

ANH NGỮ THỰC HÀNH

SỔ TAY

TIẾNG ANH KỸ THUẬT

(Phiên âm - Minh họa)

**A HANDBOOK of
ENGINEERING ENGLISH**

(With key to pronunciation - Illustrations)



NHÀ XUẤT BẢN TP. HO CHÍ MINH

TIẾNG ANH KỸ THUẬT

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*1954
Vũ Ngọc Loan Bưng*

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LỜI NÓI ĐẦU

Nhu cầu học tập và sử dụng tiếng Anh trong các ngành kỹ thuật ngày càng tăng trong những năm gần đây, để đáp ứng phần nào nhu cầu đó, chúng tôi biên soạn "Sổ Tay Tiếng Anh Kỹ Thuật". Nội dung cuốn sách gồm Phần mở đầu, Phần thuật ngữ và Phần số liệu.

- Trong Phần mở đầu chúng tôi giới thiệu lối phiên âm Quốc tế mới nhất (dựa theo pronouncing dictionary của Daniel Jones 1992) được dùng để phiên âm các thuật ngữ kỹ thuật, giới thiệu cách đọc các thuật ngữ và câu thông thường trong khoa học kỹ thuật.

- Phần các thuật ngữ được phân loại theo từng chủ đề bao quát trong ngành cơ khí, từ vẽ kỹ thuật, nguyên lý máy, ... đến các phương pháp gia công cơ khí. Mỗi thuật ngữ được trình bày bằng tiếng Việt, tiếng Anh có phiên âm kèm theo hình minh họa. Để tiện tra cứu, các thuật ngữ và các hình minh họa được đánh số thứ tự.

- Phần số liệu gồm các hình vẽ, các bảng tiêu chuẩn, các công thức tính toán phổ biến trong các ngành kỹ thuật, phần này được sắp xếp theo các mục: Nguyên lý máy, truyền động đai, xích, bánh răng, ổ lăn, các mối ghép.

Qua quyển sách này, bạn đọc không những chỉ tra cứu các thuật ngữ tiếng Anh kỹ thuật mà còn tra cứu các bảng tiêu chuẩn cần thiết về kích thước, dung sai, lắp ghép, vật liệu v.v... về mặt dữ liệu lẫn mặt thuật ngữ gốc tiếng Anh.

Biên soạn sách này chúng tôi dựa trên việc chuyển dịch có chọn lọc quyển The Concise Illustrated Russian - English Dictionary of Mechanical Engineering của Vladimir V. Shvarts (Moscow Russian

IV

Language Publishers 1980); Dữ liệu được chọn lọc từ Machinery's Handbook của Erik Öberg và F. D. Jones tái bản lần thứ 17, vốn được xem là sách gối đầu cho kỹ sư cơ khí và người làm công tác kỹ thuật.

Chúng tôi rất vui mừng và cảm kích khi nhận được những chỉ dẫn của bạn đọc xa gần, góp phần nâng cao chất lượng cho những lần tái bản.

NHÓM BIÊN SOẠN

KEY TO PHONETIC SYMBOLS

KÝ HIỆU PHÁT ÂM

Vowels and diphthongs

1. i: as in see /si:/
2. ɪ as in sit /sɪt/
3. e as in ten /ten/
4. æ as in hat /hæt/
5. ɑ: as in arm /ɑ:m/
6. ɒ as in got /gɒt/
7. ɔ: as in saw /sɔ:/
8. ʊ as in put /pʊt/
9. u: as in too /tu:/
10. ʌ as in cup /kʌp/

Nguyên âm và nguyên âm đôi

11. ɜ: as in fur /fɜ:(r)/
12. ə as in ago /ə'gəʊ/
13. eɪ as in page /peɪdʒ/
14. əʊ as in home /həʊm/
15. aɪ as in five /faɪv/
16. aʊ as in now /naʊ/
17. ɔɪ as in join /dʒɔɪn/
18. ɪə as in near /nɪə(r)/
19. eə as in hair /heə(r)/
20. ʊə as in pure /pjʊə(r)/

Consonants

1. p as in pen /pen/
2. b as in bad /bæd/
3. t as in tea /ti:/
4. d as in did /dɪd/
5. k as in cat /kæt/
6. g as in got /gɒt/
7. tʃ as in chin /tʃɪn/
8. dʒ as in June /dʒu:n/
9. f as in fall /fɔ:l/
10. v as in voice /vɔɪs/
11. θ as in thin /θɪn/
12. ð as in then /ðen/

Phụ âm

13. s as in so /səʊ/
14. z as in zoo /zu:/
15. ʃ as in she /ʃi:/
16. ʒ as in vision /'vɪʒn/
17. h as in how /haʊ/
18. m as in man /mæn/
19. n as in no /nəʊ/
20. ŋ as in sing /sɪŋ/
21. l as in leg /leg/
22. r as in red /red/
23. j as in yes /jes/
24. w as in wet /wet/

/ / dấu trọng âm

vd: about /ə'baʊt/

Sách Tham khảo

1. The Concise Illustrated

Russian - English Dictionary of Mechanical

Engineering, Moscow Russian Language Publishers.

1980.

2. Machinery's Handbook

Seventeenth Edition

The Industrial press Newyork - 1964

3. English - Vietnamese Polytechnical Dictionary

Từ điển Kỹ thuật Tổng hợp Anh - Việt

- Nhà Xuất bản Khoa học Kỹ thuật

4. Mechanical Engineering Dictionary

English - Vietnamese

Từ điển Kỹ thuật Cơ khí Anh - Việt

- Nhà Xuất bản Tổng Hợp Đồng Tháp 1994

CÁCH ĐỌC THUẬT NGỮ TOÁN HỌC
HOW TO READ THE MATHEMATICAL TERMS

SỐ ĐẼM - PHẦN SỐ - SỐ THẬP PHẦN
CARDINAL NUMBER - FRACTIONS - PERCENTAGE

PHÂN MỞ ĐẦU

CÁCH ĐỌC CÁC SỐ ĐẼM	
25 twenty - five	237 two hundred and thirty - seven
2 662 two thousand six hundred and	
HOW TO READ THE TERMS OF SCIENCE	

CÁCH ĐỌC NĂM THÁNG	
1812 eighteen twelve	1908 nineteen hundred and eight
21 January, 1952	1952
nineteen ninety - two	
CÁCH ĐỌC	

CÁC THUẬT NGỮ KHOA HỌC

CÁCH ĐỌC CÁC SỐ LỚP	
1/2 a half, one half	1/3 a third, one third
1/4 a quarter, one quarter	1/5 a fifth, one fifth
1/10 a tenth, one tenth	1/20 a (one) twenty - fifth
1/100 a (one) hundredth	1/1000 a (one) thousandth
1/1000 a (one) thousandth	

VIII

CÁCH ĐỌC THUẬT NGỮ TOÁN HỌC HOW TO READ THE MATHEMATICAL TERMS

SỐ ĐẾM - PHÂN SỐ - SỐ THẬP PHẦN CARDINAL NUMBER - FRACTIONS - PERCENTAGE

CÁCH ĐỌC CÁC SỐ ĐẾM	
25	twenty - five
237	two hundred and thirty - seven
409	four hundred and nine
2,653	two thousand six hundred and fifty - three

CÁCH ĐỌC NĂM THÁNG	
1812	eighteen twelve
1908	nineteen hundred and eight
21 January, 1992	the twenty - first of January, nineteen ninety - two

CÁCH ĐỌC CÁC SỐ LẺ	
1/2	a half, one half
1/3	a third, one third
1/4	a quarter, one quarter; a fourth, one fourth
1/5	a fifth, one fifth
1/10	a tenth, one tenth
1/25	a (one) twenty - fifth
1/100	a (one) hundredth
4/5	four - fifths

IX

CÁCH ĐỌC CÁC KÝ HIỆU SỐ HỌC

HOW TO READ THE ARITHMETIC SYMBOLS

a^2 a square hoặc a squared
 b^3 b cube hoặc b cubed
 c^4 c (raised) to the fourth (power)

f^1 f to the minus one

0.4 zero (hoặc nought) point four

$\sqrt[3]{120}$ the cube(hoặc third) root root of
 one hundred and twenty

10x8 feet ten by eight feet

$\equiv$ be congruent with; approximately equal

$\sim$ equivalent to 'Kongrat phn / hinh hup,
 tương đương; tương đương

CÁCH DIỄN TẢ CÁC PHÉP TÍNH SỐ HỌC HOẶC HOW TO EXPRESS THE ARITHMETIC CALCULATIONS

CỘNG (Addition)

Ví dụ : $3 + 5 = 8$

Three plus five equal (or equals) eight.

+ is plus sign; 3 and 5 are components; 8 is the sum.

- is minus sign; 3 is the difference.

NHÂN (Multiplication)

Ví dụ : 3×5 (hoặc 3.5) = 15

Three times five make fifteen.

Three multiplied by five is fifteen.

x or . is multiplication sign; 3 and 5 are factors;
15 is the produce.

CHIA (Division)

Ví dụ : $21 : 3 = 7$

Twenty one divided by three equals seven.

Three into twenty one goes seven times.

: is division sign; 7 is the quotient;

= is the sign of equality.

CÁCH ĐỌC CÁC SỐ LẺ THẬP PHẦN

0.2	ou/zero point two point two
0.02	ou point ou two zero point zero two point nought two point zero two
0.16	zero/nought point sixteen point one six
2.9	two point nine

CÁCH ĐỌC CÁC SỐ LŨY THỪA

Bậc lũy thừa	Ký hiệu	Tên bậc lũy thừa
10^9	G	giga
10^6	M	mega
10^3	k	kilo
10^{-1}	d	deci
10^{-3}	m	milli
10^{-6}	μ	micro
10^{-9}	n	nano
10^{-12}	p	pico

CÁCH ĐỌC CÁC CHỮ HY LẬP

Chữ hoa	Chữ thường	Tiếng Anh + Cách đọc
A	α	alpha /'alfa/; /ælfə/
B	β	beta /'beta/; /bitə/
Γ	γ	gamma /'gama/; /gæmə/
Δ	δ	delta /'delta/
E	ϵ	epsilon /'epsilən/; /ɛpsaɪlən/
Z	ζ	zeta /'zeta/; /zita/
H	η	eta /'eta/; /ita/
Θ	θ	theta /'θita/; /θeita/

CÁCH ĐỌC THUẬT NGỮ VẬT LÝ
HOW TO READ THE PHYSICAL TERMS

CÁCH ĐỌC CÁC KÝ HIỆU CHỈ CÁC ĐẠI LƯỢNG
VẬT LÝ
HOW TO READ THE SYMBOLS OF PHYSICAL
QUANTITIES

l	length	chiều dài
m	mass	khối lượng
t	time	thời gian
S	area	diện tích
V	volume	thể tích
v	velocity	vận tốc
a	acceleration	gia tốc
ρ	density	tỉ trọng, mật độ
f	force	lực
m	moment	mômen
p	pressure	áp suất
w	work	công
P	power	công suất
σ	stress	ứng suất
V	electric potential	điện thế
I	electric current	dòng điện
R	electric resistance	điện trở
t	temperature	nhiệt độ
Q	heat	nhiệt lượng
c	specific heat	nhiệt dung riêng

XIII

CÁCH ĐỌC CÁC KÝ HIỆU CHỈ ĐƠN VỊ CỦA CÁC ĐẠI LƯỢNG VẬT LÝ *HOW TO READ THE SYMBOLS OF PHYSICAL UNITS*

ft	foot	lb	pound
ft²	square foot	s	second
ft³	cubic foot	gal	gallon
lbf	pound force	rad	radian
hp	horse-power	A	ampere
m	metre	g	gramme
m²	square metre	kg	kilogramme
m³	cubic metre	min	minute
l	litre	N	newton
w	watt	V	volt
Ω	ohm	C	coulomb
kcal	kilocalorie		
kgf	kilogramme force		
°F	Fahrenheit temperature		
°C	Celsius temperature		
Btu	British thermal unit		

CÁCH ĐỌC CÁC ĐƠN VỊ ĐO LƯỜNG *HOW TO READ THE UNITS OF MEASUREMENT*

ĐO CHIỀU DÀI (<i>Linear Measures</i>)		
inch	in.	2.54 cm
foot	ft (12 in.)	30.48 cm
yard	yd (3 ft)	91.44 cm
mile	mi. (1760 yd)	1609.33 m
nautical mile (knot)	naut. mi. (6080 ft)	1853.18 m

XIV

ĐO TRỌNG LƯỢNG (Measures of Weights)		
drachm	dr	1.77 g
ounce	oz (16 dr.)	28.35 g
pound	lb (16 oz)	453.59 g
stone	st (14 lb.)	6.35 kg
quarter	qr (28 lb.)	12.7 kg
hundredweight	hwt (112 lb.)	50.8 kg
ton	t (20 hwt)	1016.048 kg

ĐO DUNG TÍCH (Measures of Volumes)		
gill		0.14 l
pint	pt (4 gills)	0.57 l
quart	qt (2 pt)	1.14 l
gallon	gal. (4 qt)	4.55 l
bushel	bsh. (8 gal.)	36.37 l
quarter	qr (8 bsh.)	290.94 l

ĐO DIỆN TÍCH (Square Measures)		
square inch	sq. in.	6.45 cm ²
square foot	sq. ft. (144 sq. in.)	9.29 dm ²
square yard	sq. yd. (9 sq. ft.)	0.836 m ²
acre	ac. (4840 sq. yd.)	0.4 hectare
square mile	sq. mi. (640 ac.)	2.59 km ²

ĐO THỂ TÍCH (Cubic Measures)		
cubic inch	c. in	16.39 cm ³
cubic foot	c. ft (1728 c. in)	28.32 dm ³
cubic yard	c. yd (27 c. ft.)	764.53 dm ³
register ton	reg. t. (100 c. ft.)	2.83 m ³

TRƯỜNG ĐẠI HỌC

PHẦN I

THE TERMS OF ENGINEERING

CÁC THUẬT NGỮ KỸ THUẬT

(1781-1987/6848)

TOÁN HỌC

MATHEMATICS

3 $\overset{5}{\overbrace{a+b}} = \overset{6}{c}$

15 $c : a = \overset{17}{b}$

7 $c - a = \overset{9}{b}$

18 $\begin{array}{ccc} 6 & 12 & 42 \\ & 6 & \end{array}$

$(6=6:1=12:2=42:7)$

10 $\overset{12}{\overbrace{a \cdot b}} = \overset{13}{c}$

19 $a : b = \frac{a}{b}$

14 $\begin{array}{ccc} 21 & 28 & 12 \\ & 84 & \end{array}$

20 $a : b = c : d$

$(84=28 \cdot 3=21 \cdot 4=12 \cdot 7)$

TOÁN HỌC ✓

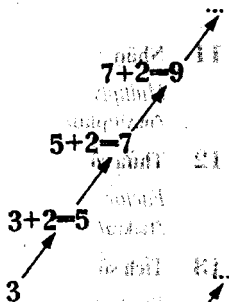
MATHEMATICS

- | | |
|---|--|
| <p>1 Số
<i>Number</i>
/ˈnʌmbə/</p> <p>2 Chữ số
<i>Digit</i>
/ˈdɪdʒɪt/</p> <p>3 Phép cộng
<i>Addition</i>
/əˈdɪʃn/</p> <p>4 Cộng
<i>Add</i>
/æd/</p> <p>5 Số cộng
<i>Addend(um)</i>
/əˈdend(ə)m/</p> <p>6 Tổng
<i>Sum</i>
/sʌm/</p> <p>7 Phép trừ
<i>Subtraction</i>
/səbˈtrækʃn/</p> <p>8 Trừ
<i>Subtract</i>
/səbˈtrækt/</p> <p>9 Hiệu số
<i>Difference</i>
/ˈdɪfrəns/</p> <p>10 Phép nhân
<i>Multiplication</i>
/ˌmʌltɪplɪˈkeɪʃn/</p> | <p>11 Nhân
<i>Multiply</i>
/ˈmʌltɪplaɪ/</p> <p>12 Thừa số
<i>Factor</i>
/ˈfæktə/</p> <p>13 Tích số
<i>Product</i>
/ˈprɒdʌkt/</p> <p>14 Bội số chung nhỏ nhất
<i>The least common multiple</i>
/ðə liːst ˈkɒmən ˈmʌltɪpl/</p> <p>15 Phép chia
<i>Division</i>
/dɪˈvɪʒn/</p> <p>16 Chia
<i>Divide</i>
/dɪˈvaɪd/</p> <p>17 Thương số
<i>Quotient</i>
/ˈkwɒʃnt/</p> <p>18 Ước số chung lớn nhất
<i>The greatest common divisor</i>
/ðə ˈɡreɪtɪst ˈkɒmən dɪˈvaɪzə/</p> <p>19 Tỷ số
<i>Ratio</i>
/ˈreɪʃiə/</p> <p>20 Tỷ lệ
<i>Proportion</i>
/prəˈpɔːʃn/</p> |
|---|--|

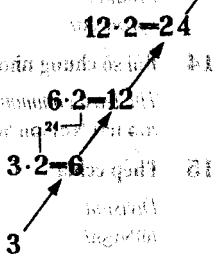
DẠY VÀO

21 $1\% = 0,01$

22

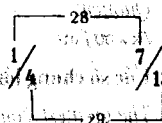


23



26 $0,05; \frac{1}{4}; 0,78; \frac{7}{13}$

27



30

$0,05; 0,78$

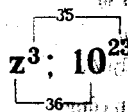
31

$1; 2; 3; 5; 7; 11; 13;$

$17; 23; 29; 31; 37 \dots$

33 $-730; -73; -0,73$

34



37 $2^3 = 2 \cdot 2 \cdot 2 = 8$

$\log_b a$

38 $\lg a \quad (b=10)$

$\ln a \quad (b=2,71828)$

$\log_a a^3 = 3$

40 $\lg 100 = 2$

$\ln e^k = k$

42 $\lg 100 = 2$

21. Phần trăm

Percentage

/pə'sentɪdʒ/

22. Cấp số cộng

Arithmetical progression

/ˌæriθ'metɪkl 'prɒ'greʃn/

23. Cấp số nhân

Geometrical progression

/dʒi:ə'metɪkl prə'greʃn/

24. Công bội

Ratio of the progression

/reɪʃɪʊ əv ðə prə'greʃn/

25. Số nguyên

Whole-number

/həʊl 'nʌmbə/

26. Phân số, số thập phân

Fraction

/ˈfrækʃn/

27. Phân số tối giản

Common fraction

/ˈkɒmən ˈfrækʃn/

28. Tử số

Numerator

/nju:mə'reɪtə/

29. Mẫu số

Denominator

/dɪ'nɒmɪneɪtə/

30. Số thập phân

Decimal fraction

/desɪml ˈfrækʃn/

31. Số nguyên tố

Prime number

/praɪm 'nʌmbə/

32. Số dương

Positive number

/ˈpɒzətɪv 'nʌmbə/

33. Số âm

Negative number

/ˌnegətɪv 'nʌmbə/

34. Lũy thừa

Power

/paʊə/

35. Số mũ

Exponent

/ˈeksˌpəʊnənt/

36. Cơ số

Base

/beɪs/

37. Khai triển lũy thừa

Raising to a power

/reɪzɪŋ tu ə 'paʊə/

38. Lôgarit

Logarithm

/ˈlɒɡərɪðəm/

39. Cơ số Lôgarit

Base of logarithm

/beɪs əv ˈlɒɡərɪðəm/

40. Sự lấy Lôgarit

Taking the logarithm

/teɪkɪŋ ðə ˈlɒɡərɪðəm/

41. Lấy Lôgarit

Take the logarithm

/teɪk ðə ˈlɒɡərɪðəm/

42. Lôgarit thập phân

Common logarithm

/ˈkɒmən ˈlɒɡərɪðəm/

$$43 \quad \ln e^k = k$$

$$56 \quad ax^2 + bx + c = 0$$

$$44 \quad \log_b x = a$$

$$x = b^a$$

$$\lg x = 2$$

$$x = 100$$

$$\ln x = 3$$

$$x = e^3$$

57

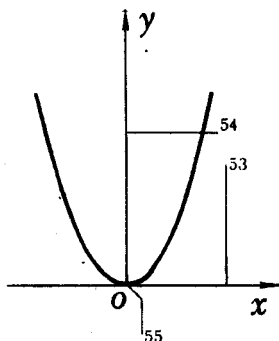
⁵⁰ $\sin \alpha$	⁵⁰ $\cos \alpha$	⁵⁰ $\operatorname{tg} \alpha$	⁵¹ $\operatorname{ctg} \alpha$	⁵² $\sec \alpha$	⁵³ $\operatorname{cosec} \alpha$
--------------------------------	--------------------------------	---	--	--------------------------------	--

57

$$47 \quad \sqrt[46]{36} = 6; \sqrt[46]{27} = 3$$

$$64 \quad dt; ds$$

51



43 Lôgarit tự nhiên
Natural logarithm
/nætʃrəl 'lɒɡərɪðəm/

44 Sự khử lôgarit
*Finding of an
anti-logarithm*
/'faɪndɪŋ əv ən
ˌæntɪ'lɒɡərɪðəm/

45 Khử lôgarit
Find an antilogarithm
/faɪnd ən ˌæntɪ'lɒɡərɪðəm/

46 Căn thức
Root
/ru:t/

47 Sự khai căn
Extracting of root
/ɪk'stræktɪŋ əv ru:t/

48 Khai căn
Extract root
/ɪk'strækt ru:t/

49 Hàm số
Function
/'fʌŋkʃn/

50 Hệ số
Coefficient
/ˌkɔːfɪ'sɪjənt/

51 Đồ thị hàm số
Diagram of function
/'daɪəɡræm əv 'fʌŋkʃn/

52 Trục tọa độ
Coordinate axis
/kəʊ'ɔːdnət 'æksɪs/

53 Trục hoành
Abscissa axis
/æb'sɪsə 'æksɪs/

54 Trục tung
Axis of ordinates
/'æksɪs əv ɔːdnəts/

55 Góc tọa độ
Origin of coordinates
/'ɒrɪdʒɪn əv kəʊ'ɔːdnəts/

56 Phương trình
Equation
/ɪ'kwetʃn/

57 Phương trình lượng giác
Trigonometric function
/ˌtrɪɡənə'metrik 'fʌŋkʃn/

58 Sin
Sine
/saɪn/

59 Cos
Cosine
/'kɔːsaɪn/

60 Tang
Tangent
/'ændʒənt/

61 Co tang
Cotangent
/ˌkɔːtændʒənt/

62 Secant
Secant
/'sekənt/

63 Côsecan
Cosecant
/ˌkɔː'sekənt/

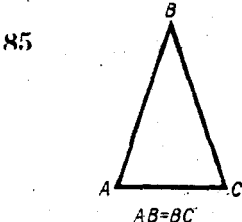
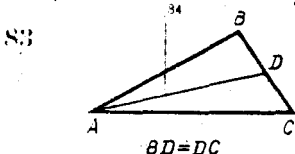
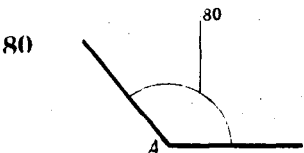
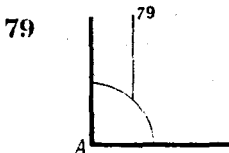
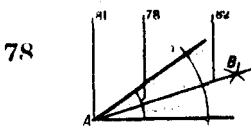
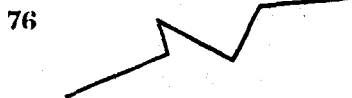
64 Vi phân
Differential
/ˌdɪfərən'siəl/

65 $\frac{ds}{dt}$

66 $\frac{d}{dt}(x^3) = 3x^2$

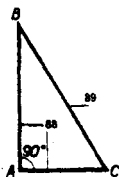
68 $\int v dt$

69 $\int (ax^2 + bx) dx =$
 $= \frac{ax^3}{3} + \frac{bx^2}{2} + c$

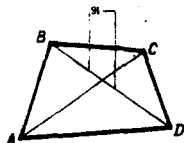


- | | |
|---|--|
| <p>65 Đạo hàm
<i>Derivative</i>
/di'rɪvətɪv/</p> <p>66 Sự lấy đạo hàm
<i>Differentiation</i>
/ˌdɪfərən'fɪ'eɪʃn/</p> <p>67 Lấy đạo hàm
<i>Differentiate</i>
/ˌdɪfə'ren'fɪeɪt/</p> <p>68 Tích phân
<i>Integral</i>
/ɪn'tɪgrəl/</p> <p>69 Sự lấy tích phân
<i>Integration</i>
/ɪn'tɪ'greɪʃn/</p> <p>70 Lấy tích phân
<i>Integrate</i>
/ɪn'tɪgreɪt/</p> <p>71 Điểm
<i>Point</i>
/pɔɪnt/</p> <p>72 Đường
<i>Line</i>
/laɪn/</p> <p>73 Đường thẳng
<i>Straight line</i>
/ˈstreɪt laɪn/</p> <p>74 Đường song song
<i>Parallel line</i>
/ˈpærəlel laɪn/</p> <p>75 Đường vuông góc
<i>Perpendicular line</i>
/ˌpɜ:pən'dɪkjʊlə laɪn/</p> | <p>76 Đường gấp khúc
<i>Broken line</i>
/brʊkən laɪn/</p> <p>77 Góc
<i>Angle</i>
/æŋɡl/</p> <p>78 Góc nhọn
<i>Acute angle</i>
/ə'kjʊt 'æŋɡl/</p> <p>79 Góc vuông
<i>Right angle</i>
/raɪt 'æŋɡl/</p> <p>80 Góc tù
<i>Obtuse angle</i>
/əb'tju:s 'æŋɡl/</p> <p>81 Góc đỉnh
<i>Vertex of angle</i>
/ˈvɜ:tɪks əv 'æŋɡl/</p> <p>82 Đường phân giác
<i>Bisectrix</i>
/baɪ'sektrɪks/</p> <p>83 Tam giác
<i>Triangle</i>
/ˈtraʊəŋɡl/</p> <p>84 Đường trung tuyến
<i>Median</i>
/ˌmɪdʒən/</p> <p>85 Tam giác cân
<i>Isosceles triangle</i>
/aɪ'sɒslɪz 'traʊəŋɡl/</p> <p>86 Tam giác đều
<i>Equilateral triangle</i>
/ɪ'kwɪlə'tərəl 'traʊəŋɡl/</p> |
|---|--|

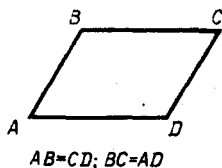
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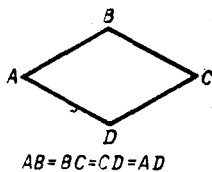
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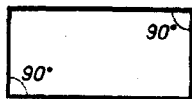
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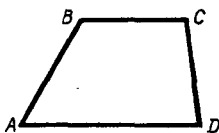
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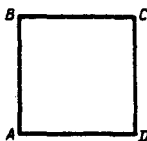
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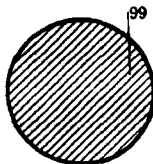
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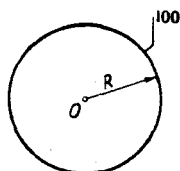
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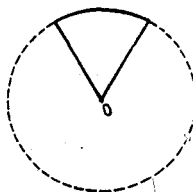
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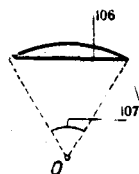
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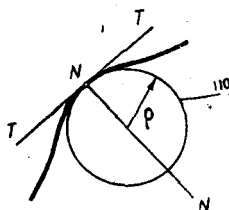
104



105



108



87 Tam giác vuông

Rectangular triangle
/rek'tæŋgju:lə 'traɪæŋgl/

88 Cạnh góc vuông

Cathetus
/'kæθɪtəs/

89 Cạnh huyền

Hypotenuse
/haɪ'pɒtənju:z/

90 Tứ giác

Tetragon
/'tetrəɡɒn/

91 Đường chéo

Diagonal
/daɪ'reɡɒnl/

92 Hình bình hành

Parallelogram
/ˌpærə'leɪlɒɡræm/

93 Hình thoi

Rhombus
/'rɒmbəs/

94 Hình chữ nhật

Rectangle
/'rek.tæŋgl/

95 Hình thang

Trapezoid
/'træpɪzɔɪd/

96 Hình vuông

Square
/'skweɪ/

98 Đường cong

Curved line, curve
/'kɜ:v d laɪn .kɜ:v/

99 Hình tròn

Circle
/'sɜ:kl/

100 Đường tròn

Circle
/'sɜ:kl/

101 Tâm đường tròn

Centre
/'sentə/

102 Bán kính

Radius
/'reɪdɪəs/

103 Đường kính

Diameter
/'daɪ'reɪmɪtə/

104 Cung

Circular sector, sector
/'sɜ:klju:lə 'sektə 'sektə/

105 Cung bị chặn

Circular segment, segment
/'sɜ:klju:lə 'seg'ment.
seg'ment/

106 Dây cung

Chord
/'kɔ:d/

107 Góc tâm

Centre angle
/'sentə æŋgl/

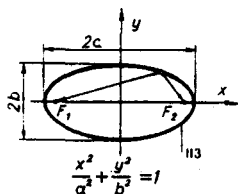
108 Tiếp tuyến

Tangent
/'tæŋdʒənt/

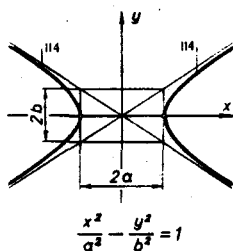
109 Pháp tuyến

Normal
/'nɔ:ml/

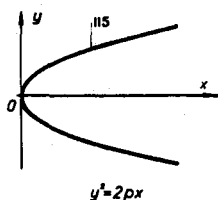
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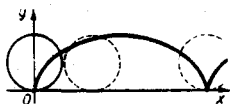
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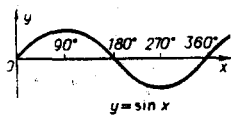
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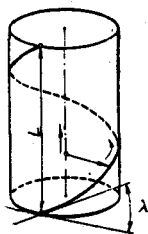
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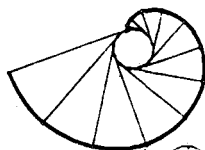
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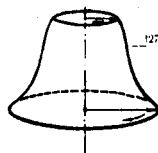
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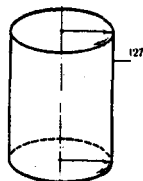
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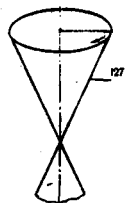
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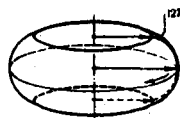
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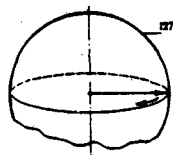
129



130



131



110 Đường cong tròn

Circle of curvature

/sə:kl əv 'kɜ:vətʃə/

111 Độ cong

Curvature

/kɜ:vətʃə/

112 Bán kính cong

Radius of curvature

/reɪdɪəs əv 'kɜ:vətʃə/

113 Hình elíp

Ellipse

/ˈɪlɪps/

114 Đường hypechôn

Hyperbola

/haɪ'pe:bələ/

115 Đường parabol

Parabola

/pə're:bələ/

116 Đường xicloit

Cycloid

/saɪkloɪd/

117 Đường sinuxoit

Sine curve

/saɪn kɜ:v/

118 Đường xoắn

Helix

/hɪlɪks/

119 Góc xoắn

Helix angle

/hɪlɪks 'æŋɡl/

120 Hướng xoắn

Helix lead

/hɪlɪks led/

121 Đường thân khai

Involute

/ɪnvəlut/

122 Đường bao

Envelope

/envə'leɪp/

123 Diện tích

Area

/eə'eɪtʃ/

124 Bề mặt

Surface

/sɜ:fɪs/

125 Mặt phẳng

Plane

/pleɪn/

126 Mặt tròn xoay

Surface by revolution

/sɜ:fɪs əv ,revə'lju:ʃn/

127 Đường sinh

Generatrix

/dʒenə'reɪtɪks/

128 Mặt trụ

Cylindrical surface

/sɪ'lɪndrɪkl 'sɜ:fɪs/

129 Mặt côn

Conical surface

/kə'nɪkl 'sɜ:fɪs/

130 Mặt tôrôit

Toroidal surface

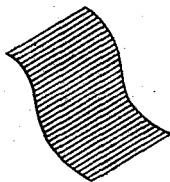
/tə'rɔɪdl 'sɜ:fɪs/

131 Mặt cầu

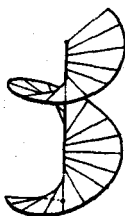
Spherical surface

/s'fɛrɪkl 'sɜ:fɪs/

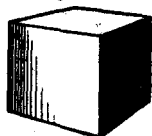
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133



135



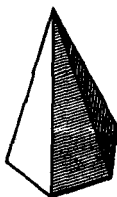
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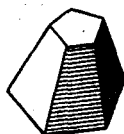
137



138



139



140



141



144



145



146



132 Mặt kẻ

Ruled surface

/ruːld 'sɜːfɪs/

133 Mặt xoắn ốc

Helical surface

/həˈlɪkəl 'sɜːfɪs/

134 Vật thể, khối

Body

/bɒdi/

135 Khối lập phương

Cube

/kjuːb/

136 Lăng trụ

Prism

/ˈprɪzəm/

137 Khối đa diện

Polyhedron

/ˌpɒliˈhiːdrən/

138 Hình chóp

Pyramid

/ˈpɪrəˌmɪd/

139 Hình chóp cụt

Frustum of a pyramid

/ˈfrʌstəm əv ə ˈpɪrəˌmɪd/

140 Hình trụ

Cylinder

/ˈsɪlɪndə/

141 Hình nón

Cone

/kɒn/

142 Đỉnh hình nón

Vertex of a cone

/ˈvɜːteks əv ə kɒn/

143 Góc ở đỉnh

Cone angle

/kɒn ˈæŋɡl/

144 Hình nón cụt

Frustum of a cone

/ˈfrʌstəm əv ə kɒn/

145 Hình cầu

Sphere

/sfɪə/

146 Hình xuyến

Torus

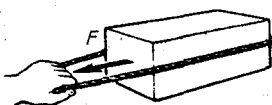
/ˈtɒrəs/

147 Thể tích

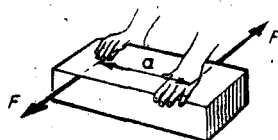
Volume

/ˈvɒljəm/

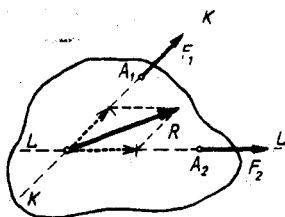
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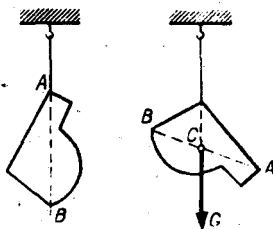
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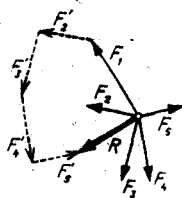
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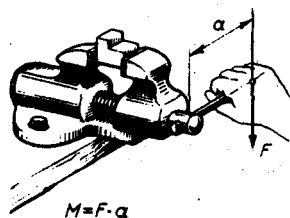
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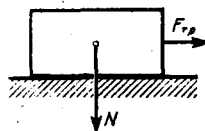
156



157



165



VẬT LÝ

PHYSICS

CƠ HỌC

MECHANICS

148 Lực, ứng lực

Force

/fɔ:s/

149 Hợp lực

Composition of forces

/ˌkɒmpəzɪʃn əv fɔ:s/

150 Hình bình hành lực

Parallelogram of forces

/ˌpærəˈlɒɡræm əv fɔ:s/

151 Lực thành phần

Component force

/kəmˈpɒnənt fɔ:s/

152 Điểm đặt của lực

Point of application of the

force

/pɔɪnt əv ˌæplɪˈkeɪʃn əv ðə fɔ:s/

153 Hướng tác dụng lực

Line of action of the force

/laɪn əv ˈækʃn əv ðə fɔ:s/

154 Lực tổng hợp

Resultant

/rɪˈzʌltənt/

155 Phép phân tích lực

Force resolution

/fɔ:s ˌrezəˈlu:ʃn/

156 Đa giác lực

Polygon of forces

/pɒˈlɪɡɒn əv fɔ:s/

157 Moment lực

Moment of a force

/məʊmənt əv ə fɔ:s/

158 Cánh tay đòn

Arm of the couple

/ɑ:m əv ðə fɔ:s/

159 Ngẫu lực

Couple

/ˈkʌpl/

160 Cánh tay đòn của ngẫu lực

Arm of the couple

/ɑ:m əv ðə ˈkʌpl/

161 Trọng tâm

Centre of gravity

/ˈsentə əv ˈɡrævəti/

162 Trọng lượng

Weight

/weɪt/

163 Trọng lượng riêng

Specific gravity

/spəˈsɪfɪk ˈɡrævəti/

164 Ma sát

Friction

/ˈfrɪkʃn/

165 Ma sát trượt

Sliding friction

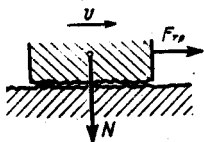
/ˈslaɪdɪŋ ˈfrɪkʃn/

166 Lực ma sát

Force of friction

/fɔ:s əv ˈfrɪkʃn/

171



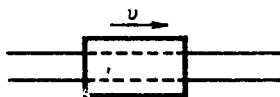
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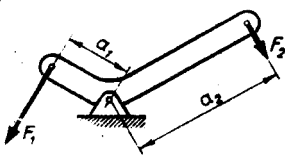
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185



174



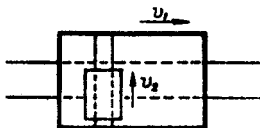
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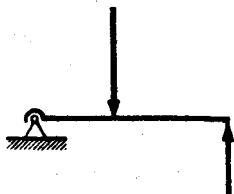
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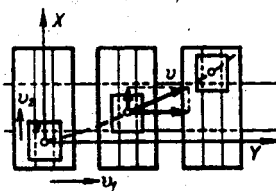
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177



188



167 Lực pháp tuyến*Normal force*

/nɔːml fɔːs/

168 Hệ số ma sát*Coefficient of friction*

/kəʊ'fɪʃnt əv 'frɪkʃn/

169 Ma sát khô*Dry friction*

/draɪ 'frɪkʃn/

170 Ma sát tĩnh*Static friction*

/stætɪk 'frɪkʃn/

171 Ma sát nhớt, ma sát ướt*Fluid friction*

/flʊɪd 'frɪkʃn/

172 Ma sát nửa khô*Semi-dry friction, boundary**friction*

/ˌsemi'draɪ 'frɪkʃn.

baʊndəri 'frɪkʃn/

173 Ma sát lăn*Rolling friction*

/rɔːlɪŋ 'frɪkʃn/

174 Đòn bẩy*Lever*

/liːvə/

175 Nguyên lý đòn bẩy*Rule of lever*

/ruːl əv liːvə/

176 Đòn bẩy loại một*Lever of the first kind*

/liːvə əv ðə fɜːst kaɪnd/

177 Đòn bẩy loại hai*Lever of the second kind*

/liːvə əv ðə 'sekənd kaɪnd/

178 Sự chuyển động*Motion*

/məʊʃn/

179 Tự chuyển động*Move*

/muːv/

180 Chuyển động*Move (d)*

/muːv(d)/

181 Tốc độ*Velocity; speed*

/vɪ'ləsəti spiːd/

182 Quỹ đạo; đường đạn*Path; trajectory*

/pɑːθ trə'dʒektəri/

183 Khoảng cách, độ dịch chuyển*Distance; displacement*

/dɪ'stəns dɪs'pleɪsmənt/

184 Thời gian*Time*

/taɪm/

185 Chuyển động thẳng*Rectilinear motion*

/ˌrektɪ'lɪniːə 'məʊʃn/

186 Chuyển động cong*Curvilinear motion*

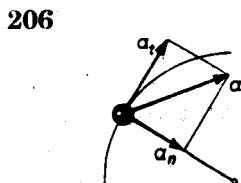
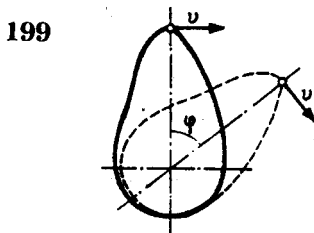
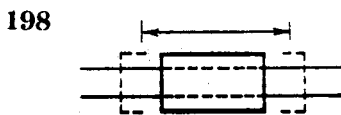
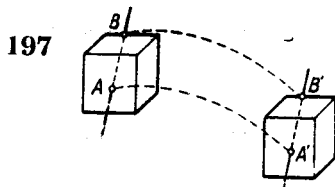
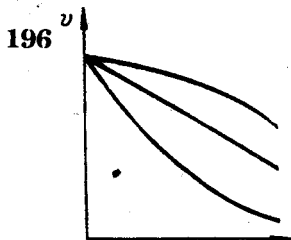
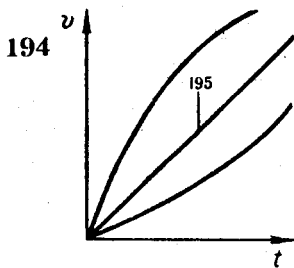
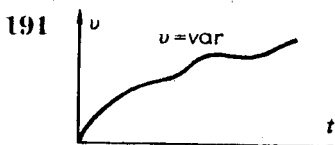
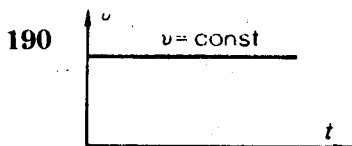
/ˌkɜːvɪ'lɪniːə 'məʊʃn/

187 Chuyển động phức hợp*Compound motion*

/ˌkɒmpaʊnd 'məʊʃn/

188 Chuyển động tuyệt đối*Absolute motion*

/ˌæbsə'lʊt 'məʊʃn/



189 Chuyển động tương đối*Relative motion*

/rɪlə'tɪv 'mʊʃn/

190 Chuyển động đều*Uniform motion*

/jʊnɪ'fɔ:m 'mʊʃn/

191 Chuyển động không đều*Non-uniform motion*

/ˌnɒn'jʊnɪ'fɔ:m 'mʊʃn/

192 Gia tốc*Acceleration*

/əkˌsɛlə'reɪʃn/

193 Gia tốc trọng trường*Acceleration of gravity*

/əkˌsɛlə'reɪʃn əv 'grævəti/

194 Chuyển động nhanh dần

(có gia tốc)

Accelerated motion

/əkˌsɛlə'reɪtɪd 'mʊʃn/

195 Chuyển động nhanh dần

đều

Uniformly accelerated motion

/jʊnɪ'fɔ:mli əkˌsɛlə'reɪtɪd

'mʊʃn/

196 Chuyển động chậm dần*Retarded motion*

/rɪ'tɔ:dɪd 'mʊʃn/

197 Chuyển động tịnh tiến*Motion of translation*

/mʊʃn əv træn'sleɪʃn/

198 Chuyển động tịnh tiến

qua lại

Reciprocating motion

/rɪ'sɪprəkeɪtɪŋ 'mʊʃn/

199 Chuyển động quay*Rotary motion, rotation*

/rɔ:təri 'mʊʃn rɔʊ'teɪʃn/

200 Tự quay*Rotate*

/rɔʊ'teɪ/

201 Quay*Rotate (t)*

/rɔʊ'teɪ(tɪ)/

202 Vận tốc quỹ đạo tròn, vận tốc dài*Circumferential velocity*

/sɜːkəm'fɛrənʃl vɪ'losəti/

203 Độ dịch chuyển góc*Angular displacement*

/æŋ'ɡjʊlə dɪ'spleɪsmənt/

204 Vận tốc góc*Angular velocity*

/æŋ'ɡjʊlə rɪ'losəti/

205 Tần số quay*Rotational frequency*

/rɔʊ'teɪʃnl 'frɪkwənsi/

206 Gia tốc tiếp tuyến*Tangential acceleration*

/tæŋ'tɛŋʃl əkˌsɛlə'reɪʃn/

207 Gia tốc pháp tuyến*Normal acceleration*

/nɔ:ml əkˌsɛlə'reɪʃn/

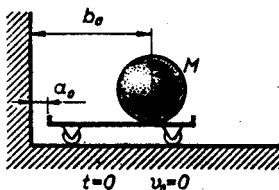
208 Gia tốc toàn phần*Total acceleration*

/tɔ:tl əkˌsɛlə'reɪʃn/

209 Gia tốc góc*Angular acceleration*

/æŋ'ɡjʊlə əkˌsɛlə'reɪʃn/

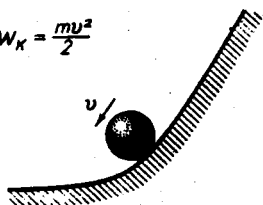
212



224

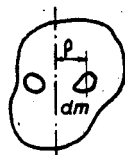
$W_K = 40 \quad (\text{J})$

$W_K = \frac{mv^2}{2}$

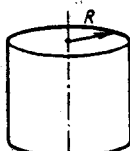


225

$I = 2,5 \quad (\text{kg} \cdot \text{m}^2)$

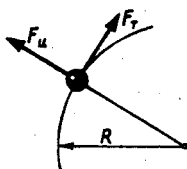


$I = \int \rho^2 dm$

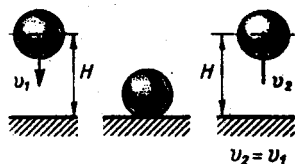


$I = \frac{1}{2} mR^2$

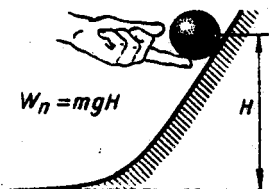
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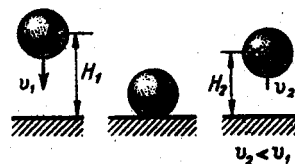
229



223



230



210 Khối lượng*Mass*

/mæ:s/

211 Khối lượng riêng*Density*

/densə'ti:/

212 Quán tính*Inertia*

/i'nɜ:ʃə/

213 Lực quán tính*Force of inertia*

/fɔ:s əv i'nɜ:ʃə/

214 Lực ly tâm*Centrifugal force*

/sen'trifʊgl fɔ:s/

215 Lực tiếp tuyến*Tangential force*

/tæn'dʒenʃl fɔ:s/

216 Mômen xoắn, mômen*quay**Torque*

/tɔ:k/

217 Công, cơ năng*Work, mechanical work*

/wɜ:k/, /mɪ'kænikəl wɜ:k/

218 Công hiệu dụng*Effective work*

/i'fektɪv wɜ:k/

219 Công tiêu hao*Expended work*

/ɪk'spendɪd wɜ:k/

220 Hiệu suất*Efficiency*

/i'fɪʃənsi/

221 Công suất*Power*

/paʊə/

222 Năng lượng*Energy*

/enədʒi/

223 Thế năng*Potential energy*

/pə'tenʃl 'enədʒi/

224 Động năng*Kinetic energy*

/kɪ'netɪk 'enədʒi/

225 Mômen quán tính*Moment of inertia*

/mɒmənt əv i'nɜ:ʃə/

226 Bán kính quán tính*Radius of gyration*

/reɪdɪəs əv ɔ:ʒə'reɪʃn/

hà: chín
ang tìn**227 Động lượng, xung***Momentum*

/mɒməntəm/

228 Sự va đập, va chạm*Impact*

/ɪm'pækt/

229 Sự va chạm đàn hồi*Elastic impact*

/i'læstɪk ɪm'pækt/

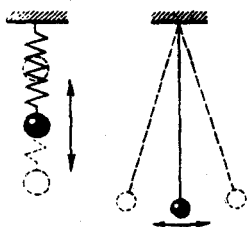
230 Va chạm không đàn hồi*Inelastic impact*

/ɪni'læstɪk ɪm'pækt/

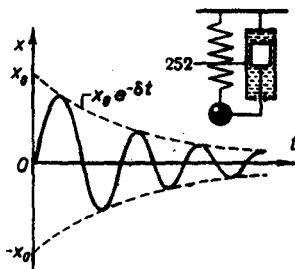
231 Sự dội lại, nảy, bật lại*Recoil*

/ri'kɔɪl/

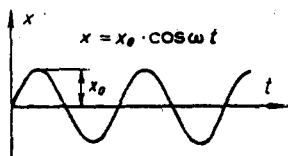
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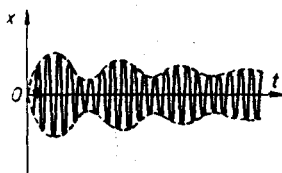
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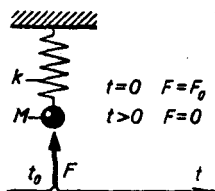
238



253



244



232 Dội lại, bật lại

Recoil
/rɪˈkɔɪl/

233 Hệ số trở lại (dạng ban đầu)

Coefficient of resitution
/ˌkəʊˈtʃɪfənt əv ˌresɪˈtjuːʃn/

234 Sự dao động

Oscillation
/ˌɒsɪˈleɪʃn/

235 Dao động

Oscillate
/ˌɒsɪˈleɪt/

236 Sự rung động

Vibration
/vaɪˈbreɪʃn/

237 Rung động

Vibrate
/vaɪˈbreɪt/

238 Dao động điều hòa

Harmonic oscillation
/hɑːˈmɒnɪk ˌɒsɪˈleɪʃn/

239 Biên độ

Amplitude
/ˌæmplɪˈtjuːd/

240 Pha dao động

Phase of oscillation
/feɪz əv ˌɒsɪˈleɪʃn/

241 Tần số vòng, tần số góc

Circular frequency
/ˈsɜːkjʊlə ˈfrikwənsi/

242 Tần số dao động

Frequency of oscillation
/ˈfrikwəsi əv ˌɒsɪˈleɪʃn/

243 Chu kỳ dao động

Period of oscillation
/ˈperiəd əv ˌɒsɪˈleɪʃn/

244 Dao động tự do

Free oscillation
/friː ˌɒsɪˈleɪʃn/

245 Tần số tự nhiên

Natural frequency
/ˈnætʃrəl ˈfrikwənsi/

246 Độ cứng lò xo

Spring stiffness
/ˈsprɪŋ ˈstɪfnəs/

247 Dao động tắt dần

Damped oscillation
/dæmt ˌɒsɪˈleɪʃn/

248 Sự tắt dần

Damping
/ˈdæmpɪŋ/

249 Tắt dần

Damp
/dæmp/

250 Hệ số tắt dần

Coefficient of damping
/ˌkəʊˈtʃɪfənt əv ˈdæmpɪŋ/

251 Độ suy giảm tắt dần

Damping decrement
/ˈdæmpɪŋ ˈdekrɪmənt/

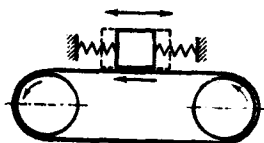
252 Bộ giảm chấn

Vibration damper
/vaɪˈbreɪʃn ˈdæmpə/

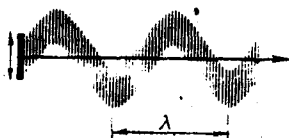
253 Dao động cưỡng bức

Forced oscillation
/fɔːst ˌɒsɪˈleɪʃn/

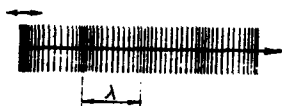
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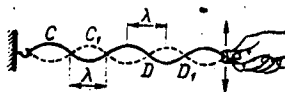
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262

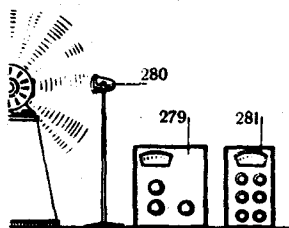


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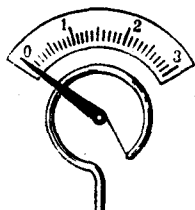


254 Lực kích thích*Exciting force**/ɪk'saɪtɪŋ fɔːs/***255 Sự cộng hưởng***Resonance**/ˈrezənəns/***256 Cộng hưởng***Resonate**/ˈrezən.eɪt/***257 Dao động tự kích thích***Self-excited oscillation**/ˌself ɪk'saɪtɪd ˌɒsɪleɪʃn/***ÂM HỌC****ACOUSTICS****258 Âm thanh***Sound**/saʊnd/***259 Tiếng ồn***Noise**/nɔɪs/***260 Sóng***Wave**/weɪv/***261 Sóng dọc***Longitudinal wave**/ˌlɒŋdʒɪˈtʃʊdɪnl weɪv/***262 Bước sóng***Wavelength**/ˈweɪvlɛŋθ/***263 Sóng ngang***Transverse wave**/ˈtrænzvɜːs weɪv/***264 Sóng đứng***Stationary wave**/ˈsteɪʃnəri weɪv/***265 Nút dao động***Node**/nɒd/***266 Bụng sóng***Antinode**/æntɪˈnɒd/***267 Mặt đầu sóng***Wave front**/weɪv frʌnt/***268 Tốc độ truyền sóng***Velocity of propagation of**a wave**/vɪˈləsɪti ɔv ˌpropəˈgeɪʃn**ɔv ə weɪv/***269 Dòng năng lượng âm***thanh**Flow of sound energy**/fləʊ ɔv saʊnd ˈenɜːdʒi/***270 Cường độ âm thanh***Sound intensity**/saʊnd ɪnˈtensity/***271 Áp suất âm thanh***Sound pressure**ˈsaʊnd ˈpreʃə/***272 Âm hưởng***Loudness**/ˈlaʊndns/***273 Âm sắc***Pitch of tone**/pɪtʃ ɔv təʊn/*

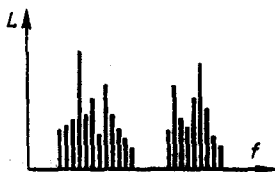
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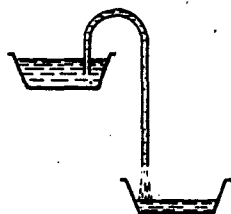
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282

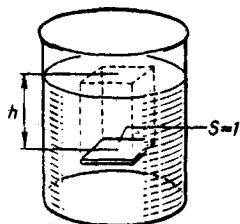


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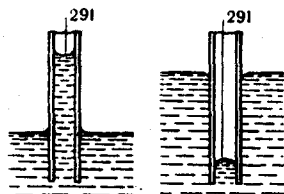


286

$$p = \rho gh$$



290



274 Cao độ âm thanh

Timbre, tone quality
/tɛmbɾə tɔn 'kwɔlɪti/

275 Ngưỡng nghe được

Threshold of audibility
/θrɛʃ'həʊld əv ɔ:di'bɪləti/

276 Mức cường độ âm thanh

Sound intensity level
/saʊnd ɪn'tensɪ'ti 'levl/

277 Mức áp suất âm thanh

Sound pressure level
/saʊnd 'preʃə 'levl/

278 Mức âm lượng

Loudness level
/laʊdnɪs 'levl/

279 Đồng hồ đo mức âm thanh

Sound-level meter
/saʊnd 'levl 'mɪtɜ:/

280 Micro

Microphone
/maɪkrə'fəʊn/

281 Phân tích tần số

Frequency analyzer
/frɪ'kwɔnsɪ/

282 Phổ nhiễu âm

Noise spectrum
/nɔɪz 'spektrəm/

283 Siêu âm

Ultrasonics
/ʌltrə'sɒnɪks/

CƠ HỌC CHẤT LỎNG

HYDROMECHANICS

284 Chất lỏng

Liquid
/'lɪkwɪd/

285 Áp suất

Pressure
/'preʃə/

286 Áp suất thủy tĩnh

Hydrostatic pressure
/haɪdrə'stætɪk 'preʃə/

287 Áp kế

Pressure gage, manometer
/'preʃə ɡeɪdʒ mənə'mɪtɜ:/

288 Ống xi phông

Siphone
/'saɪfɪn/

289 Sức căng bề mặt

Surface tension
/'sɜ:fɪs 'tenʃn/

290 Ống mao dẫn

Capillary tube
/kə'pɪləri tjʊb/

291 Mặt khum

Meniscus
/'mɪnɪs-kəs/

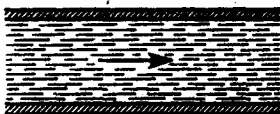
292 Dòng ra

Outflow
/aʊt'fləʊ/

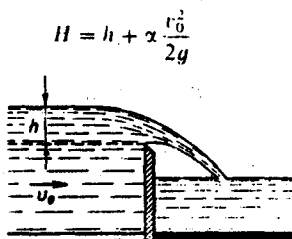
293 Dòng chảy

Flow
/fləʊ/

294



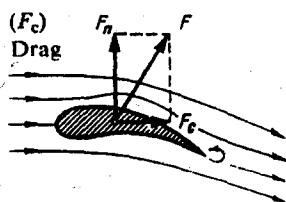
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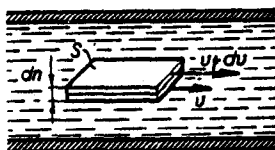
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307

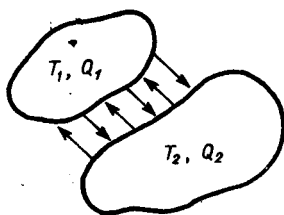


299

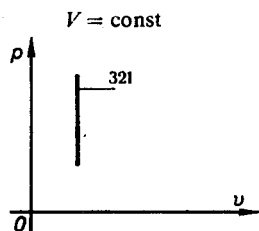


294 Dòng chảy tầng*Laminar flow, streamline**flow**/læmɪnə fliʊ 'striːmlaɪn**fliʊ/***295 Dòng chảy rối***Turbulent flow**/tɜːbjʊlənt fliʊ/***296 Chỉ số Reynold***Reynolds' number**/reɪldz 'nʌmbə/***297 Độ nhớt***Viscosity**/vɪ'skɒsəti/***298 Lực ma sát nhớt***Force of viscous friction**/fɔːs əv 'vɪskəs 'frɪkʃn/***299 Gradient tốc độ dòng***Flow velocity gradient**/fliʊ vi'tɒləsəti 'greɪdɪənt/***300 Hệ số động lực của độ****nhớt***Dynamic coefficient of**viscosity**/daɪ'næmɪk ,kəʊ'i'fɪʃnt əv**vi'skɒsəti/***301 Độ nhớt động***Kinematic viscosity**/kɪnɪ'mætɪk vi'skɒsəti/***302 Đầu phun***Head**/hed/***303 Đầu động lực***Kinetic head**/kɪ'netɪk hed/***304 Tồn hao áp suất***Pressure loss**/preʃə lɒs/***305 Trở lực dòng chảy***Hydraulic resistance**/haɪ'drɒlɪk rɪ'zɪstəns/***306 Hệ số trở lực***Resistance coefficient**/rɪ'zɪstəns ,kəʊ'i'fɪʃnt/***307 Vật cản dòng***Drag**/dræg/***308 Lực nâng***Lift force**/lɪft fɔːs/***NHIỆT ĐỘNG LỰC HỌC****THERMODYNAMICS****309 Nhiệt độ***Temperature**/temprətʃə/***310 Nhiệt kế***Thermometer**/θə'mɒmɪtə/***311 Nhiệt năng***Heat**/hi:t/***312 Nhiệt dung***Thermal capacity**/θɜːml kə'pæsəti/***313 Nhiệt dung riêng***Specific heat**/spə'sɪfɪk hi:t/*

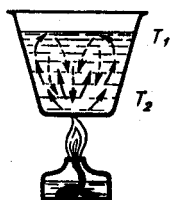
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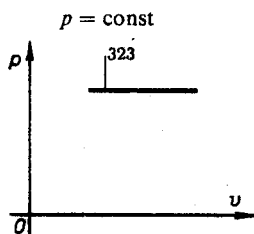
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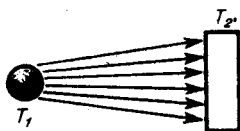
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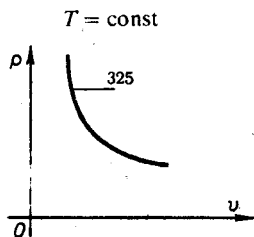
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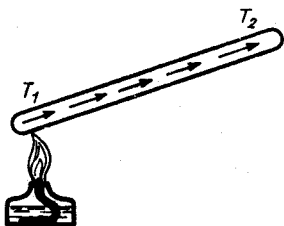
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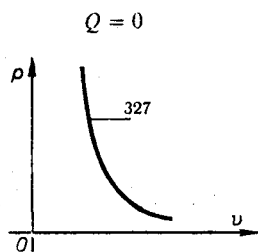
324



317



326



314 Truyền nhiệt, trao đổi nhiệt

Heat transmission, heat exchange

/hít trɛnz'mi:f n, hít tks'ʃ'eɪndʒ/

315 Đối lưu nhiệt

Convection of heat

/kən'vekʃ n əv hít/

316 Bức xạ

Radiation

/ˌreɪdɪ'eɪʃ n/

317 Dẫn nhiệt

Conduction of heat

/kən'dʌkʃ n əv hít/

318 Độ dẫn nhiệt

Thermal conductivity

/θɜ:ml ,kɒndʌk'tɪvətɪ/

319 Quá trình nhiệt động lực

Thermodynamic process

/θɜ:mədau 'næmɪk prə'ses/

320 Quá trình đẳng tích

Isovolumic process

/aɪsə'vɒljʊmɪk prə'ses/

321 Đẳng tích

Isochore

/aɪsə'kɔ:/

322 Quá trình đẳng áp

Constant-pressure process

/kɒnstənt 'preʃə prə'ses/

323 Đường đẳng áp

Isobaric line

/ˌaɪsə'bæɪtɪk 'laɪn/

324 Quá trình đẳng nhiệt

Isothermal process

/ˌaɪsə'θɜ:ml prə'ses/

325 Đường đẳng nhiệt

Isothermal line

/ˌaɪsə'θɜ:ml laɪn/

326 Quá trình đoạn nhiệt

Adiabatic process

/ˌɒdɪə'bætɪk prə'ses/

327 Đường đoạn nhiệt

Adiabatic line

/ˌɒdɪə'bætɪk laɪn/

328 Entropi

Entropy

/ən'trɒpi/

329 Sự hoá hơi

Evaporation: vaporization

/ˌvæpə'reɪʃ n

ˌveɪpəraɪ'zeɪʃ n/

330 Sự sôi

Boiling

/ˈbɔɪlɪŋ/

331 Sôi

Boiling

/ˈbɔɪl/

332 Điểm sôi

Boiling point

/ˈbɔɪlɪŋ poɪnt/

333 Ẩn nhiệt hoá hơi

Latent heat of vaporization

/ˌlænt hɪt əv

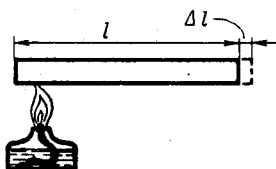
ˌveɪpəraɪ'zeɪʃ n/

334 Hơi

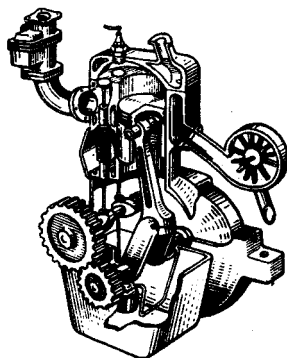
Vapour

/ˌveɪpə/

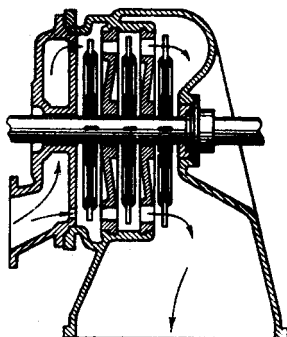
347



353



354



335 Hơi bão hoà

Saturated vapour
/ˈætsʌərəntd ˈveɪpə/

336 Sự ngưng tụ

Condensation
/ˌkɒndənˈseɪʃn/

337 Độ ẩm

Humidity
/hjuˈmɪdətɪ/

338 Độ ẩm không khí

Atmospheric humidity
/ˌætməˈfɛrɪk hjuˈmɪdətɪ/

339 Điểm sương

Dew point
/djuˈpɔɪnt/

340 Khí hoá lỏng

Liquefaction of gas
/ˌlikwɪˈfɛkʃn əv ɡæs/

341 Sự kết tinh

Crystallization
/ˌkrɪstəlaɪˈzeɪʃn/

342 Sự nóng chảy

Fusion, melting
/ˈfjuːʒn, ˈmeltɪŋ/

343 Tự nóng chảy

Melt
/melt/

344 Nóng chảy

Melt (d)
/melt(d)/

345 Điểm nóng chảy

Melting point
/ˈmeltɪŋ pɔɪnt/

346 Ẩn nhiệt nóng chảy

Latent heat of melting
/ˈleɪtənt hi:t əv ˈmeltɪŋ/

347 Biến dạng nhiệt

Thermal deformation
/θɜːml ˌdiːfɔːˈmeɪʃn/

348 Hệ số dẫn nở tuyến tính

Coefficient of linear expansion
/ˌkɔʊˈfɪʃnt əv ˈliːniə ɪkˈspənʃn/

349 Hệ số dẫn nở thể tích

Coefficient of cubical expansion
/ˌkɔʊˈfɪʃnt əv ˈkjuːbɪk ɪkˈspənʃn/

350 Nhiên liệu

Fuel

351 Nhiệt đốt cháy

Combustion heat
/kəmˈbʌʃən hi:t/

352 Sự cách nhiệt

Heat insulation
/hi:t ˌɪnsjʊˈleɪʃn/

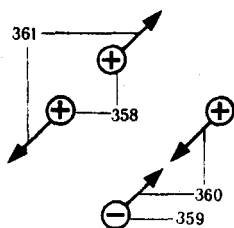
353 Động cơ đốt trong

Internal Combustion engine
/ˌɪntəˌnl kəmˈbʌʃən ˈendʒɪŋ/

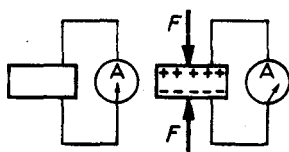
354 Tuabin

Turbine
/ˈtʊbaɪn/

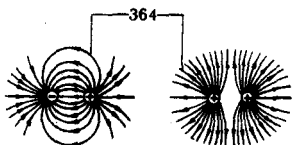
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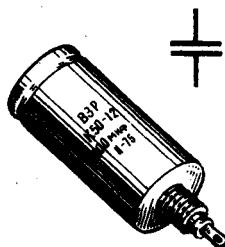
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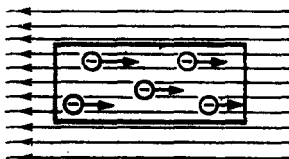
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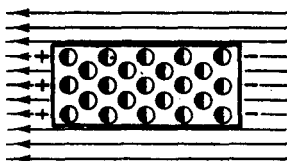
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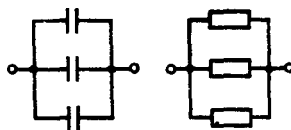
366



367



373



ĐIỆN VÀ TỪ ELECTRICITY AND MAGNETISM

355 Điện học

Electricity
/ɪˈlekˈtrɪsəti/

356 Điện tích

Electric charge
/ɪˈlekˌtrɪk tʃɑːdʒ/

357 Điện lượng

Quantity of electricity
/kwɒntəti əv ɪˈlekˈtrɪsəti/

358 Điện tích dương

Positive charge
/pəʒəˌtɪv tʃɑː/

359 Điện tích âm

Negative charge
/negəˌtɪv tʃɑːdʒ/

360 Lực hút

Attractive force
/əˈtræktɪv fɔːs/

361 Lực đẩy

Repulsive force
/rɪˈpʌlsɪv fɔːs/

362 Hằng số điện môi

Dielectric constant
/ˌdaɪˈlekˌtrɪk ˈkɒnstənt/

363 Trường tĩnh điện

Electrostatic field
/ɪˌlekˌtrəʊˈstætɪk fiːld/

364 Đường sức của điện

trường
Line of electric force
/laɪn əv ɪˈlekˌtrɪk fɔːs/

365 Cường độ điện trường

Electric field strength
/ɪˈlekˌtrɪk fiːld streŋθ/

366 Vật dẫn điện

Conductor
/kənˈdʌktə/

367 Điện môi, cách điện

Dielectric
/ˌdaɪˈlekˌtrɪk/

368 Điện thế

Electric potential
/ɪˈlekˌtrɪk pəʊˈtenʃl/

369 Chênh lệch điện thế

Difference of potential
/dɪfərəns əv pəʊˈtenʃl/

370 Hiệu ứng áp điện

Piezoelectric effect
/ˌpiːzəʊˈlekˌtrɪk ɪˈfekt/

371 Điện dung

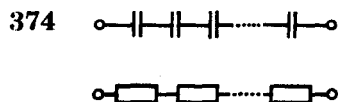
Electrical capacity,
capacitance
/ɪˈlekˌtrɪkl kəˈpæsəti
kəˈpæsətəns/

372 Tủ điện

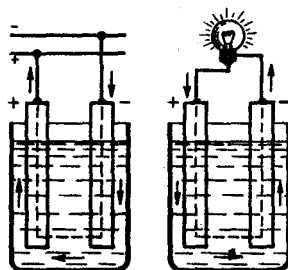
Condenser, capacitor
/kənˈdensə kəˈpəsətə/

373 Mắc song song

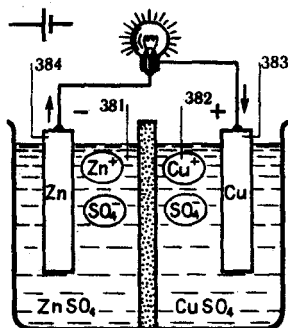
Parallel connection
/pəˈræləl kəˈnekʃn/



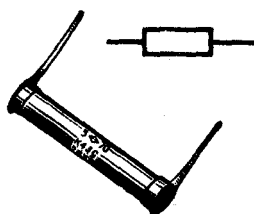
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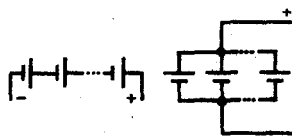
380



390



385



374 Mạch nối tiếp*Series connection*

/sɪəriːz kə'netʃn/

375 Dòng điện*Electric current*

/ɪ'lektrɪk 'kʌrənt/

376 Cường độ dòng điện*Current strength, current*

/kʌrənt streŋθ 'kʌrənt/

377 Mật độ dòng điện*Current density*

/kʌrənt 'densəti/

378 Mạch điện*Electric circuit*

/ɪ'lektrɪks ˈsɪkt/

379 Nguồn điện*Source of electric power*

/sɔ:s əv ɪ'lektrɪk 'paʊə/

380 Pin điện hoá*Electrochemical cell, cell*

/ɪ.lektrəʊ'kemɪkl sel, sel/

381 Dung dịch điện phân*Electrolyte*

/ɪ'lektrəʊlaɪt/

382 Ion*Ion*

/aɪən/

383 Dương cực, anôt*Anode*

/ˈænəʊd/

384 Âm cực, catôt*Cathode*

/ˈkæθəʊd/

385 Pin, acqui*Battery*

/ˈbætəri/

386 Acquì*Storage cell, accumulator*

/ˈstɔ:tɪdʒ sel.əkju:mjʊlətə/

387 Lực điện động*Electromotive force, e.m.f*

/ɪ.lektrəʊ'məʊtɪv fɔ:s i: em ef/

388 Điện áp*Voltage*

/ˈvɔ:ltɪdʒ/

389 Điện trở*Resistance*

/rɪ'zɪstəns/

390 Điện trở (lĩnh kiện)*Resistor*

/rɪ'zɪstə/

391 Điện trở suất*Specific resistance,**resistivity*

/spə'sɪfɪk rɪ'zɪstəns

rɪ'zɪstɪvɪti/

392 Độ dẫn điện*Conductance*

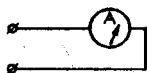
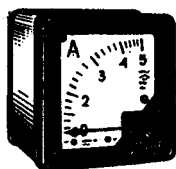
/kən'dʌktəns/

393 Độ dẫn điện riêng*Specific conductance,**conductivity*

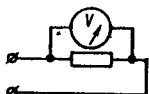
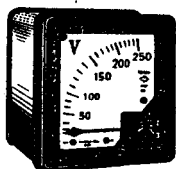
/spə'sɪfɪk kən'dʌktəns

kən'dʌktɪvɪti/

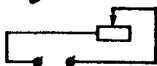
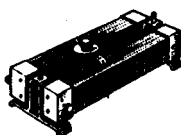
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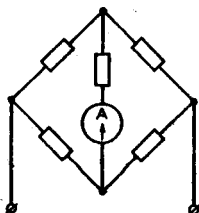
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397



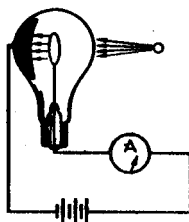
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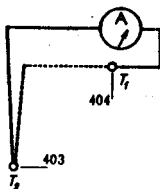
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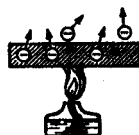
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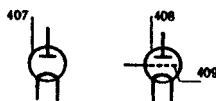
402



405



406



410

6	8			
B	C			
14	15	16		
Si	P	S		
32	33	34		
Ge	As	Se		
50	51	52	53	
Sn	Sb	Te	I	

394 Ampe kế*Ammeter***395 Vôn kế***Voltmeter*

/vɔlt.mi:tə/

396 Điện trở kế, ôm kế*Ohmmeter*

/ɔm.mi:tə/

397 Biến trở*Rheostat*

/ri:ʊstæt/

398 Cầu*Electric bridge*

/ɪ'lektrik bri:dʒ/

399 Hiệu ứng quang điện*Photoelectric effect*

/fəʊtəʊ'lektrik i'fekt/

400 Tế bào quang điện*Photocell*

/fəʊtəsəl/

401 Hiệu ứng nhiệt điện*Thermoelectric effect*

/θɜ:məʊ'lektrik i'fekt/

402 Cặp nhiệt điện, nhiệt**ngẫu***Thermocouple*

/θɜ:mə'kʌpl/

403 Đầu nối nóng*Hot junction*

/hɒt 'dʒʌŋkʃn/

404 Đầu nối nguội*Cold junction*

/kəʊld 'dʒʌŋkʃn/

405 Bức xạ ion nhiệt*Thermionic emission*

/tɜ:məʊ'ɒnɪk i'mɪʃn/

406 Đèn điện tử*Electronic tube*

/ɪlek'trɒnɪk tjʊb/

407 Diode, điôt*Diode value*

/daɪəʊd vɛlv/

408 Triot*Triode value*

/traɪəʊd vɛlv/

409 Lưới biến điệu*Modulation grid*

/mɒdju'leɪʃn grɪd/

410 Chất bán dẫn*Semiconductor*

/sɛmɪkən'dʌktə/

411 Bán dẫn kiểu n*Electronic conduction, n-**type conduction*

/ɪlek'trɒnɪk kən'dʌkʃn .ən

təp kən'dʌkʃn/

412 Bán dẫn kiểu p*Hole conduction, p-type**conduction*

/həʊl kən'dʌkʃn pi:təp

kən'dʌkʃn/

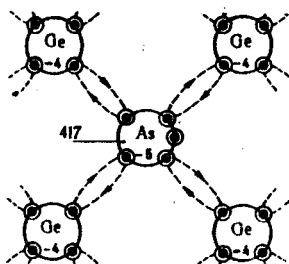
413 Lỗ*Electron hole, hole*

/ɪ'lektrɒn həʊl həʊl/

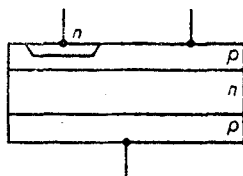
414 Dẫn bằng tạp chất*Impurity*

/ɪm'pjʊərɪ kən'dʌkʃn/

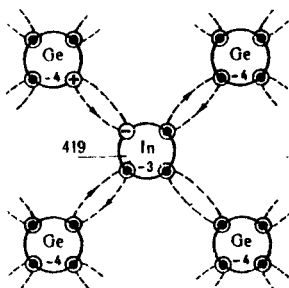
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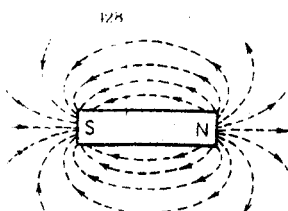
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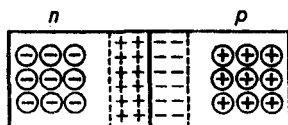
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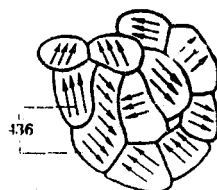
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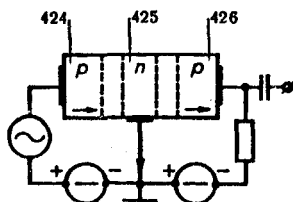
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435

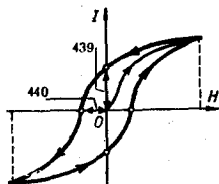


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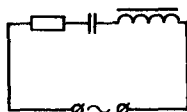


- 415** Tập chất trung tâm
Impurity centre
/ɪm'pjʊərɪti 'sentə/
- 416** Chất bán dẫn kiểu n
Electronic conductor, n-type conductor
/ɪlek'trɒnɪk kən'dʌktə ,en tʌi kən'ʌktə/
- 417** Chất cho
Donor
/'dɒnə/
- 418** Chất bán dẫn kiểu p
Extrinsic semiconductor
/ɪk'strɪnstɪk ,semi'kən'dʌktə ,pɪstʌp ,remɪnɪt kən'dʌktə/
- 419** Chất nhận
Acceptor
/ək'septə/
- 420** Mặt tiếp giáp p-n
p-n junction
/pi:n 'dʒʌŋkʃn/
- 421** Lớp chắn
Barrier layer
/'bɪəriə 'leɪə/
- 422** Linh kiện bán dẫn
Semiconductor device
/ ,semi kən'dʌktə di'vaɪs/
- 423** Tranzitor
Transistor
/træn'zɪstə/
- 424** Cực phát
Emitter
/ɪ'mɪtə/
- 425** Cực gốc
Base
/beɪs/
- 426** Cực góp
Collector
/kə'lektə/
- 427** Tiristo
Thyristor
/'θaɪrɪstə/
- 428** Nam châm
Magnet
/'mæɡnɪt/
- 429** Từ trường
Magnetic field
/mæɡ'netɪk fi:ld/
- 430** Cảm ứng từ
Magnetic induction
/mæɡ'netɪk ɪn'dʌkʃn/
- 431** Từ thông
Magnetic flux
/mæɡ'netɪk flʌks/
- 432** Độ từ thẩm
Magnetic permeability
/mæɡ'netɪk pɜ:mjə'bɪləti/
- 433** Chất thuận từ
Paramagnetic substance
/pærə'mæɡ, netɪk 'sʌbstəns/
- 434** Chất nghịch từ
Diamagnetic substance
/ ,daɪə'mæɡ'netɪk 'sʌbstəns/
- 435** Chất sắt từ
Ferromagnetic substance
/'ferɒ'mæɡ, netɪk 'sʌbstəns/

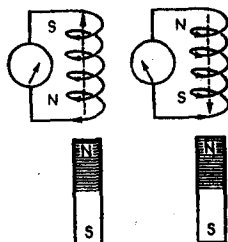
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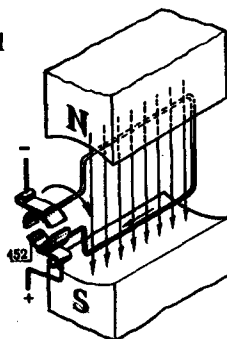
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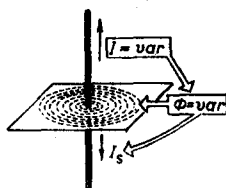
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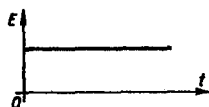
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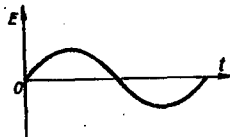
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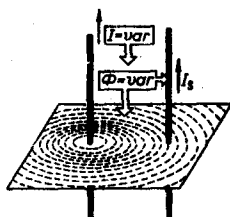
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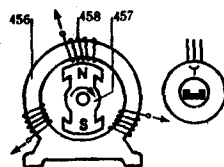
454



445



455



436 Đồ men từ

Doman

/dɔʊ'meɪn/

437 Sự từ hoá

Magnetization

/ˌmæɡnɪtɪ'zeɪʃn/

438 Vòng từ trễ

Hysteresis loop

/hɪ'sterəsɪs lʊp/

439 Sự từ hoá dư

Residual magnetization

/rɪ'zɪdjʊəl ˌmæɡnɪtɪ'zeɪʃn/

440 Lực kháng

Coercive force

/kɔʊ'ɜːsɪv fɔːs/

441 Cảm ứng điện từ

Electromagnetic induction

/ˌlektɹəmæɡ'netɪk

ɪn'dʌkʃn/

442 Trường điện từ

Electromagnetic field

/ˌlektɹəmæɡ'netɪk fiːld/

443 Tự cảm ứng

Self induction

/self ɪn'dʌkʃn/

444 Độ tự cảm

Self inductance

/self ɪn'dʌktəns/

445 Hồ cảm, cảm ứng tương

hồ

Mutual induction

/ˌmjuːʃnəl ɪn'dʌkʃn/

446 Mạch dao động

Oscillatory circuit

/ɒsɪlətɔːri 'sɜːkɪt/

447 Trở kháng

Reactance

/rɪ'æktəns/

448 Cảm kháng

Inductive reactance

/ɪn'dʌktɪv rɪ'æktəns/

449 Dung kháng

Capacitance

/kə'pæsɪtəns/

450 Tổng trở kháng

Impedance

/ɪm'piːdəns/

451 Máy phát điện

Electric machine generator

/ɪ'lektrɪk mə'ʃɪn

'dʒenərətə/

452 Cỗ góp, cực góp

Collector

/kə'lektə/

453 Dòng điện một chiều

Direct current

/dɪ'rekt 'kærənt/

454 Dòng điện xoay chiều

Alternating current

/ɔːltəneɪtɪŋ 'kærənt/

455 Máy phát điện ba pha

Three-phase generator

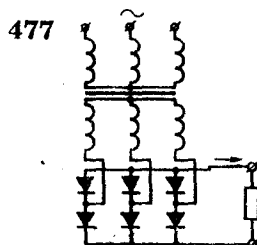
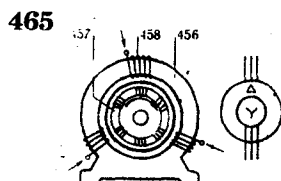
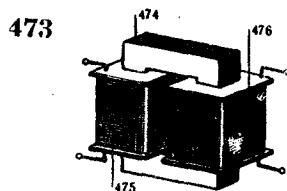
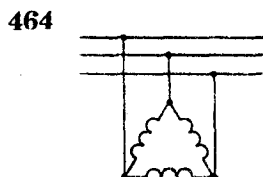
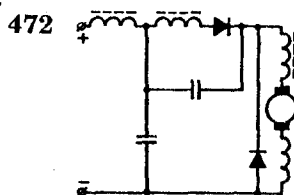
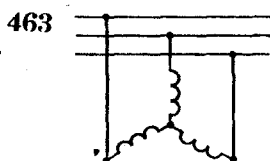
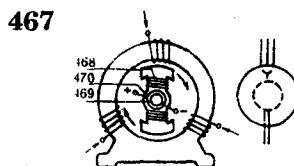
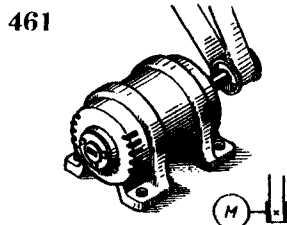
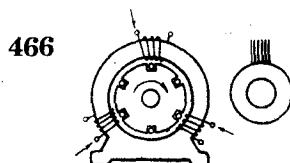
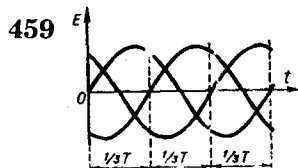
/θriː feɪz 'dʒenərətə/

456 Stato (phần tĩnh)

Stator

/'steɪtə/

my: tu x



457 Rôto (phần quay)*Rotor*

/rəʊtə/

458 Sự quấn dây*Winding*

/ˈwaɪndɪŋ/

459 Dòng điện ba pha*Three-phase current*

/θriː feɪz ˈkærənt/

460 Máy phát điện một chiều*Direct-current generator*

/diˈrekt ˈkærənt ˈdʒenəreɪtə/

461 Động cơ điện*Electric motor*

/ɪˈlektɹɪk ˈmɔ:tə/

462 Động cơ điện xoay chiều*Alternating current motor*

/ɔːltnənɪŋ ˈkærənt ˈmɔ:tə/

463 Mắc hình sao*Star connection*

/stɑː kəˈnekʃn/

464 Mắc tam giác*Delta connection*

/delta kəˈnekʃn/

465 Động cơ cảm ứng*Induction motor*

/ɪnˈdʌkʃn ˈmɔ:tə/

466 Động cơ lồng sóc*Squirrel-cage motor*

/ˈskwɪrəl keɪdʒ ˈmɔ:tə/

467 Động cơ đồng bộ*Synchronous motor*

/ˈsɪŋkrənəs ˈmɔ:tə/

468 Cuộn dây từ trường*Field winding*

/fi:ld ˈwaɪndɪŋ/

469 Vòng trượt*Slip ring*

/slɪp rɪŋ/

470 Chổi tiếp xúc*Contact brush*

/ˈkɒntækt brʌʃ/

471 Động cơ - Máy phát*Motor-generator set*

/ˈmɔ:tə ˈdʒenəreɪtə sɛt/

472 Động cơ biến đổi Tiristor*Thyristor converter-motor**set*

/θaɪrɪstə kɒnˈvɜːtə ˈmɔ:tə

*set/***473 Biến áp***Electric transformer*

/ɪˈlektɹɪk ˈtrænzfɔːmə/

474 Mạch từ*Magnetic circuit*

/mæɡˈnetɪk ˈsɜːkt/

475 Cuộn sơ cấp*Primary winding*

/ˈpraɪməɪ ˈwaɪndɪŋ/

476 Cuộn thứ cấp*Secondary winding*

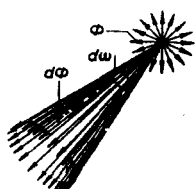
/ˈsekəndəri ˈwaɪndɪŋ/

477 Bộ chỉnh lưu*Rectifier*

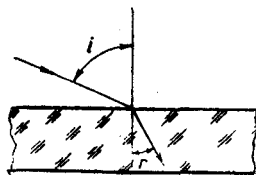
/ˈrektaɪfə/

481

$$\Phi = 2 \text{ лм (lm)}$$



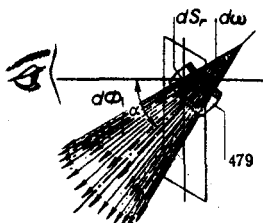
489



483

$$M = \frac{d\Phi}{dS_r}$$

$$M = 1 \text{ лм/м}^2 \text{ (lm/m}^2\text{)}$$



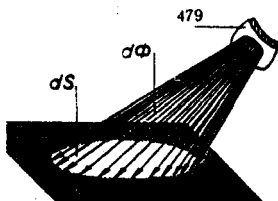
492



485

$$E = \frac{d\Phi}{dS}$$

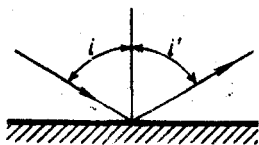
$$E = 10 \text{ лк (lx)}$$



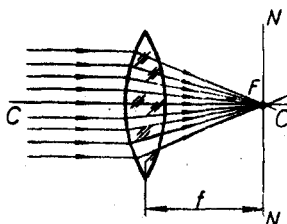
493



486



494



QUANG HỌC OPTICS

478 Ánh sáng

Light
/laɪt/

479 Nguồn sáng

Light source
/laɪt sɔ:s/

480 Tia

Ray
/reɪ/

481 Quang thông

Luminous flux
/lʊmɪnəs flʌks/

482 Cường độ sáng

Luminous intensity
/lʊmɪnəs ɪn'tensəti/

483 Độ trưng

Luminosity
/lʊmɪ'nɒsəti/

484 Độ sáng bề mặt

Luminance
/lʊmɪnəns/

485 Độ rọi

Illumination
/ɪ'lʊmɪneɪʃn/

486 Phản xạ tia sáng

Reflection of light
/rɪ'flekʃn əv laɪt/

487 Góc tới

Angle of incidence
/æŋɡl əv ɪn'sɪdəns/

488 Góc phản xạ

Angle of reflection
/æŋɡl əv rɪ'flekʃn/

489 Khúc xạ ánh sáng

Refraction of light
/rɪ'frækʃn əv laɪt/

490 Góc khúc xạ

Angle of refraction
/æŋɡl əv rɪ'frækʃn/

491 Chiết suất

Index of refraction
/ɪndeks əv rɪ'frækʃn/

492 Giao thoa

Interference of light
/ɪntə'fɪərəns əv laɪt/

493 Vân giao thoa

Interference fringes
/ɪntə'fɪərəns frɪndʒɪz/

494 Thấu kính

Lens
/lenz/

495 Trục quang học

Optical axis
/ɒptɪkl 'æksɪs/

496 Tiêu điểm

Focus
/fəʊkəs/

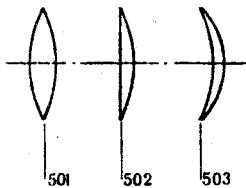
497 Mặt phẳng tiêu cự

Focal plane
/fəʊkl pleɪn/

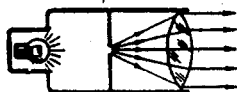
498 Tiêu cự

Focal length
/fəʊkl lɛŋθ/

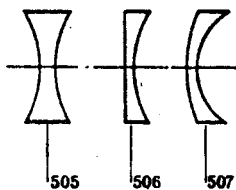
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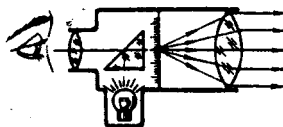
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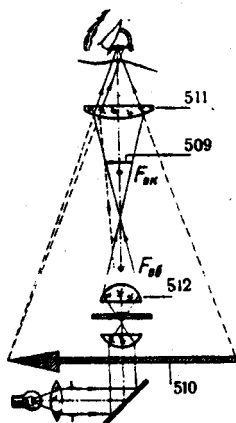
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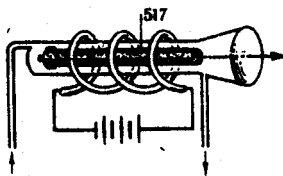
515



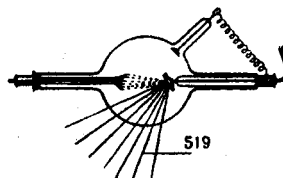
508



516



518



499 Độ hội tụ

Power of a lens

/paʊə əv ə lenz/

500 Thấu kính hội tụ

Converging lens

/kən'vɜ:ðɪŋ lenz/

501 Thấu kính lồi

Biconvex lens

/ˌbaɪkən'veks lenz/

502 Thấu kính phẳng lồi

Plano-convex lens

/plænəʊ kon'veks lenz/

503 Thấu kính lõm lồi

Concavo-convex lens

/kənkeɪvəʊ kon'veks lenz/

504 Thấu kính phân kỳ

Diverging lens

/daɪ'vɜ:ðɪŋ lenz/

505 Thấu kính lõm

Biconcave lens

/ˌbaɪkənkeɪv lenz/

506 Thấu kính phẳng-lõm

Plano-concave lens

/plænəʊ 'kənkeɪv lenz/

507 Thấu kính lồi-lõm

Convexo-concave lens

/kənveksəʊ 'kənkeɪv lenz/

508 Kính hiển vi

Microscope

/ˈmaɪkrəskəʊp/

509 Ảnh thực

Real image

/rɪəl 'ɪmɪdʒ/

510 Ảnh ảo

Virtual image

/ˈvɜ:tʃʊəl 'ɪmɪdʒ/

511 Thị kính

Eyepiece

/ˈaɪpi:s/

512 Vật kính

Objective

/əb'dʒektɪv/

513 Độ phóng đại

Magnification

/ˌmæɡnɪfɪ'keɪʃn/

514 Ống chuẩn trực

Collimator

/ˈkɒlɪmeɪtə/

515 Ống chuẩn trực tự động

Autocollimator

/ˈɔ:təʊˌkɒlɪmeɪtə/

516 Laze

Laser

/ˈleɪzə/

517 Môi trường hoạt động

Active medium

/ˈæktɪv 'mɪdiəm/

518 Ống tia-X

X-ray tube

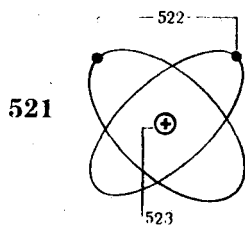
/ˌeks'reɪ tʃʊb/

519 Tia-X

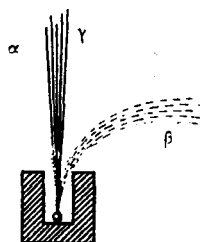
X-ray

/ˌeks'reɪ/

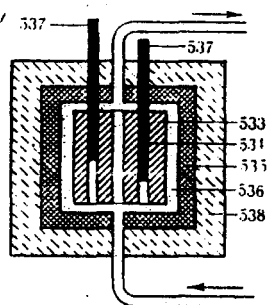
vɜ: + tʃʊəl



526



532



VẬT LÝ HẠT NHÂN

NUCLEAR PHYSICS

520 Phân tử

Molecule
/mə'likju:l/

521 Nguyên tử

Atom
/ætəm/

522 Điện tử

Electron
/i'lektron/

523 Nhân nguyên tử

Atomic nucleus
/ə'tɒm/

524 Proton

Proton
/prəʊtɒn/

525 Nơtron

Neutron
/nju'trɒn/

526 Sự phóng xạ

Radioactivity
/ˌreɪdɪəʊ'æktɪv/

527 Hạt - α

Alpha-particle
/ælfə 'pɑ:tɪkl/

528 Hạt - β

Beta particle
/bi:tə 'pɑ:tɪkl/

529 Tia - γ

Gamma-ray
/gæmə reɪ/

530 Phân rã hạt nhân

Nuclear fission
/ˈnjuːklɪə 'fɪʃn/

531 Phản ứng dây chuyền
phân rã hạt nhân

Chain reaction of fission
/tʃeɪn rɪ'ækʃn əv 'fɪʃn/

532 Lò phản ứng hạt nhân

Nuclear reactor
/ˈnjuːklɪə rɪ'æktə/

533 Chất phân hạch

Fissionable substance
/fɪʃnəbl 'sʌbstəns/

534 Bộ phận làm chậm

Moderator
/mə'dɒrətə/

535 Bộ phận phản xạ

Reflector
/rɪ'flektə/

536 Chất mang nhiệt

Heat carrier
/hi:t 'kæriə/

537 Thanh kiểm soát

Control rod
/kən'trɒl rod/

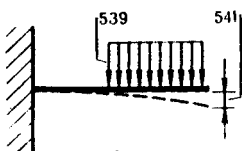
538 Tấm bảo vệ sinh học

Biological shield
/ˌbaɪəʊ'lɒdʒɪkl ʃi:ld/

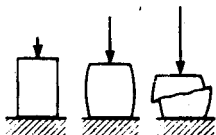
SỨC BỀN VẬT LIỆU

STRENGTHS OF MATERIALS

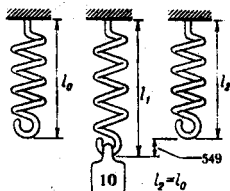
540



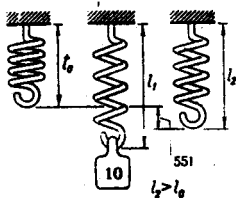
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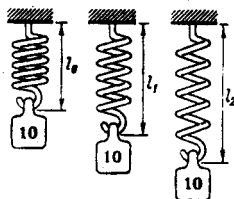
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550

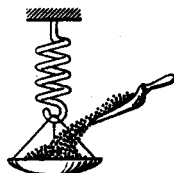


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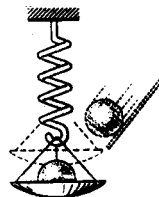


$$l_2 > l_1 > l_0$$

553



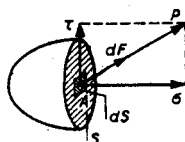
554



555

$$p = \frac{dF}{dS}$$

$$p = 600 \text{ (MPa)}$$



SỨC BỀN VẬT LIỆU ✓

STRENGTHS OF MATERIALS

539 Tải trọng

Load

/lɔ:d/

540 Đặt tải

Load

/lɔ:d/

541 Sự biến dạng

Deformation

/ˌdɪfɔ:'meɪʃn/

542 Biến dạng

Strain, deform

/streɪn dɪ'fɔ:m/

543 Sự phá hủy

Rupture

/rʌptʃə/

544 Phá hủy

Break

/breɪk/

545 Độ bền

Strength

/streŋθ/

546 Tính dẻo

Pliability

/ˌplɪə'bɪləti/

547 Độ cứng vững

Rigidity, stiffness

/rɪ'ʤɪdətɪ 'stɪfnəs/

548 Độ đàn hồi

Elasticity

/ˌelæ'stɪsɪti/

549 Biến dạng đàn hồi

Elastic deformation

/ˌɛləstɪk ˌdɪfɔ:'meɪʃn/

550 Độ dẻo

Plasticity

/ˌplæ'stɪsɪti/

551 Biến dạng dẻo

Plastic deformation

/ˌplæstɪk ˌdɪfɔ:'meɪʃn/

552 Sự bò (trườn)

Creep

/kri:p/

553 Tải trọng tĩnh

Static loading

/stætɪk ˈlɔ:dɪŋ/

554 Tải trọng động

Dynamic loading

/daɪ'næmɪk ˈlɔ:dɪŋ/

555 Ứng suất

Stress

/stres/

556 Mặt cắt ngang (tiết diện)

Cross section

/krɒs 'sekʃn/

557 Diện tích mặt cắt ngang

Area of cross section

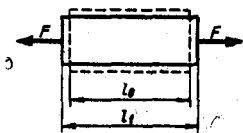
/ˈeəriə əv krɒs 'sekʃn/

558 Ứng suất pháp

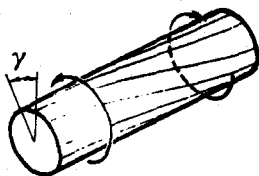
Normal stress

/ˈnɔ:ml stress/

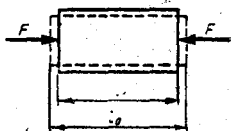
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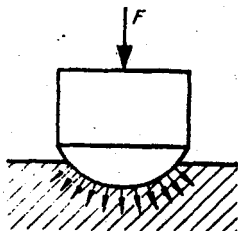
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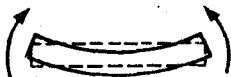
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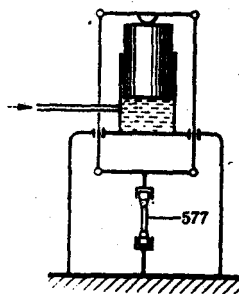
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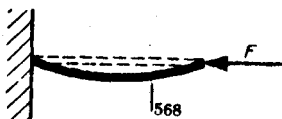
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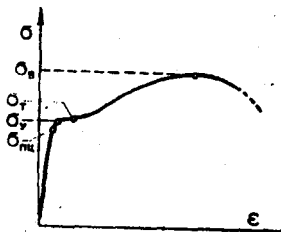
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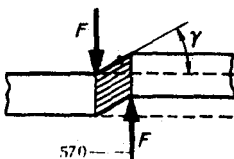
565



578



569



559 Ứng suất tiếp

Tangential stress
/tæ'n'dʒenʃl stres/

560 Sự kéo ; sức căng

Tension
/tenʃn/

561 Độ giãn dài

Elongation
/i:lɒŋ'geɪʃn/

562 Độ giãn dài tương đối

Relative elongation
/relatɪv i:lɒŋ'geɪʃn/

563 Nén

Compression
/kəm'pre:ʃn/

564 Uốn, uốn thẳng góc

Bending
/beɪndɪŋ/

565 Uốn theo chiều trục

Buckling
/bʌklɪŋ/

566 Độ mảnh

Slenderness
/slendənɪs/

567 Lực tối hạn

Critical load
/kɪrɪtɪkl lɔ:ɪd/

568 Thanh

Bar
/bɑ:/

569 Trượt

Shear

570 Lực trượt

Shear force
/ʃɪə fɔ:s/

571 Góc trượt

Shear angle
/ʃɪə 'æŋgl/

572 Xoắn

Torsion
/tɔ:ʃn/

573 Góc xoắn

Twist angle
/twɪst 'æŋgl/

574 Nghiền

Crushing
/kɹʌʃɪŋ/

575 Sự thử kéo

Tensile test
/tensail test/

576 Máy thử kéo

Direct stress machine
/dɪ'rekt stres mə'ʃɪn/

577 Mẫu thử

Tensile test specimen
/tensail test 'spesɪmən/

578 Đồ thị ứng suất-biến dạng

Stress-strain diagram

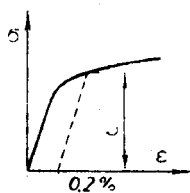
579 Giới hạn tỷ lệ

Proportionality limit
/prəpɔ:ʃnə'liətɪ 'lɪmɪt/

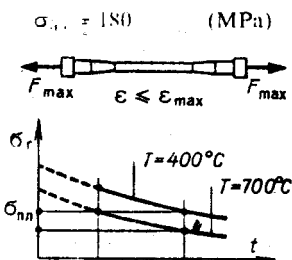
580 Giới hạn đàn hồi

Elastic limit
/i'æstɪkəl 'lɪmɪt/

583

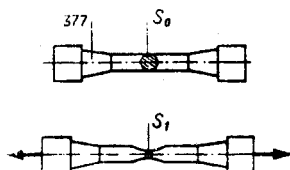


589

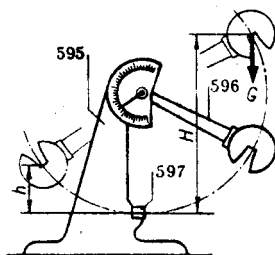


587

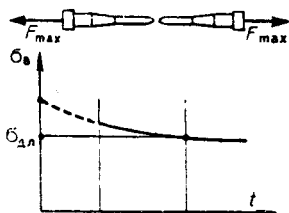
$$\psi = \frac{S_0 - S_1}{S_0} [\%]$$



594

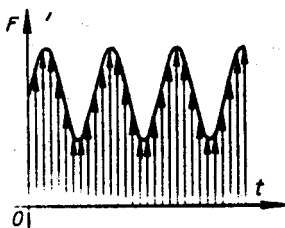


588

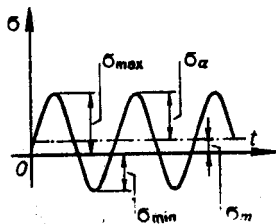


- 581 Giới hạn chảy**
Yield limit
 /jɪld 'lɪmɪt/
- 582 Giới hạn bền**
Ultimate strength
 /ʌltɪmət streŋθ/
- 583 Giới hạn chảy biểu kiến**
Conventional yield limit
 /kən'venʃənl jɪld 'lɪmɪt/
- 584 Giới hạn bền kéo**
Tensile strength
 /tensəl streŋθ/
- 585 Giới hạn bền nén**
Compression ultimate strength
 /kəm'preʃn 'ʌltɪmət streŋθ/
- 586 Giới hạn bền uốn**
Bending ultimate strength
 /bendɪŋ 'ʌltɪmət streŋθ/
- 587 Độ thắt tương đối**
Relative reduction of cross section area
 /relatɪv rɪ'dʌkʃn əv kros 'sekʃn 'eəriə/
- 588 Giới hạn bền lâu (mỏi)**
Long-term strength
 /lɒŋ 'tɜ:m streŋθ/
- 589 Giới hạn bò**
Creep limit
 /kri:p 'lɪmɪt/
- 590 Modul đàn hồi**
Modulus of elasticity
 /'mɒdjʊləs əv ,elæ'stɪsɪti/
- 591 Modul young, modul đàn hồi pháp tuyến**
Young's modulus, modulus of elongation
 /jʌŋs 'mɒdjʊləs, 'mɒdjʊləs əv ,ɪlɒŋ'geɪʃn/
- 592 Modul đàn hồi tiếp tuyến**
Shear modulus, modulus of transverse elasticity
 /ʃiə 'mɒdjʊləs, 'mɒdjʊləs əv 'trænzvɜ:s ,elæ'stɪsɪti/
- 593 Hệ số Poisson**
Poisson's ratio
 /pɔɪzɒs 'reɪʃiəʊ/
- 594 Thử độ dai va đập**
Impact test
 /ɪmpækt test/
- 595 Máy thử độ dai va đập kiểu con lắc**
Pendulum impact testing
 /pendjʊləm 'ɪmpækt 'testɪŋ mə'ʃi:n/
- 596 Con lắc**
Pendulum
 /pendjʊləm/
- 597 Mẫu thử**
Notched specimen
 /nɒtʃt 'spesi:mə/
- 598 Rãnh chữ V**
Notch
 /nɒtʃ/

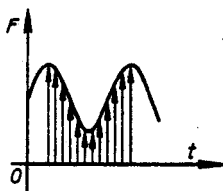
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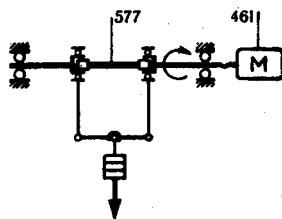
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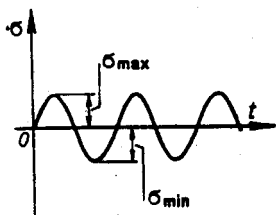
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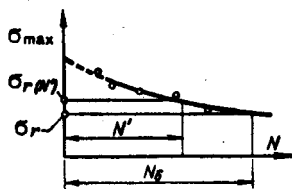
612



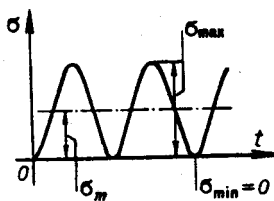
604



613



605



599 Độ dai va đập

Impact strength, modulus of toughness
/ɪmpækt streŋθ 'mɒdjuːləs
əv 'tɑːnɪs/

600 Sự mỏi của kim loại

Fatigue of metals
/fə'tiːg əv 'metlz/

601 Tải trọng biến đổi theo chu kỳ

Fluctuating load
/flʌktʃʊeɪŋ ləʊd/

602 Chu kỳ tác dụng lực

Stress cycle
/stres 'saɪkl/

603 Số chu kỳ

Number of cycles
/nʌmbə əv 'saɪklz/

604 Chu kỳ tải trọng đối xứng

Completely reversed stress cycle
/kəm'pliːtli rɪ'vɜːst stres
'saɪkl/

605 Chu kỳ tải trọng dạng

xung
Pulsating stress cycle
/pʌl'sɜːtɪŋ/

606 Chu kỳ tải trọng không đối xứng

Fluctuating stress cycle
/flʌktʃʊeɪŋ stres 'saɪkl/

607 Ứng suất cực đại của chu kỳ

Maximum stress of the cycle
/mæksɪməm stres əv ðə
'saɪkl/

608 Ứng suất cực tiểu của chu kỳ

Minimum stress of the cycle
/mɪnɪməm stres əv ðə
'saɪkl/

609 Ứng suất trung bình của chu kỳ

Mean stress of the cycle
/miːn stres əv ðə 'saɪkl/

610 Biên độ ứng suất của chu kỳ

Stress amplitude
/stres 'æmplɪ'tjuːd/

611 Tỷ số ứng suất

Cycle ratio, stress ratio
/saɪkl 'reɪʃɪʊ stres
'reɪʃɪʊ/

612 Thí nghiệm mỏi

Fatigue test
/fə'tiːg test/

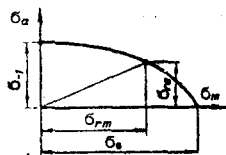
613 Đường cong mỏi

Wohler's curve
/wʊləs kɜːv/

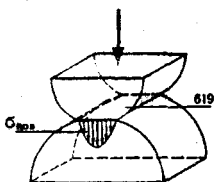
614 Giới hạn bền lâu

Endurance limit
/ɪn'dʒʊərəns 'lɪmɪt/

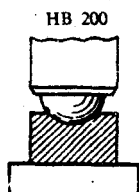
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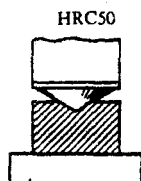
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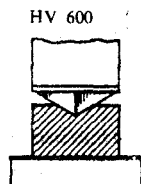
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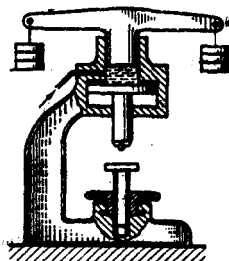
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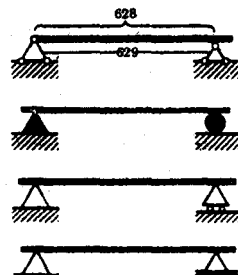
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625



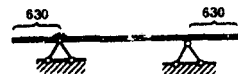
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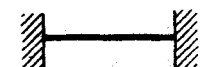
630



631



632



633



615 Số chu kỳ cơ sở

Basic number of cycles
/beisik 'nʌmbə əv 'saɪklz/

616 Giới hạn bền mỏi

*Fatigue strength (at
specified life)*
/fə'ti:g streŋθ/

617 Đồ thị bền mỏi

Fatigue strength diagram
/fə'ti:g streŋθ 'daɪəgræm/

618 Ứng suất tiếp xúc

Contact stress
/kən'tækt stress/

619 Diện tích tiếp xúc

Contact area
/kən'tækt 'eəriə/

620 Giới hạn tiếp xúc lâu dài

Contact endurance limit
/kən'tækt ɪn'dʒʊərəns 'lɪmɪt/

621 Độ cứng

Hardness
/'hɑ:dnis/

622 Độ cứng Brinell

Brinell hardness
/'brɪnəl 'hɑ:dnis/

623 Độ cứng Rockwell

Rockwell hardness
/'rɒkwəl 'hɑ:dnis/

624 Độ cứng Vickers

Vickers hardness
/'vɪkəz 'hɑ:dnis/

625 Máy đo độ cứng

Hardness tester
/'hɑ:dnis 'testə/

626 Dầm

Beam
/bi:m/

627 Dầm tựa tự do

Freely supported beam
/'fri:li sə'pɔ:tɪd bi:m/

628 Khẩu độ

Span
/spæn/

629 Tựa

Support
/sə'pɔ:t/

630 Dầm công xon

Cantilever beam
/'kæntɪli:və bi:m/

631 Dầm 2 đầu công xon

*Both end overhanging
beam*
/bɔ:θ endz, əvə'hæŋgɪŋ
bi:m/

632 Dầm ngàm 2 đầu

Restrained beam
/rɪ'streɪnɪd bi:m/

633 Dầm nhiều khẩu độ, dầm

liên tục
*Multispan beam,
continuous beam*
/ˌmʌlti'spæn bi:m
kən'tɪnjuəs bi:m/

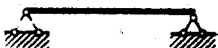
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639



635



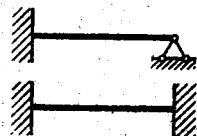
640



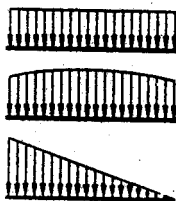
641



636



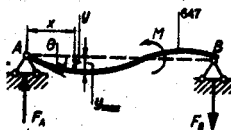
643



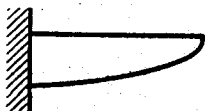
637



644



638



652



634 Dầm khâu độ bằng nhau*Equal span beam*

/i'kwəl spæn bi:m/

635 Dầm tĩnh xác định*Statically determined*

/stætɪklɪ dɪ'ts:mɪnd bi:m/

636 Dầm tĩnh không xác định*Statically indetermined**beam*/stætɪklɪ ɪndɪ'ts:mɪnd
bi:m/**637 Dầm trên nền đàn hồi***Beam on an elastic base*

/bi:m ɒn ən ɪ'læstɪk beɪs/

638 Dầm lực đồng nhất*Beam of uniform strength*

/bi:m ɒv 'ju:nɪfɔ:m strɒŋθ/

639 Tải trọng khâu độ*Span load*

/spæn lɔ:ʊd/

640 Tải trọng tập trung*Concentrated load*

/kɒnsəntreɪtɪd lɔ:ʊd/

641 Tải trọng phân tán*Distributed load*

/dɪ'strɪbjʊtɪd lɔ:ʊd/

642 Cường độ tải trọng*Load intensity*

/lɔ:ʊd ɪn'tensəti/

643 Sơ đồ tải trọng*Load diagram*

/lɔ:ʊd 'daɪəgræm/

644 Biến dạng uốn*Bending deformation*

/ˈbendɪŋ ˌdɪfɔ:'meɪʃn/

645 Momen uốn*Bending moment*

/ˈbendɪŋ 'mɒmənt/

646 Phản lực gối tựa*Reaction at the support*

/rɪ'ækʃn æt ðə sə'pɔ:t/

647 Đường cong đàn hồi*Elastic curve*

/ɪ'læstɪk kɜ:v/

648 Độ uốn*Deflection*

/dɪ'flekʃn/

649 Độ uốn cực đại*Maximum deflection*

/mæksɪməm dɪ'flekʃn/

650 Góc uốn đàn hồi*Slope of the elastic curve*

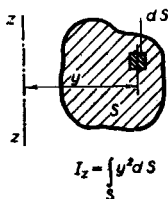
/sləʊp ɒv ɪ'læstɪk kɜ:v/

**651 Phương trình vi phân uốn
đàn hồi***Differential equation of the
elastic curve*/ˌdɪfərənʃl i'kwetʃn ɒv ðɪ
ɪ'læstɪk kɜ:v/**652 Sơ đồ momen uốn***Diagram of the bending**moments*

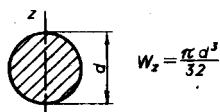
/ˌdaɪəgræm ɒv ðə 'bendɪŋ

'mɒmənts/

653



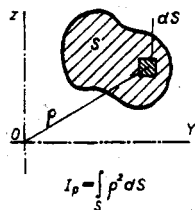
654



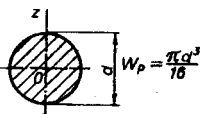
655



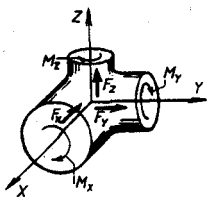
656



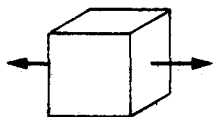
657



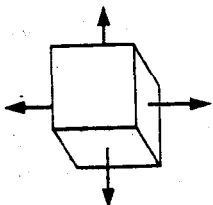
659



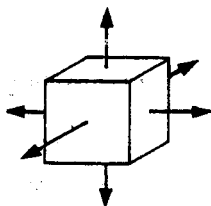
660



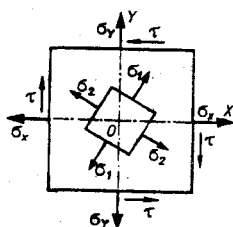
661



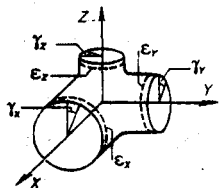
662



663



664



666

$$\sigma_{\max} \leq |\sigma|$$

667

$$\epsilon_{\max} \leq \frac{|\sigma|}{E}$$

653 Momen quán tính

Moment of inertia
/mə'mənt əv 'i'nɜ:fə/

654 Momen chống cắt

Section modulus
/sekʃn 'mɒdjʊləs/

655 Bán kính mặt cắt hồi
chuyên

Sectional radius of gyration
/sekʃnəl 'reɪdɪəs əv
ˌdʒaɪə'reɪʃn/

656 Momen quán tính cực

Polar moment of inertia
/pəʊlə 'mɒmənt əv
'i'nɜ:fə/

657 Modul quay mặt cắt

*Sectional modulus of
torsion*
/sekʃnəl 'mɒdjʊləs əv
'tɔ:fən/

658 Ứng suất phức tạp

Combined strength
/kəmbaɪnd streŋθ/

659 Trạng thái ứng suất

Stressed state
/strest steɪt/

660 Trạng thái ứng suất tuyến
tính

Uniaxial stressed state
/ˌjuːni'æksɪəl strest steɪt/

661 Trạng thái ứng suất
nhằng

Planar-stressed state
/plænə strest steɪt/

662 Trạng thái ứng suất 3
chiều

*Three-dimensionally
stressed state*
/θri:di'menʃənli strest
steɪt/

663 Ứng suất chính

Principal stress
/prɪnsɪpl stress/

664 Trạng thái biến dạng

Strained state
/streɪnd steɪt/

665 Lý thuyết bền

Strength theory
/streŋθ 'θi:əri/

666 Lý thuyết ứng suất pháp
cực đại

*The maximum normal
stress theory*
/ðə 'mæksɪməm 'nɔ:ml
stress 'θi:əri/

667 Lý thuyết biến dạng

tuyến tính cực đại
*The maximum linear strain
theory*
/ðə 'mæksɪməm 'lɪni:
streɪn 'θi:əri/

668

$$\tau_{\max} \leq \frac{[\sigma]}{2}$$

676

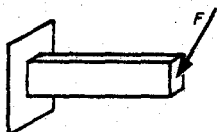
$$\sigma \leq [\sigma]$$

$$\tau \leq [\tau]$$

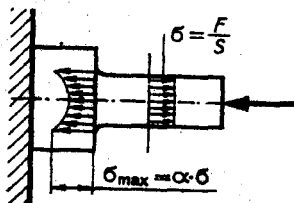
669 $\sqrt{\sigma_1^2 + \sigma_2^2 - \sigma_1 \sigma_2} \leq [\sigma]$

678 $K = \frac{\sigma_B}{[\sigma]}, K = \frac{\sigma_T}{[\sigma]}$

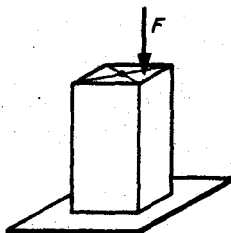
670



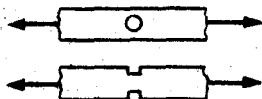
679



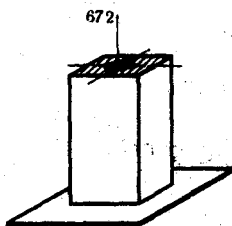
671



680



672



668 Lý thuyết ứng suất tiếp

cực đại

*The maximum shearing**stress theory*

/ðə 'mæksɪməm 'ʃiəriŋ/

stres θiəri/

669 Lý thuyết năng lượng

biến dạng

*The distortion energy**theory*

/ðə di'stɔ:ʃn 'enədʒi θiəri/

670 Uốn xiên

Oblique bending

/ə'blik bendiŋ/

671 Nén lệch tâm

Eccentric compression

/ɪk'sentrik kəm'preʃn/

672 Lõi mặt cắt

Core of section

/kɔ: əv 'sekʃn/

673 Thiết kế theo độ bền

Strength design

/streŋθ di'zain/

674 Tính toán sơ bộ

Preliminary calculation

/pri'liminəri , kælkjʊ'leɪʃn/

675 Tính toán kiểm tra

Check calculation

/tʃek , kælkjʊ'leɪʃn/

676 Ứng suất tính toán

Design stress

/di'zain stress/

677 Ứng suất cho phép

*Permissible stress**allowable stress*/pə'misəbl stres ə'laʊəbl
stres/

[σ], [τ]

678 Hệ số an toàn

Factor of safety

/fæktə əv 'seɪfti/

679 Sự tập trung ứng suất

Stress concentration

/stres , kɒnsən'treɪʃn/

680 Vật tập trung ứng suất

Stress concentrator

/stres 'kɒnsən'treɪtə/

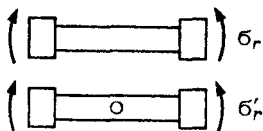
681 Hệ số tập trung ứng suất

hình học (α)

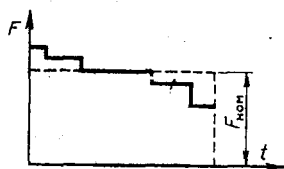
*Geometrical stress**concentration factor*/dʒi:ə 'metrikl stres
, kɒnsən'treɪʃn fæktə/

682

$$\alpha = \frac{\sigma_r}{\sigma'_r}$$



686

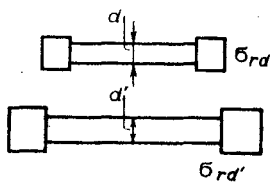


683

$$q = \frac{K-1}{\alpha-1}$$

684

$$\varepsilon = \frac{\sigma_{rd}}{\sigma_d}$$



682 Hệ số tập trung ứng suất

hiệu dụng

Effective stress

concentration factor

/ɪ'fektɪv stres

.kɒnsən'treɪf n 'fæktə/

**683 Hệ số nhạy cảm của vật
liệu đối với ứng suất tập
trung (q)**

*Factor of sensitivity of the
material to stress*

concentration

/fæktə əv 'sensɪvətɪ əv ðə

mə'tɪəriəl tʊ stres.

.kɒnsən'treɪf n /

684 Hệ số kích thước (ε)

Size factor

/saɪz 'fæktə/

685 Điều kiện tải trọng

Loading conditions

/lɔʊdɪŋ kən'dɪʃnz/

686 Sơ đồ chế độ tải trọng

Diagram of loading

conditions

/daɪəgræm əv lɔʊdɪŋ

kən'dɪʃnz/

687 Tải trọng danh nghĩa (F_n)

Nominal load

/nɒmɪnəl lɔʊd/

688 Tải trọng tương đương

F_{eq}

Equivalent load

/ɪ'kwɪvələnt lɔʊd/

$$F_{eq} = F_n \times K$$

689 Hệ số tuổi thọ (K)

Durability factor

/dʒʊərə'bɪlətɪ 'fæktə/

VẬT LIÊU KỸ THUẬT

ENGINEERING MATERIALS

691	$\begin{matrix} 7 \\ 14,0067 \\ 2s^2 2p^3 \\ \text{Nito} \end{matrix}$	700	$\begin{matrix} 14 \\ 28,086 \\ 3s^2 3p^2 \\ \text{Silic} \end{matrix}$
692	$\begin{matrix} 13 \\ 26,981 \\ 3s^2 3p^1 \\ \text{Nhôm} \end{matrix}$	701	$\begin{matrix} 12 \\ 24,305 \\ 3s^2 \\ \text{Magie} \end{matrix}$
693	$\begin{matrix} 5 \\ 10,811 \\ 2s^2 2p^1 \\ \text{Bo} \end{matrix}$	702	$\begin{matrix} 25 \\ 54,938 \\ 3d^5 4s^2 \\ \text{Mangan} \end{matrix}$
694	$\begin{matrix} 23 \\ 50,942 \\ 3d^3 4s^2 \\ \text{Vanadi} \end{matrix}$	703	$\begin{matrix} 29 \\ 63,546 \\ 3d^{10} 4s^1 \\ \text{Đồng} \end{matrix}$
695	$\begin{matrix} 1 \\ 1,0079 \\ 1s^1 \\ \text{Hidro} \end{matrix}$	705	$\begin{matrix} 28 \\ 58,70 \\ 3d^8 4s^2 \\ \text{Niken} \end{matrix}$
696	$\begin{matrix} 74 \\ 183,85 \\ 5d^4 6s^2 \\ \text{Vonfram} \end{matrix}$	706	$\begin{matrix} 50 \\ 118,70 \\ 5s^2 5p^2 \\ \text{Thiếc} \end{matrix}$
697	$\begin{matrix} 26 \\ 55,847 \\ 3d^6 4s^2 \\ \text{Sắt} \end{matrix}$	707	$\begin{matrix} 82 \\ 207,19 \\ 6s^2 6p^2 \\ \text{Chì} \end{matrix}$
698	$\begin{matrix} 8 \\ 15,999 \\ 2s^2 2p^4 \\ \text{Oxi} \end{matrix}$	708	$\begin{matrix} 16 \\ 32,06 \\ 3s^2 3p^4 \\ \text{Lưu huỳnh} \end{matrix}$
699	$\begin{matrix} 27 \\ 58,933 \\ 3d^7 4s^2 \\ \text{Coban} \end{matrix}$	709	$\begin{matrix} 51 \\ 121,75 \\ 5s^2 5p^3 \\ \text{Stibi} \end{matrix}$

VẬT LIỆU KỸ THUẬT

ENGINEERING MATERIALS

690 Nguyên tố hoá học

Chemical element

/ˈkɛmɪkl ˈɛlɪmənt/

691 Nitơ (N)

Nitrogen

/ˈnaɪtrədʒən/

692 Nhôm (Al)

Aluminium

/ˌæljʊˈmɪniəm/

693 Bor (B)

Boron

694 Vanadi (V)

Vanadium

/ˈvænɪdiəm/

695 Hydro (H)

Hydrogen

/ˈhaɪdrədʒən/

696 Vônphram (W)

Wolfram : Tungsten

/ˈwʊlfrəm/

697 Sắt (Fe)

Iron

/ˈaɪən/

698 Oxy (O)

Oxygen

/ˈɒksɪdʒən/

699 Cöban (Co)

Cobalt

/ˈkɒbɔɪl/

700 Silic (S)

Silicon

/ˈsɪlɪkən/

701 Manhê (Mg)

Magnesium

/ˈmægˈniʒiəm/

702 Mangan (Mn)

Manganese

/ˈmæŋɡəniːz/

703 Đồng (Cu)

Copper

/ˈkɒpər/

704 Molipden (Mo)

Molybdenum

/ˈmɒlɪbdɪniəm/

705 Nikel (Ni)

Nickel

/ˈniːkl/

706 Thiếc (Sn)

Tin

/tɪn/

707 Chì (Pb)

Lead

/led/

708 Lưu huỳnh (S)

Sulphur

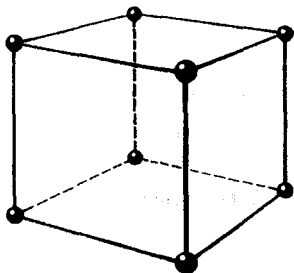
/ˈsʌlfə/

709 Antimon (Sb)

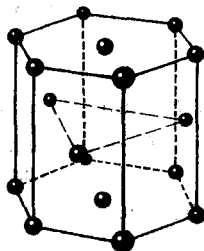
Antimony, stibium

/ˈæntɪməni, stɪˈbiːəm/

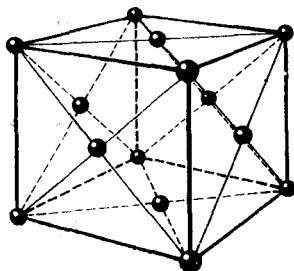
718



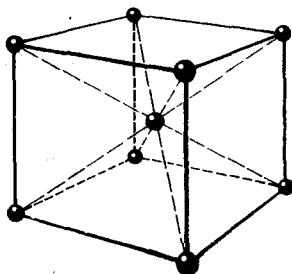
721



719



720



710 Tantan (Ta)

Tantalum
/ˈtæntələm/

711 Titan (Ti)

Titanium
/tiˈtæniəm/

712 Cacbon (C)

Carbon
/ˈkɑːbən/

713 Photpho (P)

Phosphorus
/ˈfɒsfərəs/

714 Crôm (Cr)

Chromium
/ˈkrɒmiəm/

715 Kẽm (Zn)

Zinc
/zɪŋk/

716 Kim loại

Metal
/ˈmetl/

717 Mạng tinh thể

Crystal lattice, space lattice
/ˈkrɪstl ˈlætɪs, speɪs ˈlætɪs/

718 Mạng lập phương đơn

giản
Simple cubic lattice
/ˈsɪmpl kjuːbɪk ˈlætɪs/

719 Mạng lập phương diện

tâm
Face-centered cubic lattice
/ˈfeɪsˈsentəd ˈkjuːbɪk ˈlætɪs/

720 Mạng lập phương thể tâm

Body-centered cubic lattice
/ˌbɒdiˈsentəd ˈkjuːbɪk ˈlætɪs/

721 Mạng lục giác

Hexagonal lattice
/hekˈsæɡənəl ˈlætɪs/

722 Hợp kim

Alloy
/əˈlɔɪ/

723 Ký hiệu hợp kim

Alloy grade
/əˈlɔɪ greɪd/

724 Thành phần hoá học

Chemical composition
/ˈkemɪkl ˌkɒmpəˈzɪʃn/

KIM LOẠI ĐEN (có sắt)

FERROUS METALS

725 Kim loại đen

Ferrous metal
/ˈferəs ˈmetl/

726 Giản đồ trạng thái

Fe-Fe₃C
Iron-iron carbide diagram
/ˈaɪə_n_ˈaɪə_n ˈkɑːbaɪd
ˈdaɪəgræm/

727 Tinh thù hình của sắt

Allotrope of iron
/ˈæləʊtrɒp əv ˈaɪə_n/

728 Sắt -α

Alpha iron
/ˈælfə ˈaɪə_n/

729 Sắt - γ

Gammairon

/gæmə 'aɪən/

733 Auxtênit

Austenite

/ɒstɪnaɪt/

(γ - Fe + C)

730 Pha

Phase

/feɪz/

734 Ferit

Ferrite

/fɛrɪt/

(α - Fe + C)

731 Dung dịch lỏng của

carbon trong sắt

Liquid solution of carbon

in iron

/ 'lɪk sə'ljʊ:ʃn əv 'kɑ:bən ɪn

'aɪən/

735 Xementit

Cementite

/sɪ'mɛntaɪt/

732 Dung dịch rắn của

carbon trong sắt

Solid solution of carbon in

iron

/sɒlɪd sə'ljʊ:ʃn əv 'kɑ:bən

ɪn 'aɪən/

736 Peclit

Pearlite

/pɜ:lɪt/

(α - Fe + C) + Fe₃C

HRC = 8 ...5

737 Ledeburit

Ledeburite

/lɛdɛbʊrɪt/

$(\gamma - \text{Fe} + \text{C}) + \text{Fe}_3\text{C}$

741 Marcenxit

Martensite

/mɑ:tsaɪt/

$(\alpha - \text{Fe} + \text{C})$

HRC = 50 - 65

738 Xocbit

Sorbite

/sɔ:bɪt/

$(\alpha - \text{Fe} + \text{C}) + \text{Fe}_3\text{C}$

HRC = 30 ... 40

742 Thép

Steel

/sti:l/

739 Troostit

Troostite

/trʊ:stɪt/

$(\alpha - \text{Fe} + \text{C}) + \text{Fe}_3\text{C}$

HRC = 40...50

743 Ký hiệu thép

Steel grade

/sti:l greɪd/

740 Bênit

Bainite

/beɪnɪt/

$(\alpha - \text{Fe} + \text{C}) + \text{Fe}_3\text{C}$

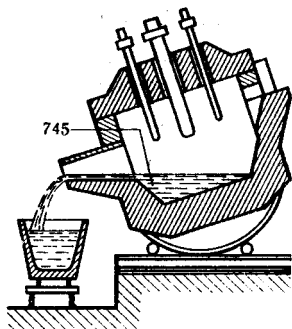
HRC = 40 - 50

744 Thép Mactanh

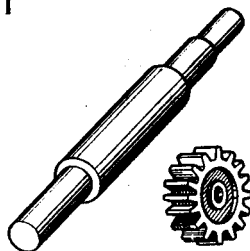
Open-hearth steel

/ˈɒpən hɜ:θ sti:l/

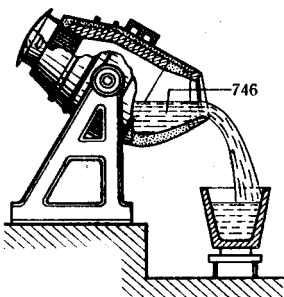
745



751



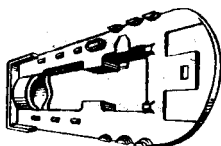
746



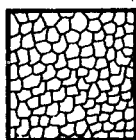
752



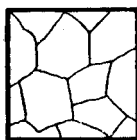
750



753



754



755

745 Thép lò điện

Electric (furnace) steel
/ɪ'lektrɪk ('fɜːnɪs) stiːl/

746 Thép lò chuyển

Converter steel bessemer steel
/kən'veɜːtə stiːl, 'besɪmə stiːl/

747 Thép lặng

Killed steel
/kɪld stiːl/

748 Thép nửa lặng

Semi-killed steel
/ˌsemi'kɪld stiːl/

749 Thép sôi

Rimming steel
/rɪmɪŋ stiːl/

750 Thép đúc

Casting steel, cast steel
/kɑːstɪŋ stiːl, kɑːst stiːl/

751 Thép kết cấu

Structural steel
/ˌstrʌktʃərəl stiːl/

752 Thép dụng cụ

Tool steel
/tuːl stiːl/

753 Cỡ hạt của thép

Grain size of steel
/greɪn saɪz əv stiːl/

754 Thép hạt nhỏ

Fine-grained steel
/faɪn greɪnd stiːl/

755 Thép hạt thô

Coarse-grained steel
/kɔːs greɪnd stiːl/

756 Thép Cacbon

(Plain) carbon steel
/pleɪn 'kɑːbən stiːl/

757 Thép Cacbon thấp

Low-carbon steel
0,05 - 0,25%C
/ləʊ 'kɑːbən stiːl/

758 Thép Cacbon trung bình

Medium-carbon steel
0,25 - 0,6%C
/miːdɪəm 'kɑːbən stiːl/

759 Thép Cacbon cao

0,6 - 2,0%C
High-carbon steel
/haɪ 'kɑːbən stiːl/

760 Thép Cacbon xác định theo tính chất cơ học

Carbon steel with guaranteed mechanical properties
/kɑːbən stiːl wɪð ɡæərən'tiːd mɪ'kænikl 'prɒpətɪz/

761 Thép Cacbon xác định theo thành phần hóa học

Carbon steel with guaranteed chemical composition
/kɑːbən stiːl wɪð ɡæərən'tiːd 'kɛmɪkl ,kɒmpə'zɪʃn/

762 Thép kết cấu Cacbon

chất lượng cao

Good-quality carbon

structural steel

/gʊd 'kwolətʰ 'kɑ:bən

'strʌktʃərəl sti:l/

766 Thép hợp kim

Alloy steel

/ə'lɔɪ sti:l/

763 Thép dễ cắt (thép tự

đồng)

Free cutting steel

/fri:'kʌtɪŋ sti:l/

767 Thép hợp kim thấp

Low-alloy steel

/ləʊ ə'lɔɪ sti:l/

764 Thép dụng cụ Cacbon

chất lượng cao

Good-quality carbon tool

steel

/gʊd 'kwolətʰ 'kɑ:bən tu:l

sti:l/

768 Thép hợp kim trung bình

Medium-alloy steel

/mi:diəm ə'lɔɪ sti:l/

765 Thép dụng cụ Cacbon

chất lượng đặc biệt

High-quality carbon tool

steel

/haɪ 'kwolətʰ 'kɑ:bən tu:l

sti:l/

769 Thép mangan

Manganese steel

/ 'mæŋɡəni:z sti:l/

770 Thép crôm

Chromium steel

/ˈkrɒmɪəm sti:l/

774 Thép Cr-Si-Mn

Chromium-silicon-

manganese steel

/ˈkrɒmɪəm sɪlɪkən

ˈmæŋɡəniːz sti:l/

771 Thép ô lăn (bạc đạn)

Chromium ball-bearing

steel

/ˈkrɒmɪəm bɔl ˈbeərɪŋ

sti:l/

775 Thép Cr-Ni

Nickel-chromium steel

/ˈnɪkl ˈkrɒmɪəm sti:l/

772 Thép Cr-Mn

Chromium-manganese steel

/ˈkrɒmɪəm ˈmæŋɡəniːz

sti:l/

776 Thép Cr-Ni-Mo

Nickel-chromium-

molybdenum steel

/ˈnɪkl ˈkrɒmɪəm

mɒˈlɪbdəniəm sti:l/

773 Thép Cr-Si

Chromium-silicon steel

/ˈkrɒmɪəm ˈsɪlɪkən sti:l/

777 Thép Cr-Mo-Al

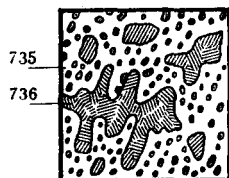
Chromium-molybdenum-

aluminum steel

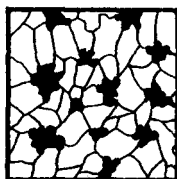
/ˈkrɒmɪəm mɒlɪbdəniəm

ˌæljʊˈmɪniəm sti:l/

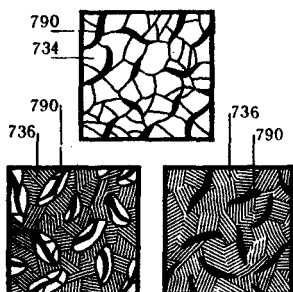
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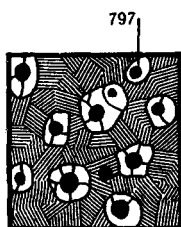
796



788



791



778 Thép dụng cụ hợp kim*Alloy tool steel*

/ə'lɔɪ tu:l sti:l/

779 Thép hợp kim cao*High-alloy steel*

/haɪ ə'lɔɪ sti:l/

780 Thép không gỉ*Stainless steel*

/ˈsteɪnls sti:l/

781 Thép chịu nóng*Scale-resistant steel*

/sjeɪl rɪˈzɪstənt sti:l/

782 Thép bền nóng*High-temperature steel*

/haɪˈtemprətʃə sti:l/

783 Thép dụng cụ cắt gọt tốc độ cao (thép gió)*High-speed steel*

/haɪ spi:d sti:l/

784 Gang đúc*Cast iron*

/kɑ:st 'aɪən/

785 Gang thỏi*Pig iron*

/pɪɡ 'aɪən/

786 Gang thỏi đúc*Foundry pig iron*

/ˈfaʊndrɪ pɪɡ 'aɪən/

787 Gang trắng*White cast iron*

/waɪt kɑ:st 'aɪən/

788 Gang xám*Grey iron*

/ɡreɪ 'aɪən/

789 Graphit*Graphite*

/ˈɡræfaɪt/

790 Graphit tấm*Flake graphite*

/ˈfleɪk 'ɡræfaɪt/

791 Gang dẻo*Malleable cast iron*

/ˈmæliəbl kɑ:st 'aɪən/

792 Cacbon ủ*Temper carbon*

/ˈtempə 'kɑ:bən/

793 Gang dẻo tâm trắng*White-heart malleable cast iron*

/waɪt hɜ:t 'mæliəbl kɑ:st 'aɪən/

794 Gang dẻo tâm đen*Black-heart malleable cast iron*

/blæk hɜ:t 'mæliəbl kɑ:st 'aɪən/

795 Gang đúc biến tính*Inoculated cast iron*

/ɪˈnɒkjuleɪtɪd kɑ:st 'aɪən/

796 Gang độ bền cao, gang cầu*High-strength cast iron, nodular cast iron*/haɪ streŋθ kɑ:st 'aɪən
'nɒdjulə kɑ:st 'aɪən/**797 Graphit cầu***Spherical graphite*

/ˈsfɛrɪkl 'ɡræfaɪt/

KIM LOẠI KHÔNG SẮT

NONFERROUS METALS

798 Kim loại không sắt

Nonferrous metal

/nɒn'fɛrəs 'metl/

799 Brông; hợp kim đồng

đồng thau

Bronze

/brɒnz/

800 Brông thiếc

Tin bronze

/tɪn brɒnz/

801 Brông nhôm

Aluminium bronze

/,æljʊ'mɪniəm brɒnz/

802 Brông Al-Fe-Ni

Aluminium-iron-nickel

bronze

/,æljʊ'mɪniəm 'aɪən 'ni:kl

brɒnz/

803 Brông chì

Lead bronze

/led brɒnz/

804 Latông, Đồng thanh

Brass

/brɑ:s/

805 Latông Si

Silicon brass

/sɪlɪkən 'brɑ:s/

806 Latông Fe-Pb

Iron-lead brass

/aɪən led brɑ:s/

807 Latông Al-Fe

Aluminium-iron brass

/,æljʊ'mɪniəm 'aɪən brɑ:s/

808 Babbit, hợp kim babit

Babbitt

/bæ'bit/

813 Hợp kim nhôm biến dạng

Wrought aluminium alloy

/rɔ:t .æljʊ'miniəm ə'lɔ:/

809 Hợp kim nhẹ

Light alloy

/laɪt ə'lɔ:/

814 Dural, hợp kim Al-Cu

Duralumin

/dʒʊ'ræljʊmin/

810 Hợp kim nhôm

Aluminium alloy

/,æljʊ'miniəm ə'lɔ:/

815 Hợp kim Al-Mg-Mn

Aluminium-magnesium

alloy

/,æljʊ'miniəm mæg'ni:ziəm

ə'lɔ:/

811 Hợp kim nhôm đúc

Aluminium casting alloy

/,æljʊ'miniəm 'kɑ:stɪŋ ə'lɔ:/

812 Hợp kim Al-Si

Aluminium-silicon alloy

/,æljʊ'miniəm 'sɪlɪkən

ə'lɔ:/

816 Hợp kim Manhê

Magnesium alloy

/mæg'ni:ziəm ə'lɔ:/

817 Hợp kim Titan

Titanium alloy

/ti'teɪniəm ə'loɪ/

820 Cacbit vonphram

Tungsten carbide

/ˈtʌŋstən 'kɑ:baid/

818 Hợp kim gốm

Sintered alloy

/sɪntəd ə'loɪ/

821 Hợp kim Cacbit

Vonphram

Cemented tungsten-carbide

composition

/sɪ'mentɪd 'tʌŋstən 'kɑ:baid

ˌkɒmpə'zɪʃn/

819 Hợp kim Cacbit, Hợp kim

cứng

Cemented-carbide

composition

/sɪ'mentɪd 'kɑ:baid

ˌkɒmpə'zɪʃn/

822 Hợp kim Cacbit

Vonphram Titan

Cemented titanium-

tungsten-carbide

composition

/sɪ'mentɪd ti'teɪniəm

'tʌŋstən 'kɑ:baid

ˌkɒmpə'zɪʃn/

823 Hợp kim Cacbit W-Ti-Ta

*Cemented titanium-
tantalum tungsten carbide
composition*
/sɪ'mentɪd ti'teɪniəm
ˈtæntələm ˈtʌŋstən ˈkɑːbaɪd
ˌkɒmpəʒɪʃn/

826 Chất độn

Filler
/fɪlə/

827 Chất làm dẻo

Plastificator
/ˌplæstɪfɪˈkeɪtə/

CHẤT DẸO

PLASTICS

824 Chất dẻo

Plastic
/ˈplæstɪk/

828 Nhựa nhiệt dẻo

Thermoplastic resin
/ˌθɜːmɒˈplæstɪk ˈrezɪn/

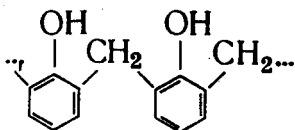
825 Nhựa

Resin
/ˈrezɪn/

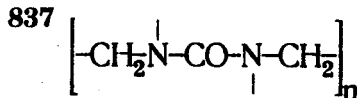
829 Chất dẻo nhiệt

Thermoplast
/ˌθɜːmɒˈplɑːst/

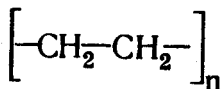
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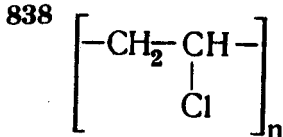
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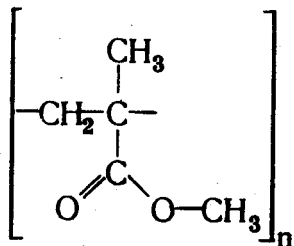
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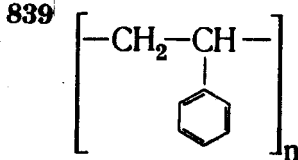
838



836



839



830 Nhựa nhiệt cứng

Thermosetting resin

/θɜ:mɔʊ'setɪŋ 'rezɪn/

831 Chất dẻo nhiệt cứng

Thermosetting plastic

/θɜ:mɔʊ'setɪŋ 'plæstɪk/

832 Nhựa tổng hợp

Synthetic resin

/sɪnθetɪk 'rezɪn/

833 Chất dẻo phenol

Phenolic plastic

/fɪ'nɒlɪk 'plæstɪk/

834 Sợi vải nhúng nhựa

Resin-dipped fabric

laminate

/ˈrezɪn dɪpt 'fæbrɪk

ˈlæmɪnɛnt/

835 Polyêtylen, PE

Polyethylene

/ˌpɒlɪ'eθɪlɪn/

836 Polymetylmetacrylat

Polymethylmethacrylate

837 Chất dẻo Cacbamit

Carbamide plastic

/ˈkɑ:bəməɪd 'plæstɪk/

838 Polyvinylchloride PVC

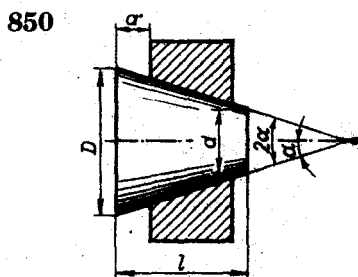
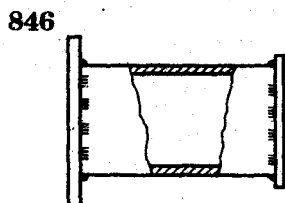
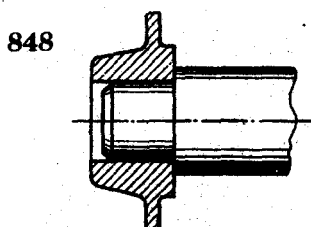
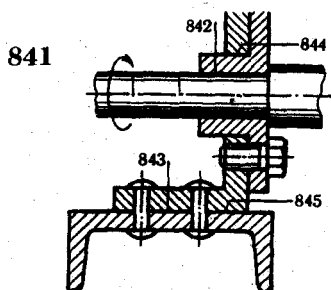
Polyvinylchloride

/ˌpɒlɪˈvaɪnɪklɔːraɪd/

839 Polystyrene PS

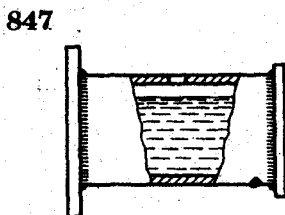
Polystyrene

/ˌpɒlɪ'staɪrɪn/



853

$$K = \frac{D-d}{l}$$



856

	D	K
N 0	9,045	0,05205
N 1	12,065	0,04988
N 2	17,780	0,04995
N 3	23,825	0,05020
N 4	31,267	0,05194
N 5	44,399	0,05263
N 6	63,348	0,05214

CHI TIẾT MÁY

MACHINE ELEMENT

KHÁI NIỆM CHUNG

GENERAL TERMS

840 Chi tiết

Part, detail
/pɑ:t, di'teɪl/

841 Mối ghép

Joint
/dʒɔɪnt/

842 Ghép di động

Movable joint
/ˈmʊvəbl dʒɔɪnt/

843 Ghép cố định

Fixed joint
/fiks dʒɔɪnt/

844 Ghép tháo được

Detachable joint
/dɪ'tætʃəbl dʒɔɪnt/

845 Ghép lâu dài

Permanent joint
/pɜːmənənt dʒɔɪnt/

846 Ghép cứng

Firm joint
/fɜːm dʒɔɪnt/

847 Ghép cứng cố định

Firm-and-impervious joint
/fɜːm ən ɪm'pɜːviəs dʒɔɪnt/

848 Mối ghép trụ

Cylindrical joint
/sɪ'lɪndrɪkl dʒɔɪnt/

849 Lỗ

Hole; bore
/həʊl bɔː/

850 Mối ghép côn

Conical joint
/'kɒnɪkl dʒɔɪnt/

851 Góc côn (2α)

Cone angle
/kəʊn 'æŋɡl/

852 Góc nghiêng (α)

Taper angle
/'teɪpə 'æŋɡl/

853 Độ côn

Taper
/'teɪpə/

854 Khoảng cách cơ sở (a)

Base distance
/beɪs 'dɪstəns/

855 Côn tự giữ

Self-holding taper
/'self həʊldɪŋ 'teɪpə/

856 Độ côn Morse

Morse taper
/'mɔːs 'teɪpə/

D K

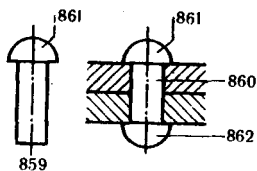
Bảng No

N₁

857

	D	K
N 4	4	0,05
N 6	6	0,05
N 80	80	0,05
N 100	100	0,05
N 120	120	0,05

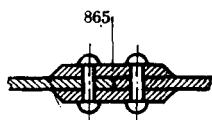
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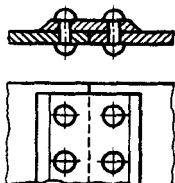
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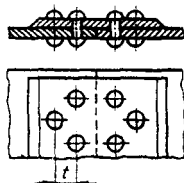
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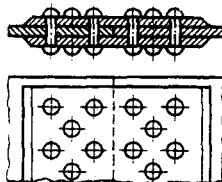
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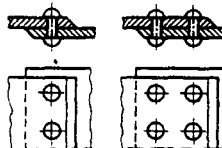
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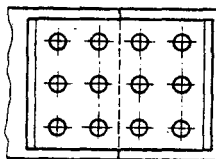
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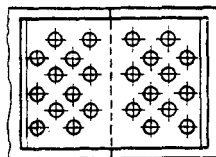
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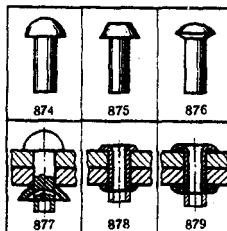
872



873



874



857 Độ côn hệ mét*Metric taper*

/ˈmetrɪk ˈteɪpə/

D K

Bảng N₄**MỐI GHÉP ĐINH TÁN****RIVETED JOINTS****858 Mối ghép đinh tán***Riveted joint*

/ˈrɪvɪtɪd ʤɔɪnt/

859 Đinh tán*Rivet*

/ˈrɪvɪt/

860 Thân đinh tán*Rivet shank*

/ˈrɪvɪt ʃæŋk/

861 Đầu đinh tán*Primary head*

/ˈpraɪməri hed/

862 Đầu đế tán*Snap head*

/ˈsnæp hed/

863 Ghép chồng*Lap-joint*

/ˈlæp ʤɔɪnt/

864 Ghép đối đỉnh, đối tiếp*Butt-joint*

/ˈbʌt ʤɔɪnt/

865 Tấm ghép ngoài*Cover plate*

/ˈkʌvə plet/

866 Mối ghép đinh tán đơn*Single-riveted joint*

/ˈsɪŋɡl ˈrɪvɪtɪd ʤɔɪnt/

867 Mối ghép đinh tán kép*Double-riveted joint*

/ˈdʌbl ˈrɪvɪtɪd ʤɔɪnt/

868 Bước ghép đinh tán*Pitch of joint*

/pɪtʃ əv ʤɔɪnt/

869 Mối ghép đinh tán 3 lớp*Triple-riveted joint*

/ˈtraɪpl ˈrɪvɪtɪd ʤɔɪnt/

870 Mối ghép bước đơn*Single shear joint*

/ˈsɪŋɡl ʃiə ʤɔɪnt/

871 Mối ghép bước kép*Double shear joint*

/ˈdʌbl ʃiə ʤɔɪnt/

872 Mối ghép song song*Parallel-row joint*

/ˈpærələl rəʊ ʤɔɪnt/

873 Mối ghép bậc*Staggered joint*

/ˈstæɡəd ʤɔɪnt/

874 Đinh tán đầu tròn*Round head rivet, button**head rivet*

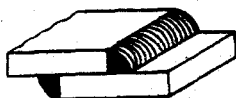
/raʊnd hed ˈrɪvɪt, ˈbʌtn

hed ˈrɪvɪt/

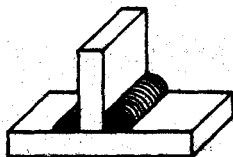
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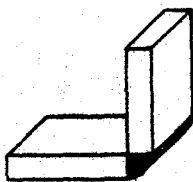
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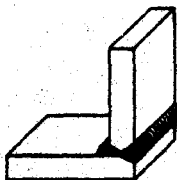
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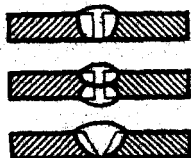
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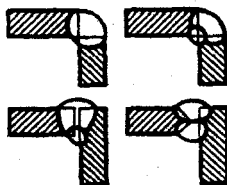
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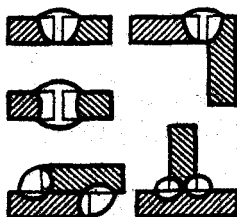
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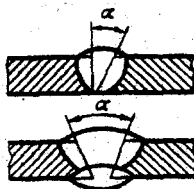
888



889



890



892



893



894



875 Đinh tán đầu côn*Cone head rivet*

/kɔn hed ʔivɪt/

876 Đinh tán đầu ôval chìm*Oval countersunk head**rivet*/ʔɔvɪ ˈkɔntɔsɔŋk hed
ʔivɪt/**877 Đinh tán nổ***Explosive rivet*

/ɛkˈsplɔsɪv ʔivɪt/

878 Đinh tán ống gờ*Flanged tubular rivet*

/flɛndʒd ʔjɜbjʊlɔ ʔivɪt/

879 Đinh tán ống gờ tròn*Round-flange tubular rivet*/rɔʊnd flɛndʒ ʔjɜbjʊlɔ
ʔivɪt/**MỐI NỐI HÀN****WELDED JOINTS****880 Mối ghép hàn***Welded joint*

/weldɪd ʒɔɪnt/

881 Mối hàn ghép mối*Butt welded joint*

/bʌt ˈweldɪd ʒɔɪnt/

882 Mối hàn phủ*Lap welded joint*

/læp ˈweldɪd ʒɔɪnt/

883 Mối hàn T*T-joint*

/ti: ʒɔɪnt/

884 Mối hàn góc*Corner joint*

/kɔ:nɔ ʒɔɪnt/

885 Mối hàn góc giáp mối*Butt corner joint*

/bʌt ˈkɔ:nɔ ʒɔɪnt/

886 Hàn*Weld*

/weld/

887 Hàn đầu mí*Butt weld*

/bʌt weld/

888 Hàn góc, hàn nổi*Corner weld, fillet weld*

/kɔ:nɔ weld ; ˈfɪlɪt weld/

889 Hàn mặt vuông*Square-face weld*

/skwɛə feɪs weld/

890 Mối hàn vát*Bevel weld*

/ˈbevl weld/

891 Góc vát (α)*Bevel angle*

/ˈbevl ˈæŋɡl/

892 Mối hàn chữ V đơn*Single-V weld*

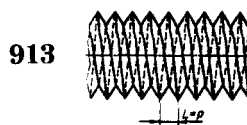
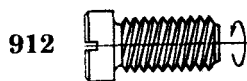
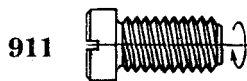
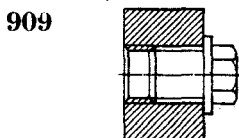
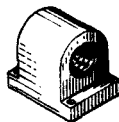
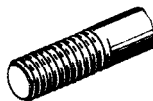
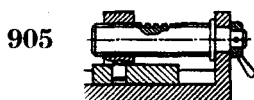
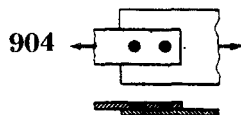
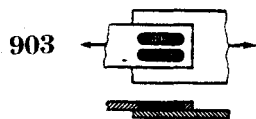
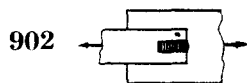
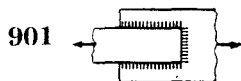
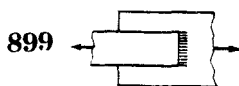
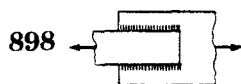
/ˈsɪŋɡl vɪ: weld/

893 Mối hàn vát đơn*Single-bevel weld*

/ˈsɪŋɡl ˈbevl weld/

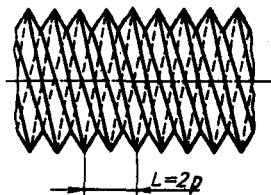
894 Hàn rãnh vát kép*Double-bevel groove weld*

/ˈdʌbl ˈbevl ɡru:v weld/

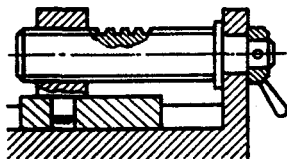


895 Hàn chữ V kép*Double-V weld**/ˈdʌbl vɪː weld/***896 Hàn chữ U đơn***Single-U weld**/ˈsɪŋɡl juː weld/***897 Mối hàn vát chữ U kép***Double-U butt weld**/ˈdʌbl juː bʌt weld/***898 Hàn chồng cạnh biên***Side lap weld, parallel fillet weld**/saɪd læp weld_ˈpærələl**ˈfɪlɪt weld/***899 Hàn góc đầu chồng***End lap weld, normal fillet**/end læp weld_ˈnɔːml ˈfɪlɪt/***900 Hàn chồng đầu xiên***Oblique lap weld**/ɒˈbliːk læp weld/***901 Hàn chồng đầu và cạnh xiên***End-and-side lap weld**/end ɔn saɪd læp weld/***902 Hàn chồng rãnh***Slot lap weld**/slɒt læp weld/***903 Hàn ghép rãnh***Transfusion weld**/ˈtrænsˈfjuːʒn weld/***904 Hàn chồng các lỗ***Plug lap weld**/plʌɡ læp weld/***MỐI GHÉP REN****THREADED JOINTS****905 Mối ghép ren***Threaded joint**/θredɪd ˈdʒɔɪnt/***906 Ren***Thread**/θred/***907 Ren ngoài***External thread**/ɪkˈstɜːnl θred/***908 Ren trong***Internal thread**/ɪnˈtɜːnl θred/***909 Ren trụ***Cylindrical thread**/sɪˈlɪndrɪkl θred/***910 Ren côn***Taper thread**/teɪpə θred/***911 Ren phải***Right-hand thread**/raɪt hænd θred/***912 Ren trái***Left-hand thread**/left hænd θred/***913 Ren một đầu nổi***Single-start thread**/ˈsɪŋɡl stɑːt θred/***914 Chiều quay ren***Turn of thread**/ˈtɜːn ɔv θred/*

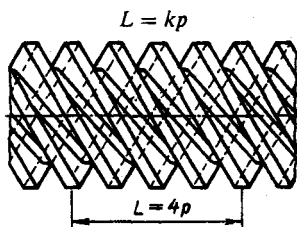
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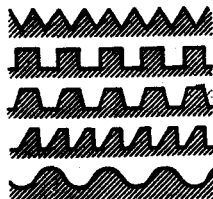
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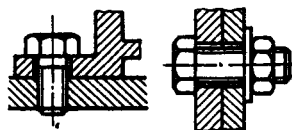
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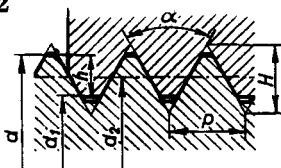
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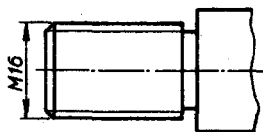
919



922



930



d	p
10	1.5
12	1.75
16	2.0

915 Hướng ren (L)*Lead of thread*

/led əv θred/

916 Bước ren (p)*Pitch of thread*

/ˈpiʃ əv θred/

917 Ren 2 đầu mối*Double-start thread*

/ˈdʌbl stɑt θred/

918 Ren nhiều đầu mối*Multiple-start thread*

/ˈmʌltipl stɑt θred/

l. = kp

919 Ghép chặt bằng ren*Fastener thread*

/ˈfɑːsnɔ θred/

920 Ren di động*Motion thread, translating thread*

/ˈmɔʃn θred ˌtrænzleɪtɪŋ θred/

921 Profin ren, biên dạng ren*Thread profile*

/θred ˈprəʊfaɪl/

922 Ren tam giác*Triangular thread*

/ˈtraɪˌæŋɡjʊləɹ θred/

923 Đường kính đỉnh ren (d)*Major diameter of thread*

/ˌmeɪdʒɔ daɪˈæmɪtɜ əv θred/

924 Đường kính chân ren (d₁)*Minor diameter of thread*

/ˈmaɪnɔ daɪˈæmɪtɜ əv θred/

925 Đường kính bước ren (d₂)*Pitch diameter*

/ˈpiʃ daɪˈæmɪtɜɹ/

926 Chiều sâu profin cơ bản

(H)

Depth of basic profile

/ˌdepθ əv ˈbeɪsɪk ˈprəʊfaɪl/

927 Chiều sâu ren (h)*Depth of thread*

/ˌdepθ əv θred/

928 Góc profin ren (α)*Angle of thread*

/ˌæŋɡl əv θred/

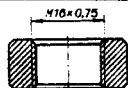
929 Ren hệ mét*Metric thread*

/ˈmetrɪk θred/

930 Ren bước thô*Coarse-pitch thread*

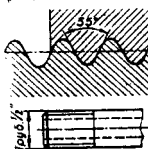
/ˈkɔːs, piʃ θred/

931

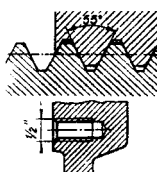


d	p
10	1.25: 1.0 0.75: 0.5
12	1.25: 1.25 1.0: 0.75
16	1.5: 1.0 0.75: 0.5

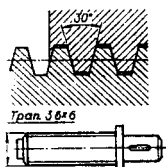
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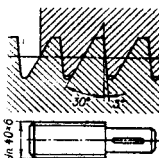
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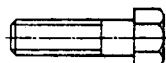
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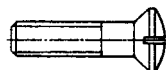
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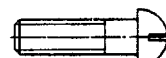
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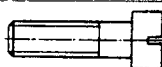
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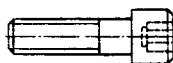
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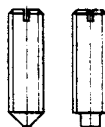
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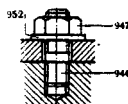
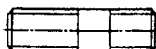
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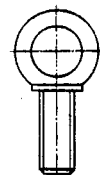
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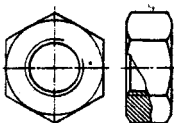
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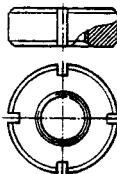
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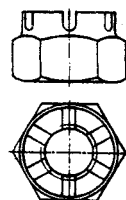
947



948



949



931 Ren bước nhỏ*Fine-pitch thread*

/faɪn ˌpɪtʃ θred/

932 Ren ống*Pipe thread*

/paɪp θred/

933 Ren whitworts*Whitworth thread*

/wɪtwɜːθ θred/

934 Ren hình thang*Trapezoidal thread*

/ˈtræpɪzɔɪdl θred/

935 Ren chặn*Buttress thread*

/ˈbʌtrɪs θred/

936 Bu lông, vít*Screw*

/skruː/

937 Bulông đầu lục giác*Hexagonal head screw*

/hek'sæɡənɪ hed skruː/

938 Vít đầu chìm*Countersunk-head screw*

/ˈkaʊntəsʌŋk hed skruː/

939 Vít đầu ôvan*Oval-head screw*

/ˈɔʊvl hed skruː/

940 Vít đầu tròn*Round-head screw*

/ˌraʊnd hed 'skruː/

941 Vít đầu trụ*Cheese-head screw*

/tʃiːz hed skruː/

942 Vít đầu có hốc lục giác*Hexagon-socket head**screw*

/hek'sæɡən 'sɒkɪt hed

skruː/

943 Vít cây chìm*Set screw*

/set skruː/

944 Vít cây*Stud, stud-bolt*

/stʌd bɔːlt/

945 Bulông vòng*Eye-bolt*

/aɪˈbɔːlt/

946 Đai ốc*Nut*

/nʌt/

947 Đai ốc lục giác*Hexagonal nut*

/hed'sæɡənɪ nʌt/

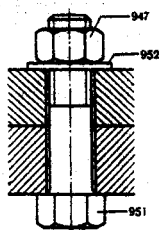
948 Đai ốc tròn*Round nut*

/raʊnd 'nʌt/

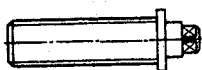
949 Đai ốc hoa*Castle nut*

/ˈkæstl nʌt/

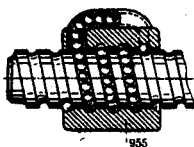
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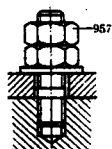
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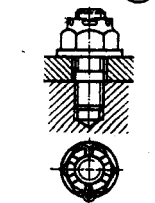
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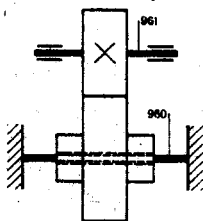
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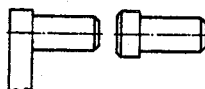
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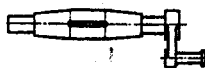
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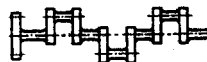
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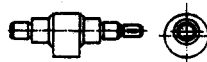
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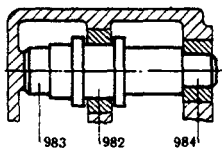


950 Mối ghép bulông*Bolt joint**/bəʊlt dʒɔɪnt/***951 Bulông***Bolt**/bəʊlt/***952 Vòng đệm***Washer**/wəʃə(r)/***953 Vít bước tiến***Feed screw**/fi:d skru:/***954 Bulông vòng bi***Ball circulating screw**/bə:l ,sɜ:kjʊleɪtɪŋ skru:/***955 Đai ốc vòng bi***Ball circulating nut**/bə:l ,sɜ:kjʊleɪtɪŋ nʌt/***956 Chốt chặt***Locking**/ˈlɒkɪŋ/***957 Đai ốc chặn***Locknut**/ˈlɒknʌt/***958 Vòng đệm chặn đàn hồi***Spring lock washer**/sprɪŋ lɒk ˈwɒʃə(r)/***959 Chốt chặn***Collar pin**/ˈkɒlə(r) pɪn/***CÁC LOẠI TRỤC****SHAFTS AND AXLES****960 Trục***Axle***961 Trục***Shaft**/ʃɑ:ft/***962 Chốt có vành tì***Collar pin**/ˈkɒlə pɪn/***963 Trục khuỷu đơn***Single-throw crankshaft**/ˌsɪŋɡl θrəʊ ˈkræŋkʃɑ:ft/***964 Trục khuỷu***Crankshaft**/ˈkrænkʃɑ:ft/***965 Trục cam***Camshaft**/ˈkæmʃɑ:ft/***966 Trục lệch tâm***Excenter shaft**/ɪkˈsentə ʃɑ:ft/***967 Trục mềm, trục đàn hồi***Flexible shaft**/ˌfleksəbl ʃɑ:ft/***968 Trục kiểu ống lồng***Telescope shaft**/ˈtelɪskɒp ʃɑ:ft/*

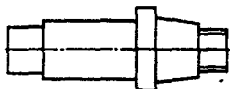
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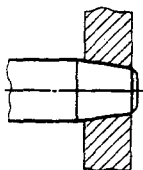
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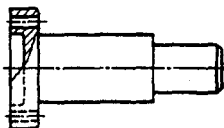
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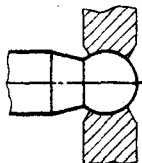
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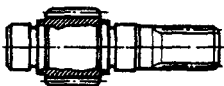
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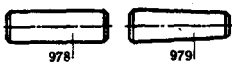
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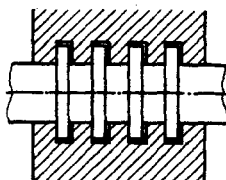
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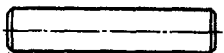
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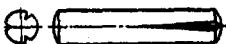
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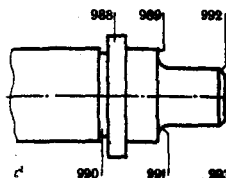
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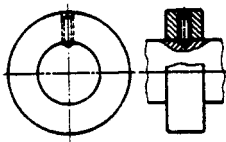


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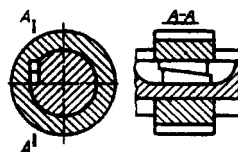


- | | |
|---|---|
| <p>969 Trục đặc
<i>Solid shaft</i>
/sɔːlɪd ˈʃɑːft/</p> <p>970 Trục rỗng
<i>Hollow shaft</i>
/ˈhɒləʊ ˈʃɑːft/</p> <p>971 Trục cac đăng
<i>Cardan shaft</i>
/ˈkɑːdn ʃɑːft/</p> <p>972 Trục bậc
<i>Stepped shaft</i>
/ˈstept ˈʃɑːft/</p> <p>973 Trục có gờ bích
<i>Flanged shaft</i>
/ˈflændʒt ʃɑːft/</p> <p>974 Trục bánh răng
<i>Pinion-shaft</i>
/ˈpɪniən ʃɑːft/</p> <p>975 Trục trơn
<i>Smooth shaft</i>
/ˈsmuːð ʃɑːft/</p> <p>976 Chốt
<i>Pin</i>
/pɪn/</p> <p>977 Chốt định tâm
<i>Alignment pin</i>
/əˈlaɪmənt pɪn/</p> <p>978 Chốt định vị
<i>Dowel pin</i>
/ˈdaʊəl pɪn/</p> <p>979 Chốt côn
<i>Taper pin</i>
/ˈteɪpə pɪn/</p> | <p>980 Chốt thẳng có rãnh
<i>Grooved straight pin</i>
/ˈɡruːvd streɪt pɪn/</p> <p>981 Ngõng trục
<i>Journal</i>
/ˈdʒɜːnl/</p> <p>982 Cỏ ngõng
<i>Neck journal</i>
/ˈnek ˈdʒɜːnl/</p> <p>983 Ngõng tựa
<i>Thrust journal</i>
/θrʌst ˈdʒɜːnl/</p> <p>984 Đầu ngõng
<i>End journal</i>
/end ˈdʒɜːnl/</p> <p>985 Ngõng côn
<i>Taper journal</i>
/ˈteɪpə ˈdʒɜːnl/</p> <p>986 Ngõng cầu
<i>Spherical journal</i>
/ˈsferɪkl ˈdʒɜːnl/</p> <p>987 Vai ngõng
<i>Collar journa</i>
/ˈkɒlə ˈdʒɜːnl/</p> <p>988 Mặt bích
<i>Collar</i>
/ˈkɒlətr/</p> <p>989 Gờ biên
<i>Shoulder</i>
/ˈʃəʊldətr/</p> <p>990 Rãnh
<i>Groove</i>
/ɡruːv/</p> |
|---|---|

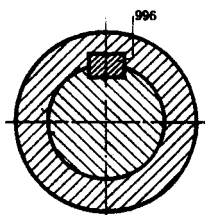
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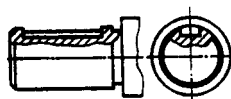
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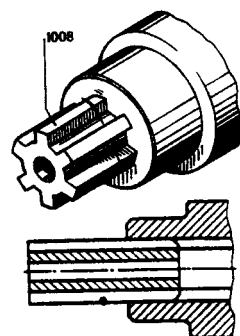
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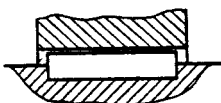
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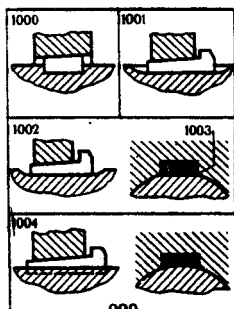
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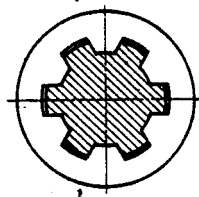
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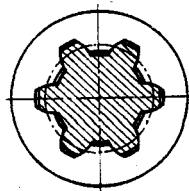
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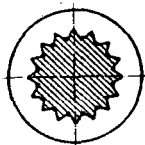


1010



991 Góc lượn*Fillet**/fɪlɪt/***992 Vạt cạnh***Chamfer**/ʃæmfə(r)/***993 Mặt đầu***Face**/feɪs/***994 Vòng định vị***Setting ring**/setɪŋ rɪŋ/***THEN CHÓT VÀ GHÉP****THEN HOA****KEY AND SPLINE JOINTS****995 Liên kết chốt***Key joint**/kiː dʒɔɪnt/***996 Chốt, chêm***Key**/kiː/***997 Chốt chìm song song***Straight sunk key,**parallel key**/streɪt sʌŋk kiː, 'pærəlel kiː/***998 Chốt bán trụ***Wood ruff key**/wʊd rʌf kiː/***999 Chốt côn***Taper key**/teɪpə 'kiː/***1000 Chốt côn chìm***Taper sunk key**/teɪpə sʌŋk 'kiː/***1001 Chốt côn đầu chặn***Gib head taper key**/gɪb .hed ,teɪpə kiː/***1002 Then phẳng***Flat key**/flæt 'kiː/***1003 Đầu phẳng***Flat**/flæt/***1004 Then ma sát***Saddle key**/sædl kiː/***1005 Then tiếp tuyến***Tangential key**/tæŋ'ʃɛnʃəl kiː/***1006 Rãnh chốt, rãnh then***Keyway, keyseat**/kiːweɪ, 'kiːsiːt/***1007 Ghép then hoa***Spline joint**/splaɪn dʒɔɪnt/***1008 Trục then hoa***Spline shaft**/splaɪn ʃɑːft/***1009 Mối ghép then hoa thẳng***Straight spline joint**/streɪt splaɪn dʒɔɪnt/***1010 Ghép then hoa trong***Involute spline joint**/ɪnvəluːt splaɪn dʒɔɪnt/*

1011



1012



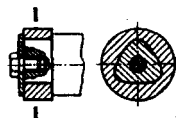
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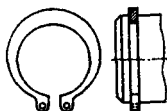
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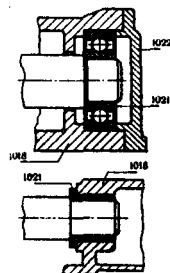
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1016



1017



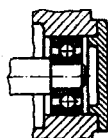
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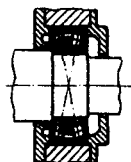
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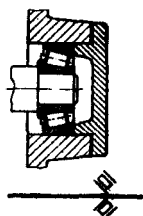
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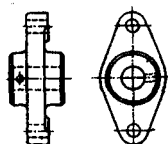
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1026



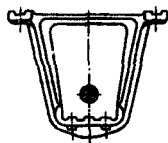
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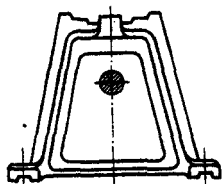


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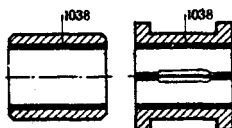


1011 Mối ghép then răng cưa*Serrated joint**/sɪ'reɪtɪd dʒɔɪnt/***1012 Lắp theo đường kính****đỉnh then***Major-diameter fit**/ˈmeɪdʒə daɪ'æmɪtə fit/***1013 Lắp theo đường kính****chân then***Minor-diameter fit**/ˈmaɪnə daɪ'æmɪtə fit/***1014 Lắp theo biên dạng****then***Side-bearing fit**/saɪd 'beərɪŋ fit/***1015 Mối ghép trục đa cạnh***Polygon shaft joint**/ˈpɒlɪɡən ʃɑːft dʒɔɪnt/***1016 Vòng giữ***Retaining ring**/rɪ'teɪnɪŋ rɪŋ/***GỐI ĐỖ, Ổ ĐỖ****SUPPORTS AND BEARING****1017 Gối đỡ***Support**/sə'pɔ:t/***1018 Thân ổ trục***Housing**/ˈhaʊsɪŋ/***1019 Vỏ bọc cứng, liền khối***Solid housing**/sɒlɪd 'haʊsɪŋ/***1020 Vỏ bọc rời***Split housing**/splɪt 'haʊsɪŋ/***1021 Vòng đỡ***Bearing**/ˈbeərɪŋ/***1022 Nắp ngoài***Cover**/ˈkʌvə(r)/***1023 Ổ lăn bi***Radial bearing**/ˌreɪdɪəl 'beərɪŋ/***1024 Ổ lăn nhào (bạc đạn nhào)***Self-aligning bearing**/self ə'laɪnɪŋ 'beərɪŋ/***1025 Ổ chặn***Thrust bearing**/θrʌst 'beərɪŋ/***1026 Ổ đỡ chặn***Radial and thrust**bearing**/ˌreɪdɪəl ɒn θrʌst 'beərɪŋ/***1027 Bích ổ đỡ***Flange bearing**/ˈflændʒ 'beərɪŋ/***1028 Tấm cơ sở***Base plate**/ˈbeɪs pleɪt/***1029 Giá treo***Hanger**/ˈhæŋɡə(r)/*

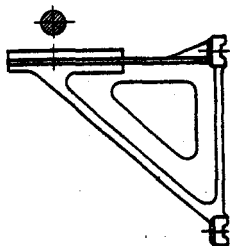
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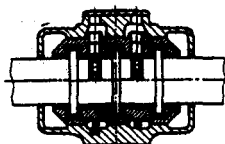
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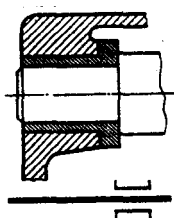
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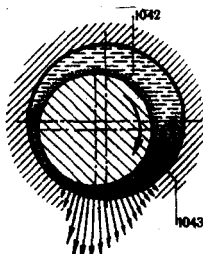
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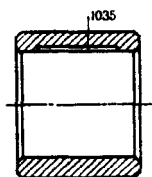
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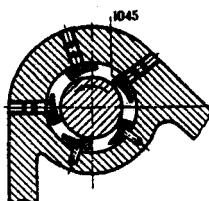
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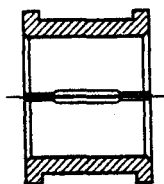
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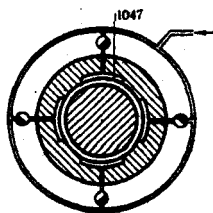
1044



1036



1046



1030 Giá đỡ

Bearing base
/ˈbeərɪŋ beɪs/

1031 Giá lắp

Bracket
/ˈbræki/

1032 Ổ trượt, trơn

Sliding bearing, plain bearing
/ˈslaɪdɪŋ ˈbeərɪŋ, pleɪn ˈbeərɪŋ/

1033 Ống lót ổ trục

Bearing shell
/ˈbeərɪŋ ʃel/

1034 Ống lót cứng, liền khối

Solid bearing shell, bearing bushing
/ˈsɒlɪd ˈbeərɪŋ ʃel, ˈbeərɪŋ ˈbʊʃɪŋ/

1035 Rãnh dầu

Oil groove
/ɔɪl ɡruːv/

1036 Ống lót có rãnh

Split bearing shell
/ˈsplɪt ˈbeərɪŋ ʃel/

1037 Luồng kim (ống lót

kim loại

kép)

Bimetal shell
/baɪˈmetəl ʃel/

1038 Lớp chống ma sát

Antifriction lining
/æntɪˈfrɪkʃn ˈlaɪnɪŋ/

1039 Ổ trượt tự bôi trơn

Self-lubricating bearing, oilless bearing
/ˈself ˌluːbrɪˈkeɪtɪŋ ˈbeərɪŋ, ˈɔɪls ˈbeərɪŋ/

1040 Ổ trượt chặn có gờ

Collar thrust bearing
/ˈkɒlə θrəʃt ˈbeərɪŋ/

1041 Ổ trượt thủy động

Hydrodynamic bearing
/ˈhaɪdrəʊdaɪˈnæmɪk ˈbeərɪŋ/

1042 Màng dầu

Oil film
/ɔɪl fɪlm/

1043 Màng dầu chêm

Oil-film wedge
/ˈɔɪlfɪlm ˈwedʒ/

1044 Ổ trượt guốc vòng

Segment shoe bearing
/ˈseɡmənt ʃuː ˈbeərɪŋ/

1045 Guốc ổ trượt

Bearing shoe
/ˈbeərɪŋ ʃuː/

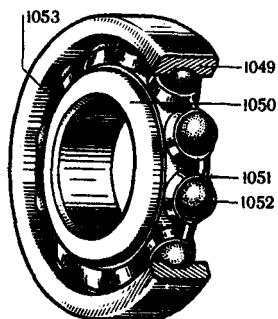
1046 Ổ trượt thủy tĩnh

Hydrostatic bearing
/ˈhaɪdrəʊ ˈstætɪk ˈbeərɪŋ/

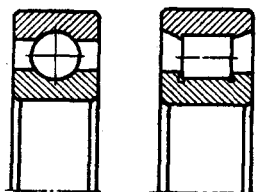
1047 Hốc dầu

Oil pocket
/ɔɪl ˈpɒkɪt/

1048



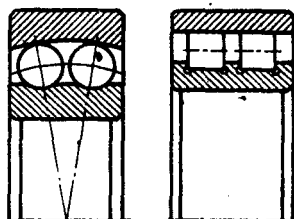
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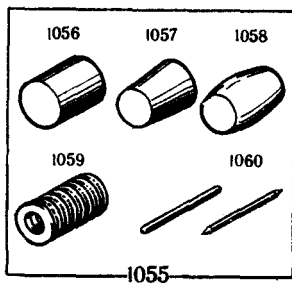
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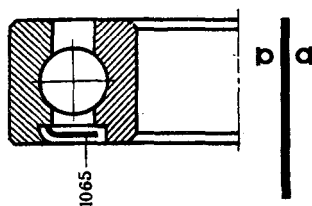
1062



1055



1064



1048 Ổ lăn (bạc đạn)

*Antifriction bearing,
rollingelement bearing*
/ænti'frɪkʃn beɪərɪŋ/
/rɔʊlɪŋ 'elɪmənt
'beɪərɪŋ/

1049 Vòng ngoài

Outer ring
/aʊtərɪŋ/

1050 Vòng trong

Inner ring
/ɪnərɪŋ/

1051 Vòng cách

Separator, cage
/ˌsepə'reɪtə(r), keɪdʒ/

1052 Phần tử lăn

Rolling element
/rɔʊlɪŋ 'elɪmənt/

1053 Rãnh lăn

Race
/reɪs/

1054 Bi cầu

Ball
/bɔ:l/

1055 Bi lăn

Roller
/rɔʊlə(r)/

1056 Bi trụ, bi dũa

*Cylindrical roller, plain
roller, straight roller*
/sɪ'lɪndrɪkl 'rɔʊlə(r), pleɪn
'rɔʊlə(r), streɪt 'rɔʊlə(r)/

1057 Bi trụ côn

Taper roller
/ˌteɪpə rɔʊlə(r)/

1058 Bi hình trống

Barrel-shaped roller
/ˌbærəl ʃeɪpt 'rɔʊlə(r)/

1059 Bi trụ xoắn

Helical roller
/helɪkl 'rɔʊlə(r)/

1060 Bi kim

Needle roller, needle
/ni:dl 'rɔʊlə, ,ni:dl/

1061 Ổ bi một tầng

Single-row bearing
/ˌsɪŋɡl rɔʊ 'beərɪŋ/

1062 Ổ bi 2 tầng

*Double-row antifriction
bearing*
/ˌdʌbl rɔʊ ænti'frɪkʃn
'beɪərɪŋ/

1063 Ổ bi

Ball bearing
/bɔ:l beɪərɪŋ/

1064 Ổ bi hình vòng

Annular ball bearing
/ˌænjʊlə bɔ:l 'beərɪŋ/

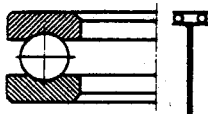
1065 Miếng chắn

Shield
/ʃi:ld/

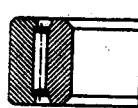
1066 Ổ bi chặn

Ball thrust bearing
/bɔ:l θrʌst beɪərɪŋ/

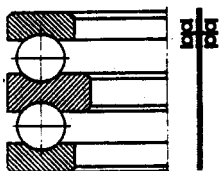
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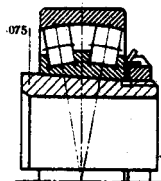
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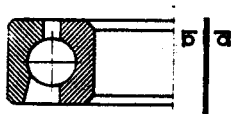
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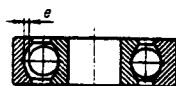
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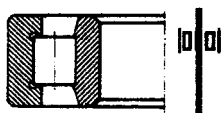
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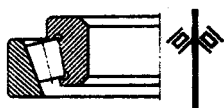
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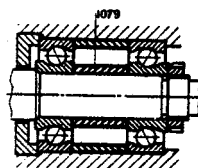
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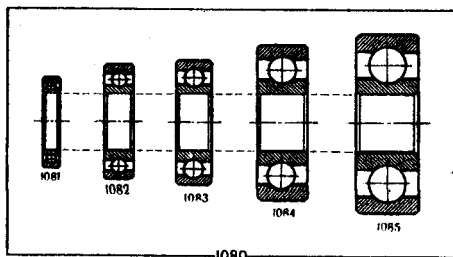
1072



1078

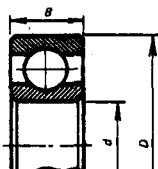


1080



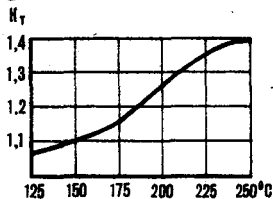
- 1067 Ổ bi chặn đơn**
Single-direction ball thrust bearing
 /ˌsɪŋɡl dɪ'rekʃn bɔ:l θrəst 'beərɪŋ/
- 1068 Ổ bi chặn kép**
Double-direction ball thrust bearing
 /ˌdʌbl dɪ'rekʃn bɔ:l θrəst 'beərɪŋ/
- 1069 Ổ bi tiếp xúc góc**
Angular-contact ball bearing
 /ˌæŋɡjʊlə .kɒntækt bɔ:l 'beərɪŋ/
- 1070 Ổ lăn trụ**
Roller bearing
 /ˌrɔ:lɪŋ 'beərɪŋ/
- 1071 Ổ lăn trụ trơn**
Plain roller bearing
 /pleɪn .rɔ:lɪŋ 'beərɪŋ/
- 1072 Ổ lăn côn nghiêng**
Tapered roller bearing
 /ˌteɪpəd .rɔ:lɪŋ 'beərɪŋ/
- 1073 Ổ lăn kim**
Needle roller bearing
 /ˌni:dl .rɔ:lɪŋ 'beərɪŋ/
- 1074 Ổ lăn trụ cầu**
Spherical roller bearing
 /ˌsfɪərɪkl .rɔ:lɪŋ 'beərɪŋ/
- 1075 Ống lót trượt**
Adapter sleeve
 /ə'dæptə sli:v/
- 1076 Khe hở bán kính**
Radial clearance
 /ˌreɪdɪəl 'kliərəns/
- 1077 Độ lệch trục**
Axial play
 /ˌæksɪəl pleɪ/
- 1078 Sự quá tải đối với ổ lăn**
Preloading of the antifriction bearing
 /ˌpri'lɔ:ðɪŋ əv ði .æntɪ'frɪkʃn 'beərɪŋ/
- 1079 Ống lót ngăn cách**
Distance sleeve
 /ˌdɪstəns sli:v/
- 1080 Chuỗi các ổ lăn**
Series of antifriction bearing
 /ˌsiəri:z əv æntɪ'frɪkʃn 'beərɪŋ/
- 1081 Chuỗi siêu nhẹ**
Super light series
 /ˌsʊpə laɪt 'siəri:z/
- 1082 Chuỗi rất nhẹ**
Extra light series
 /ˌekstrə laɪt 'siəri:z/
- 1083 Chuỗi nhẹ**
Light series
 /laɪt 'siəri:z/
- 1084 Chuỗi trung bình**
Medium series
 /ˌmi:diəm 'siəri:z/
- 1085 Chuỗi nặng**
Heavy series
 /ˌhevi 'siəri:z/

1086

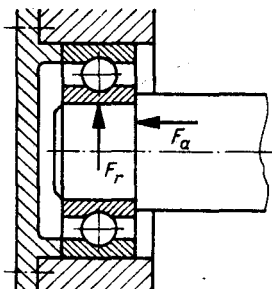


d	D	B	C, кгс	C ₀ , кгс
25	52	15	1100	700
25	80	21	2920	2080
50	90	20	2780	2020

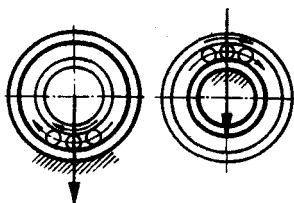
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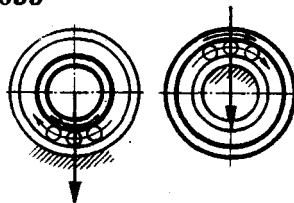
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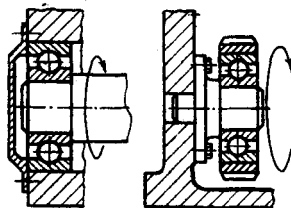
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1099



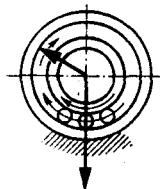
1091



V=1

V=1,2

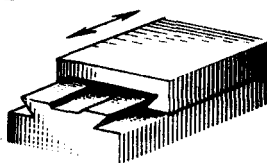
1100



1093

КОЭФФИЦИЕНТ НАГРУЗКИ ПОДШИПНИКА (1092, 1093)	
$F_a < 0.2F_r$	$F_a \geq 0.2F_r$
X = 1	X = 0.56
Y = 0	Y = 1.0...2.0

1101



- 1086** Mức tải trọng cơ sở,
mức tải trọng động
lực
Basic load
rating, dynamic load
rating (C)
/beisik ləʊd 'reɪtɪŋ,
daɪ'næmɪk ləʊd 'reɪtɪŋ/
- 1087** Mức tải trọng tĩnh
Static load rating (Co)
/stætɪk ləʊd 'reɪtɪŋ/
- 1088** Tải trọng hướng kính
Radial load
/reɪdɪəl ləʊd/
- 1089** Tải trọng hướng trục
Axial load
/æksɪəl ləʊd/
- 1090** Tải trọng hướng kính
tương đương
Equivalent radial load
/ɪkwɪvələnt 'reɪdɪəl ləʊd
'beɪtɪŋ/
- 1091** Hệ số quay
Rotation factor
/rəʊ'teɪʃn 'fæktə(r)/
- 1092** Hệ số hướng kính
Radial factor
/reɪdɪəl 'fæktə(r)/
- 1093** Hệ số chặn
Thrust factor
/θrəst 'fæktə(r)/
- 1094** Hệ số an toàn
Factor of safety
/fæktə(r)əv 'sefti/

- 1095** Hệ số nhiệt độ
Temperature factor
/ˌtemprətʃə 'fæktə(r)/
- 1096** Tuổi bền của ổ lăn
Rating life of a bearing
/reɪtɪŋ laɪf əv ə 'beɪtɪŋ/
- 1097** Kiểu tải trọng đối với ổ
lăn
Type of loading of
antifriction bearing
/aɪp əv 'ləʊdɪŋ əv
æntɪ'frɪkʃn 'beɪtɪŋ/
- 1098** Tải trọng cục bộ
Local loading
/ˌləʊkl 'ləʊdɪŋ/
- 1099** Tải trọng theo chu vi
Circulation loading
/sɜ:kjʊ'leɪʃn 'ləʊdɪŋ/
- 1100** Tải trọng dao động
Oscillation loading
/ə'sɪ'leɪʃn 'ləʊdɪŋ/

HỆ DẪN

GUIDEWAYS

- 1101** Hướng, dẫn hướng
Guideway, guide
/ˌgaɪdweɪ, ˌgaɪd/
- 1102** Sự dẫn hướng kiểu
trượt
Sliding guideways
/ˌslaɪdɪŋ ˌgaɪdweɪz/

1103



1104



1105



1106



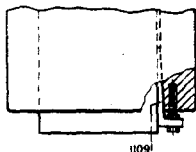
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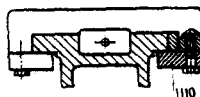
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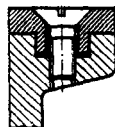
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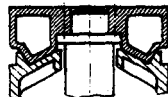
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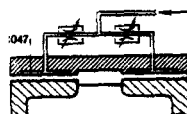
1111



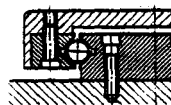
1112



1113



1115



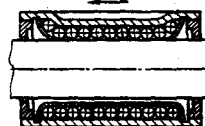
1116



1117



1118



1103 Dẫn hướng kín

Closed guideways
/kləʊzd 'gaidweɪz/

1104 Dẫn hướng mở

Open guideways
/ˌɒpən 'gaidweɪz/

1105 Dẫn hướng phẳng

Flat guideway
/flæt 'gaidweɪ/

1106 Dẫn hướng chữ V

V-guideway
/vi: 'gaidweɪ/

1107 Dẫn hướng ăn khớp

đuôi én
Dovetail guideway
/ˌdʌvteɪl 'gaidweɪ/

1108 Dẫn hướng trụ

Cylindrical guideway
/sɪ'lɪndrɪkl 'gaidweɪ/

1109 Chốt hãm côn

Taper gib
/ˌteɪpə 'gɪb/

1110 Vòng kẹp

Clamping strip
/klæmpɪŋ stri:p/

1111 Dẫn hướng ở phía trên

Built-up guideway
/ˌbɪltʌp 'gaidweɪ/

1112 Dẫn hướng vòng

Circular guideway
/ˌsɜ:kjʊlə 'gaidweɪ/

1113 Dẫn hướng thủy tĩnh

Hydrostatic guideway
/ˌhaɪdrəʊ'stætɪk 'gaidweɪ/

**1114 Ổ trượt chống ma sát
chuyển động tịnh
tính**

Linear-motion
antifriction bearings
/ˌlɪniə 'məʊʃn
æntɪ'frɪkʃn 'beərɪŋz/

1115 Dẫn hướng đỡ cầu

Ball-bearing guideways
/bɔ:l .beərɪŋ 'gaidweɪz/

1116 Dẫn hướng ổ trục

Roller-bearing
guideways
/ˌrɔ:lə beərɪŋ 'gaidweɪz/

**1117 Dẫn hướng ở trụ tuyến
tính**

Linear-motion roller
bearing
/ˌlɪniə 'məʊʃn .rɔ:lə
'beərɪŋ/

1118 Ống lót ổ bi

Ball-bearing bushing
/bɔ:l .beərɪŋ ˈbʊʃɪŋ/

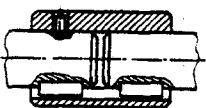
LY HỢP VÀ KHỚP NỐI**CLUTCHES AND
COUPLINGS****1119 Ly hợp, khớp nối trục**

Clutch; shaft coupling
/klaʊʃ .fa:ft 'kʌplɪŋ/

1121



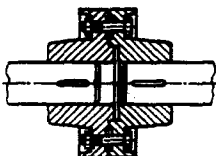
1122



1123



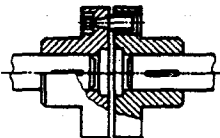
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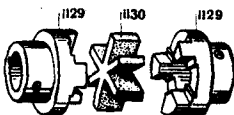
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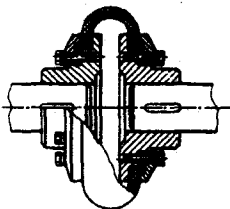
1127



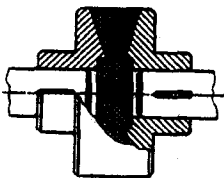
1128



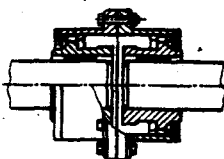
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1132



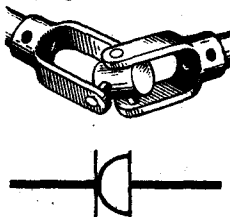
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1134

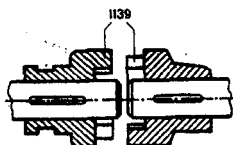


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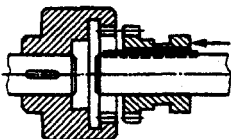


- 1120** Sự nối khớp, sự nối trục
Coupling, shaft coupling
/kʌplɪŋ/
- 1121** Khớp nối cứng
Rigid coupling
/ˌrɪdʒɪd ˈkʌplɪŋ/
- 1122** Khớp nối kiểu ống
Sleeve coupling
/sli:v ˈkʌplɪŋ/
- 1123** Khớp ống chẻ
Split muff coupling
/splɪt mʌf ˈkʌplɪŋ/
- 1124** Khớp bích
Flange coupling
/flændʒ ˈkʌplɪŋ/
- 1125** Khớp mềm, khớp đàn hồi
Flexible coupling
/ˌfleksəbl ˈkʌplɪŋ/
- 1126** Khớp dùng vật liệu đàn hồi
Resilient-material coupling
/rɪˈzɪliənt məˈtɪəriəl ˈkʌplɪŋ/
- 1127** Khớp mềm chốt và ống lót
Pin-and-bushing flexible coupling
/pɪn ən .bʊʃɪŋ ˌfleksəbl ˈkʌplɪŋ/
- 1128** Khớp cao su hình sao
Rubber spider coupling
/ˌrʌbə ˌspɑɪdə ˈkʌplɪŋ/
- 1129** Một nửa khớp nối
Half of the coupling
/hʌf əv ðə ˈkʌplɪŋ/
- 1130** Cao su hình sao
Rubber spider
/ˌrʌbə ˌspɑɪdə/
- 1131** Khớp nối bánh cao su
Rubber tyre coupling
/ˌrʌbə taɪə ˈkʌplɪŋ/
- 1132** Khớp nối đệm cao su
Rubber annulus coupling
/ˌrʌbə ɹˈænjʊləs ˈkʌplɪŋ/
- 1133** Khớp nối răng
Gear coupling
/gɪə ˈkʌplɪŋ/
- 1134** Khớp nối trượt, khớp nối oldham
Oldham coupling, slider coupling
/ˌɔldəm ˈkʌplɪŋ
ˌslaɪdə ˈkʌplɪŋ/
- 1135** Khớp nối vạn năng
Universal joint, Hooke's coupling
/ˌjuːnɪvɜːsl dʒɔɪnt ˌhʊks ˈkʌplɪŋ/
- 1136** Ly hợp
Clutch
/klaʃ/
- 1137** Ly hợp dẫn động ngoài
Externally actuated clutch
/ˌkʰsts-nli ˈækt/veɪd klaʃ/

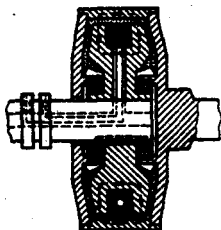
1138



1140



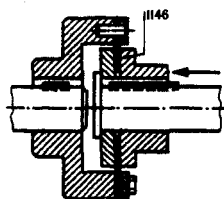
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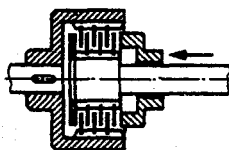
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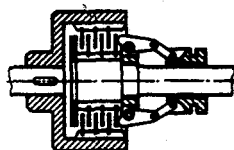
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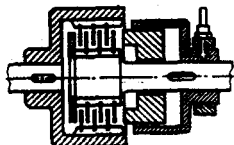
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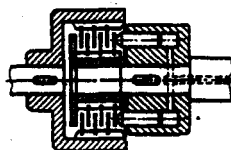
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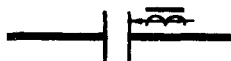
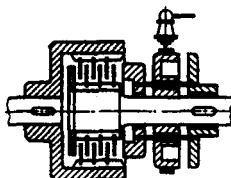
1148



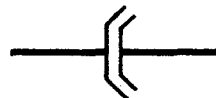
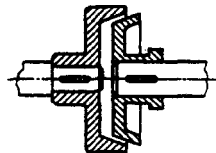
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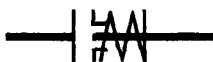
1150



1151

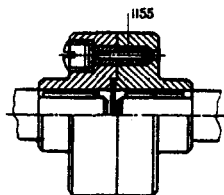


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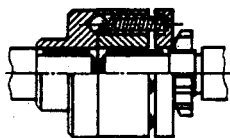


- 1138** Ly hợp vấu
Positive-contact clutch, jaw clutch
 /pəzitiv 'kɒntækt klʌtʃ/
 ɔʃɔ: klʌtʃ/
- 1139** Vấu
jaw
 /ɔʃɔ:/
- 1140** Ly hợp răng
Gear clutch
 /gɪə klʌtʃ/
- 1141** Ly hợp dòng từ sinh
Magnetic fluid clutch^a
 /mæɡ'netɪk 'flʊɪd klʌtʃ/
- 1142** Ly hợp ma sát
Friction clutch
 /'frɪkʃn klʌtʃ/
- 1143** Ly hợp đĩa
Disk clutch
 /dɪsk klʌtʃ/
- 1144** Ly hợp đĩa đơn
Single-disk clutch
 /,sɪŋɡl dɪsk 'klʌtʃ/
- 1145** Ly hợp nhiều đĩa
Multiple-disk clutch
 /,mʌltɪpl dɪsk 'klʌtʃ/
- 1146** Đĩa ma sát
Friction disk
 /'frɪkʃn dɪsk/
- 1147** Ly hợp ma sát cần dẫn động
Lever-actuated friction clutch
 /'levə æktɪ'veɪd 'frɪkʃn klʌtʃ/
- 1148** Ly hợp ma sát dẫn động bằng khí nén
Air-actuated friction clutch
 /eə æktɪ'veɪd 'frɪkʃn klʌtʃ/
- 1149** Ly hợp ma sát dẫn động bằng dầu ép
Oil-actuated friction clutch
 /'ɔɪl æktɪ'veɪd 'frɪkʃn klʌtʃ/
- 1150** Ly hợp ma sát điện từ
Electromagnetic friction clutch
 /ˌɛləkt'rɔʊmæɡ'netɪk 'frɪkʃn klʌtʃ/
- 1151** Ly hợp côn
Cone clutch
 /kɒn klʌtʃ/
- 1152** Ly hợp tự dẫn động
Self-actuated clutch
 /ˌself æktɪ'veɪd 'klʌtʃ/
- 1153** Ly hợp an toàn
Safety clutch, overload release clutch
 /ˌseɪfə klʌtʃ ɔʊvə'lɒd rɪ'li:s klʌtʃ/

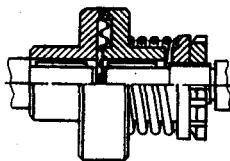
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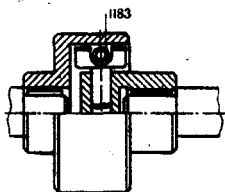
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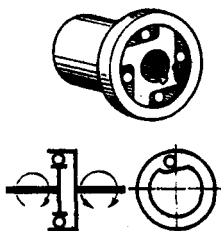
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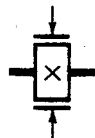
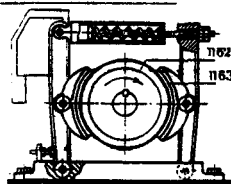
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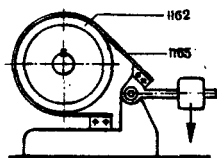
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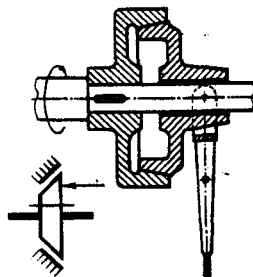
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1164



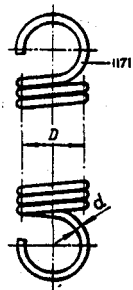
1166



1168



1169



1154 Ly hợp cắt khi quá tải*Overload shearing clutch*

/ɔʊvə'lɔʊd 'ʃiəriŋ

klʌʃ/

1155 Chốt cắt*Shear pin*

/'ʃiə piŋ/

1156 Ly hợp nhả quá tải kiểu**bi***Ball-type overload-**release clutch*

/bɔ:l taɪp ɔʊvə'lɔʊd ri'li:s

klʌʃ/

1157 Ly hợp nhả quá tải kiểu**vầu***jaw-type overload-**release clutch*

/dʒɔ:taɪp. ɔʊvə'lɔʊd

ri'li:s/

1158 Ly hợp ly tâm*Centrifugal clutch*

/'sentri'fju:ɡəl klʌʃ/

1159 Ly hợp chạy tự do*Overrunning clutch*

/ɔʊvə'rʌniŋ klʌʃ/

1160 Thắng (phanh)*Brake*

/breɪk/

1161 Thắng kiểu khối*Block brake*

/blɒk breɪk/

1162 Trống thắng*Brake drum*

/breɪk drʌm/

1163 Khối thắng*Brake block*

/breɪk blɒk/

1164 Thắng đai*Band brake*

/bənd breɪk/

1165 Đai thắng*Brake band*

/breɪk bænd/

1166 Thắng côn*Cone brake*

/kɔ:n breɪk/

LÒ XO VÀ NHIẾP**SPRINGS****1167 Lò xo***Spring*

/sprɪŋ/

1168 Lò xo xoắn ốc*Helical spring*

/helɪkəl sprɪŋ/

1169 Lò xo dãn nở trụ*Cylindrical extension**spring*

/sɪ'lɪndrɪkəl ɪk'stenʃn

sprɪŋ/

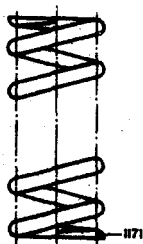
1170 Vòng xoắn lò xo*Spring coil, spring turn*

/sprɪŋ kəʊl, sprɪŋ tɜ:n/

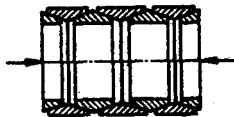
1171 Đầu móc*Hook end*

/hʊkend/

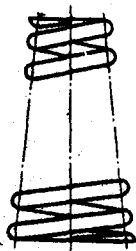
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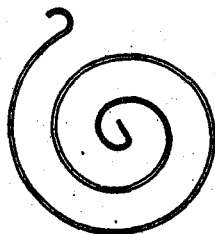
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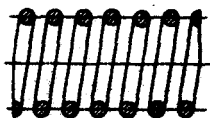
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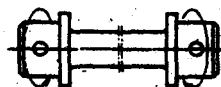
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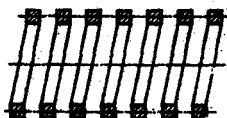
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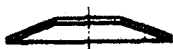
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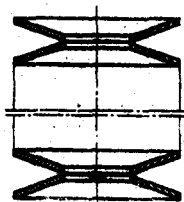
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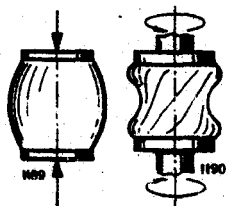
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1182



1188

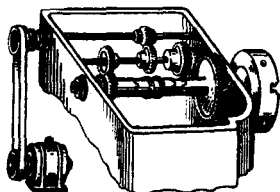


- 1172 Đường kính trung bình của lò xo**
Mean spring diameter
 /mɪn sprɪŋ daɪ'æmɪtə(r)/
- 1173 Đường kính dây**
Wire diameter
 /waɪə daɪ'æmɪtə(r)/
- 1174 Chỉ số lò xo**
Spring index
 /sprɪŋ ɪn'deks/
- 1175 Độ cứng lò xo**
Spring rate
 /sprɪŋ reɪt/
- 1176 Lò xo nén kiểu trụ**
Cylindrical compression spring
 /sɪ'lɪndrɪkl kəm'preʃn sprɪŋ/
- 1177 Đầu xoắn lò xo**
Squared end turn, close end turn
 /ˌskweədnd tɜːn kləʊzd end tɜːn /
- 1178 Lò xo côn**
Conical spring
 /kə'nɪkl sprɪŋ/
- 1179 Lò xo dây tròn**
Spring of round wire
 /sprɪŋ əv raʊnd waɪə(r)/
- 1180 Lò xo dây chữ nhật**
Spring of rectangular wire
 /sprɪŋ əv rek'tæŋgʊlə waɪə(r) /
- 1181 Lò xo belleville**
Belleville spring
 /ˈbelvɪl sprɪŋ/
- 1182 Chồng lò xo belleville**
Set of Belleville springs
 /ˌset əv ˈbelvɪl sprɪŋ/
- 1183 Lò xo vòng**
Ring spring
 /rɪŋ sprɪŋ/
- 1184 Lò xo xoắn ốc**
Spiral spring
 /ˈspəʊl sprɪŋ/
- 1185 Lò xo thanh xoắn**
Torsion bar spring
 /tɔːʃn bɑː sprɪŋ/
- 1186 Lò xo lá**
Leaf spring
 /liːf rɪŋ/
- 1187 Nhíp nhiều lá**
Multiple-leaf spring
 /ˌmʌltɪpl ˈliːf sprɪŋ/
- 1188 Lò xo khối**
Block spring
 /ˈblɒk sprɪŋ/
- 1189**
Rubber-block compression
 /ˈrʌbər.blɒk kəm'preʃn sprɪŋ/
- 1190**
Rubber-block torsion spring
 /ˈrʌbər.blɒk tɔːʃn sprɪŋ/

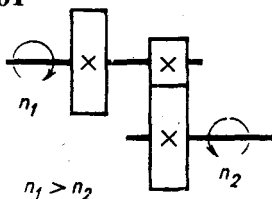
CƠ CẤU VÀ TRUYỀN ĐỘNG

POWER TRANSMISSION AND MECHANISMS

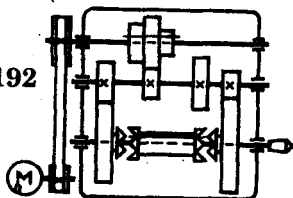
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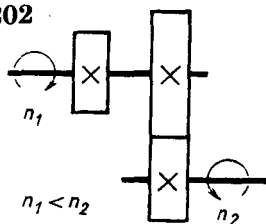
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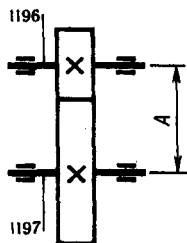
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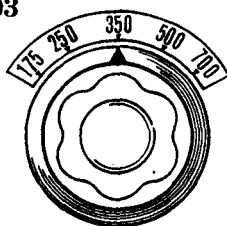
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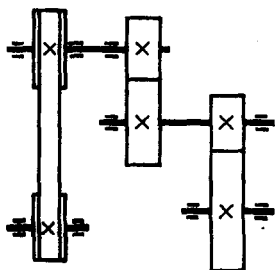
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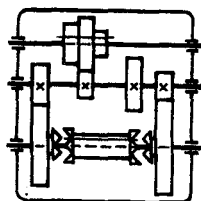
1203



1200



1204



CƠ CẤU VÀ TRUYỀN ĐỘNG

POWER TRANSMISSION AND MECHANISMS

KHÁI NIỆM CHUNG

GENERAL TERMS

1191 Sự truyền động

Drive

/draɪv/

1192 Sơ đồ động

Kinematic diagram

/kɪnɪ'mætɪk 'daɪəgræm/

1193 Truyền động công suất

Power transmission,

transmission

/pəʊə træn'z'mɪʃn/

1194 Truyền động một cấp

Single-stage transmission

/ˌsɪŋɡl steɪdʒ

træn'z'mɪʃn/

1195 Khoảng cách tâm

Centre distance

/ˈsentə 'dɪstəns/

1196 Trục dẫn động

Driving shaft

/draɪvɪŋ ʃɑːft/

1197 Trục bị dẫn

Driven shaft

/drɪvən ʃɑːft/

1198 Tỷ số tốc độ

Velocity ratio, Speed

ratio

/vɪləsəti 'reɪfɪəʊ spɪd

'reɪfɪəʊ/

1199 Tỷ số truyền động

Transmission ratio

/trænz'mɪʃn 'reɪfɪəʊ/

1200 Truyền động nhiều cấp

Multi-stage transmisson

/ˌmʌlti steɪdʒ

træn'z'mɪʃn/

1201 Truyền động giảm tốc

Underdrive transmission,

reducing transmission

/ˌʌndədraɪv træn'z'mɪʃn

rɪ'djuːsɪŋ/

1202 Truyền động tăng tốc

Overdrive transmission,

stepup transmission

/ˌoʊvədraɪv træn'z'mɪʃn

ˌstepˌʌp/

1203 Thay đổi tốc độ theo

cấp

Stepped speed variation

/stept spɪd v'eəri'eɪʃn/

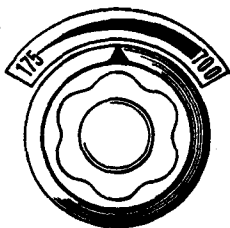
1204 Hộp bánh răng truyền

động

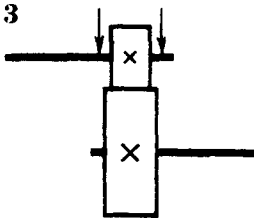
Transmission gearbox

/træn'z'mɪʃn ɡɪˈbɒks/

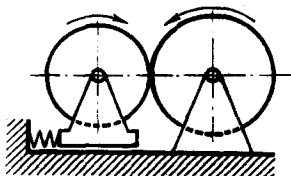
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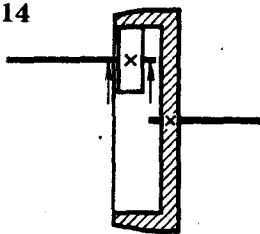
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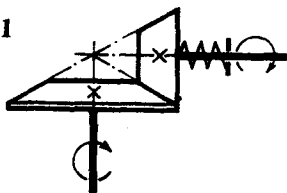
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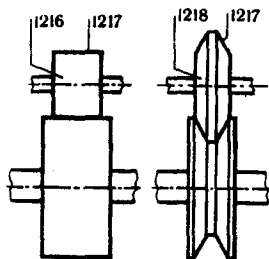
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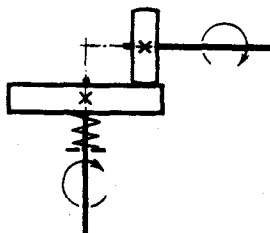
1211



1215



1212



1205 Chuỗi tốc độ
Series of speeds
 /'stɔ:ri:z əv spi:dz/

1206 Khoảng biến đổi
Range of variation
 /reɪndʒ əv veəri'eɪʃn/

1207 Tỷ số chung của chuỗi
 tốc độ
*Common ratio of the
 series of speeds*
 /,kɒmən 'reɪʃɪʊ əv óə
 'stɔ:ri:z əv spi:dz/

1208 Biến đổi tốc độ và cấp
Stepless speed variations
 /,stepləs spi:d vəri'eɪʃn/

TRUYỀN ĐỘNG MA SÁT FRICTION GEARINGS

1209 Truyền động ma sát
Friction gearing
 /'frɪkʃn 'gɪərɪŋ/

1210
Spur friction gearing
 /ˈspɜ: 'frɪkʃn 'gɪərɪŋ/

1211 Truyền động ma sát
 côn
Cone friction gearing
 /kəʊn 'frɪkʃn 'gɪərɪŋ/

1212 Truyền động ma sát
 mặt
Frontal friction gearing
 /ˌfrʌntl 'frɪkʃn 'gɪərɪŋ/

1213 Truyền động ma sát
 tiếp xúc ngoài
*External-contact friction
 gearing*
 /ɛk'stɜ:nl 'kɒntækt 'frɪkʃn
 'gɪərɪŋ/

1214 Truyền động ma sát
 tiếp xúc trong
*Internal-contact friction
 gearing*
 /ɪn'tɜ:nl 'kɒntækt 'frɪkʃn
 'gɪərɪŋ/

1215 Bánh ma sát, đĩa ma sát
*Friction wheel, friction
 disk*
 /'frɪkʃn wɪl dɪsk/

1216 Bánh ma sát vành
 phẳng
*Flat-faced-rim
 frictionwheel*
 /flæt feɪst ,rɪm 'frɪkʃn
 wɪl/

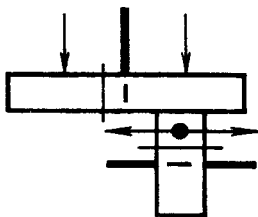
1217 Vành bánh
Rim
 /rɪm/

1218 Bánh ma sát có rãnh
Grooved friction wheel
 /gru:vɪd 'frɪkʃn wɪl/

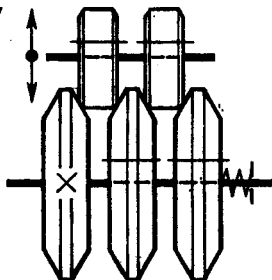
1219 Sự trượt
Slip
 /slɪp/

1220 Trượt tương đối
Relative slip
 /ˌrelatɪv slɪp/

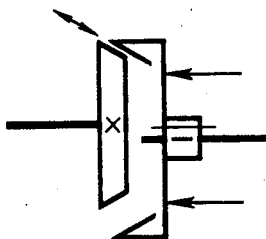
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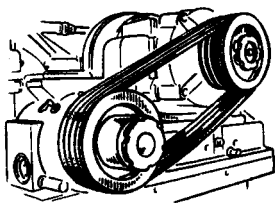
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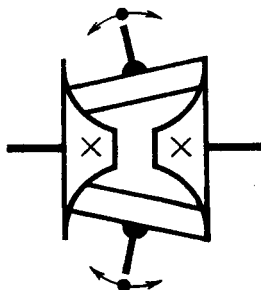
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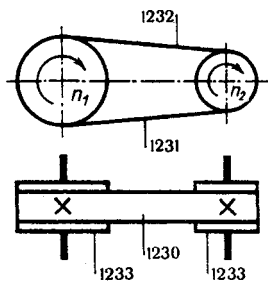
1228



1226



1229



1221 Yếu tố kéo*Pull factor*

/pʊl 'fæktə(r)/

1222 Đặc tính kéo của truyền động ma sát*Pull characteristic of a friction gearing*

/pʊl kærɪktərɪstɪk ɔv ə 'frɪkʃn gɪərɪŋ/

1223 Cụm truyền động ma sát tốc độ thay đổi*Variable-speed friction drive unit*

/ˌveəriəbl 'spi:d 'frɪkʃn draɪv 'ju:nɪt/

1224 Cụm truyền động ma sát phẳng tốc độ thay đổi*Frontal variable-speed friction drive unit*

/ˌfrʌntl ˌveəriəbl 'spi:d 'frɪkʃn draɪv 'ju:nɪt/

1225 Cụm truyền động ma sát côn tốc độ thay đổi*Cone variable-speed friction drive unit*

/kʊn ˌveəriəbl 'spi:d 'frɪkʃn draɪv 'ju:nɪt/

1226 Cụm truyền động ma sát toroit tốc độ thay đổi*Toroidal variable-speed friction drive unit*

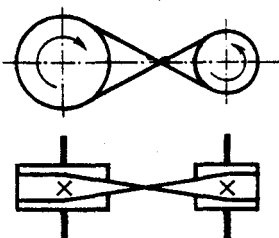
/tɔrɔɪ ˌveəriəbl 'spi:d 'frɪkʃn draɪv 'ju:nɪt/

1227 Cụm truyền động ma sát kiểu đĩa tốc độ thay đổi*Disk-type variable-speed friction drive unit*

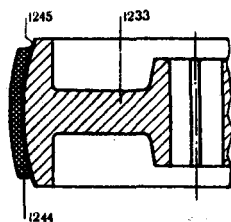
/ˌdisk taɪp ˌveəriəbl 'spi:d/

**TRUYỀN ĐỘNG DAI
BELT DRIVES****1228 Sự truyền động đai**
Belt drive
/bɛlt draɪv/**1229 Truyền động đai hở**
Open-belt drive
/ˌɒpən bɛlt 'draɪv/**1230 Đai**
Belt
/bɛlt/**1231 Mặt truyền động của đai**
Driving side of belt
/ˌdraɪvɪŋ 'saɪd ɔv bɛlt/

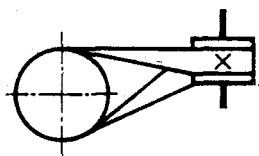
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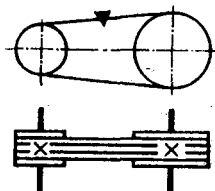
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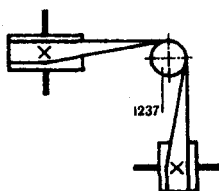
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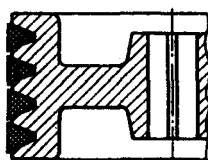
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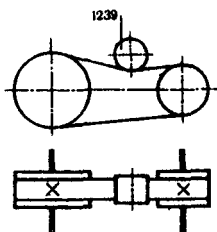
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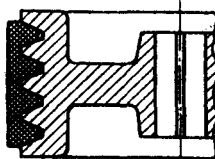
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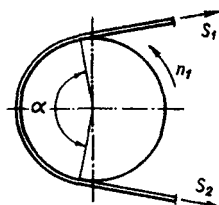
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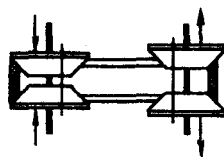
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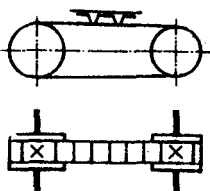
1240



1249



1250



1232 Mặt chùng của đai

Slack side of belt
/slæk 'saɪd əv belt/

1233 Ròng rọc, puli

Pulley
/pʊli/

1234 Truyền động đai chéo

Crossed-belt drive
/ˌkrɒst belt 'draɪv/

1235 Truyền động đai nửa chéo

Quarter-turn belt drive
/ˌkɔːtə tɜːn belt 'draɪv/

1236 Truyền động đai góc

Angular belt drive
/ˌæŋɡjʊlə belt 'draɪv/

1237 Puli dẫn hướng trung gian

Guiding idler pulley
/ˌɡaɪdɪŋ aɪdlə 'pʊli/

1238 Truyền động đai có bộ căng đai

Belt drive with a tensioner
/belt 'draɪv wɪθ ə tenʃnə/

1239 Puli căng đai trung gian

Tensioning idler pulley
/ˌtenʃnɪŋ aɪdlə 'pʊli/

1240 Sự căng đai

Belt tensioning
/belt 'tenʃnɪŋ/

1241 Góc tiếp xúc

Arc of contact
/ɔːk əv 'kɒntækt/

1242 Hệ số kéo

Pull factor
/pʊl 'fæktə/

1243 Truyền động đai dẹp

Flat-belt drive
/flæt belt 'draɪv/

1244 Đai dẹp

Flat belt
/flæt belt/

1245 Rãnh vành khăn

Crowned rim
/ˌkraʊnd 'rɪm/

1246 Truyền động đai-V

V-belt drive
/viː belt 'draɪv/

1247 Đai V

Vee-belt
/viːbelt/

1248 Đai V bội

Multiple vee-belt
/ˌmʌltɪpl 'viːbelt/

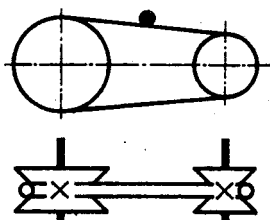
1249 Truyền động đai V vô cấp

V-belt variable-speed drive unit
/viːbelt ˌveɪəriəbl 'spiːd 'draɪv 'juːnɪt/

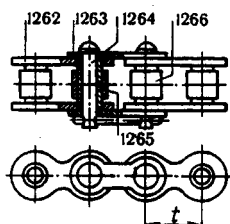
1250 Đai có răng

Timing belt
/ˌtaɪmɪŋ belt/

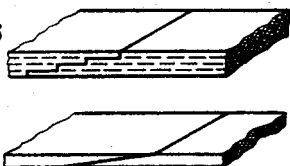
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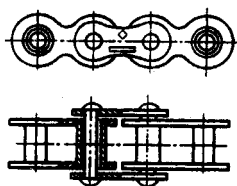
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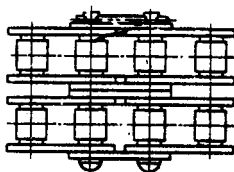
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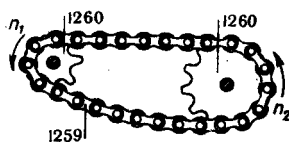
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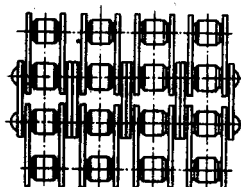
1269



1258



1270



1251 Đai tiết diện tròn

Round belt
/rʌʊnd belt/

1252 Đai da

Leather belt
/leðə belt/

1253 Đai vải sợi

Woven fabric belt
/wʊvən 'fæbrɪk belt/

1254 Đai cao su

Rubber-impregnated belt
/rʌbɔ 'ɪmpregneɪtɪd belt/

1255 Đầu nối đai

Belt joint
/bel dʒɔɪnt/

1256 Mối nối dán

Cemented joint
/sɪ'mentɪd dʒɔɪnt/

1257 Mối nối móc

Laced joint
/leɪst dʒɔɪnt/

TRUYỀN ĐỘNG XÍCH**CHAIN TRANSMISSIONS****1258 Truyền động xích**

Chain transmission
/tʃeɪn trænz'mɪʃn/

1259 Xích truyền động

Power transmission chain
/paʊə trænz'mɪʃn tʃeɪn/

1260 Đĩa răng

Sprocket
/'sprɒkɪt/

1261 Xích lăn

Roller chain
/rɔʊlə tʃeɪn/

1262 Má trong của xích

Roller-link plate
/rɔʊlə lɪŋk pleɪt/

1263 Má ngoài của xích

Pin-link plate
/pɪn lɪŋk pleɪt/

1264 Chốt xích

Pin
/pɪn/

1265 Ống lót chốt xích

Bushing
/'bʊʃɪŋ/

1266 Con lăn

Chain roller
/tʃeɪn 'rɔʊlə/

1267 Bước xích

Pitch of chain
/pɪtʃ əv tʃeɪn/

1268 Xích mắt phẳng

Bushing chain
/'bʊʃɪŋ tʃeɪn/

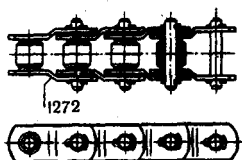
1269 Xích kép

Two-strand chain
tuː strænd tʃeɪn/

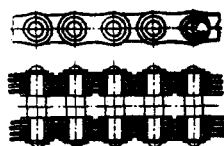
1270 Xích nhiều dây

Multiple-strand chain
/mʌltɪpl strænd tʃeɪn/

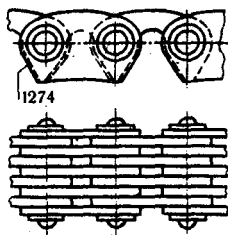
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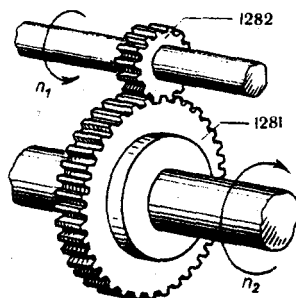
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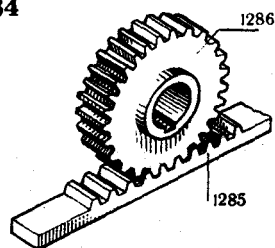
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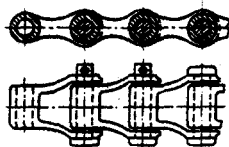
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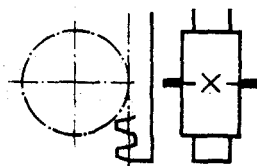
1284



1276



1278



1271 Xích Ewart

Ewart chain
/ɛwət tʃeɪn/

1272 Má xích

Bent plate
/bent plent/

1273 Xích êm

Silent chain
/saɪlənt tʃeɪn/

1274 Tấm giữ hướng

Plate retainer
/plent riˈteɪnə/

1275 Xích tháo được

Detachable chain
/dɪˈtæʃəbəl tʃeɪn/

1276 Xích chốt mắt phẳng

Bushing-stud chain
/bʊʃɪŋ stʊd tʃeɪn/

1277 Xích kéo

Hoisting chain
/ˈhoɪstɪŋ tʃeɪn/

1278 Xích mắt dẻ nâng

Hoisting coil chain
/ˈhoɪstɪŋ kɔɪl tʃeɪn/

1279 Xích nâng mắt dẻ

Flat-link hoisting chain
/flæt lɪŋk ˈhoɪstɪŋ tʃeɪn/

TRUYỀN ĐỘNG BÁNH RĂNG**TOOTHED GEARINGS****1280 Truyền động, bánh răng**

Toothed gearing,
gearing, gear train
/tuːθd ɡiːərɪŋ, ɡiːərɪŋ,
ɡiːə treɪn/

1281 Bánh răng

Toothed gear, gear
/tuːθd ɡiːərɪŋ/

1282 Bánh răng nhỏ

Pinion
/ˈpɪniən/

1283

Number of teeth
/ˈnʌmbər ɒv tiːθ/

1284 Truyền động bánh răng

- thanh răng
Rack-and-pinion
transmission
/ˈræk ən ˈpɪniən
trænzˈmɪʃn/

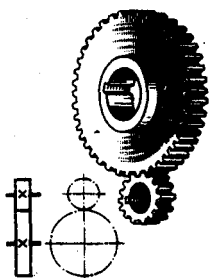
1285 Thanh răng

Gear rack, rack
/ɡiːə ræk/

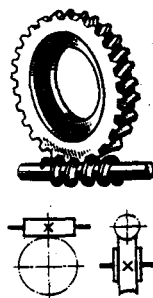
1286 Bánh răng nhỏ

Rack pinion
/ræk ˈpɪniən/

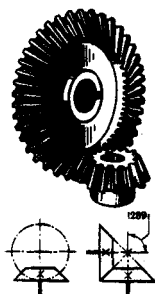
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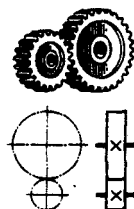
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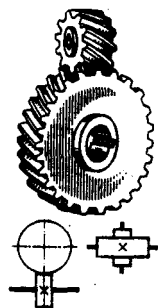
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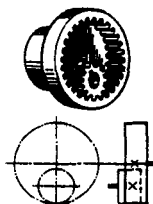
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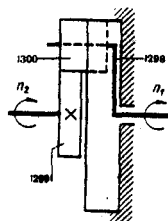
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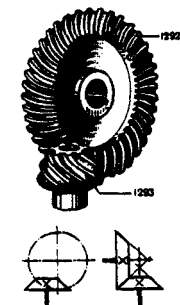
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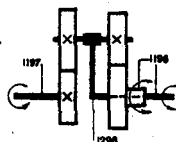
1297



1291



1302



1287 Truyền động bánh răng

trụ

Cylindrical gearing

/sɪˌlɪndrɪkl 'ɡiərɪŋ/

1288 Truyền động bánh răng

côn

Bevel gearing

/ˌbevl 'ɡiərɪŋ/

1289 Góc giữa các trục*Shaft angle*

/ʃɑft 'æŋɡl/

1290 Truyền động bánh răng

xoắn trục vuông góc

*Crossed-axis helical**gearing*

/ˌkrɒst æksɪs ˌhelɪkl

'ɡiərɪŋ/

1291 Truyền động bánh răng

hypoit

Hypoid gearing

/ˌhaɪpɔɪd 'ɡiərɪŋ/

1292 Bánh răng chủ động

hypoit

Hypoid gear

/ˌhaɪpɔɪd ɡiər/

1293 Bánh răng bị động

hypoit

Hypoid pinion

/ˌhaɪpɔɪd 'pɪniən/

1294 Truyền động bánh vít -

trục vít

Worm gearing

/wɜːm 'ɡiərɪŋ/

1295 Truyền động bánh răng

ngoài

External gearing

/ɪk'stɜːnl 'ɡiərɪŋ/

1296 Truyền động bánh răng

trong

Internal gearing

/ɪn'tɜːnl 'ɡiərɪŋ/

1297 Truyền động bánh răng

hành tinh

Epicyclic gear train

/ˌepɪˌsaɪklɪk 'ɡiər treɪn/

1298 Trục quay hành tinh*Planet carrier*

/ˌplænit 'kæriə(r)/

1299 Bánh răng định tinh*Sungear*

/ˌsʌŋ ɡiər/

~~**1300 Bánh răng hành tinh**~~~~*Differential gear train*~~~~/ˌplænit 'pɪniən/~~**1301 Truyền động bánh răng**

vi sai

Differential gear train

/dɪfə'renʃl 'ɡiər treɪn/

1302 Truyền động bánh răng

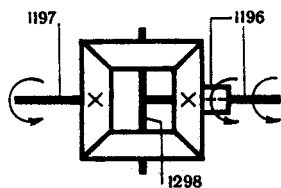
vi sai phân nhánh

*Differential spur gear**train*

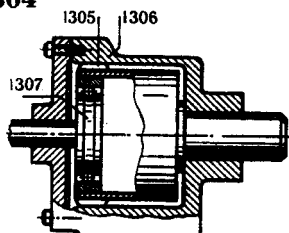
/dɪfə'renʃl spɜː 'ɡiər

treɪn/

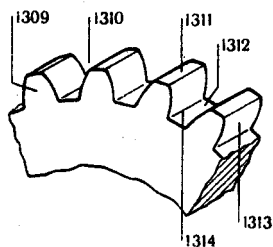
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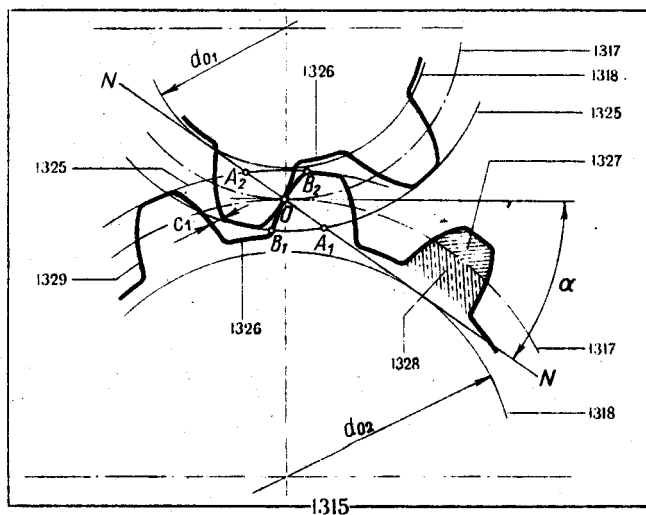
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1308

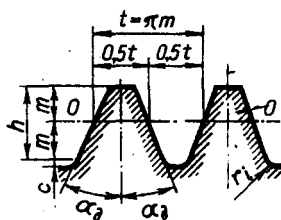


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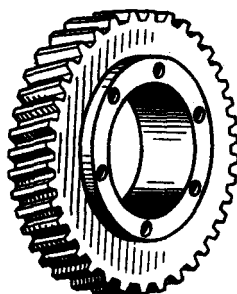


1303 Truyền động bánh răng*côn vi sai**Differential bevel gear**train**/dɪfə'renʃl 'bevl 'gɪə**treɪn/***1304 Truyền động bánh răng***kiểu sóng**Wave gearing**/weɪv 'gɪərɪŋ/***1305 Bánh răng mềm dẻo***Flexible gear**/fɪleksə'bɪl 'gɪər/***1306 Bánh răng cứng***Rigid gear**/rɪdʒɪd 'gɪər/***1307 Bộ tạo sóng***Wave generator**/weɪv 'dʒenə'reɪtər/***1308 Tạo răng***Toothing**/tu:θɪŋ/***1309 Răng***Tooth**/tu:θ/***1310 Khe hở răng***Tooth space**/tu:θ 'speɪs/***1311 Đỉnh răng***Tip surface**/tɪp 'sɜːfɪs/***1312 Chân răng***Root surface**/ru:t 'sɜːfɪs/***1313 Mặt răng tiếp xúc***Tooth flank**/tu:θ flæŋk/***1314 Mặt lượn***Filler surface**/fɪltə 'sɜːfɪs/***1315 Hệ thống thân khai***Involute tooth system**/ɪnvə'lut tu:θ 'sɪstəm/***1316 Tâm của bước răng***Pitch point**/pɪtʃ 'pɔɪnt/***1317 Vòng bước răng***Pitch circle**/pɪtʃ 'sɜːkl/***1318 Vòng cơ sở***Base circle**/beɪs 'sɜːkl/***1319 Đường kính vòng cơ sở***Base-circle diameter**/beɪs 'sɜːkl daɪ'æmɪtər/***1320 Bước cơ bản***Base pitch**/beɪs pɪtʃ/***1321 Đường tác dụng***Line of action**/laɪn əv 'ækʃn/***1322 Góc áp lực***Pressure angle**/preʃ ə 'æŋɡl/*

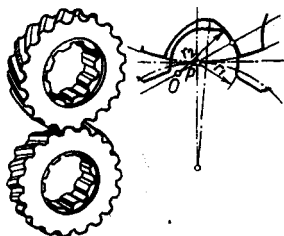
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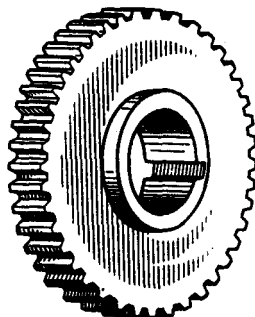
1342



1339



1341



1323 Chiều dài đường tiếp xúc
Length of path in contact
 /lɛŋθ əv pæθ ɪn
 'kɒntækt/

1324 Tỷ số tiếp xúc có công thức toán học
Transverse contact ratio
 /,trænzvɜ:s 'kɒntækt
 reɪ/

1325 Vòng đỉnh răng
Tip circle
 /tɪp 's:kl/

1326 Vòng chân răng
Root circle
 /ru:t 's:kl/

1327 Phần đầu rãnh
Addendum part of tooth
 /ə'dendəm pɑ:t əv tu:θ/

1328 Phần chân rãnh
Dedendum part of tooth
 /di'dendəm pɑ:t əv tu:θ/

1329 Biên dạng răng
Tooth profile
 /tu:θ prə'faɪl/

1330 Mặt hoạt động
Active flank
 /'æktɪv flæŋk/

1331 Khe hở chu vi
Circumferential backlash
 /sə.kʌmfə'ren/əl
 'bæklæʃ/

1332 Vòng cơ sở
Basic rack
 /'beɪsɪk ræk/

1333 Modul bánh răng
Module
 /'mɒdjʊl/

1334 Góc biên dạng
Profile angle
 /,prə'faɪl 'æŋgl/

1335 Chiều sâu tiếp xúc
Depth of engagement
 /,depθ əv ɪn'geɪdʒmənt/

1336 Đường bước răng
Pitch line
 /'pɪtʃ laɪn/

1337 Khe hở đáy chân răng
Bottom clearance
 /'bɒtəm 'kliəəns/

1338 Bán kính góc lượn
Fillet radius
 /'fɪlɪt'reɪdɪəs/

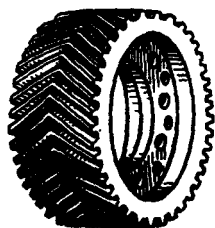
1339 Hệ thống hành răng trụ xoắn
Circular-helical system
 /,sɜ:kjʊlə'helɪkəl'sɪstəm/

1340 Bánh răng trụ
Cylindrical gear
 /sɪ'lɪndrɪkl'giə/

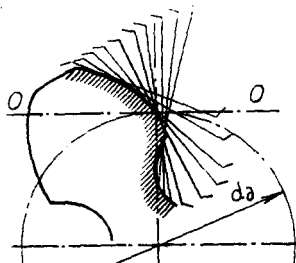
1341 Bánh răng trụ thẳng
Spur gear
 /'spɜ:giə/

1342 Bánh răng xoắn
Helical gear
 /'helɪkl'giə/

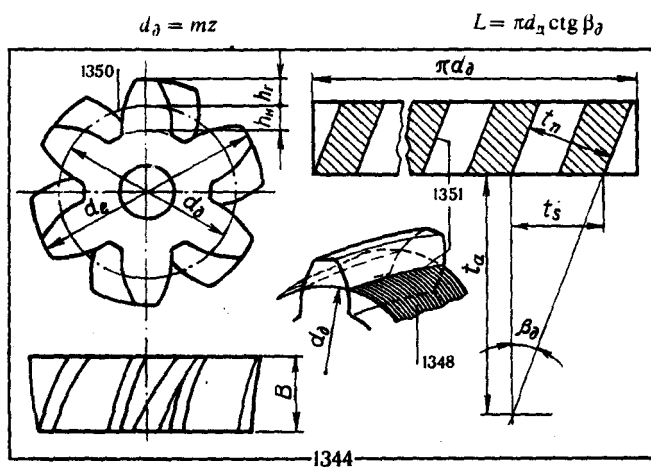
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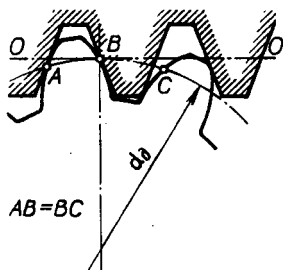


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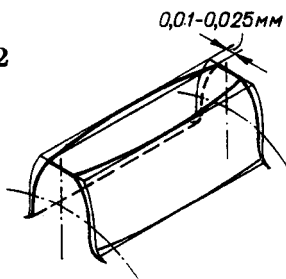


- 1343 Bánh răng chữ V**
Herringbone gear
 /ˈhɛrɪŋbɔːn ˈɡiːʔ/
- 1344 Các thành phần của bánh răng trụ**
Elements of a cylindrical gear
 /ɛlɪmənts əv ə sɪˈlɪndrɪkəl ɡiːʔ/
- 1345 Bề rộng mặt răng**
Face width
 /fets wɪθ/
- 1346 Bước chia**
Transverse circular pitch
 /ˈtrænzvɜːs ˌsɜːkjʊlə ˈpɪtʃ/
- 1347 Modul chia**
Transverse module
 /ˈtrænzvɜːs ˈmɒdjʊl/
- 1348 Hình trụ chia**
Reference cylindrer
 /ˈrɛfərəns ˈsɪlɪndəʔ/
- 1349 Đường kính chia**
Reference diameter
 /ˈrɛfərəns daɪˈɛmɪtəʔ/
- 1350 Vòng chia**
Reference circle
 /ˈrɛfərəns ˈsɜːkl/
- 1351 Đường răng**
Tooth trace
 /tuːθ treɪs/
- 1352 Góc xoắn trên vòng trụ chia**
Helix angle on the reference cylinder
 /ˈhɛlɪks ˈæŋɡl on ðə ˈrɛfərəns ˈsɪlɪndəʔ/
- 1353 Bước pháp tuyến**
Normal pitch
 /ˈnɔːml pɪtʃ/
- 1354 Modul pháp tuyến**
Normal module
 /ˈnɔːml ˈmɒdjʊl/
- 1355 Bước trục**
Axial pitch
 /ˈæksɪəl pɪtʃ/
- 1356 Tỷ số không ăn khớp**
Overlap ratio
 /ˈɔʊvələp ˈreɪʃɪʊ/
- 1357 Hướng của đường xoắn răng**
Lead of tooth helix
 /liːd əv tuːθ ˈhɛlɪks/
- 1358 Đường kính đỉnh**
Tip diameter
 /tɪp daɪˈɛmɪtə/
- 1359 Đầu răng**
Addendum
 /əˈdɛndəm/
- 1360 Chân răng**
Dedendum
 /dɪˈdɛndəm/
- 1361 Cắt chân răng**
Tooth undercut
 /tuːθ ˈʌndəʔkʌt/

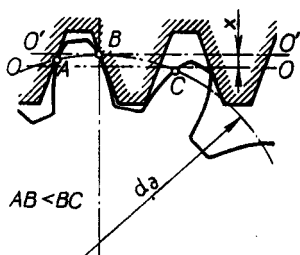
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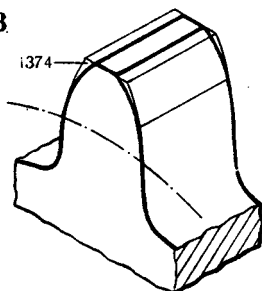
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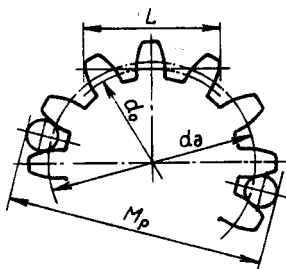
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1373



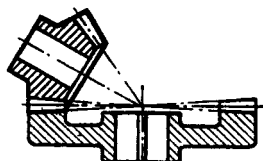
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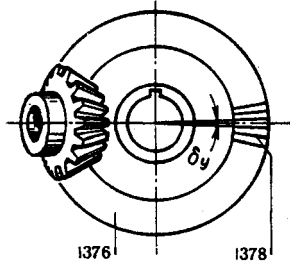
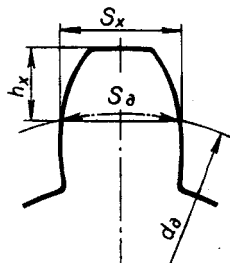
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1377



1369

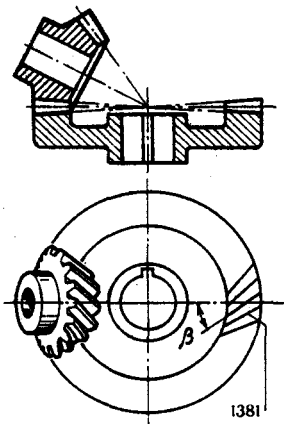


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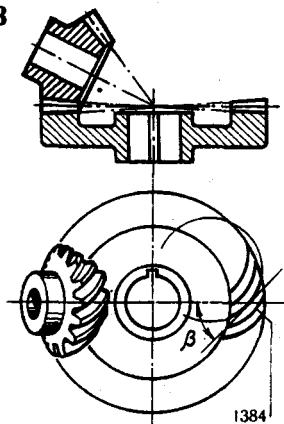
1378

- 1362** Biên dạng đầu răng
Addendum modification
 /ə'dendəmm
 mɒdɪfɪ'keɪfən/
- 1363** Bánh răng chuẩn
X- zero gear
 /eks'ziərəʊ ɡiə(r)/
- 1364** Bánh răng chữ X
X- gear
 /eksɡiə(r)/
- 1365** Di trượt đầu răng
Addendum modification
shift
 /ə'dendəmm mɒdɪfɪ'keɪfən
 fɪʃt/
- 1366** Hệ số biên dạng đầu
 răng
Addendum modification
coefficient
 /ə'dendəmm mɒdɪfɪ'keɪfən
 kəʊ'fɪfɪnt/
- 1367** Chiều dài tiếp tuyến cơ
 sở
Base tangent length
 /beɪs'tændʒənt leŋθ/
- 1368** Kích thước qua chốt
Distance over pins
 /dɪstəns.əʊvə'pɪnz/
- 1369** Chiều dài răng theo
 dây cung
Tooth thickness along
chord
 /tʊθ'θɪktnɪs ə'lɒŋ kɔ:d/
- 1370** Chiều cao dây cung
Chordal height
 /'kɔ:dl heɪt/
- 1371** Chiều dày răng theo
 đường tròn qui chiếu
Tooth thickness along
reference circle
 /tʊθ.θɪktnɪs
 ə'lɒŋ'refərəns'sɜ:kl/
- 1372** Răng dạng Barrel
Barrel- shaped tooth
 /,bærəl ʃeɪpt tʊθ/
- 1373** Răng đỉnh hót lưg
Tip relieved tooth
 /tɪp rɪ'li:vɪd tʊθ/
- 1374** Hót lưg đỉnh răng
Tip relief
 /tɪp rɪ'li:f/
- 1375** Bánh răng côn
Bevel gear
 /'bevl ɡiə(r)/
- 1376** Bánh dẫn
Crown wheel
 /'kraʊn wi:l/
- 1377** Bánh răng gòn thẳng
Straight- tooth bevel gear
 /streɪt .tʊθ.'bevl'ɡiə(r)/
- 1378** Răng thẳng
Straight tooth
 /streɪt tʊθ/
- 1379** Góc côn của răng
Tooth taper angle
 /tʊθ.teɪpər 'æŋɡl/

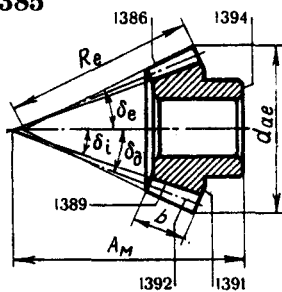
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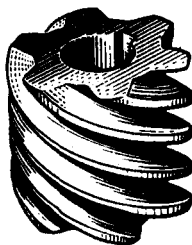
1383



1385



1398



1380 Bánh răng côn xoắn*Helical bevel gear*

/helɪkl 'bevl ɡɪər/

1381 Răng côn xoắn*Helical bevel tooth*

/helɪkl.bevl'tu:θ/

1382 Góc xoắn*Spiral angle*

/ˌspiərɪ'æŋɡl/

1383 Bánh răng côn xoắn ốc*Spiral bevel gear*

/ˌspiərɪl.bevl'ɡɪər/

1384 Răng côn xoắn ốc vòng cung*Circular arc spiral bevel gear tooth*

/ˌsɜːklvɪə

ɔːk.spɪərɪl.bevl'ɡɪər/

1385 Các thành phần của bánh răng côn*Elements of a bevel gear*

/ˌelɪmɛnts ə

ə.bevl'ɡɪər/

1386 Côn đỉnh*Tip cone*

/tɪp kəʊn/

1387 Góc côn đỉnh*Tip cone angle*

/tɪp kəʊn 'æŋɡl/

1388 Đường kính ngoài*Outside diameter*

/ˌaʊtsaɪd daɪ'æmɪtə/

1389 Côn chân răng*Root cone*

/ru:t kəʊn/

1390 Góc côn chân răng*Root cone angle*

/ru:t kəʊn'æŋɡl/

1391 Phần côn bù*Complementary cone*

/ˌkɒmplɪ'mentɪ kəʊn/

1392 Bước côn, côn qui chiếu*Reference cone, pitch cone*

/ˌrefərəns kəʊn pɪtʃ/

1393 Góc bước*Pitch angle*

/pɪtʃ'æŋɡl/

1394 Mặt đỡ*Bearing face*

/ˌbeərɪŋ feɪs/

1395 Chiều rộng mặt đầu*Width of face*

/wɪð əv feɪs/

1396 Bán kính bước côn*Pitch cone radius*

/pɪtʃ kəʊn 'reɪdiəs/

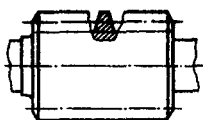
1397 Khoảng cách lắp*Mounting distance*

/ˌmaʊntɪŋ'dɪstəns/

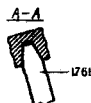
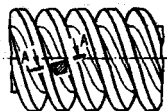
1398 Trục vít*Worm*

/wɜːm/

1399



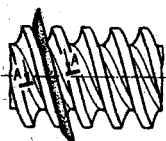
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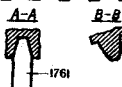
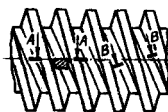
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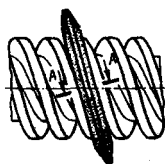
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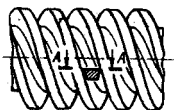
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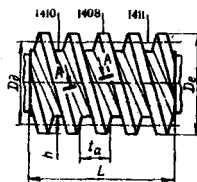
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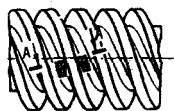
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1407

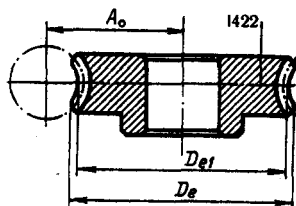


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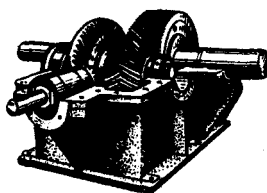


- 1399 Trục vít trụ**
Cylindrical worm
/sɪ'lɪndrɪkl wɜ:m/
- 1400 Trục vít cầu**
Globodial worm
/glɔ:bɔ:dɪəl wɜ:m/
- 1401 Trục vít Acimet**
Archimedes worm
/ɑ:kɪ'mi:dɪz wɜ:m/
- 1402 Trục vít thân khai**
trong
Involute worm
/ɪnvɔ:lut wɜ:m/
- 1403 Trục vít ren xoắn**
Thread-convolute worm
/θred 'kɒnvɔlut wɜ:m/
- 1404 Trục vít ren không gian xoắn**
Thread-space worm
/θred speɪs wɜ:m/
- 1405 Mài trục vít bằng bánh mài xuyên**
Worm grind by toroidal wheel
/wɜ:m graɪnd baɪ 'tɔrɔɪdl wi:l/
- 1406 Mài trục vít bằng bánh mài côn**
Worm grind by cone wheel
/wɜ:m graɪnd baɪ kɔ:n wi:l/
- 1407 Các thành phần của trục vít**
Elements of worm
/ɛlɪmɛnts ɔv wɜ:m/
- 1408 Đỉnh trục**
Tip cylinder
/tɪp'sɪlɪndə/
- 1409 Đường kính trụ đỉnh**
Tip cylinder diameter
/sɪlɪndə daɪ'reɪmɪtə/
- 1410 Trụ chân**
Root cylinder
/ru:t 'sɪlɪndə/
- 1411 Bước trụ**
Pitch cylinder
/pɪtʃ'sɪlɪndə/
- 1412 Đường kính bước**
Pitch diameter
/pɪtʃ daɪ'reɪmɪtə/
- 1413 Phần ren**
Threaded length
/θredɪd lɛŋθ/
- 1414 Bước trục**
Axial pitch
/æksɪəl pɪtʃ/
- 1415 Modul trục**
Axial module
/æksɪəl 'mɒdjʊl/
- 1416 Số ren**
Number of threads
/nʌmbə ɔv θredz/

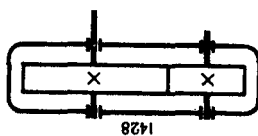
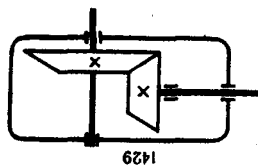
1421



1426



1427



1417 Chiều sâu ren toàn phần

Whole depth of thread
/hʊl depθ əv θred/

1418 Profin ren ở mặt cắt ngang

Thread profile in normal section
/θred 'prɒfɒl in 'nɔ:ml 'sek/n/

1419 Chiều dày ren ở mặt cắt ngang

Thickness of thread in normal section
/θɪknis əv θred in 'nɔ:ml 'sek/n/

1420 Chiều cao đo

Measurement height
/med ʒəmənt haɪt/

1421 Bánh vít

Worm-wheel
/wɜ:m wi:l/

1422 Mặt phẳng giữa của vòng bánh vít

Medium plane of worm-wheel rim
/mɪ:diəm pleɪn əv 'wɜ:m wi:l rɪm/

1423 Đường kính chuẩn

Throat diameter
/θrəʊt daɪ'æmɪtə/

1424 Đường kính ngoài của bánh vít

Outside diameter of worm-wheel rim
/aʊtsaɪd daɪ'æmɪtə əv 'wɜ:m wi:l rɪm/

1425 Khoảng cách tâm ăn khớp

Centre distance in cutting
/sentrə 'dɪstəns in 'kʌtɪŋ/

HỘP GIẢM TỐC

SPEED REDUCERS

1426 Hộp giảm tốc

Speed reducer, reducer
/spi:t rɪ'dju:sə, rɪ'dju:sə/

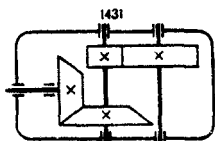
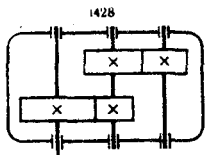
1427 Hộp giảm tốc một cấp

Single-stage reducer
/sɪŋɡl steɪdʒ rɪ'dju:sə/

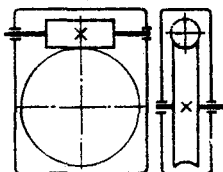
1428 Hộp giảm tốc trục song song

Parallel-shaft reducer
/'pærələl ʃaʊt rɪ'dju:sə/

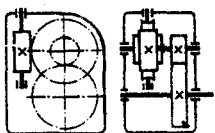
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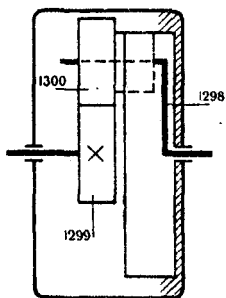
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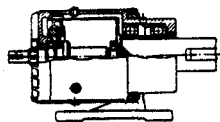
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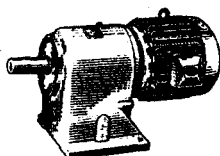
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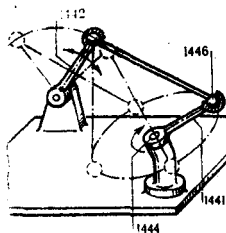
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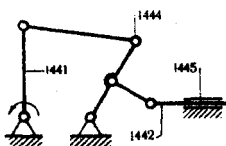
1436



1438



1439



1429 Hộp giảm tốc trục
vuông góc

Right-angle reducer
/raɪ 'æŋɡl rɪ'dʒʊsə/

1430 Hộp giảm tốc hai
cấp

Two-stage reducer
/tuː steɪdʒ rɪ'dʒʊsə/

1431 Hộp giảm tốc hai
cấp vuông góc

*Two-stage right-angle
reducer*
/tuː steɪdʒ raɪ 'æŋɡl
rɪ'dʒʊsə/

1432 Hộp giảm tốc bánh vít-
trục vít

Worm-gear reducer
/wɜ:m ɡiə rɪ'dʒʊsə/

1433 Hộp giảm tốc trục vít
hai cấp

Two-stage worm reducer
/tuː steɪdʒ wɜ:m rɪ'dʒʊsə/

1434 Hộp giảm tốc epicyclic
reducer

*Epicyclic-gear-train
reducer*
/ˌepɪ'saɪklɪk ɡiə treɪn
rɪ'dʒʊsə/

1435 Hộp giảm tốc kiểu sóng

Wave-type reducer
/weɪv taɪp rɪ'dʒʊsə/

1436 Hộp giảm tốc động cơ

Gearmotor
/ɡiə'məʊtə/

NGUYÊN LÝ MÁY MECHANISMS

1437 Cơ cấu

Mechanism
/mekə'nɪzəm/

1438 Cơ cấu không gian

Spatial mechanism
/ˌspeɪʃl 'mekə'nɪzəm/

1439 Cơ cấu phẳng

Planar mechanism
/ˌpleɪnə 'mekə'nɪzəm/

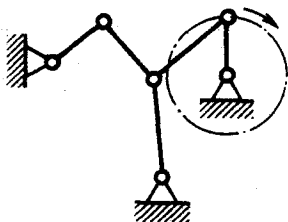
1440 Khâu

Link
/lɪŋk/

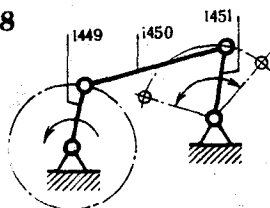
1441 Khâu dẫn động

Input link, driving link
/ɪnpʊt lɪŋk, 'draɪvɪŋ
lɪŋk/

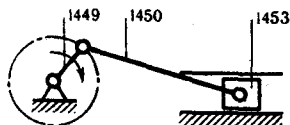
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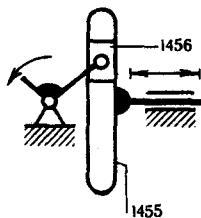
1448



1452



1457



1442 Khâu bị động*Output link, driven link*

/aʊtpʊt lɪŋk, 'drɪvn lɪŋk/

1443 Cặp động học*Kinematic pair*

/ˌkɪnɪ'mætɪk peə/

1444 Khớp quay bản lề*Turning pair, hinge*

/ˌtɜːnɪŋ peə hɪndʒ/

1445 Khớp trượt*Rectilinear sliding pair*

/ˌrektɪ'lɪnɪə 'slɑɪdɪŋ peə/

1446 Khớp cầu*Spheric pair*

/ˌsfɛrɪk peə/

1447 Cơ cấu nối khớp*Articulated mechanism*/ɑː'tɪkjʊleɪtɪd
'mekənɪzəm/**1448 Cơ cấu tay quay-****Thanh trượt***Crank-and-rocker
mechanism*/kræŋk ən rɒkə
'mekənɪzəm/**1449 Tay quay***Crank*

/kræŋk/

1450 Thanh truyền*Connecting rod*

/kə'nektɪŋ rɒd/

1451 Thanh trượt*Rocker*

/rɒkə(r)/

1452 Cơ cấu tay quay - trượt*Slider-crank mechanism*/ˌslaɪdə kræŋk
'mekənɪzəm/**1453 Khung, khối trượt***Ram slider, slide block*/ræm 'slɑɪdə(r), slɑɪd
blɒk/**1454 Cơ cấu Culit***Slotted-link mechanism,**linkage with moving slide*/slɒlɪd lɪŋk 'mekənɪzəm,
lɪŋkɪdʒ wɪð 'muːvɪŋ
slɑɪd/**1455 Đường rãnh***Slotted link*

/ˌslɒtɪd lɪŋk/

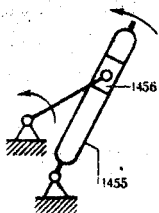
1456 Khối trượt*Slide block*

/slɑɪd blɒk/

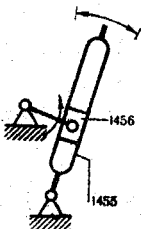
1457 Đường trượt rãnh*Sliding slotted link*

/ˌslaɪdɪŋ slɒtɪd 'lɪŋk/

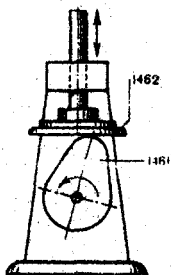
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1459



1460



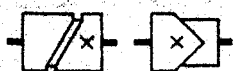
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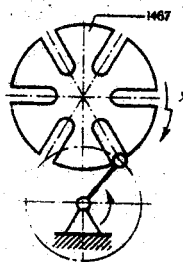
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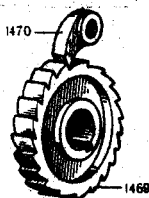
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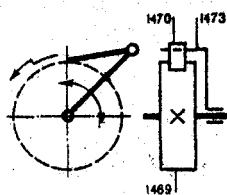
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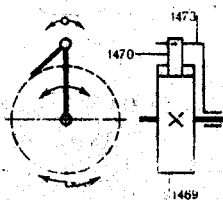
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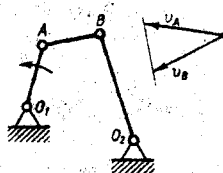
1471



1472



1474



1458 Đường rãnh quay*Rotating slotted link*

/rəʊ'teɪnɪŋ 'slɒtɪd lɪŋk/

1467 Bánh Geneva*Geneva wheel*

/dʒi'ni:və wi:l/

1459 Đường rãnh dao động*Oscillating slotted link*

/'ɒsɪleɪtɪŋ 'slɒtɪd lɪŋk/

1468 Bánh răng con cóc*Ratchet gearing*

/ræʃɪt'giərɪŋ/

1460 Cơ cấu Cam*Cam mechanism*

/kæm 'mekənɪzəm/

1469 Bánh cóc*Ratchet wheel*

/ræʃɪt wi:l/

1461 Cam*Cam***1470 Chốt cóc***Pawl, detent*

/pɔ:l di'tent/

1462 Bánh bị dẫn*Follower*

/'fɒləʊə /

1471 Bánh cóc một chiều*One-way ratchet gearing*

/wʌn weɪ ræʃɪt wi:l/

1463 Cam trượt*Sliding cam*

/'slaɪdɪŋ kæm/

1472 Bánh cóc hai chiều*Two-way ratchet**gearing*

/tu: weɪ ræʃɪt 'giərɪŋ/

1464 Cam phẳng lệch tâm*Radial cam, plate cam*

/'reɪdɪəl kæm , plent/

1473 Tải*Carrier*

/'kæriə(r)/

1465 Cam trống, Cam trụ*Drum cam, cylinder cam*

/drʌm kæm , 'sɪlɪndə/

1474 Sơ đồ vectơ tốc độ*Velocity vector diagram*

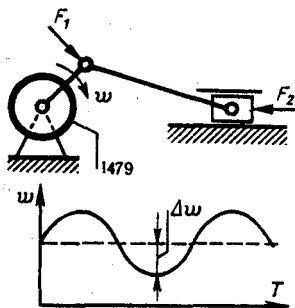
/vɪ'loʊsɪti vek'tə

'daɪəgrəm/

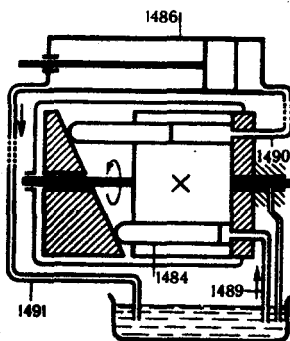
1466 Cơ cấu Geneva*Geneva mechanism*

/dʒi'ni:və 'mekənɪzəm/

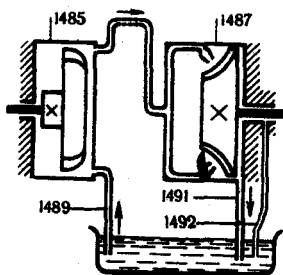
1476



1482



1483



1475 Sơ đồ vectơ gia tốc

*Acceleration vector
diagram*
/əksələ'reɪʃnˌvektə
'daɪəgræm/

1476 Động lực

Motive force
/ˌmɒtɪvˈfɔːs/

1477 Lực cản

Resistance force
/rɪ'zɪstənsˈfɔːs/

1478 Biến đổi tốc độ

Velocity fluctuation
/vɪ'lɒsəti flʌktɪv'eɪʃn/

1479 Bánh đà

Flywheel
/'flaɪwi:l/

TRUYỀN ĐỘNG BẰNG DÒNG LƯU ĐỘNG

FLUID POWER DRIVES

1480 Truyền động thủy lực

Hydraulic power drive
/haɪ'drɒlɪkˈpaʊə draɪv/

1481 Truyền động khí nén

Pneumatic power drive
/nju:'mættɪkˈpaʊə fraɪv/

1482 Truyền động thủy tĩnh

Hydrostatic power drive
/ˌhaɪdrəʊstætɪkˈpaʊə
draɪv/

**1483 Truyền động thủy động
lực**

*Hydrodynamic power
drive*
/ˌhaɪdrəʊdaɪ'næmɪk
'paʊə draɪv/

1484 Máy bơm kiểu piston

*Positive-displacement
pump*
/pəʒɪtɪv dɪs'pleɪsmənt
pʌmp/

**1485 Máy bơm kiểu cánh
quạt**

Impeller-type pump
/ɪm'pelə taɪp pʌmp/

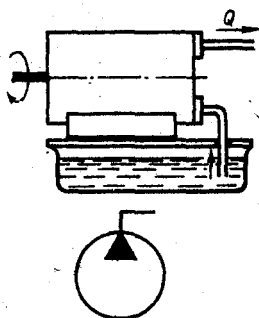
1486 Bộ dẫn động thủy lực

Hydraulic actuator
/haɪ'drɒlɪkˈæktɪvətəɪtə/

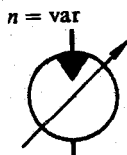
1488 Đường thủy lực

Hydraulic line, line
/haɪ'drɒlɪk laɪn/

1493



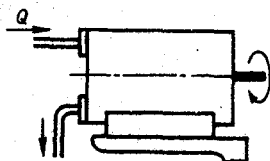
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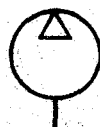
1500



1495



1501



1498

 $Q = \text{var}$ 

1502

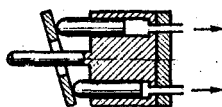


1489 Đường nạp*Intake line**/ˈɪntek laɪn/***1490 Đường áp lực***Pressure line**/ˈpreʃə laɪn/***1491 Đường hồi chuyển***Return line**/rɪˈtɜːn laɪn/***1492 Đường xả***Drain line**/dreɪn laɪn/***1493 Máy bơm***Pump**/pʌmp/***1494 Dung lượng bơm***Pump capacity**/pʌmp kəˈpæsəti/***1495 Động cơ thủy lực***Hydraulic motor**/haɪˈdrɒlɪkˈmɔːtə/***1496 Bơm với khoản
dịch chuyển không đổi***Constant-displacement**pump**/ˈkɒnstənt dɪsˈpleɪsmənt**pʌmp/***1497 Động cơ thủy lực tốc độ****không đổi***Constant-speed**hydraulic motor**/ˈkɒnstənt spiːd**haɪˈdrɒlɪkˈmɔːtə/***1498 Động cơ thủy lực biến
đổi khoảng dịch chuyển***Variable-displacement**pump**/ˌveɪəriəbl dɪsˈpleɪsmənt**pʌmp/***1499 Động cơ thủy lực tốc độ
biến đổi***Variable-speed hydraulic**motor**/ˌveɪəriəbl spiːd**haɪˈdrɒlɪkˈmɔːtə/***1500 Động cơ bơm***Pump-motor**/pʌmp ˈmɔːtə/***1501 Máy nén không khí***Air compressor**/eə kəmˈpresə/***1502 Động cơ khí nén***Pneumatic motor**/njuːˈmætɪkˈmɔːtə/*

1503



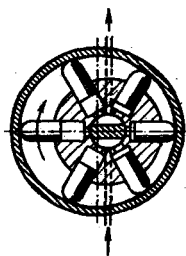
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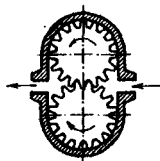
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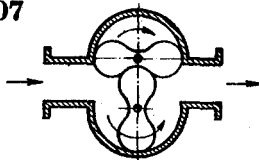
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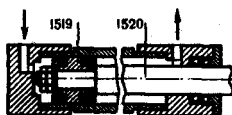
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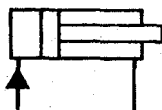
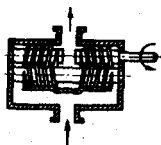
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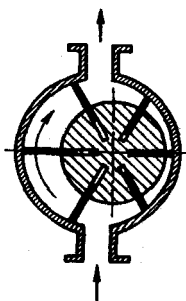
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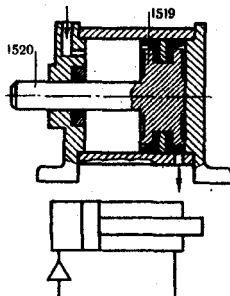
1509



1511



1518



1503 Bơm chân không

Vacuum pump
/ˈvækjʊəm pʌmp/

1504 Quạt

Fan
/fæn/

1505 Bơm bánh răng

Gear pump
/giə pʌmp/

1506 Động cơ thủy lực kiểu

bánh răng
Gear-type hydraulic motor

/ˈgiə taɪp haɪˈdrɔːlɪk
ˈmɔːtə/

1507 Bơm khương tuyến

quay
Rotary abutment pump
/ˈrɔːtəri əˈbʌtmənt
pʌmp/

1508 Động cơ khương tuyến

quay
Rotary abutment motor
/ˈrɔːtəri əˈbʌtmənt
ˈmɔːtə/

1509 Bơm kiểu trục vít

Screw pump
/skuː pʌmp/

1510 Động cơ kiểu trục vít

Screw motor
/ˈskuː ˈmɔːtə/

1511 Bơm cánh quạt

Vane pump
/veɪn pʌmp/

1512 Động cơ kiểu cánh quạt

Vane motor
/veɪn ˈmɔːtə/

1513 Bơm pittông trục

Axialpiston pump
/ˌæksɪəlˈpɪstn pʌmp/

1514 Động cơ pittông trục

Axial-piston motor
/ˌæksɪəlˈpɪstn ˈmɔːtə/

1515 Bơm pittông kính

Radial-piston pump
/ˈreɪdiəl ˈpɪstn pʌmp/

1516 Động cơ pittông kính

Radial-piston motor
/ˈreɪdiəl ˈpɪstn ˈmɔːtə/

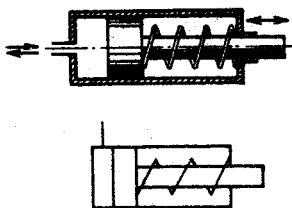
1517 Xylanh thủy lực

Hydraulic cylinder
/haɪdrɔːlɪk ˈsɪlɪndə/

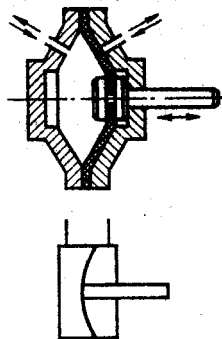
1518 Xylanh khí nén

Pneumatic cylinder
/njuːˈmætɪk ˈsɪlɪndə/

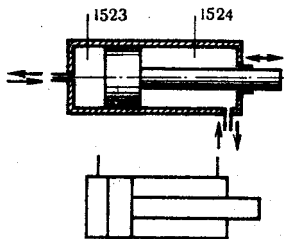
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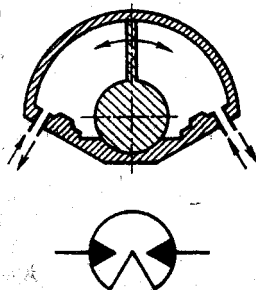
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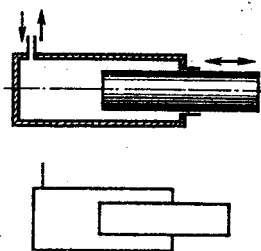
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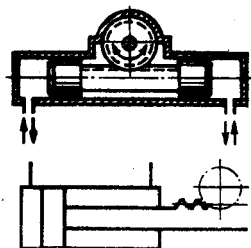
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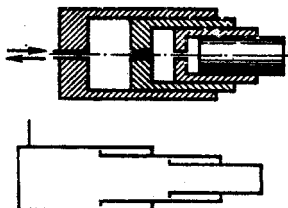
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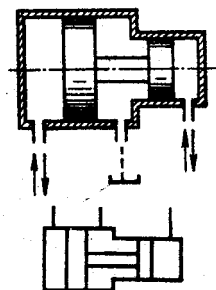
1530



1526



1531



1519 Pit-tông*Piston*

/ˈpɪstən/

1520 Cần pit-tông*Piston rod*

/ˈpɪstən rɒd/

1521 Xylanh tác động đơn*Single-acting cylinder*

/ˌsɪŋɡl.æk.tɪŋ 'sɪlɪndə/

1522 Xylanh tác động kép*Double-acting cylinder*

/ˌdʌbl.æk.tɪŋ 'sɪlɪndə/

1523 Đầu cuối của xylanh*Head end of cylinder*

/ˈhed end əv 'sɪlɪndə/

1524 Đầu cần của xylanh*Rod end of cylinder*

/rɒd end əv 'sɪlɪndə/

1525 Xylanh cần đẩy*Plunger cylinder*

/ˈplʌŋdʒə 'sɪlɪndə/

1526 Xylanh tác động xa*Telescoping cylinder*

/ˈtelɪskəpɪŋ 'sɪlɪndə/

1527 Bộ kích thích kiểu*màng**Diaphragm actuator*

/daɪəfræm ˈæktɪˈvəɪtə/

1528 Động cơ thủy lực quay*hạn chế**Limited rotary hydraulic**motor*

/ˈlɪmɪtɪd ˈrəʊtəri

ˈhaɪˈdrɒlɪk ˈməʊtə/

1529 Động cơ thủy lực kiểu*cánh quạt quay hạn chế**Vane-type limited rotary**hydraulic motor*

/ˈveɪn taɪp ˈlɪmɪtɪd ˈrəʊtə

ˈhaɪˈdrɒlɪk ˈməʊtə/

1530 Động cơ quay hạn chế*kiểu pittông**Piston-type limited rotary**motor*

/ˈpɪstn taɪp ˈlɪmɪtɪd

ˈrəʊtəri ˈməʊtə/

1531 Bộ thay đổi áp suất*thủy lực**Hydraulic transformer*

/haɪˈdrɒlɪk

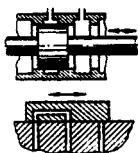
ˈtrænsfɔːmə/

1532 Van kiểm soát thủy lực*Hydraulic control valve*

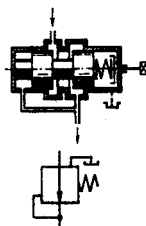
/haɪˈdrɒlɪk kənˈtrɒl

væl/

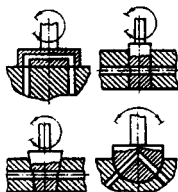
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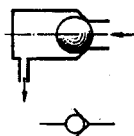
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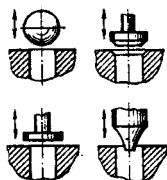
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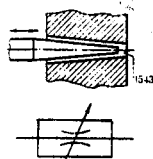
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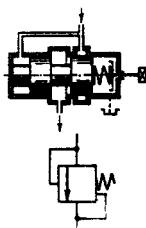
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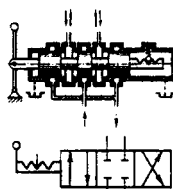
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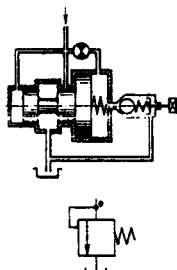
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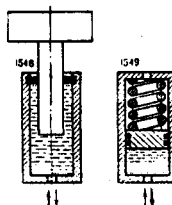
1544



1538

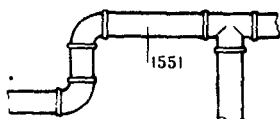


1547



1533 Van trượt*Spool valve, slide valve**/spu:l vælv, slaid vælv/***1534 Van quay***Rotary valve**/rəʊtəri vælv/***1535 Van kín***Seat valve**/si:t vælv/***1536 Van kiểm soát áp suất***Pressure control valve**/preʃəkən'trəʊl vælv/***1537 Van an toàn***Relief valve**/ri'li:f vælv/***1538 Van bảo hiểm***Safety valve**/seɪfti vælv/***1539 Van giảm áp***Pressure reducing valve**/preʃə ri'dju:sɪŋ vælv/***1540 Van đóng, van kiểm tra***Check valve**/tʃek vælv/***1541 Ổng phim***Throttle**/θrəʊtlɪ/***1542 Đường phun***Throttling**/θrəʊtlɪ/***1543 Lô phin***Orifice**/ɔrɪfɪs/***1544 Van phân phối***Distribution valve**/dɪstrɪ'bju:fən vælv/***1545 Van phân phối thủy lực***Hydraulic distribution**valve**/haɪ'drɔ:lɪk dɪstrɪ'bju:fən vælv/***1546 Van phân phối khí nén***Pneumatic distribution**valve**/nju:'mættɪk dɪstrɪ'bju:fən vælv/***1547 Bình trữ thủy lực***Hydraulic accumulator**/haɪ'drɔ:lɪk**ə'kjumjʊleɪtə(r)/***1548 Bình trữ thủy lực theo***trọng lượng**Weighted hydraulic**accumulator**/wɛɪtɪd haɪ'drɔ:lɪk**ə'kjumjʊleɪtə(r)/*

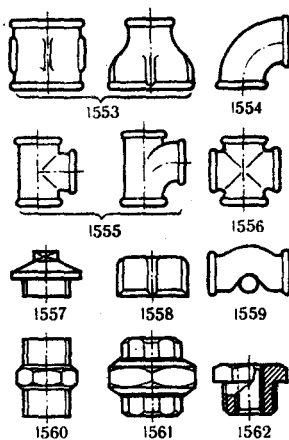
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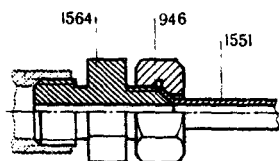
1565



1552



1563



1549 Bình trữ thủy lực bằng
lực lò xo

*Spring-loaded hydraulic
accumulator*
/ˌsprɪŋ ləʊdɪd haɪ'drɔːlɪk
ə'kjuːmjʊleɪtə/

1551 Ống

Pipe
/paɪp/

1552 Nối ghép ống

Pipe fitting
/paɪp'fɪtɪŋ/

1553 Ống nối

Pipe coupling
/paɪp'kʌplɪŋ/

1554 Ống khuỷu

Elbow
/elbɔʊ/

1555 Ống T

Tee
ti:/

1556 Nối ống chữ thập

Cross
/krɒs/

1557 Nút ống chính

Male pipe plug
/meɪl paɪp plʌg/

1558 Nắp, chụp

Bonnet
/krɒs ɔʊvə(r) , 'sæd/

1560 Đai ốc nối

Shoulder nipple
/ʃəʊldə 'nɪpl/

1561 Đai ốc xiết nối

Collar nut
/kɒlə nʌt/

1562 Ống lót có ren

Threaded bushing
/θredɪd bʊʃɪŋ/

1563 Nối liên kết

Union joint
/jʊnɪən dʒɔɪnt/

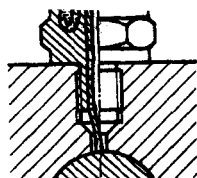
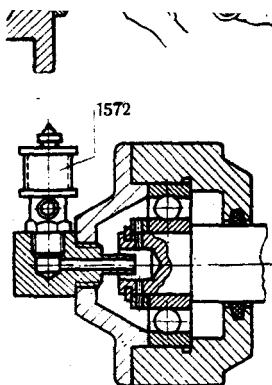
1564 Đai ốc nối liên kết

Union nipple
/jʊnɪən'nipl/

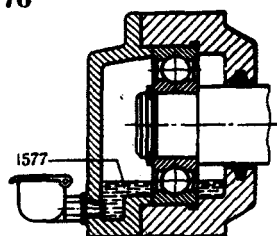
1565 Đoạn ống mềm

Hose
/həʊz/

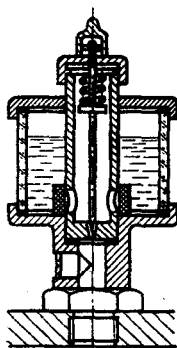
1571



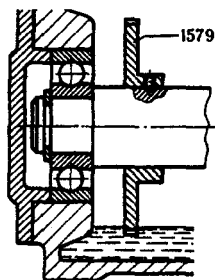
1576



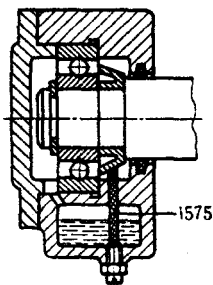
1572



1578



1573



SỰ BÔI TRƠN

LUBRICATION

1566 Sự bôi trơn

Lubrication

/ˈlʊbrɪˈkeɪʃn/

1567 Sự bôi trơn bằng tay

Manual lubrication

/ˌmæn.jʊəl ˈlʊbrɪˈkeɪʃn/

1568 Bơm dầu kiểu bi

Ball oiler

/bɔːl ˈɔɪlə/

1569 Cái bơm dầu

Oil gun

/ˈɔɪl ɡʌn/

1570 Bình chứa dầu

Oil can

/ˈɔɪl kæn/

1571 Bôi trơn kiểu nhỏ giọt

Drip-feed lubrication

/ˌdrɪp.fiːd ˈlʊbrɪˈkeɪʃn/

1572 Bơm dầu nhỏ giọt van kim

Needle-valve drip-feed

oiler

/ˈniːdl væl.v ˌdrɪp ˌfiːd

ˈɔɪlə/

1573 Sự bôi trơn bằng tim

(bấc)

Wick lubrication

/wɪk ˈlʊbrɪˈkeɪʃn/

1574 Bơm dầu bằng sợi bấc

Wick-feed oiler

/wɪk fiːd ˈɔɪlə/

1575 Bấc (tim)

Wick

/wɪk/

1576 Sự bôi trơn với thùng chứa

Bath lubrication

/bɑːθ ˈlʊbrɪˈkeɪʃn/

1577 Thùng dầu

Oil bath

/ˈɔɪl bɑːθ/

1578 Sự bôi trơn bằng văng tóe

Splash lubrication

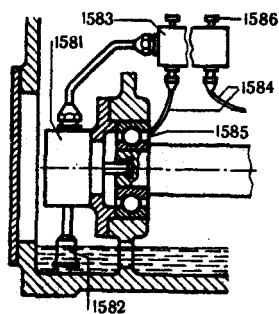
/ˈsplæʃ ˈlʊbrɪˈkeɪʃn/

1579 Vòng đệm văng tóe

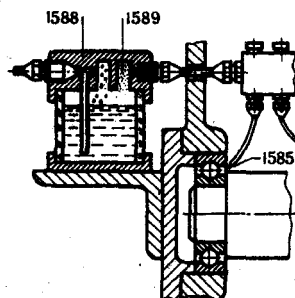
Splash ring

/ˈsplæʃ rɪŋ/

1580



1587



1580 Sự bôi trơn tuần hoàn
cưỡng bức

*Forced circulation
lubrication*
/fɔːst sɜːkjuːlɪʃn
lubrɪˈkeɪʃn/

1581 Thiết bị bơm dầu bôi
trơn

Lubrication pump
/lubrɪˈkeɪʃn pʌmp/

1582 Bộ lọc dầu

Oil strainer
/ɔɪl ˈstreɪnə(r)/

1583 Bộ phân phối dầu

Oil distributor
/ɔɪl ˈdɪstrɪbjʊtə(r)/

1584 Ống dẫn dầu

Oiling pipe
/ˈoɪlɪŋ paɪp/

1585 Điểm bôi trơn

Lubrication point
/luːbrɪˈkeɪʃn pɔɪnt/

1586 Điều chỉnh cung cấp
dầu

Oil feed adjustment
/ɔɪl fiːd ədʒʌstmənt/

1587 Sự bôi trơn kiểu phun
sương

Splash lubrication
/splæʃ luːbrɪˈkeɪʃn/

1588 Bộ phun sương

Oil atomizer
/ɔɪl ˈetəmaɪzə(r)/

1589 Sương mù dầu

Oil mist
/ɔɪl mɪst/

1590 Chất bôi trơn

Lubrication
/luːbrɪkənt/

1591 Dầu bôi trơn

Oil
/ɔɪl/

1592 Cấp độ dầu bôi trơn

Oil grade
/ɔɪl greɪd/

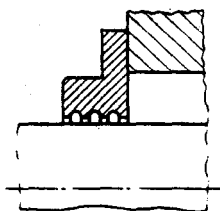
1593 Dầu nhớt công nghiệp

Industrial oil
/ɪnˈdʌstriəl ɔɪl/

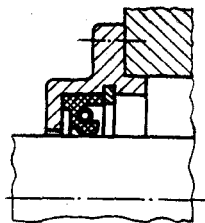
1594 Chất phụ gia cho dầu
bôi trơn

Oil additive
/ɔɪl ˈædɪtɪv/

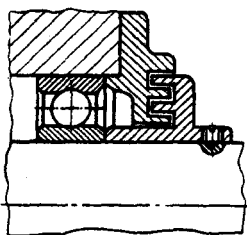
1603



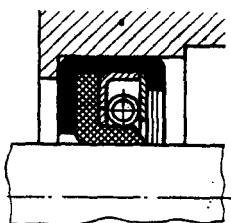
1609



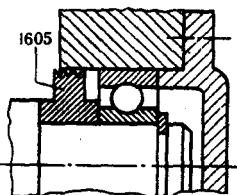
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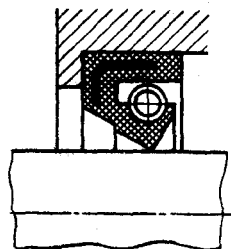
1610



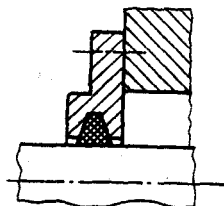
1605



1611

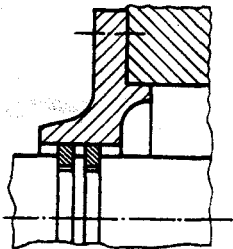


1607

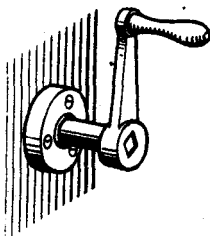


1595 Mỡ bôi trơn*Grease**/grɪs/***1596** Chất làm đặc*Thickener**/θɪknə(r)/***1597** Mỡ xà bông canxi*Lime- soap grease**ˈlaɪm sɔʊp grɪs/***1598** Mỡ xà bông natri*Sodium- soap grease**/səʊdiəm sɔʊp grɪs/***1599** Chỉ số thấm (thâm nhập)*Penetration number**ˈpenɪtreɪʃ nʌmbə(r)/***1600** Làm kín, bịt kín*Sealing, seal**ˈsi:lɪŋ, ˈsi:l/***1601** Nút đẩy kín*Seal***1602** Bịt kín không tiếp xúc*Non- contact seal**/nɒnˈkɒntækt si:l/***1603** Bịt kín kiểu rãnh*Groove seal**/ɡruːv si:l/***1604** Bịt kín kiểu đường phức tạp*Laby - rinth seal**/ˈleɪbərɪnθ, ˈsi:l/***1605** Vòng chặn mỡ*Grease- retaining ring**/ˈɡriːs riˈteɪnɪŋ rɪŋ/***1606** Bịt kín kiểu tiếp xúc*Contact seal**/ˈkɒntækt si:l/***1607** Bịt kín bằng phớt*Felt seal**/felt si:l/***1608** Làm kín kiểu miệng cắt*Lip- type seal**/ˌlɪp taɪp ˈsi:l/***1609** Lắp chặt bằng bích*Flange packing**/ˈfleɪndʒ ˈpækɪŋ/***1610** Nút chặn nén*Press- fit seal**/ˌpres ˈfiːt ˈsi:l/***1611** Nút chặn tăng bền*Reinforced lip- type seal**/ˌriːnfɔːst ˌlɪp taɪp ˈsi:l/*

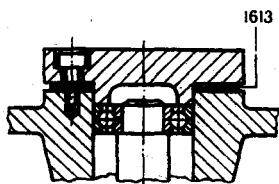
1612



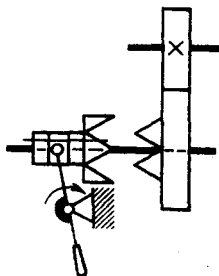
1621



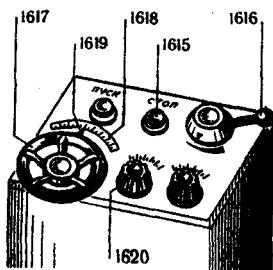
1613



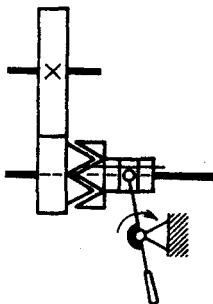
1623



1614



1625



1612 Vòng chẻ

Split ring
/splɪt rɪŋ/

1613 Đệm lót

Gasket
/ˈɡæskɪt/

THIẾT BỊ KIỂM TRA**CONTROL DEVICES****1614 Bảng điều khiển**

Control panel
/kənˈtrɒl ˈpænl/

1615 Nút nhấn

Push button
/pʊʃ ˈbʌtn/

1616 Cần gạt điều khiển

Handle
/ˈhændl/

1617 Tay quay

Handwheel
/ˈhændwi:l/

1618 Mặt số (đồng hồ)

Dial
/ˈdaɪəl/

1619 Kim chỉ

Index
/ˈɪndeks/

1620 Nút xoay

Knob
/nɒb/

1621 Tay quay

Crank handle
/ˈkræŋk ˈhændl/

1622 Bàn đạp

Treadle
/ˈtredl/

1623 Sự ăn khớp, mở máy

Engagement; switching
on
/ɪnˈɡeɪdʒmənt; ˈswɪtʃɪŋ
on/

1624 Ăn khớp; cho máy chạy

Engage; switch on
/ɪnˈɡeɪdʒ; ˈswɪtʃ on/

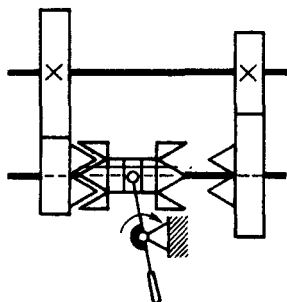
1625 Sự nhả khớp, ngừng máy

Disengagement;
switching out
/dɪsɪnˈɡeɪdʒmənt
ˈswɪtʃɪŋ aʊt/

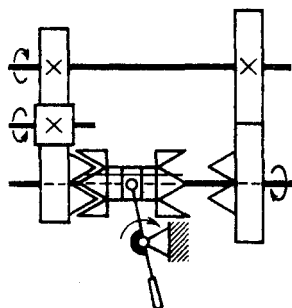
1626 Nhả khớp, tắt máy

Disengage; switch off
/dɪsɪnˈɡeɪdʒ; ˈswɪtʃ ɒf/

1627



1635



1627 Sự sang số, sự đổi tốc

độ

Shifting

/ˈʃɪftɪŋ/

1628 Sang số, đổi tốc độ

Shift

/ʃɪft/

1629 Sự khởi động

Start

/stɑ:t/

1630 Khởi động

Start

1631 Sự dừng

Stop

/stɒp/

1632 Dừng máy

Stop

1633 Sự thắng

Braking

/ˈbreɪkɪŋ/

1634 Thắng lại

Brake

/breɪk/

1635 Sự đổi chiều

Reversing

/rɪˈvɜːsɪŋ/

1636 Đổi chiều

Reverse

/rɪˈvɜːs/

1637 Sự điều chỉnh

Adjustment

/əˈdʒʌstmənt/

1638 Điều chỉnh

Adjust

/əˈdʒʌst/

J TỔ CHỨC VÀ QUẢN TRỊ CÔNG NGHIỆP

INDUSTRIAL ORGANIZATION & MANAGEMENT

KHÁI NIỆM CHUNG

GENERAL TERMS

1639 Sự sản xuất

Production

/prə'dʌkʃn/

1640 Công việc, lao động

Labour: work

/leɪbə(r) wɜ:k/

1641 Sản phẩm

Product

/prɒdʌkt/

1642 Công cụ sản xuất

Means of production

/ˌmiːnz əv prə'dʌkʃn/

1643 Công nghiệp

Industry

/ɪndʌstri/

1644 Công nghiệp sản xuất

hàng hoá

Producer- goods industry

/prə'djuːsə, ɡʊdz

ˈɪndʌstri/

1645 Xí nghiệp

Enterprise

/entəpraɪz/

1646 Xưởng, nhà máy

Factory, plant

/ˈfækəri plænt/

1647 Năng suất

Output

/ˈɒtpuːt/

1648 Sản lượng hàng hoá

Commodity output

/kə'mɒdɪtɪ 'ɒtpuːt/

1649 Tổng năng suất

Gross output

/ɡrɒs 'ɒtpuːt/

TỔ CHỨC SẢN SUẤT

INDUSTRIAL

ORGANIZATION

1650 Tổ chức công nghiệp

Industrial organization

/ɪn'dʌstriəl

ɔːɡənə'zeɪʃn/

1651 Cơ cấu tổ chức*Organization structure*

/ɔ:ɡənə'zeɪʃn

'strʌktʃə(r)/

1652 Bộ*Ministry*

/'mɪnɪstrɪ/

1653 Cục, vụ*Ministerial department*

/'mɪnɪstɪəriəl

dɪ'pɑ:tmənt/

1654 Hiệp hội sản xuất*Production association*

/prə'dʌkʃn ə'səʊʃi'eɪʃn/

1655 Giám đốc xí nghiệp*Director of the plant*

/dɪ'rektə ɔv ðə plænt/

1656 Kỹ sư trưởng*Chief engineer*

/tʃi:f enʤɪ'nɪə(r)/

1657 Phòng kinh tế- kế**hoạch***Planing and economics**department*

/'plænrɪŋ ən i:kə'nɒmɪks

dɪ'pɑ:tmənt/

1658 Phòng kế toán*Accounts department*

/ə'kaʊnts dɪ'pɑ:tmənt/

1659 Phòng lao động tiền**lương***Labour and wage**department*

/leɪbər ən 'weɪdʒ

dɪ'pɑ:tmənt/

1660 Phòng nhân sự và đào**tạo***Personnel and training**department*

/pɜ:snəl ən 'treɪnɪŋ

dɪ'pɑ:tmənt/

1661 Phòng kiểm tra chất**lượng***Technical inspection**department*

/ˌteknɪkl ɪn'spekʃn

dɪ'pɑ:tmənt/

1662 Phòng xây dựng xí
ngành*Plant construction**department*

/plænt kən'strʌkʃn

dɪ'pɑ:tmənt/

1663 Phòng thiết kế*Design department*

/dɪ'zaɪn dɪ'pɑ:tmənt/

1664 Phòng công nghệ

*Process planning
department*
/prəʊses 'plæniŋ
di'pɑ:tmənt/

**1665 Phòng kiểm tra sản
suất**

*Production control
department*
/prə'dʌktʃn kən'trəʊl
di'pɑ:tmənt/

**1666 Phòng kỹ thuật và bảo
trì**

*Plant engineering and
maintenance department*
/plænt endʒi'nɪəriŋ ən
'meɪntənəns di'pɑ:tmənt/

1667 Phòng cung ứng vật tư

*Materials procurement
and supply department*
/mə'tɪəriəlz
prə'kjʊmənt ən sə'plai
di'pɑ:tmənt/

**1668 Phòng tài chính và mại
vụ**

*Finance-and-sales
department*
/'faɪnəns ən seɪlz
di'pɑ:tmənt/

1669 Phòng hành chính

Household office
/'haʊshəʊld 'ɒfɪs/

1670 Phòng vận tải

*Transportation
department*
/'trænzpɔ:teɪʃn
di'pɑ:tmənt/

1671 Phòng đời sống

*Housing-and-hostel
department*
/'haʊsɪŋ ən 'hɒstl
di'pɑ:tmənt/

1672 Phân xưởng

Workshop, shop
/'wɜ:kʃɒp/

1673 Phân xưởng chính

*Main workshop,
production shop*
/'meɪn wɜ:kʃɒp
prə'dʌktʃn ʃɒp/

1674 Phân xưởng hoàn tất

Blank preparation shop
/'blæŋk prepe'reɪʃn ʃɒp/

1675 Phân xưởng đúc

Foundry
/'faʊndri/

1676 Phân xưởng gia công

áp lực

Forge shop

/fɔːdʒ ʃɒp/

1677 Phân xưởng cơ khí*Machine shop*

/mæˈʃiːn ʃɒp/

1678 Phân xưởng lắp ráp*Assembly shop*

/əˈsembli ʃɒp/

1679 Phân xưởng phụ trợ*Auxiliary shop*

/ɔːgˈzɪliəri ʃɒp/

1680 Phân xưởng dụng cụ*Toolroom*

/tuːlruːm/

1681 Phân xưởng mẫu*Pattern shop*

/ˈpætɪn ʃɒp/

1682 Phân xưởng sửa chữa*Repair shop*

/rɪˈpeə ʃɒp/

1683 Nhà kho*Storeroom*

/ˈstɔːruːm/

1684 Nhân viên*Personnel*

/pɜːsəˈneɪl/

/

1685 Nhân công*Employee*

/emˈplɔɪˈiː/

1686 Công nhân*Worker*

/wɜːkə(r)/

1687 Tổ sản xuất (đội)*Team*

/tiːm/

1688 Đội ngũ kỹ sư*Engineering staff worker*

/endʒɪˈniəriŋ stɑːf/

wɜːkə(r)/

1689 Kỹ sư*Engineer*

/endʒɪˈniə(r)/

1690 Kỹ thuật viên*Technician*

/tekˈniʃn/

1691 Kỹ sư thiết kế*Design engineer*

/diˈzaɪn endʒɪˈniə(r)/

1692 Kỹ sư công nghệ*Process engineer*

/ˈprɒses endʒɪˈniə(r)/

1693 Trưởng phòng

Chief of department
/tʃi:f əv di'pɑ:tmənt/

1694 Quản đốc phân xưởng

Shop superintendant
/ʃɒp.su:pəri'n'tendənt/

1695 Tổ trưởng, đốc công

Foreman
/'fɔ:mən/

1696 Nhân viên văn phòng

*Office worker, clerical
worker*
/'ɒfis 'wɜ:kə 'klɜ:kl/

1697 Ca, kíp

Shift
/ʃɪft/

1698 Mặt bằng phân xưởng

Workshop layout
/'wɜ:kʃɒp 'leɪaʊt/

1699 Gian, khoang

Bay
/beɪ/

1700 Công đoạn

Workshop section
/'wɜ:kʃɒp 'sekʃn/

1701 Hành trình

Pass
/pɑ:s/

1702 Vị trí làm việc

Working place
/'wɜ:kɪŋ pleɪs/

1703 Tiền trả công

Payment for work
/'peɪmənt fɔ wɜ:k/

1704 Hệ thống tiền lương

theo ngày công
Day-work payment
system
/deɪ wɜ:k 'peɪmənt
'sɪstəm/

1705 Hệ thống tiền lương

theo sản phẩm
Piece-work payment
system
/pi:s wɜ:k 'peɪmənt
'sɪstəm/

1706 Tiền công

Wage
/weɪdʒ/

1707 Tiền lương

Salary
/'sæləri/

1708 Chỉ số lương cơ bản*Standard base-rate**structure*

/ˌstændəd beɪs.rent

'strʌktʃə(r)/

1709 Mức lương*Wage class*

/weɪdʒ ˈklɑːs/

1710 Lương theo giờ*Base hourly rate*

/beɪs ˌaʊəli'rent/

1711 Định mức thời gian*Standard piece time*

/ˌstændəd piːs'taɪm/

1712 Thời gian-Sản phẩm*Time per piece*

/taɪm pə piːs/

1713 Thời gian hoàn tất*Setup time*

/ˌsetʌp taɪm/

1714 Thời gian gia công*Base cycle time*

/beɪs ˈkaɪkl taɪm/

1715 Thời gian sản xuất trực tiếp*Computed machine time**direct manufacture time*

/kəm.pjʊtɪd mə'fɪn

tʌɪm : dɪrekt

mænʃʊ'fæktʃə taɪm/

1716 Thời gian phụ*Auxiliary time*

/ɔːg'zɪliɪrɪtaɪm/

1717 Thời gian bổ sung*Additional time*

/ə'dɪʃnəl taɪm/

1718 Thời gian phục vụ máy*Time for machine**servicing*

/taɪm fɔ mə'fɪn

'sɜːvɪsɪŋ/

1719 Thời gian nghỉ và nhu cầu cá nhân*Time for rest and**personal needs*

/taɪm fɔ ˌrest ən ˌpɜːsənl

'niːdz/

1720 Năng suất sản xuất định mức*Standard production rate*

/ˌstændəd prɒ'dʌkʃn

reɪt/

1721 Giá thành sản phẩm*Piece-rate price*

/pi:s reit prais/

1722 Tiêu thụ công lao động*Labour-consumption*

/ˌleɪbə kən'sʌmpʃn/

1723 Tiền thưởng*Bonus*

/ˈbʊnəs/

1724 Năng suất lao động*Labour productivity*

/ˌleɪbə prɒdʌk'tɪvəti/

1725 Chất lượng sản phẩm*Product quality*

/prɒdʌkt 'kwɒləti/

1726 Kiểm tra chất lượng sản phẩm*Product quality**inspection*

/ˌprɒdʌkt.kwɒləti

ɪn'spekʃn/

1727 Kiểm tra toàn phần*Complete inspection*

/kəm.pli:t ɪn'spekʃn/

1728 Kiểm tra theo mẫu*Sampling inspection*

/sæmplɪŋ ɪn'spekʃn/

1729 Kiểm tra trong dây*chuyên sản xuất**Incoming inspection*

/ˌɪnkʌmɪŋ ɪn'spekʃn/

1730 Nghiệm thu*Acceptance inspection*

/ək'sepʃn ɪn'spekʃn/

1731 Thử nghiệm sản phẩm*Product tests*

/ˈprɒdʌkt tests/

1732 Thử nghiệm thực tế*Performance tests*

/pə'fɔ:məns tests/

1733 Thử nghiệm phá hủy mẫu*Destructive tests*

/dɪ'strʌktɪv tests/

1734 Thử nghiệm không phá hủy mẫu*Nondestructive tests*

/nɒndɪ'strʌktɪv tests/

1735 Độ tin cậy thử nghiệm*Reliability tests*

/rɪləɪə'bɪləti tests/

1736 Độ tin cậy*Reliability*

1737 Độ an toàn*Failsafety*

/feɪl'seɪfti/

1745 Dấu chất lượng*Quality mark*

/ˈkwɒləti mɑ:k/

1738 Tuổi bền sản phẩm*Durability*

/dʒʊərə'bɪləti/

1739 Hư hỏng*Failure*

/ˈfeɪljə(r)/

QUI TRÌNH SẢN XUẤT
PRODUCTION PROCESS**1740 Hư hỏng tạm thời***Temporary failure*

/ˈtempərəri ˈfeɪljə(r)/

1746 Kiểu sản xuất*Type of production*

/ˌtaɪp əv prəˈdʌkʃn/

1741 Hư hỏng nặng*Critical failure*

/ˌkrɪtɪkl ˈfeɪljə(r)/

1747 Sản xuất đơn chiếc*Job-lot production*

/ˌdʒɒb lɒt prəˈdʌkʃn/

1742 Thời hạn sử dụng*Service life*

/ˈsɜ:vɪs laɪf/

1748 Sản xuất hàng loạt*Serial production*

/ˌsiəriəl prəˈdʌkʃn/

1743 Sác xuất không phế phẩm, hệ số tin cậy
Probability of no-failure, reliability factor, survival rate

/prəbə'bɪləti əv nəʊ

ˈfeɪljə(r) rɪləɪə'bɪləti

ˈfæktə sɜ:'vaɪvl reɪt/

1749 Lô*Lot*

/lɒt/

1750 Sản xuất đại trà*Mass production*

/mæs prəˈdʌkʃn/

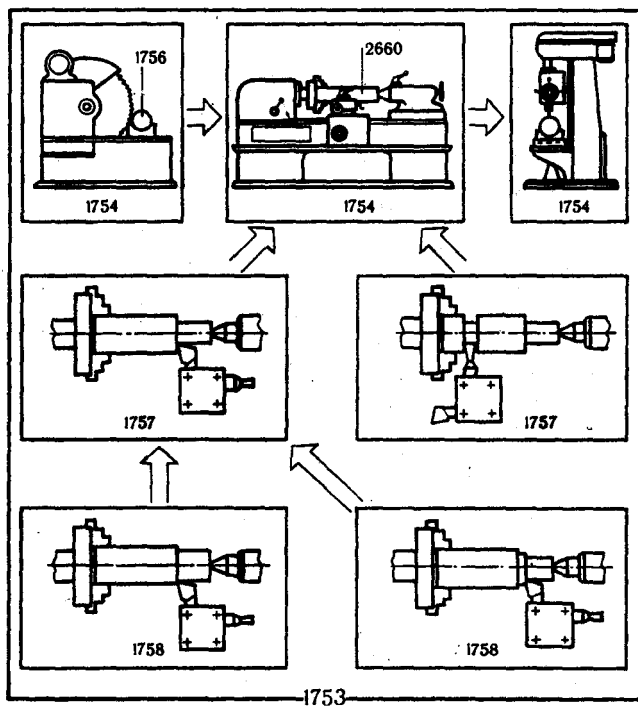
1744 Phế phẩm*Reject*

/rɪˈdʒekt/

1751 Chu kỳ hoàn tất*Output cycle time*

/ˌaʊtpuːt ˈsaɪkl taɪm/

1753



1752 Tỷ suất hoàn tất

Output rate
/aʊtpʊt reɪt/

1760 Gia công cắt gọt

Tooling
/tuːlɪŋ/

1753 Quy trình công nghệ

Manufacturing process
/mænɪʃʊˈfæktʃərɪŋ
ˈprɒses/

1761 Dụng cụ gia công

Tool
/tuːl/

1754 Nguyên công

Manufacturing operation
/mænɪʃʊˈfæktʃərɪŋ
opəˈreɪʃn/

1762 Gá lắp

Setting-up
/ˈsetɪŋ ʌp/

1755 Lô sản xuất

Operation batch
/opəˈreɪʃn bæʃt/

1763 Chi phí sản xuất

Production cost
/prəˈdʌkʃn kɒst/

1756 Bán thành phẩm

Blank
/blæŋk/

1764 Giá vật tư

Cost of material
/ˌkɒst əv məˈtɪəriəl/

1757 Bước gia công

Manufacturing step
/mænɪʃʊˈfæktʃərɪŋ steɪp/

1765 Giá năng lượng điện

Cost of electric power
/ˌkɒst əv ɪˈlektrɪk
ˈpaʊə/

1758 Chuỗi gia công

Manufacturing pass
/mænɪʃʊˈfæktʃərɪŋ pɑːs/

1766 Giá nhân công

Cost of labour
/ˌkɒst əv ˈleɪbə/

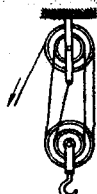
1759 Thiết bị gia công

*Manufacturing
equipment*
/mænɪʃʊˈfæktʃərɪŋ
ɪˈkwɪpmənt/

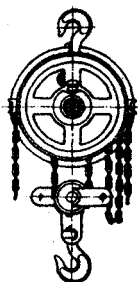
1767 Bảo hiểm xã hội

Social insurance
/ˌsəʊʃl ɪnˈfʊərəns/

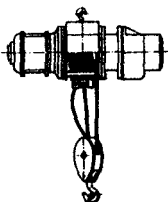
1783



1784



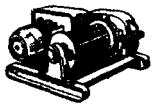
1785



1786



1788



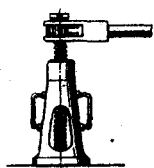
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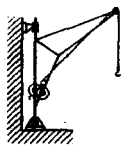
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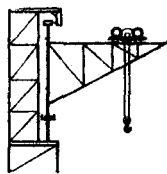
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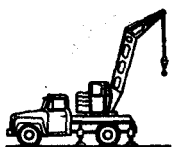
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1794



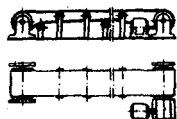
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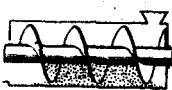
1796



1798



1799



1800



1768 Sửa chữa bảo trì

*Machine repairs and
maintenance*
/mɔːʃɪn rɪˈpeəz ən
ˈmeɪntənəns/

1769 Khấu hao máy

Machine depreciation
/mɔːʃɪn dɪˈpriːʃɪˈeɪʃn/

1770 Chi phí phụ trội

Overhead expense(s)
/ˌoʊvəhɛd ɪkˈspen(s)/

1771 Giá cả

Price
/praɪs/

1772 Lợi nhuận

Profit
/ˈprɒfɪt/

1773 Khả năng thuê mướn

Rentability
/rentəˈbɪləti/

1774 Dịch vụ

Service
/ˈsɜːvɪs/

1775 Sửa chữa ; bảo trì

Repair ; maintenance
/rɪˈpeə(r) ˈmeɪntənəns/

1776 Bảo trì đón đầu

Preventive maintenance
/prɪˈventɪv ˈmeɪntənəns/

1777 Sửa chữa nhỏ (tiểu tu)

Minor repair
/ˌmaɪnə rɪˈpeə(r)/

**1778 Sửa chữa trung (trung)
tu**

Medium repair
/ˌmiːdiəm rɪˈpeə(r)/

1779 Đại tu

Overhaul
/ˌoʊvəˈhoʊl/

**VẬN CHUYỂN VẬT TƯ
NỘI BỘ****INTERNAL MATERIAL
HANDLING****1780 Vận chuyển vật tư**

Material handling
/mæˈtɪəriəl ˈhændlɪŋ/

1781 Thùng chứa , kiểu phễu

Hopper-type bin
/ˌhɒpə ˈtaɪp ˈbɪn/

**1782 Tời nâng, thang máy
nâng**

Hoist
/hɔɪst/

1783 Khối palăng

Block and tackle
/ˈblɒk ən ˈtækl/

1784 Khối ròng rọc nâng

Pulley block hoist
/ˌpʊli blɒk ˈhɔɪst/

1785 Palăng có động cơ điện

Overhead electric hoist
/ˌoʊvəhed ɪˈlektɹɪk ˈhɔɪst/

1786 Cầu động cơ một ray

Monorail motor hoist
/ˌmɒnəreɪl ˈmɔʊtə hɔɪst/

1787 Ray đơn

Monorail
/ˌmɒnəreɪl/

1788 Tời quay

Winch
/wɪntʃ/

1789 Xe tải

Truck
/trʌk/

1790 Xe tải chạy điện

Battery-driven truck
/ˌbæteri ˈdrɪvɪn ˈtrʌk/

1791 Xe nâng chuyên

Power lift truck
/ˌpaʊə lift ˈtrʌk/

1792 Con đội

jack
/dʒæk/

1793 Cần cầu gán tường

Wall-jib crane
/ˌwɔ:l dʒɪb kreɪn/

1794 Cần cầu giá công xon

Bracket crane
/ˌbrækɪt kreɪn/

1795 Xe cầu

Motorized crane
/ˌmɔʊtəraɪzd kreɪn/

1796 Cầu trục, cần trục công

Gantry crane
/ˌɡæntɹi kreɪn/

1797 Băng chuyền

Conveyer, conveyor
/kənˈveɪə(r)/

1798 Băng tải

Belt conveyer
/belt kənˈveɪə(r)/

1799 Vít tải

Screw conveyer
/skruː kənˈveɪə(r)/

1800 Băng tải lăn

Roller conveyer
/ˌrɔʊlə kənˈveɪə(r)/

1801 Băng treo*Overhead conveyer*

/ˌoʊvəˈhed kənˈveɪər/

1804 Guồng nâng*Bucket elevator*

/ˌbʌkɪtˈelɪvətər/

1802 Băng chuyền xe lăn*Truck conveyer*

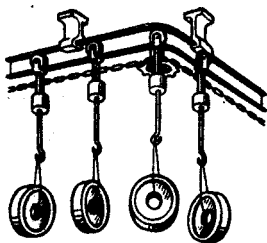
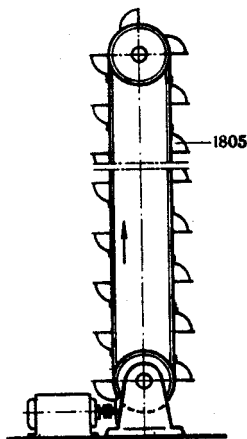
/trʌk kənˈveɪər/

1805 Gàu, khoang chứa*Bucket*

/ˈbʌkɪt/

1803 Thang máy, thang
nâng*Elevator*

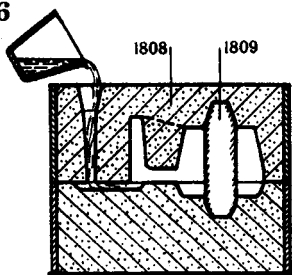
/ˈelɪvətər/

1801**1802****1804**

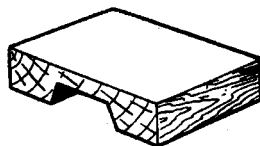
KỸ THUẬT ĐÚC

FOUNDRY ENGINEERING

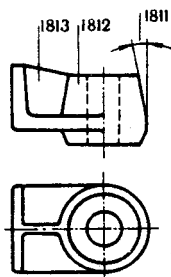
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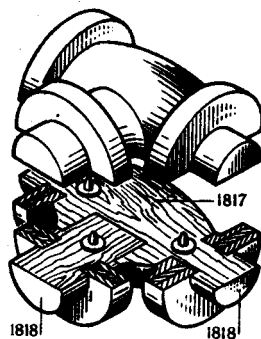
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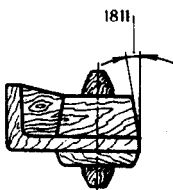
1810



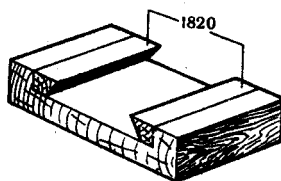
1816



1814



1819



KỸ THUẬT ĐÚC

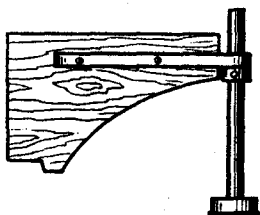
FOUNDRY ENGINEERING

KHÁI NIỆM CHUNG

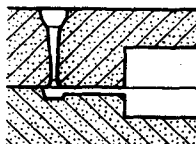
GENERAL TERMS

1806 Sự đúc*Casting**/ˈkɑːstɪŋ/***1807 Đúc***Cast**/kɑːst/***1808 Khuôn***Mould**/maʊld/***1809 Lõi khuôn***Mould core, core**/maʊld kɔːr/***1810 Vật đúc***Casting***1811 Độ dốc lấy phôi***Draft**/draʊt/***1812 Vấu lõi***Boss**/bɒs/***1813 Gân***Rib**/rɪb/***1814 Mẫu đúc***Pattern**/ˈpætn/***1815 Mẫu cứng liền khối***Solid pattern**/ˌsɒlɪd ˈpætn/***1816 Mẫu phân chia nhiều mảnh***Split pattern**/splɪt ˈpætn/***1817 Mặt phân khuôn***Parting plane**/ˈpɑːtɪŋ pleɪn/***1818 Dấu ghi lõi***Core print**/kɔː ˈprɪnt/***1819 Mẫu tháo được***Loose-piece pattern**/luːs piːs ˈpætn/*

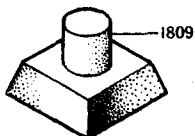
1821



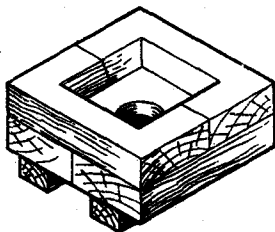
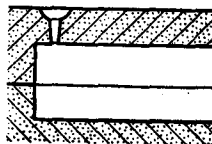
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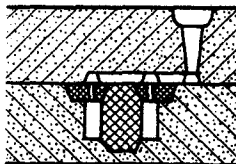
1822



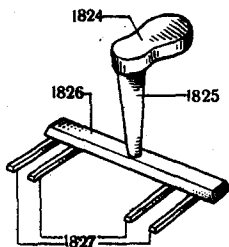
1833



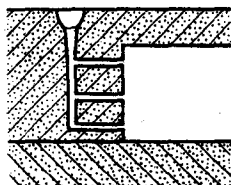
1835



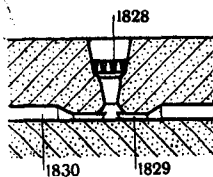
1823



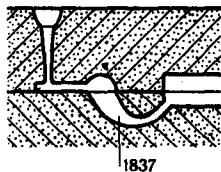
1834



1828



1836



1820 Phần tháo được

Loose piece

/lʊs pi:əs/

1821 Đường gạt

Sweep pattern

/swi:p 'pætn/

1822 Hộp lõi

Core box

/kɔ: bɒks/

1823 Hệ thống đậu rót

Gating system

/,geɪtɪŋ 'sɪstəm/

1824 Phễu rót

Pouring basin

/pɔ:tɪŋ ,beɪsn/

1825 Thân đậu rót

Sprue

/spru:/

1826 Rãnh chính

Runner

/ˈrʌnə(r)/

1827 Rãnh phân chia

Gate

/geɪt/

1828 Lõi tăng bền

Strainer core

/ˈstreɪnə kɔ:(r)/

1829 Rãnh tiết lưu

Choke

/tʃɔ:k/

1830 Rãnh xỉ, rãnh tạp chất

Dirt trap

/dɜ:t træp/

1831 Hệ thống rót rãnh ngang

Parting-line gating system

/,pɑ:tɪŋ laɪn ,geɪtɪŋ 'sɪstəm/

1832 Hệ thống rót rãnh đứng

Vertical gating system

/ˌvɜ:tɪkl ,geɪtɪŋ 'sɪstəm/

1833 Hệ thống rót rãnh đỉnh

Top gating system

/tɒp ,geɪtɪŋ 'sɪstəm/

1834 Hệ thống rót kiểu bút chì

Pencil gating system.

/ˌpensl ,geɪtɪŋ 'sɪstəm/

1835 Hệ thống rót theo bậc

Step gating system.

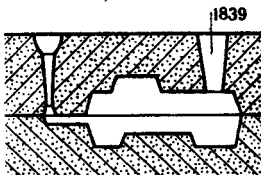
/ˌstep ,geɪtɪŋ 'sɪstəm/

1836 Hệ thống rót từ đáy lên

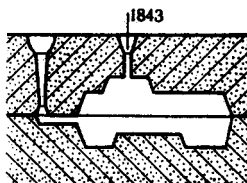
Bottom gating system.

/ˌbɒtm ,geɪtɪŋ 'sɪstəm/

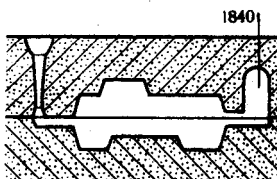
1839



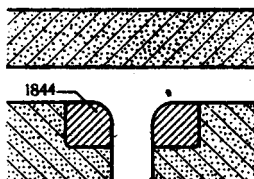
1843



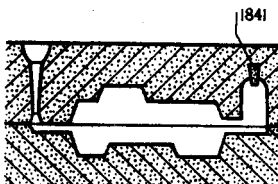
1840



1844



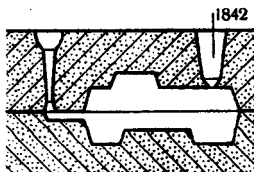
1841



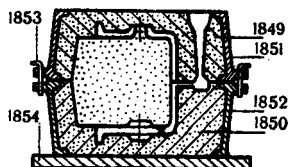
1845



1842



1847



1837 Rãnh đầu cong

Horn gate.

/hɔ:n 'gen/

1838 Đầu ngót, đầu hơi

Feeder head, riser.

/fi:ðə hed 'raɪzə(r)/

1839 Đầu ngót hở, đầu hơi hở

Open the top feeder,

open riser.

/,əʊpən tɒp 'fi:ðə

,əʊpən 'raɪzə(r)/

1840 Đầu ngót kín

Blind feeder, blind riser.

/blaɪnd 'fi:ðə blaɪnd

'raɪzə/

1841 Lõi thấm khí

Permeable core; pencil

core.

/pɜ:mɪəbəl kɔ:(r)

'pensl kɔ:(r)/

1842 Đầu ngót cổ thắt

Necked-down feeder,

necked-down riser.

/,nekt daʊn fi:ðə(r)

nekt daʊn 'raɪzə(r)/

1843 Đầu hơi

Air gate, whistler.

/ə'eɪɡent ,wɪstlə/

1844 Miếng kim loại để làm

nguồn nhanh

Chill.

/tʃɪl/

1845 Con mã (đúc)

Chaplet.

/tʃæplɪt/

1846 Khuôn dùng 1 lần

Expendable mould.

/ɪk'spendəbəl məʊld/

1847 Khuôn cát

Sand mould.

/sænd məʊld/

1848 Hộp khuôn, hòm khuôn

Flask, moulding box.

/flɑ:sk ; 'mɔ:ldɪŋ bɒks/

1849 Nửa trên của khuôn

Cope.

/kəʊp/

1850 Nửa dưới của khuôn

Drag.

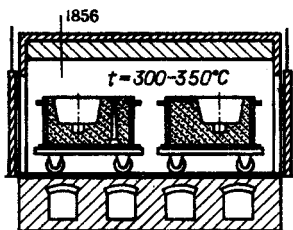
/dræg/

1851 Hộp khuôn trên

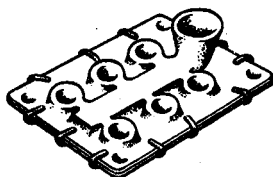
Cope flask, cope box.

/kəʊp flɑ:sk 'kəʊp bɒks/

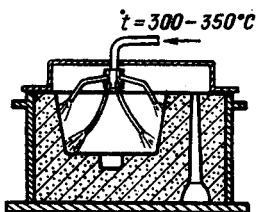
1856



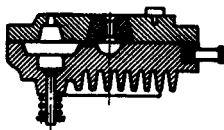
1859



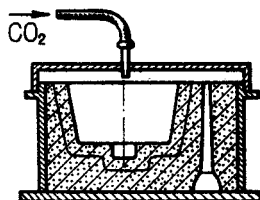
1857



1861



1858



1852 Hộp khuôn dưới

Drag flask, drag box.

/dræg flæsk dræg bɒks/

1853 Chốt định vị

Alignment pin.

/ə'laɪnmənt pɪn/

1854 Đế hộp khuôn

Bottom board.

/bɒtəm bɔ:d/

1855 Khuôn cát xám

Green-sand mould.

/grɪn ,sænd 'mɔ:ld/

1856 Khuôn cát khô

Dry-sand mould.

/draɪ ,sænd 'mɔ:ld/

1857 Khuôn có lớp bề mặt

sấy

Skin-dried mould.

/,skɪn draɪd 'mɔ:ld/

1858 Khuôn làm cứng bằng

hoá chất

*Chemically hardening
mould.*

/,kɛmɪkəl ,hɑ:dənɪŋ

'mɔ:ld/

1859 Khuôn vỏ

Shell mould.

/ʃel mɔ:ld/

1860 Khuôn vĩnh cửu

Permanent mould.

/pɜ:mənənt mɔ:ld/

1861 Khuôn kim loại

Metal mould.

/metl mɔ:ld/

**VẬT LIỆU LÀM KHUÔN
VÀ LỖI**

**MOULD AND CORE
MATERIALS**

**1862 Vật liệu làm khuôn và
lõi**

Mould and core material.

/mɔ:ld ənko: m

ə'tɪəriəl/

1863 Cát tự nhiên để làm

khuôn

Natural moulding sand.

/,nætʃrəl 'mɔ:ldɪŋ sænd/

1864 Silic

Silica.

/sɪlɪkə/

1865 Đất sét

Clay.

/kleɪ/

1866 Cát giàu silic

High-silica sand.

/haɪ ,sɪlɪkə 'sænd/

1867 Cát ít silic

Low-silica sand.

/ləʊˌsɪlɪkəˈsænd/

1872 Vật liệu kết dính

Bond.

/bɒnd/

1868 Cát yếu

Weak sand, lean sand.

/wɪkˈsænd liːnˈsænd/

1873 Chất gắn, liên kết

Binder.

/ˈbaɪndə/

1869 Cát trung bình bền

Medium strong sand.

/ˌmiːdiəm strɒŋˈsænd/

1874 Dầu khô, dầu hạt lanh

Drying oil, linseed oil.

/ˈdraɪɪŋ ɔɪl; ˈlɪnsiːd ɔɪl/

1870 Cát bền

Strong sand.

/strɒŋˈsænd/

1871 Cát rất bền

Very strong sand.

1875 Dextrin

Dextrin.

/ˈdekstriːn/

1876 Mật mía

Molasses.

/mɒˈlæsɪz/

1880 Hỗn hợp lõi

Core mix, core sand.

/kɔː mɪks kɔː sænd/

1877 Thủy tinh lỏng

Water glass.

$\text{Na}_2\text{O} \cdot n\text{SiO}_2 \cdot m\text{H}_2\text{O}$

/ˈwɔtə glaːs/

1881 Cát mặt

Facing sand.

/feɪsɪŋ sænd/

**1878 Hỗn hợp làm khuôn ,
cát làm khuôn**

Moulding mixture,

moulding sand.

/ˈmɔʊldɪŋ ,mɪkstʃə(r) /

1882 Cát lót

Backing sand.

/ˈbækɪŋ sænd/

1879 Hỗn hợp cát - đất sét

Sand-and-clay mixture.

/ˌsændən ,kleɪˈmɪkstʃə(r) /

1883 Cát lót - cát mặt

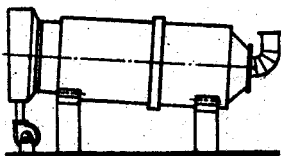
*Facing-and-backing
sand.*

/feɪsɪŋən ˈbækɪŋ sænd/

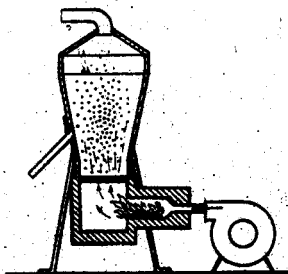
1893



1896



1897



1884 Hỗn hợp lỏng tự đông cứng

Liquid self-hardening

mixture.

/ˈlikwɪd self ˌhɑːdənɪŋ

ˈmɪkstʃər/

1885 Lượng chứa ẩm, độ ẩm

Moisture content.

/ˌmɔɪstʃə ˈkɒntənt/

1886 Lượng đất sét

Clay content.

/ˈkleɪ ˈkɒntənt/

1887 Thành phần cỡ hạt

Grain-size distribution.

/ɡreɪn saɪz dɪstrɪˈbjʊːʃn/

1888 Độ thông khí

Permeability.

/pəˈmiəˈbɪləti/

1889 Chống đập vỡ

Resistance to spalling.

/rɪˈzɪstəns tə ˈspɔɪlɪŋ/

1890 Kết tụ, thiêu kết

Sintering.

/ˈsɪntərɪŋ/

1891 Tính chịu nhiệt

Refractoriness.

/rɪˈfræktərɪnɪs/

1892 Chuẩn bị cát làm khuôn

Moulding-sand

preparation.

/ˌmɔʊldɪŋ sænd

prepəˈreɪʃn/

1893 Sự sấy khuôn

Drying, backing.

/ˈdraɪŋ ˈbeɪkɪŋ/

1894 Sấy

Dry.

/draɪ/

1895 Lò sấy, thiết bị sấy

Drier

/ˈdraɪə/

1896 Lò sấy kiểu quay

Rotary drier.

/ˌrɔʊtəri ˈdraɪə/

1897 Lắp đặt máy sấy kiểu phun

Installation for fluidized-

bed drying.

/ɪnstəˈleɪʃn fɔː ˌfluɪdaɪzɪd

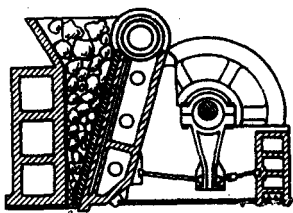
bed ˈdraɪɪŋ/

1898 Sự nghiền nhỏ

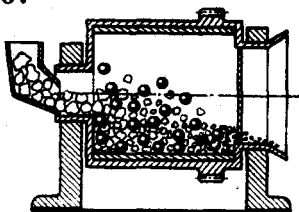
Crushing.

/ˈkrʌʃɪŋ/

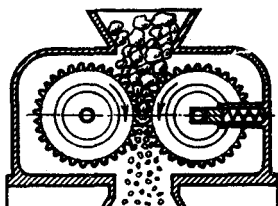
1901



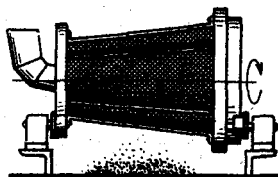
1907



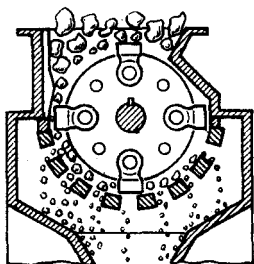
1902



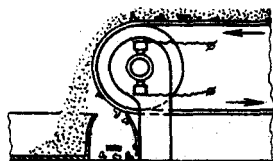
1911



1906



1913



1899 Nghiền nhỏ

Crush.

/kɾʌʃ/

1900 Máy nghiền

Crusher.

/kɾʌʃə/

1901 Máy nghiền kiểu vấu

Jaw crusher.

/dʒɔː kɾʌʃə/

1902 Máy nghiền trục lăn

*Roll breaker, roll
crusher.*

/rɔːl breɪkə/ rɔːl
kɾʌʃə/

1903 Sự nghiền xay

Grinding, milling.

/ˈɡraɪndɪŋ ˈmɪlɪŋ/

1904 Mài, xay

Grind, mill.

/ˈɡraɪnd , mɪl/

1905 Máy xay mịn

Mill.

/mɪl/

1906 Máy nghiền búa

Hammer mill.

/ˈhæmə mɪl/

1907 Máy nghiền bi

Ball mill.

/ˈbɔːlmɪl/

1908 Sự sàng lọc

Screening.

/ˈskɪnɪŋ/

1909 Sàng

Screen.

/skɪn/

1910 Lưới sàng

Sieve, screen.

/sɪv skɪn/

1911 Lưới sàng quay

*Gyratory sieve, rotary
screen.*

/ˈdʒaɪrətəri ˈsɪv
ˌrɔːtəri ˈskɪn/

1912 Sàng rung

Oscillating sieve.

/ˈɒsɪlətɪŋ sɪv/

1913 Máy tách bằng từ tính

Magnetic separator.

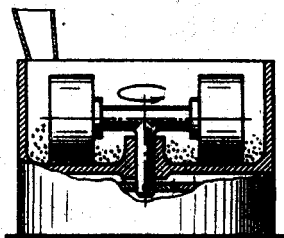
/ˈmæɡ.netɪk ˈsepəreɪtə/

1914 Sự hoà trộn

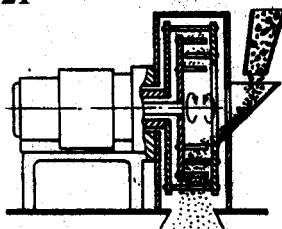
Mixing.

/ˈmɪksɪŋ/

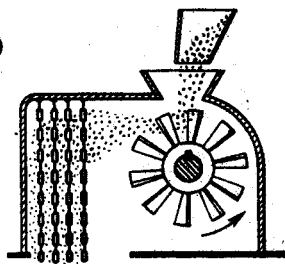
1916



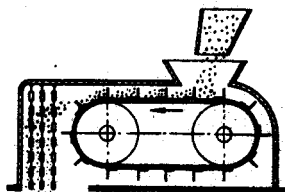
1921



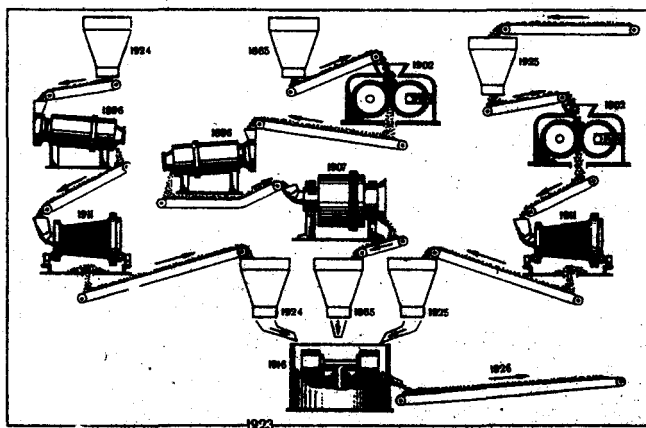
1920



1922



1923



1915 Hòa trộn

Mix.
/miks/

1916 Xay, nghiền, trộn cát

Sand mill, mixer, miller.
/sænd mil, 'miksə(r),
'mɪlə(r)/

1917 Sự làm rời tơi, sự làm tơi

Desintegration.
/dɪsɪntɪ'greɪʃn/

1918 Làm tơi cát

Desintegrate, break up
the sand.
/dɪ'sɪntɪgreɪt, 'breɪkʌp ðə
sænd/

1919 Thiết bị đánh tơi cát

Sand desintegrator.
/sænd dɪ'sɪntɪgreɪtə(r)/

1920 Máy làm tơi bằng

không khí
Aerator.
/'æriətə(r)/

1921 Máy làm tơi kiểu thanh

Spike desintegrator.
/spaɪk dɪ'sɪntɪgreɪtə(r)/

1922 Máy đánh tơi kiểu băng tải

Belt-type desintegrator.
/ˌbelt taɪp dɪ'sɪntɪgreɪ
tə(r)/

1923 Phân xưởng cát

Sand plant.
/sænd plænt/

1924 Cát mới

New sand.
/nju: 'sænd/

1925 Cát cũ (đã làm khuôn nhiều lần)

Burnt sand.
/bɜ:nt 'sænd/

1926 Cát dùng lại

Reused sand,
reconditioned sand.
/ri'ju:zd sænd
rɪkən'dɪʃnd sænd/

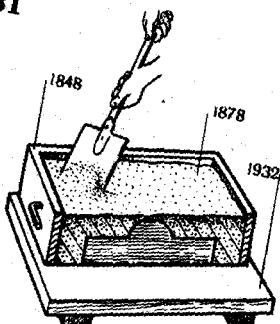
SỰ LÀM KHUÔN

MOULDING

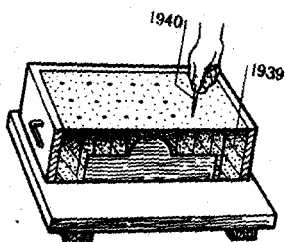
1927 Sự làm khuôn

Moulding.

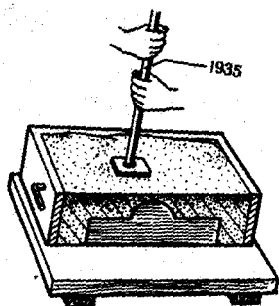
1931



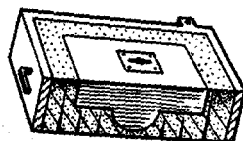
1937



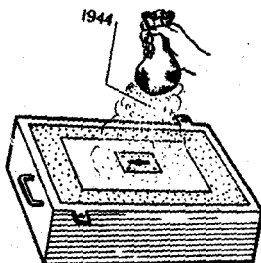
1933



1941



1943



1936



1928 Làm khuôn

Mould.

1929 Làm khuôn theo mẫu

Pattern moulding.

/ˌpætn 'mɔːldɪŋ/

1930 Làm khuôn bằng tay

Hand moulding.

/hænd 'mɔːldɪŋ/

1931 Sự xúc cát làm khuôn

Shoveling the moulding

sand.

/ˈʃʌvlɪŋ ðə mɔːldɪŋ

sænd/

1932 Bảng khuôn

Mould board.

/mɔːld bɔːd/

1933 Sự đầm cát

Ramming.

/ˈræmɪŋ/

1934 Đầm cát

Ram

/ræm/.

1935 Búa đầm cát cầm tay

Hand rammer.

/hænd 'ræmə(r)/

1936 Thiết bị đầm cát khí

nén

Pneumatic rammer.

/njuː.mætɪk 'ræmə(r)/

1937 Chọc lỗ thông khí

Punching the vent holes.

/ˈpʌntʃɪŋ ðə 'vent hɔːlz/

1938 Chọc lỗ

Punch.

/pʌntʃ/

1939 Lỗ thông khí

Vent hole.

/ˈvent hɔːl/

1940 Dây thông khí

Vent wire.

/ˈvent 'waɪə(r)/

1941 Sự lật khuôn lên trên

Rolling over

/ˈrɔːlɪŋ əʊvə(r)/

1942 Lật khuôn lên trên

Roll over.

1943 Sự phun bột

Dusting.

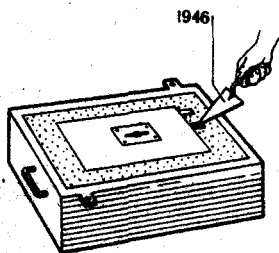
/ˈdʌstɪŋ/

1944 Bột ở mẫu vật

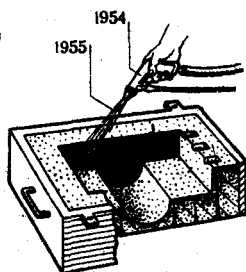
Parting dust.

/ˈpɑːtɪŋ dʌst/

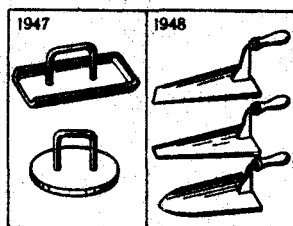
1945



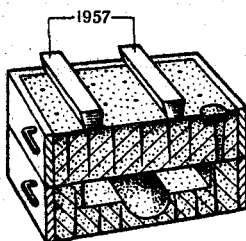
1952



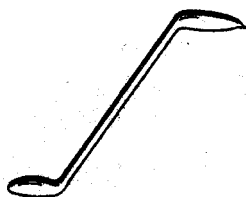
1946



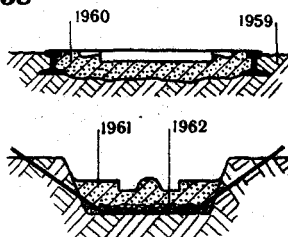
1956



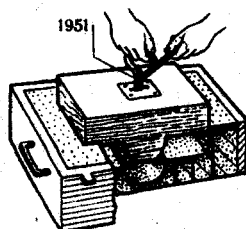
1949



1958



1950



1945 Sự cắt rãnh rót

Cutting the gates.

/ˈkʌtɪŋ ðə ɡeɪt/

1946 Cái bay làm khuôn

Trowel.

/ˈtraʊəl/

1947 Bay làm phẳng

Flat trowel.

/flæt ˈtraʊəl/

1948 Bay tạo hình

Shaped trowel.

/ʃeɪpt ˈtraʊəl/

1949 Thìa

Slick, sleeker.

/sɪk, ˈsliːkə/

1950 Lấy mẫu ra khỏi khuôn

Drawing the pattern.

/ˈdrɔːɪŋ ðə ˈpætn/

1951 Móc kéo mẫu

Draw spike.

/dɹoː ˈspaɪk/

1952 Sự phun khuôn

Spraying.

/ˈspreɪŋ/

1953 Dòng phun khuôn

Spray.

1954 Súng phun

Spraying gun.

/ˈspeɪŋ ɡʌn/

1955 Áo khuôn

Mould wash, mould

coating.

/ˈmɔːld wɒʃ; ˈmɔːld

ˈkɔːtɪŋ/

1956 Lắp khuôn

Assembly of the mould.

/əˈsembli ɒv ðə ˈmɔːld/

1957 Vật chặn (đè) khuôn

Weight.

/weɪt/

1958 Làm khuôn trên nền

xương

Floor moulding.

/flɔː ˈmɔːldɪŋ/

1959 Nền xương, nền cát

'Ground.

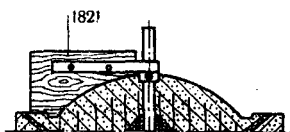
/ɡraʊnd/

1960 Nền mềm

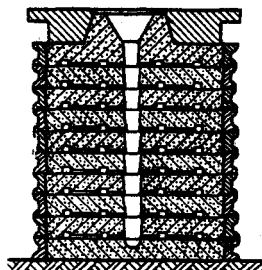
Soft bed.

/sɒft bed/

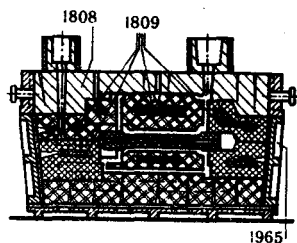
1963



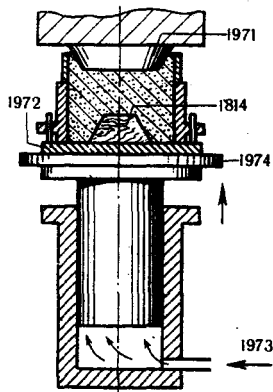
1967



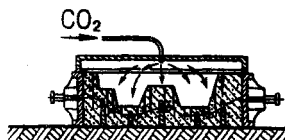
1964



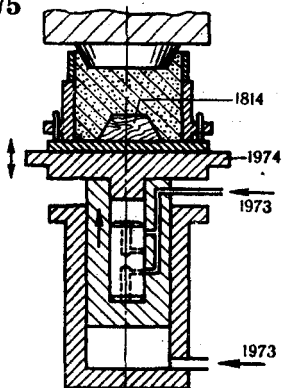
1970



1966



1975



1961 Nền cứng

Stiff bed.

/stɪf bed/

1968 Làm khuôn bằng máy

Machine moulding.

/məʃɪn 'mɔːldɪŋ/

1962 Xi

Slag.

/slæɡ/

1969 Máy làm khuôn

Moulding machine.

/mɔːldɪŋ məʃɪn/

1963 Làm khuôn theo đường

gạt

Strickling.

/ˈstrɪklɪŋ/

1970 Sự ép cát làm khuôn

Squeezing of moulding

sand.

/ˈskwɪzɪŋ əv 'mɔːldɪŋ

sænd/

1964 Sự làm khuôn có lắp lõi

Core assembly moulding.

/kɔː əsəmbli 'mɔːldɪŋ/

1971 Đầu ép

Squeeze head.

/skɪːwz hed/

1965 Áo ngoài hòm khuôn

Jacket.

/dʒækɪt/

1972 Tấm mẫu

Pattern plate.

/ˈpætɪn pleɪt/

1966 Quá trình làm cứng

khuôn bằng khí CO₂

CO₂ - mould hardening

process.

/ˈkəʊbən daɪ.əksaɪd

mɔːld ˌhɑːdɪnɪŋ

ˈprəʊses/

1973 Không khí nén

Compressed air.

/kəmˈprest eə/

1974 Bàn ép

Table.

/teɪbl/

1967 Làm khuôn nhiều tầng

Stack moulding.

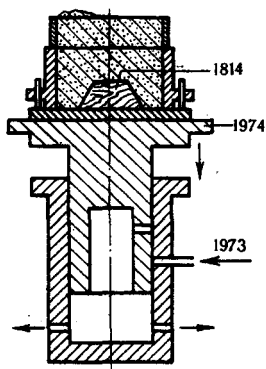
/stæk 'mɔːldɪŋ/

1975 Sự ép rung

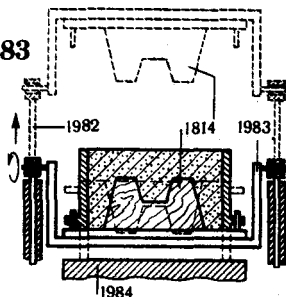
Squeezing and vibration.

/ˈskwɪzɪŋ ən vaɪˈbreɪʃn/

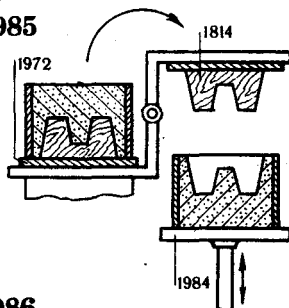
1977



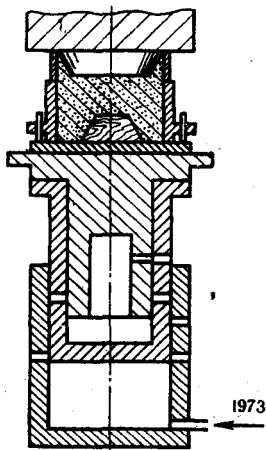
1983



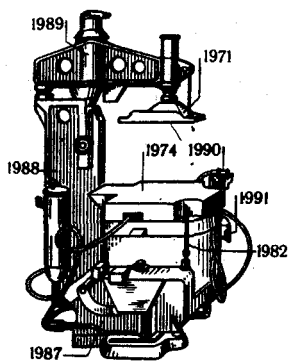
1985



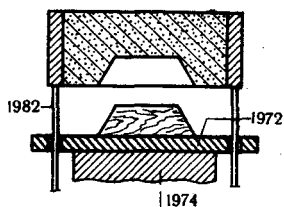
1980



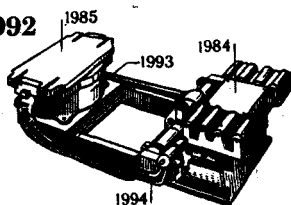
1986



1981



1992



1976 Máy rung bàn khuôn

Vibrator of the table.
/vaɪˈbreɪtə ɔvðə ˈteɪbl/

1977 Sự lèn rung

Jolting.
/dʒɒlɪŋ/

1978 Lèn rung

Jolt.
/dʒɒlt/

1979 Lèn và ép chặt

Jolting and squeezing.
/dʒɒlɪŋ ən ˈskwiːzɪŋ/

1980 Sự ép kết thúc

Final squeezing.
/ˈfaɪnl ˈskwiːzɪŋ/

1981 Sự nâng bằng chốt

Pin lift.
/pɪn lɪft/

1982 Chốt nâng

Lifting pin.
/ˈlɪftɪŋ pɪn/

1983 Lật ngược bàn khuôn

Roll-over table.
/ˌrɒl.əʊvə ˈteɪbl/

1984 Bàn kéo

Draw table.
/drɔː ˈteɪbl/

1985 Bàn lật quay

Rock-over table.
/ˌrɒk.əʊvə ˈteɪbl/

1986 Máy làm khuôn kiểu ép

- rung
Vibratory squeeze
moulding machine.
/vaɪˈbreɪtəɪ skwiːz
ˈmɔʊldɪŋ məʊˈfiːn/

1987 Giá đỡ máy

Bed.
/bed/

1988 Cột máy

Column.
/ˈkɒləm/

1989 Cần máy

Arm.
/ɑːm/

1990 Bộ phân phối khí

Air distributor.
/eəˈdɪstrɪbjʊtəɪ/

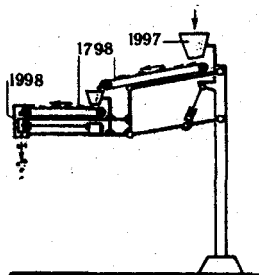
1991 Van , khớp quay

Knee valve.
/niːvæl/

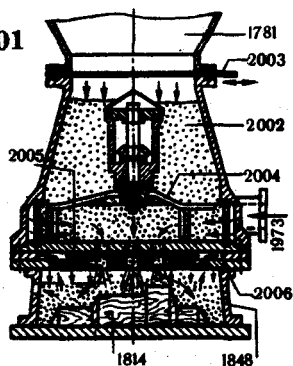
1992 Máy làm khuôn kiểu

lèn kéo khuôn
Jolt rock-over pattern-
draw moulding machine.
/dʒɒlt ˌrɒk.əʊvə ˌpætən
drɔː ˈmɔʊldɪŋ məʊˈfiːn/

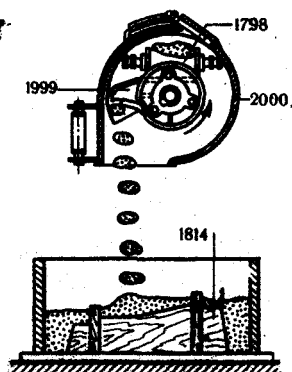
1996



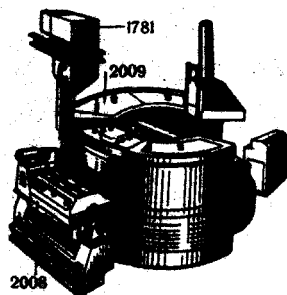
2001



1998

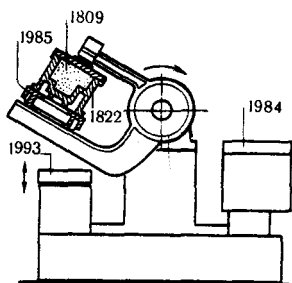


2007

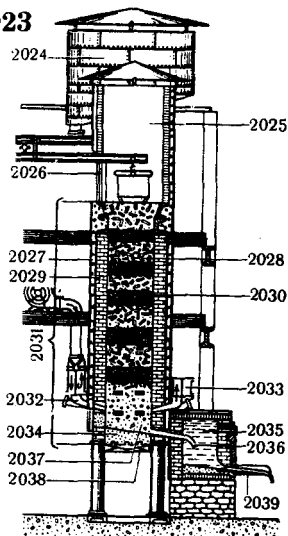


1993 Bàn lèn chặt*Jolt table.***1994 Cần lật quay***Rock-over arm.**/ˌrɒkəʊər'ɑ:m/***1995 Máy làm khuôn kiểu***lèn - rung**Jolt-squeeze moulding**machine.**/dʒɒlt skwiːz 'mɔːldɪŋ**məˌʃɪn/***1996 Máy phân phối cát***Sandslinger.**/ˈsænd slɪŋɡər/***1997 Phễu***Hopper.**/ˈhɒpər/***1998 Đầu cánh quay***Impeller, impeller head.**/ɪmˈpelər, ɪmˈpelər hed/***1999 Hộp, cánh phân phối***Bucket, blade.**/ˈbʌkɪt bleɪd/***2000 Vỏ ngoài***Hood.**/hʊd/***2001 Máy phun khuôn***Mould-blowing machine.**/mɔːl ˈblɔːɪŋ məˈʃɪn/***2002 Bình trữ cát***Sand reservoir.**/ˈsændˈrezəvɔːr/***2003 Cửa chặn, lưới chặn***Gate.**/ɡeɪt/***2004 Bộ phận khuấy trộn***Stirrer.**/ˈstɜːr/***2005 Tấm phun***Blow plate.**/blɔː pleɪt/***2006 Tấm tạo lỗ thông khí***Vent-hole plate.**/ˌvent hɔːl ˈpleɪt/***2007 Máy làm áo khuôn***Shell moulding machine.**/ʃel ˈmɔːldɪŋ məˌʃɪn/***2008 Phễu cấp***Roll-over hopper.**/rɔːl əʊvər ˈhɒpər/***2009 Lò thiêu kết áo khuôn***Shell sintering furnace.**/ʃel ˈsɪntərɪŋ ˌfɜːnsɪs/*

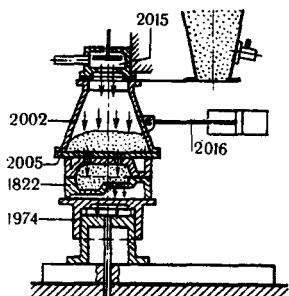
2013



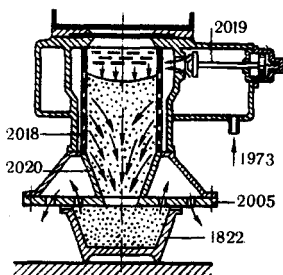
2023



2014



2017



2010 Làm khuôn với hộp

khuôn tháo được

Removeable-flask

moulding.

/ri.mʊvəbəl flæsk

'mɔʊldɪŋ/

2011 Máy làm lõi

Core-making machine

/kɔː.meɪkɪŋ me'fiːn/

2012 Máy làm lõi kiểu đầm

Squeezing core-making

machine.

/skwɪziŋ kɔː.meɪkɪŋ

mə'fiːn/

2013 Máy làm lõi kiểu lèn
chặt

Jolt core-making

machine.

/dʒɒlk kɔː.meɪkɪŋ

mə'fiːn/

2014 Máy làm lõi kiểu phun

Core-blowing machine.

/kɔː.bləʊɪŋ mə'fiːn/

2015 Vòi phun

Blow valve.

/bləʊ vɜːlv/

2016 Cần nén khí

Air pusher.

/eə'pʊʃə/

2017 Máy làm lõi kiểu máng

ngiêng

Core-shooting machine.

/kɔː.ʃuːtɪŋ mə'fiːn/

2018 Ống lót nhiều lỗ

Slotted sleeve.

/ˈslɒtɪd sliːv/

2019 Van tác động nhanh

Fast acting valve.

/fɑːst 'æktɪŋ vɜːlv/

2020 Họng phun

Nozzle.

/ˈnoʊzl/

2021 Máy làm lõi hộp nóng

Hot-box core-making

machine.

/hɒt.bɒks kɔː.meɪkɪŋ

mə'fiːn/

NẤU CHÁY VÀ RÓT

MELTING AND POURING

2022 Sự nấu chảy

Melting.

/ˈmeltɪŋ/

2023 Lò đứng

Cupola.

/ˈkjuːpələ/

cupola

2024 Ống khói dập tia lửa*Spark arrester.**/spɔ:k ə'restə(r)/***2028 Nạp kim loại***Iron charge, metal**charge.**/aɪən tʃɑ:ʒ/**'metal tʃɑ:ʒ /***2025 Ống khói***Stack.**/stæk/***2029 Tường gạch chịu lửa***Lining.**/laɪnɪŋ/***2026 Cửa nạp liệu***Charging door.**/tʃɑ:ʒɪŋ dɔ:ə/***2030 Nạp than cốc***Coke charge.**/kəʊk tʃɑ:ʒ/***2027 Vỏ lò***Shell.**/ʃel/***2031 Thân lò***Cupolar body, cupola**shaft.**/kju:pələ 'bɒdi ʃɑ:ft/*

2032 Ống cấp không khí

Tuyere.

2037 Xi than cốc

Coke bed.

/kɔʊk bed/

2033 Hộp gió

Wind box.

/wɪnd bɒks/

2038 Cửa xả xỉ

Door.

/dɔː/

2034 Đáy cát

Sand bottom.

/sænd 'bɒtəm/

2039 Cửa ra kim loại lỏng

Tap hole.

/tæp hoʊl/

2035 Lò tiền

Forehearth.

/fɔː'hɜːθ/

2036 Ống rót

Spout.

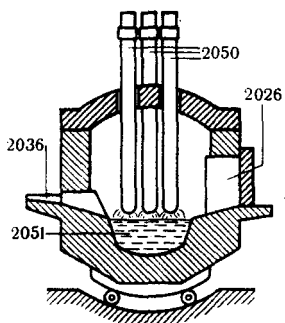
/spaʊt/

2040 Sự thổi gió

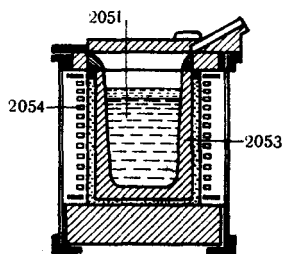
Blast.

/blɑːst/

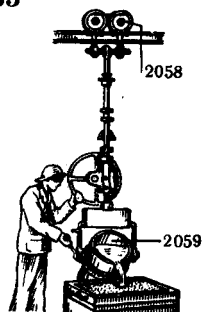
2049



2052



2055



2041 Hỗn hợp nguyên liệu thô

Mixture of raw materials.

/ˈmɪksʃən əv ɪˈroʊ mətəriəl/

2042 Liệu nạp lò

Charge.

/tʃɑːdʒ/

2043 Tính toán liệu nạp lò

Charge calculation.

/tʃɑːdʒ kælkjʊˈleɪʃn/

2044 Kim loại vụn

Scrap.

/ˈskɹæp/

2045 Phoi đóng bánh

Chip briquette.

/tʃɪp brɪˈket/

2046 Hợp kim sắt

Ferroalloy.

/ˈfɛrəʊˈlɔɪ/

2047 Than cốc

Coke.

/ˈkɔːk/

2048 Chất tạo xỉ

Flux.

/ˈflʌks/

2049 Lò điện hồ quang

Electric arc furnace.

/ˈɪləktrɪk ɑːk ˈfɜːn

ɪs/

2050 Điện cực graphit

Graphite electrode.

/ˈɡræfʌɪt ɪˈlektroʊd/

2051 Kim loại nóng chảy

Molten metal.

/ˌmɒltən ˈmetəl/

2052 Lò điện cảm ứng

Induction furnace.

/ɪnˈdʌkʃən ˈfɜːnɪs/

2053 Nồi lò

Crucible.

/ˈkrʊsɪbl/

2054 Cuộn cảm ứng

Induction coil.

/ɪnˈdʌkʃən kɔɪl/

2055 Sự đúc, rót

Casting, pouring.

/ˈkɑːstɪŋ ˈpɔːrɪŋ/

2056 Đúc, rót

Cast, pour.

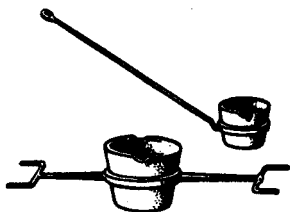
/ˈkɑːst , pɔːr/

2057 Nồi rót

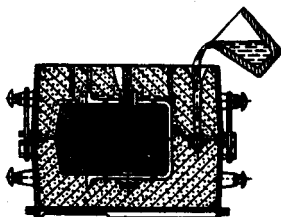
Ladle.

/ˈleɪdl/

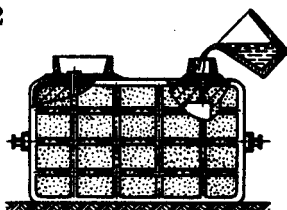
2060



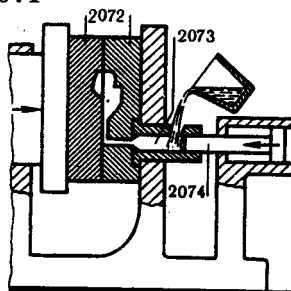
2061



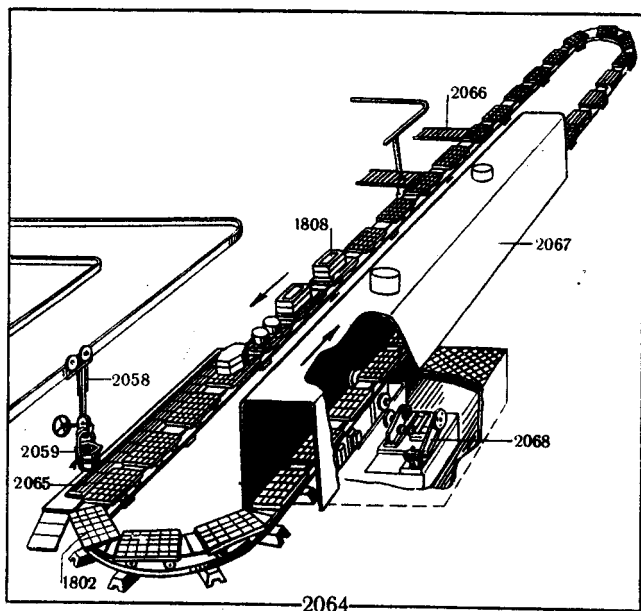
2062



2071

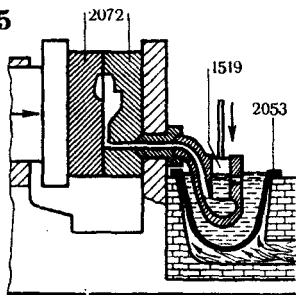


2064

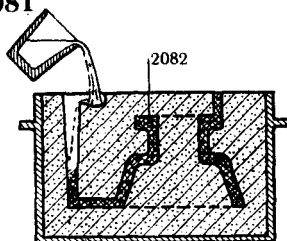


2058 Cán nâng nôi rót*Ladle handler.**/ˈleɪdl ˈhændlɪər/***2059** Xe rót kim loại 1 ray*Monorail ladle.**/ˌmɒnəˈreɪl ˈleɪdl/***2060** Thùng rót khuôn tay*Hand ladle.**/hænd ˈleɪdl/***2061** Đúc mầm ngang*Horizontal casting.**/hɒrɪˌzɒntl ˈkɑːstɪŋ/***2062** Đúc thẳng đứng*Vertical casting.**/ˌvɜːtɪkl ˈkɑːstɪŋ/***2063** Đúc theo dây chuyền*Pouring in a conveyer.**/ˈpɔːrɪŋ ɪn ə kənˈveɪər/***2064** Dây chuyền đúc*Foundry conveyer.**/ˈfaʊndrɪ kənˈveɪ
ər/***2065** Chuyển động của*khuôn để rót**Moving platform for**pouring.**/ˈmuːvɪŋ ˌplætfɔːm fɔː
ˈpɔːrɪŋ/***2066** Dây chuyền lăn tổng*hợp**Assembly roller**conveyer.**/əˈsembliˌrɔːlə**kənˈveɪər/***2067** Vùng làm nguội của*dây chuyền**Cooling zone of the**conveyer.**/ˈkuːlɪŋ zɔːn əv ðə**kənˈveɪər/***2068** Trạm dẫn động dây*chuyền**Power-drive station.**/ˌpaʊə draɪv ˈsteɪʃn/***2069** Sự đúc khuôn dưới áp*lực**Pressure die casting.**/ˌpreʃə daɪ ˈkɑːstɪŋ/***2070** Máy đúc áp lực*Die-casting machine.**/daɪ ˈkɑːstɪŋ məˈʃɪn/***2071** Máy đúc áp lực có*buồng nguội**Cold-chamber die-**casting machine.**/ˈkəʊld tʃ ˈembə**daɪ ˈkɑːstɪŋ məˈʃɪn/*

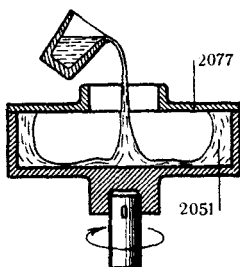
2075



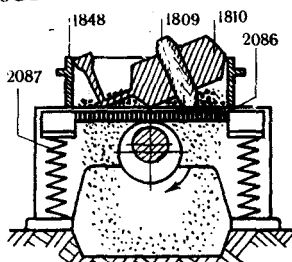
2081



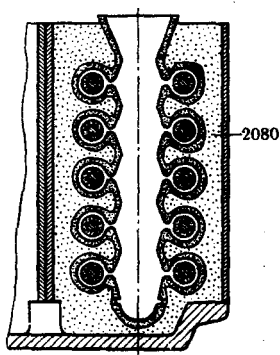
2076



2085



2079



2072 Khuôn kim loại

Die.

/daɪ/

2073 Buồng áp lực

Pressure chamber.

/preʃə ˈtʃeɪmbə/

2074 Cản đẩy

Plunger.

/plʌndʒ/

2075 Máy đúc áp lực buồng nóng

Hot-chamber die-casting machine.

/hɒt ˈtʃeɪmbə daɪ ˈkɑːstɪŋ məˈʃiːn/

2076 Đúc ly tâm

Centrifugal casting.

/senˈtrɪfjʊgl ˈkɑːstɪŋ/

2077 Khuôn quay

Rotating mould.

/rəʊˈteɪtɪŋ maʊld/

2078 Quá trình đúc chính

xác, đúc mẫu chảy

Precision-investment

casting. Lost-wax process.

/priˈʒɪn ɪnˈvestmənt

ˈkɑːstɪŋ ˌlɒst wɒs

ˈprɒses/

2079 Khuôn mẫu chảy

Investment mould.

/ɪnˈvestmənt maʊld/

2080 Vật liệu chịu lửa

Refractory backing material.

/rɪˈfræktɔːrɪ ˈbækɪŋ məˈtɪəriəl/

2081 Sự đúc mẫu cháy

Burnt-pattern casting.

/bɜːnt ˌpætrn ˈkɑːstɪŋ/

2082 Mẫu bằng polystyrene

Polystyrene pattern.

/pɒlɪˈstaɪrɪn ˈpætrn/

2083 Lắc khuôn, lấy vật đúc

Knock-out; shake-out.

/nɒkɔːt ˌˈʃeɪkɔːt/

2084 Máy lấy vật đúc

Knock-out machine.

/nɒkɔːt məˈʃiːn/

2085 Lưới lệch tâm, lấy vật đúc

Eccentric knock-out grid.

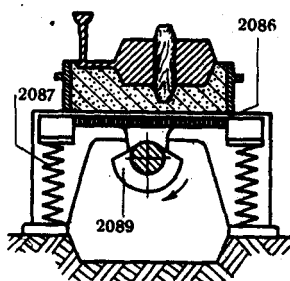
/ɪkˈsentɪrɪk ˈnɒkɔːt grɪd/

2086 Lưới

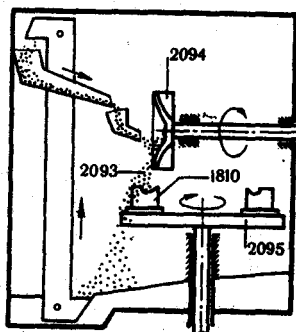
Grid.

/grɪd/

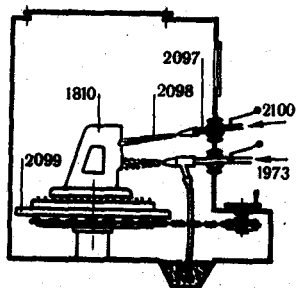
2088



2092



2096



2087 Đệm giảm va đập

Resilient bumper.

/rɪˈzɪliənt ˈbʌmpə(r)/

2088 Lưới lấy vật đúc kiểu

quán tính

Inertia-type knock-out

grid.

/ɪnɜːʃiə ˈtʌp nɒkəʊt

grid/

2089 Trọng lượng không cân

bằng

Unbalanced weight.

/ʌnˈbælənst weɪt/

2090 Làm sạch vật đúc

Cleaning of casting.

/kliːnɪŋ əv ˈkɑːstɪŋz/

2091 Máy làm sạch

Cleaning machine.

/kliːnɪŋ məˈʃiːn/

2092 Máy thổi kiểu tuabin

Turbine shot-blasting

machine.

/tɜːbaɪn ʃɒt ˌblɑːstɪŋ

məˈʃiːn/

2093 Hạt cát

Shot.

/ʃɒt/

2094 Bánh có cánh

Vane wheel.

/veɪn wiːl/

2095 Bàn xoay

Rotary table.

/ˈrɒtəri ˈteɪbl/

2096 Buồng phun nước

Hydroblast room.

/ˈhaɪdrəʊblɑːst ruːm/

2097 Súng phun nước

Hydraulic gun.

/haɪˈdrɒlɪk ɡʌn/

2098 Đầu phun

Jet.

/dʒet/

2099 Bàn quay

Turn-table.

/tɜːn ˈteɪbl/

2100 Nước

Water.

/ˈwɔːtə/

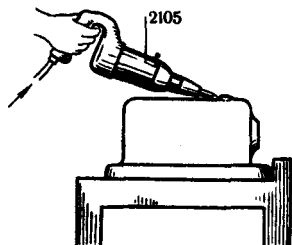
2101 Buồng phun cát

Sand-blasting chamber.

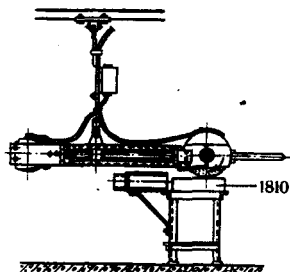
/sænd ˌblɑːstɪŋ

ˈtʃeɪmbə(r)/

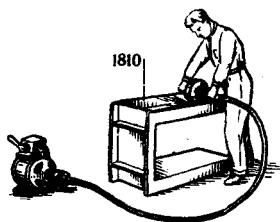
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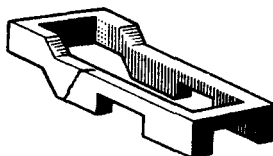
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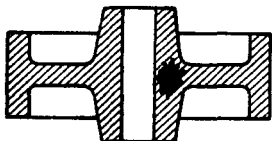
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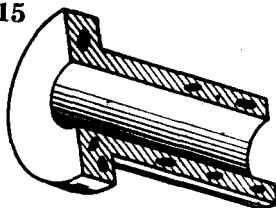
2110



2113



2115



2102 Sự phun nước phóng điện

Electrical-discharge

hydroblasting.

/ˈlektrɪkl dɪsˈtʃɑːdʒ/

ˌhaɪdrəʊ ˈblɑːstɪŋ/

2103 Sự cắt bavia

Fettling, chipping.

/ˈfetlɪŋ, ˈtʃɪpɪŋ/

2104 Cắt, cạo bavia

Fettle, chip.

/ˈfetl ˌtʃɪp/

2105 Máy cạo bằng khí nén

Air chipper.

/eə ˈtʃɪpə/

2106 Máy mài thô làm sạch

Finishing, rough

grinding, snagging.

/ˈfɪnɪʃɪŋ ˌrʌʃ ˈɡraɪndɪŋ/

ˈsnæɡɪŋ/

2107 Máy mài kiểu khung

lắc

Swing-frame grinder.

/swɪŋ freɪm ˈɡraɪndə/

2108 Máy mài cầm tay

Portable grinder.

/ˌpɔːtəbl ˈɡraɪndə/

KHUYẾT TẬT VẬT ĐÚC

FOUNDRY DEFECTS

2109 Khuyết tật đúc

Foundry defect, casting

defect.

/ˈfaʊndrɪ dɪˈfekt, ˈkɑːstɪŋ

dɪˈfekt/

2110 Vết nứt, đường nứt

Crack.

/kræk/

2111 Vết nứt nóng

Hot crack, hot tear.

/hɒt ˈkræk, ˈjɒt ˈtɪə/

2112 Vết nứt nguội

Cold crack.

/kɔːl kræk/

2113 Rỗ khuyết

Draw.

/drɔː/

2114 Rỗ co

Shrinkage.

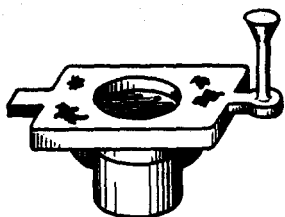
/ˈfrɪŋkeɪdʒ/

2115 Rỗ khí

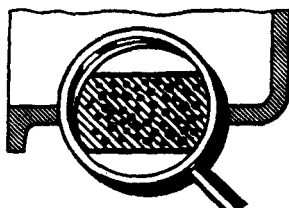
Blowhole.

/ˈblɔːhɔːl/

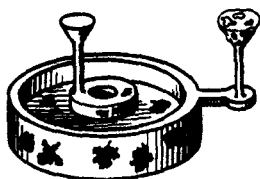
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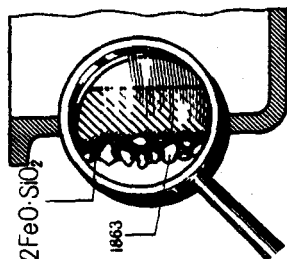
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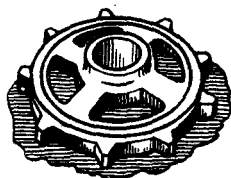
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2122

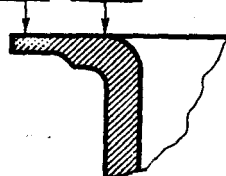


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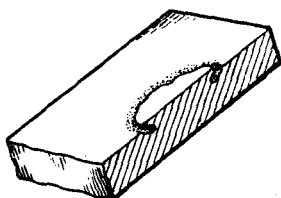


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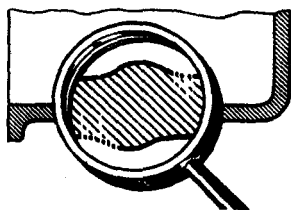
$HB > 400$. $HB = 200$



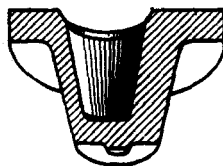
2119



2120



2124



2116 Rỗ cát

Sand inclusion.

/sænd ɪn'klʊ:ʒn/

2117 Rỗ xỉ

Slag blowhole.

/slæg 'bləʊhəʊl/

2118 Bavia

Flash.

/flæʃ/

2119 Nút do lẫn cát

Rattail.

/ræteɪl/

2120 Vết dộp, phồng

Swell, ram-off.

/swel ; 'ræməʊf/

2121 Lỗ xâm kim

Pin holes, pinhole

porosity.

/pɪn həʊlz ; 'pɪnhəʊl

pɔ:'rɒsəti/

2122 Xâm nhập cát hoặc kim

loại

Metal penetration and

sand fusion.

/,metl penɪ'treɪʃn ən

sænd 'fju:ʒn/

2123 Vùng biên trắng, vùng

cứng

Chill zone, hard spot.

/tʃɪl'zəʊn; hɒt 'spɒt/

2124 Lỗi đặt lệch

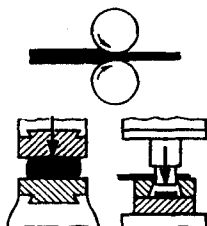
Core shift.

/kɔ:'ʃɪt/

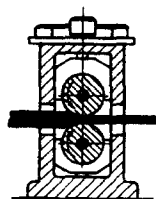
GIA CÔNG ÁP LỰC

MECHANICAL WORKING

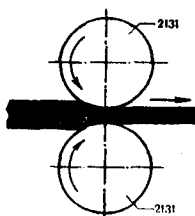
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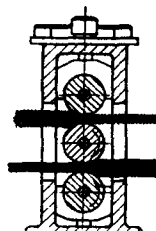
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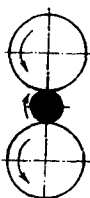
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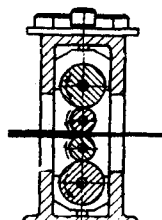
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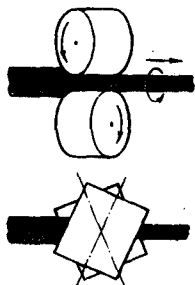
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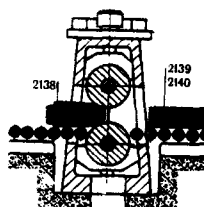
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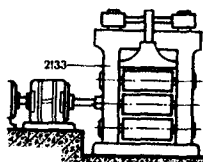
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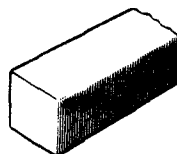
2137



2132



2139



GIA CÔNG ÁP LỰC

MECHANICAL WORKING

SỰ CÁN

ROLLING

2125 Gia công áp lực

Mechanical working.
/mɛ.kzɛntɪkɫ 'wɜ:kɪŋ/

2126 Sự cán

Rolling.
/rɔ:lɪŋ/

2127 Cán

Roll
/rɔ:l/

2128 Cán dọc

Longitudinal rolling.
/lɔndʒɪ'tʃu:dɪnɪ 'rɔ:lɪŋ/

2129 Cán ngang

Cross rolling.
/krɔs'rɔ:lɪŋ/

2130 Cán trục đặt xoắn

Cross helical rolling.
/krɔs.həlɪkɪ 'rɔ:lɪŋ/

2131 Trục cán

Roll.

2132 Máy cán

Rolling mill.
/rɔ:lɪŋ mɪl/

2133 Khung máy cán

Rolling mill stand, stand.
/rɔ:lɪŋ mɪl 'stænd/

2134 Khung hai trục cán

Two-high stand.
/tu:haɪ stænd/

2135 Khung ba trục cán

Three-high stand.
/θri:haɪ stænd/

2136 Khung bốn trục cán

Four-high stand.
/fɔ:haɪ stænd/

2137 Máy cán thô

Primary mill.
/'praɪməri mɪl/

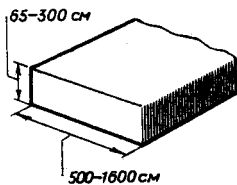
2138 Thỏi thép

Ingot.
/ɪŋgɔ:/

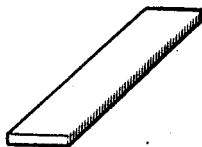
2139 Thép cán thô

Bloom.
/blu:m/

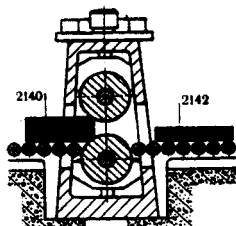
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2147



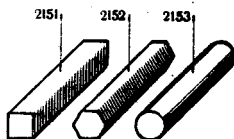
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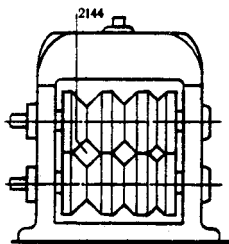
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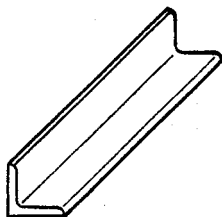
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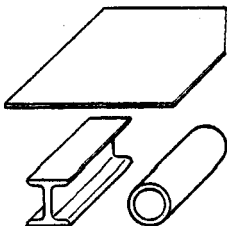
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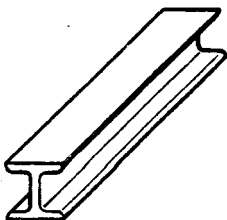
2155



2146

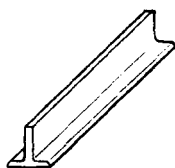


2156



2140 Tấm cán*Slab.**/sleɪb/***2141 Máy cán bán thành phẩm***Billet mill.**/ˈbɪlɪt miːl/***2142 Bán thành phẩm***Billet**/ˈbɪlɪt/***2143 Máy cán định hình***Section mill.**/ˈsekʃn miːl/***2144 Dải cán***Roll-pass.**ˈrɔːl ˈpɑːs/***2145 Phôi cán***Rolled stock.**ˈrɔːld stɒk/***2146 Phôi cán định hình***Rolled section.**ˈrɔːld ˈsekʃn/***2147 Dải***Strip.**/striːp/***2148 Băng***Band.**/bænd/***2149 Cuộn***Roll.***2150 Thanh***Bar.**/bɑː(r)/***2151 Thanh vuông***Square bar.**/ˈskeɪˌbɑː(r)/***2152 Thanh lục giác***Hexagonal bar.**/hekˈsæɡənəl bɑː(r)/***2153 Thanh tròn***Round bar, rod.**ˈraʊnd bɑː ; rɒd/***2154 Tiết diện định hình***Shaped section.**/ʃeɪpt ˈsekʃn/***2155 Thép (sắt) góc***Angle iron.**/ˌæŋɡl ˈaɪən/***2156 Thanh chữ I***I-beam.**/aɪbɪm/*

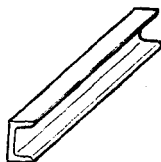
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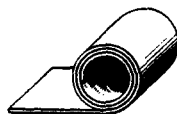
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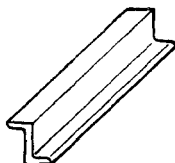
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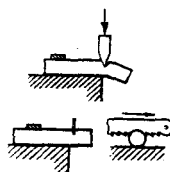
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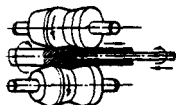
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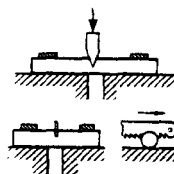
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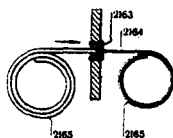
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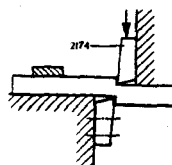
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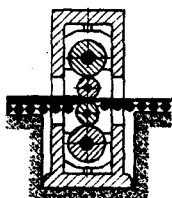
2162



2173



2166



2157 Thanh chữ T

Tec beam, T-beam.
/ti:bi:m/

2158 Thanh chữ U

Structural channel.
/ˌstrʌktʃərəl ˈʃænl/

2159 Thanh chữ Z

Zee beam.
/zi:bi:m/

2160 Máy cán ống

Tube-rolling mill.
/tjʊb ˌrɔʊlɪŋ ˈmɪl/

2161 Ống

Pipe, tube.
/paɪp ; tjʊb/

2162 Máy kéo sợi

Drawing machine.
drawing mill.
/ˈdrɔ:ɪŋ məˌʃi:n ˌˈdrɔ:ɪŋ
ˈmɪl/

2163 Khuôn kéo

Drawing die.
/ˈdrɔ:ɪŋ daɪ/

2164 Sợi, dây

Wire.
/waɪə(r)/

2165 Cuộn dây

Coil.
/kɔɪl/

2166 Máy cán tấm

Sheet mill.
/ʃi:t mɪl/

2167 Tấm dày

Plate.
/pleɪt/

2168 Tấm mỏng

Sheet.
/ʃi:t/

2169 Sự cắt đứt

Cutting-off.
/ˈkʌtɪŋ ɒf/

2170 Cắt thành đoạn

Cut off.
/ˈkʌtɒf/

2171 Sự cắt đôi

Cutting in two.
/ˈkʌtɪŋ ɪn tu:/

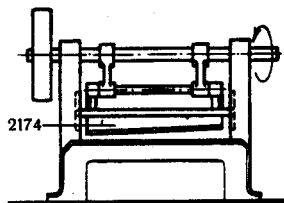
2172 Cắt đôi

Cut in two.

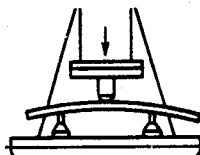
2173 Cắt bằng kéo

Shearing.
/ʃi:əɪŋ/

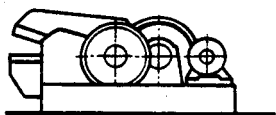
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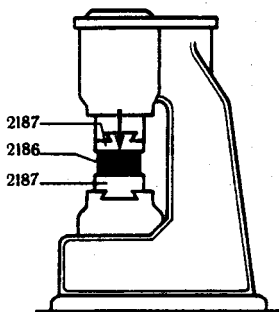
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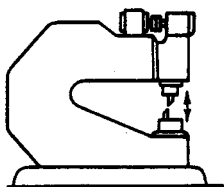
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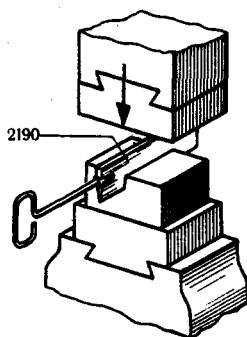
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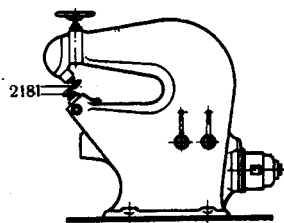
2179



2188



2180



2174 Lưỡi cắt*Blade.*

/bleɪd/

2183 Sửa thẳng*Streighten.*

/streɪtn/

2175 Dao cắt*Cut.***RÈN***FORING***2176 Kéo cắt, máy cắt kéo***Shear, shearing machine.*

/ʃɪə(r) mə'fi:n/

2184 Sự rèn*Forging.*

/fɔːdʒɪŋ/

2177 Kéo cắt dập*Guillotine shear.*

/gɪlə'ti:n ʃɪə(r)/

2185 Rèn*Forge*

/fɔːdʒ/

2178 Kéo cắt cần*Alligator shear.*

/æ'lɪgə'tɔː ʃɪə(r)/

2186 Vật rèn*Forged part, forging.*

/fɔːdʒd pɑːt/

2179 Máy cắt kiểu mỏ*Nibbling shear.*

/nɪblɪŋ ʃɪə(r)/

2187 Khuôn phẳng*Flat die.*

/flæt 'daɪ/

2180 Kéo quay*Rotary shear.*

/rəʊ'tɔːri ʃɪə(r)/

2188 Sự chặt*Chopping.*

/tʃɒpɪŋ/

2181 Đĩa cắt, bánh cắt*Disk blade, cutting roll.*

/dɪsk bleɪd ; 'kʌtɪŋ rɔːl/

2189 Chặt*Chop*

/tʃɒp/

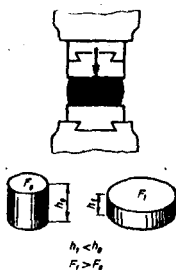
2182 Sự sửa thẳng*Straightening.*

/streɪtnɪŋ/

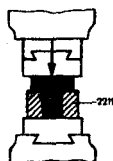
2190 Đục thợ rèn*Smith's chisel.*

/smɪθs'tʃɪzl/

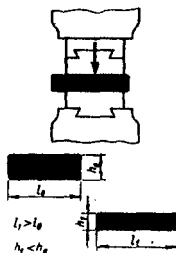
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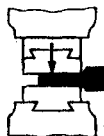
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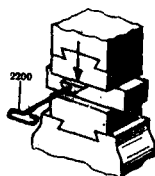
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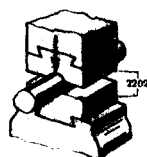
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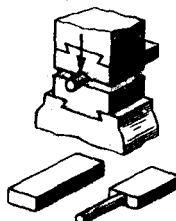
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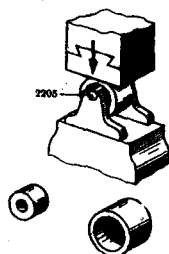
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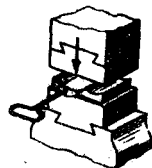
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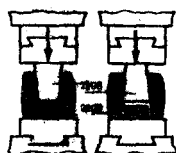
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2206

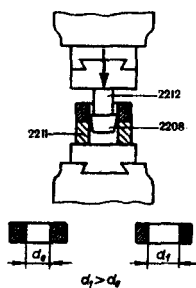


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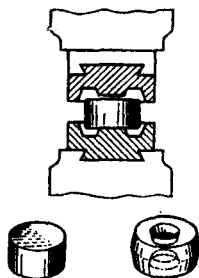


2191 Sự chôn*Setting.**/ˈsetɪŋ/***2192** Chôn*Set.**/set/***2193** Tỷ số chôn*Setting ratio.**/ˈsetɪŋ ˈreɪʃɪʊ/***2194** Sự chôn một đầu*Upsetting.**/ʌpˈsetɪŋ/***2195** Chôn một đầu*Upset.**/ʌpˈset/***2196** Sự nện, ép*Fullering.**/ˈfʊlɪərɪŋ/***2197** Sự kéo dãn*Drawing out.**/ˈdrɔːɪŋ aʊt/***2198** Kéo dãn*Draw out.**/ˈdrɔː aʊt/***2199** Nện, ép khu vực*Local fullering.**/ˈləʊkl ˈfʊlɪərɪŋ/***2200** Tạo rãnh*Fuller.**/ˈfʊlɪə(r)/***2201** Uốn mép*Rolling, edging.**/ˈrɔːlɪŋ ; ˈedʒɪŋ/***2202** Khuôn ép lăn*Rolling-impression die.**/ˈrɔːlɪŋ ɪmˈpreʃn daɪ/***2203** Vuốt một đầu*End rolling.**/endˈrɔːlɪŋ/***2204** Sự cán, nong rộng*Ring rolling.**/rɪŋ ˈrɔːlɪŋ/***2205** Trục nong rộng*Mandrel.**/ˈmændrəl/***2206** Là phẳng*Flattening.**/ˈflætɪŋ/***2207** Sự đột lỗ*Piercing.**/ˈpɪəɪsɪŋ/***2208** Mũi đột, chày đột*Piercing punch.**/ˈpɪəɪsɪŋ pʌntʃ/*

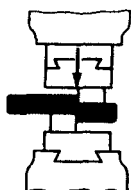
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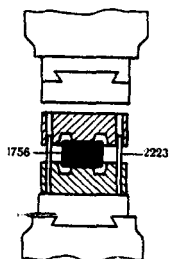
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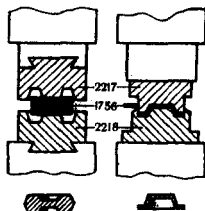
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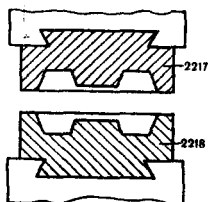
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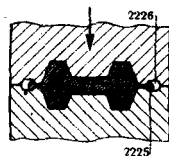
2214



2216



2224



2209 Mảnh kim loại*Slug.*

/sɫʌg/

2210 Nong lỗ*Hole expansion.*

/hɔʊl ɪk'spænzən/

2211 Vòng đáy*Bottom spacing ring.*

/bɒtəm 'speɪsɪŋ rɪŋ/

2212 Chày nong lỗ*Extension piece.*

/ɪk'stɛnzən pi:əs/

2213 Tạo bạc*Joggling.*

/dʒɒɡlɪŋ/

2214 Sự rèn, dập khuôn*Die forging, die forming.*

/daɪ 'fɔ:ɢɪŋ daɪ 'fɔ:mɪŋ/

2215 Rèn khuôn, tạo hình*trong khuôn**Forge in a die, form in a**die.*

/fɔ:ɢɪŋ ɪn ə daɪ, fɔ:m ɪn ə daɪ/

2216 Dụng cụ ép, khuôn rèn*Press tool, die.*

/pres tu:l; daɪ/

2217 Nửa khuôn trên*Upper die, punch.*

/ʌpədaɪ; pʌntʃ/

2218 Nửa khuôn dưới*Lower die, female die.*

/ləʊədaɪ; 'fɪmeɪl daɪ/

2219 Sự rèn khuôn*Die forging.*

/daɪ 'fɔ:ɢɪŋ/

2220 Khuôn rèn*Forging die.*

/'fɔ:ɢɪŋ daɪ/

2221 Rèn khuôn nóng*Hot die forging.*

/hɒt daɪ 'fɔ:ɢɪŋ/

2222 Khuôn tự dẫn hướng*Self-guiding die.*

/'self .gaɪdɪŋ 'daɪ/

2223 Chốt dẫn hướng*Guide pin.*

/gaɪd pɪn/

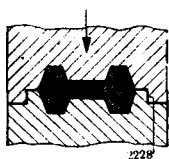
2224 Khuôn hở*Open die.*

/ɒpən daɪ/

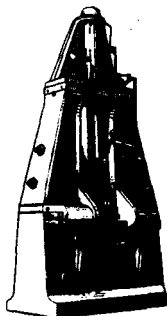
2225 Bavia, rià dư*Flash.*

/flæʃ/

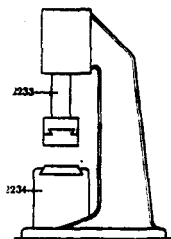
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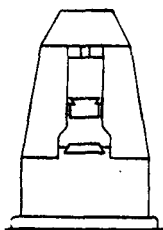
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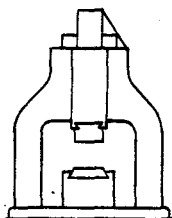
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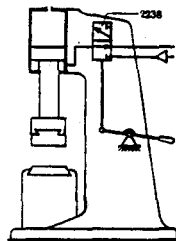
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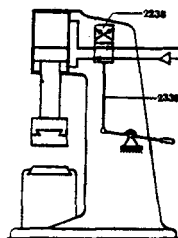
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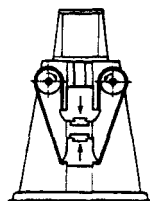
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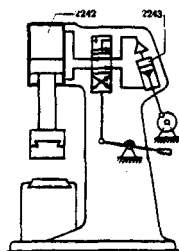
2237



2240



2241



2226 Rãnh bavia

Flash gutter.
/flæʃ'gʌtə(r)/

2227 Khuôn kín

Closed die.
/'kləʊzd daɪ/

2228 Khóa khuôn

Counterlock.
/'kaʊntə lɒk/

2229 Búa máy

Power hammer.
/'paʊə 'hæmə(r)/

2230 Búa khung đơn

Single-frame hammer.
/.'sɪŋɡl freɪm 'hæmə(r)/

2231 Búa máy khung kép

Double-frame hammer.
/.'dʌbl freɪm 'hæmə(r)/

2232 Búa máy khung chữ U

Arch hammer.
/.'ɑːtʃ 'hæmə(r)/

2233 Thanh dẫn đầu búa

Ram of hammer.
/.'ræməv 'hæmə(r)/

2234 Đe, bệ

Anvil.
/'ænvɪl/

2235 Búa máy không khí

nén hoặc hơi nước
Steam or air hammer.
/.'stiːm oʊ əə 'hæmə(r)/

2236 Búa tác dụng đơn

Single-acting hammer;
drop hammer.
/.'sɪŋɡl.ækʃŋ 'hæmə(r)/

2237 Búa tác dụng kép

Double-acting hammer.
/.'dʌbl.ækʃŋ 'hæmə(r)/

2238 Hộp van phân phối

Valve box.
/'vɒlv bɒks/

2239 Cần dẫn động

Trip rod.
/'trɪp rɒd./

2240 Búa không có đe

Counterblow hammer.
/.'kaʊntəbləʊ 'hæmə(r)/

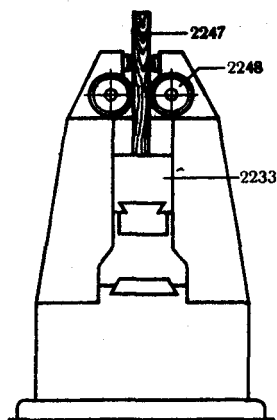
2241 Búa khí nén

Pneumatic hammer.
/.'njuː'mætɪk 'hæmə(r)/

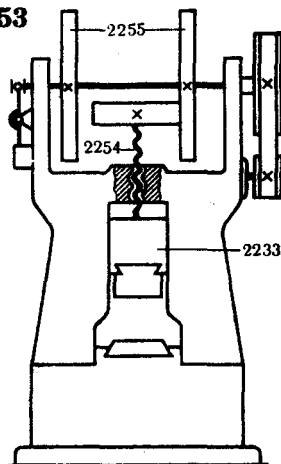
2242 Xylanh công tác

Working cylinder.
/.'wɜːkɪŋ 'sɪlɪndə(r)/

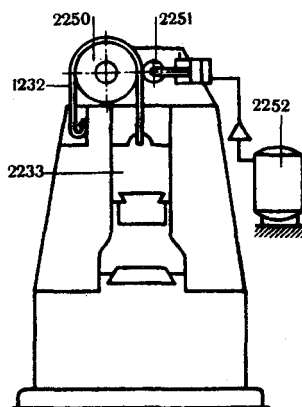
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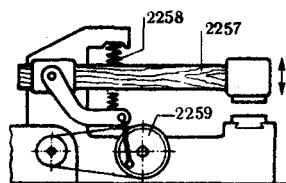
2253



2249



2256



2243 Xylanh nén*Compressor cylinder.*

/kəmˈpresəˈsɪlɪndə(r)/

2244 Búa cơ học*Mechanical hammer.*

/mɪˌkæniˈkəl ˈhæmə(r)/

2245 Búa ma sát*Friction hammer.*

/ˈfrɪʃn ˈhæmə(r)/

2246 Búa kiểu ván gỗ*Board drop hammer.*

/bɔːd drɒp ˈhæmə(r)/

2247 Tấm ván*Board.*

/bɔːd/

2248 Con lăn nâng hạ*Lifting roll.*

/ˈlɪftɪŋ rɔːl/

2249 Búa kiểu đai*Belt lift hammer.*

/belt lɪft ˈhæmə(r)/

2250 Tang nâng, trống nâng*Lifting drum.*

/ˈlɪftɪŋ drʌm/

2251 Con lăn ép*Pressure roll.*

/preʃə rɔːl/

2252 Bình chứa khí nén*Air receiver.*

/eə rɪˈsɪvə(r)/

2253 Máy búa trục vít*Power screw hammer,**percussion power press.*

/ˌpaʊə skuː ˈhæmə(r) ;

pɜːˈkʌʃn ˌpaʊə pres/

2254 Trục vít*Screw.*

/skuːl/

2255 Đĩa dẫn động*Driving disk.*

/ˈdraɪvɪŋ dɪsk/

2256 Máy búa cần đòn bẩy*Helve hammer.*

/helv ˈhæmə(r)/

2257 Cán búa*Helve.*

/helv/

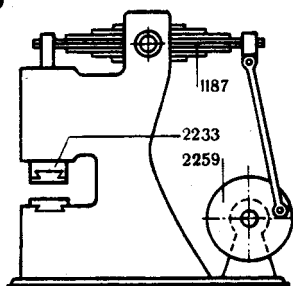
2258 Lò xo giảm chấn*Recoil bumper.*

/rɪˈkɔɪl ˈbʌmpə(r)/

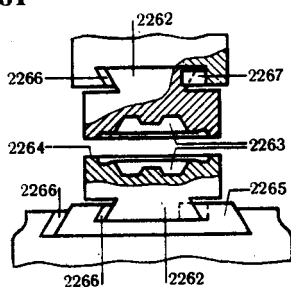
2259 Đĩa truyền*Crank disk.*

/kræŋk ˈdɪsk/

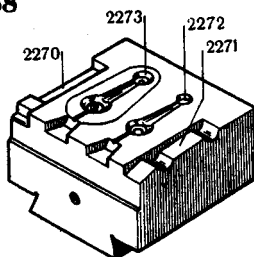
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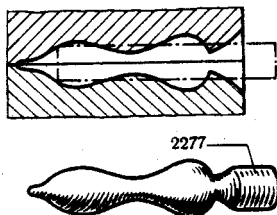
2261



2268



2274



2260 Máy búa lò xo

Spring hammer.

/sprɪŋ ˈhæmə(r)/

2261 Khuôn trên máy búa

Hammer die.

/ˈhæmə daɪ/

2262 Chuôi của khuôn

Shank.

/ʃæŋk/

2263 Lòng khuôn

Die cavity.

/daɪ ˈkævɪti/

2264 Mặt phân khuôn

Die parting plane

2265 Tấm đế giữ khuôn

Bolster plate, anvil cap.

/ˈbɒlstə plent; ˈænvɪl

kæp/

2266 Chêm lắp ghép

Fastening gib.

/ˈfæsnɪŋ ɡɪb/

2267 Then

Dowel.

/daʊəl/

2268 Dụng cụ dập nhiều lần,

*khuôn dập nhiều lần**Multiple-impression**press tool, multiple-**impression die.*

/ˌmʌltɪpl ɪmˈpreʃn pres

tuːl; ˌmʌltɪpl ɪmˈpreʃn

daɪ/

2269 Sự dập

Impression.

/ɪmˈpreʃn/

2270 Rãnh ngoài

Fuller.

/ˈfʊlə(r)/

2271 Cạnh nép

Roller, edger.

/ˈrɒlə(r); ˈedʒə(r)/

2272 Sự dập khối

*Blocking impression,**blocker.*

/ˌblɒkɪŋ ɪmˈpreʃn;

ˈblɒkə(r)/

2273 Dập lần cuối

Finishing impression.

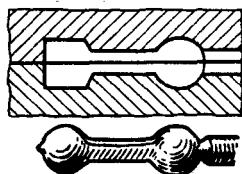
/ˈfɪnɪʃɪŋ ɪmˈpreʃn/

2274 Dập ép

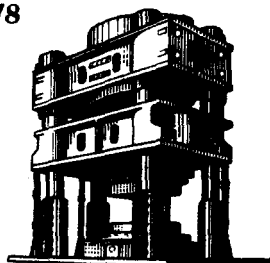
Fuller.

/ˈfʊlə/

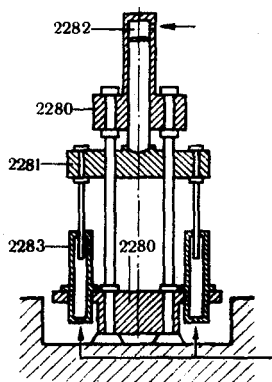
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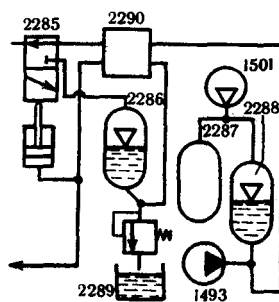
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2279

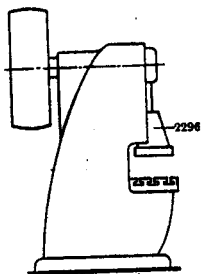


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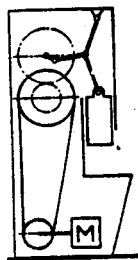


2275 Sự dập tạo hình*Forming impression.**/fɔːmɪŋ ɪmˈpreʃn/***2283 Xylanh nâng***Lift cylinder.**/lɪft ˈsɪlɪndə(r)/***2276 Dập uốn***Bending impression,**bender.**/ˈbendɪŋ ɪmˈpreʃn ;**ˈbendə(r)/***2284 Trạm bơm***Pump-and-accumulator**station.**/ˌpʌmp ənd**əˈkjʊmjuˌleɪtə ˈsteɪʃn/***2277 Cán giữ***Tong hold.**/tɒŋ hɔʊld/***2285 Van tác động***Make up valve.**/ˌmeɪkʌp ˈvælʊ/***2278 Máy ép***Press.**/pres/***2286 Bồn công tác***Make-up tank.**/ˌmeɪkʌp ˈtæŋk/***2279 Máy ép thủy lực***Hydraulic press.**/haɪˈdrɔːlɪk pres/***2287 Xylanh khí***Air-cylinder.**/eə ˈsɪlɪndə(r)/***2280 Bệ cố định***Stationary cross-rail.**/ˌsteɪʃənri ˈkros reɪl/***2288 Bồn trữ***Accumulator.**/əˈkjʊmjuˌleɪtə(r)/***2281 Khung di trượt***Ram.**/ræm/***2289 Bồn xả***Discharge tank.**/dɪsˈtʃɑːdʒ ˈtæŋk/***2282 Xylanh chính***Main cylinder.**/meɪn ˈsɪlɪndə(r)/***2290 Hộp van điều khiển***Valve box**/ˈvælʊ bɒks/*

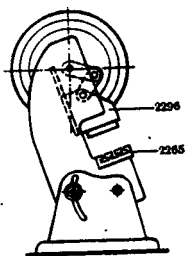
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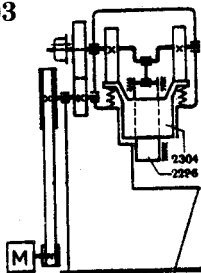
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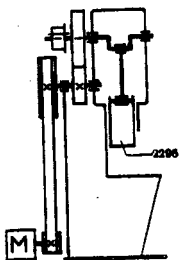
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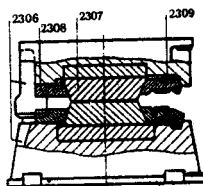
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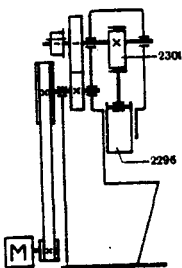
2299



2305



2300



2291 Máy nén ép

Forging press.
/fɔːdʒɪŋ pres/

2292 Máy nén ép khuôn

Closed-die forging press.
/kləʊzd daɪ fɔːdʒɪŋ pres/

2293 Máy ép cơ học

Mechanical press.
/mɪˈkæniːkl pres/

2294 Cần nén ép

Crank press.
/kræŋk pres/

**2295 Máy nén ép khung mở,
cần đứng**

*Open-frame vertical
crank press.*
/ɔʊpən freɪm ˈvɜːtɪkl
kræŋk pres/

2296 Thanh trượt

Ram, punch slide.
/ræm ; ˈpʌntʃ slaɪd/

**2297 Máy ép khung mở trục
xiên**

*Open-frame inelinalable
crank press.*
/ɔʊpən freɪm ɪnɪlɪnəbəl
ˈkræŋk pres/

**2298 Máy ép trục thẳng
khung kín**

*Closed-frame press,
straightside press.*
/kləʊzd freɪm ˈpres ;
streɪt,saɪd ˈpres/

2299 Máy ép trục đơn

Single crank press.
/sɪŋɡl kræŋk pres/

2300 Máy ép lệch tâm

Eccentric press.
/ɛkˈsentɪrɪk pres/

2301 Lệch tâm

Eccentric.
/ɛkˈsentɪrɪk/

**2302 Máy ép kiểu khớp bản
lề**

Knuckle-joint press.
/ˌnʌkl dʒɔɪnt pres/

2303 Máy ép tác dụng kép

Double-action press
/ˌdʌbl ækʃn pres/

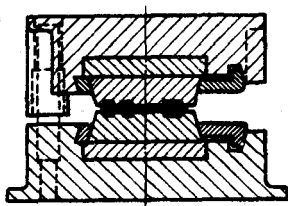
2304 Trượt bổ sung

Additional slide.
/əˈdɪʃnəl slaɪd/

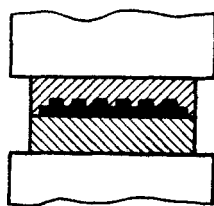
2305 Khuôn đá lấp

Insert die.
/ɪnˈsɜːt daɪ/

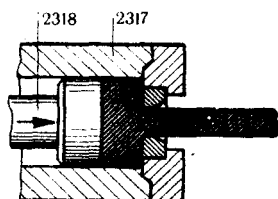
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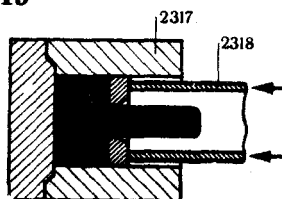
2312



2315



2319



2306 Bộ khuôn

Die set.
/daɪ set/

2307 Lắp lắp khuôn

Insert.
/ɪn'sɜ:t/

2308 Miếng chêm

Wedge strip.
/wedʒ stri:p/

2309 Cữ kẹp

Clamp.
/klæmp/

2310 Kích cỡ chuẩn

Sizing.
/saɪzɪŋ/

2311 Dụng cụ, khuôn dập

chính xác
Sizing press tool, sizing
die.
/saɪzɪŋ 'pres tu:l ;
'saɪzɪŋ daɪ/

2312 Sự định cỡ, dập tinh

Coining.
/kɔɪnɪŋ/

**2313 Dụng cụ, khuôn dập
tinh**

Coining press tool,
coining die
/kɔɪnɪŋ 'pres tu:l ;
'kɔɪnɪŋ daɪ/

2314 Sự đùn ép

Extruding
/ɪk'stru:ðɪŋ/

2315 Đùn ép xuôi

Forward extrusion,
direct extrusion
/fɔ:wəd ɪk'stru:ʒn ;
dɪrekt ɪk'stru:ʒn/

2316 Khuôn đùn ép

Extruding die
/ɪk'stru:ðɪŋ daɪ/

2317 Khung ngoài

Container
/kən'teɪnə(r)/

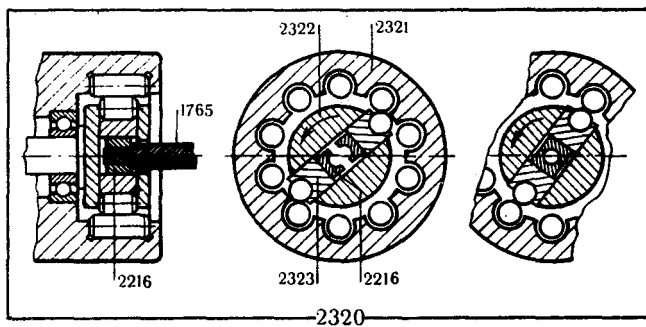
2318 Cản đẩy

Ram
/ræm/

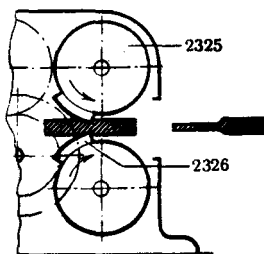
2319 Đùn ép ngược

Backward extrusion,
reverse extrusion
/bækwəd ɪk'stru:ʒn ;
rɪvɜ:s ɪk'stru:ʒn/

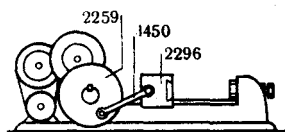
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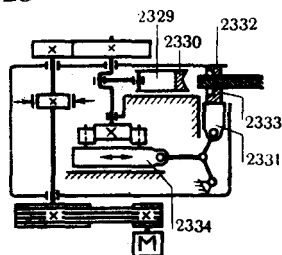
2324



2327



2328



2320 Sự dập quay*Rotary swaging*

/rəʊtəri 'sweldʒɪŋ/

2321 Vòng ngoài*Roll cage*

/rɒl keɪdʒ/

2322 Trục chính*Spindle*

/'spɪndl/

2323 Di trượt*Slide*

/'slaɪd/

2324 Rèn cán*Roll-forging*

/rɒl 'fɔ:ɔ:ʒɪŋ/

2325 Con lăn rèn*Forging rolls*

/'fɔ:ɔ:ʒɪŋ rɒlz/

2326 Khuôn cán*Roll die*

/rɒl daɪ/

2327 Búa máy công suất lớn*Bulldozer*

/'bʌldʒə:zə/

2328 Máy búa đẩy ngang*Horizontal upset**forging machine.*

/hɒrɪzɒntl ʌp.set

/'fɔ:ɔ:ʒɪŋ məʃɪn/

2329 Cần đẩy chính*Header ram*

/'hedʒræm/

2330 Đầu khuôn*Heading die*

/'hedɪŋ daɪ/

2331 Thanh trượt kẹp chặt*Gripping slide*

/'grɪpɪŋ slaɪd/

2332 Khuôn kẹp chặt*Stationary gripping die*

/'steɪʃənəri 'grɪpɪŋ daɪ/

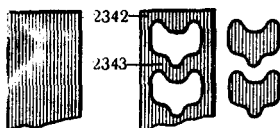
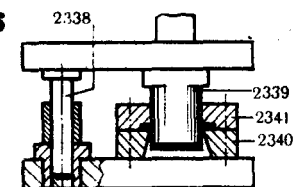
2333 Khuôn kẹp di động*Movable gripping die*

/'mu:vəbl 'grɪpɪŋ daɪ/

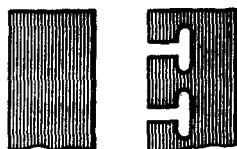
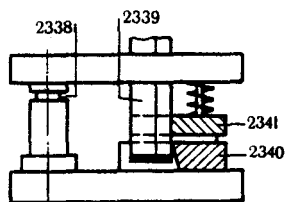
2334 Trượt dải biên*Side slide*

/'saɪd slaɪd/

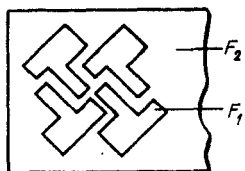
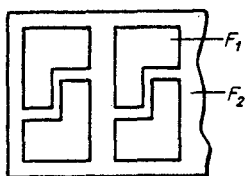
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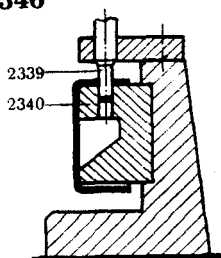
2348



2344



2346



DẬP TẤM, DẬP SÂU

SHEET PRESSWORK

2335 Sự dập tấm

Sheet presswork

/ʃi:t 'preswɜ:k/

2336 Sự dập cắt

Blanking

/ˈblæŋkɪŋ/

2337 Dụng cụ khuôn dập cắt

Blanking press tool,

blanking die.

/ˈblæŋkɪŋ 'prestʊl ;

'blæŋkɪŋ daɪ/

2338 Chốt dẫn hướng

Guid pin.

/ˈgaɪd pɪn/

2339 Chày cắt

Punch.

/pʌntʃ/

2340 Khuôn cắt

Die.

/daɪ/

2341 Dụng cụ gỡ khuôn

Stripper.

/ˈstri:pə/

2342 Mảnh vụn, dư

Scrap.

/skræp/

2343 Đường gờ

Web.

/web/

2344 Bố trí dề dập cắt

Blank lay-out.

/ˈblæŋk leɪaʊt/

2345 Tỷ số sử dụng vật liệu

Ratio of material

utilization.

/ˈreɪʃɪəʊ ɒv mə'tɪəriəl

ˌjuːtɪlɪ'zeɪʃən/

2346 Sự đột dập

Piercing.

/ˈpiəsiŋ/

2347 Dụng cụ, khuôn đột dập

Piercing press tool,

piercing die.

/ˈpiəsiŋ 'pres tʊl; 'piəsiŋ

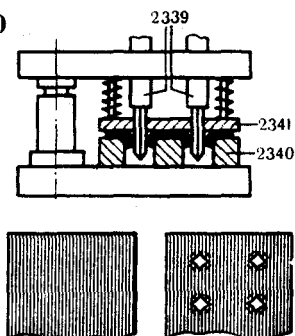
daɪ/

2348 Sự cắt rãnh

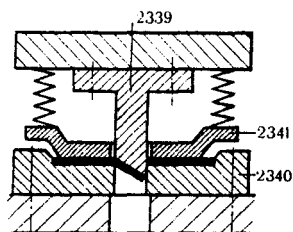
Notching.

/ˈnɒtʃɪŋ/

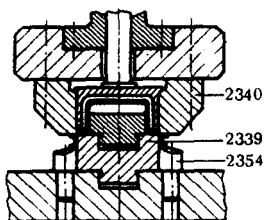
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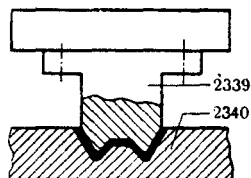
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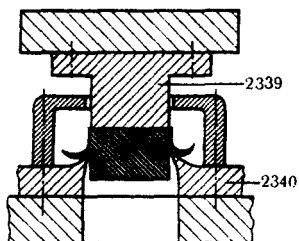
2352



2359



2355



**2349 Dụng cụ, khuôn cắt
rãnh**

Notching press tool,

notching die.

/ˌnɒtʃɪŋ 'prestʊl ;

'nɒtʃɪŋ daɪ/

2350 Đốt lỗ không có phoi

Scrapless piercing.

/ˌskreɪplɪs 'piːsɪŋ/

**2351 Dụng cụ, khuôn đốt lỗ
không phoi**

Scrapless-piercing press

tool, scrapless-piercing

die.

/ˌskreɪplɪs.piːsɪŋ

'prestʊl ; ˌskreɪplɪs

'piːsɪŋ daɪ/

**2352 Sự tinh chỉnh, sự cắt
mép, sự cắt bavia**

Trimming.

/ˈtrɪmɪŋ/

2353 Khuôn cắt bavia

Trimming press tool,

trimming die.

/ˈtrɪmɪŋ 'prestʊl ; 'trɪmɪŋ

daɪ/

2354 Dao cắt

Shearing blade.

/ˈʃɪərɪŋ bleɪd/

2355 Sự cạo

Shaving.

/ˈʃeɪvɪŋ/

2356 Dụng cụ, khuôn cạo

Shaving press tool,

shaving die.

/ˈʃeɪvɪŋ 'prestʊl ; 'ʃeɪvɪŋ

daɪ/

2357 Sự xẻ rãnh, xẻ dọc

Slitting.

/ˈslɪtɪŋ/

**2358 Dụng cụ, khuôn xẻ
rãnh**

Slitting press tool, slitting

die.

/ˈslɪtɪŋ 'prestʊl ; 'slɪtɪŋ

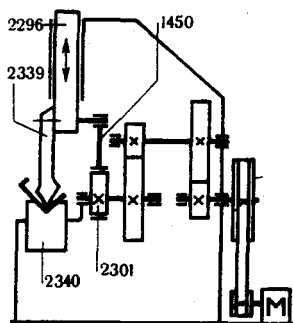
daɪ/

**2359 Sự dập uốn, dập tạo
hình**

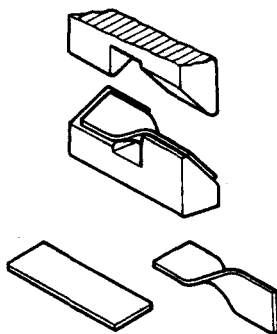
Bending, forming.

/ˈbendɪŋ . ˈfɔːmɪŋ/

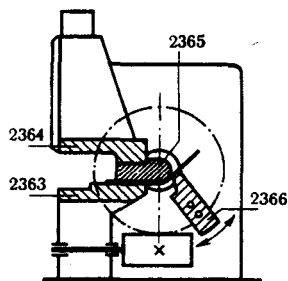
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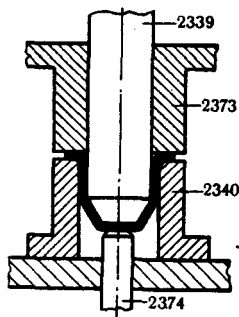
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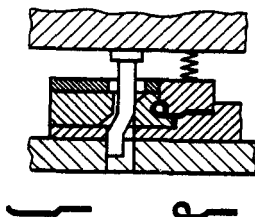
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2371

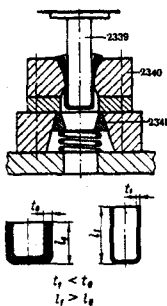


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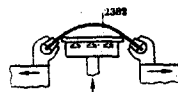


2360 Dụng cụ, khuôn dập uốn*Bending press tool,**forming die.**/ˈbendɪŋ ˈprestʊl ;**ˈfɔːmɪŋ daɪ/***2361 Máy dập ép***Press brake.**/pres breɪk/***2362 Máy uốn tấm mỏng***Sheet bending machine.**/ʃi:t ˈbendɪŋ məʃiːn/***2363 Khung cố định***Stationary frame.**/ˈsteɪʃənəri freɪm/***2364 Đồ gá di trượt***Clamping slide.**/ˈklæmɪŋ slaɪd/***2365 Dưỡng, khuôn***Template.**/ˈtemplɪt/***2366 Khung xoay***Swivelling frame.**/ˈswɪvlɪŋ freɪm/***2367 Sự uốn vòng***Coiling.**/ˈkɔɪlɪŋ/***2368 Dụng cụ, khuôn cuộn vòng***Coiling press tool,**coiling die.**/ˈkɔɪlɪŋ ˈprestʊl ; ˈkɔɪlɪŋ**daɪ/***2369 Sự xoắn***Twisting.**/ˈtwɪstɪŋ /***2370 Dụng cụ, khuôn xoắn***Twisting press tool,**twisting die.**/ˈtwɪstɪŋ ˈprestʊl ;**ˈtwɪstɪŋ daɪ/***2371 Sự kéo***Drawing**/ˈdrɔɪŋ/.***2372 Dụng cụ, khuôn kéo***Drawing press tool,**drawing die.**/ˈdrɔɪŋ ˈprestʊl ; ˈdrɔɪŋ**daɪ/***2373 Đồ gá giữ đế dập cắt***Blank holder.**/ˈblæŋk ˈhəʊldə(r)/***2374 Lấy sản phẩm***Knock-out.**/ˈnɒk.aʊt/*

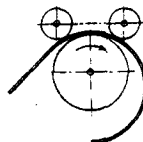
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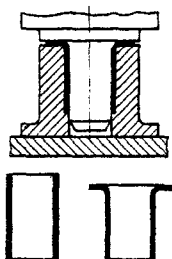
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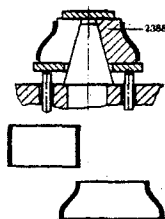
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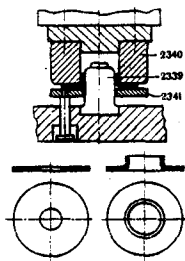
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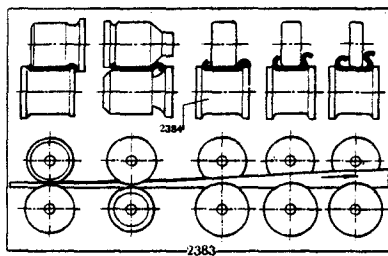
2386



2379



2383



2375 Dập sâu*Ironing.*

/aɪənɪŋ/

2376 Dụng cụ, khuôn dập sâu*Ironing press tool,**ironing die.*

/aɪənɪŋ 'pres tu:l ;

'aɪənɪŋ daɪ/

2377 Sự tạo mép, rìa ngoài*Outward flanging.*

/aʊtɹəd 'flændʒɪŋ/

2378 Dụng cụ khuôn tạo mép, rìa ngoài*Outward flanging press tool, outward 'flanging die.*

/aʊtɹəd 'flændʒɪŋ 'pres tu:l , aʊtɹəd 'flændʒɪŋ daɪ/

2379 Sự tạo mép trong*Inward flanging*

/ɪnwəd 'flændʒɪŋ/

2380 Khuôn, dụng cụ tạo mép trong*Inward flanging press**tool, inward flanging die.*

/ɪnwəd 'flændʒɪŋ pres tu:l ; ɪnwəd 'flændʒɪŋ daɪ/

2381 Sự vuốt dài*Stretch forming.*

/stretʃ 'fɔ:mɪŋ/

2382 Khuôn dập vuốt*Stretch forming punch.*

/stretʃ 'fɔ:mɪŋ pʌntʃ/

2383 Tạo hình bằng phương pháp cán*Roll forming.*

/rɔ:l 'fɔ:mɪŋ /

2384 Con lăn tạo hình*Forming roll.*

/fɔ:mɪŋ rɔ:l/

2385 Uốn cong bằng con lăn*Roll bending.*

/rɔ:l 'bendɪŋ/

2386 Sự làm loe rộng*Bulging.*

/bʌldʒɪŋ/

2387 Dụng cụ, khuôn làm loe rộng*Bulging press tool,**bulging die.*

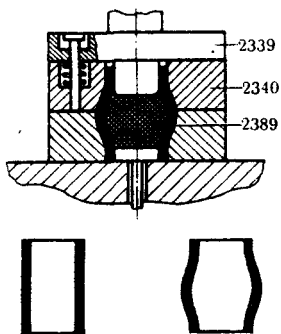
/bʌldʒɪŋ 'pres tu:l ;

bʌldʒɪŋ daɪ/

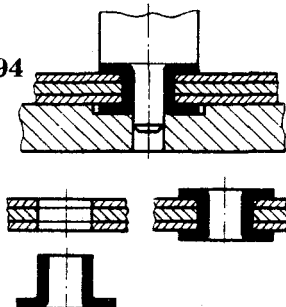
2388 Dập nong rộng*Expandable punch.*

/ɪk.spendəbəl pʌntʃ/

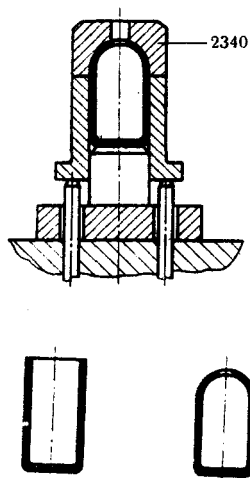
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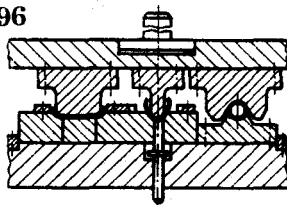
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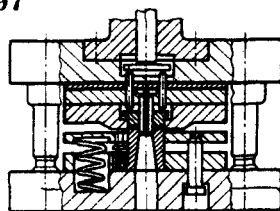
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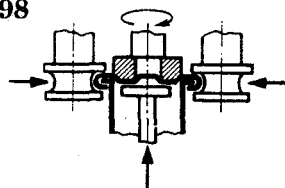
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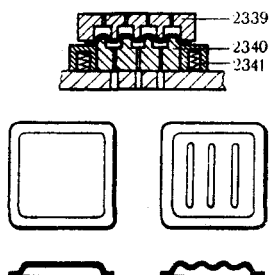
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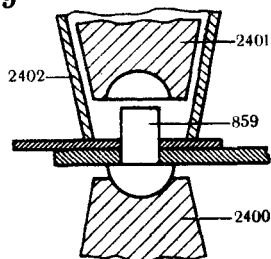
2398



2392



2399



2389 Chày dập bọc cao su*Rubber punch.*

/rʌbə ɒntʃ/

2390 Dập rút ngắn*Reducing.*

/rɪ'dʒʊsɪŋ/

2391 Dụng cụ, khuôn dập**rút ngắn***Reducing press tool,**reducing die.*

/rɪ'dʒʊsɪŋ 'pres tu:l ;

rɪ'dʒʊsɪŋ daɪ/

2392 Sự dập nổi*Embossing.*

/ɪm'boʊsɪŋ/

2393 Dụng cụ, khuôn dập**nổi***Embossing press tool,**embossing die.*

/ɪm'boʊsɪŋ 'pres tu:l ;

ɪm'boʊsɪŋ daɪ/

2394 Dụng cụ, khuôn ghép*Assembling press tool,**assembling die.*

/ə'sembliŋ 'pres tu:l ;

ə'sembliŋ daɪ/

2395 Dụng cụ khuôn tổng**hợp***Combination press tool;**combination die.*

/kɒmbɪ'neɪʃn 'prestʊ:l

;kɒmbɪ'neɪʃn daɪ/

2396 Dụng cụ khuôn dập**hoàn thiện***Progressive press tool,**progressive die.*

/prɒ'gresɪv 'pres tu:l ;

prɒ'gresɪv daɪ/

2397 Dụng cụ, khuôn dập**thành phần***Compound press tool,**compound die.*

/kɒmpaʊnd 'prestʊ:l ;

'kɒmpaʊnd daɪ/

2398 Mối ghép mí cán*Roll seaming.*

/rɒl 'si:mɪŋ/

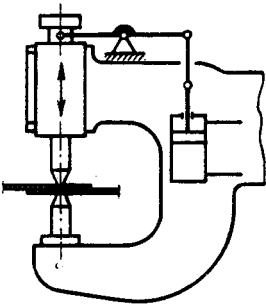
2399 Sự tán đinh*Retg.*

/rɪvɪt/

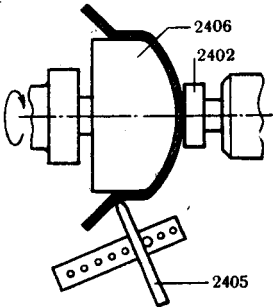
2400 Chày giữ đinh tán*Rivet buckler*

/rɪvɪt 'bʌkəlɜ:/

2403



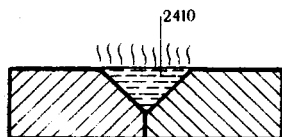
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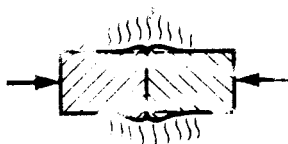
2401 Cối tán đinh*Rivet set.**/ˈrɪvɪt set/***2402 Giá giữ***Holder.**/ˈhəʊldə/***2403 Máy tán đinh***Riveting machine.**/ˈrɪvɪtɪŋ məˈʃiːn/***2404 Sự ép miết kim loại***Metal spinning.**/ˈmetl ˈspɪnɪŋ/***2405 Dụng cụ để miết***Spinning tool.**/ˈspɪnɪŋ tuːl/***2406 Khối tạo hình***Chuck, form block.**/tʃʌk ˈfɔːm blɒk/*

KỸ THUẬT HÀN WELDING

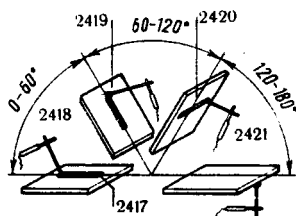
2409



2411



2415



KỸ THUẬT HÀN

WELDING

KHÁI NIỆM CHUNG

GENERAL TERMS

2407 Sự hàn

Welding.

/ˈweldɪŋ/

2408 Hàn

Weld

/weld/

2409 Hàn nóng chảy

Fusion welding.

/ˈfjuːʒn ˈweldɪŋ/

2410 Vũng chảy

Molten pool.

/ˈmɒltən puːl/

2411 Hàn áp lực (hàn rèn)

Pressure welding.

/ˈpreʃə ˈweldɪŋ/

2412 Kim loại gốc

Base metal.

/beɪs ˈmetl/

2413 Tính hàn

Weldability.

/ˈweldəˈbɪləti/

2414 Thử nghiệm tính hàn

Weldability test.

/ˈweldəˈbɪləti test/

2415 Mẫu hàn

Welded specimen.

/ˌweldɪŋ ˈspeʃɪmən/

2416 Vị trí hàn

Welding position.

/ˌweldɪŋ pəˈziʃn/

2417 Đường hàn

Bead.

/biːd/

2418 Vị trí phẳng

Flat position.

/flæt pəˈziʃn/

2419 Vị trí đứng

Vertical position

/ˌvɜːtɪkl pəˈziʃn/

2420 Vị trí ngang

Horizontal position

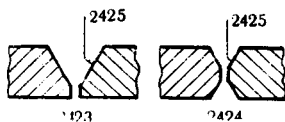
/ˈhɒrɪ.zəntl pəˈziʃn/

2421 Vị trí ngửa

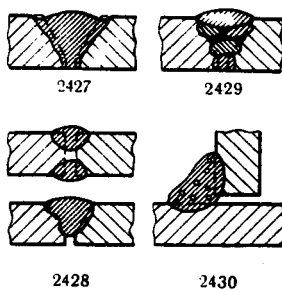
Overhead position

/ˌoʊvəhed pəˈziʃn/

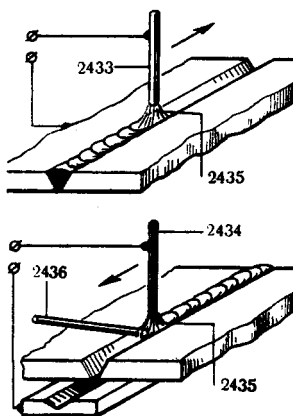
2422



2426



2432



2422 Chuẩn bị mép, biên*Edge preparation*

/eɪˈprepəˈreɪʃn/

2423 Chuẩn bị mép chữ V**đơn***Single - V - edge**preparation*

/ˌsɪŋɡlˈvːeɪdʒ

ˈprepəˈreɪʃn/

2424 Chuẩn bị mép chữ V**kép***Double-V-edge**preparation*

/ˌdʌblˈvːiːeɪdʒ

ˈprepəˈreɪʃn/

2425 Mép vát*Bevel*

/ˈbeɪvl/

*bevel***2426 Khuyết tật hàn***Welding defect*

/ˈweldɪŋ dɪˈfekt/

2427 Khuyết chân mối hàn*Undercut*

/ˈʌndəˌkʌt/

2428 Thụ kim loại*slag inclusion*

/ˈslæɡ ɪnˈkluːʒn/

2429 Lẫn xỉ hàn*Slag inclusion*

/ˈslæɡ ɪnˈkluːʒn/

2430 Bọt khí*Gas pore*

/ɡæːs ˈpɔːr/

HÀN HỒ QUANG**ARC WELDING****2431 Sự hàn điện***Electric welding*

/ɪˌlektɹɪk ˈweldɪŋ/

2432 Sự hàn hồ quang*Arc welding***2433 Điện cực kim loại nóng chảy***Consumable metal**electrode*

/kənˈsjʊməbl ˈmetl

ɪˈlektɹəd/

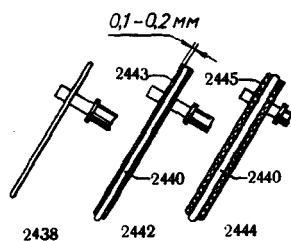
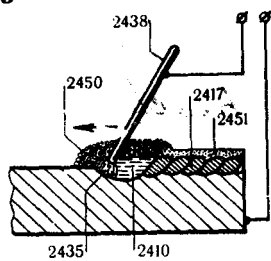
2434 Điện cực graphit không nóng chảy*Non-consumable carbon**electrode*

/nɒn kənˈsjʊməbl ˈkɑːbɒn

ɪˈlektɹəd/

2435 Hồ quang*Arc*

/ɑːk/

2437**2449**

**2436 Thanh, kim loại điện
dày**

Filler rod, filler metal
/ˈfɪlə rod, ˈfɪləˈmetl/

2437 Điện cực

Electrode
/ɪˈlektroʊd/

**2438 Dây điện cực trần
(không bọc)**

Bare electrode wire
/beɪ ɪˈlektroʊd ˈwaɪə(r)/

2439 Điện cực có thuốc bọc

Coated electrode
/ˌkoʊtɪd ɪˈlektroʊd/

2440 Thanh lõi

Core wire
/kɔː ˈwaɪə(r)/

2441 Vỏ thuốc bọc điện cực

*Electrode coating,
coating*
/ɪˈlektroʊd ˈkoʊtɪŋ;
ˈkoʊtɪŋ/

**2442 Điện cực có lớp bọc
mỏng**

Lightly-coated electrode
/ˌlaɪtliˌkoʊtɪd ɪˈlektroʊd/

2443 Lớp bọc nhẹ, mỏng

*Arc stabilizing coating,
light coating*
/ˌɑːkˌsteɪbɪlaɪzɪŋ ˈkoʊtɪŋ
laɪt ˈkoʊtɪŋ/

2444 Điện cực có lớp bọc dày

Heavy-coated electrode
/ˌheviˌkoʊtɪd ɪˈlektroʊd/

2445 Lớp bọc dày

Heavy coating
/ˌheviˈkoʊtɪŋ/

2446 Lớp bọc oxyt

Oxide coating
/ˈɒksaɪdˈkoʊtɪŋ/

2447 Lớp bọc rutin

Rutile coating
/ˈruːtɪl ˈkoʊtɪŋ/

2448 Lớp bọc CaF_2

Calcium-fluoride coating
/ˈkælsɪəm ˈflɒraɪd
ˈkoʊtɪŋ/

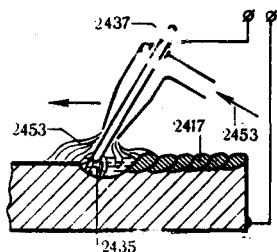
2449 Hàn hồ quang chìm

Submerged-arc welding
/sʌbmɜːdɪd ɑːk ˈweldɪŋ/

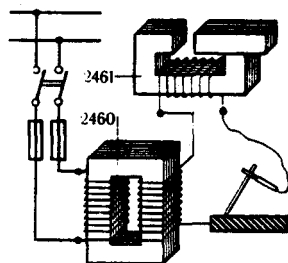
2450 Chất trợ dung để hàn

Welding flux
/ˈweldɪŋ ˈflʌks/

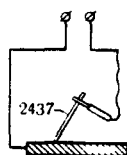
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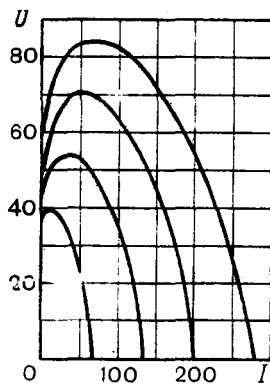
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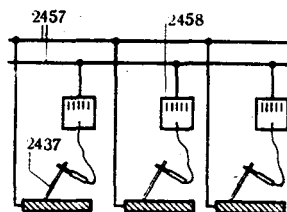
2455



2464



2456



2451 Lớp xỉ bề mặt

Slag skin
/slæg skɪn/

2452 Hàn hồ quang khí bảo vệ

Gas-shielded arc welding
/ˌɡæs ʃi:ldɪd ɑ:k ˈweldɪŋ/

2453 Khí bảo vệ

Shield gas
/ʃi:ld ɡæz/

2454 Nguồn điện

Power supply
/ˈpaʊə səˈplaɪ/

2455 Máy hàn đơn

Single-operator welding set
/ˌsɪŋɡl̩ ˈɒpəreɪtə ˈweldɪŋ set/

2456 Máy hàn nhiều kẹp hàn

Multi-operator welding set
/ˌmʌlti ˈɒpəreɪtə ˈweldɪŋ set/

2457 Dây cung cấp điện

Feed bar
/fi:d bɑ:(r)/

2458 Bộ điều chỉnh tải

Loading regulator
/ˈlɔ:diŋ ˈregjʊləteɪ/

2459 Hàn hồ quang điện xoay chiều

A-c arc - welding
/ˈeɪst ɑ:k ˈweldɪŋ/

2460 Biến áp hàn

Welding transformer
/ˈweldɪŋ trænsˈfɔ:mə:(r)/

2461 Cuộn dây công tác

Reactor coil
/rɪˈæktə kɔɪl/

2462 Bộ biến đổi hàn

Welding converter
/ˈweldɪŋ kənˈvɜ:tə:(r)/

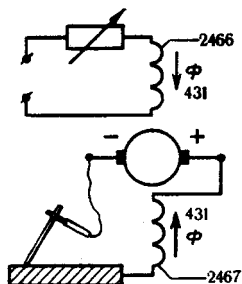
2463 Máy hàn điện một chiều

Welding DC generator
/ˈweldɪŋ ˈdi:stɪˈdʒenəreɪtə:(r)/

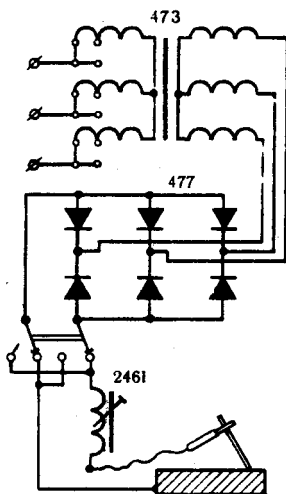
2464 Đặt tính giảm điện áp khi hàn

Dropping voltage characteristic
/ˌdrɒpɪŋ ˈvɒltɪdʒ ˌkærɪktəˈrɪstɪk/

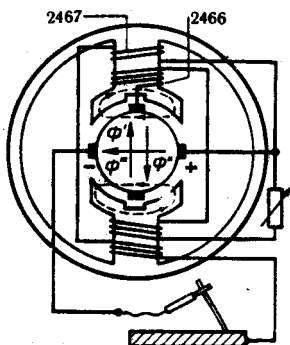
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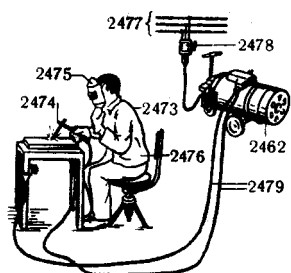
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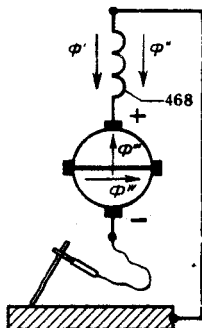
2468



2472



2469



- 2465** Máy hàn có cuộn kích thích tách biệt và cuộn giảm điện áp nối tiếp
Welding generator with a separate excitation winding and a series bucking winding
 /ˌweldɪŋ ˈdʒenəreɪtə wɪð ə ˌseɪərənt ɪksaɪtɪfɪŋ ˈwaɪndɪŋ ə ˌsɪəri ˈbʌkɪŋ ˈwaɪndɪŋ/

- 2466** Cuộn cảm ứng
Inducing field winding
 /ɪnˌdjuːsɪŋ ˌfi:ld ˈwaɪndɪŋ/

- 2467** Cuộn giảm điện áp
Bucking field winding
 /ˌbʌkɪŋ ˌfi:ld ˈwaɪndɪŋ/

- 2468** Máy hàn tự kích thích
Self-excited welding generator
 /self ɪkˌsaɪtɪd ˈweldɪŋ ˈdʒenəreɪtə/

- 2469** Máy hàn tự kích thích mắc ngang
Self-excited cross-connected welding generator
 /self ɪkˌsaɪtɪd kros kənetɪd ˈweldɪŋ ˈdʒenəreɪtə/

- 2470** Bộ chỉnh lưu hàn
Welding rectifier
 /ˌweldɪŋ ˈrektɪfaɪə/

- 2471** Hàn bằng tay
Hand welding
 /hænd ˈweldɪŋ/

- 2472** Trạm hàn, cụm hàn
Welding station
 /ˌweldɪŋ ˈsteɪʃn/

- 2473** Thợ hàn
Welder
 /ˌweldə/

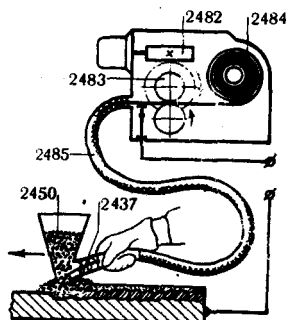
- 2474** Kẹp que hàn
Electrode holder
 /ˈɪlektroʊd ˈhəʊldə/

- 2475** Mặt nạ hàn
Hand-held shield
 /hænd held ˈfi:ld/

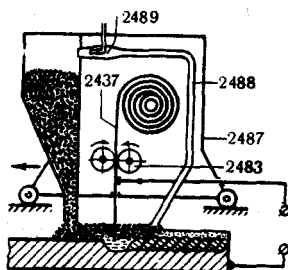
- 2476** Quần áo bảo vệ
Protective clothing
 /prəˌtektɪv ˈkloʊðɪŋ/

- 2477** Nguồn điện lưới
Three-phase current mains
 /θriːˌfeɪz ˈkərənt meɪnz/

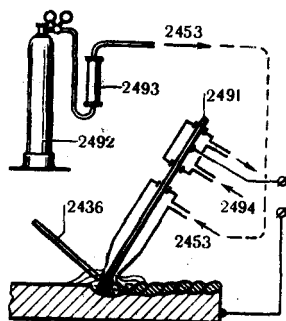
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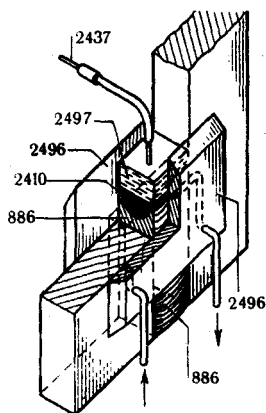


2490

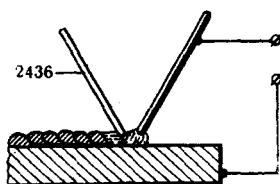


2478 Cầu dao chính*Knife switch**/naɪf swɪtʃ/***2479 Dây điện mềm***Flexible cable**/ˌfleksəbl 'keɪbl/***2480 Hàn hồ quang chìm bán****tự động***Semi-automatic**submerge-arc welding**/ˌsemi ɔɪə.mætɪk**səb.ms:ɔɪd ə:k 'weldɪŋ/***2481 Càn (mỏ) hàn bán tự****động***Semi-automatic welding**head, hose-type welder**/ˌsemi ɔɪə.mætɪk**'weldɪŋ hed ; hɔʊz taɪp**'weldɔɪ/***2482 Cơ cấu cấp dây hàn***Wire feed mechanism**/ˌwaɪə fi:d 'mekənɪzəm/***2483 Con lăn cấp dây***Feed rolls**/fi:d rɔʊlz/***2484 Cuộn dây***Wire reel**/ˌwaɪə ri:l/***2485 Ống dẫn hướng***Hose guide**/həʊz gaɪd/***2486 Hàn hồ quang chìm tự động***Automatic submerged**arc welding**/ɔɪə.mætɪk səb.ms:ɔɪd**ə:k 'weldɪŋ/***2487 Máy hàn tự động***Automatic welding**machine**/ɔɪə.mætɪk 'weldɪŋ**məʊʃɪn/***2488 Ống hút***Suction pipe**/sʌkʃn paɪp/***2489 Đầu phun***Ejector**/ɪˈdʒektɔɪ/***2490 Hàn hồ quang Ar-W***Tungsten argon arc**welding**/ˌtʌŋstən 'ɑ:gn ə:k**'weldɪŋ/***2491 Điện cực volfram***Tungsten electrode**/ˌtʌŋstən ɪˈlektroʊd/*

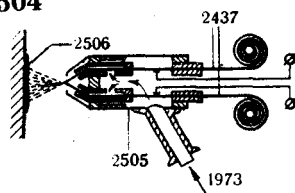
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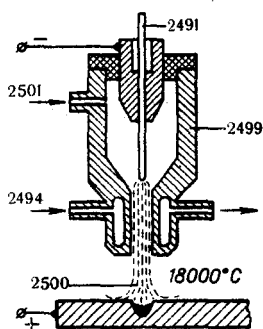
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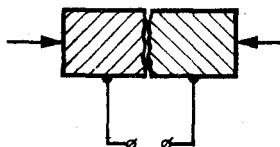
2504



2498



2507



2492 Bình Argon

Argon cylinder
/ɑ:gn 'silində(r)/

2493 Đồng hồ đo dòng khí

Flow meter
/fləʊ 'mitə(r)/

2494 Nước làm nguội

Cooling water
/kʊliŋ ,wotə(r)/

2495 Hàn điện xỉ

Electroslag welding
/ɪ'lektroʊslæg 'weldiŋ/

2496 Tấm khuôn bằng Cu

Copper moulding plate
/kɒpə 'mʊldiŋ plent/

2497. Xi chảy

Molten slag
/mɒltən slæg/

2498 Hàn hồ quang plasma

Plasma arc welding
/'plɑ:smə a:k 'weldiŋ/

2499 Mỏ phun plasma

Plasma torch
/'plɑ:smə tɔ:tʃ/

2500 Dòng plasma

Plasma stream
/'plɑ:smə stri:m/

2501 Khí tạo plasma

Plasma-forming gas
/'plɑ:smə 'fɔ:mɪŋ 'gæs/

2502 Đắp bề mặt bằng cách hàn (hàn đắp)

Surfacing, building up by welding
/'sɜ:fisiŋ ; 'bildiŋ ʌp baɪ'weldiŋ/

2503 Hàn đắp

Build up by welding
/'bildʌp baɪ'weldiŋ/

2504 Sự phun kim loại

Metal spraying, metalizing
/'metl spreɪŋ , 'metalaiziŋ/

2505 Súng phun kim loại

Metal spray gun
/'metl 'spreɪ gʌn/

2506 Lớp kim loại phun

Sprayed-metal coating
/'spreɪd 'metl kəʊtiŋ/

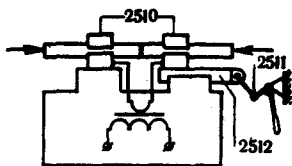
2507 Hàn điện trở .

Resistance welding
/ɪ'zɪstəns 'weldiŋ/

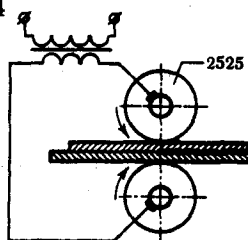
2508 Hàn nối đầu

Butt welding
/bʌt 'weldiŋ/

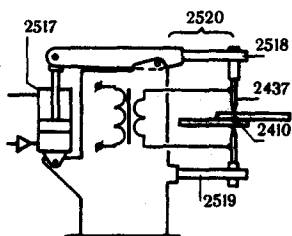
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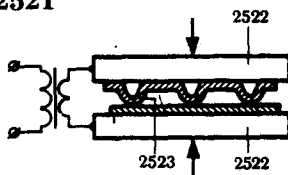
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2516

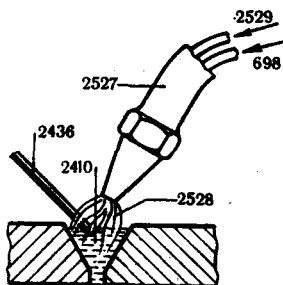


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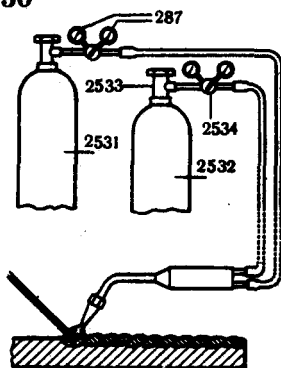


- 2509** Máy hàn điểm
Butt welding machine
/bʌt 'weldɪŋ məʃiːn/
- 2510** Bộ phận kẹp giữ
Clamping device, clamp
/'klæmpɪŋ dɪ'vaɪs _
'klæmp/
- 2511** Bộ phận truyền động
Feed and upsetting drive
/'fiːd ɔn ʌp'setɪŋ draɪv/
- 2512** Tấm di động
Movable plate
/'mʊvəbl pleɪt/
- 2513** Hàn điểm điện trở
*Resistance but welding,
upset welding*
/'rɪzɪstəns bʌt 'weldɪŋ
ʌp'set 'weldɪŋ/
- 2514** Hàn tiếp xúc
Flash welding
/flæʃ 'weldɪŋ/
- 2515** Hàn điểm
Spot welding
/'spot 'weldɪŋ/
- 2516** Máy hàn điểm
Spot welding machine
/'spot 'weldɪŋ məʃiːn/
- 2517** Cơ cấu ép nén
Compressing mechanism
/'kɒm'presɪŋ 'mekənɪzəm/
- 2518** Cần di động
Movable arm
/'mʊvəbl ɑːm/
- 2519** Cần cố định
Stationary arm
/'steɪfənəri ɑːm/
- 2520** Chiều dài cần hàn
Throat depth
/θəʊt depθ/
- 2521** Sự hàn nổi
Projection welding
/'prɒ'dʒekʃn 'weldɪŋ/
- 2522** Tấm tiếp xúc
Contact plate
/'kɒntækt pleɪt/
- 2523** Sự phóng điện
Projection
/'prɒ'dʒekʃn/
- 2524** Sự hàn lằn
Seam welding
/'siːm 'weldɪŋ/
- 2525** Điện cực đĩa
Disc-shaped electrode
/'dɪsk ʃeɪpt ɪ'lektroʊd/

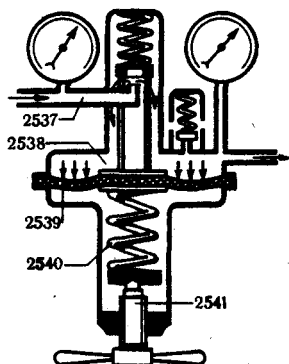
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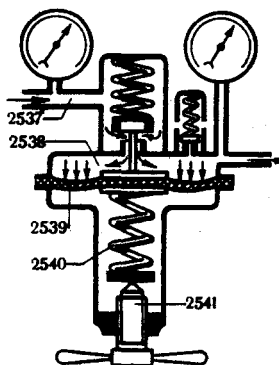
2530



2535



2536



HÀN HƠI (KHÍ)

GAS WELDING

2526 Hàn hơi, hàn khí

Gas welding
/gæs 'weldɪŋ/

2527 Mỏ hàn, ống hàn

Welding torch, welding
blowpipe
/ˈweldɪŋ ˌtɔːtʃ/ weldɪŋ
ˈblɔʊpaɪp/

2528 Ngọn lửa

Flame
/fleɪm/

2529 Nhiên liệu khí

Fuel gas, combustible
gas
/ˈfʊəl gæs kəmˈbʌstəbl
gæs/

2530 Hàn oxy axetylen

Oxyacetylene welding
/ˌɒksɪə ˈsetɪliːn 'weldɪŋ/

2531 Bình oxy

Oxygen cylinder
/ˈɒksɪdʒən ˈsɪlɪndə(r)/

2532 Bình axetylen

Acetylene cylinder
/əˈsetɪliːn ˈsɪlɪndə(r)/

2533 Van chính

Cut-off valve
/ˈkʌt ɒf vælv/

2534 Van điều chỉnh giảm áp

Pressure reducing
regulator
/ˌpreʃə rɪˈdʒʊsɪŋ
ˈregjʊlətə(r)/

2535 Bộ điều chỉnh giảm áp
kiểu ống phun

Nozzle-type pressure
reducing regulator
/ˌnoʊzl taɪp ˈpreʃə
rɪˈdʒʊsɪŋ ˈregjʊlətə(r)/

2536 Bộ giảm áp kiểu ngược
dòng

Stem-type pressure
reducing regulator
/ˌstem taɪp ˈpreʃə
rɪˈdʒʊsɪŋ ˈregjʊlətə(r)/

2537 Buồng cao áp

High pressure chamber
haɪ ˈpreʃə ʃeɪmbə(r)/

2538 Buồng áp thấp

Low pressure chamber
ləʊ ˈpreʃə ʃeɪmbə(r)/

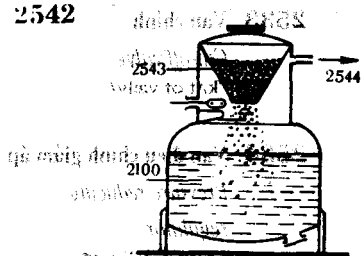
2539 Màng chắn

Diaphragm
/daɪəfræm/

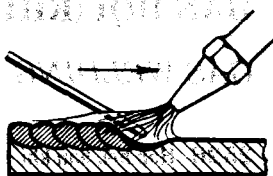
2540 Lò xo điều chỉnh

Adjustment spring
/əˈdʒʌstmənt sprɪŋ/

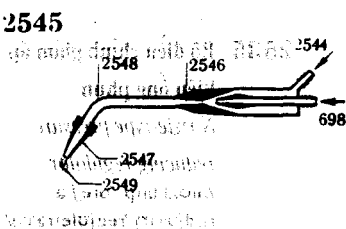
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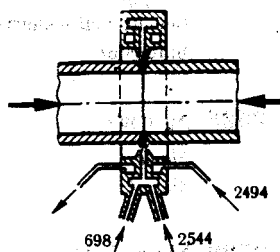
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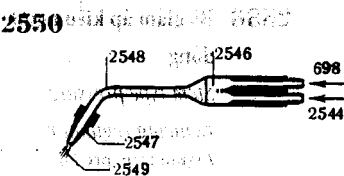
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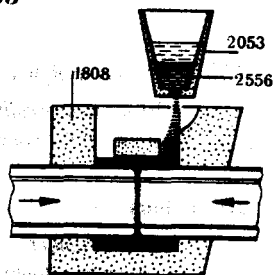
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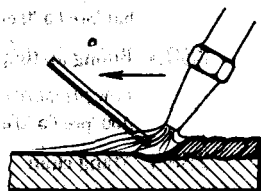
2550



2555



2551



2541 Vít điều chỉnh

Adjusting screw
/ə'dʒʌstɪŋ skru:/

2549 Hỗn hợp nhiên liệu

Fuel mixture
/fjuəl 'mɪktʃə(r)/

2542 Bộ (thiết bị) tạo ra axêtylen

Acetylene generator
/ə'setɪlɪn 'dʒenəreɪtə(r)/

2550 Mỏ hàn kiểu cao áp

Positive-pressure type torch
/pəʒɪtɪv 'preʃə tɔ:p tʃ:/

2543 Carbure calci CaC₂

Calcium carbide
/kæl'sɪəm 'kɑ:bəɪd/

2551 Hàn bên trái hàn xuôi

Leftward welding, forward welding
/ˌleftwəd 'weldɪŋ /ˌfɔ:wəd 'weldɪŋ/

2544 Axêtylen C₂H₂

Acetylene
/ə'setɪlɪn/

2552 Hàn ngược

Rightward welding, back-ward welding
/ˌraɪtwəd 'weldɪŋ /ˌbækwəd 'weldɪŋ/

2545 Mỏ hàn kiểu phun

Injector-type torch
/ɪn'dʒektə tɔ:p tʃ:/

2553 Hàn khí áp suất cao

Pressure-gas welding
/ˌpreʃə ɡæs 'weldɪŋ/

2546 Buồng hòa trộn

Mixing chamber
/mɪksɪŋ ʃeɪmbə(r)/

2554 Mỏ hàn nhiều đầu phun

Multi-nozzle torch
/ˌmʌlti 'noʒl tɔ:p tʃ:/

2547 Ống phun

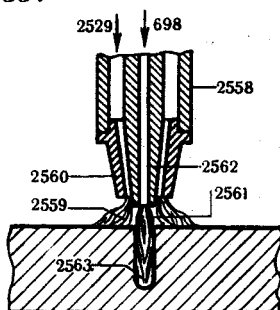
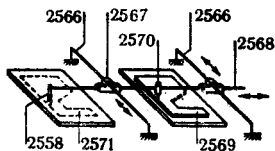
Nozzle
/ˈnoʒl/

2548 Đầu phun

Tip
/tɪp/

2555 Hàn nhiệt nhôm

Thermit welding
/θə'mɪt 'weldɪŋ/

2557**2565**

2556 Nhiệt nhôm*Therm it*

/θɜːmɪt/

2557 Sự cắt bằng oxy*Oxygen cutting*

/ˈɒksɪdʒən ˈkʌtɪŋ/

2558 Mỏ cắt, vòi cắt*Cutting torch, cutting**blowpipe*

/ˈkʌtɪŋ ˈtɔːtʃ ˈkʌtɪŋ

ˈblɒʊpaɪp/

2559 Ngọn lửa nung sơ bộ*Preheating flame*

/prɪˈhiːtɪŋ fleɪm/

2560 Vòi nung sơ bộ*Preheating nozzle*

/prɪˈhiːtɪŋ ˈnoʊz/

2561 Oxy để cắt*Cutting oxygen*

/ˈkʌtɪŋ ˈɒksɪdʒən/

2562 Vòi cắt*Cutting nozzle*

/ˈkʌtɪŋ ˈnoʊz/

2563 Cắt*Kerf, cut*

/kɜːf kʌt/

2564 Máy cắt bằng oxy*Oxygen cutting machine*

/ˈɒksɪdʒən ˈkʌtɪŋ

məˈʃiːn/

2565 Máy cắt oxy trực giao*Orthogonal-coordinate**oxygen cutting machine*

/ˌɔːθəɡəˈnəl ˈkɔːdɪnət

ˈɒksɪdʒən ˈkʌtɪŋ

məˈʃiːn/

2566 Cần hướng dẫn dọc*Longitudinal guiding rail*

/lɒŋɡɪˈtʃʊdɪnəl ɡaɪdɪŋ reɪl/

2567 Trượt dọc*Longitudinal slide*

/lɒŋɡɪˈtʃʊdɪnəl slaɪd/

2568 Thanh*Bar*

/bɑː/

2569 Mẫu dưỡng cắt*Templet*

/ˈtemplit/

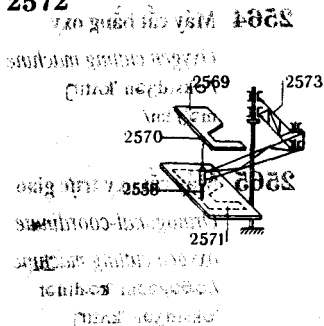
2570 Chốt lấy dấu từ tính*Magnetic tracing pin*

/mæɡˈnetɪk ˈtreɪsɪŋ pɪn/

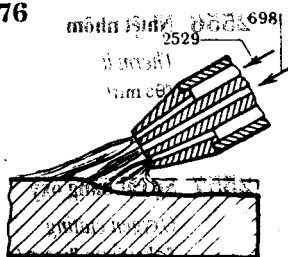
2571 Phần được cắt*Part to be cut out*

/pɑːt tə biː ˈkʌt aʊt/

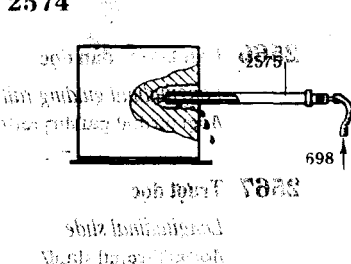
2572



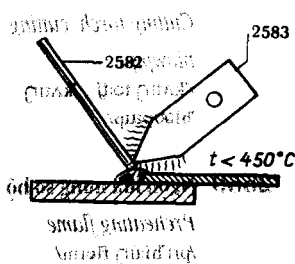
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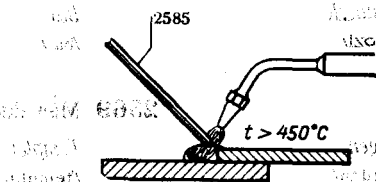
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2581



2584



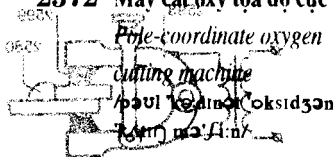
2572 Máy cắt oxy toa độ cực

Pole-coordinate oxygen

cutting machine

/pəʊl ˈkɔːdɪnət ˈɒksɪdʒən/

/kʌtɪŋ məˈʃiːn/



2573 Khung xoay

Swivelling frame

/ˈswɪvəlɪŋ freɪm/

2574 Sự cắt bằng ngọn lửa
đèn xi

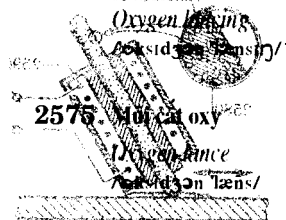
Oxygen flaming

/ˈɒksɪdʒən ˈfleɪmɪŋ/

2575 Hồ cắt oxy

Oxygen lance

/ˈɒksɪdʒən ˈleɪns/

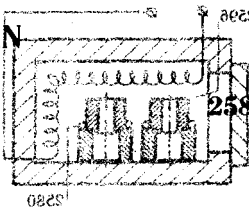


2576 Sự hút lớp mặt bằng

oxy

Surface oxygen cutting

/ˈsʌfɪs ˈɒksɪdʒən ˈkʌtɪŋ/

HÀN QUE, HÀN
CHẢYBRAZING AND
SOLDERING

2577 Sự hàn với que hàn

chảy, hàn chảy

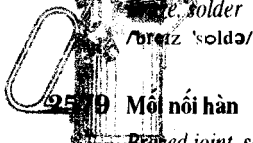
Brazing, soldering

/ˈbreɪzɪŋ ˈsɒldərɪŋ/

2578 Hàn chảy que hàn

Brazing, solder

/ˈbreɪzɪŋ ˈsɒldə/



2579 Mối nối hàn

Brazed joint, soldered

joint

/ˈbreɪzɪd dʒɔɪnt ˈsɒldəd

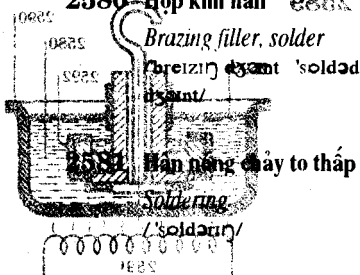
dʒɔɪnt/

2580 Hợp kim hàn

Brazing filler, solder

/ˈbreɪzɪŋ ˈfɪlə ˈsɒldəd

dʒɔɪnt/



2581 Hàn nóng chảy to thấp

Soldering

/ˈsɒldərɪŋ/

2582 Hợp kim hàn mềm

Solder

/ˈsɒldə/

2583 Đồng để hàn

Soldering copper

/ˈsɒldərɪŋ ˈkɒpər/

2584 Hàn vảy đồng hàn thau

Brazing

/ˈbreɪzɪŋ/

2585 Hợp kim Cu để hàn

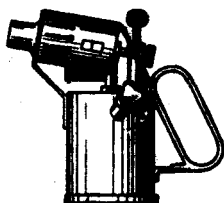
Brazing filler, brazing

alloy

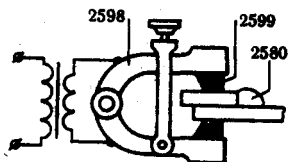
/ˈbreɪzɪŋ ˈfɪlənt/

ˈbreɪzɪŋ ˈælɔɪ/

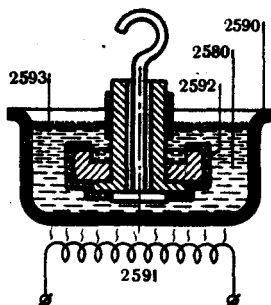
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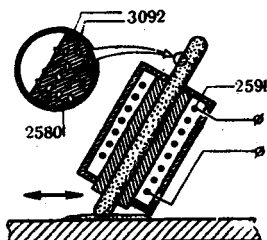
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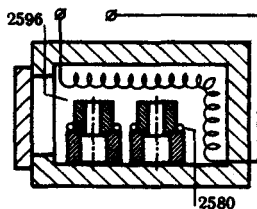
2589



2600



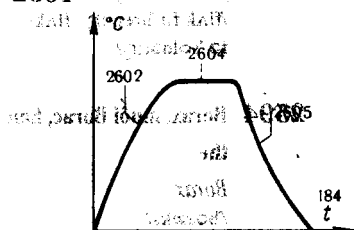
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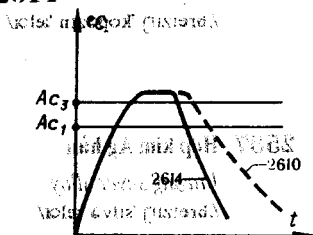
- 2586** Hợp kim Cu-Zn hàn
Brazing Copper-Zinc alloy
/ˌbreɪzɪŋ ˈkɒpəzɪn ˈelɔɪ/
- 2587** Hợp kim Ag hàn
Brazing silver alloy
/ˌbreɪzɪŋ ˈsɪlvə ˈelɔɪ/
- 2588** Mỏ hàn vẩy
Soldering torch
/ˈsɒldərɪŋ ˈtɔːtʃ/
- 2589** Sự hàn nhúng
Dip brazing
/dɪp ˈbreɪzɪŋ/
- 2590** Bể chứa
Bath
/bɑːθ/
- 2591** Cuộn dây cấp nhiệt
Heating coil
/hiːtɪŋ ˈkɔɪl/
- 2592** Chất bảo vệ
Protective paste
/prəˈtektɪv ˈpeɪst/
- 2593** Dòng chảy dễ hàn
Flux for brazing, flux for soldering
/flʌk fə ˈbreɪzɪŋ flʌks fə ˈsɒldərɪŋ/
- 2594** Borax, muối Borac, hàn the
Borax
/ˈbɒræks/
- 2595** Sự hàn vẩy trong lò
Furnace brazing
/ˈfɜːnɪs ˈbreɪzɪŋ/
- 2596** Khí quyển bảo vệ
Controlled atmosphere
/kənˌtrɒld ˈætəməsfɪə(r)/
- 2597** Hàn vẩy bằng điện trở
Resistance brazing
/rɪˈzɪstəns ˈbreɪzɪŋ/
- 2598** Kẹp hàn
Brazing tongs
/ˈbreɪzɪŋ ˈtʌŋz/
- 2599** Tiếp xúc bằng Cacbon
Carbon contact
/ˈkɑːbən ˈkɒntækt/
- 2600** Hàn ma sát
Wiping soldering
/ˈwaɪpɪŋ ˈsɒldərɪŋ/

NHIỆT LUYỆN HEAT TREATMENT

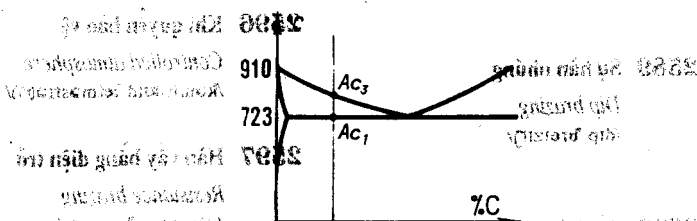
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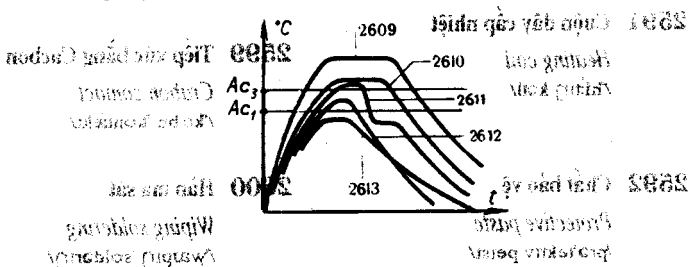
2614



2606



2607



NHIỆT LUYỆN

HEAT TREATMENT

0100

2601 Nhiệt luyện*Heat treatment*

/hi:et'li:juən/

2602 Sự nung nóng*Heating*

/hi:juŋ/

2603 Nung nóng*Heat*

/hi:t/

2604 Giữ nhiệt*Soaking*

/səʊkiŋ/

2605 Làm nguội*Cooling*

/ku:liŋ/

2606 Điểm nhiệt độ tới hạn*Critical point*

/kritikl pɔɪnt/

2607 Sự ủ*Annealing*

/ə'ni:lɪŋ/

2608 Ủ*Anneal*

/ə'ni:l/

2609 Ủ lệch tâm*Diffusion annealing*

/di'fju:ʒn ə'ni:lɪŋ/

2610 Ủ hoàn toàn*Full annealing*

/fʊl ə'ni:lɪŋ/

2611 Ủ đẳng nhiệt*Isothermal annealing*

/aɪsə'θɜ:məl ə'ni:lɪŋ/

2612 Ủ không hoàn toàn; Ủ*khử ứng suất**Stress relieving**annealing*

/stres ri'li:vɪŋ ə'ni:lɪŋ/

2613 Ủ kết tinh lại*Recrystallization**annealing*

/ri.kristəlaɪ'zeɪʃn

ə'ni:lɪŋ/

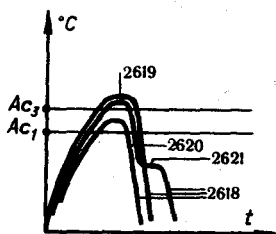
2614 Sự thường hóa*Normalizing*

/nɔ:məlaɪzɪŋ/

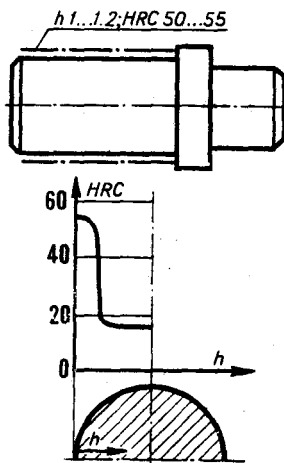
2615 Thường hóa*Normalize*

/nɔ:məlaɪz/

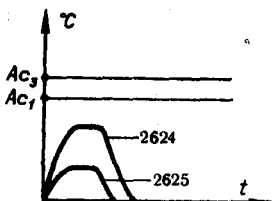
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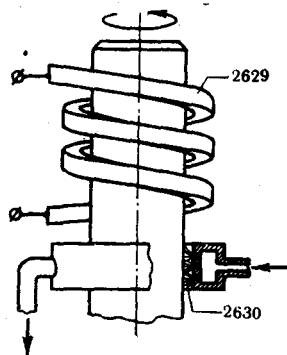
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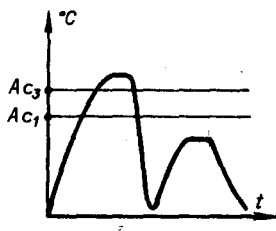
2622



2628



2626



2616 Sự tôi ; trui

Hardening

/hɑ:dnɪŋ/

2617 Tôi ; trui

Harden

/hɑ:dn/

2618 Làm nguội nhanh

Quenching

/kwentʃɪŋ/

2619 Tôi hoàn toàn

Full hardening

/fʊl hɑ:dnɪŋ/

2620 Tôi không hoàn toàn

Soft hardening

/sɒft hɑ:dnɪŋ/

2621 Tôi đẳng nhiệt

Isothermal hardening

/ˌaɪsəθɜ:ml hɑ:dnɪŋ/

2622 Sự ram

Tempering

/tempəɪŋ/

2623 Ram

Temper

/tempə/

2624 Ram ở nhiệt độ cao

High tempering

/haɪ tempəɪŋ/

2625 Ram thấp

Low tempering

/ləʊ tempəɪŋ/

2626 Tôi và ram cao

*Hardening with high**tempering*

/hɑ:dnɪŋ wɪθ haɪ

tempəɪŋ/

2627 Tôi bề mặt

Surface hardening

/sɜ:fsɪs hɑ:dnɪŋ/

2628 Tôi cảm ứng

Induction hardening

/ɪnˈdʌkʃn hɑ:dnɪŋ/

2629 Cuộn cảm ứng

Inductor coil, inductor

/ɪnˈdʌktə kəʊl

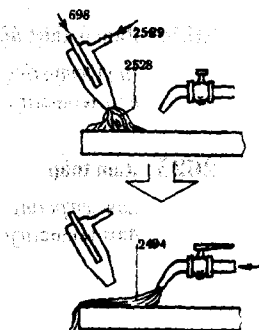
ɪnˈdʌktə(r)/

2630 Vòi phun nước

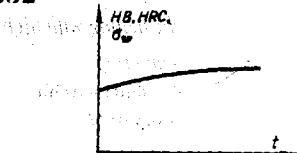
Water spray

/ˈwɔ:tə spreɪ/

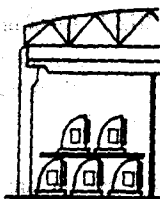
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2632



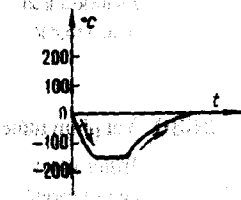
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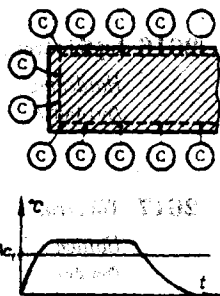
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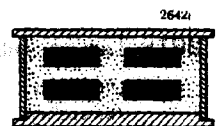
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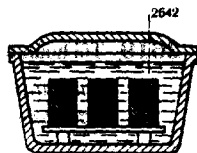
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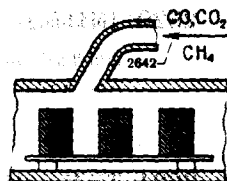
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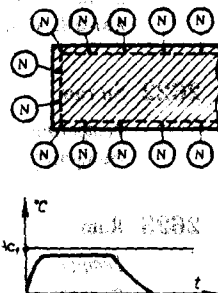
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2641

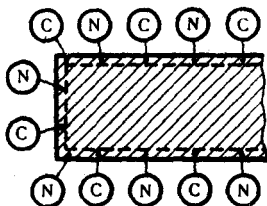


2643



2631 Tôi bằng ngọn lửa*Flame hardening**/flæm 'hɔ:dnɪŋ/***2632 Sự hóa già***Ageing**/eɪdʒɪŋ/***2633 Hóa già tự nhiên***Natural ageing**/ˈnætʃrəl 'eɪdʒɪŋ/***2634 Hóa già nhân tạo***Artificial ageing**/ɑ:ˈtɪʃl 'eɪdʒɪŋ/***2635 Gia công lạnh***Sub-zero treatment**/sʌb ˈzɪrəʊ ˈtri:tmənt/***2636 Hóa nhiệt luyện nhiệt***Diffusion heat treatment**chemical heat treatment**/dɪˈfju:ʒn hi:t ˈtri:tmənt/***2637 Sự thấm Carbon***Carburizing**/kəˈbjʊəzɪŋ/***2638 Thấm carbon***Carburize**/kəˈbjʊəz/***2639 Hộp thấm carbon***Pack carburizing**/pæk ˈkəbjʊəzɪŋ/***2640 Thấm C thể lỏng***Liquid carburizing**/ˈliːkwɪd ˈkəbjʊəzɪŋ/***2641 Thấm C thể khí***Gas carburizing**/ɡæs ˈkəbjʊəzɪŋ/***2642 Hỗn hợp thấm C***Carbonaceous material**/kəˈbɔ:ʊ 'neɪfəs**məˈtɪəriəl/***2643 Sự thấm Nitơ***Nitriding**/ˈnɪtrəɪdɪŋ/***2644 Thấm Nitơ***Nitride**/ˈnɪtrəɪd/*

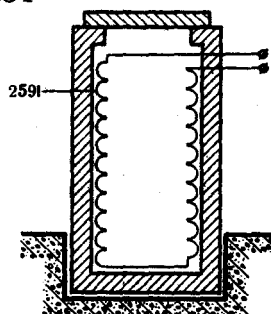
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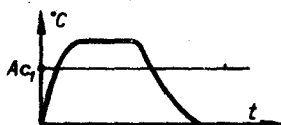
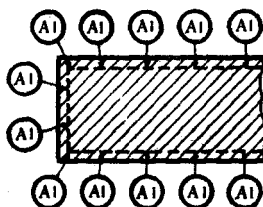
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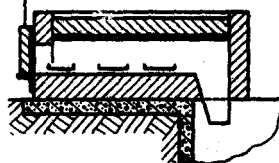
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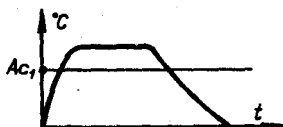
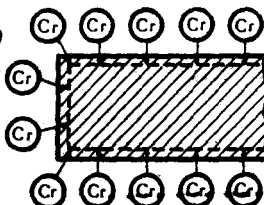
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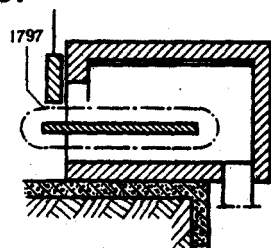
2656



2649



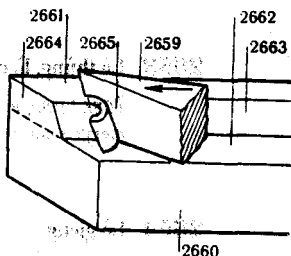
2657



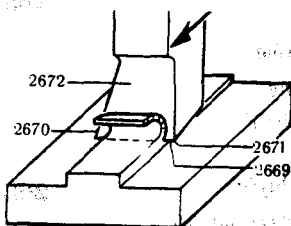
2645 Sự thấm Xyanua*Cyaniding**/ˈsaɪnədaɪɪŋ/***2646 Thấm Xyanua***Cyanide**/ˈsaɪnədaɪd/***2647 Sự thấm Al***Calorizing**/ˈkæləraɪzɪŋ/***2648 Thấm Al***Calorize**/ˈkæləraɪz/***2649 Thấm Crôm***Chromizing**/ˈkrəʊməɪzɪŋ/***2650 Lò nhiệt luyện***Heat treatment furnace**/hi:t ˈtri:tmənt ˈfʊ:ni:s/***2651 Lò hoạt động theo chu****kỳ***Batch furnace**/bætʃ ˈfʊ:ni:s/***2652 Lò kiểu hộp kín***Box furnace**/bɒks ˈfʊ:ni:s/***2653 Lò thùng, lò chuyên***Tank furnace**/tæŋk ˈfʊ:ni:s/***2654 Lò giềng***Pit furnace**/pɪt ˈfʊ:ni:s/***2655 Lò liên tục***Continuous furnace**/kən.tɪnju:əs ˈfʊ:ni:s/***2656 Lò kiểu đẩy***Pusher-type furnace**/ˈpuʃə taɪp ˈfʊ:ni:s/***2657 Lò băng chuyền***Conveyer furnace**/kənˈveɪə ˈfʊ:ni:s/*

GIÁ CÔNG CƠ KHÍ MACHINING

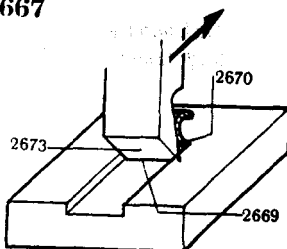
2658



2666



2667



GIA CÔNG CƠ KHÍ

MACHINING

KHÁI NIỆM CHUNG

GENERAL TERMS

2658 Sự cắt gọt

Cutting

/ˈkʌtɪŋ/

2659 Dụng cụ cắt

Cutting tool

/ˈkʌtɪŋ tuːl/

2660 Chi tiết gia công

Workpiece

/ˈwɜːkpiːs/

2661 Bề mặt gia công

Work surface

/wɜːk ˈsɜːfɪs/

2662 Bề mặt đã được gia công

Machined surface

/məˈʃɪnd ˈsɜːfɪs/

2663 Bề mặt chuyển tiếp

Transient surface

/trænzɪənt ˈsɜːfɪs/

2664 Dung sai cho phép để gia công

Allowance for machining

/əˈləʊəns fɔ məˈʃɪnɪŋ/

2665 Phoi

Chip

/tʃɪp/

2666 Sự cắt tự do

Free cutting

/friːˈkʌtɪŋ/

2667 Sự cắt giới hạn

Restrained cutting

/rɪˈstreɪnd ˈkʌtɪŋ/

2668 Lưỡi cắt

Cutting edge

/ˈkʌtɪŋ ɛdʒ/

2669 Lưỡi cắt chính

Major cutting edge

/ˌmeɪdʒə ˈkʌtɪŋ ɛdʒ/

2670 Lưỡi cắt phụ

Minor cutting edge

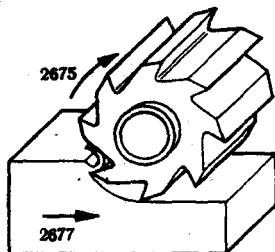
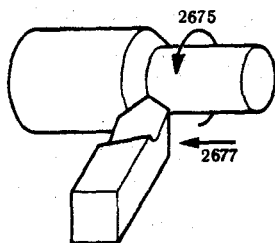
/ˌmaɪnə ˈkʌtɪŋ ɛdʒ/

2671 Đầu lưỡi

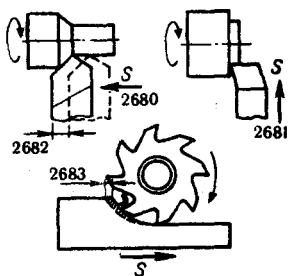
Nose, corner

/nəʊz ˈkɔːnə/

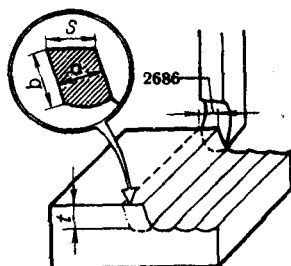
2675



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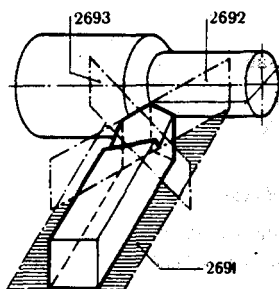


2672 Mặt trước*Face**/feɪs/***2673 Mặt sau***Flank**/flæŋk/***2674 Chế độ cắt***Cutting conditions**/ˈkʌtɪŋ kənˈdɪʃnz/***2675 Chuyển động cắt***Primary motion ; cutting
motion**/ˈpraɪməri ˈmʊʃn/**ˈkʌtɪŋ ˈmʊʃn/***2676 Tốc độ cắt***Cutting speed* *$v = 150 \text{ (m/min)}$* */ˈkʌtɪŋ spiːd/***2677 Chuyển động ăn dao***Feed motion**/fiːd ˈmʊʃn/***2678 Ăn dao***Feed**/fiːd/***2679 Ăn dao liên tục***Continuous feed**/kənˈtɪnuəs fiːd/***2680 Ăn dao dọc***Longitudinal feed**/lɒndʒɪˈtʃuːdɪnl fiːd/***2681 Ăn dao ngang***Cross-feed**/ˈkros fiːd/***2682 Ăn dao vòng***Feed per revolution* *$s = 0,5 \text{ mm/rev}$* */fiːd pə ˌrevəˈluːʃn/***2683 Ăn dao/răng***Feed per tooth* *$s_z = 0,1 \text{ mm/răng}$* *(mm/tooth)**/fiːd pə tuːθ/***2684 Ăn dao/phút***Feed per minute* *$s = (\text{mm/m})$* */fiːd pə ˈmɪnɪt/***2685 Ăn dao gián đoạn***(hành trình đơn)**Intermittent feed**/ˌɪntəˈmɪtənt fiːd/***2686 Ăn dao/hành hình kép***Feed per double stroke* *$s_m = 2 \text{ mm/hành trình kép}$* */fiːd pə ˌdʌbl strəʊk/*

Đồ thị của trục
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Đồ thị của trục

2691

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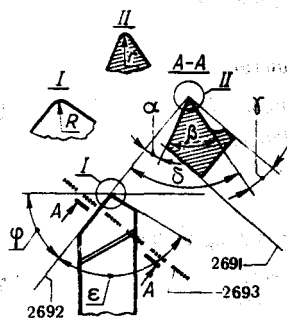


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2687 Chiều sâu cắt

Depth of cut : back
engagement

/depθ ɔv kæt brek

in'geɪdʒmənt/

2688 Chiều dày phoi không

biến dạng (a)

Undeformed chip

thickness

/ˌʌndɪfɔːmd ʃɪp 'θɪkniːs/

2689 Chiều rộng phoi không

biến dạng (b)

Undeformed chip width

/ˌʌndɪfɔːmd ʃɪp wɪθ/

2690 Tiết diện ngang của

phoi

Cross-sectional area of

uncut chip

$F = a.b$

/krɒsˌsekʃənəl 'eɪrɪə ɔv

ʌnˌkʌt ʃɪp/

2691 Mặt cơ sở

Base

/beɪs/

2692 Mặt phẳng cắt của dao

Tool cutting edge plane

/tuːl 'kʌtɪŋ edʒ pleɪn/

2693 Mặt phẳng chéo

của lưỡi cắt

Cutting edge orthogonal

plane

/kʌtɪŋ edʒ ɔːθəɡənəl

pleɪn/

2694 Các góc của dao cắt

Tool angles

/tuːl 'æŋɡlz/

2695 Góc trước

Tool rake

/tuːl reɪk/

2696 Góc sau (α)

Tool clearance

/tuːl 'klɪərəns/

2697 Góc chêm (β)

Wedge angle

/wedʒ 'æŋɡl/

2698 Góc cắt (δ)

Angle of cutting

/'æŋɡl ɔv 'kʌtɪŋ/

2699 Góc lưỡi cắt (ϕ)

Tool cutting edge angle

/tuːl 'kʌtɪŋ edʒ 'æŋɡl/

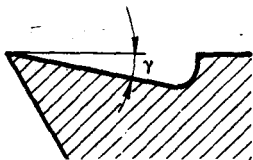
2700 Góc đỉnh

Nose angle : corner

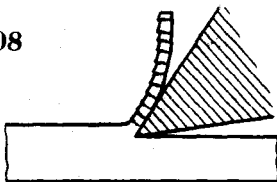
angle

/nəʊz 'æŋɡl .kɔːnə 'æŋɡl/

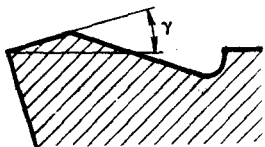
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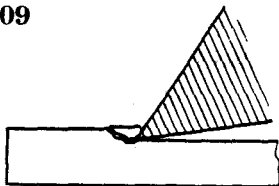
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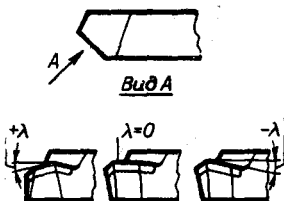
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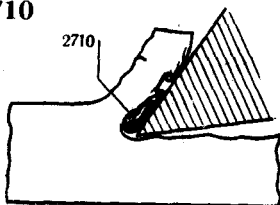
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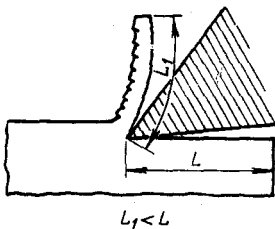
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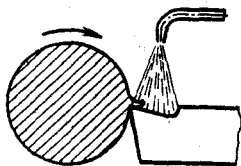
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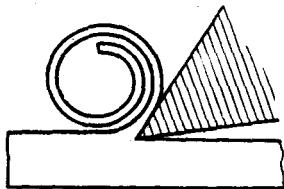
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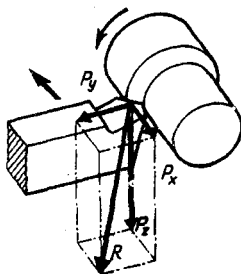
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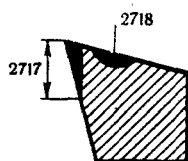


2712

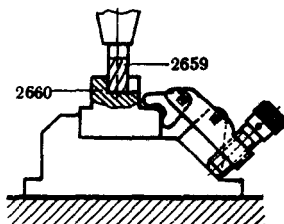


2701 Bán kính đỉnh (R)*Nose radius, corner**radius**/nəʊz 'reɪdiəs, kɔ:nə**'reɪdiəs/***2702 Bán kính lưỡi cắt (r)***Cutting edge radius**/ˈkʌtɪŋ ɛdʒ 'reɪdiəs/***2703 Góc nghiêng dương***Positive rake**/ˈpɒzətɪv reɪk/***2704 Góc nghiêng âm***Negative rake**/ˈnegətɪv reɪk/***2705 Độ nghiêng của lưỡi cắt***(λ)**Tool cutting edge**inclination**ˈwɜ:l 'kʌtɪŋ ɛdʒ**ɪnklɪˈneɪʃn/***2706 Sự co phoi***Chip contraction**/tʃɪp kənˈtrækʃn/***2707 Phoi liên tục***Continuous chip**/kənˈtɪnjuəs tʃɪp/***2708 Phoi vòng không liên***tục**Discontinuous shearing**segment chip**/dɪskənˈtɪnjuəs 'fræŋ**'segment tʃɪp/***2709 Phoi vòng gãy***Discontinuous breaking**segment chip**/dɪskənˈtɪnjuəs breɪkɪŋ**'segment tʃɪp/***2710 Mép cuộn***Built-up edge**/bɪltʌp ɛdʒ/***2711 Sự làm phoi nguội***Coolant**/ˈkʊlənt/***2712 Lực cắt***Cutting force**/ˈkʌtɪŋ fɔ:s/***2713 Thành phần tiếp tuyến***(Pz)**Tangential component of
cutting force**Pz = 2500N**ˈtæŋˈdʒenʃl**kəmˈpəʊnənt əv 'kʌtɪŋ**fɔ:s/*

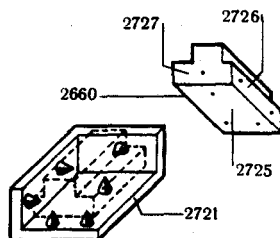
2716



2721



2722



2714 Thành phần dọc trục

(Px) của lực cắt

*Axial component of
cutting force* $P_x = 300N$ /æksɪəl kə'pɔʊnt əv
'kʌtɪŋ fɔ:s/**2715 Thành phần hướng**

kinh của lực cắt (Py)

*Radial component of
cutting force* $P_y = 300N$ /ˌreɪdiəl kəm.pɔʊnt
ə'kʌtɪŋ fɔ:s/**2716 Sự mòn dụng cụ cắt***Tool wear*

/tu:l weə(r)/

2717 Vùng bị mòn*Wear land*

/weə lænd/

2718 Vùng mòn khuyết*Wear crater*

/weə 'kreɪtə(r)/

**2719 Giá trị giới hạn của độ
mòn***Limit value of wear*

/ˌlɪmɪt 'vælju əv weə(r)/

2720 Tuổi bền dụng cụ cắt*Tool life*

/tu:l laɪf/

2721 Sự kẹp chặt*Fixture*

/'fɪkstʃə/

2722 Sự định vị*Locating*

/ləʊ'keɪɪŋ/

2723 Định vị*Locate*

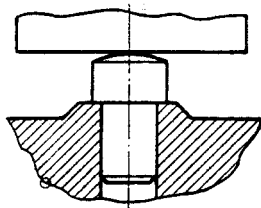
/ləʊ'keɪn/

2724 Thành phần định vị*Locating element*

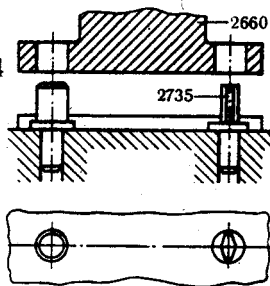
/ləʊ'keɪɪŋ 'elɪmənt/

**2725 Thành phần định vị 3
điểm***Three-point locating
element*/θri:point ləʊ'keɪɪŋ
'elɪmənt/**2726 Thành phần định vị 2
điểm***Two-point locating
element*/tu:point ləʊ'keɪɪŋ
'elɪmənt/

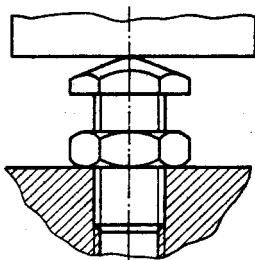
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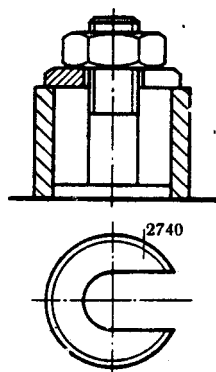
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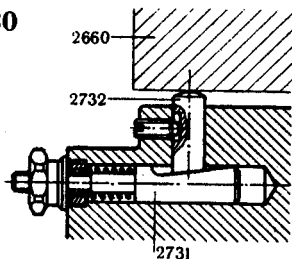
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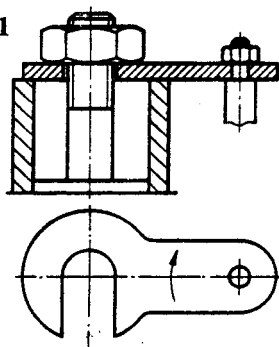
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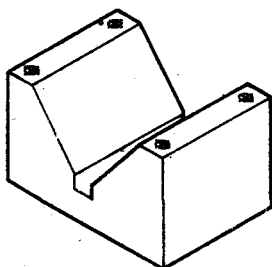
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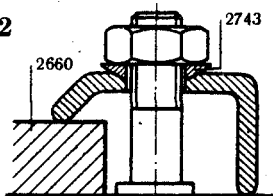
2741



2733



2742



2727 Thành phần định vị 1
điểm

*Single-point locating
element*
/ˌsɪŋɡl pɔɪnt laʊˈkeɪtɪŋ
ˈelɪmənt/

2728 Gối tựa cố định

Fixed support
/fɪkst səˈpɔ:t/

2729 Gối tựa điều chỉnh

Adjustable support
/əˈdʒʌstəbl səˈpɔ:t/

2730 Gối tựa điều chỉnh bổ
sung

*Additional adjustable
support*
/əˈdɪʃənəl əˈdʒʌstəbl
səˈpɔ:t/

2731 Chêm, nêm

Wedge
/wedʒ/

2732 Chốt đỡ

Supporting pin
/səˈpɔ:tɪŋ pɪn/

2733 Khối V

V-block
/vɪˈblɒk/

2734 Chốt định vị

Locating pin
/ləʊˈkeɪtɪŋ pɪn/

2735 Chốt hình thoi

Diamond pin
/daɪəmənd pɪn/

2736 Sự kẹp chặt

Clamping
/ˈklæmpɪŋ/

2737 Kẹp chặt

Clamp
/klæmp/

2738 Dụng cụ, đồ gá kẹp

Clamping device
/ˈklæmpɪŋ dɪˈvaɪs/

2739 Kẹp bằng vít

Screw clamp
/skrɜː klæmp/

2740 Vòng đệm có rãnh

Slotted washer
/slɒtɪd ˈwɒʃə(r)/

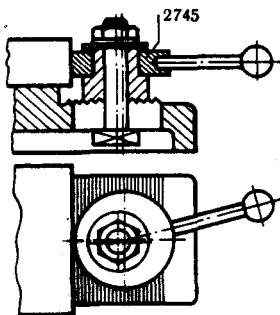
2741 Kẹp lắc

Swinging clamp
/ˈswɪŋɪŋ klæmp/

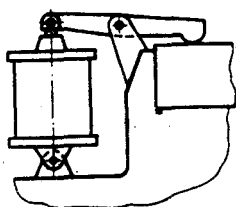
2742 Kẹp kiểu vòng

Strap clamp
/stræp klæmp/

2744



2746



2743 Vòng đệm cầu

Spherical washer
/sfi:ə'ri:kl 'wəʃə(r)/

2744 Kẹp lệch tâm

Eccentric clamp
/ɛk'sentrik klæmp/

2745 Lệch tâm

Eccentric
/ɛk'sentrik/

2746 Thiết bị kẹp chặt dùng khí nén

Air-operated clamping device
/eə ɒpə'reitɪd 'klæmpɪŋ di'vaɪs/

2747 Máy công cụ, máy cắt kim loại

Metal-cutting machine tool, universal machine
/ˌmetl kʌtɪŋ mə'fi:n tu:l/

2748 Máy công cụ vạn năng

Universal machine tool, universal machine
/ˌju:nɪvɜ:sl mə'fi:n tu:l/ -
/ˌju:nɪvɜ:sl mə'fi:n/

2749 Máy công cụ chuyên dùng

Special machine tool, special machine
/ˌspeʃəl mə'fi:n tu:l, ˌspeʃəl mə'fi:n/

2750 Máy công cụ bán tự động

Semi-automatic machine
/ˌsemi ɔ:tə,mætɪk mə'fi:n/

2751 Cấp phối bằng tay

Hand loading
/hænd 'ləʊdɪŋ/

2752 Chu kỳ gia công bán tự động

Semi-automatic machining cycle
/ˌsemi ɔ:tə,mætɪk mə'fi:nɪŋ 'saɪkl/

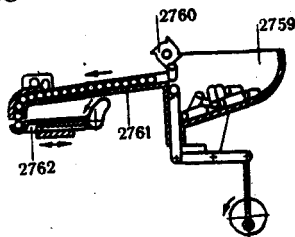
2753 Lấy sản phẩm bằng tay

Hand unloading
/hænd ʌn'ləʊdɪŋ/

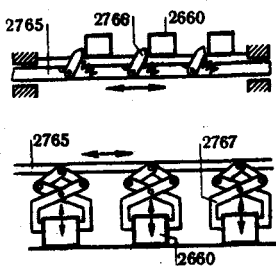
2754 Máy công cụ tự động

Automatic machine tool, automatic machine
/ɔ:tə,mætɪk mə'fi:n tu:l/

2758

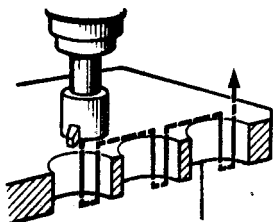


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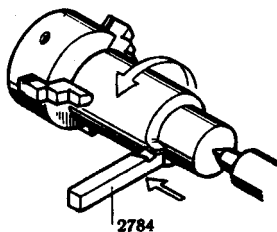


- 2755** Thiết bị cấp phôi tự động
Automatic loading device
/ɔtə.mætɪk 'ləʊdɪŋ di'vaɪs/
- 2756** Thiết bị kiểm soát chu kỳ tự động
Automatic cycle control device
/ɔtə.mætɪk saɪkl kən'trəʊl di'vaɪs/
- 2757** Nơi trữ phôi
Magazine
/'mæɡəziːn/
- 2758** Thiết bị cấp phôi kiểu phễu
Hopper-type loading device
/ˌhɒpə'taɪp 'ləʊdɪŋ di'vaɪs/
- 2759** Phễu cấp phôi
Hopper
/'hɒpə(r)/
- 2760** Bộ phân chia
Separator
/'seɪpəreɪtə(r)/
- 2761** Máng trượt
Chute
/'ʃuː/
- 2762** Máng cấp phôi
Feeder
/'fiːdə(r)/
- 2763** Đường truyền
Transfer line
/'trænsfə laɪn/
- 2764** Băng chuyền kiểu bước
Step-by-step conveyer
/ˌstepbaɪ step kən'veɪə(r)/
- 2765** Thanh chuyển
Transfer bar
/'trænsfə bɑː(r)/
- 2766** Cỡ chặn
Transfer finger
/'trænsfə'fɪŋɡə(r)/
- 2767** Móc kẹp
Clamp hook
/'klemp huːk/
- 2768** Kiểm soát bằng chương trình số (NC)
Numerical control-NC
/'njuː.merɪkl kən'trəʊl/
- 2769** Chương trình
Program
/'prɒɡræm/

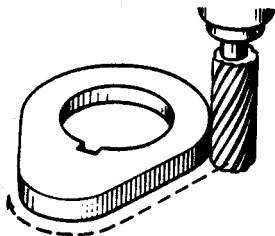
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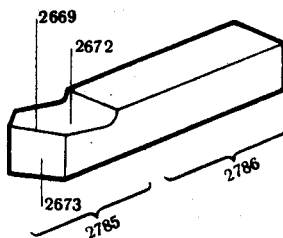
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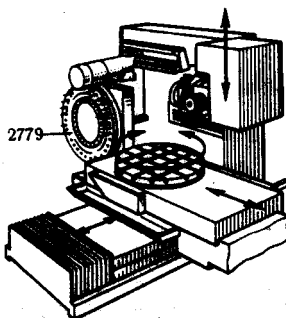
2777



2784



2778



2770 Thiết bị đục lỗ

Tape punch
/teip pʌntʃ/

2771 Phiến đục lỗ

Punched tape
/pʌntʃt teip/

2772 Máy công cụ chương trình số

Numerically controlled machine-tool-NC machine-tool
/nɜː,merɪkli kən,trəʊld məʃɪn tuːl/

2773 Đơn vị NC của máy

Machine-tool numerical control unit
/məʃɪn tuːl nɜː,merɪ kən'trəʊl 'juːnɪt/

2774 Hệ thống NC vị trí

Positioning NC system
/pə'zɪʃnɪŋ en si'sɪstəm/

2775 Động cơ theo bước

Step motor
/step 'mɔːtə(r)/

2776 Đầu ghi hồi chuyển

Feed back sensing head
/fiːdbæk 'sensɪŋ hed/

2777 Hệ thống NC chu vi

Contouring NC system
/kɒntʊrɪŋ en si'sɪstəm/

2778 Tâm gia công

Machining centre
/məʃɪnɪŋ 'sentə(r)/

2779 Nơi trữ dụng cụ dao cắt

Tool magazine
/tuːl'mæɡəzɪn/

TIỆN**LATHE WORK****2780 Gia công tiện**

Lathe work
/leɪθ wɜːk/

2781 Sự tiện

Turning
/tɜːnɪŋ/

2782 Tiện

Turn

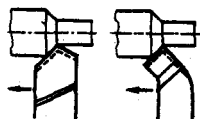
2783 Dao tiện một lưỡi cắt

Single-point tool
/ˌsɪŋɡl pɔɪnt tuːl/

2784 Dao tiện

Lathe tool
/leɪθ tuːl/

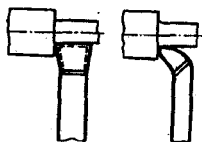
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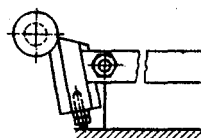
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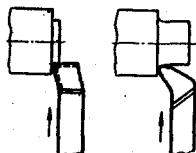
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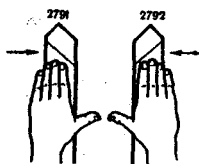
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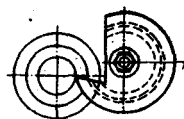
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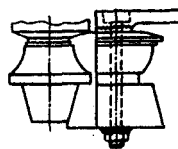
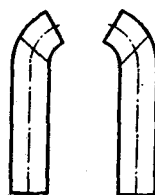
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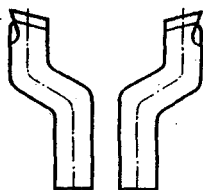
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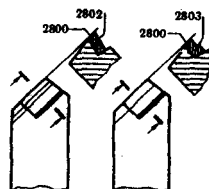
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2794

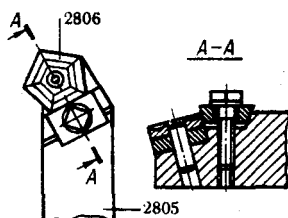


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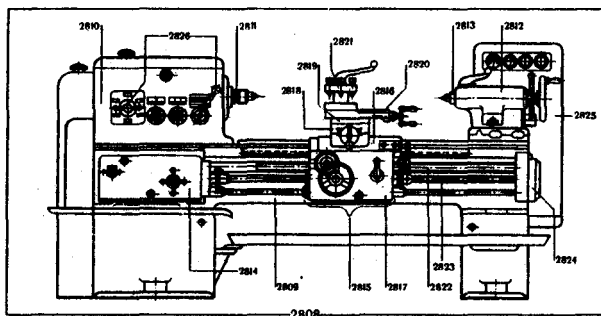


2785 Phần cắt, đầu cắt*Tool point, cutting part**/tu:l pɔɪnt 'kʌtɪŋ pɑ:t/***2786** Cán dao*Tool shank**/tu:l ʃæŋk/***2787** Dao tiện trơn*Turning tool**/tɜ:nɪŋ tu:l/***2788** Dao tiện tinh*Finishing turning tool**/fɪnɪʃɪŋ 'tɜ:nɪŋ tu:l/***2789** Dao tiện mặt đầu*Facing tool**/feɪsɪŋ tu:l/***2790** Dao cán thẳng*Straight-shank tool**/streɪt ʃæŋk tu:l/***2791** Dao trái*Left-hand tool***2792** Dao phải*Right-hand tool***2793** Dao đầu cong*Bent tool***2794** Dao cổ ngỗng*Goose-neck tool**/ˌɡu:z nek tu:l/***2795** Dao cắt đứt, dao tiện
rãnh*Offset tool**/ɒfset tu:l/***2796** Dao định hình*Form tool**/fɔ:m tu:l/***2797** Dao định hình phẳng*Flat form tool**/flæt fɔ:m tu:l/***2798** Dao định hình tròn*Circular form tool**/ˌsɜ:kjʊlə fɔ:m tu:l/***2799** Dao gắn lưỡi cắt bằng
cách hàn*Brazed-tip tool**/breɪzɪd tɪp tu:l/***2800** Đỉnh cắt*Cutting tip**/ˈkʌtɪŋ tɪp/***2801** Khe thoát phoi*Chip breaker**/ˈtʃɪp ˈbreɪkə(r)/*

2804

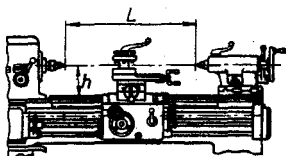


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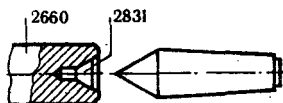


2802 Thoát phoi kiểu rãnh*Groove-type chip**breaker**/ˌɡruːv taɪp ˈtʃɪp**ˈbreɪkə(r)/***2803 Thoát phoi kiểu bậc***Step-type chip breaker**/ˌstep taɪp ˈtʃɪp ˈbreɪkə(r)/***2804 Dao gắn lưỡi cắt bằng****kẹp chặt***Clamped-tip tool**/ˈklæmpt tɪptuːl/***2805 Cán dao***Holder**/ˈhəʊldə(r)/***2806 Gắn mảnh hợp kim****cứng cacbit***Throwaway sintered-**carbide insert**/ˌθrəʊəweɪ ˌsɪntəd**ˈkeɪbaɪd ˈɪnsɜːt/***2807 Máy tiện***Lathe**/leɪθ/***2808 Máy tiện ren***Engine lathe**/ˈendʒɪn leɪθ/***2809 Băng máy***Bed***2810 Đầu máy***Headstock**/ˈhedstɒk/***2811 Trục chính***Spindle**/ˈspɪndl/***2812 Ủ động***Tailstock**/ˈteɪlstɒk/***2813 Mũi chống tâm***Quill**/ˈkwɪl/***2814 Hộp xe dao***Feed box**/ˈfiːdɒks/***2815 Hộp chạy dao***Carriage**/ˈkærɪdʒ/***2816 Bàn trượt***Saddle**/ˈsædl/***2817 Tấm chắn***Apron**/ˈeɪprɒn/*

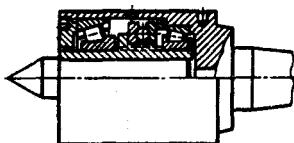
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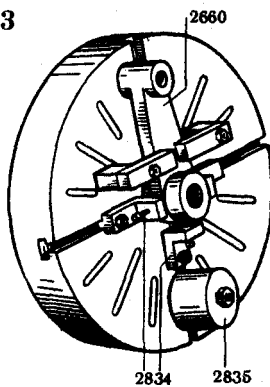
2830



2832



2833



2818 Bàn trượt ngang

Cross slide
/ˈkrɒslɑɪn/

2819 Bàn dao phức hợp

Compound rest
/ˈkɒmpaʊnd rest/

2820 Giá trượt bàn dao

Compound rest slide
/ˈkɒmpaʊnd rest slaɪd/

2821 Giá kẹp dao

Tool post
/tu:l pəʊst/

2822 Trục vítme (dẫn hướng)

Lead screw
/li:d skru:/

2823 Trục chạy dao

Feed shaft
/fi:d ʃɑ:ft/

2824 Truyền động không tải nhanh

Carriage rapid traverse drive
/ˈkærɪdʒ ˈræpɪd trəˌvɜ:s draɪv/

2825 Hộp công tắc điện

Electric ɔ' binit
/ˈlektrɪk ˈkæbɪnɪt/

2826 Cần tốc độ

Speed selector lever
/spi:d sɪˈlektə ˈlevə(r)/

2827 Khoảng cách từ tâm đến tâm

Centre-to-centre distance
/ˈsentə təˈsentə ˈdɪstəns/

2828 Chiều cao tâm

Centre height
/ˈsentə haɪt/

2829 Phụ tùng máy tiện

Lathe accessories
/leɪθ əkˈsesɔ:rɪz/

2830 Tâm máy tiện

Lathe centre, centre
/leɪθ ˈsentə(r)/

2831 Lỗ định tâm

Centre hole
/ˈsentə hoʊl/

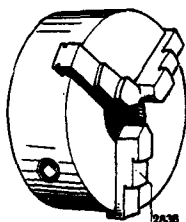
2832 Tâm quay

Rotating centre
/rəʊˈteɪɪŋ ˈsentə(r)/

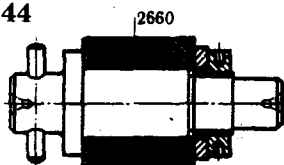
2833 Mặt giữ

Face plate
/feɪs plent/

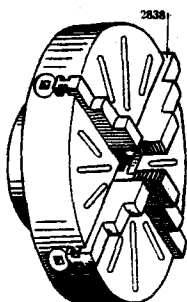
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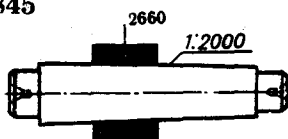
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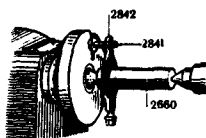
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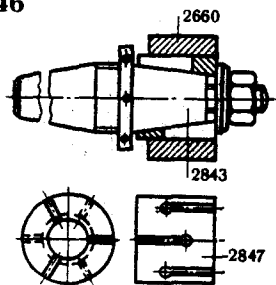
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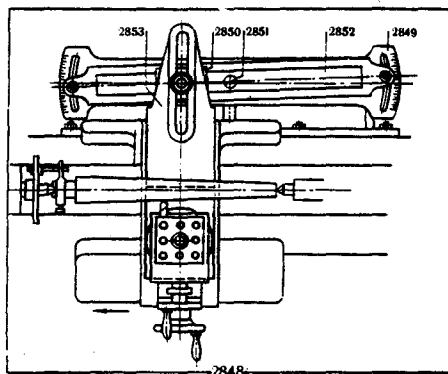
2840



2846



2848



2834 Vấu đỡ*Stop bracket*

/stɒp 'bræki:t/

2835 Đồi trọng*Counterweight*

/'kæʊntəweɪt/

2836 Mâm cặp*Chuck*

/'ʃʌk/

2837 Mâm cặp ba chấu*Three-jaw chuck*

/θri: dʒɔ: 'ʃʌk/

2838 Chấu kẹp*jaw*

/dʒɔ:/

2839 Mâm cặp bốn chấu*Four-jaw chuck*

/fɔ: dʒɔ: 'ʃʌk/

2840 Mâm quay*Driver plate*

/'draɪvə plent/

2841 Chốt xoay*Driving pin*

/'draɪvɪŋ pi:n/

2842 Cái tọc*Lathe dog*

/leɪθ dɒg/

2843 Trục gá, trục tâm*Mandrel, arbor*

/'mændrəl 'ɑ:bə(r)/

2844 Trục gá trụ*Cylindrical mandrel*

/sɪ.lɪndrɪkəl 'mændrəl/

2845 Trục gá côn*Taper mandrel*

/ˌteɪpə 'mændrəl/

2846 Trục gá bung*Expanding mandrel*

/ɪk.speɪndɪŋ 'mændrəl/

2847 Ống kẹp*Collet*

/'kɒlɪt/

2848 Đồ gá tiện côn*Taper-turning**attachment*

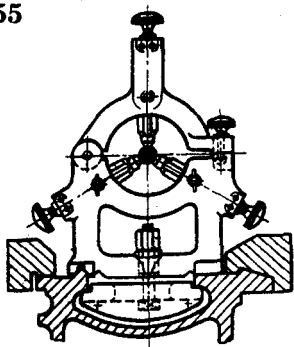
/ˌteɪpə ˌtʃɜ:nɪŋ

ə'tætʃmənt/

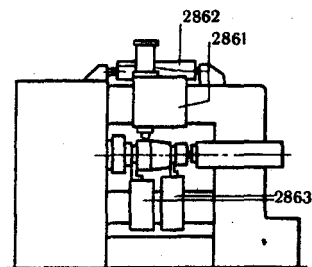
2849 Giá chia*Base***2850 Con trượt***Slider***2851 Chốt***Pivot*

/'pɪvɔ:/

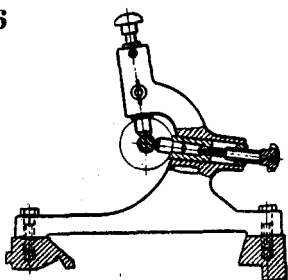
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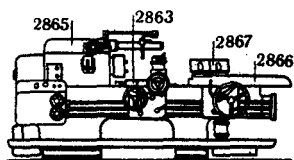
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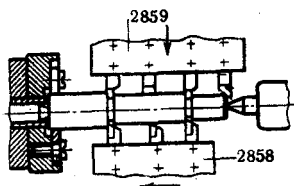
2856



2864



2857



2852 Dẫn hướng thẳng điều chỉnh được
Adjustable straight guide
/ə'dʒʌstəbl streɪn 'gaɪd/

2853 Thanh trượt
Slide bar
/slaid bə/

2854 Tấc kẹp
Rest
/rest/

2855 Tấc định vị
Steady rest
/'stedɪ rest/

2856 Tấc lăn theo
Follower rest
/'fɒləʊə rest/

2857 Máy tiện nhiều dao
Multi-tool lathe
/ˌmʌlti tu:l 'leɪθ/

2858 Bàn trượt trước
Front slide
/'frʌnt slaid/

2859 Bàn trượt sau
Rear slide
/rɪə slaid/

2860 Máy tiện chép hình thủy lực
Hydraulically-operated copying lathe
/haɪ.droʊli.kli.əpə'reɪtɪd 'kɒpiɪŋ leɪθ/

2861 Trượt theo dấu
Tracing slide
/'treɪsɪŋ slaid/

2862 Dưỡng, mẫu
Template
/'templɪt/

2863 Trượt ngang
Cross slide
/'krɒslain/

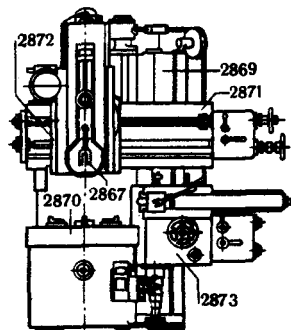
2864 Máy tiện rổnvonve
Turret lathe
/'tʌr leɪθ/

2865 Ụ trước
Headstock
/'hedstɒk/

2866 Bàn trượt rổnvonve
Turret slide
/'tʌrɪt slaid/

2867 Đầu rổnvonve
Turret
/'tʌrɪt/

2868



2868 Máy khoan doa đứng

*Vertical boring and
turning machine, vertical*

boring mill

/ˌvɜːtɪkl̩ ˈbɔːrɪŋ ɔn ˈtɜːnɪŋ
məʊˈfɪn ˌvɜːtɪkl̩ ˈbɔːrɪŋ
mɪl/

2869 Cột, trụ

Upright, column

/ʌpraɪt ˈkɒlʌm/

2870 Bàn xoay

Rotary table

/ˌrəʊtəri ˈteɪbl̩/

2871 Thanh dẫn ngang

Crossrail

/ˈkrɒsreɪl/

2872 Đầu gá dao đứng

Vertical toolhead

/ˌvɜːtɪkl̩ ˈtuːlhed/

2873 Đầu gá dao ngang

Side toolhead

2874 Máy tiện tự động

Automatic lathe

/ɔːtəˈmætɪk leɪθ/

2875 Máy tiện tự động một

trục chính

Single-spindle automatic

lathe

/ˌsɪŋɡl̩ ˌspɪndl̩ ɔːtəˈmætɪk
leɪθ/

2876 Máy tiện ren tự động ụ

trước cố định kiểu

Thụy Sĩ

Swiss-type stationary-

head-stock automatic

screw machine

/ˌswɪs taɪp ˌsteɪʃənəri
ˌhedstɒk ɔːtəˈmætɪk
skruːməʊˈfɪn/

2877 Cơ cấu thanh dẫn tiến

Bar-advancement

mechanism

/bɔː ɔdˌvənsmənt
ˈmekənɪzəm/

2878 Cơ cấu thanh kẹp

Bar-clamping mechanism

/bɔː klæmpɪŋ

ˈmekənɪzəm/

2879 Máy tiện ren ụ trước di

động kiểu Thụy Sĩ

Swiss-type movable-

head-stock automatic

screw machine

/ˌswɪs taɪp ˌməʊvəbəl
ˌhedstɒk ɔːtəˈmætɪk
skruːməʊˈfɪn/

2880. Bàn trượt đứng

Vertical slide
/ˌvɜːtɪkl slaɪd/

2881 Thanh cân bằng

Rocker
/ˈrɒkə(r)/

2882 Máy tiện ren rơvonne

Turret automatic screw machine
/ˈtʌrɪt ɔːtə.mætɪk skruː mɔːʃɪn/

2883 Trục cam

Camshaft
/ˈkæmʃɑːft/

2884 Cơ cấu chia, cơ cấu phân độ

Indexing mechanism
/ɪnˈdeksɪŋ ˈmekənɪzəm/

2885 Máy tiện tự động nhiều

trục nằm ngang
Multiple-spindle horizontal automatic machine
/ˌmʌltɪpl ˌspɪndl hɒrɪ.zəntl ɔːtə.mætɪk mɔːʃɪn/

2886 Giá đỡ trục

Spindle carrier
/ˌspɪndl ˈkæriə(r)/

2887 Bàn trượt dao chính

Main tool slide
/ˌmeɪn tuːl slaɪd/

2888 Máy tiện đứng nhiều

trục bán tự động
Multiple-spindle vertical semi-automatic machine
/ˌmʌltɪpl ˌspɪndl ˌvɜːtɪkl semi ɔːtə.mætɪk mɔːʃɪn/

2889 Vị trí nơi cấp phôi

Loading station
/ˈləʊdɪŋ ˈsteɪʃn/

SỰ GIA CÔNG LỖ MACHINING OF HOLES

2890 Sự doa lỗ

Boring
/ˈbɔːrɪŋ/

2891 Doa lỗ

Bore

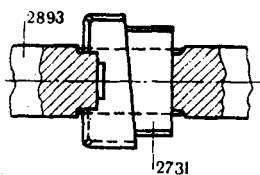
2892 Dụng cụ doa

Boring tool
/ˈbɔːrɪŋ tuːl/

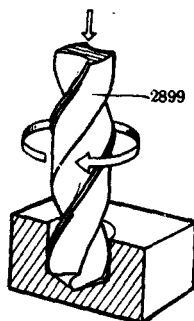
2893 Cán dao doa

Boring bar
/ˈbɔːrɪŋ bɑː(r)/

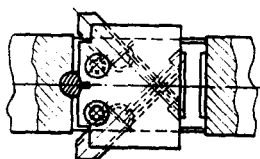
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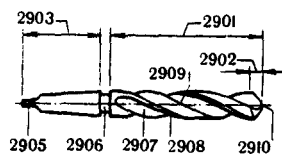
2897



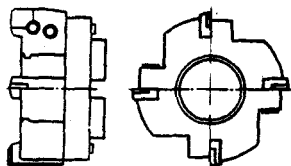
2895



2900



2896



2894 Dao doa một cán lưỡi
cắt kép

*Single-bit boring double
cutter*
/ˈsɪŋɡl bɪt ˌbɔːrɪŋ ˌdʌbl
ˈkʌtə(r)/

2895 Dao doa bung kiểu
khối lưỡi cắt kép

*Expanding block-type
boring double cutter*
/ɪkˌspændɪŋ ˌblɒk taɪp
ˌbɔːrɪŋ ˌdʌbl ˈkʌtə(r)/

2896 Đầu dao doa

Boring head
/ˈbɔːrɪŋ hed/

2897 Sự khoan lỗ

Drilling
/ˈdrɪlɪŋ/

2898 Khoan lỗ

Drill

2899 Mũi khoan

Drill

2900 Mũi khoan xoắn

Twist drill
/ˈtwɪst drɪl/

2901 Thân mũi khoan

Body
/ˈbɒdɪ/

2902 Phần cắt của mũi
khoan

Cutting point
/ˈkʌtɪŋ poɪnt/

2903 Chuôi côn

Taper shank
/ˈteɪpə ʃæŋk/

2904 Chuôi thẳng

Straight shank
/streɪt ʃæŋk/

2905 Đuôi mũi khoan

Tang
/tæŋ/

2906 Cổ thắt mũi khoan

Neck
/nek/

2907 Rãnh xoắn, rãnh thoát
phoi

Flute
/flʊt/

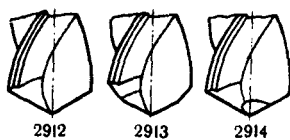
2908 Gờ xoắn

Margin
/ˈmɑːdʒɪn/

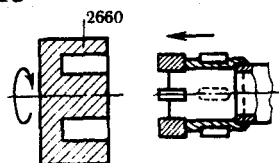
2909 Rãnh thoát phoi

Land
/lænd/

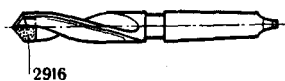
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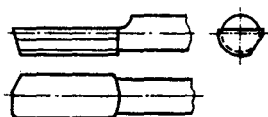
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2915



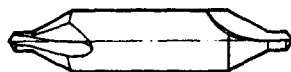
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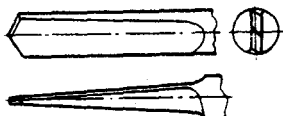
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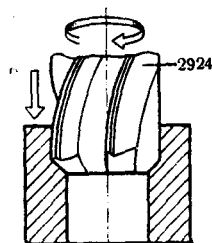
2921



2918



2922



2910 Đỉnh cắt

Chisel edge
/tʃɪzəl ɛdʒ/

2911 Mài định hình mũi khoan

Drill grinding, drill sharpening
/drɪl 'graɪndɪŋ drɪl
'ʃɑ:pənɪŋ/

2912 Điểm phẳng

Flat point
/flæt pɔɪnt/

2913 Điểm góc kép

Double-angle point
/ˌdʌbl 'æŋɡl pɔɪnt/

2914 Có gờ mỏng

Web thinning
/web 'θɪnɪŋ/

2915 Mũi khoan gắn hợp kim Cacbit

Carbide-tipped drill
/'kɑ:bəɪd tɪpt drɪl/

2916 Đầu cắt hợp kim cứng Cacbit

Sintered-carbide tip
/ˌsɪntəd ,kɑ:bəɪd 'tɪp/

2917 Mũi khoan bậc

Step drill
/'step drɪl/

2918 Mũi khoan phẳng

Flat drill
/flæt drɪl/

2919 Mũi khoan đột tròn

Trepanning drill
/tri'pænɪŋ drɪl/

2920 Mũi khoan rãnh xoắn đơn

Single-flute drill
/ˌsɪŋɡl flʊt 'drɪl/

2921 Mũi khoan tâm

Combination centre drill
/kəm'bɪ'nɪʃn 'sentə drɪl/

2922 Sự khoan lõi

Core drilling
/'kɔ: 'drɪlɪŋ/

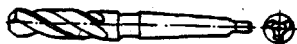
2923 Khoan lõi

Coredrill
/'kɔ: 'drɪl/

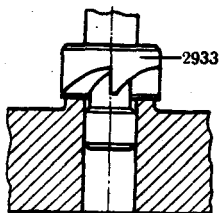
2924 Mũi khoan lõi

Core drill
/'kɔ: 'drɪl/

2925



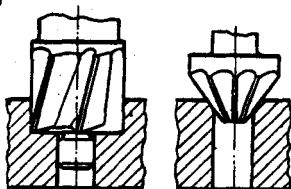
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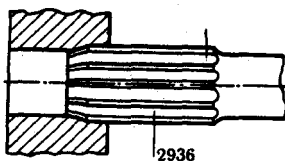
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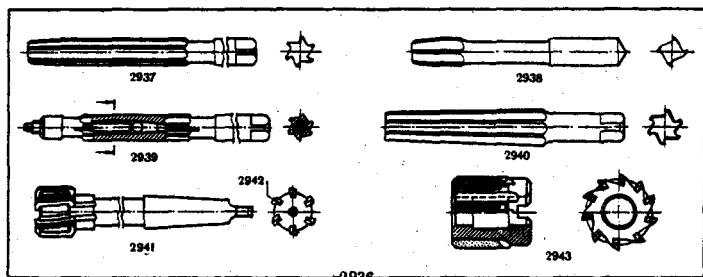
2929

2930

2934



2936



2925 Mũi khoan kiểu có
chuôi
Shank-type core drill
/ˌʃæŋk taɪp ˈkɔːdrɪl/

2926 Mũi khoan kiểu ống lót
Shell-type core drill
/ˌʃel taɪp ˈkɔːdrɪl/

2927 Sự khoan, xoáy mặt
đầu
*Counterboring or
countersinking*
/ˈkaʊntəbɔːrɪŋ ðː
kaʊntəsɪŋkɪŋ/

2928 Khoan, xoáy mặt đầu
*Counterbore or
countersink*
/ˈkaʊntəbɔː ðː
kaʊntəsɪŋk/

2929 Mũi khoan, xoáy mặt
đầu
Counterbore
/ˈkaʊntəbɔː/

2930 Mũi lã, xoáy mặt đầu
Countersink
/ˈkaʊntəsɪŋk/

2931 Sự lã miệng
Spot-facing
/spɒt ˈfeɪsɪŋ/

2932 Lã miệng
Spot-face
/spɒt ˈfeɪs/

2933 Mũi lã miệng
Spotfacer
/spɒt ˈfeɪsə(r)/

2934 Sự chuốt lỗ
Reaming
/ˈriːmɪŋ/

2935 Chuốt lỗ
Ream
/riːm/

2936 Dao chuốt
Reamer
/ˈriːmə(r)/

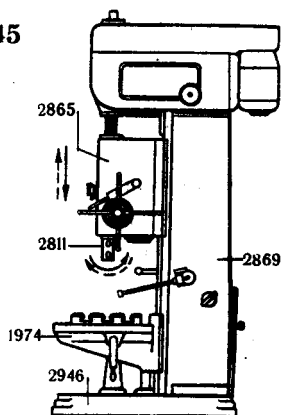
2937 Dao chuốt cầm tay
Hand reamer
/hænd ˈriːmə(r)/

2938 Dao chuốt trên máy
Machine reamer
/məˈʃɪn ˈriːmə(r)/

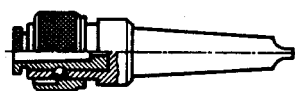
2939 Dao chuốt nong rộng
Expansion reamer
/ɪkˈspænzən ˈriːmə(r)/

2940 Dao chuốt côn
Taper reamer
/teɪpə ˈriːmə(r)/

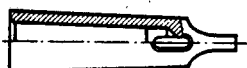
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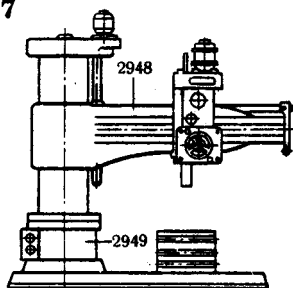
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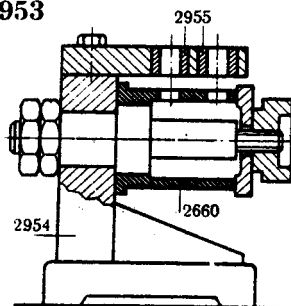
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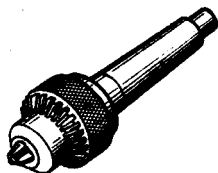
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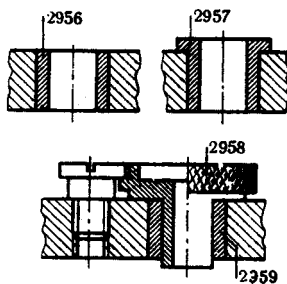
2953



2950



2955



2941 Dao chuốt có gắn lưỡi
cắt

Inserted blade reamer
/ɪn.sə'tɪd bleɪd 'ri:mə(r)/

2942 Lưỡi cắt
Shell reamer
/ʃel 'ni:mə/

2943 Dao chuốt thô, chuốt
phá
Shell reamer
/ʃel 'ri:mə(r)/

2944 Máy khoan
Drilling machine
/drɪlɪŋ mə'ʃi:n/

2945 Máy khoan đứng
Vertical drilling machine
/vɜ:tɪkl 'drɪlɪŋ mə'ʃi:n/

2946 Đế máy
Base
/beɪs/

2947 Máy khoan cần (xoay
được)
Radial drilling machine
/ˌreɪdiəl 'drɪlɪŋ mə'ʃi:n/

2948 Cần xoay
Arm
/ɑ:m/

2949 Bệ cố định máy
Clamp
/klæmp/

2950 Đầu kẹp mũi khoan
Drill chuck
/drɪl tʃʌk/

2951 Đầu kẹp rút
Quick-change chuck
/kwɪk tʃeɪndʒ tʃʌk/

2952 Ống nối trượt
Adapter sleeve
/ə'dæptə sli:v/

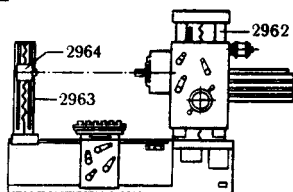
2953 Bạc dẫn mũi khoan
Drill jig
/drɪl dʒɪg/

2954 Giá đỡ bạc dẫn
Jig base
/dʒɪg beɪs/

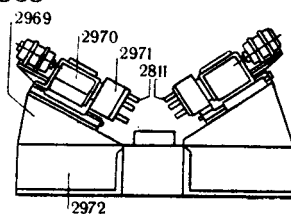
2955 Ống lót bạc dẫn
Jig bushing
/dʒɪg ˈbʊʃɪŋ /

2956 Ống lót lắp ép bạc dẫn
Press fit jig bushing
/ˌpres fɪt dʒɪg ˈbʊʃɪŋ/

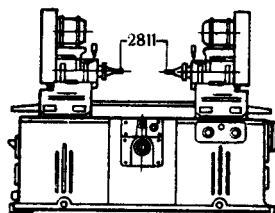
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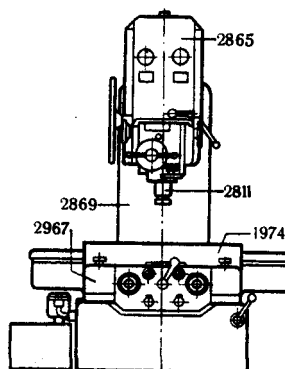
2968



2965



2966



2957 Ống lót bạc dẫn kiểu có
gờ

Head-type jig bushing
/hed taɪp dʒɪɡ ˈbʊʃɪŋ/

2958 Ống lót bạc dẫn phục
hồi được

Renewable jig bushing
/riːnjuː əbl dʒɪɡ ˈbʊʃɪŋ/

2959 Ống lót thẳng

Liner bushing
/laɪnə ˈbʊʃɪŋ/

2960 Ống lót doa lỗ

Boring machine
/ˈbɔrɪŋ məʃiːn/

2961 Máy doa nằm ngang

*Horizontal boring
machine*
/ˈhɒrɪzəntl ˈbɔrɪŋ
məʃiːn/

2962 Cột phía trước

Head column
/hed ˈkɒləm/

2963 Giá đỡ phía sau

End support
/end sʊˈpɔrt/

2964 Ổ đỡ trên giá phía sau

End support bearing
/end sʊˈpɔrtɪŋ ˈbeərɪŋ/

2965 Máy doa chính xác (doa
tinh)

*Precision boring
machine*
/priˈsɪʒn ˈbɔrɪŋ məʃiːn/

2966 Máy doa có dẫn hướng

Jig-boring machine
/dʒɪɡ ˈbɔrɪŋ məʃiːn/

2967 Bệ máy

Saddle
/ˈsædl/

2968 Máy có đầu tiêu chuẩn

*Standard-unit-type
machine*
/ˈstændəd ˌjuːnɪt taɪp
məʃiːn/

2969 Bộ gắn đầu tiêu chuẩn

Adapter plate unit
/əˈdæptə pleɪt ˌjuːnɪt/

2970 Phần truyền động

Power head
/paʊə hed/

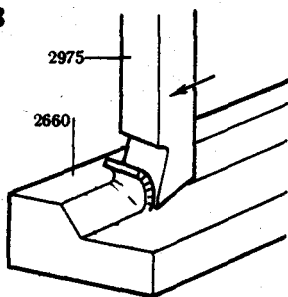
2971 Phần hộp trục

Spindle box unit
/ˈspɪndl bɒks ˌjuːnɪt/

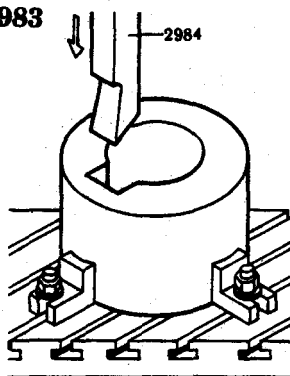
2972 Phần thân máy

Base unit
/beɪs ˌjuːnɪt/

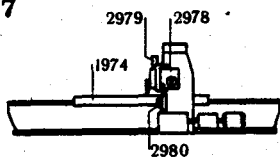
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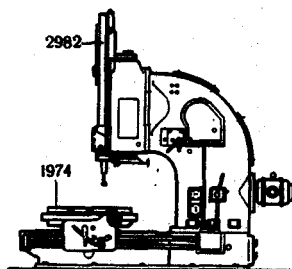
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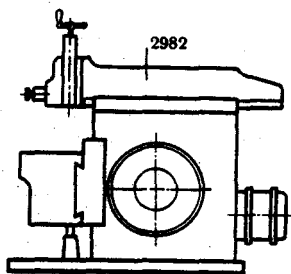
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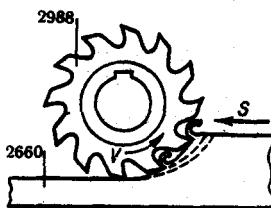
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2981



2986



BÀO PHẪNG, BÀO RÃNH

*PLANING, SHAPING,
SLOTTING*

2973 Sự bào phẳng

*Planing or shaping
/plæniŋ ɔ: 'ʃeɪpɪŋ/*

2974 Bào phẳng

*Plane or shape
/plæn ɔ: 'ʃeɪp/*

2975 Dao, dụng cụ bào

*Planing tool or shaping
tool
/plæniŋ tu:l 'ʃeɪpɪŋ tu:l/*

2976 Máy bào

*Planer or shaper
/plænə 'ʃeɪpə/*

2977 Máy bào dọc, máy bào

*giường
Planer
/plænə/*

2978 Cản xoay ngang

*Crossrail
/krosreɪl/*

2979 Đầu xoay ngang

*Crossrail head
/krosreɪl hed/*

2980 Đầu trượt

*Side head
/saɪd hed/*

2981 Máy bào ngang

*Shaper
/'ʃeɪpə/*

2982 Khung chạy dao

*Ram
/ræm/*

2983 Sự gia công rãnh

*Slotting
/'slɒtɪŋ/*

2984 Dao cắt rãnh

*Slotting tool
/'slɒtɪŋ tu:l/*

2985 Máy bào rãnh

*Slotting machine
/'slɒtɪŋ mə'ʃi:n/*

PHAY

MILLING

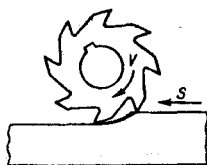
2986 Sự phay, gia công phay

*Milling
/'mɪlɪŋ/*

2987 Phay

*Mill
/mɪl/*

2989



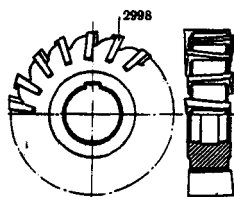
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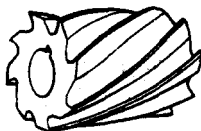
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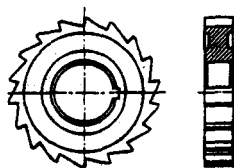
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2993



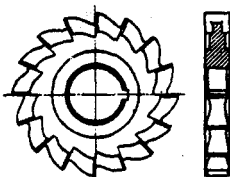
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2994



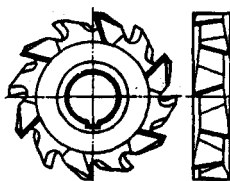
3000



2995



3001



2988 Dao phay*Milling cutter*

/mɪlɪŋ 'kʌtə(r)/

2989 Sự phay xuôi*Climb milling, down**milling*

/klaɪm 'mɪlɪŋ daʊn

'mɪlɪŋ/

2990 Sự phay ngược*Up milling, conventional**milling*

/ʌp'mɪlɪŋ kən'venʃnl

'mɪlɪŋ/

2991 Dao phay đơn*Plain milling cutter*

/pleɪn 'mɪlɪŋ ,kʌtə(r)/

2992 Dao phay răng xoắn*Helical tooth cutter*

/ˌhelɪkl tuː θ 'kʌtə(r)/

2993 Dao phay chiều trái*Left-hand milling cutter*

/leɪt.hænd 'mɪlɪŋ

2994 Dao phay chiều phải*Right-hand milling cutter*

/raɪt.hænd 'mɪlɪŋ

2995 Răng phay*Milled tooth*

/mɪld tuː θ/

2996 Răng dạng hót lưng*Form-relieved tooth*

/fɔːm rɪ.li:vɪd tuː θ/

2997 Dao phay có răng ghép*Inserted-blade milling**cutter*

/ɪn.sɜːtɪd ,bleɪd 'mɪlɪŋ

2998 Răng ghép*Inserted blade*

/ɪn.sɜːtɪd bleɪd/

2999 Dao phay đĩa*Disk-type milling cutter*

/ˌdɪsktaɪp 'mɪlɪŋ kʌtə(r)/

3000 Dao phay 3 phía*Three-side milling cutter*

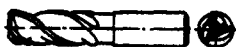
/θriːsaɪd 'mɪlɪŋ 'kʌtə(r)/

3001 Dao phay đĩa răng dọc*Staggered tooth disk-type**milling cutter*

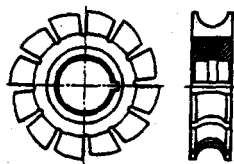
/stæɡəd tuːθ, dɪsk taɪp

'mɪlɪŋ ,kʌtə(r)/

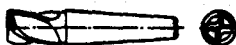
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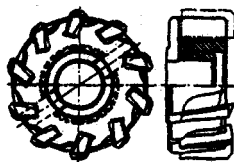
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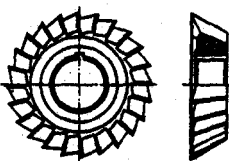
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3008



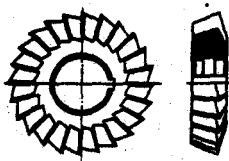
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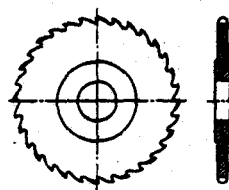
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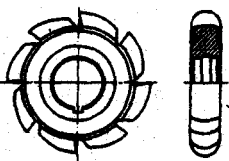
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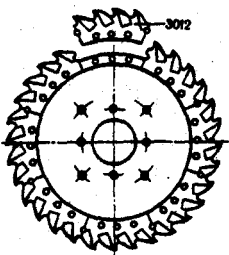
3010



3006



3011



3002 Dao phay mặt đầu*End mill*

/ɛnd mil/

3003 Dao phay răng then*Key-seat milling cutter*

/kɪːsɪt 'mɪlɪŋ 'kɑːtə(r)/

3004 Dao phay góc đơn*Single-angle milling**cutter*/ˌsɪŋɡl. æŋɡl 'mɪlɪŋ.
kɑːtə(r)/**3005 Dao phay góc kép***Double-angle milling**cutter*/ˌdʌbl. æŋɡl 'mɪlɪŋ.
kɑːtə(r)/**3006 Dao phay bán cầu lõm***Conver half-round**milling cutter*/ˌkɒŋvɜk hɔf raʊnd
'mɪlɪŋ. kɑːtə/**3007 Dao phay bán cầu lõm***Concave half-round**milling cutter*/ˌkɒŋkɜv hɔf raʊnd
'mɪlɪŋ. kɑːtə(r)/**3008 Dao phay mặt***Face milling cutter*

/feɪs 'mɪlɪŋ. kɑːtə(r)/

3009 Đầu dao phay mặt*Face milling head*

/feɪs 'mɪlɪŋ hed/

3010 Dao phay cắt rãnh*Slitting saw, circular saw*

/ˌslɪtɪŋ sɔː 'sɜːkjʊlə(r) sɔː/

3011 Dao cắt vòng ghép*Segmental circular saw*

/ˌseg.men.tl. sɔːkjʊlə 'sɔː/

3012 Vòng ghép*Segment*

/ˌsegment/

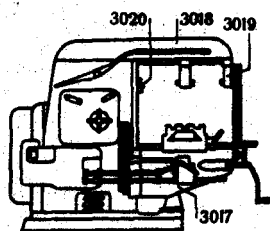
3013 Máy phay*Milling machine*

/ˌmɪlɪŋ me'ʃiːn/

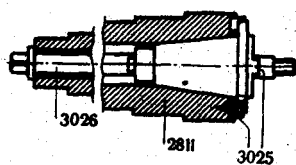
3014 Máy phay kiểu cong xon*Knee-type milling**machine*

/ˌniː tʌp 'mɪlɪŋ me'ʃiːn/

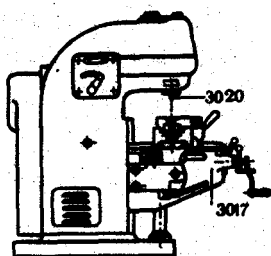
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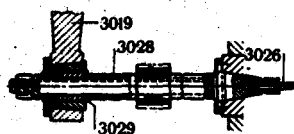
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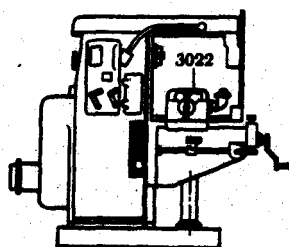
3016



3027



3021



**3015 Máy phay nằm ngang
kiểu congxon**

Horizontal knee-type

milling machine

/hɒrɪ.zəntl .ni: taɪp/

'mɪlɪŋ mə'fi:n/

**3016 Máy phay đứng kiểu
congxon**

Vertical knee-type

milling machine

/vɜ:tkl .ni: taɪp 'mɪlɪŋ/

mə'fi:n/

3017 Khớp congxon

Knee

/ni:/

3018 Cần phía trên

Overarm

/əʊvər'ɑ:m/

3019 Ổ đỡ trục

Arbor support

/,ɑ:bə sə'pɔ:t/

3020 Nắp trục chính

Spindle nose

/spɪndl nəʊz/

**3021 Máy phay ngang vạn
năng**

Universal-type horizontal

milling machine

/ju:nɪ .vɜ:sl taɪp/

hɒrɪ.zəntl 'mɪlɪŋ/

mə'fi:n/

3022 Bàn xoay

Swivelling table

/,swɪvəlɪŋ 'teɪbl/

**3023 Máy phay kiểu trụ
trượt**

Ram-type milling

machine

/,ræmtaɪp .mɪlɪŋ/

mə'fi:n/

3024 Ổ trục chính

Stub arbor

/stʌb 'ɑ:bə(r)/

3025 Chốt đầu trục chính

Spindle-nose key

/,spɪndl nəʊz'ki:/

3026 Thanh kéo

Drawbar, draw-in rod

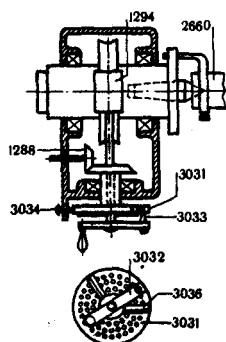
/drɔ:bə(r) .dru:ɪn rɒd/

3027 Trục gá dao

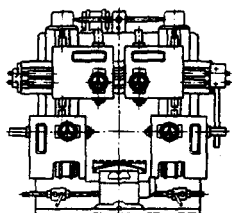
Shaft-type arbor

/ʃɑ:t taɪp 'ɑ:bə(r)/

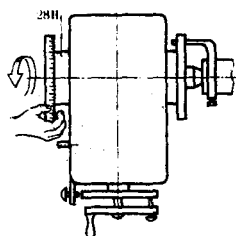
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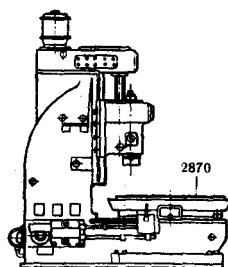
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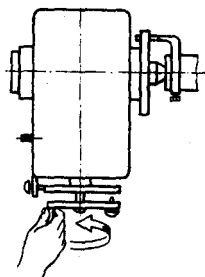
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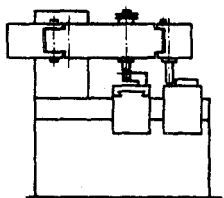
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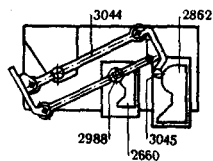
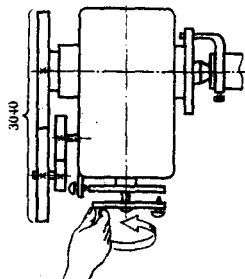
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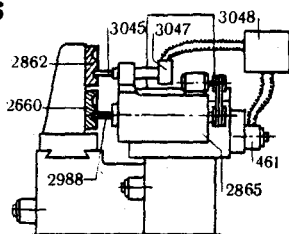


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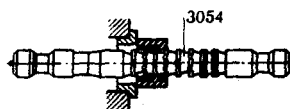


3028 Vành ngăn cách*Spacing collar**/ˌspeɪsɪŋ ˈkɒlə(r)/***3029 Ổng lót ổ đỡ***Bearing sleeve**/ˈbeərɪŋ sliːv/***3030 Đầu chia, đầu phân độ***Dividing head, indexing**head**/dɪˈvaɪdɪŋ hed**ɪnˈdeksɪŋ hed/***3031 Đĩa chia***Index plate**/ɪnˈdeks pleɪt/***3032 Thanh chia***Index crank**/ɪnˈdeks kræŋk/***3033 Chốt chia***Index pin**/ɪnˈdeks pɪn/***3034 Chốt định vị***Lock pin**/lɒk pɪn/***3035 Trục tỷ lệ***Sector arm**/ˌsektər ˈɑːm/***3036 Chia, phân độ***Indexing**/ɪnˈdeksɪŋ/***3037 Phân độ trực tiếp***Direct indexing**/dɪˌrekt ɪnˈdeksɪŋ/***3038 Phân độ đơn giản***Plain indexing**/pleɪn ɪnˈdeksɪŋ/***3039 Phân độ vi sai***Differential indexing**/dɪfəˈrenʃl ɪnˈdeksɪŋ/***3040 Các bánh răng thay thế***Change gears**/tʃeɪndʒ ɡɪəz/***3041 Máy phay giường***Planer-type milling**machine**/ˌplænə taɪp ˈmɪlɪŋ**məˌʃiːn/***3042 Máy phay mâm quay***Rotary-table milling**machine**/ˌrɒtəriː teɪbl ˈmɪlɪŋ**məˌʃiːn/***3043 Máy phay chép hình***Engraving machine**/ɪnˈɡreɪvɪŋ məˌʃiːn/*

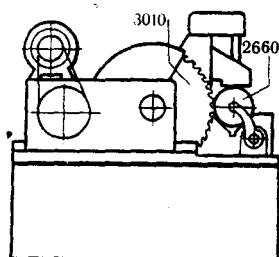
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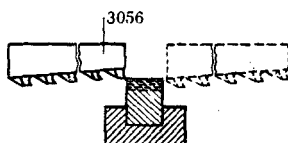
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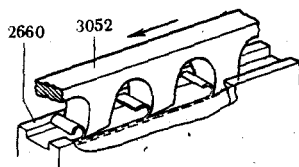
3049



3055



3050



3044 Thước vẽ truyền*Pantograph*

/ˈpæntəɡrɑːf/

3045 Chốt theo dấu*Tracing pin, tracer*

/ˈtreɪsɪŋ piːn, ˈtreɪsə(r)/

3046 Máy phay chép hình

bán tự động

*Semi-automatic electrical**trace-milling machine*

/ˌsɔːmi ɔːtəˈmætiːk

ɪˈlektɹɪkl treɪsˈmɪlɪŋ

məˈʃɪn/

3047 Bộ phát kiểu cảm

kháng

Inductance-type pick-up

/ɪnˈdʌktʃn taɪp ˈpɪkʌp/

3048 Bộ khuếch đại*Amplifier*

/ˈæmplɪfaɪə(r)/

3049 Máy cửa vòng*Circular sawing machine*

/ˌsɜːkjʊlə ˈsɔːɪŋ məˈʃɪn/

SỰ CHUỐT**BROACHING****3050** Sự chuốt kéo*Pull broaching,**broaching*

/pʊl ˈbrɔːtʃɪŋ, ˈbrɔːtʃɪŋ/

3051 Chuốt*Broach*

/brɔːtʃ/

3052 Chuốt kéo*Pull broach, broach*

/pʊl ˈbrɔːtʃ, ˈbrɔːtʃ/

3053 Sự chuốt lỗ*Internal broaching*

/ɪn.tɜːnl ˈbrɔːtʃɪŋ/

3054 Chuốt lỗ*Internal broach*

/ɪn.tɜːnl brɔːtʃ/

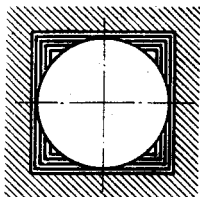
3055 Sự chuốt bề mặt*Surface broaching*

/sɜːfɪs ˈbrɔːtʃɪŋ/

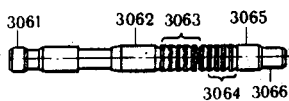
3056 Chuốt bề mặt*Surface broach*

/sɜːfɪs brɔːtʃ/

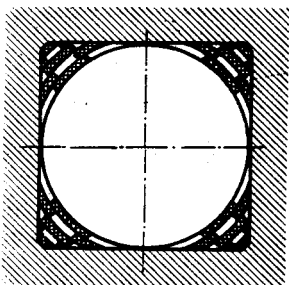
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3060



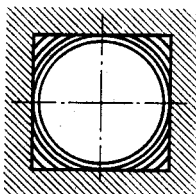
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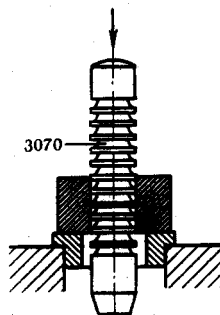
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3059



3068



3057 Chuốt theo biên dạng

Profile-cut broaching
/ˌprɒfaɪl kʌt ˈbrɔʊtʃɪŋ/

3058 Sự chuốt dần tiến

*Progressive-cut
broaching*
/prɒˌɡresɪv kʌt ˈbrɔʊtʃɪŋ/

3059 Chuốt theo đường sinh

*Generation-cut
broaching*
/dʒenəˌreɪʃn kʌt
ˈbrɔʊtʃɪŋ/

3060 Dao chuốt lỗ

Circular broach
/ˈsɜːkjuːlə brɔʊtʃ/

3061 Đầu kéo

Pull end
/pʊl ˈend/

3062 Thân trước

Front pilot
/frʌnt ˈpaɪlət/

3063 Phần cắt

Cutting section
/ˈkʌtɪŋ ˌsekʃn/

3064 Phần định cỡ, kích thước

*Sizing section, finishing
section*
/ˈsaɪzɪŋ ˈsekʃn ˈfɪnɪʃɪŋ
ˈsekʃn/

3065 Cán sau

Rear pilot
/rɪə ˈpaɪlət/

3066 Chuôi sau

Rear support
/rɪə səˈpɔːt/

3067 Dao chuốt rãnh then

Keyway broach
/ˈkiːweɪ brɔʊtʃ/

3068 Sự chuốt đẩy

Push broaching
/pʊʃ ˈbrɔʊtʃɪŋ/

3069 Chuốt đẩy

Push broach
/pʊʃ ˈbrɔʊtʃ/

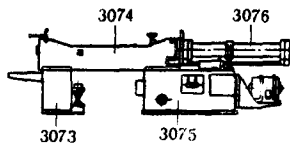
3070 Dao chuốt đẩy

Push broach

3071 Máy chuốt

Broaching machine
/ˈbrɔʊtʃɪŋ məˈʃiːn/

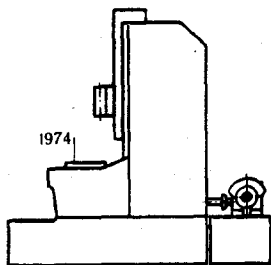
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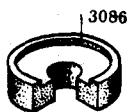
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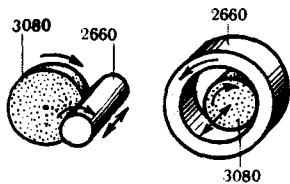
3077



3085



3078



3087



3072 Máy chuốt ngang
Horizontal broaching machine
 /hɒrɪˌzɒntl̩ ˈbrəʊtʃɪŋ məˈʃiːn/

3073 Bệ máy
Pedestal
 /ˈpedɪstl̩/

3074 Thân trên
Top bed
 /tɒp bed/

3075 Thân dưới
Bottom bed
 /ˈbɒtəm bed/

3076 Xylanh chính
Main cylinder
 /meɪn ˈsɪlɪndə(r)/

3077 Máy chuốt đứng
Vertical broaching machine
 /vɜːtɪkl̩ ˈbrəʊtʃɪŋ məˈʃiːn/

SỰ MÀI GRINDING

3078 Sự mài
Grinding
 /ˈɡaɪndɪŋ/

3079 Mài
Grind
 /ɡraɪnd/

3080 Bánh, đá mài
Grinding wheel

3081 Ký hiệu đá mài
Grinding wheel marking
 /ˌɡraɪndɪŋ wiːl ˈmɑːkɪŋ/

3082 Nhà máy sản xuất
Producing factory
 /prəˈdjuːsɪŋ ˈfæktəri/

3083 Dạng đá mài
Wheel shape
 /wiːl ʃeɪp/

3084 Bánh mài phẳng
Straight wheel
 /streɪt wiːl/

3085 Bánh mài có gờ ngoài
Recessed straight wheel
 /rɪˈsesɪd streɪt wiːl/

3086 Gờ đá mài
Recess
 /rɪˈses/

3087 Đá mài dạng đĩa
Disk-type wheel
 /ˌdɪsk taɪp ˈwiːl/

3088



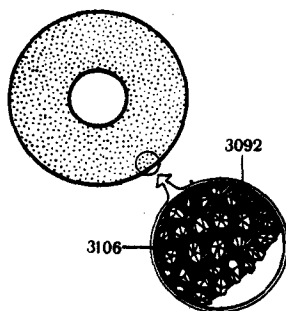
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3089



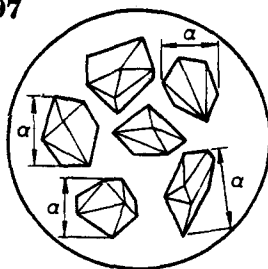
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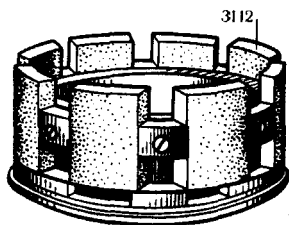


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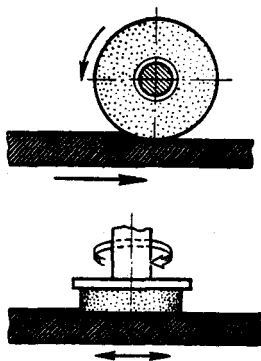


3088 Đá mài hình trụ*Cylinder wheel**/ˈsɪlɪndə wi:l/***3089 Đá mài hình chậu thẳng***Straight cup wheel**/ˈstreɪt kʌp ˈwi:l/***3090 Đá mài hình chậu côn***Flaring cup wheel**/ˈflɛərɪŋ kʌp wi:l/***3091 Đá mài đĩa***Dish wheel**/dɪʃ ˈwi:l/***3092 Chất liệu mài***Abrasive**/əˈbreɪsɪv/***3093 Oxit nhôm tổng hợp***Synthetic aluminium**oxide**/ˈsɪnθetɪk æljʊˈmɪniəm**ˈɒksaɪd/***3094 Cacbua silic***Silicon carbide**/ˈsɪlɪkən ˈkɑ:bəɪd/***3095 Nitritbo***Boron nitride**/ˈbɔːrən ˈnaɪtraɪd/***3096 Kim cương***Diamond**/ˈdaɪəmənd/***3097 Hạt mài***Grain**/ɡreɪn/***3098 Cỡ hạt mài***Grain size**/ɡreɪn saɪz/***3099 Thành phần hạt mài cơ bản***Basic mesh fraction**/ˌbeɪsɪk meʃ ˈfrækʃn/***3100 Ký hiệu cỡ hạt***Grain size index**/ɡreɪn saɪz ɪnˈdeks/***3101 Cấp độ cứng của đá mài***Grinding wheel grade**/ˌɡraɪndɪŋ wi:l ˈɡreɪd/***3102 Cấu trúc đá mài***Grinding wheel structure**/ˌɡraɪndɪŋ wi:l**ˈstrʌktʃə(r)/***3103 Cấu trúc chặt***Dense structure**/dens ˈstrʌktʃə(r)/*

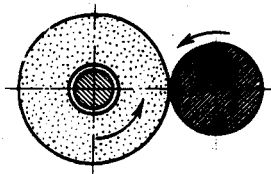
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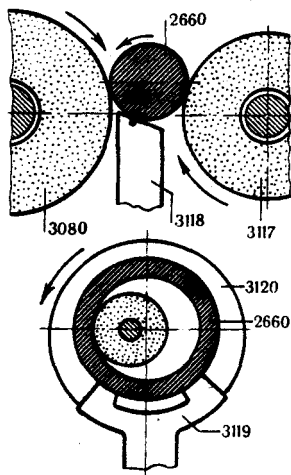
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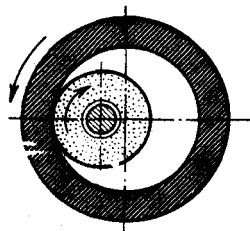
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3116



3114



3104 Cấu trúc trung bình*Medium structure*

/mi:diəm 'strʌktʃə(r)/

3105 Cấu trúc không chặt*Open structure*

/əʊpən 'strʌktʃə(r)/

3106 Liên kết*Bond*

/bɒnd/

3107 Liên kết kiểu thủy tinh hóa*Vitrified bond*

/ˌvɪtrɪfaɪd bɒnd/

3108 Liên kết nhựa hóa*Resinoid bond*

/ˌrezɪnɔɪd bɒnd/

3109 Liên kết cao su*Rubber bond*

/ˌrʌbər bɒnd/

3110 Độ chính xác của đá mài*Wheel accuracy degree*

/wɪl 'ækjʊrəsi dɪ'ɡri:/

3111 Đá mài kiểu vòng xéc*măng**Segmental grinding**wheel*

/ˌseg.men.tl 'graɪndɪŋ

wi:l/

3112 Xéc măng mài*Grinding segment*

/ˌgraɪndɪŋ. seg.mənt/

3113 Sự mài tròn ngoài*Cylindrical grinding*

/sɪ.lɪndrɪkl 'graɪndɪŋ/

3114 Mài tròn trong*Internal grinding*

/ɪn'tɜːnl 'graɪndɪŋ/

3115 Mài bề mặt, mài phẳng*Surface grinding*

/ˌsɜːfɪs 'graɪndɪŋ/

3116 Mài vô tâm*Centreless grinding*

/ˌsentəlis 'graɪndɪŋ/

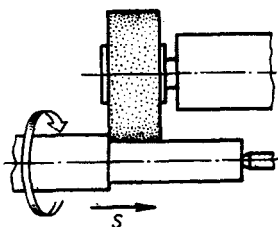
3117 Bánh dẫn*Regulating wheel*

/ˌregjʊleɪŋ wi:l/

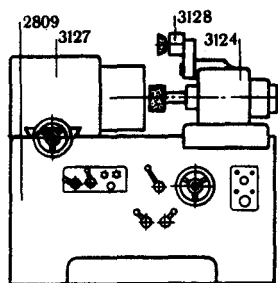
3118 Thanh tựa*Work rest blade*

/ˌwɜːk rest 'bleɪd/

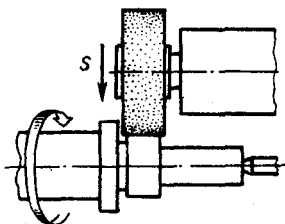
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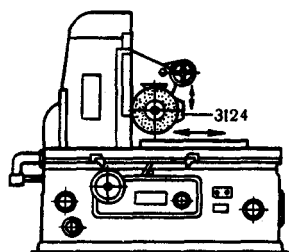
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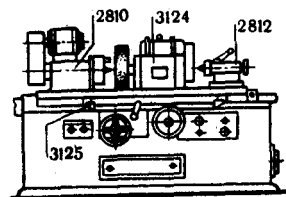
3122



3130



3123



3119 Guốc tựa*Supporting shoe*

/sə'pɔ:tɪŋ ʃu:/

3120 Mâm từ tính*Magnetic chuck*

/mæg'netɪk tʃʌk/

3121 Sự mài tịnh tiến dọc*Traverse grinding*

/trævɜ:s 'graɪndɪŋ/

3122 Mài tịnh tiến ngang*Infeed grinding plunge-
cut grinding*/ɪnfɪ:d 'graɪndɪŋ plʌndʒ
kʌt 'graɪndɪŋ /**3123 Máy mài tròn ngoài***Cylindrical grinding
machine*/sɪ'lɪndrɪkl 'graɪndɪŋ
mə'ʃi:n/**3124 Hộp đá mài***Wheelhead*

/wi:lhed/

3125 Con cóc hành trình*Tripping dog*

/trɪpɪŋ dog/

3126 Máy mài tròn trong*Internal grinding**machine*

/ɪn.tɜ:nɪ 'graɪndɪŋ

mə'ʃi:n/

3127 Đầu làm việc*Workhead*

/wɜ:khed/

**3128 Trục chính mài mặt
đầu***Face-grinding spindle*

/feɪs 'graɪndɪŋ 'spɪndl/

3129 Máy mài phẳng*Surface-grinding**machine*

/sɜ:fɪs 'graɪndɪŋ

mə'ʃi:n/

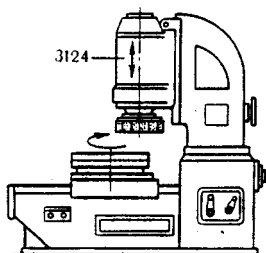
**3130 Máy mài bề mặt với
bàn máy tịnh tiến trục
chính nằm ngang***Reciprocating table**horizontal spindle**surface-grinding**machine*

/rɪ'sɪprəkeɪtɪŋ 'teɪbl

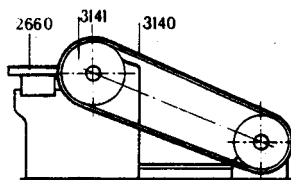
hɒrɪ'zɒntl 'spɪndl 'sɜ:fɪs

'graɪndɪŋ mə'ʃi:n/

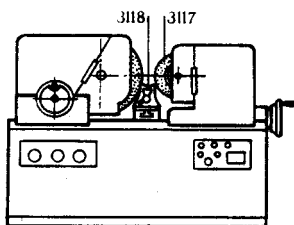
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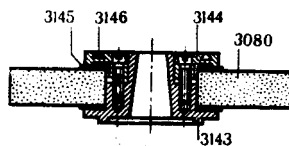
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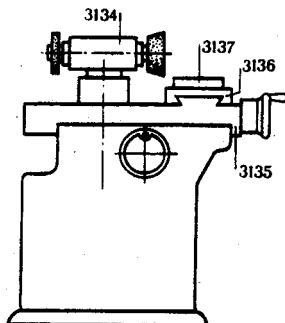
3132



3142



3133



3131 Máy mài phẳng trục
đứng, mâm quay
*Rotary table vertical
spindle surface- grinding
machine*
/rəʊtəri 'teɪbl 'vɜ:tɪkl
'spɪndl səfɪs 'graɪndɪŋ
mə'ʃi:n/

3132 Máy mài vô tâm
*Centreless grinding
machine*
/ 'sentələs 'graɪndɪŋ
mə'ʃi:n/

3133 Máy mài dụng cụ cắt
*Tool-and-cutter grinding
machine*
/tu:l ən ,kʌtə 'graɪndɪŋ
mə'ʃi:n/

3134 Đầu làm việc
Wheelhead
/wi:l 'hed/

3135 Hộp gá
Bottom carriage
/ ,bɒtəm 'kærɪdʒ/

3136 Bàn dọc
Longitudinal table
/lɒŋdʒɪ'tjʊdɪnl 'teɪbl/

3137 Bàn xoay
Swivelling table
/ 'swɪvəlɪŋ 'teɪbl/

3138 Mài bằng băng tải có
gắn bột mài
Abrasive-belt grinding
/ə'breɪsɪv 'belt 'graɪndɪŋ/

3139 Máy mài bằng phẳng
gắn bột mài
*Abrasive-belt grinding
machine*
/ə'breɪsɪv 'belt 'graɪndɪŋ
mə'ʃi:n/

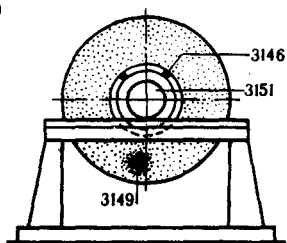
3140 Băng tải gắn bột mài
Abrasive belt
/ə'breɪsɪv 'belt/

3141 Con lăn tiếp xúc
Contact roll
/ 'kɒntækt rɒl/

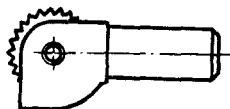
3142 Gá lắp đá mài
*Mounting of grinding
wheel*
/ ,maʊntɪŋ əv 'graɪndɪŋ
wi:l/

3143 Khâu nối
Adapter
/ə'dæptə(r)/

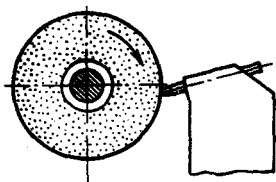
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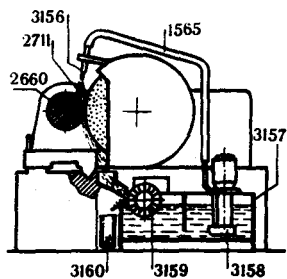
3154



3152



3155



3153



3144 Bích kẹp

Clamping flange
/ˈklæmpɪŋ ˈfleɪndʒ/

3145 Đệm lót

Gasket
/ˈɡæskɪt/

3146 Đối trọng cân bằng

Balancing weight
/ˈbælənsɪŋ wi:l/

3147 Sự cân bằng

Balancing
/ˈbælənsɪŋ/

3148 Cân bằng

Balance
/ˈbæləns/

3149 Không cân bằng

Unbalance
/ʌnˈbæləns/

3150 Giá cân bằng

Balancing stand
/ˈbælənsɪŋ stænd/

3151 Trục cân bằng

Balancing mandrel
/ˈbælənsɪŋ ˈmændrəl/

3152 Sự sửa chỉnh đá mài

Truing dressing
/ˈtru:ɪŋ ˈdresɪŋ/

3153 Đầu sửa đá mài có gắn kim cương

Diamond-point dresser
/ˌdaɪəmənd pɔɪnt ˈdresə(r)/

3154 Đầu sửa đá mài kiểu sao

Star-type dresser
/ˌstɑ:təɪp ˈdresə(r)/

3155 Sự mài ướt

Wet grinding
/wet ˈɡraɪdɪŋ/

3156 Đầu phun

Nozzle
/ˈnoʒl/

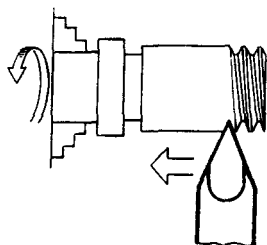
3157 Bể chứa

Tank
/tæŋk/

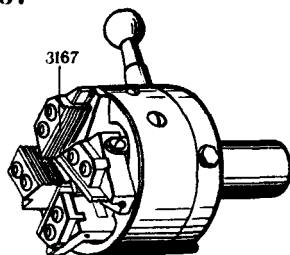
3158 Bơm chất làm nguội

Coolant pump
/ˈku:lənt pʌmp/

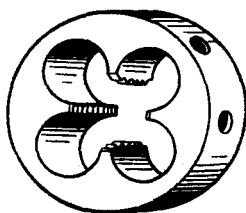
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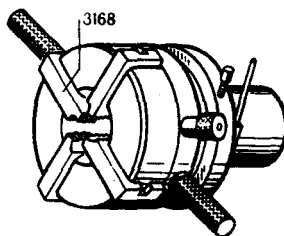
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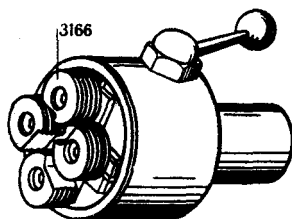
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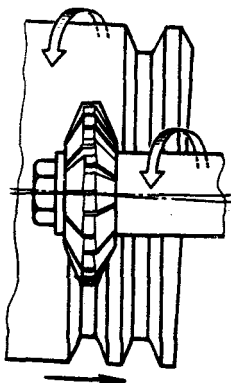
3168



3165



3171



3159 Bộ tách từ tính*Magnetic separator*

/mæg'netik sepə'reitə/

3160 Bùn sệt*Abrasive slurry*

/ə'breisiv 'slɜ:ri/

SỰ GIA CÔNG REN**THREAD MACHINING****3161 Sự cắt ren***Thread cutting*

/θred 'kʌtɪŋ/

3162 Dao tiện ren*Single-point threading**tool*

/sɪŋɡl pɔɪnt 'θredɪŋ tu:l/

3163 Khuôn bàn cắt ren*Thread-cutting die*

/θred 'kʌtɪŋ daɪ/

3164 Đầu cắt ren*Thread-cutting head*

/θred 'kʌtɪŋ hed/

3165 Đầu khuôn cắt ren*Thread-cutting die head*

/θred 'kʌtɪŋ daɪ hed/

3166 Dao lược ren vòng*Circular chaser*

/sɜ:kjʊlə 'ʃeɪsə/

3167 Dao lược ren tiếp tuyến*Tangent chaser*

/tændʒənt 'ʃeɪsə/

3168 Dao lược ren tròn*Radial chaser*

/reɪdiəl 'ʃeɪsə/

3169 Sự phay ren*Thread milling*

/θred 'mɪlɪŋ/

3170 Dao phay ren*Thread-milling cutter*

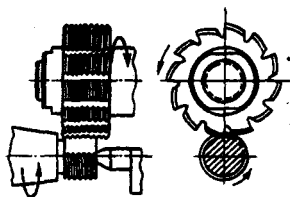
/θred 'mɪlɪŋ 'kʌtə/

3171 Dao phay ren đơn*Singer-thread milling**cutter*

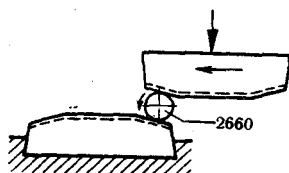
/sɪŋɡl θred 'mɪlɪŋ

'kʌtə/

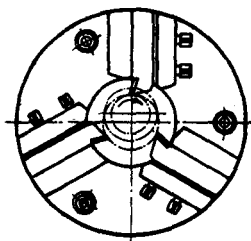
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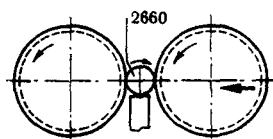
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3174



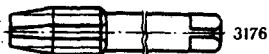
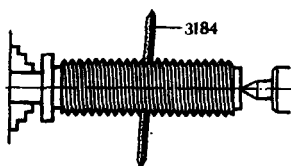
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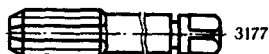
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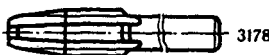
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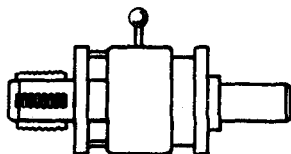


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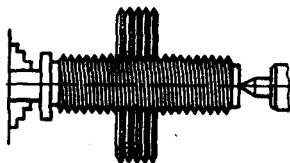


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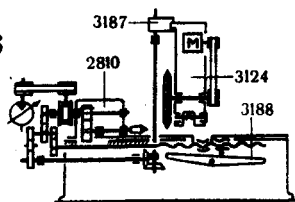


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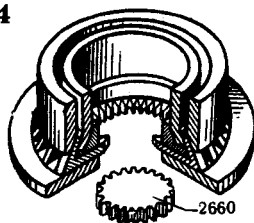


- 3172 Dao phay nhiều ren**
Multiple-thread milling cutter
/mʌltɪpl θred 'mɪlɪŋ kʌtə/
- 3173 Sự phay ren hành tinh**
Planetary thread milling
/plænɪtəri θred 'mɪlɪŋ/
- 3174 Đầu phay ren hành tinh**
Planetary thread-milling head
/plænɪtəri θred 'mɪlɪŋ hed/
- 3175 Mũi cắt ren tarô**
Tap
tæp/
- 3176 Tarô tay**
Hand tap
hænd tæp/
- 3177 Tarô trên máy**
Machine tap
mʌʃ 'i:n tæp/
- 3178 Tarô đai ốc**
Nut tap
nʌt tæp/
- 3179 Tarô xếp mở (được)**
Collapsible tap
kɔ'ləpsəbl tæp/
- 3180 Sự cán ren**
Thread rolling
θred 'rɔ:liŋ/
- 3181 Khuôn cán ren phẳng**
Flat thread-rolling die
flæt θred 'rɔ:liŋ daɪ/
- 3182 Khuôn cán ren trụ**
Cylindrical thread rolling die
/sɪlɪndrɪkl θred 'rɔ:liŋ daɪ/
- 3183 Sự mài ren**
Thread grinding
θred 'graɪndɪŋ/
- 3184 Bánh mài đơn**
Single-rib grinding wheel
/sɪŋgl rɪb 'graɪndɪŋ wi:l/
- 3185 Bánh mài nhiều ren**
Multi-rib grinding wheel
/mʌltɪ rɪb 'graɪndɪŋ wi:l/

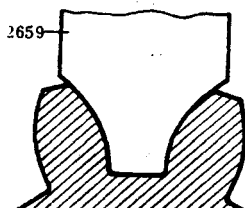
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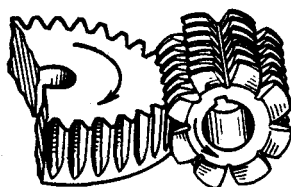
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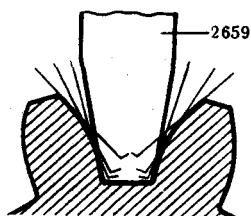
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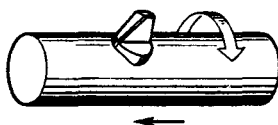
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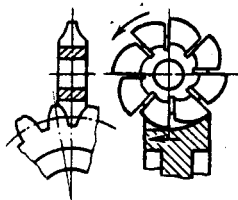
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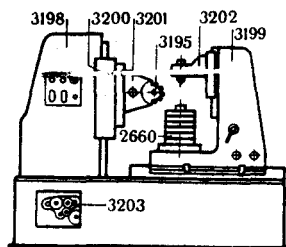
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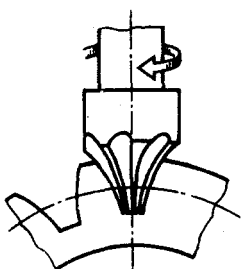
3192



3197



3193



3186 Máy mài ren

*Thread-grinding
machine*

/θred 'graɪndɪŋ məʃiːn/

3187 Cam đỡ

Relieving cam
/rɪ'liːvɪŋ kæm/

3188 Bộ chỉnh bù hướng

Lead compensator
/liːd kəm'pen'seɪtə(ɹ)/

SỰ GIA CÔNG BÁNH RĂNG

GEAR MACHINING**3189 Sự cắt răng**

Gear cutting
/gɪə 'kʌtɪŋ/

3190 Phương pháp chép hình

Form-copying method
/fɔːm 'kɒpiŋ 'meθəd/

3191 Phương pháp sinh

Generating method
/dʒenə'reɪtɪŋ 'meθəd/

3192 Dao phay biên răng

*Gear-tooth side milling
cutter*
/gɪə tuːθ saɪd 'mɪlɪŋ
'kʌtə/

3193 Dao phay chân răng

Gear-tooth end mill
/gɪə tuːθ end 'mɪl/

3194 Đầu cắt răng nhiều lưỡi

*Multiple-blade gear-
cutting head*
/,mʌltɪpl bled
gɪə,kʌtɪŋ hed/

3195 Dao phay phác hình

Hob
/hɒb/

3196 Dao phác hình đơn

Flyhob
/'flaɪhɒb/

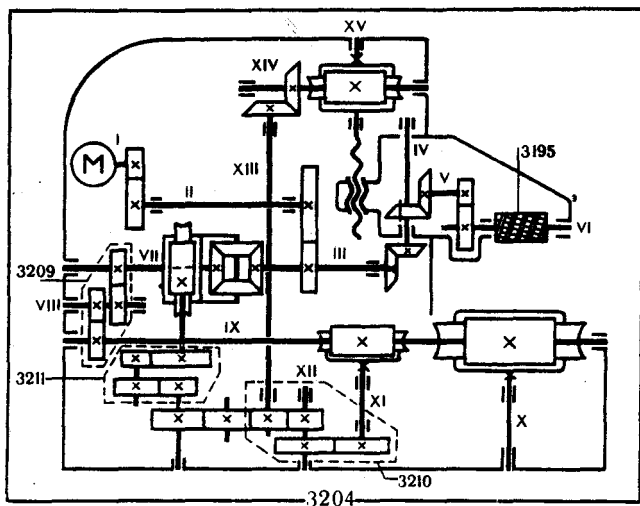
3197 Máy phay răng phác hình

Gear hobbing machine
/gɪə.hɒbɪŋ məʃiːn/

3198 Trụ trước

Front column
/frʌnt 'kɒləm/

3204



3199 Trụ sau

Rear column
/rɪə 'kɒləm/

3200 Bàn trượt dao

Hob slide
/hɒb 'slaɪd/

3201 Đầu xoay dao

Hob swivel head
/hɒb ,swɪl hed/

3202 Càn chống

Work support arm
/wɜ:k sə'pɔ:t ɑ:m/

3203 Truyền động đôi răng

Change gear train
/tʃeɪndʒ ɡiə treɪn/

**3204 Sơ đồ động của máy
phác hình**

*Kinematic diagram of the
hobbing machine*
/kɪnɒ.mæ.tɪk 'di:ɒgræm
əv ðə 'hɒbɪŋ mə'ʃi:n/

3205 Chuỗi truyền động

Kinematic chain
/kɪnɒ.mæ.tɪk 'tʃeɪn/

**3206 Truyền động chuỗi theo
chuyển động thứ cấp**

*Kinematic chain of
indexing and generating
motion*
/kɪnɒ.mæ.tɪk 'tʃeɪn əv
ɪn'deksɪŋ ən
'dʒenəreɪtɪŋ 'mɔʊʃn/

**3207 Truyền động chuỗi theo
chuyển động chính**

*Kinematic chain of
primary motion*
/kɪnɒ.mæ.tɪk 'tʃeɪn əv
,praɪməri 'mɔʊʃn/

**3208 Chuỗi truyền động ăn
dao đứng**

*Kinematic chain of
vertical feed*
/kɪnɒ.mæ.tɪk 'tʃeɪn əv
,vɜ:tɪkl fi:d/

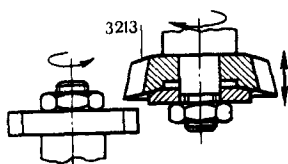
**3209 Các bánh răng thay đổi
tỷ số**

Index change gears
/ɪndeks 'tʃeɪndʒ ɡiəz/

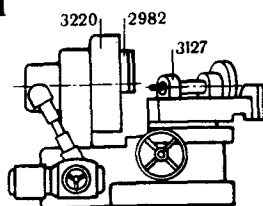
**3210 Các bánh răng thay đổi
lượng cắt**

Feed change gears
/fi:d 'tʃeɪndʒ ɡiəz/

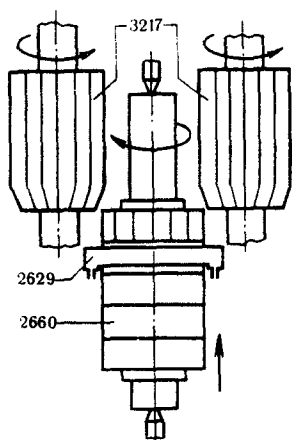
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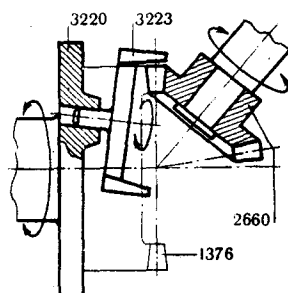
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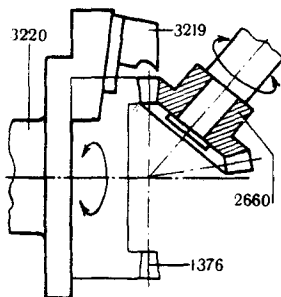
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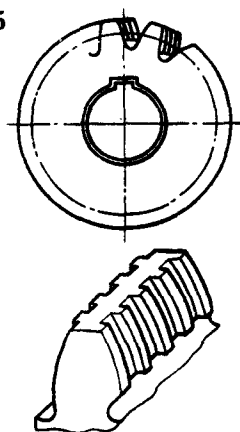
3222



3218



3225



3211 Các bánh răng vi sai*Differential change gears*

/dɪfə.renʃl 'tʃeɪndʒ 'ɡiːz/

3212 Tạo dạng răng*Gear shaping*

/ɡiːə 'ʃeɪpɪŋ/

3213 Dao tạo hình răng*Gear shaper cutter*

/ɡiːə 'ʃeɪpə 'kʌtə(r)/

3214 Máy bào bánh răng*Gear shaping machine**gear shaper*

/ɡiːə 'ʃeɪpɪŋ mə'ʃiːn ɡiːə

ʃeɪpə/

3215 Bộ đỡ*Saddle*

/'sædl/

3216 Sự cán răng*Gear rolling*

/ɡiːə 'rɔʊlɪŋ/

3217 Bánh cán răng*Gear roll*

/ɡiːə 'rɔʊl/

3218 Cắt răng côn bằng các**dao tịnh tiến***Bevel gear cutting by**reciprocating tools*

/ˌbeɪvəl ɡiːə 'kʌtɪŋ baɪ

rɪ'sɪprəkeɪtɪŋ tuːlz/

3219 Dụng cụ cắt răng tịnh tiến*Reciprocating gear**cutting tool*

/rɪ'sɪprəkeɪtɪŋ ɡiːə 'kʌtɪŋ

tuːl/

3220 Bộ đỡ*Cradle*

/'kreɪdl/

3221 Máy cắt bánh răng côn thẳng*Straight-bevel-gear**generator/strett .beɪvəl ɡiːə*

'dʒenəreɪtə(r)/

3222 Sự cắt bánh răng côn xoắn*Spiral-bevel-gear cutting*

/ˌspəʊrəl .beɪvəl ɡiːə 'kʌtɪŋ/

3223 Đầu cắt kiểu phay mặt đầu*Face-mill type cutter**head*

/feɪs mɪl taɪp 'kʌtə hed/

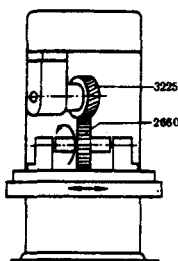
3224 Sự chà răng*Gear shaving*

/ɡiːə 'ʃeɪvɪŋ/

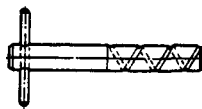
3225 Dao chà răng*Gear-shaving cutter*

/ɡiːə 'ʃeɪvɪŋ 'kʌtə(r)/

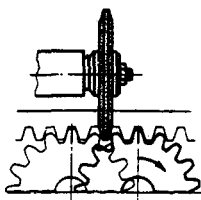
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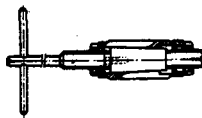
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3227



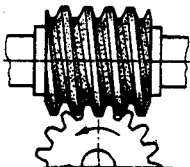
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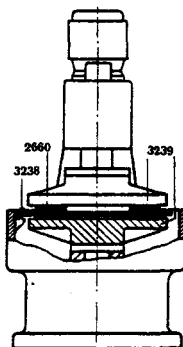
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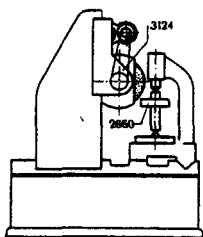
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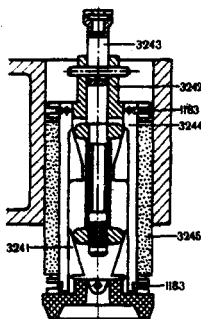
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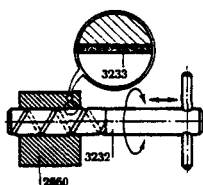
3229



3240



3231



3226 Máy cà răng

Gear-shaving machine
/giə 'feɪvɪŋ məʃiːn/

3227 Sự mài bánh răng

Gear grinding
/giə 'graɪndɪŋ/

3228 Bánh mài biên dạng xoắn

*Helically profiled
grinding wheel*
/ˌhelɪkəl ˌprəʊfaɪld
'graɪndɪŋ wiːl/

3229 Máy mài bánh răng

Gear grinding machine
/giə 'graɪndɪŋ məʃiːn/

GIA CÔNG TĨNH

FINISHING

3230 Sự gia công tinh, đánh bóng

Finishing
/fɪnɪʃɪŋ/

3231 Sự mài rà, mài nghiền

Lapping
/ˈlæpɪŋ/

3232 Mài rà

Lap
/ˈlæp/

3233 Chất mài rà

Lapping compound
/ˈlæpɪŋ ˈkɒmpaʊnd/

3234 Dao mài rà cứng

Solid lap
ˌsɒlɪd ˈlæp/

3235 Dao mài rà điều chỉnh được

Adjustable lap
/ə.dʒʌstəbəl ˈlæp/

3236 Dao mài rà kiểu vòng

Ring lap
/rɪŋ ˈlæp/

3237 Máy mài rà

Lapping machine
/ˈlæpɪŋ məʃiːn/

3238 Mâm kẹp phôi

Workholder retainer
/wɜːkˌhəʊldə rɪˈteɪnə(r)/

3239 Bàn rà quay

Rotating lap
/rəʊˈteɪtɪŋ ˈlæp/

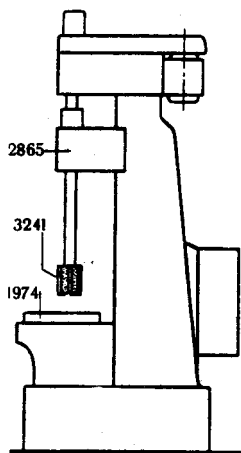
3240 Sự mài khôn, mài doa

Honing
/ˈhɒnɪŋ/

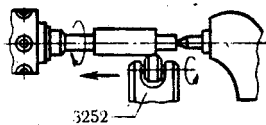
3241 Dụng cụ mài khôn

Honing tool
/ˈhɒnɪŋ tuːl/

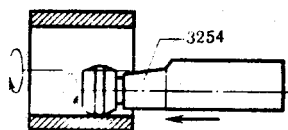
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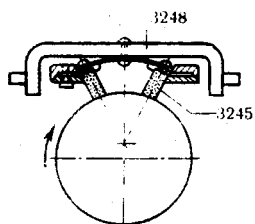
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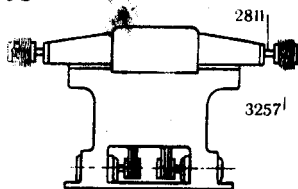
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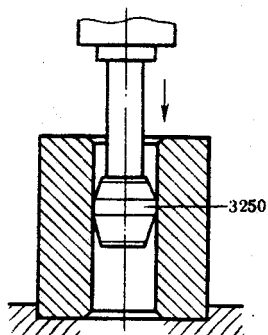
3247



3256



3249



3242 Thân dụng cụ

Body
/ˈbɒdi/

3243 Cần điều khiển

Radial feed rod
/reɪdɪəl fiːd rɒd/

3244 Cần giữ đá

Stone holder
/stəʊn ˈhəʊldə(r)/

3245 Đá mài

Abrasive stick, stone
/əˈbreɪsɪv stɪk stəʊn/

3246 Máy mài khôn

Honing machine
/ˈhɒnɪŋ məˈʃiːn/

3247 Sự gia công siêu tinh

Superfinishing
/ˌsʊpəˈfɪnɪʃɪŋ/

3248 Đầu gia công siêu tinh

Superfinishing head
/ˌsʊpəˈfɪnɪʃɪŋ hed/

3249 Sự đánh bóng, mài

bóng
Burnishing
/ˈbɜːnɪʃɪŋ/

3250 Dụng cụ mài bóng

Burnisher
/ˈbɜːnɪʃə(r)/

3251 Sự cán bóng

Roll burnishing
/rɒl ˈbɜːnɪʃɪŋ/

3252 Con lăn cán bóng

Roll burnisher
/rɒl ˈbɜːnɪʃə(r)/

3253 Sự cán bóng mặt trong

Internal roll burnishing
/ɪn.tɜːnl rɒl ˈbɜːnɪʃɪŋ/

3254 Con lăn cán bóng mặt trong

Internal roll burnisher
/ɪn.tɜːnl rɒl ˈbɜːnɪʃə(r)/

3255 Sự chà, đánh bóng

Polishing
/ˈpɒlɪʃɪŋ/

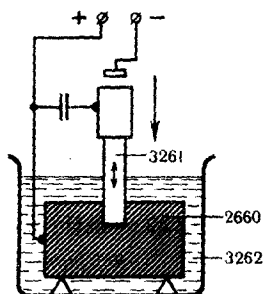
3256 Máy chà đánh bóng

Polishing machine
/ˈpɒlɪʃɪŋ məˈʃiːn/

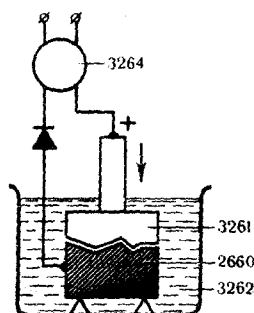
3257 Đĩa chà bóng

Buffing wheel
/ˌbʌfɪŋ wiːl/

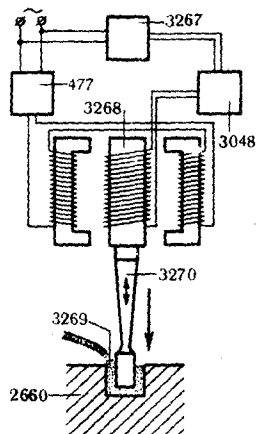
3260



3263



3266



**GIA CÔNG CƠ KHÍ
BẰNG HÓA - LÝ**
*PHYSICAL AND
CHEMICAL MACHINING*

3258 Sự gia công hóa-lý

Electrophysical

machining

/ɛ.lɛktrɔʊ.fɪzɪkəl/

məʊʃiːnɪŋ/

**3259 Gia công bằng phóng
điện**

Electrical-discharge

machining

/ɛ.lɛktrɪkəl dɪs.tʃɑːdʒ/

məʊʃiːnɪŋ/

3260 Gia công tia lửa điện

Electric-spark machining

/ɛ.lɛktrɪk spɑːk/

məʊʃiːnɪŋ/

3261 Điện cực dụng cụ

Tool electrode

/tuːl ɪˈlektroʊd/

3262 Chất lỏng cách điện

Dielectric fluid

/di.ɪˈlektɪk ˈfluɪd/

**3263 Gia công bằng xung
điện**

Electric-pulse machining

/ɛ.lɛktrɪk pʌls/

məʊʃiːnɪŋ/

3264 Máy phát xung

Machine pulse generator

/məʊʃiːn pʌls/

ˈdʒenəreɪtə(r)/

**3265 Gia công bằng điện
tiếp xúc**

Electrical contact

machining

/ɛ.lɛktrɪkəl ˈkɒntækt/

məʊʃiːnɪŋ/

3266 Gia công bằng siêu âm

Ultrasonic machining

/ʌlˌtrəˈsɒnɪk məʊʃiːnɪŋ/

3267 Bộ dao động âm thanh

Audio oscillator

/ɔːdiəʊ ˈɒsɪleɪtə(r)/

3268 Bộ rung động từ giảo

Magnetostriptive vibrator

/mæɡˈnɪtəʊstriktɪv/

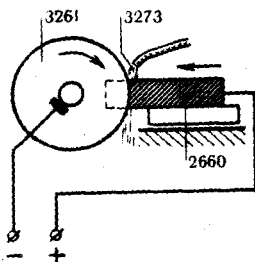
vaiˈbreɪtə(r)/

3269 Bùn sệt mài

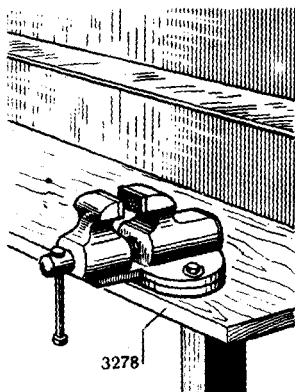
Abrasive slurry

/əˈbreɪsɪv ˈslʌrɪ/

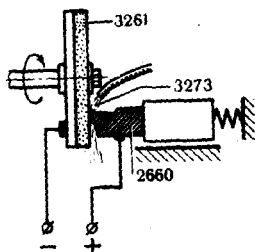
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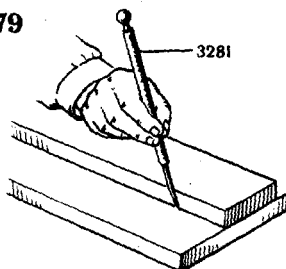
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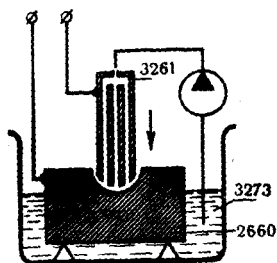
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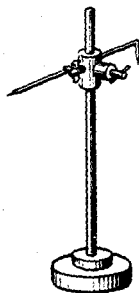
3279



3275



3282



3270 Dụng cụ siêu âm*Ultrasonic tool*

/ˌʌltrə'sonik tu:l/

3271 Gia công bằng điện hóa*Electrochemical**machining*

/iˌlektʁəʊ.kemɪkl

məʃ'iːnɪŋ/

3272 Gia công điện hóa âm*cực quay**Electrochemical rotary**cathode machining*

/iˌlektʁəʊ.kemɪkl ˌrəʊtəri

'kæθəʊd məʃ'iːnɪŋ/

3273 Dung dịch điện ly*Electrolyte*

/iˌlektʁəʊlaɪt/

3274 Sự mài trong dung dịch*điện ly**Electrolytic grinding*

/iˌlektʁəʊ'lɪtɪk 'graɪndɪŋ/

3275 Gia công bằng dòng*phun điện hóa**Jet electrochemical**machining*

/dʒet iˌlektʁəʊ.kemɪkl

məʃ'iːnɪŋ/

**GIA CÔNG NGUỘI VÀ
LẮP RÁP****BENCH AND ASSEMBLY
WORK****3276 Gia công nguội***Benchwork*

/ˈbentʃˈwɜ:k/

3277 Êtô, bàn kẹp*Vice*

/ˈvaɪs/

3278 Bàn thợ nguội*Bench*

/ˈbentʃ/

3279 Sự lấy dầu, lấy mực*Laying out*

/ˈleɪɪŋ aʊt/

3280 Lấy dầu*Lay out*

/ˈleɪ aʊt/

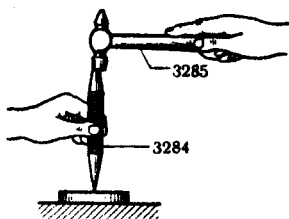
3281 Mũi vạch*Scriber*

/ˈskraɪbə(r)/

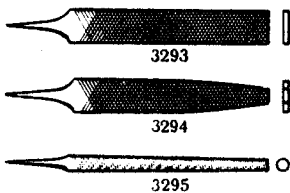
3282 Cữ phẳng*Surface gauge*

/ˈsɜːfɪs geɪdʒ/

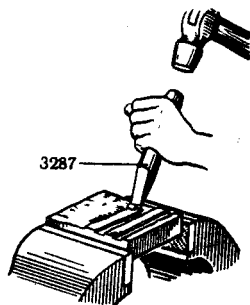
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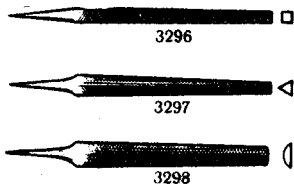
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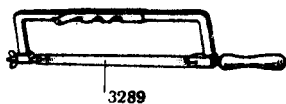
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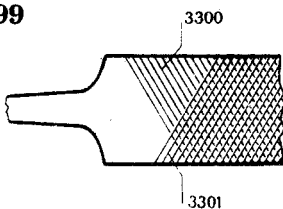
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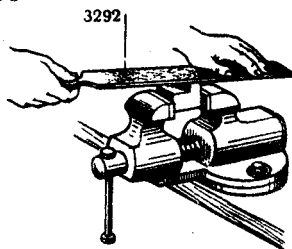
3288



3299



3290



3283 Sự đột đầu

Punching
/ˈpʌntʃɪŋ/

3284 Đột đầu

Punch
/pʌntʃ/

3285 Búa thợ nguội

Bench hammer
/bentʃ ˈhæmə(ɹ)/

3286 Sự đục bằng tay

Hand chipping
/hænd ˈtʃɪpɪŋ/

3287 Cái đục phẳng

Flat chisel
/flæt ˈtʃɪzəl/

3288 Cái cưa

Hacksaw
/ˈhæksɔː/

3289 Lưỡi cưa

Hacksaw blade
/ˈhæksɔː bleɪd/

3290 Sự giũa

Filing
/ˈfaɪlɪŋ/

3291 Giũa

File
/faɪl/

3292 Cái giũa

File

3293 Giũa phẳng đầu thẳng

Blunt flat file
/blʌnt flæt faɪl/

3294 Giũa phẳng đầu côn

Taper flat file
/ˈteɪpə flæt faɪl/

3295 Giũa tròn

Round file
/raʊnd faɪl/

3296 Giũa vuông

Square file
/ˈskweə faɪl/

3297 Giũa tam giác

Three-square file
/ˈθriːskweə faɪl/

3298 Giũa lòng mo

Half-round file
/hɑːf raʊnd faɪl/

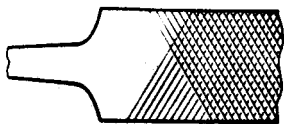
3299 Rãnh giũa

Cut
/kʌt/

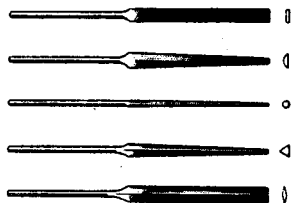
3300 Rãnh cơ sở

Overcut
/ˈoʊvərkʌt/

3302



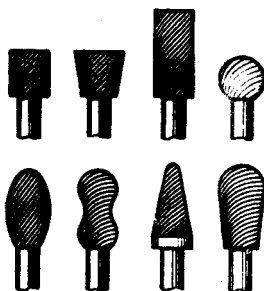
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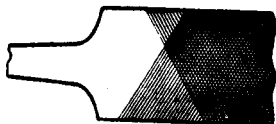
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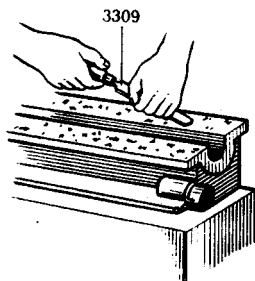
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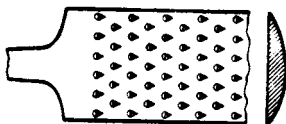
3304



3308



3305



3301 Rãnh trên*Up cut*

/ʌp'kʌt/

3302 Giữa thô*Coarse file*

/kɔ:s faɪl/

3303 Giữa mịn*Smooth file*

/smu:θ faɪl/

3304 Giữa tinh*Dead-smooth file*

/ded smu:θ faɪl/

3305 Giữa nạo*Rasp*

/ræsp/

3306 Giữa kim*Needle file*

/ni:dl faɪl/

3307 Giữa quay, giữa bavia*Rotary file, burr*

/rɔ:təri faɪl bɜ:r/

3308 Sự cạo rà*Scraping*

/'skreɪpɪŋ/

3309 Cạo rà,*Scraper*

/'skreɪpə(r)/

3310 Sự lắp ráp*Assembly*

/ə'sembli/

3311 Dụng cụ đóng, mở bu*lông, đai ốc cỡ lẻ**Wrench, spanner*

/rentʃ 'spænə(r)/

3312 Cờ lê 2 đầu*Double-head wrench*

/ˌdʌbl hed rentʃ/

3313 Đầu mở miệng, đầu*khóa**Wrench opening*

/rentʃ 'ɔ:pənɪŋ/

3314 Cờ lê có một đầu mở*miệng**Single-head open-end**wrench*

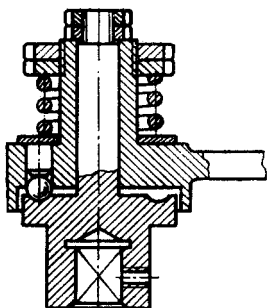
/ˌsɪŋgl hed ˌɔ:pən end

/rentʃ/

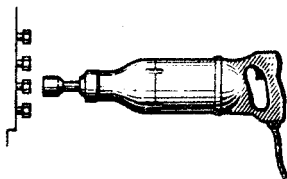
3315 Khóa vòng 2 đầu*Double-head box wrench*

/ˌdʌbl hed 'bɒks rentʃ/

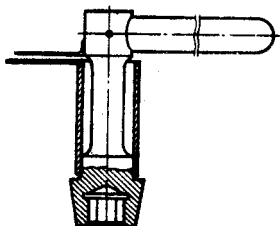
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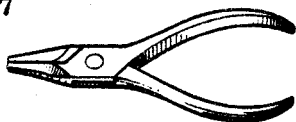
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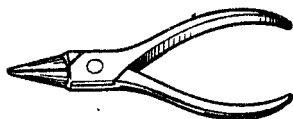
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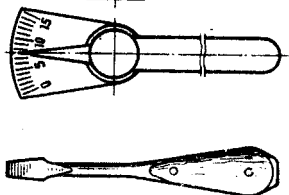
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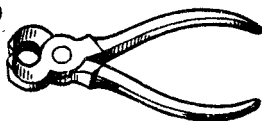
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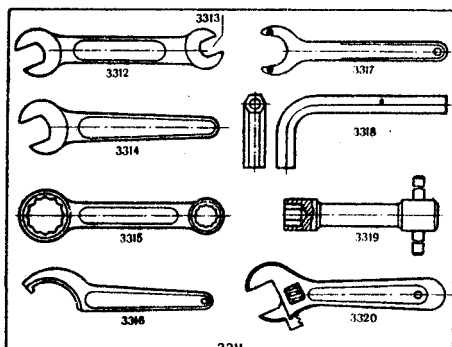
3323



3329



3311



3316 Khóa móc, cờ lê móc*Hook spanner*

/hʊk 'spɛnɔ(t)/

3317 Khóa mở chốt*Pin-face wrench*

/pɪn fets rɛntʃ/

3318 Khóa ống lục giác*Bent wrench for**hexagonsocket socket**head screw*

/bɛnt 'rɛntʃ fə.

hɛksɔgən, sɔkɪt 'hed

skrɜ:/

3319 Khóa ống chìm*Socket wrench*

/'sɔkɪt rɛntʃ/

3320 Mỏ lét*Adjustable wrench*

/'ɔdʒʌstəbl rɛntʃ/

3321 Mỏ lét xoắn chịu lực*Torque wrench*

/'tɔ:k rɛntʃ/

3322 Mỏ lét xoắn đo lực siết*Torque indicating**wrench*

/'tɔ:k 'ɪndɪkɛtɪŋ rɛntʃ/

3323 Cây vặn vít, tuốc nơ vít*Serewdriver*

/'skrɜ:'draɪvɔ(t)/

3324 Cây vặn vít chịu lực*Power screwdriver*

/'paʊə skrɜ:'draɪvɔ(t)/

3325 Khoan điện cầm tay*Electric drill*

/ɪ'lektrɪk drɪl/

3326 Khoan điện dùng khí*nén**Pneumatic drill*

/nɪjɜ:'mætɪk drɪl/

3327 Kìm mỏ dẹp*Flat-nose pliers*

/'flæt ,nəʊz 'plɑɪəz/

3328 Kìm mỏ nhọn*Round-nose pliers*

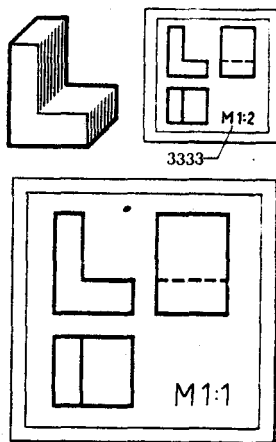
/'raʊnd, nəʊz 'plɑɪəz/

3329 Kìm cắt*Cutting pliers, nippers*

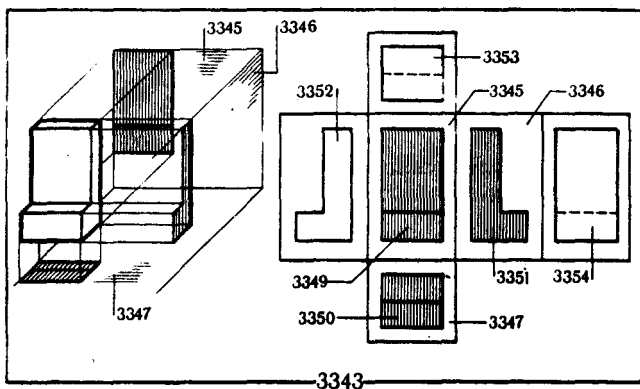
/'kʌtɪŋ 'plɑɪəz ; 'nɪpɔz/

VẼ KỸ THUẬT ENGINEERING DRAWING

3332



3343



VẼ KỸ THUẬT

ENGINEERING DRAWING

3330 Sự vẽ kỹ thuật*Drawing*

/ˈdrɔːɪŋ/

3338 Nét gián đoạn*Short dashes*

/ʃɔːt ˈdæʃɪz/

3331 Vẽ kỹ thuật*Draw*

/drɔː/

3339 Nét chấm gạch*Long chain*

/lɒŋ tʃeɪn/

3332 Bản vẽ kỹ thuật*Drawing***3340** Sự biểu diễn*Representation*

/ˌreprɪzenˈteɪʃn/

3333 Tỷ lệ*Scale*

/skeɪl/

3341 Sự chiếu, hình chiếu*Projection*

/prɔːˈdʒekʃn/

3334 Các loại đường nét*Line*

/laɪn/

3342 Chiếu*Project*

/prɔːdʒekt/

3335 Nét liền*Continuous line*

/kənˈtɪnjuəs laɪn/

3336 Nét đậm*Thick line*

/θɪk laɪn/

3343 Phép chiếu trực giao*Orthographic projection*

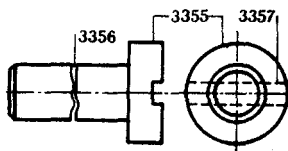
/ɔːθəˈɡræfɪk prɔːˈdʒekʃn/

3337 Nét mảnh*Thin line*

/θɪn laɪn/

3344 Mặt phẳng chiếu*Plane of projection*

/pleɪn əv prɔːˈdʒekʃn/

3355

3345 Mặt phẳng chính diện*Frontal plane of**projection*

/frʌntl pleɪn əv

prə'dʒekʃn/

3351 Hình chiếu cạnh trái*View from the left, left-**hand end view*

/vju: frəm ðə left left

hænd 'end vju:/

3346 Mặt phẳng bên*Profile plane of**projection*

/prəʊfaɪl pleɪn əv

prə'dʒekʃn/

3352 Hình chiếu cạnh phải*View from the right,**right-hand end view*

/vju: frəm ðə raɪt raɪt

hænd end 'vju:/

3347 Mặt phẳng ngang*Horizontal plane of**projection*

/hɒrɪ,zɒntl pleɪn əv

prə'dʒekʃn/

3353 Hình chiếu dưới*View from below, bottom**view*

/vju: frəm bləʊ 'bɒtəm

vju:/

3348 Sự chiếu*View*

/vju:/

3354 Hình chiếu từ phía sau*View from behind, rear**view*

/vju: frəm bi, haɪnd riə

vju:/

3349 Hình chiếu đứng, hình*chiếu mặt cắt đứng**Front view, front**elevation*

/frʌnt vju: frʌnt

el'vɛɪʃn/

3355 Đường bao thấy được*Visible outline*

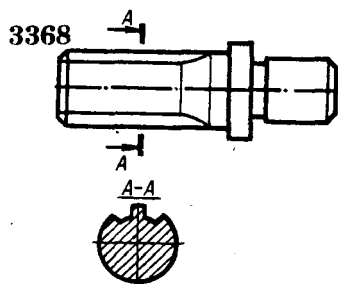
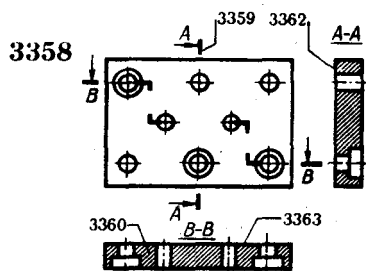
/ˌvɪzɪbl 'aʊtlaɪn/

3350 Hình chiếu trên, hình*chiếu phẳng**View from above, plan*

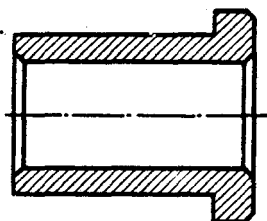
/vju: frəm əbʌv. plæn/

3356 Chỗ cắt*Break*

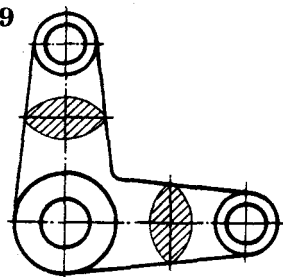
/breɪk/



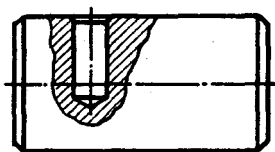
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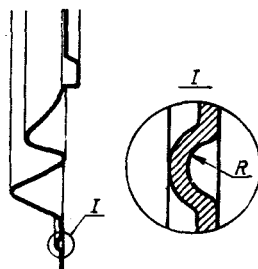
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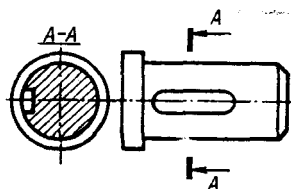
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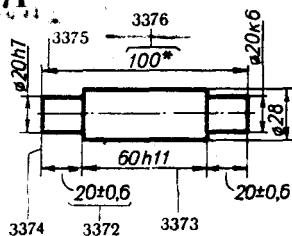
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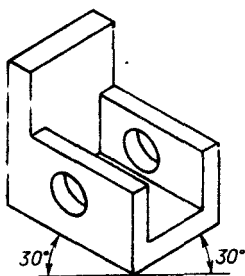


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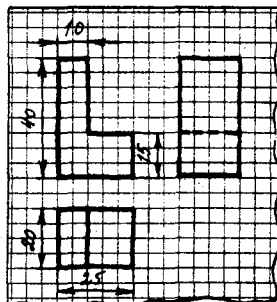


3357 Đường bao khuất*Hidden outline**/ˈhɪdn̩ ˈaʊtlaɪn/***3364 Mặt cắt dọc***Longitudinal section**/lɒŋɡɪˌtʃʊdɪnəl ˈsekʃn/***3358 Mặt cắt, tiết diện***Section views, section**/ˈsekʃn vjuː ˈsekʃn/***3365 Mặt cắt một phần***Broken section**/ˌbrɔʊkn̩ ˈsekʃn/***3359 Mặt phẳng cắt***Cutting plane**/ˈkʌtɪŋ pleɪn/***3366 Mặt cắt ngang***Cross section**/ˈkros ˈsekʃn/***3360 Nét gạch bóng***Cross-hatching**/ˈkros ˈhætʃɪŋ/***3367 Sự cắt***Section**/ˈsekʃn/***3361 Vẽ nét gạch bóng***Crosshatch**/ˈkros ˈhætʃ/***3368 Sự cắt bước***Removed section**/rɪˌmuːvd̩ ˈsekʃn/***3362 Mặt cắt đứng***Vertical section**/ˌvɜːtɪkl̩ ˈsekʃn/***3369 Sự cắt xoay***Revolved section**/rɪˌvɒlvd̩ ˈsekʃn/***3363 Mặt cắt bậc***Sectional view in an**offset cutting plane**/ˈsekʃnəl ˈvjuː ɪn ɔn**ˌɒfset ˈkʌtɪŋ pleɪn/***3370 Sự cắt chi tiết***Detail section**/ˌdiːteɪl ˈsekʃn/***3371 Sự ghi kích thước***Dimensioning**/dɪˈmenʃnɪŋ/*

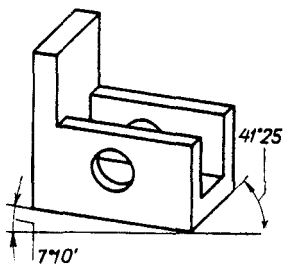
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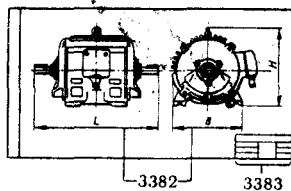
3384



3379



3381



3372 Giá trị bằng số của kích thước

Numerical value of size
/nɜː.merɪkl 'væljʊ əv saɪz/

3373 Đường kích thước

Dimension line
/di'menʃn laɪn/

3374 Đường kéo dài

Extension line
/ɪk'stenʃn laɪn/

3375 Đầu mũi tên

Arrowhead
/'ærəʊhed/

3376 Kích thước sơ bộ

Information size
/ɪnfə'meɪʃn saɪz/

3377 Phép chiếu trục đo

Axonometric projection
/æksənɒ.metrɪk prə'dʒekʃn/

3378 Phép chiếu trục giao
cùng kích thước

*Orthogonal isometric
projection*
/ɔːθə.gəʊnl aɪsə.metrɪk
prə'dʒekʃn/

3379 Phép chiếu trục giao
không cùng kích thước

*Orthogonal dimetric
projection*
/ɔːθə.gəʊnl dɪ.metrɪk
prə'dʒekʃn/

3380 Bản vẽ lắp

Assembly drawing
/ə'sembli 'drɔːɪŋ/

3381 Hình chiếu tổng thể

General view
/'dʒenərəl vjuː/

3382 Kích thước bao

Overall dimension
/ˌəʊvəɹɔːl dɪ'menʃn/

3383 Khung tên

Title block
/'taɪtl blɒk/

3384 Bản vẽ phác

Sketch
/'skeɪʃ/

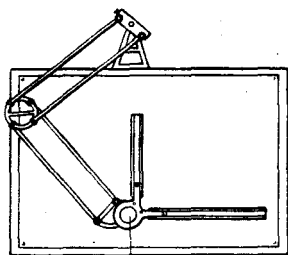
3385 Thiết kế sơ bộ

Preliminary design
/priːlɪmɪnəri dɪ'zaɪn/

3386 Thiết kế thu nhỏ

Contract design
/'kɒntrækt dɪ'zaɪn/

3391



3392

3387 Thiết kế chi tiết*Detail design*

/ˌdɪteɪl dɪˈzaɪn/

3391 Bảng vẽ*Drafting board*

/ˈdrɑːftɪŋ bɔːd/

3388 Giấy can, giấy vẽ*Tracing paper*

/ˈtreɪsɪŋ ˈpeɪpə(r)/

3392 Máy vẽ*Drafting machine*

/ˈdrɑːftɪŋ məˈʃiːn/

3389 Giấy mờ, giấy nhạy*sáng**Light-sensitive paper*

/laɪtˌsensətɪv ˈpeɪpə(r)/

3393 Thước T*T-square*

/tiː skweɪə(r)/

3394 Com pa*Compasses*

/ˈkʌmpəseɪz/

3390 Bản in phôi*Blueprint*

/ˈbluːprɪnt/

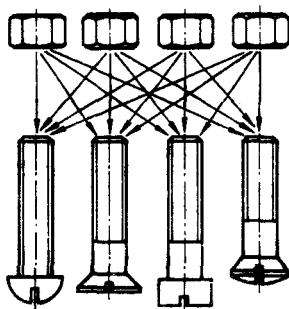
3395 Khuôn, thước cong*Template*

/ˈtemplɪt/

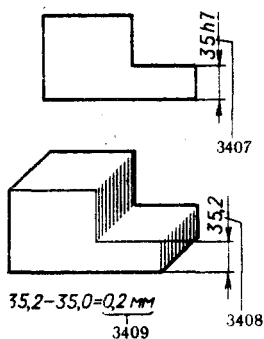
ĐỘ CHÍNH XÁC, ĐỘ LẮP LẪN, SỰ ĐO LƯỜNG

Accuracy, Interchangeability, Measurements

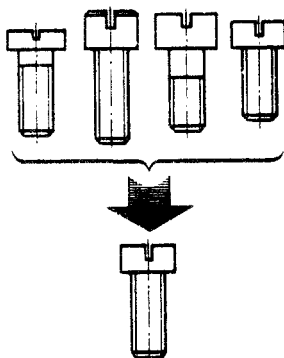
3397



3406



3398



ĐỘ CHÍNH XÁC, ĐỘ LẮP LẪN, SỰ ĐO LƯỜNG

Accuracy, Interchangeability, Measurements

KHÁI NIỆM CHUNG

GENERAL TERMS

3396 Độ chính xác
Accuracy
/ækjʊərəsɪ/

3397 Tính lắp lẫn
Interchangeability
/ˌɪntəʃeɪndʒəbɪləti/

3398 Sự đồng nhất
Unification
/ˌjʊnɪfɪˈkeɪʃn/

3399 Làm đồng nhất
Unify
/ˌjʊnɪfaɪ/

3400 Sự tiêu chuẩn hóa
Standardization
/ˌstændədaɪzəʃn/

3401 Tiêu chuẩn hóa
Standardize
/ˌstændədaɪz/

3402 Tiêu chuẩn
Standard
/ˌstændəd/

3403 Tiêu chuẩn quốc gia
National standard
/ˌnæʃənəl ˈstændəd/

3404 Tiêu chuẩn ngành
Branch standard
/bræntʃ ˈstændəd/

3405 Tiêu chuẩn xí nghiệp
Factory standard
/ˈfæktəri ˈstændəd/

3406 Kích thước
Size, dimension
/saɪz ; dɪˈmɛnʃn/

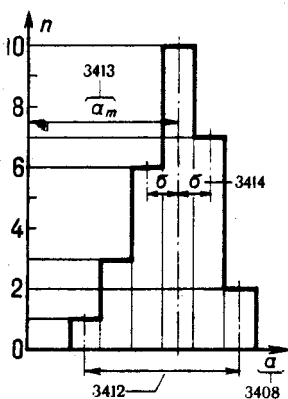
3407 Kích thước danh nghĩa
Nominal size
/ˈnɒmɪnəl saɪz/

3408 Kích thước thật
Actual size
/æktʃʊəl saɪz/

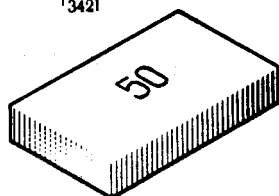
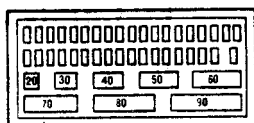
3409 Độ lệch kích thước
Size deviation
/saɪz dɪˈvɪʃən/

3410 Độ phân tán kích thước
Size scatter
/saɪz ˈskætə(r)/

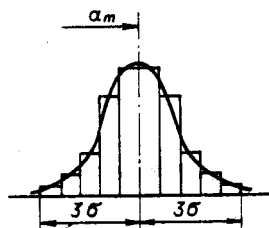
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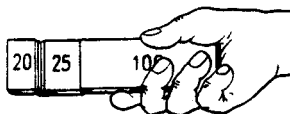
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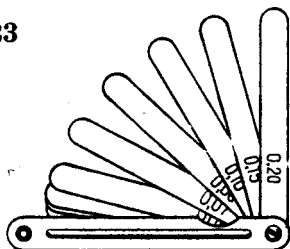
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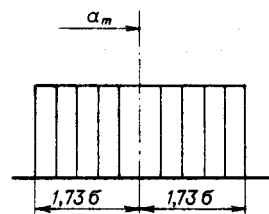
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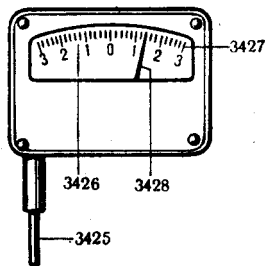
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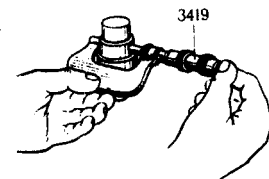
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3424

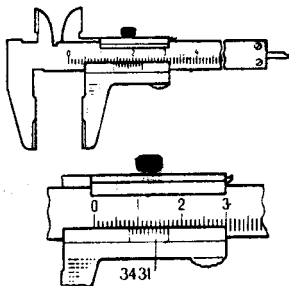


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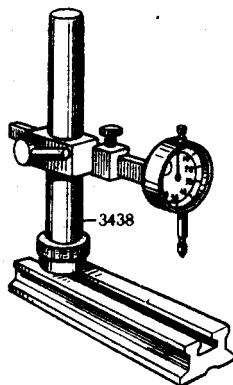


3411 Sơ đồ thanh phân bố*Distribution bar chart**/distri'bju:fn bɑ: tʃɑ:t/***3418 Đo***Measure**/meʒə(r)/***3412 Khoảng phân tán***Range of scatter**/reɪnʤ əv 'sketə(r)/***3419 Phương tiện, dụng cụ đo***Measuring means**/meʒə mi:nz/***3413 Giá trị kích thước trung bình***Average value of size**/,ævərɪʤ 'vælju: əv saɪz/***3420 Khối cỡ đo***Gauge block**/geɪʤ blɒk/***3414 Độ sai lệch tiêu chuẩn***Standard deviation**/,stændəd di'vi:ʃn/***3421 Cỡ đo trong khối cỡ đo***Set of gauge blocks**/set əv 'geɪʤ blɒks/***3415 Phân bố chuẩn, phân bố Gauss***Normal distribution,**Gaussian distribution**/,nɔ:ml distri'bju:fn/***3422 Thước xếp cỡ***Stack of gauge blocks**/stæk əv 'geɪʤ blɒks/***3416 Phân bố đồng nhất***Uniform distribution**/,ju:nɪfɔ:m distri'bju:fn/***3423 Chiều dày***Feeler gauge**/fi:lə geɪʤ/***3424 Máy đo, đồng hồ đo***Measuring apparatus**/meʒərɪŋ əpə'rents/***3417 Sự đo lường***Measurement**/meʒəmənt/***3425 Đầu đo***Sensitive contact**/,sensətɪv 'kɒntækt/*

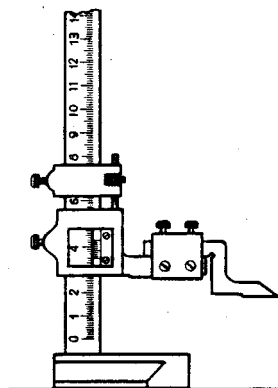
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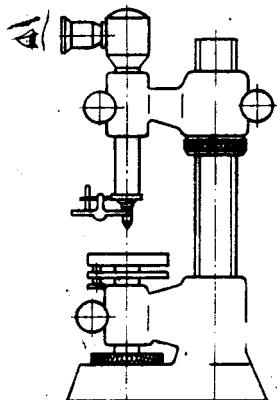
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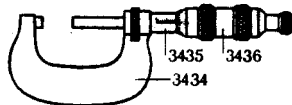
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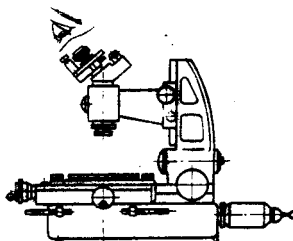
3439



3433



3440



3426 Thang đo*Scale*

/ˈkeɪl/

3433 Panme*Micrometer*

/ˈmaɪkrəˈmɪtə(r)/

3427 Vạch chia*Scale graduation*

/fˈkeɪl grædʒv'eɪf n/

3434 Khung*Frame*

/freɪm/

3428 Kim chỉ thị*Index*

/ɪnˈdeɪks/

3435 Thân thước*Barrel*

/ˈbærəl/

3429 Giá trị trên vạch chia*Value of the scale**graduation*

/ˈvæljuːv ðə ˈkeɪl

grædʒv'eɪf n/

3436 Cán thước*Thimble*

/ˈθɪmbl/

3437 Đồng hồ so*Dial indicator*

/ˌdaɪəl ˈɪndɪkətə(r)/

3430 Thước cặp*Vernier caliper*

/ˌvɜːniə ˈkælɪpə(r)/

3438 Cán, thân*Stand*

/stænd/

3431 Du xích thước cặp*Vernier scale*

/ˌvɜːniə ˈskeɪl/

3439 Thước đo quang học*Visual gauge*

/ˌvɪʒʊəl ɡeɪdʒ/

3432 Thước chạy, du xích đo*độ cao**Vernier height gauge*

/ˌvɜːniə ˈhaʊt ɡeɪdʒ/

3440 Kính hiển vi đo kích*thước**Tool-maker's**microscope*

/aʊl.meɪkəz

ˌmaɪkrəˈskəʊp/

3441 Bộ phản chiếu quang học

Optical projector

/ˌɒptɪkl prɔˈdʒektə(r)/

3442 Phần ngưng cố định

Permanent condenser

/ˌpɜːmənənt

kənˈdensə(r)/

3443 Phần ngưng biến đổi

Change condenser

/tʃeɪndʒ kənˈdensə(r)/

3444 Gương phản xạ

Reflecting mirror

/rɪˈflekʃn̩ ˈmɪrə(r)/

3445 Lăng kính

Optical prism

/ˌɒptɪkl ˈprɪzm/

3446 Màn chắn

Screen

/skriːn/

3447 Cỗ đo khí nén

Pneumatic gauge

/njuːˈmæʃtɪk geɪdʒ/

3448 Cỗ đo khí nén áp lực thấp ; cỗ đo cột nước

Low-pressure pneumatic

gauge, water-column

gauge

/ləʊ preʃə njuːmæʃtɪk

geɪdʒ ˌwɔːtə.kələm

ˈgeɪdʒ/

3449 Chi tiết đo

Part to be checked

/pɑːt tə biː tʃeɪkt/

3450 Bộ cân bằng áp suất

Pressure stabilizer

/preʃə ˈstəbilaɪzə(r)/

3451 Ống dẫn, bộ chặn

Input nozzle, restrictor

/ɪnpʊtˈnoʊzl rɪˈstrɪktə(r)/

3452 Ống đo

Metering nozzle,

metering orifice

/ˈmɪtərɪŋ ˈnoʊzl ˈmɪtərɪŋ

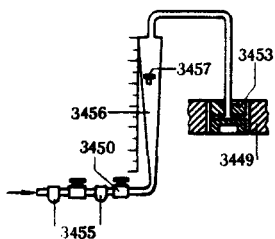
ˈɒrɪfɪs/

3453 Calíp đo

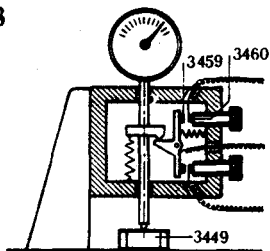
Gaging plug

/ˈgeɪdʒɪŋ plʌɡ/

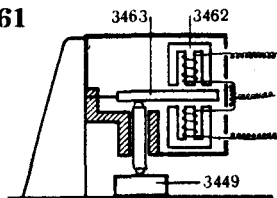
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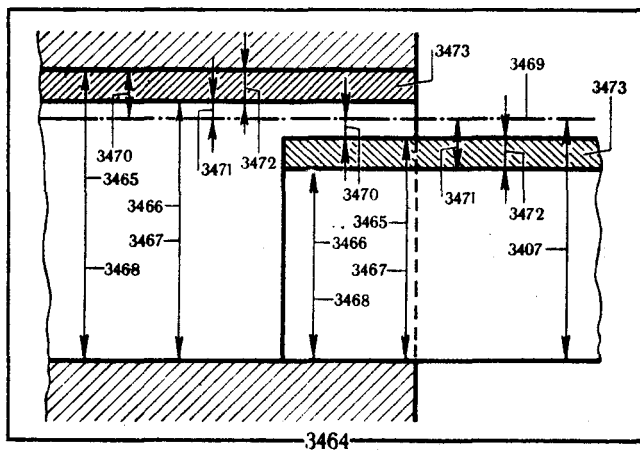
3458



3461



3464



3454 Cỗ đo khí nén áp lực
cao ; cỗ đo dòng
*High-pressure pneumatic
gauge. flow-metering
gauge*
/hau.pɾɛʃə.nju:.mætɪk
'geɪdʒ fləʊ.mɪtəɪŋ
'geɪdʒ/

3455 Bộ lọc
Filter
/'fɪltə(r)/

3456 Ống thủy tinh
Glass tube
/'glɑ:s tju:b/

3457 Phao
Float
/fləʊ/

3458 Đầu đo điện tiếp xúc
*Electric-contact gauge
head*
/ɪ.lektrɪk.kontækt 'geɪdʒ
hed/

3459 Tiếp điểm di động
Movable contact
/'mu:vəbl 'kɒntækt/

3460 Tiếp điểm điều chỉnh
Adjustable contact
/ə.dʒʌstəbl 'kɒntækt/

3461 Đầu đo cảm kháng
Inductance gauge head
/ɪn'dʌktəns 'geɪdʒ hed/

3462 Cuộn cảm
Inductance coil
/ɪn'dʌktəns kɔɪl/

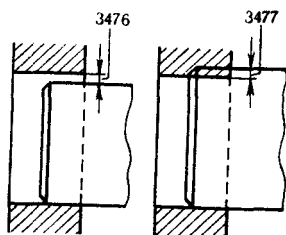
3463 Cuộn ứng
Armature
/'ɑ:məʃə(r)/

DUNG SAI VÀ LẮP GHÉP FITS AND TOLERANCES

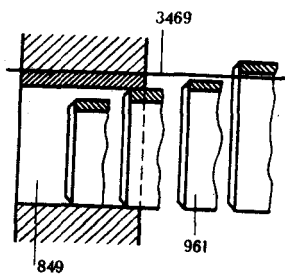
3464 Kích thước giới hạn
Limit of size
/'lɪmɪt əv saɪz/

3465 Giới hạn trên của kích
thước
Maximum limit of size
/ˌmæksɪməɪm 'lɪmɪt əv
saɪz/

3475



3478



3466 Giới hạn dưới của kích thước

Minimum limit of size
/ˌmɪnɪməŋ ˈlɪmɪt əv saɪz/

3467 Giới hạn trên của vật liệu

Maximum material limit
/ˌmæksɪməŋ məˈtɪəriəl ˈlɪmɪt/

3468 Giới hạn dưới của vật liệu

Minimum material limit
/ˌmɪnɪməŋ məˈtɪəriəl ˈlɪmɪt/

3469 Đường trung hòa, đường zêrô

Zero line
/ˈziːrəʊ laɪn/

3470 Độ lệch trên

Upper deviation
/ˌʌpə diˈviːʃən/

3471 Độ lệch dưới

Lower deviation
/ˌləʊə diˈviːʃən/

3472 Dung sai

Tolerance
/ˈtɒlərəns/

3473 Vùng dung sai cho phép

Tolerance zone
/ˈtɒlərəns zəʊn/

3474 Đơn vị dung sai

Tolerance unit
 $i = 0.45 \sqrt{3D + 0.001D}$
/ˈtɒlərəns ˈjuːnɪt/

3475 Sự lắp ghép

Fit
/fɪt/

3476 Khe hở

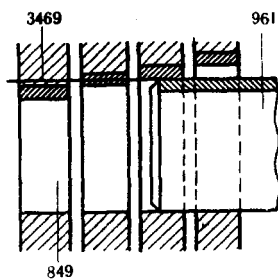
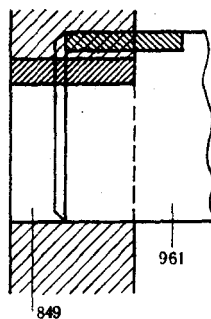
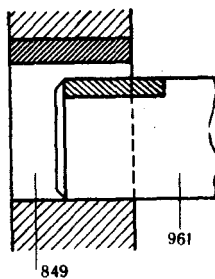
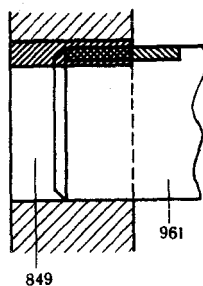
Clearance
/ˈkliːərəns/

3477 Độ dôi khi lắp

Interference
/ˌɪntəˈfɪərəns/

3478 Lỗ cơ sở

Basic hole
/ˈbeɪsɪk hoʊl/

3479**3482****3480****3481**

3479 Trục cơ sở*Basic shaft*

/ˈbeɪsɪk ʃɑːft/

3480 Lắp lỏng*Clearance fit*

/ˈkliːərəns fiːt/

3481 Lắp có độ dôi*Interference fit*

/ˌɪntəˈfɪərəns fiːt/

3482 Lắp trung gian*Transition fit*

/ˈtrænˈzɪʃn fiːt/

3483 Hệ thống đơn vị tiêu chuẩn Việt Nam về dung sai lắp ghép**TCVN***TCVN unified system of fits and tolerances*

Ti: si: vi:en .juːnəmaɪd

'sɪstəm əv 'fiːts ən

'tɒlərəns/

3484 Độ chính xác*Accuracy degree*

/ˈækjʊərəsi diːɡriː/

3485 Hệ thống tiêu chuẩn**Quốc tế về dung sai và lắp ghép***All-union system of fits and tolerances. OST**system*

/ɔːl juːniən sɪstəm əv

fiːts ən tɒlərəns

æstiːˈsɪstəm/

3486 Cấp chính xác*Accuracy class*

/ˈækjʊərəsi klɑːs/

3487 Lắp ép trung gian cấp chính xác 2*Medium drive fit of**second accuracy class***H7/s6 ... H7/s6**

/ˌmiːdiəm draɪv 'fiːt əv

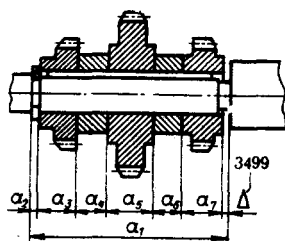
ˌsekəndˈækjʊərəsi klɑːs/

3488 Lắp ép trung gian cấp 2a*Medium drive fit of 2a**accuracy class***= H8/s7**

/ˌmiːdiəm draɪv 'fiːt əv tuː

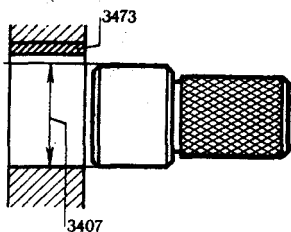
eɪ ˈækjʊərəsi klɑːs/

3498

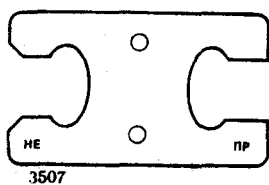


3489 Lắp ép nặng*Heavy drive fit* $= H8/u8$ */ˌheɪvɪ draɪvˈfiːt/***3490 Lắp trung gian nhẹ***Light-drive transition fit* $H7/m6$ */laɪt draɪv træˈziːʃn fiːt/***3491 Lắp chặt trung gian***Tight transition fit* $= H7/k6$ */taɪt træˈziːʃn fiːt/***3492 Lắp trượt trung gian***Snug transition fit* $H7/j6$ */sɪnʌg træˈziːʃn fiːt/***3493 Lắp trượt***Sliding transition fit* $= H7/h6$ $= H9/h8$ */slaɪdɪŋ træˈziːʃn fiːt/***3494 Lắp lỏng, lắp có độ dư***Locational clearance fit* $H7/g6$ */lɔːˈkeɪʃn kɪərəns fiːt/***3495 Sự lắp động***Running fit* $= H7/f7$ $= H9/f9$ */ˈrʌnɪŋ fiːt/***3496 Lắp động tự do***Free-running fit* $= H7/e8$ */friː ˈrʌnɪŋ fiːt/***3497 Lắp động lỏng***Loose-running fit* $= H9/d9$ */ləʊs, ˈrʌnɪŋ fiːt/***3498 Chuỗi kích thước***Dimension chain**/diˈmenʃn tʃeɪn/***3499 Kích thước đóng***Closing dimension**/ˈklɔːzɪŋ diˈmenʃn/*

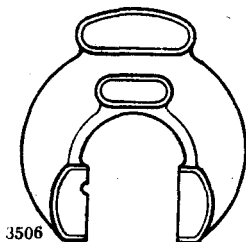
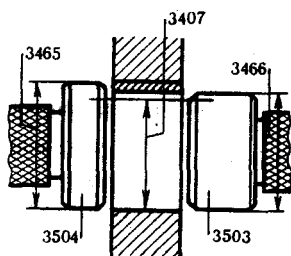
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3508



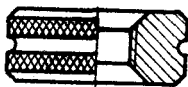
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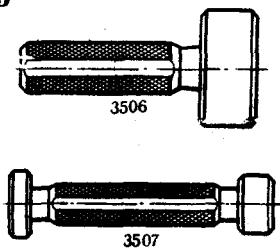
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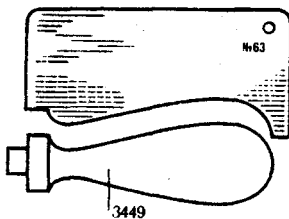
3511



3505



3512



**CỦ ĐO KHÔNG CHỈ
THỊ CALIP CHUẨN**
*NON-INDICATING
GAUGES*

**3500 Calip, cỡ đo không chỉ
thị**
Non-indicating gauge
/nɒn'ɪndɪkətɪŋ geɪdʒ/

3501 Calip mẫu
Master gauge
/'mɑːstə geɪdʒ/

3502 Calip giới hạn
Limit gauge
/'lɪmɪt geɪdʒ/

3503 Đầu lọt vào của calip
Go-gauge
/'gɔː geɪdʒ/

3504 Đầu không lọt
Not-go gauge
/ˌnɒtɡɔː geɪdʒ/

3505 Calip đo trong
Plug gauge
/'plʌɡ geɪdʒ/

3506 Calip một đầu
Single-ended gauge
/ˌsɪŋɡl ɛndɪd'geɪdʒ/

3507 Calip 2 đầu
Double-ended gauge
/ˌdʌbl ɛndɪd'geɪdʒ/

3508 Calip hàm
Snap gauge
/'snæp geɪdʒ/

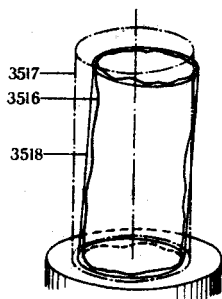
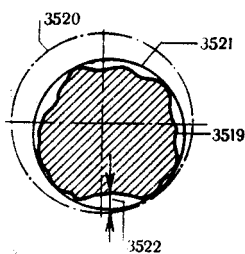
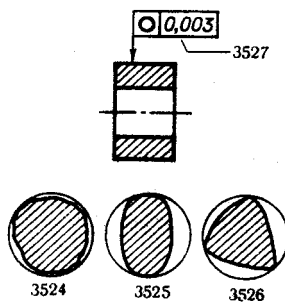
3509 Calip ren
Thread gauge
/θred geɪdʒ/

3510 Calip ren trong
Thread plug gauge
/θred plʌɡ geɪdʒ/

3511 Calip vòng ren
Thread ring gauge
/θred rɪŋ geɪdʒ/

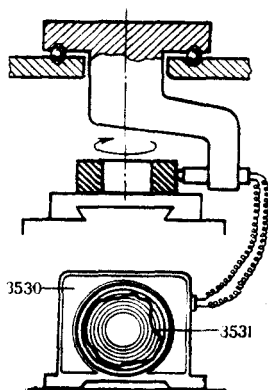
3512 Calip đường biên dạng
Profile gauge
/'prɔːfaɪl geɪdʒ/

3513 Calip làm việc
Working gauge
/'wɜːkɪŋ geɪdʒ/

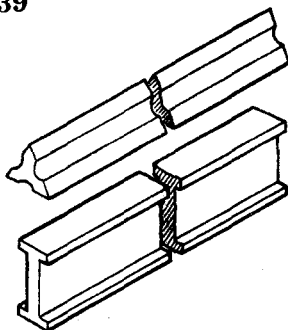
3516**3519****3523**

3514 Calip kiểm tra*Inspection gauge**/ɪn'spekʃn geɪdʒ/***3515 Calip chuẩn***Master gauge**/ma:ɪtʃ geɪdʒ/***ĐỘ CHÍNH XÁC BỀ****MẶT****ACCURACY OF SURFACE****FORM****3516 Bề mặt thực***Actual surface**/ˌæktʃʊəl 'sɜ:fɪs/***3517 Bề mặt hình học***Geometric surface**/dʒi:ɒ,metrɪk'sɜ:fɪs/***3518 Bề mặt ghép kề***Adjoining surface**/ədʒɔɪnɪŋ 'sɜ:fɪs/***3519 Biên dạng thực***Actual profile**/ˌæktʃʊəl'prəʊfaɪl/***3520 Biên dạng hình học***Geometric profile**/dʒi:ɒ,metrɪk 'prəʊfaɪl/***3521 Biên dạng tiếp liền***Adjoining profile**/ədʒɔɪnɪŋ 'prəʊfaɪl/***3522 Độ sai lệch hình dạng***Form deviation**/fɔ:m di'vi'eɪʃn/***3523 Độ tròn***Roundness**/rʌʊndnɪs/***3524 Độ không tròn***Out-of-roundness**/aʊtəv'rʌʊndnɪs/***3525 Độ ovan***Ovality**/ɔ:vəlɪti/***3526 Độ quét***Lobing**/lɒbɪŋ/***3527 Ký hiệu qui ước***Conventional**designation**/kɒn.ven'sɒnəl**disaɪ'neiʃn/*

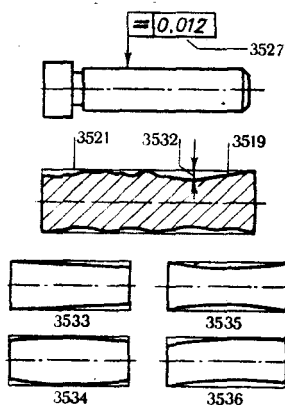
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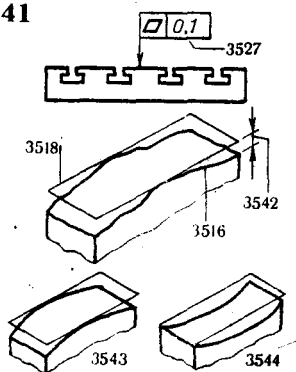
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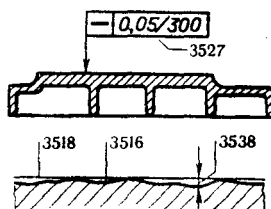
3532



3541



3537



3528 Phương pháp kiểm tra*Method of checking*

/məθəd əv 'ʃekɪŋ/

3529 Thước đo độ tròn*Roundness meter*

/rəʊndnɪs 'mi:tə(r)/

3530 Thiết bị ghi*Recording apparatus*

/rɪ'kɔ:dɪŋ əpə'rentəs/

3531 Đồ thị độ sai lệch*Deviation diagram*

/dɪ'vi:ʃn 'daɪəgræm/

3532 Độ sai lệch biên dạng*dọc**Deviation of**longitudinal-section**profile*

/dɪ'vi:ʃn əv

ləŋgɪ.tʃɪnəl'sekʃn

'prɔʊfaʊl/

3533 Độ côn*Taper*

/teɪpə(r)/

3534 Độ tăng tròn*Barrel*

/bærəl/

3535 Độ võng*Bow*

/bəʊ/

3536 Độ cong*Camber*

/kæmbə(r)/

3537 Độ thẳng*Straightness*

/'streɪtnɪs/

3538 Độ không thẳng*Nonstraightness*

/nɒn'streɪtnɪs/

3539 Biên thẳng chính xác*Precision straight-edge*

/pri'sɪʒn streɪt edʒ/

3540 Mức ngang*Spirit level*

/'spɪrɪt 'levl/

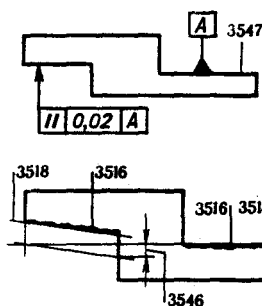
3541 Độ phẳng*Flatness*

/'flætɪnɪs/

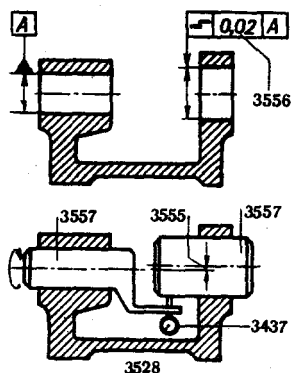
3542 Độ không phẳng*Nonflatness*

/nɒn'flætɪnɪs/

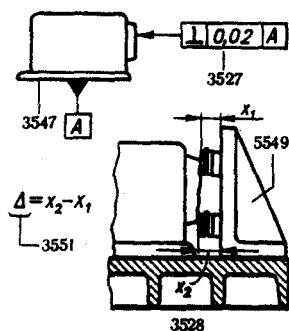
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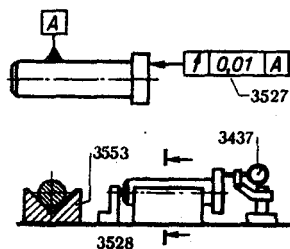
3554



3548



3552



3543 Độ lồi*Convexity*

/kən'veksəti/

3544 Độ lõm*Concavity*

/kən'kævəti/

**ĐỘ CHÍNH XÁC VỊ TRÍ
BỀ MẶT***ACCURACY OF SURFACE
POSITION***3545 Độ song song***Parallelism*

/pærə'lelɪzəm/

3546 Độ không song song*Non-parallelity*

/nɒn pærə'leləti/

3547 Bề mặt chuẩn*Datum surface*

/deɪtəm 'sɜːfɪs/

3548 Độ vuông góc*Squareness*

/'skweənɪs/

3549 Độ vuông góc chính xác*Precision square*

/pri'sɪʒn 'skweəɔn/

3550 Độ phẳng chính xác*Precision surface plate*

/pri'sɪʒn 'sɜːfɪs pleɪt/

3551 Độ không vuông góc*Nonsquareness*

/nɒn'skweəɔnɪs/

3552 Tác động lệnh*Camming action*

/'kæmɪŋ 'ækʃn/

3553 Khối V*Vee block*

/viː 'blɒk/

3554 Độ đồng tâm*Concentricity*

/kɒnsən'trɪsɪti/

3555 Độ lệch tâm*Eccentricity*

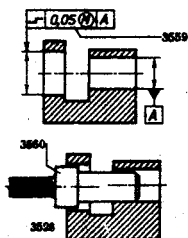
/'eksen'trɪsɪti/

3556 Đơn vị sai số độc lập*Nonqualified tolerance*

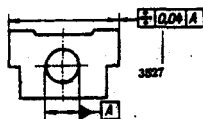
/nɒn.kwɒlɪfaɪd

'tɒlərəns/

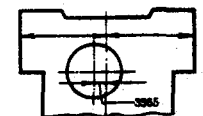
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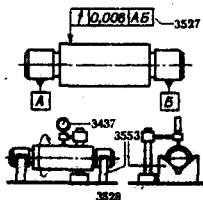
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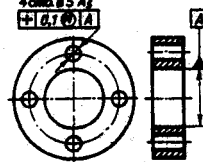
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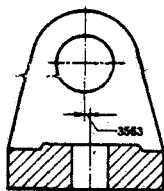
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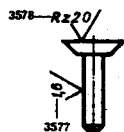
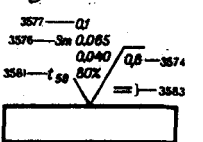
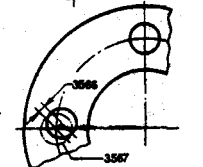
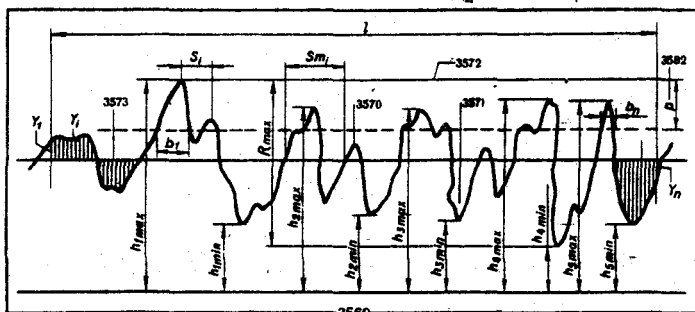
3568



3562



3569



3557 Trục kiểm tra*Checking mandrel*

/ˈtʃeɪkɪŋ ˈmændrəl/

3564 Độ đối xứng*Symmetry*

/ˈsɪmɪtri/

3558 Sai số phụ thuộc*Qualified tolerance*

/ˌkwɒlɪfaɪd ˈtɒlərəns/

3565 Không đối xứng*Nonsymmetry*

/nɒnˈsɪmɪtri/

3559 Điều kiện vật liệu cực đại*Maximum material**condition*

/ˌmæksɪmɪəm məˈtɪəriəl

kənˈdɪʃn/

3566 Độ lệch trục so với vị trí chuẩn*Displacement of axis**from the true position*

/dɪsˈpleɪsmənt əv ˈæksɪs

frəm ðə truː pəˈzɪʃn/

3560 Calíp vị trí*Position gauge*

/pəˈzɪʃn ɡeɪdʒ/

3567 Vị trí đúng*True position*

/truː pəˈzɪʃn/

**3561 Độ lệch tâm***Radial run out*

/ˌreɪdiəl ˈrʌnəʊt/

ĐỘ BÓNG BỀ MẶT**SURFACE FINISH****3562 Giao của các trục tâm***Intersection of axes*

/ɪntəˈsekʃn əv ˈæksɪz/

3568 Độ nhám bề mặt*Roughness ; surface**finish*

/ˈrʌfnɪs ˈsɜːfɪs ˈfɪnɪʃ/

3563 Không giao*Nonintersection*

/ˌnɒnɪntəˈsekʃn/

3569 Độ không phẳng biên*dạng**Profile irregularities*

/ˌprəʊfaɪl ɪˌreɡjʊˈlærətɪz/

$$3576 \quad S_m = \frac{1}{n} \sum_{i=1}^n S_m$$

$$3577 \quad R_a = \frac{1}{n} \sum_{i=1}^n |y_i|$$

$$3578 \quad R_z = \frac{1}{5} \left(\sum_{i=1}^5 h_{i_{\max}} - \sum_{i=1}^5 h_{i_{\min}} \right)$$

3570 Đỉnh biên dạng

Profile peak
/prəʊfaɪl pi:k/

3571 Đáy biên dạng

Profile valley
/prəʊfaɪl 'væli/

3572 Tuyến đỉnh biên dạng

Line of profile peaks
/laɪn əv .prəʊfaɪl pi:ks/

3573 Đường biên dạng trung bình

Mean line of the profile
/mi:n 'laɪn əv ðə
'prəʊfaɪl/

3574 Chiều dài cơ sở (l)

Sampling length
/sæmpling lenθ/

3575 Khoảng cách độ nhấp nhô bề mặt (SI)

Spacing of the profile irregularities in crests
/'speɪsɪŋ əv ðə .prəʊfaɪl
ɪ'regju'lərətɪz ɪn krest/

3576 Khoảng cách trung bình độ nhấp nhô bề mặt

Mean spacing of the profile irregularities
/mi:n 'speɪsɪŋ əv ðə
prəʊfaɪl ɪ'regju'lərətɪz/

3577 Độ lệch trung bình số học của biên dạng

Arithmetical mean deviation of the profile
/ənθ'metɪkl mi:n
di:vi'eɪʃn əv ðə
prəʊfaɪl/

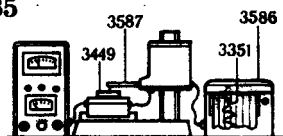
3578 Độ cao 10 điểm của độ nhám

Ten-point height of irregularities
/ten pɔɪnt 'haʊt əv
ɪ'regju'lərətɪz/

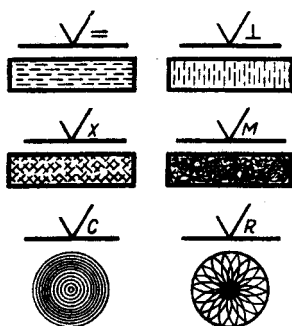
3581

$$l_p = \frac{1}{l} \sum_{i=1}^n b_i$$

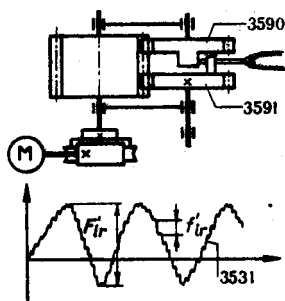
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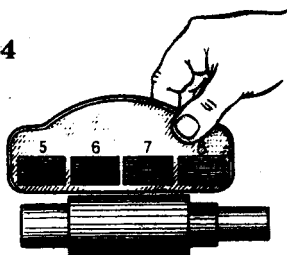
3583



3589



3584



3579 Độ cao cực đại của biên dạng ($R_{\max}$)

Maximum height of the profile

/ˌmæksɪməˈhaɪt əv ðə ˈprəʊfaɪl/

3580 Chiều dài qui chiếu của biên dạng

Reference length of the profile

/ˌrefərəns leŋθ əv ðə ˈprəʊfaɪl/

3581 Chiều dài qui chiếu tương đối của biên dạng

Relative reference length of the profile

/ˌrelatɪv ˌrefərəns leŋθ əv ðə ˈprəʊfaɪl/

3582 Mức biên dạng (p)

Level of the profile section

/ˈlevl əv ðə ˈprəʊfaɪl ˈsekʃn/

3583 Độ đồng hướng

Lay
/leɪ/

3584 Mẫu đo độ nhám bề mặt

Roughness comparison specimen

/ˈrʌfnɪs kəmˈpærɪsn ˈspesɪmən/

3585 Thước đo biên dạng

Profilometer

/ˌprəʊfaɪləˈmɪtə(r)/

3586 Đồ thị biên dạng

Profilograph

/ˌprəʊfaɪləˈɡrɑːf/

3587 Đầu dò

Tracing head

/ˈtreɪsɪŋ hed/

ĐỘ CHÍNH XÁC CỦA BÁNH RĂNG

ACCURACY OF GEARS

3588 Độ chính xác động học

Kinematic accuracy

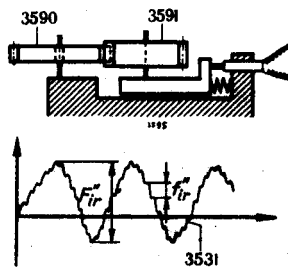
/ˌkɪnɪmetɪk ˈækjʊərəsɪ/

3589 Sự kiểm tra bằng cách lăn đơn mặt sau

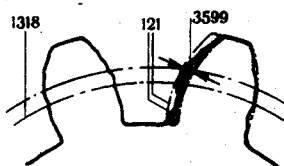
Checking by single-flank rolling

/ˈtʃeːkɪŋ baɪ ˌsɪŋɡl flæŋk ˈrəʊlɪŋ/

3594



3599



3590 Bánh răng được kiểm tra

Gear to be checked
/gɪə tə bi: tʃekt/

3591 Bánh răng mẫu

Master gear
/mɑ:stə gɪə(r)/

3592 Tổng sai số mặt lưng (F_{ir})

*Total composite error
single flank*
/ˌtəʊtəl ˌkɒmpəzɪt ˌerə
ˌsɪŋɡl ˈflæŋk/

3593 Tổng sai số mặt lưng từ răng đến răng (F_{ir})

*Tooth-to-tooth composite
error single flank*
/tu:θ tə tu:θ ˌkɒmpəzɪt
ˌerə ˌsɪŋɡl ˈflæŋk/

3594 Kiểm tra bằng cách lăn kép mặt sau

*Checking by double-flank
rolling*
/tʃekɪŋ baɪ ˌdʌbl ˈflæŋk
ˈrəʊlɪŋ/

3595 Máy thử lăn răng thay đổi khoảng cách tâm

*Variable-centre-distance
gear-rolling tester*
/ˌveəriəbl ˌsentə ˌdɪstəns
ˌgɪə rəʊlɪŋ ˈtestə(r)/

3596 Tổng sai số mặt lưng kép (F_{ir})

*Total composite error
double flank*
/ˌtəʊtəl ˌkɒmpəzɪt ˌerə
ˌdʌbl ˈflæŋk/

3597 Sai số mặt lưng kép từ răng đến răng (F_{ir})

*Tooth-to-tooth composite
error double flank*
/tu:θ tə tu:θ ˌkɒmpəzɪt
ˌerə ˌdʌbl ˈflæŋk/

3598 Sai số bước tích lũy (F_{pr})

Cumulative pitch error
/ˌkju:mju:lətɪv pɪtʃ ˈerə(r)/

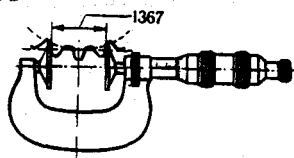
3599 Sai số biên dạng răng (f_{pr})

Tooth profile error
/tu:θ ˈprəʊfaɪl ˈerə(r)/

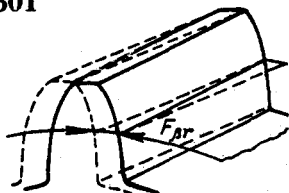
3600



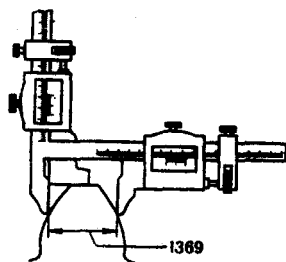
3603



3601



3602



3600 Vết tiếp xúc*Bearing pattern*

/bɛərɪŋ 'pætn/

3602 Calíp cặp đo răng*Vernier tooth calliper*

/vɜːniə tuːθ 'kælɪpə(r)/

3601 Tổng sai số méo ($F_{\beta r}$)*Total error of distortion*

/təʊtəl 'erə ɒv dɪs'tɔːʃn/

3603 Panme đo khẩu độ*Micrometer for span**measurement*

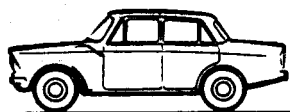
/ˌmaɪkrə'mɪtə fə spæn

'meʒmənt/

CÁC LOẠI MÁY MÓC THÔNG DỤNG

MISCELLANEOUS MACHINES

3605



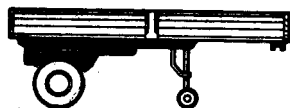
3609



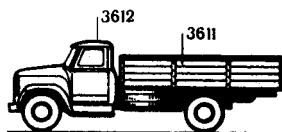
3606



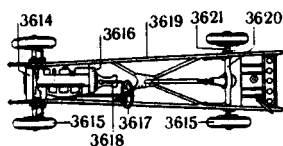
3610



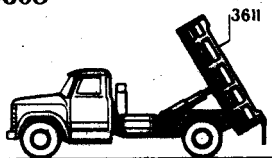
3607



3613



3608



CÁC LOẠI MÁY MÓC THÔNG DỤNG

MISCELLANEOUS MACHINES

PHƯƠNG TIỆN GIAO THÔNG VẬN TẢI TRANSPORT MACHINES

3604 Xe có động cơ
Motor vehicle
/ˌməʊtə ˈviːkl/

3605 Xe du lịch
(Passenger) car
/ˈpæsiŋdʒə kɑː(r)/

3606 Xe buýt
Bus
/bʌs/

3607 Xe tải nhẹ
Lorry, truck
/ˈlɒri ˈtrʌk/

3608 Xe tải tự đổ, xe ben
Dump(-body) truck
/dʌmp, bɒd ɪ ˈtrʌk/

3609 Xe kéo móc
Truck trailer
/ˈtrʌk ˈtreɪlə(r)/

3610 Móc
Trailer
/ˈtreɪlə(r)/

3611 Thân xe
Body
/bɒd ɪ/

3612 Buồng lái
Driver's cabin
/ˈdraɪvəz ˈkæbɪn/

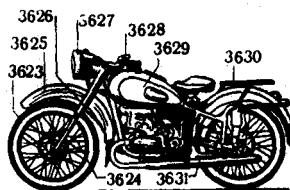
3613 Sườn xe
Chassis
/ˈʃæsiːs/

3614 Bộ tản nhiệt
Radiator
/ˈreɪdɪeɪtə(r)/

3615 Bánh xe
Wheel
/wiːl/

3616 Ly hợp
Clutch
/ˈklʌʃ/

3617 Tay lái
Steering gear
/ˈstiːərɪŋ ɡiə(r)/

3622

3618 Hộp số

Gearbox
/ˈɡɪəbɒks/

3619 Khung xe

Frame
/freɪm/

3620 Trục sau

Rear axle
/rɪəˈæksl/

3621 Trục quay

Swing axle
/swɪŋˈæksl/

3622 Xe gắn máy xe mô tô

Motorcycle
/ˌməʊtəˈsaɪkl/

3623 Vỏ, lốp xe

Tyre
/taɪə(r)/

3624 Cầm, nan hoa

Spoke
/spəʊk/

3625 Chắn bùn trước

Front fender, mudguard
/frʌntˈfendə(r)/
ˈmʌdgɑːd/

3626 Chạc, sườn trước

Front fork
/frʌnt fɔːk/

3627 Đèn pha

Head lamp
/hed læmp/

3628 Tay lái

Handlebars
/ˈhændlbɑːz/

3629 Thùng nhiên liệu

Gasoline tank, petrol
tank
/ˈɡæzəliːn tæŋk ˈpetrəʊl
tæŋk/

3630 Giá đeo hàng

(Luggage) carrier
/ˈlʌɡɪdʒ ˈkæriə(r)/

3631 Ống xả, ống bô

Muffler
/ˈmʌflə(r)/

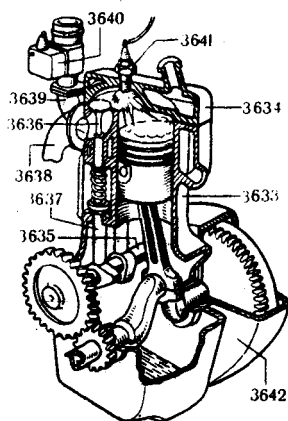
3632 Động cơ xăng,

Petrol engine,
carburettor engine
/ˈpetrəʊl ɛndʒɪn
kɑːbəˈreɪtə ˈɛndʒɪn/

3633 Khói xy lanh

Cylinder block
/ˈsɪlɪndə blɒk/

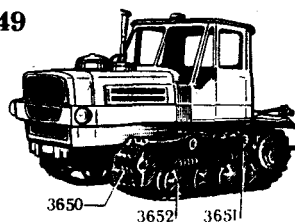
3637



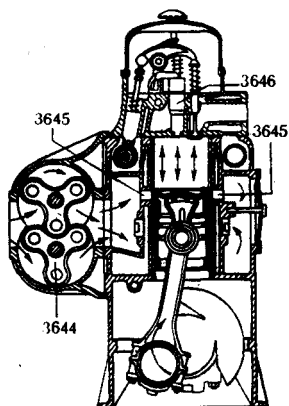
3648



3649



3643



3634 Đầu xy lanh

Cylinder head
/ˈsɪlɪndə hed/

3635 Trục cam

Camshaft
/kæmʃɑ:ft/

3636 Van, xup pap

Valve
/vælv/

**3637 Thanh đẩy xup pap,
cần van**

Valve tappet
/vælv ˈtæpɪt/

3638 Ống xả

Exhaust pipe
/ɪgˈzɔ:st paɪp/

3639 Ống nạp

Intake pipe
/ˈɪnteɪk paɪp/

3640 Bộ chế hòa khí

Carburettor
/kɑ:bəˈretə(r)/

3641 Bugi

Spark plug
/ˈspɑ:k plʌg/

3642 Cacte

Crankase
/ˈkræŋkeɪs/

3643 Động cơ diesel

Oil engine, diesel engine
/ɔɪl ˈendʒɪn ˈdi:zl ˈendʒɪn/

3644 Bơm cao áp (heo dầu)

Supercharger
/ˌsʊpəˈtʃɑ:dʒə(r)/

3645 Chỗ xả cặn

Scavenging port
/ˈskævɪndʒɪŋ pɔ:t/

**3646 Bơm và vòi phun nhiên
liệu**

Fuel pump and injector
/ˈfju:əl pʌmp ənd
ɪnˈdʒektə(r)/

3647 Máy kéo

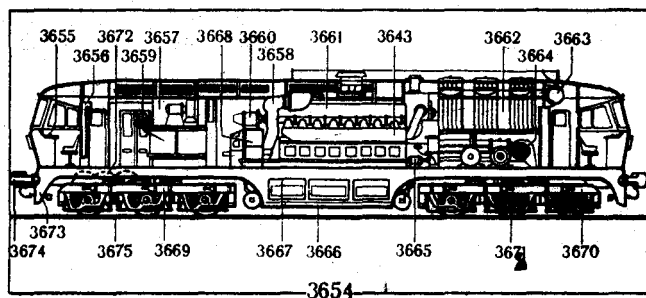
Tractor
/ˈtræktə(r)/

3648 Máy kéo bánh hơi

Wheel (-type) tractor
/wi:l (taɪp) ˈtræktə(r)/

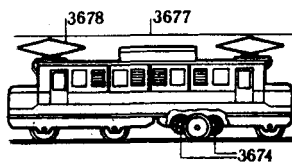
3649 Máy kéo bánh xích

Crawler tractor
/ˈkrɔ:lə ˈtræktə(r)/

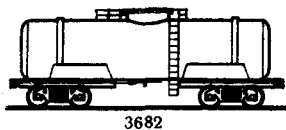
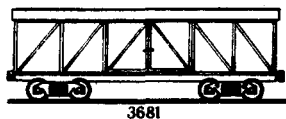
3654

3650 Xích, sên tải*Track chain, track**/tɹæk tʃeɪn/***3651 Con lăn đỡ***Support roller**/sə'pɔ:t 'rəʊlə(r)/***3652 Bánh lăn xích***Track wheel**/tɹæk wi:l/***3653 Đầu máy xe lửa***Locomotive**/ləʊkə'məʊtɪv/***3654 Đầu máy diesel***Diesel locomotive**/di:zl 'ləʊkə'məʊtɪv/***3655 Bảng đồng hồ đo***Control desk**/kən'trɔ:l desk/***3656 Khoang chứa cát chống cháy***Sand bunker**/sænd 'bʌŋkə(r)/***3657 Ngăn thiết bị điện***Electrical equipment**compartment**/ɪ.lektrɪkl ɪ.kwɪpmənt**kəm'pɑ:tmənt/***3658 Quạt máy động cơ***Motor fan**/məʊtə 'fæn/***3659 Cụm chỉnh lưu công suất***Power rectifier unit**/paʊə ,rektɪfaɪə 'ju:nɪt/***3660 Máy phát khởi động***Starter-generator**/stɑ:tə 'dʒenəreɪtə(r)/***3661 Buồng động cơ máy***Engine compartment**/endʒɪn kəm'pɑ:tmənt/***3662 Buồng nước làm nguội***Water cooling section**/wɔ:tə 'kʊlɪŋ 'sekʃn/***3663 Bồn nước***Water tank**/wɔ:tə tæŋk/***3664 Buồng máy, tủ lạnh***Refrigerator**compartment**/rɪfrɪdʒəreɪtə**kəm'pɑ:tmənt/***3665 Ngăn cung cấp nhiên liệu***Fuel-feed unit**/fju:əl fi:d 'ju:nɪt/*

3676



3679



3666 Bồn nhiên liệu*Fuel tank*

/fjuəl tæŋk/

3667 Acqui*Accumulator battery*

/ə'kjumjulentə 'bætəri/

3668 Máy phát đề kéo*Traction generator*

/trækʃn 'dʒenəreɪtə(r)/

3669 Xylanh thắng hãm*Brake cylinder*

/breɪk 'sɪlɪndə(r)/

3670 Thanh chuyển hướng*Bogic*

/bəʊɡɪk/

3671 Cặp bánh xe*Wheel pair*

/wi:l peə/

3672 Động cơ điện kéo*Traction electric motor*/trækʃn ɪ.lektrɪk
'məʊtə(r)/**3673 Thiết bị vệ sinh***Track cleaner*

/træk 'kliː nɔ(r)/

3674 Động nối tự động*Automatic coupling*

/ɔ:təmətɪk 'kʌplɪŋ/

3675 Đường ray*Rail*

/reɪl/

3676 Đầu máy điện*Electric locomotive*

/ɪ.lektrɪk ɪəʊkəməʊtɪv/

3677 Dây điện tiếp xúc trên*Overhead contact wire,**aerial line*/əʊvəhed 'kɒntækt
waɪə(r) 'eəriəl laɪn/**3678 Khung góp điện***Current collector,**pantograph*/kɑːrənt kə'lektə(r)
'pæntəgrɒf/**3679 Toa chở hàng***Freight car*

/frent kɑː(r)/

3680 Toa trần, toa**không mui***Gondola, open car*

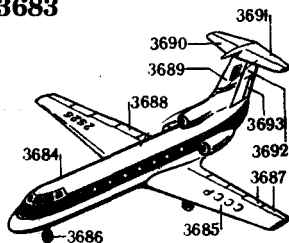
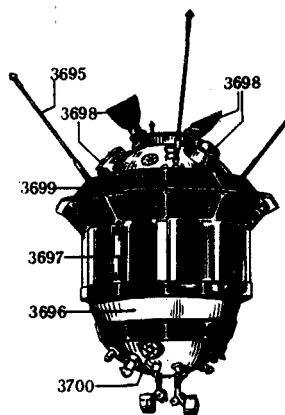
/gɒndələ ʊpən kɑː(r)/

3681 Toa kín*Box freight car*

/bɒks 'frent kɑː(r)/

3682 Toa chở nhiên liệu*Tank car*

/tæŋk kɑː(r)/

3683**3694**

3683 Máy bay

Aircraft
/ˈeɪkrɑːft/

3684 Thân máy bay

Fuselage
/ˈfjuːsɪliːdʒ/

3685 Cánh

Wing
/wɪŋ/

3686 Bánh dẫn hướng

Undercarriage
/ˌʌndəˈkæriːdʒ/

3687 Cánh phụ cân bằng

Aileron
/ˈeɪləron/

3688 Cánh rà, cánh gấp

Flap
/flæp/

3689 Cánh đứng

Fin
/frɪn/

3690 Cánh đuôi

Tailplane
/ˈteɪlpleɪn/

3691 Cánh nâng

Elevator
/ˈelɪveɪtə(r)/

3692 Cánh lái

Rudder
/ˈrʌdə(r)/

3693 Dải cân bằng

Trimming tab
/ˈtrɪmɪŋ tæb/

3694 Tàu, Phi thuyền không gian liên hành tinh

Interplanetary station
/ˌɪntəˈplæniəri ˈsteɪʃn/

3695 Anten

Antenna
/ænˈtenə/

3696 Màn chắn nhiệt

Thermal screen
/ˌθɜːml skriːn/

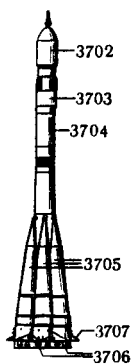
3697 Cửa chắn hệ thống điều nhiệt

Thermoregulating system
shutter
/ˌθɜːməˌregjʊleɪtɪŋ
ˈsɪstəm ˈʃʌtə(r)/

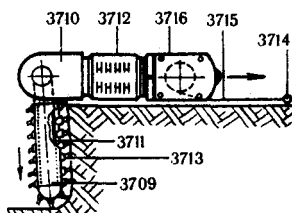
3698 Dụng cụ nghiên cứu khoa học

Scientific instruments
/saɪənˌtɪfɪk ˈɪnstrʊmənts/

3701

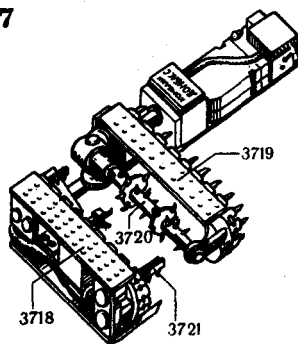


3708

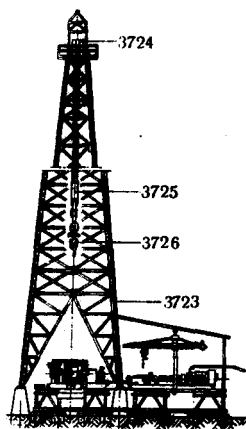


3699 Pin mặt trời*Solar battery**/sɔːlə 'bætəri/***3700 Động cơ chỉnh hướng***Orientation engine**/ɔːriən'teɪʃn 'endʒɪn/***3701 Tên lửa đẩy***Launch rocket**/lɔːnʃ 'rɒkɪt/***3702 Mũi rẽ dòng***Nose fairing**/nɔːz 'feəriŋ/***3703 Tầng tên lửa cuối cùng***Final rocket stage**/faɪnəl 'rɒkɪt steɪdʒ/***3704 Tầng tên lửa thứ hai***Second rocket stage**/səkənd 'rɒkɪt steɪdʒ/***3705 Động cơ tăng tốc***Booster**/bəʊstɜː/***3706 Ổng phản lực***Jet**/dʒet/***3707 Bộ kiểm soát khí động***lực**Aerodynamic controller**/ˌæərədaɪ'næmɪk**kən'trɒlə(r)/***MÁY KHAI THÁC MỎ****VÀ DẦU MỎ****MINING AND****PETROLEUM MACHINES****3708 Máy đào than***Coal-cutter**/kɔːl 'kʌtɜː/***3709 Băng tải***jib**/dʒɪb/***3710 Hộp bánh răng***Gearhead**/gɪə'hed/***3711 Xích khai thác***Cutting chain**/kʌtɪŋ tʃeɪn/***3712 Cụm công suất***Power unit**/paʊə 'juːnɪt/***3713 Răng đào***(Cutter) pick**/kʌtɜː pɪk/*

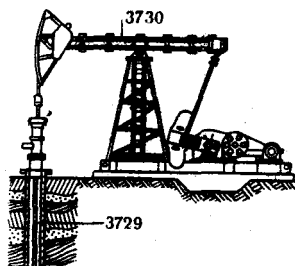
3717



3722



3727



3714 Chân cố định

Anchor prop

/æŋkə'prɒp/

3715 Cáp tải

Haulage rope

/hɔ:lɪdʒ raʊp/

3716 Cụm tải

Haulage unit

/hɔ:lɪdʒ 'ju:nɪt/

3717 Thiết bị khai thác than
liên hợp*Combined cutter-loader**coal getter-loader*

/kəm.baɪnd 'kʌtə

'lɔ:ðə(r) kəʊl 'getə

lɔ:ðə(r)/

3718 Bộ nạp than

Loader

/lɔ:ðə(r)/

3719 Băng chuyền

Face conveyer

/feɪs kən'veɪə(r)/

3720 Trục cắt

Cutting shaft

/'kʌtɪŋ ʃɑ:ft/

3721 Lưỡi nạo

Scraper

/'skreɪpə(r)/

3722 Tháp khoan

Drilling rig

/'drɪlɪŋ rɪg/

3723 Tháp

Derrick

/'derɪk/

3724 Khối đỉnh

Crown block

/'krəʊn blɒk/

3725 Hệ thống nâng

Tackle block

/'tækl blɒk/

3726 Khớp xoay

Swivel

/'swɪvl/

3727 Con đội bơm

Pumping jack

/'pʌmpɪŋ dʒæk/

3728 Bơm ở đáy lỗ khoan

Bottom-hole pump

/.'bɒtəm hɔ:l 'pʌmp/

3729 Thanh bơm

(Pumping) rod

/'pʌmpɪŋ rɒd/

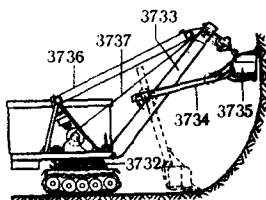
3730 Càn, thanh ngang

Beam

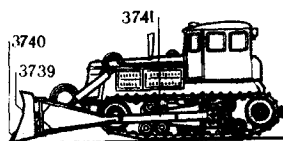
/bi:m/

gian 1c

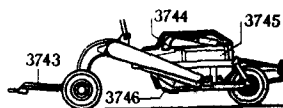
3731



3738



3742



MÁY MÓC XÂY DỰNG

BUILDING MACHINES

3731 Máy đào đất
(Power) excavator
/pəʊə 'ekskaʊeɪtə(r)/

3732 Đé xoay
Revolving platform
/rɪ'vɒlviŋ 'plætfɔ:m/

3733 Thanh đai
(Shovel) boom
/'ʃɒvl bʊm/

3734 Cần, thanh đào xúc
Bucket arm, dipper stick
/'bʌkɪt ɑ:m 'dɪpə(r) stɪk/

3735 Gàu xúc
Digging bucket, dipper
/'dɪɡɪŋ 'bʌkɪt 'dɪpə(r)/

3736 Cáp nâng thanh đai
Boom hoist rope
/bʊm hoɪst rəʊp/

3737 Cáp chính
Bucket rope
/'bʌkɪt rəʊp/

3738 Máy ủi đất
Dozer, bulldozer
/'dɒʒə(r) bʌl'dɒʒə(r)/

3739 Lưỡi ủi
Plough share
/'pləʊʃeɪə(r)/

3740 Cánh ủi
Blade
/bleɪd/

3741 Thanh, cần đẩy
Push rod beam
/'pʊʃ rɒd bi:m/

3742 Máp cạp đất
Scraper
/'skreɪpə(r)/

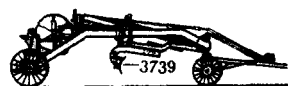
3743 Thanh kéo
Tow bar
/təʊ bɑ:(r)/

3744 Tấm chắn
Apron
/'eɪprɒn/

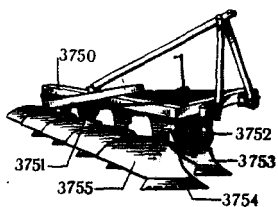
3745 Thùng chứa
(Sraper) bowl
/'skreɪpə bɔʊl/

3746 Lưỡi cắt
Cutting blade
/'kʌtɪŋ bleɪd/

3747



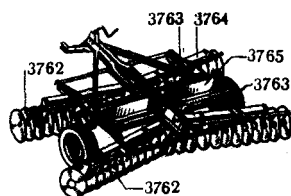
3749



3756



3761



3747 Máy san phẳng có động

cơ

(Motor) grader

/ˈmɔ:tə ˈɡreɪdər/

MÁY MÓC NÔNG**NGHIỆP****FARMING MACHINES****3748 Cái cày***Plough*

/plɔ:z/

(plaw)

3749 Cái cày có gắn lưỡi*Mounted plough*

/ˈmaʊntɪd plɔ:z/

3750 Khung, cần*Frame, beam*

/freɪm ˌbi:m/

3751 Đĩa xới phụ*Disk coulter*

/disk ˈkʊltər/

Disk cùl

3752 Bánh xe đỡ*Supporting wheel*

/səˈpɔ:tɪŋ wi:l/

3753 Lưỡi hót lớp mặt*Skim*

/skɪm/

3754 Lưỡi cày*Ploughshare*

/ˈplɔ:ʃeə/

3755 Thân lưỡi cày*Mouldboard, breast*

/ˈmɔ:lbɔ:d breɪst/

3756 Dàn cày gắn máy kéo*Trailing plough*

/ˈtreɪlɪŋ plɔ:z/

3757 Cày móc*Hitch*

/hɪtʃ/

3758 Bánh tỳ đất*Land wheel*

/lənd wi:l/

3759 Bánh rạch luống*Furrow wheel*

/ˈfʌrɔ: wi:l/

3760 Cái bừa đất*Harrow*

/ˈhærɔ:/

3761 Máy kéo bừa dạng đĩa*Trailed disk harrow*

/ˈtreɪld disk ˈhærɔ:/

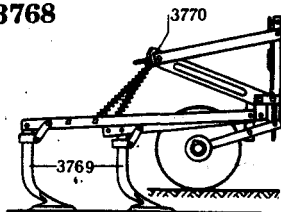
3762 Bộ đĩa bừa*Disk section gang*

/disk ˈsekʃn ɡæŋ/

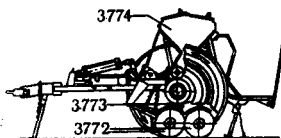
3766



3768



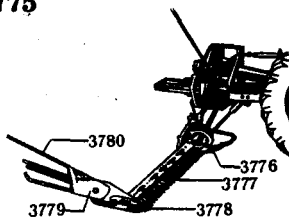
3771



3773

3772

3775



—3776

-3777

3779

-3778

3763 Chốt, then

Dowel
/dəʊəl/

3764 Thanh giữ

Section beam
/ˈsekʃn bi:m/

3765 Hộp chứa hạt giống

Ballast box
/ˈbæləst bɒks/

3766 Bừa thanh nhọn

Spike tooth harrow
/ˈspaɪk tu:θ hæɾəʊ/

3767 Thanh làm phẳng

Evener bar
/ˈivnə bɑ:(r)/

3768 Máy xới

Cultivator
/ˈkʌltɪveɪtə(r)/

3769 Thanh xới

Sweep
/swi:p/

3770 Thanh áp lực

Pressure rod
/ˈpreʃə rɒd/

3771 Máy gieo hạt

Seeder, drill
/ˈsi:də(r) drɪl/

3772 Lưỡi xới phụ

Coulter
/ˈkəʊltə(r)/

3773 Ống cấp hạt

Seed tube
/ˈsi:d tju:b/

3774 Hộp đựng phân và hạt giống

Grain-and-fertilizer box
/ˈgreɪn ən ˈfɜ:tɪlaɪzə bɒks/

3775 Máy cắt cỏ

Mowing machine
/ˈməʊɪŋ məʃi:n/

3776 Guốc trong

Inner shoe
/ˈɪnə ʃu:/

3777 Thanh cắt

Cutter bar
/ˈkʌtə bɑ:(r)/

3778 Guốc ngoài

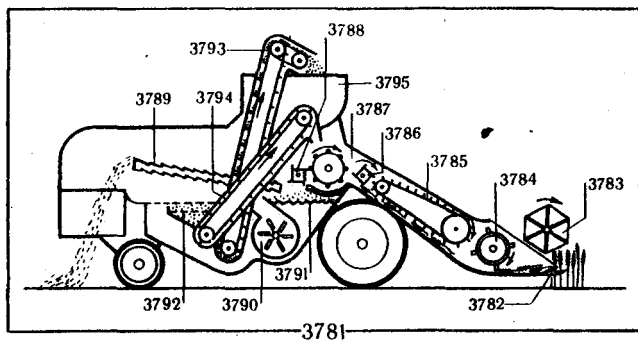
Outer shoe
/ˈaʊtə ʃu:/

3779 Cụm gom cỏ

Swath board
/ˈswɑ:θ bɔ:d/

(thực / Vase có bi in)

3781



3780 Cần hót cỏ*Swath stick*

/swɔːθ stɪk/

3781 Máy gặt đập liên hợp*Combine harvester*

/kəmˈbaɪn ˈhɑːvɪstə(r)/

3782 Thanh cắt*Cutter bar*

/kʌtə bɑː/

3783 Bánh lồng*Reel*

/riːl/

3784 Ống xoắn lấy bông*Auger*

/ɔːɡə(r)/

3785 Tải nâng*Feed elevator*

/fiːd ˈelɪvətə(r)/

3786 Bộ tách hạt phía trước*Front beater*

/frʌnt ˈbiːtə(r)/

3787 Trống tách hạt*Threshing drum*

/θreʃɪŋ drʌm/

3788 Bộ tách hạt phía sau*Rear beater*

/riə ˈbiːtə(r)/

3789 Ống lấy rơm*Straw walker*

/strɔː ˈwɔlkə(r)/

3790 Quạt gió*Fan*

/fæn/

3791 Sàng đãi hạt*Grain pan*

/ɡreɪn pæn/

3792 Sàng ; rây*Sieve*

/siv/

3793 Guồng nâng hạt*Grain elevator*

/ɡreɪn ˈelɪvətə(r)/

3794 Guồng tải rơm*Tailings elevator*

/ˈteɪlɪŋz ˈelɪvətə(r)/

3795 Thùng chứa hạt*Grain tank*

/ɡreɪn tæŋk/

PHẦN II

- KÝ HIỆU**
- CÔNG THỨC**
- SỐ LIỆU**

CÁC NGÀNH KỸ THUẬT

- SYMBOLS**
- FORMULAE**
- MATERIAL NUMBERS**

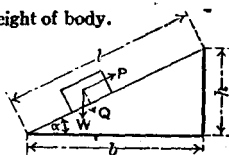
OF MECHANICAL ENGINEERINGS

CƠ HỌC

MẶT PHẪNG NGHIÊNG - CHÈM

INCLINED PLANE - WEDGE

W = weight of body.



Neglecting friction:

$$P = W \times \frac{h}{l} = W \times \sin \alpha$$

$$W = P \times \frac{l}{h} = \frac{P}{\sin \alpha} = P \times \operatorname{cosec} \alpha$$

$$Q = W \times \frac{b}{l} = W \times \cos \alpha$$

If friction is taken into account, then force P to pull body up is:

$$P = W (\mu \cos \alpha + \sin \alpha)$$

Force P_1 to pull body down is:

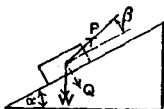
$$P_1 = W (\mu \cos \alpha - \sin \alpha)$$

Force P_2 to hold body stationary:

$$P_2 = W (\sin \alpha - \mu \cos \alpha)$$

in which μ is the coefficient of friction.

W = weight of body.



Neglecting friction:

$$P = W \times \frac{\sin \alpha}{\cos \beta}$$

$$W = P \times \frac{\cos \beta}{\sin \alpha}$$

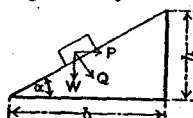
$$Q = W \times \frac{\cos (\alpha + \beta)}{\cos \beta}$$

With friction:

Coefficient of friction = $\mu = \tan \phi$.

$$P = W \times \frac{\sin (\alpha + \phi)}{\cos (\beta - \phi)}$$

W = weight of body.



Neglecting friction:

$$P = W \times \frac{h}{b} = W \times \tan \alpha$$

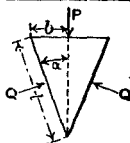
$$W = P \times \frac{b}{h} = P \times \cot \alpha$$

$$Q = \frac{W}{\cos \alpha} = W \times \sec \alpha$$

With friction:

Coefficient of friction = $\mu = \tan \phi$.

$$P = W \tan (\alpha + \phi)$$



Neglecting friction:

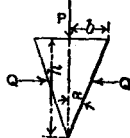
$$P = 2 Q \times \frac{b}{l} = 2 Q \times \sin \alpha$$

$$Q = P \times \frac{l}{2b} = \frac{1}{2} P \times \operatorname{cosec} \alpha$$

With friction:

Coefficient of friction = μ .

$$P = 2 Q (\mu \cos \alpha + \sin \alpha)$$



Neglecting friction:

$$P = 2 Q \times \frac{b}{h} = 2 Q \times \tan \alpha$$

$$Q = P \times \frac{h}{2b} = \frac{1}{2} P \times \cot \alpha$$

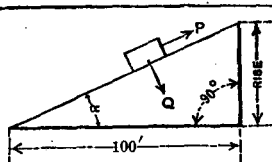
With friction:

Coefficient of friction = $\mu = \tan \phi$.

$$P = 2 Q \tan (\alpha + \phi)$$

BẢNG TÍNH LỰC TRÊN MẶT PHẪNG NGHIÊNG

TABLE OF FORCES ON INCLINED PLANES



The table below makes it possible to find the force required for moving a body on an inclined plane. The friction on the plane is not taken into account. The column headed "Tension P in Cable per Ton of 2000 Pounds" gives the pull in pounds required for moving one ton along the inclined surface. The fourth column gives the perpendicular or normal pressure. If the coefficient of friction is known, the added pull required to overcome friction is thus easily determined:

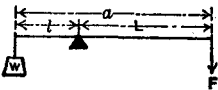
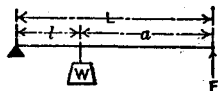
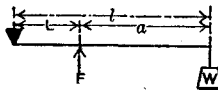
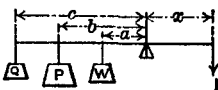
$Q \times \text{coefficient of friction} = \text{additional pull required.}$

Tensions and Pressures in Pounds

Per Cent of Grade. Rise, Ft. per 100 Ft.	Angle α	Tension P in Cable per Ton of 2000 Lbs.	Perpendicular Pressure Q on Plane per Ton of 2000 Lbs.	Per Cent of Grade. Rise, Ft. per 100 Ft.	Angle α	Tension P in Cable per Ton of 2000 Lbs.	Perpendicular Pressure Q on Plane per Ton of 2000 Lbs.
1	0° 35'	20.2	1999.8	39	21° 19'	727.0	1863.0
2	1 9	40.0	1999.4	40	21 49	743.2	1856.6
3	1 44	60.4	1999.0	41	22 18	758.8	1850.4
4	2 18	80.2	1998.2	42	22 47	774.4	1843.8
5	2 52	100.0	1997.4	43	23 17	790.4	1837.0
6	3 27	120.2	1996.2	44	23 45	805.4	1830.6
7	4 1	140.0	1995.0	45	24 14	820.8	1823.6
8	4 35	159.8	1993.6	46	24 43	836.2	1816.6
9	5 9	179.4	1991.8	47	25 11	851.0	1809.8
10	5 43	199.2	1990.0	48	25 39	865.6	1802.8
11	6 17	218.8	1987.8	49	26 7	880.4	1795.6
12	6 51	238.4	1985.6	50	26 34	894.4	1788.8
13	7 25	258.0	1983.2	51	27 2	909.0	1781.4
14	7 59	277.6	1980.6	52	27 29	922.8	1774.2
15	8 32	296.6	1977.8	53	27 56	936.8	1766.8
16	9 6	316.2	1974.8	54	28 23	950.6	1759.4
17	9 39	335.2	1971.6	55	28 49	964.0	1752.2
18	10 13	354.6	1968.2	56	29 15	977.2	1744.8
19	10 46	373.6	1964.6	57	29 41	990.4	1737.4
20	11 19	392.4	1961.0	58	30 7	1003.4	1730.0
21	11 52	411.2	1957.2	59	30 33	1016.4	1722.2
22	12 25	430.0	1953.2	60	30 58	1029.0	1714.8
23	12 58	448.6	1949.0	61	31 23	1041.4	1707.4
24	13 30	466.8	1944.6	62	31 48	1053.8	1699.6
25	14 3	485.4	1940.0	63	32 13	1066.2	1692.0
26	14 35	503.4	1935.4	64	32 38	1078.4	1684.2
27	15 7	521.4	1930.6	65	33 2	1090.2	1676.6
28	15 39	539.4	1925.8	66	33 26	1101.8	1669.0
29	16 11	557.4	1920.6	67	33 50	1113.4	1661.2
30	16 42	574.6	1915.6	68	34 13	1124.6	1653.8
31	17 14	592.4	1910.2	69	34 37	1136.0	1645.8
32	17 45	609.6	1904.6	70	35 0	1147.0	1638.2
33	18 16	626.8	1899.2	71	35 23	1158.0	1630.4
34	18 47	643.8	1893.4	72	35 46	1168.8	1622.8
35	19 18	661.0	1887.6	73	36 8	1179.2	1615.2
36	19 48	677.4	1881.6	74	36 31	1190.0	1607.2
37	20 19	694.4	1875.4	75	36 53	1200.4	1599.6
38	20 49	710.6	1869.4				

ĐỒN BẨY

LEVERS

Types of Levers	Examples
 $F:W = l:L \quad F \times L = W \times l$ $F = \frac{W \times l}{L} \quad W = \frac{F \times L}{l}$ $L = \frac{W \times a}{W + F} = \frac{W \times l}{F}; \quad l = \frac{F \times a}{W + F} = \frac{F \times L}{W}$	A pull of 80 pounds is exerted at the end of the lever, at W; $l = 12$ inches and $L = 32$ inches. Find the value of force F required to balance the lever. $F = \frac{80 \times 12}{32} = \frac{960}{32} = 30 \text{ pounds.}$ If $F = 20$; $W = 180$; and $l = 3$; how long must L be made to secure equilibrium? $L = \frac{180 \times 3}{20} = 27.$
 $F:W = l:L \quad F \times L = W \times l$ $F = \frac{W \times l}{L} \quad W = \frac{F \times L}{l}$ $L = \frac{W \times a}{W - F} = \frac{W \times l}{F}; \quad l = \frac{F \times a}{W - F} = \frac{F \times L}{W}$	Total length L of a lever is 25 inches. A weight of 90 pounds is supported at W; l is 10 inches. Find the value of F. $F = \frac{90 \times 10}{25} = 36 \text{ pounds.}$ If $F = 100$ pounds, $W = 2200$ pounds, and $a = 5$ feet, what should L equal to secure equilibrium? $L = \frac{2200 \times 5}{2200 - 100} = 5.24 \text{ feet.}$
 $F:W = l:L \quad F \times L = W \times l$ $F = \frac{W \times l}{L} \quad W = \frac{F \times L}{l}$ $L = \frac{W \times a}{F - W} = \frac{W \times l}{F}; \quad l = \frac{F \times a}{F - W} = \frac{F \times L}{W}$	$F = 28$ pounds; $L = 10$ inches; $a = 24$ inches. What weight W can be supported? $l = a + L = 24 + 10 = 34 \text{ inches.}$ $W = \frac{28 \times 10}{34} = 8.23 \text{ pounds.}$ Let $F = 12$ tons; $W = 4.5$ tons; $a = 16$ feet. Find L and l. $L = \frac{4.5 \times 16}{12 - 4.5} = 9.6 \text{ feet;}$ $l = 16 + 9.6 = 25.6 \text{ feet.}$
 When three or more forces act on a lever: $F \times x = W \times a + P \times b + Q \times c$ $x = \frac{W \times a + P \times b + Q \times c}{F}$ $F = \frac{W \times a + P \times b + Q \times c}{x}$	Let $W = 20$, $P = 30$, and $Q = 15$ pounds; $a = 4$, $b = 7$, and $c = 10$ inches. If $x = 6$ inches, find F. $F = \frac{20 \times 4 + 30 \times 7 + 15 \times 10}{6} = 73\frac{1}{3} \text{ lbs.}$ Assuming $F = 20$ in the example above, how long must lever arm x be made? $x = \frac{20 \times 4 + 30 \times 7 + 15 \times 10}{20} = 22 \text{ ins.}$

KHỚP KHUYU

TOGGLE-JOINT

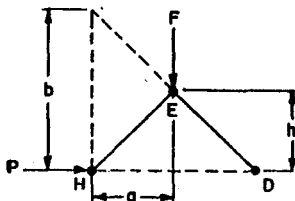
Toggle-joint. — If arms ED and EH are of unequal length:

$$P = \frac{Fa}{b}$$

The relation between P and F changes constantly as F moves downwards.

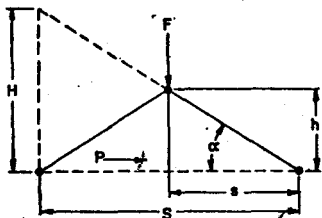
If arms ED and EH are equal:

$$P = \frac{Fa}{2h}$$



A double toggle-joint does not increase the pressure exerted so long as the relative distances moved by F and P remain the same.

Toggle-joints with Equal Arms



F = force applied;

P = resistance;

α = given angle.

$$P \sin \alpha = F \cos \alpha;$$

$$\frac{P}{F} = \frac{\cos \alpha}{2 \sin \alpha} = \text{coefficient};$$

or,

$$P = F \times \text{coefficient}.$$

Equivalent expressions:

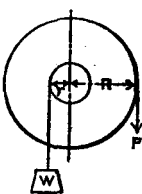
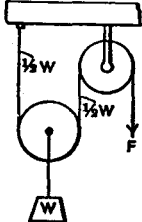
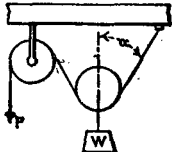
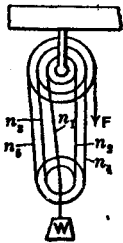
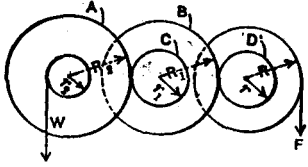
$$P = \frac{FS}{4h}; \quad P = \frac{Fs}{H}, \text{ as per diagram.}$$

To use the table, measure angle α , and find the coefficient in the table corresponding to the angle found. The coefficient is the ratio of the resistance to the force applied, and multiplying the force applied by the coefficient gives the resistance, neglecting friction.

Angle	Coefficient	Angle	Coefficient	Angle	Coefficient	Angle	Coefficient
0° 2'	862	0° 50'	34.4	2° 45'	10.4	8° 0'	3.58
0 4	456	0 55	31.2	2 50	10.1	8 30	3.35
0 6	285	1 0	28.6	3 0	9.54	9 0	3.15
0 8	216	1 10	24.6	3 15	8.81	9 30	2.99
0 10	171	1 15	22.9	3 30	8.17	10 0	2.84
0 12	143	1 20	21.5	3 45	7.63	11 0	2.57
0 14	122	1 30	19.1	4 0	7.25	12 0	2.35
0 15	115	1 40	17.2	4 15	6.73	13 0	2.17
0 16	107	1 45	16.4	4 30	6.35	14 0	2.00
0 18	95.4	1 50	15.6	4 45	6.02	15 0	1.87
0 20	85.8	2 0	14.3	5 0	5.71	16 0	1.74
0 25	68.6	2 10	13.2	5 30	5.19	17 0	1.64
0 30	57.3	2 15	12.7	6 0	4.76	18 0	1.54
0 35	49.1	2 20	12.5	6 30	4.39	19 0	1.45
0 40	42.8	2 30	11.5	7 0	4.07	20 0	1.37
0 45	38.2	2 40	10.7	7 30	3.79	.....	.....

BÁNH XE - RÒNG RỌC

WHEELS AND PULLEYS

 $F : W = r : R$ $F \times R = W \times r$ $F = \frac{W \times r}{R}$ $W = \frac{F \times R}{r}$ $R = \frac{W \times r}{F}$ $r = \frac{F \times R}{W}$	The radius of a drum on which is wound the lifting rope of a windlass is 2 inches. What force will be exerted at the periphery of a gear of 24 inches diameter, mounted on the same shaft as the drum and transmitting power to it, if one ton (2000 pounds) is to be lifted? Here $W = 2000$; $R = 12$; $r = 2$. $F = \frac{2000 \times 2}{12} = 333 \text{ pounds.}$
 $F = \frac{1}{2} W$ The velocity with which weight W will be raised equals one-half the velocity of the force applied at F.	 $F : W = \sec \alpha : 2$ $F = \frac{W \times \sec \alpha}{2}$ $W = 2 F \times \cos \alpha$
 n = number of strands or parts of rope (n_1, n_2, etc.). $F = \frac{1}{n} \times W$ The velocity with which W will be raised equals $\frac{1}{n}$ of the velocity of the force applied at F.	In the illustration is shown a combination of a double and triple block. The pulleys each turn freely on a pin as axis, and are drawn with different diameters, to show the parts of the rope more clearly. There are 5 parts of rope. Therefore, if 200 pounds is to be lifted, the force F required at the end of the rope is: $F = \frac{1}{5} \times 200 = 40 \text{ pounds.}$
 A, B, C and D are the pitch circles of gears. $F = \frac{W \times r \times n_1 \times n_2}{R \times R_1 \times R_2}$ $W = \frac{F \times R \times R_1 \times R_2}{r \times n_1 \times n_2}$	Let the pitch diameters of gears A, B, C and D be 30, 28, 12 and 10 inches, respectively. Then $R_1 = 15$; $R_2 = 14$; $r_1 = 6$; and $r_2 = 5$. Let $R = 12$, and $n_2 = 4$. Then the force F required to lift a weight W of 2000 pounds, friction being neglected, is: $F = \frac{2000 \times 5 \times 6 \times 4}{12 \times 14 \times 15} = 95 \text{ pounds}$

RÒNG RỌC VI SAI - VIS

DIFFERENTIAL PULLEY - SCREW

	Differential Pulley. — In the differential pulley a chain must be used, engaging sprockets, so as to prevent the chain from slipping over the pulley faces. $P \times R = \frac{1}{2} W (R - r)$ $P = \frac{W (R - r)}{2 R}$ $W = \frac{2 P R}{R - r}$
	Force Moving Body on Horizontal Plane. — F tends to move B along line CD; Q is the component which actually moves B; P is the pressure, due to F, of the body on CD. $Q = F \times \cos \alpha; \quad P = \sqrt{F^2 - Q^2}$
	Screw. — F = force at end of handle or wrench; R = lever-arm of F; r = pitch radius of screw; p = lead of thread; Q = load. Then, neglecting friction: $F = Q \times \frac{p}{6.2832 R} \quad Q = F \times \frac{6.2832 R}{p}$ If μ is the coefficient of friction, then: For motion in direction of load Q which assists it: $F = Q \times \frac{6.2832 \mu r - p}{6.2832 r + \mu p} \times \frac{r}{R}$ For motion opposite load Q which resists it: $F = Q \times \frac{p + 6.2832 \mu r}{6.2832 r - \mu p} \times \frac{r}{R}$

Center of Gravity. — The center of gravity of a body, volume, area, or line is that point at which if the body, volume, area, or line were suspended it would be perfectly balanced in all positions. For symmetrical bodies of uniform material it is at the geometric center. The center of gravity of a uniform round rod, for example, is at the center of its diameter halfway along its length; the center of gravity of a sphere is at the center of the sphere. For solids, areas, and arcs that are not symmetrical, the determination of the center of gravity may be made experimentally or may be calculated by the use of formulas.

The tables that follow give such formulas for some of the more important shapes. For more complicated and unsymmetrical shapes the methods outlined on page 313 may be used.

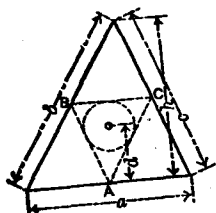
Example: A piece of wire is bent into the form of a semi-circular arc of 10-inch radius. How far from the center of the arc is the center of gravity located?

Accompanying the third diagram on page 308 is a formula for the distance from the center of gravity of an arc to the center of the arc: $a = 2r + \pi$. Therefore, in this case,

$$a = 2 \times 10 + 3.1416 = 6.366 \text{ inches.}$$

TRỌNG TÂM

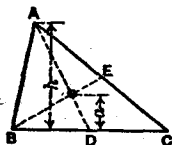
CENTER OF GRAVITY



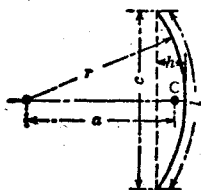
Perimeter of a Triangle. — If A , B and C are the middle points of the sides of the triangle, then the center of gravity is at the center of the circle that can be inscribed in triangle ABC . The distance d of the center of gravity from side a is:

$$d = \frac{h(b+c)}{2(a+b+c)}$$

where h is the height perpendicular to a .



Area of Triangle. — The center of gravity is at the intersection of lines AD and BE , which bisect the sides BC and AC . The perpendicular distance from the center of gravity to any one of the sides is equal to one-third the height perpendicular to that side. Hence, $a = h + 3$.



Circular Arc. — The center of gravity is on the line that bisects the arc, at a distance

$$a = \frac{r \times c}{l} = \frac{c(c^2 + 4h^2)}{8lh}$$

from the center of the circle.

For an arc equal to one-half the periphery:

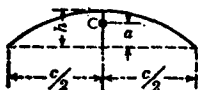
$$a = 2r + \pi = 0.6366r$$

For an arc equal to one-quarter of the periphery:

$$a = 2r\sqrt{2} + \pi = 0.9003r$$

For an arc equal to one-sixth of the periphery:

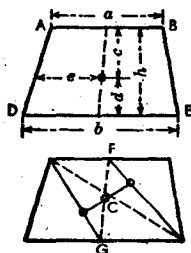
$$a = 3r + \pi = 0.9549r$$



Circular Arc (approximate). —

$$a = \frac{2}{3}h$$

This formula is very nearly exact for all arcs less than one-quarter of the periphery. The error is only about one per cent for a quarter circle, and decreases for smaller arcs.



Area of Trapezoid. — The center of gravity is on the line joining the middle points of parallel lines AB and DE .

$$c = \frac{h(a+b)}{3(a+b)} \quad d = \frac{h(2a+b)}{3(a+b)}$$

$$e = \frac{a^2 + ab + b^2}{3(a+b)}$$

The trapezoid can also be divided into two triangles. The center of gravity is at the intersection of the line joining the centers of gravity of the triangles, and the middle line FG .

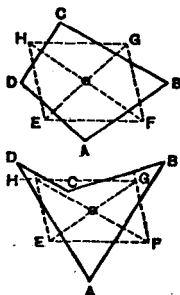
TRỌNG TÂM

CENTER OF GRAVITY

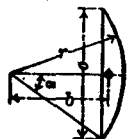


Perimeter of a Parallelogram. — The center of gravity is at the intersection of the diagonals.

Area of a Parallelogram. — The center of gravity is at the intersection of the diagonals.



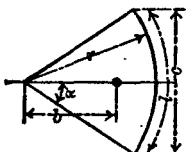
Any Four-sided Figure. — Two cases are possible, as shown in the illustration. To find the center of gravity of the four-sided figure $ABCD$, each of the sides is divided into three equal parts. A line is then drawn through each pair of division points next to the points of intersection A, B, C , and D of the sides of the figure. These lines form a parallelogram $EFGH$; the intersection of the diagonals EG and FH locates the required center of gravity.



Circle Segment. — The distance of the center of gravity from the center of the circle is:

$$b = \frac{c^3}{12A} = \frac{2}{3} \times \frac{r^3 \sin^3 \alpha}{A}$$

in which A = area of segment.



Circle Sector. — Distance b from center of gravity to center of circle is:

$$b = \frac{2rc}{3l} = \frac{r^2 c}{3A} = 38.197 \frac{r \sin \alpha}{\alpha}$$

in which A = area of sector, and α is expressed in degrees.

For the area of a half-circle:

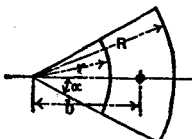
$$b = 4r + 3\pi = 0.4244r$$

For the area of a quarter circle:

$$b = 4\sqrt{2} \times r + 3\pi = 0.6002r$$

For the area of a sixth of a circle:

$$b = 2r + \pi = 0.6366r$$



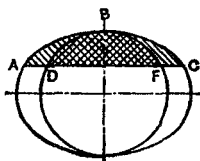
Part of Circle Ring. — Distance b from center of gravity to center of circle is:

$$b = 38.197 \frac{(R^3 - r^3) \sin \alpha}{(R^2 - r^2) \alpha}$$

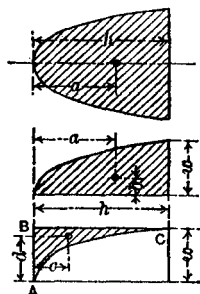
Angle α is expressed in degrees.

TRỌNG TÂM

CENTER OF GRAVITY



Segment of an Ellipse.—The center of gravity of an elliptic segment ABC , symmetrical about one of the axes, coincides with the center of gravity of the segment DBF of a circle, the diameter of which is equal to that axis of the ellipse about which the elliptic segment is symmetrical.



Area of a Parabola.—For the complete parabolic area, the center of gravity is on the center line or axis, and

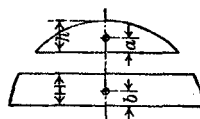
$$a = \frac{3h}{5}$$

For one-half of the parabola:

$$a = \frac{3h}{5} \quad \text{and} \quad b = \frac{3w}{8}$$

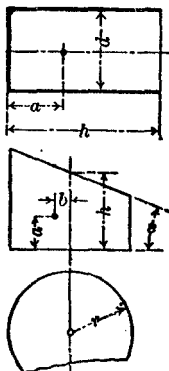
For the complement area ABC :

$$c = 0.3h \quad \text{and} \quad d = 0.75w$$



Spherical Surface of Segments and Zones of Spheres.—Distances a and b which determine the center of gravity, are:

$$a = \frac{h}{2} \quad b = \frac{H}{2}$$



Cylinder.—The center of gravity of a solid cylinder (or prism) with parallel end surfaces, is located at the middle of the line that joins the centers of gravity of the end surfaces.

The center of gravity of a cylindrical surface or shell, with the base or end surface in one end, is found from:

$$a = \frac{2h^2}{4h + d}$$

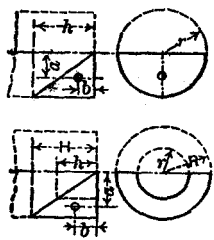
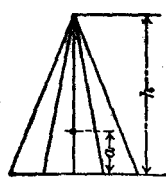
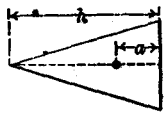
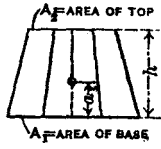
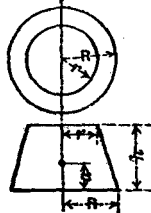
The center of gravity of a cylinder cut off by an inclined plane is located by:

$$a = \frac{h}{2} + \frac{r^2 \tan^2 \alpha}{8h} \quad b = \frac{r^2 \tan \alpha}{4h}$$

where α is the angle between the obliquely cut off surface and the base surface.

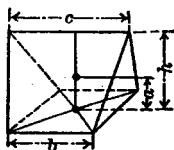
TRỌNG TÂM

CENTER OF GRAVITY

	<i>Portion of Cylinder.</i> — For a solid portion of a cylinder, as shown, the center of gravity is determined by: $a = \frac{r^2}{8} \times 3.1416 r \quad b = \frac{h^2}{8} \times 3.1416 h$ For the cylindrical surface only: $a = \frac{1}{4} \times 3.1416 r \quad b = \frac{1}{3} \times 3.1416 h$ If the cylinder is hollow, the center of gravity of the solid shell is found by: $a = \frac{R^3}{16} \times 3.1416 \frac{R^4 - r^4}{R^2 - r^2}; \quad b = \frac{h^3}{32} \times 3.1416 \frac{H^4 - h^4}{H^2 - h^2}$
	<i>Pyramid.</i> — In a solid pyramid the center of gravity is located on the line joining the apex with the center of gravity of the base surface, at a distance from the base equal to one-quarter of the height; or $a = \frac{1}{4} h$. The center of gravity of the triangular surfaces forming the pyramid is located on the line joining the apex with the center of gravity of the base surface, at a distance from the base equal to one-third of the height; or $a = \frac{1}{3} h$.
	<i>Cone.</i> — The same rules apply as for the pyramid. For the solid cone: $a = \frac{1}{4} h$ For the conical surface: $a = \frac{1}{3} h$
	<i>Frustum of Pyramid.</i> — The center of gravity is located on the line that joins the centers of gravity of the end surfaces. If A_1 = area of base surface, and A_2 area of top surface, $a = \frac{h (A_1 + 2 \sqrt{A_1 \times A_2} + 3 A_2)}{4 (A_1 + \sqrt{A_1 \times A_2} + A_2)}$
	<i>Frustum of Cone.</i> — The same rules apply as for the frustum of a pyramid. For a solid frustum of a circular cone the formula below is also used: $a = \frac{h (R^2 + 2 Rr + 3 r^2)}{4 (R^2 + Rr + r^2)}$ The location of the center of gravity of the conical surface of a frustum of a cone is determined by: $a = \frac{h (R + 2 r)}{3 (R + r)}$

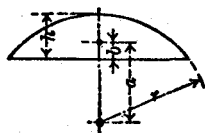
TRỌNG TÂM

CENTER OF GRAVITY



Wedge. — The center of gravity is on the line joining the center of gravity of the base with the middle point of the edge, and is located at:

$$a = \frac{h(b+c)}{2(2b+c)}$$



Spherical Segment. — The center of gravity of a solid segment is determined by:

$$a = \frac{3(2r-h)^2}{4(3r-h)}$$

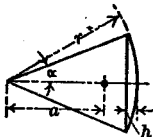
$$b = \frac{h(4r-h)}{4(3r-h)}$$

For a half-sphere, $a = b = \frac{3}{8}r$



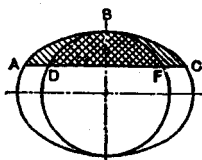
Half of a Hollow Sphere. — The center of gravity is located at:

$$a = \frac{3(R^4 - r^4)}{8(R^3 - r^3)}$$

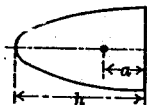


Spherical Sector. — The center of gravity of a solid sector is at:

$$a = \frac{3}{8}(1 + \cos \alpha)r = \frac{3}{8}(2r-h)$$

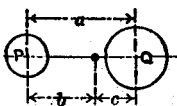


Segment of Ellipsoid or Spheroid. — The center of gravity of a solid segment ABC, symmetrical about the axis of rotation, coincides with the center of gravity of the segment DBF of a sphere, the diameter of which is equal to the axis of rotation of the spheroid.



Paraboloid. — The center of gravity of a solid paraboloid of rotation is at:

$$a = \frac{1}{2}h$$



Center of Gravity of Two Bodies. — If the weights of the bodies are P and Q, and the distance between their centers of gravity is a, then:

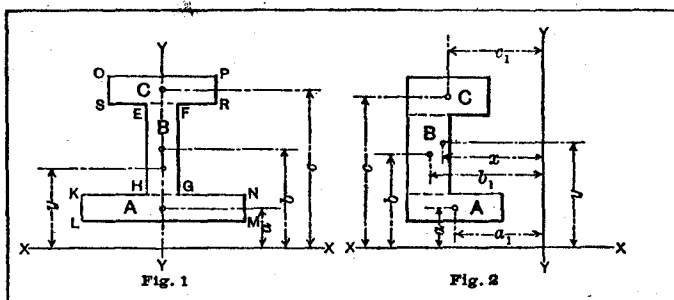
$$b = \frac{Qa}{P+Q} \quad c = \frac{Pa}{P+Q}$$

MECHANICS

Center of Gravity of Figures of any Outline. — If the figure is symmetrical about a center line, as in Fig. 1, the center of gravity will be located on that line. To find the exact location on that line, the simplest method is by taking moments with reference to any convenient axis at right angles to this center line. Divide the area into geometrical figures, the centers of gravity of which can be easily found. In this case, divide the figure into three rectangles *KLMN*, *EFGH* and *OPRS*. Call the areas of these rectangles *A*, *B* and *C*, respectively, and find the center of gravity of each. Then select any convenient axis, as *XX*, at right angles to the center line *YY*, and determine distances *a*, *b* and *c*. The distance *y* of the center of gravity of the complete figure from the axis *XX* is then found from the equation:

$$y = \frac{Aa + Bb + Cc}{A + B + C}$$

As an example, assume that the area *A* is 24 square inches, *B*, 14 square inches,



and *C*, 16 square inches, and that *a* = 3 inches, *b* = 7.5 inches, and *c* = 12 inches. Then:

$$y = \frac{24 \times 3 + 14 \times 7.5 + 16 \times 12}{24 + 14 + 16} = \frac{369}{54} = 6.83 \text{ inches.}$$

If the figure, the center of gravity of which is to be found, is not symmetrical about any axis, then moments must be taken with relation to two axes *XX* and *YY*, as shown in Fig. 2. The figure is divided into convenient geometrical figures, the centers of gravity of which can be easily found, the same as before. The center of gravity is determined by the equations:

$$x = \frac{Aa_1 + Bb_1 + Cc_1}{A + B + C} \quad y = \frac{Aa + Bb + Cc}{A + B + C}$$

As an example, let *A* = 14 square inches, *B* = 18 square inches, and *C* = 20 square inches. Let *a* = 3 inches, *b* = 7 inches, and *c* = 11.5 inches. Let *a*₁ = 6.5 inches, *b*₁ = 8.5 inches, and *c*₁ = 7 inches. Then:

$$x = \frac{14 \times 6.5 + 18 \times 8.5 + 20 \times 7}{14 + 18 + 20} = \frac{384}{52} = 7.38 \text{ inches.}$$

$$y = \frac{14 \times 3 + 18 \times 7 + 20 \times 11.5}{14 + 18 + 20} = \frac{398}{52} = 7.65 \text{ inches.}$$

In other words, the center of gravity is located at a distance of 7.65 inches from the axis *XX* and 7.38 inches from the axis *YY*.

MOMENT QUẢN TÍNH

MOMENTS OF INERTIA

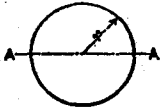
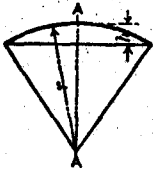
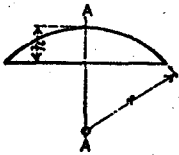
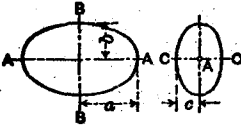
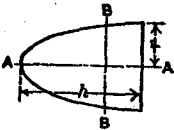
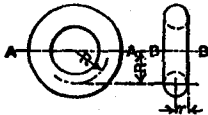
 $(M = \text{mass of body} = \text{weight} \div 32.16)$

	<i>Prism.</i> — With reference to axis $A - A$: $I = \frac{M}{12} (h^2 + b^2)$ With reference to axis $B - B$: $I = M \left(\frac{b^2}{3} + \frac{h^2}{12} \right)$
	<i>Cylinder.</i> — With reference to axis $A - A$: $I = \frac{1}{2} M r^2$ With reference to axis $B - B$: $I = M \left(\frac{b^2}{3} + \frac{r^2}{4} \right)$
	<i>Hollow Cylinder.</i> — With reference to axis $A - A$: $I = \frac{1}{2} M (R^2 + r^2)$ With reference to axis $B - B$: $I = M \left(\frac{b^2}{3} + \frac{R^2 + r^2}{4} \right)$
	<i>Pyramid, rectangular base.</i> — With reference to axis $A - A$: $I = \frac{M}{20} (a^2 + b^2)$ With reference to axis $B - B$ (through the center of gravity): $I = M \left(\frac{3}{80} h^2 + \frac{b^2}{20} \right)$
	<i>Cone.</i> — With reference to axis $A - A$: $I = \frac{3M}{10} r^2$ With reference to axis $B - B$ (through the center of gravity): $I = \frac{3M}{20} \left(r^2 + \frac{h^2}{4} \right)$
	<i>Frustum of Cone.</i> — With reference to axis $A - A$: $I = \frac{3M}{10} \frac{(R^5 - r^5)}{(R^3 - r^3)}$

MOMENT QUÁN TÍNH

MOMENTS OF INERTIA

(M = mass of body = weight $\div$ 32.16)

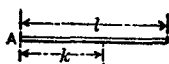
	<i>Sphere.</i> — With reference to any axis through the center: $I = \frac{2}{5} Mr^2$
	<i>Spherical Sector.</i> — With reference to axis A-A: $I = \frac{M}{5} (3rh - h^2)$
	<i>Spherical Segment.</i> — With reference to axis A-A: $I = M \left(r^2 - \frac{3rh}{4} + \frac{3h^2}{20} \right) \frac{2h}{3r-h}$
	<i>Ellipsoid.</i> — With reference to axis A-A: $I = \frac{M}{5} (b^2 + c^2)$ With reference to axis B-B: $I = \frac{M}{5} (a^2 + c^2)$ With reference to axis C-C: $I = \frac{M}{5} (a^2 + b^2)$
	<i>Paraboloid.</i> — With reference to axis A-A: $I = \frac{1}{2} Mr^2$ With reference to axis B-B (through the center of gravity): $I = M \left(\frac{r^2}{6} + \frac{h^2}{18} \right)$
	<i>Torus.</i> — With reference to axis A-A: $I = M \left(\frac{R^2}{2} + \frac{5r^2}{8} \right)$ With reference to axis B-B: $I = M (R^2 + \frac{3}{2} r^2)$

BẢN KÍNH HỒI CHUYÊN

RADIUS OF GYRATION

Bar of Small Diameter.

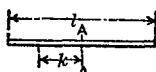
Axis at end.



$$k = 0.5773 l$$

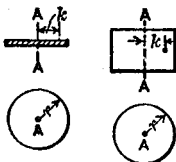
$$k^2 = \frac{1}{3} l^2$$

Axis at center.



$$k = 0.2886 l$$

$$k^2 = \frac{1}{12} l^2$$

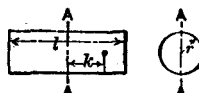
Thin Circular Disk.
Axis through center.Cylinder.
Axis through center.

$$k = 0.7071 r$$

$$k^2 = \frac{1}{2} r^2$$

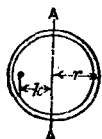
Cylinder.

Axis, diameter at mid-length.



$$k = 0.289 \sqrt{l^2 + 3 r^2}$$

$$k^2 = \frac{l^2}{12} + \frac{r^2}{4}$$

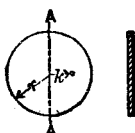
Bar of Small Diameter,
bent to Circular Shape.Axis, a diameter of the
ring.

$$k = 0.7071 r$$

$$k^2 = \frac{1}{2} r^2$$

Thin Circular Disk.

Axis its diameter.



$$k = \frac{1}{2} r$$

$$k^2 = \frac{1}{4} r^2$$

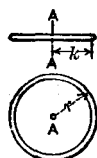
Cylinder.

Axis, diameter at end.



$$k = 0.289 \sqrt{4 l^2 + 3 r^2}$$

$$k^2 = \frac{l^2}{3} + \frac{r^2}{4}$$

Bar of Small Diameter,
bent to Circular Shape.Axis through center of
ring.

$$k = r; \quad k^2 = r^2$$

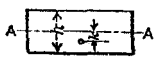
Parallelogram (Thin flat
plate).

Axis at base.



$$k = 0.5773 h; \quad k^2 = \frac{1}{3} h^2$$

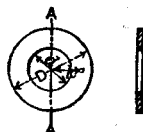
Axis at mid-height.



$$k = 0.2886 h; \quad k^2 = \frac{1}{12} h^2$$

Thin, Flat, Circular
Ring.

Axis its diameter.



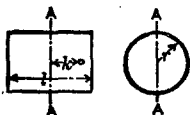
$$k = \frac{1}{4} \sqrt{D^2 + d^2}$$

$$k^2 = \frac{D^2 + d^2}{16}$$

BÁN KÍNH HỒI CHUYÊN

RADIUS OF GYRATION

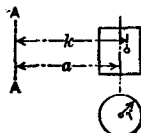
Thin Hollow Cylinder.
Axis, diameter at mid-length.



$$k = 0.289 \sqrt{d^2 + 6r^2}$$

$$k^2 = \frac{d^2}{12} + \frac{r^2}{2}$$

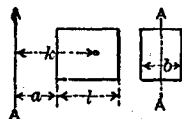
Cylinder.
Axis at a distance.



$$k = \sqrt{a^2 + \frac{1}{2}r^2}$$

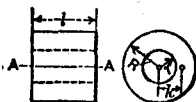
$$k^2 = a^2 + \frac{1}{2}r^2$$

Parallelepiped.
Axis at distance from end.



$$k = \sqrt{\frac{4l^2 + b^2}{12} + a^2 + al}$$

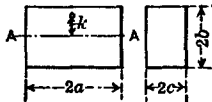
Hollow Cylinder.
Longitudinal Axis.



$$k = 0.7071 \sqrt{R^2 + r^2}$$

$$k^2 = \frac{1}{2} (R^2 + r^2)$$

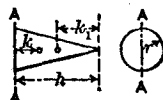
Rectangular Prism.
Axis through center.



$$k = 0.577 \sqrt{b^2 + c^2}$$

$$k^2 = \frac{1}{2} (b^2 + c^2)$$

Cone.
Axis at base.

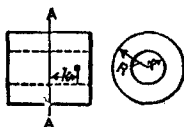


$$k = \sqrt{\frac{2h^2 + 3r^2}{20}}$$

Axis at apex.

$$k_1 = \sqrt{\frac{12h^2 + 3r^2}{20}}$$

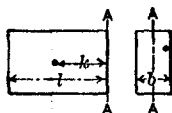
Hollow Cylinder.
Axis, diameter at mid-length.



$$k = 0.289 \sqrt{d^2 + 3(R^2 + r^2)}$$

$$k^2 = \frac{d^2}{12} + \frac{R^2 + r^2}{4}$$

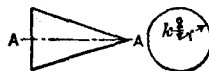
Parallelepiped.
Axis at one end, central.



$$k = 0.289 \sqrt{4l^2 + b^2}$$

$$k^2 = \frac{4l^2 + b^2}{12}$$

Cone.
Axis through its center line.



$$k = 0.5477 r$$

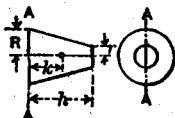
$$k^2 = 0.3 r^2$$

BÁN KÍNH HỒI CHUYỀN

RADIUS OF GYRATION

Frustum of Cone.

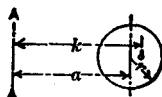
Axis at large end.



$$k = \sqrt{\frac{k^2}{10} \left(\frac{R^2 + 3Rr + 6r^2}{R^2 + Rr + r^2} \right) + \frac{3}{20} \left(\frac{R^2 - r^2}{R^2 - r^2} \right)}$$

Sphere.

Axis at a distance.



$$k = \sqrt{a^2 + \frac{2}{3}r^2}$$

$$k^2 = a^2 + \frac{2}{3}r^2$$

Sphere.

Axis its diameter.



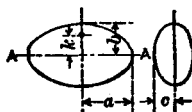
$$k = 0.6325r; \quad k^2 = \frac{2}{3}r^2$$

Thin Spherical Shell.

$$k = 0.8165r; \quad k^2 = \frac{2}{3}r^2$$

Ellipsoid.

Axis through center.



$$k = 0.447 \sqrt{b^2 + c^2}$$

$$k^2 = \frac{1}{5} (b^2 + c^2)$$

Hollow Sphere.

Axis its diameter.

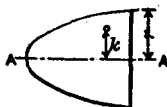


$$k = 0.6325 \sqrt{\frac{R^2 - r^2}{R^2 - r^2}}$$

$$k^2 = \frac{2}{5} \frac{(R^2 - r^2)}{(R^2 - r^2)}$$

Paraboloid.

Axis through center.



$$k = 0.5773r$$

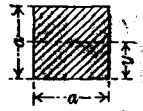
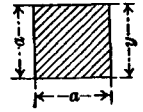
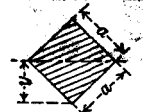
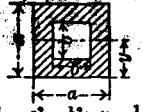
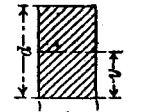
$$k^2 = \frac{1}{3}r^2$$

STRENGTH OF MATERIALS

SỨC BỀN VẬT LIỆU

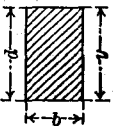
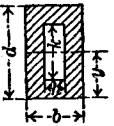
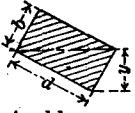
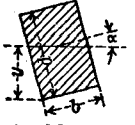
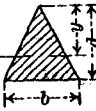
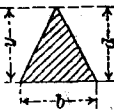
MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Section A = area y = distance from axis to ex- treme fiber	Moment of Inertia I	Section Modulus $Z = \frac{I}{y}$	Radius of Gyration $r = \sqrt{\frac{I}{A}}$
 $A = a^2; \quad y = \frac{1}{2} a$	$\frac{a^4}{12}$	$\frac{a^3}{6}$	$\frac{a}{\sqrt{12}} = 0.289 a$
 $A = a^2; \quad y = a$	$\frac{a^4}{3}$	$\frac{a^3}{3}$	$\frac{a}{\sqrt{3}} = 0.577 a$
 $A = a^2$ $y = \frac{a}{\sqrt{2}} = 0.707 a$	$\frac{a^4}{12}$	$\frac{a^3}{6\sqrt{2}} = 0.118 a^3$	$\frac{a}{\sqrt{12}} = 0.289 a$
 $A = a^2 - b^2; \quad y = \frac{1}{2} a$	$\frac{a^4 - b^4}{12}$	$\frac{a^4 - b^4}{6 a}$	$\frac{\sqrt{a^2 + b^2}}{12}$ $= 0.289 \sqrt{a^2 + b^2}$
 $A = a^2 - b^2$ $y = \frac{a}{\sqrt{2}} = 0.707 a$	$\frac{a^4 - b^4}{12}$	$\frac{\sqrt{2} (a^4 - b^4)}{12 a}$ $= 0.118 \frac{a^4 - b^4}{a}$	$\frac{\sqrt{a^2 + b^2}}{12}$ $= 0.289 \sqrt{a^2 + b^2}$
 $A = bd; \quad y = \frac{1}{2} d$	$\frac{bd^3}{12}$	$\frac{bd^2}{6}$	$\frac{d}{\sqrt{12}} = 0.289 d$

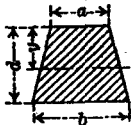
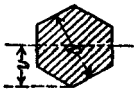
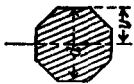
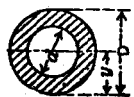
MOMENT QUẢN TÍNH: MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

A = area y = distance from axis to extreme fiber	Moment of Inertia I	Section Modulus $Z = \frac{I}{y}$	Radius of Gyration $r = \sqrt{\frac{I}{A}}$
 $A = bd; y = d$	$\frac{bd^3}{3}$	$\frac{bd^2}{3}$	$\frac{d}{\sqrt{3}} = 0.577 d$
 $A = bd - hk$ $y = \frac{1}{2} d$	$\frac{bd^3 - hk^3}{12}$	$\frac{bd^2 - hk^2}{6 d}$	$\sqrt{\frac{bd^2 - hk^2}{12 (bd - hk)}}$ $= 0.289 \sqrt{\frac{bd^2 - hk^2}{bd - hk}}$
 $A = bd$ $y = \frac{bd}{\sqrt{b^2 + d^2}}$	$\frac{b^3 d^3}{6 (b^2 + d^2)}$	$\frac{b^2 d^2}{6 \sqrt{b^2 + d^2}}$	$\frac{bd}{\sqrt{6 (b^2 + d^2)}}$ $= 0.408 \frac{bd}{\sqrt{b^2 + d^2}}$
 $A = bd$ $y = \frac{1}{2} (d \cos \alpha + b \sin \alpha)$	$\frac{bd}{12} (d^2 \cos^2 \alpha + b^2 \sin^2 \alpha)$	$\frac{bd}{6} \left(\frac{d^2 \cos^2 \alpha}{d \cos \alpha} + \frac{b^2 \sin^2 \alpha}{b \sin \alpha} \right)$	$\sqrt{\frac{d^2 \cos^2 \alpha + b^2 \sin^2 \alpha}{12}}$ $= 0.289 \times \sqrt{d^2 \cos^2 \alpha + b^2 \sin^2 \alpha}$
 $A = \frac{1}{2} bd; y = \frac{2}{3} d$	$\frac{bd^3}{36}$	$\frac{bd^2}{24}$	$\frac{d}{\sqrt{18}} = 0.236 d$
 $A = \frac{1}{2} bd; y = d$	$\frac{bd^3}{12}$	$\frac{bd^2}{12}$	$\frac{d}{\sqrt{6}} = 0.408 d$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Section	Area of Section, A	Distance from Neutral Axis to Extreme Fiber, y
	$\frac{d(a+b)}{2}$	$\frac{d(a+2b)}{3(a+b)}$
	$\frac{3d^2 \tan 30^\circ}{2} = 0.866 d^2$	$\frac{d}{2}$
	$\frac{3d^2 \tan 30^\circ}{2} = 0.866 d^2$	$\frac{d}{2 \cos 30^\circ} = 0.577 d$
	$2d^2 \tan 22\frac{1}{2}^\circ = 0.828 d^2$	$\frac{d}{2}$
	$\frac{\pi d^2}{4} = 0.7854 d^2$	$\frac{d}{2}$
	$\frac{\pi(D^2 - d^2)}{4}$ $= 0.7854(D^2 - d^2)$	$\frac{D}{2}$
	$\frac{\pi d^2}{8} = 0.393 d^2$	$\frac{(3\pi - 4)d}{6\pi}$ $= 0.288 d$
	$\frac{\pi(R^2 - r^2)}{2}$ $= 1.5708(R^2 - r^2)$	$\frac{4(R^2 - r^2)}{3\pi(R^2 - r^2)}$ $= 0.424 \frac{R^2 - r^2}{R^2 - r^2}$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT
MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Moment of Inertia, I	Section Modulus, $Z = \frac{I}{y}$	Radius of Gyration, $r = \sqrt{\frac{I}{A}}$
$\frac{d^3 (a^3 + 4 ab + b^3)}{36 (a + b)}$	$\frac{d^3 (a^3 + 4 ab + b^3)}{12 (a + 2b)}$	$\sqrt{\frac{d^3 (a^3 + 4 ab + b^3)}{18 (a + b)^3}}$
$\frac{A}{12} \left[\frac{d^3 (1 + 2 \cos^2 30^\circ)}{4 \cos^2 30^\circ} \right]$ $= 0.06 d^4$	$\frac{A}{6} \left[\frac{d (1 + 2 \cos^2 30^\circ)}{4 \cos^2 30^\circ} \right]$ $= 0.12 d^3$	$\sqrt{\frac{d^3 (1 + 2 \cos^2 30^\circ)}{48 \cos^2 30^\circ}}$ $= 0.264 d$
$\frac{A}{12} \left[\frac{d^3 (1 + 2 \cos^2 30^\circ)}{4 \cos^2 30^\circ} \right]$ $= 0.06 d^4$	$\frac{A}{6.9} \left[\frac{d (1 + 2 \cos^2 30^\circ)}{4 \cos^2 30^\circ} \right]$ $= 0.104 d^3$	$\sqrt{\frac{d^3 (1 + 2 \cos^2 30^\circ)}{48 \cos^2 30^\circ}}$ $= 0.264 d$
$\frac{A}{12} \left[\frac{d^3 (1 + 2 \cos^2 22\frac{1}{2}^\circ)}{4 \cos^2 22\frac{1}{2}^\circ} \right]$ $= 0.055 d^4$	$\frac{A}{6} \left[\frac{d (1 + 2 \cos^2 22\frac{1}{2}^\circ)}{4 \cos^2 22\frac{1}{2}^\circ} \right]$ $= 0.109 d^3$	$\sqrt{\frac{d^3 (1 + 2 \cos^2 22\frac{1}{2}^\circ)}{48 \cos^2 22\frac{1}{2}^\circ}}$ $= 0.257 d$
$\frac{\pi d^4}{64} = 0.049 d^4$	$\frac{\pi d^3}{32} = 0.098 d^3$	$\frac{d}{4}$
$\frac{\pi (D^4 - d^4)}{64}$ $= 0.049 (D^4 - d^4)$	$\frac{\pi (D^4 - d^4)}{32 D}$ $= 0.098 \frac{D^4 - d^4}{D}$	$\frac{\sqrt{D^3 + d^3}}{4}$
$\frac{(9\pi^2 - 64) d^4}{1152 \pi}$ $= 0.007 d^4$	$\frac{(9\pi^2 - 64) d^3}{192 (3\pi - 4)}$ $= 0.024 d^3$	$\frac{\sqrt{(9\pi^2 - 64) d^3}}{12 \pi}$ $= 0.132 d$
$0.1098 (R^4 - r^4)$ $\frac{0.283 R^2 r^2 (R - r)}{R + r}$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Section	Area of Section, A	Distance from Neutral Axis to Extreme Fiber, y
	$\pi ab = 3.1416 ab$	e
	$\pi (ab - cd)$ $= 3.1416 (ab - cd)$	e
	$dt + 2a(s + n)$	$\frac{d}{2}$
	$dt + 2a(s + n)$	$\frac{b}{2}$
	$dt + a(s + n)$	$\frac{d}{2}$
	$dt + a(s + n)$	$b - [bs^2 + \frac{ht^2}{2} + \frac{g}{3}(b-t)^2 \times (b+2t)] + A$ in which g = slope of flange = $\frac{h-l}{2(b-l)}$
	$\frac{l(T+t)}{2} + Tn + a(s + n)$	$d - [3s^2(b-T) + 2am(m+3s) + 3Td^2 - l(T-l)(3d-l)] + 6A$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA. SECTION MODULUS. etc., OF SECTION

Moment of Inertia, I	Section Modulus, $Z = \frac{I}{y}$	Radius of Gyration, $r = \sqrt{\frac{I}{A}}$
$\frac{\pi a^3 b}{4} = 0.7854 a^3 b$	$\frac{\pi a^3 b}{4} = 0.7854 a^3 b$	$\frac{a}{2}$
$\frac{\pi}{4} (a^3 b - c^3 d)$ $= 0.7854 (a^3 b - c^3 d)$	$\frac{\pi (a^3 b - c^3 d)}{4 a}$ $= 0.7854 \frac{a^3 b - c^3 d}{a}$	$\frac{1}{2} \sqrt{\frac{a^3 b - c^3 d}{ab - cd}}$
$\frac{1}{12} \left[bd^3 - \frac{1}{4g} (h^4 - l^4) \right]$ in which $g = \text{slope of flange} = \frac{h-l}{b-l} = \frac{1}{6}$ for standard I-beams.	$\frac{1}{6d} \left[bd^3 - \frac{1}{4g} (h^4 - l^4) \right]$	$\sqrt{\frac{\frac{1}{12} \left[bd^3 - \frac{1}{4g} (h^4 - l^4) \right]}{dt + 2a(s+n)}}$
$\frac{1}{12} \left[b^3 (d-h) + l^3 + \frac{g}{4} (b^4 - l^4) \right]$ in which $g = \text{slope of flange}$ (see above).	$\frac{1}{6b} \left[b^3 (d-h) + l^3 + \frac{g}{4} (b^4 - l^4) \right]$	$\sqrt{\frac{I}{A}}$
$\frac{1}{12} \left[bd^3 - \frac{1}{8g} (h^4 - l^4) \right]$ in which $g = \text{slope of flange} = \frac{h-l}{2(b-l)} = \frac{1}{6}$ for standard channels.	$\frac{1}{6d} \left[bd^3 - \frac{1}{8g} (h^4 - l^4) \right]$	$\sqrt{\frac{\frac{1}{12} \left[bd^3 - \frac{1}{8g} (h^4 - l^4) \right]}{dl + a(s+n)}}$
$\frac{1}{3} \left[2sb^3 + l^3 + \frac{g}{2} (b^4 - l^4) - A(b-y)^2 \right]$ in which $g = \text{slope of flange}$ (see above).	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{1}{12} [l^3 (T+3t) + 4bn^3 - 2am^3] - A(d-y-n)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Section	Area of Section, A	Distance from Neutral Axis to Extreme Fiber, y
	$\frac{t(T+t)}{2} + Tn + a(s+n)$	$\frac{b}{2}$
	$t(2a - t)$	$a - \frac{a^2 + at - t^2}{2(2a - t)}$
	$t(2a - t)$	$\frac{a^2 + at - t^2}{2(2a - t) \cos 45^\circ}$
	$bd - h(b - t)$	$\frac{d}{2}$
	$bd - h(b - t)$	$\frac{b}{2}$
	$bd - h(b - t)$	$\frac{d}{2}$
	$bd - h(b - t)$	$b - \frac{2b^2s + ht^2}{2bd - 2h(b - t)}$
	$dt + s(b - t)$	$\frac{d}{2}$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS: etc., OF SECTION

Moment of inertia, I	Section Modulus, $Z = \frac{I}{y}$	Radius of Gyration, $r = \sqrt{\frac{I}{A}}$
$\frac{sb^3 + mT^3 + l^3}{12}$ $+ \frac{am [2a^2 + (2a + 3T)^2]}{36}$ $+ \frac{l(T-l)[(T-l)^2 + 2(T+2l)^2]}{144}$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{1}{2} [ty^3 + a(a-y)^3]$ $- (a-l)(a-y-l)^3]$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{1}{2} [2x^4 - 2(x-l)^4]$ $+ l[a - (2x - \frac{1}{2}l)]^3]$ in which $x = \frac{a^2 + al - l^2}{2(2a-l)}$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{bd^3 - h^3(b-l)}{12}$	$\frac{bd^3 - h^3(b-l)}{6d}$	$\sqrt{\frac{bd^3 - h^3(b-l)}{12[bd - h(b-l)]}}$
$\frac{2sb^3 + ht^3}{12}$	$\frac{2sb^3 + ht^3}{6b}$	$\sqrt{\frac{2sb^3 + ht^3}{12[bd - h(b-l)]}}$
$\frac{bd^3 - h^3(b-l)}{12}$	$\frac{bd^3 - h^3(b-l)}{6d}$	$\sqrt{\frac{bd^3 - h^3(b-l)}{12[bd - h(b-l)]}}$
$\frac{2sb^3 + ht^3}{3} - A(b-y)^3]$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{td^3 + s^3(b-l)}{12}$	$\frac{td^3 + s^3(b-l)}{6d}$	$\sqrt{\frac{td^3 + s^3(b-l)}{12[td + s(b-l)]}}$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Section	Area of Section, A	Distance from Neutral Axis to Extreme Fiber, y
	$bs + ht + as$	$d - [td^2 + s^2(b-t) + s(a-t)(2d-s)] + 2A$
	$bs + ht$	$d - \frac{d^2t + s^2(b-t)}{2(bs + ht)}$
	$bs + \frac{h(T+t)}{2}$	$d - [3bs^2 + 3ht(d+s) + h(T-t)(h+3s)] + 6A$
	$t(a+b-t)$	$b - \frac{t(2d+a) + d^2}{2(d+a)}$
	$t(a+b-t)$	$a - \frac{t(2c+b) + c^2}{2(c+b)}$
	$t[h + 2(a-t)]$	$\frac{b}{2}$
	$t[b + 2(a-t)]$	$\frac{2a-t}{2}$

MOMENT QUÁN TÍNH : MODUL MẶT CẮT

MOMENTS OF INERTIA, SECTION MODULUS, etc., OF SECTION

Moment of Inertia, I	Section Modulus, $Z = \frac{I}{y}$	Radius of Gyration, $r = \sqrt{\frac{I}{A}}$
$\frac{1}{12} [b (d-y)^2 + ay^2 - (b-t) (d-y-s)^2 - (a-t) (y-s)^2]$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{1}{12} [ty^3 + b (d-y)^2 - (b-t) (d-y-s)^2]$	$\frac{I}{y}$	$\sqrt{\frac{I}{3 (bs+ht) [ty^3 + b (d-y)^2 - (b-t) (d-y-s)^2]}}$
$\frac{1}{12} [4 bs^2 + h^2 (3t+T) - A (d-y-s)^2]$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
$\frac{1}{12} [ty^3 + a (b-y)^2 - (a-t) (b-y-t)^2]$	$\frac{I}{y}$	$\sqrt{\frac{I}{3 t (a+b-t) [ty^3 + a (b-y)^2 - (a-t) (b-y-t)^2]}}$
$\frac{1}{12} [ty^3 + b (a-y)^2 - (b-t) (a-y-t)^2]$	$\frac{I}{y}$	$\sqrt{\frac{I}{3 t (a+b-t) [ty^3 + b (a-y)^2 - (b-t) (a-y-t)^2]}}$
$\frac{ab^2 - c (b-2t)^2}{12}$	$\frac{ab^2 - c (b-2t)^2}{6b}$	$\sqrt{\frac{ab^2 - c (b-2t)^2}{12t [b+2(a-t)]}}$
$\frac{b (a+c)^2 - 2c^2d - 6a^2cd}{12}$	$\frac{b (a+c)^2 - 2c^2d - 6a^2cd}{6(2a-t)}$	$\sqrt{\frac{b (a+c)^2 - 2c^2d - 6a^2cd}{12t [b+2(a-t)]}}$

TÍNH CHẤT CÁC TIẾT DIỆN KHUNG CẮT

PROPERTIES OF SECTIONS FOR PUNCH AND SHEAR FRAMES

Z_c = Section Modulus for Compression;
 Z_t = Section Modulus for Tension;
 F = Area of Section;
 I = Moment of Inertia about Gravity Axis
 $A - A$.

All dimensions in inches

B	b	h = 1/4t	H	F	I	Z_c	Z_t
10	10	1/4	0.57	15.36	228.51	35.20	65.40
		3/8	1.10	23.43	311.78	47.95	89.10
		1/2	1.80	31.82	397.83	61.20	113.70
	9	1/4	0.51	14.66	200.77	30.89	57.36
		3/8	0.99	21.64	290.32	44.66	82.95
		1/2	1.61	29.56	371.95	57.22	106.27
	8	1/4	2.41	38.69	438.24	67.44	125.21
		3/8	0.44	13.87	180.98	27.80	51.50
		1/2	0.88	20.41	272.07	41.90	77.70
	7	1/4	1.38	27.27	345.47	53.20	98.50
		3/8	2.04	35.20	410.37	63.10	117.00
		1/2	3.50	49.63	462.98	71.20	132.00
9	9	1/4	0.38	13.15	172.76	26.50	49.30
		3/8	0.77	19.21	261.46	40.30	74.60
		1/2	1.24	25.69	320.52	49.30	91.50
	8	1/4	1.74	32.24	378.80	58.30	108.00
		3/8	2.34	39.42	428.57	65.90	122.60
	7	1/4	0.59	14.66	204.06	31.40	58.30
		3/8	1.20	21.57	291.47	44.80	83.40
		1/2	2.00	30.68	363.50	55.80	103.60
	6	1/4	0.50	13.83	185.91	28.60	53.65
		3/8	1.00	20.34	268.15	41.28	76.65
		1/2	1.70	28.07	338.66	52.15	96.81
	5	1/4	2.60	37.12	403.27	62.10	115.12
8	8	1/4	0.42	13.00	173.33	26.60	49.80
		3/8	0.89	19.25	250.41	38.40	71.60
		1/2	1.42	25.65	317.24	48.80	90.50
	7	1/4	2.11	33.03	375.00	57.70	107.10
		3/8	3.06	42.13	420.36	64.60	120.10
	6	1/4	0.36	12.40	161.70	24.90	46.20
		3/8	0.75	17.92	226.20	34.80	64.70
		1/2	1.23	23.89	290.50	44.70	83.00
	5	1/4	1.79	30.22	345.70	53.10	100.60
		3/8	2.62	38.26	392.00	60.30	112.00

Z_c = Section Modulus for Compression;
 Z_t = Section Modulus for Tension;
 F = Area of Section;
 I = Moment of Inertia about Gravity Axis
 $A - A$

All dimensions in inches

<i>B</i>	<i>b</i>	$h = \frac{1}{2}t$	<i>H</i>	<i>F</i>	<i>I</i>	<i>Z_c</i>	<i>Z_t</i>
8	7	$\frac{1}{2}$	3.00	36.41	377.05	58.0	108.0
		$\frac{1}{4}$	0.43	12.43	155.80	23.9	44.5
		$\frac{3}{8}$	0.91	18.07	221.14	34.0	63.1
		$\frac{1}{2}$	1.50	24.20	283.77	43.5	80.8
	6	$\frac{3}{8}$	2.36	31.79	339.75	52.3	96.9
		$\frac{1}{2}$	0.33	11.61	139.76	21.42	39.9
		$\frac{3}{4}$	0.75	16.81	204.37	31.41	58.4
		$\frac{1}{2}$	1.25	22.27	261.65	40.25	75.2
	5	$\frac{3}{4}$	2.00	29.00	310.74	49.7	88.8
		$\frac{1}{2}$	2.75	35.66	350.65	54.0	100.0
		$\frac{1}{4}$	0.70	13.52	169.40	26.04	48.4
		$\frac{3}{8}$	1.40	19.99	243.80	37.5	69.6
7	7	$\frac{1}{2}$	2.44	27.28	310.80	47.8	88.8
		$\frac{1}{4}$	0.55	12.55	147.20	22.6	42.1
		$\frac{3}{8}$	1.14	18.27	220.03	33.8	62.8
		$\frac{1}{2}$	2.00	25.17	282.60	43.4	80.8
	6	$\frac{1}{4}$	0.41	12.28	136.92	20.0	39.1
		$\frac{3}{8}$	0.95	16.98	203.40	31.0	58.0
		$\frac{1}{2}$	1.65	23.03	258.64	40.0	73.8
		$\frac{3}{4}$	2.55	30.56	302.60	46.5	86.5
	5	$\frac{1}{4}$	0.31	10.96	124.20	19.12	35.5
		$\frac{3}{8}$	0.76	15.71	183.00	28.15	52.3
		$\frac{1}{2}$	1.31	20.80	232.20	35.7	66.4
		$\frac{3}{4}$	1.98	26.30	275.00	42.3	78.6
6	4	$\frac{1}{4}$	0.68	12.56	156.25	24.0	44.6
		$\frac{3}{8}$	1.56	18.79	222.10	32.6	60.5
		$\frac{1}{2}$	3.50	30.00	275.00	42.3	78.6
		$\frac{3}{4}$	0.53	11.68	180.83	29.0	51.6
	5	$\frac{3}{8}$	1.27	17.25	214.79	33.0	61.4
		$\frac{1}{2}$	2.35	24.15	253.85	39.0	73.4
		$\frac{3}{4}$	0.38	10.88	125.59	19.3	35.8
		$\frac{1}{2}$	1.00	15.84	181.36	27.9	51.8
	4	$\frac{3}{4}$	1.80	20.87	228.96	35.2	65.4
		$\frac{1}{4}$	0.73	11.76	139.73	21.5	40.0
		$\frac{3}{8}$	1.70	17.28	196.98	30.2	56.2
5	5	$\frac{1}{4}$	0.55	10.97	125.40	19.3	35.9
		$\frac{3}{8}$	1.45	16.13	181.52	28.0	52.0
		$\frac{1}{2}$	0.84	10.16	110.14	17.25	32.0
		$\frac{3}{4}$	1.12	14.90	167.70	25.7	47.6
	3	$\frac{1}{2}$	2.10	19.99	198.57	30.5	56.8

MODUL TIẾT DIỆN CHỮ NHẬT

SECTION MODULUS FOR RECTANGLES

Section modulus values shown are for rectangles 1 inch wide. To obtain section modulus for rectangle of given length of side, multiply value in table by given width.							
Length of Side	Section Modulus	Length of Side	Section Modulus	Length of Side	Section Modulus	Length of Side	Section Modulus
$\frac{1}{8}$	0.0026	$2\frac{3}{4}$	1.26	12	24.00	25	104.2
$\frac{1}{4}$	0.0059	3	1.50	$12\frac{1}{2}$	26.04	26	112.7
$\frac{3}{8}$	0.0104	$3\frac{1}{4}$	1.76	13	28.17	27	121.5
$\frac{1}{2}$	0.0163	$3\frac{1}{2}$	2.04	$13\frac{1}{2}$	30.38	28	130.7
$\frac{5}{8}$	0.0234	$3\frac{3}{4}$	2.34	14	32.67	29	140.2
$\frac{3}{4}$	0.032	4	2.67	$14\frac{1}{2}$	35.04	30	150
$\frac{7}{8}$	0.042	$4\frac{1}{4}$	3.38	15	37.5	32	171
$\frac{1}{2}$	0.065	5	4.17	$15\frac{1}{2}$	40.0	34	193
$\frac{9}{8}$	0.094	$5\frac{1}{4}$	5.04	16	42.7	36	216
$\frac{5}{4}$	0.128	6	6.00	$16\frac{1}{2}$	45.4	38	241
1	0.167	$6\frac{1}{4}$	7.04	17	48.2	40	267
$1\frac{1}{8}$	0.211	7	8.17	$17\frac{1}{2}$	51.0	42	294
$1\frac{1}{4}$	0.260	$7\frac{1}{4}$	9.38	18	54.0	44	323
$1\frac{3}{8}$	0.315	8	10.67	$18\frac{1}{2}$	57.0	46	353
$1\frac{1}{2}$	0.375	$8\frac{1}{4}$	12.04	19	60.2	48	384
$1\frac{3}{4}$	0.440	9	13.50	$19\frac{1}{2}$	63.4	50	417
$1\frac{7}{8}$	0.510	$9\frac{1}{4}$	15.04	20	66.7	52	451
2	0.586	10	16.67	21	73.5	54	486
$2\frac{1}{8}$	0.67	$10\frac{1}{4}$	18.38	22	80.7	56	523
$2\frac{1}{4}$	0.84	11	20.17	23	88.2	58	561
$2\frac{3}{8}$	1.04	$11\frac{1}{4}$	22.04	24	96.0	60	600

MODUL TIẾT DIỆN VÀ MOMENT QUÁN TÍNH
CỦA TRỤC TRÒNSECTION MODULUS AND MOMENTS OF INERTIA
FOR ROUND SHAFTS

Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia
$\frac{1}{8}$	0.00019	0.00001	$2\frac{3}{4}$	0.0074	0.00155	$2\frac{3}{4}$	0.0364	0.01308
$\frac{1}{4}$	0.00027	0.00002	$\frac{7}{8}$	0.0082	0.00180	$\frac{7}{8}$	0.0388	0.01425
$\frac{3}{8}$	0.00037	0.00003	$2\frac{1}{4}$	0.0091	0.00207	$\frac{3}{4}$	0.0413	0.01550
$1\frac{1}{8}$	0.00050	0.00004	$1\frac{1}{2}$	0.0101	0.00237	$\frac{1}{2}$	0.0440	0.01684
$\frac{1}{2}$	0.00065	0.00006	$1\frac{3}{4}$	0.0111	0.00270	$2\frac{1}{2}$	0.0467	0.01825
$1\frac{1}{4}$	0.00082	0.00008	$\frac{1}{2}$	0.0123	0.00306	$1\frac{1}{4}$	0.0496	0.01976
$\frac{3}{4}$	0.00102	0.00011	$2\frac{3}{4}$	0.0134	0.00346	$1\frac{3}{4}$	0.0526	0.02135
$1\frac{3}{8}$	0.00126	0.00015	$1\frac{1}{4}$	0.0147	0.00390	$\frac{5}{8}$	0.0557	0.02305
$\frac{1}{2}$	0.00153	0.00019	$2\frac{1}{4}$	0.0160	0.00438	$2\frac{1}{2}$	0.0588	0.02483
$1\frac{1}{2}$	0.00183	0.00024	$\frac{1}{2}$	0.0174	0.00491	$\frac{5}{8}$	0.0622	0.02673
$\frac{3}{4}$	0.00218	0.00031	$2\frac{3}{4}$	0.0189	0.00547	$\frac{7}{8}$	0.0656	0.02872
$1\frac{1}{4}$	0.00256	0.00038	$1\frac{1}{2}$	0.0205	0.00609	$\frac{7}{8}$	0.0692	0.03083
$\frac{1}{2}$	0.00299	0.00047	$2\frac{1}{4}$	0.0222	0.00676	$2\frac{1}{2}$	0.0728	0.03305
$1\frac{3}{4}$	0.00344	0.00057	$\frac{3}{4}$	0.0239	0.00748	$\frac{5}{8}$	0.0767	0.03539
$1\frac{1}{2}$	0.00398	0.00068	$\frac{1}{4}$	0.0258	0.00825	$1\frac{1}{2}$	0.0807	0.03785
$2\frac{1}{8}$	0.0045	0.00082	$2\frac{1}{4}$	0.0277	0.00909	$\frac{1}{4}$	0.0849	0.04044
$\frac{3}{4}$	0.0052	0.00097	$\frac{3}{4}$	0.0297	0.00999	$1\frac{1}{4}$	0.0891	0.04316
$2\frac{1}{4}$	0.0058	0.00114	$1\frac{1}{2}$	0.0318	0.01095	$\frac{3}{4}$	0.0934	0.04601
$1\frac{3}{4}$	0.0066	0.00133	$\frac{5}{8}$	0.0341	0.01198	...	...	...

In this and succeeding tables, the *Polar Section Modulus* for a shaft of given diameter can be obtained by multiplying its Section Modulus by 2. Similarly its *Polar Moment of Inertia* can be obtained by multiplying its Moment of Inertia by 2.

MODUL TIẾT DIỆN VÀ MOMENT QUÁN TÍNH
CỦA TRỤC TRÒN
SECTION MODULUS AND MOMENTS OF INERTIA
FOR ROUND SHAFTS

Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia
1.00	0.0981	0.0490	1.50	0.3313	0.2485	2.00	0.7854	0.7854
1.01	0.1011	0.0510	1.51	0.3380	0.2552	2.01	0.7972	0.8012
1.02	0.1041	0.0531	1.52	0.3447	0.2620	2.02	0.8092	0.8172
1.03	0.1072	0.0552	1.53	0.3516	0.2689	2.03	0.8212	0.8335
1.04	0.1104	0.0574	1.54	0.3585	0.2761	2.04	0.8334	0.8501
1.05	0.1136	0.0596	1.55	0.3655	0.2833	2.05	0.8457	0.8669
1.06	0.1169	0.0619	1.56	0.3727	0.2907	2.06	0.8582	0.8839
1.07	0.1202	0.0643	1.57	0.3799	0.2982	2.07	0.8707	0.9012
1.08	0.1236	0.0667	1.58	0.3872	0.3059	2.08	0.8834	0.9188
1.09	0.1271	0.0692	1.59	0.3946	0.3137	2.09	0.8962	0.9366
1.10	0.1307	0.0718	1.60	0.4021	0.3217	2.10	0.9092	0.9547
1.11	0.1342	0.0745	1.61	0.4097	0.3298	2.11	0.9222	0.9729
1.12	0.1379	0.0772	1.62	0.4173	0.3380	2.12	0.9354	0.9915
1.13	0.1416	0.0800	1.63	0.4251	0.3465	2.13	0.9487	1.0103
1.14	0.1454	0.0829	1.64	0.4330	0.3550	2.14	0.9621	1.0295
1.15	0.1493	0.0859	1.65	0.4410	0.3638	2.15	0.9757	1.0488
1.16	0.1532	0.0888	1.66	0.4490	0.3727	2.16	0.9894	1.0685
1.17	0.1572	0.0919	1.67	0.4572	0.3818	2.17	1.0031	1.0884
1.18	0.1613	0.0951	1.68	0.4655	0.3910	2.18	1.0171	1.1086
1.19	0.1654	0.0984	1.69	0.4738	0.4004	2.19	1.0311	1.1291
1.20	0.1696	0.1018	1.70	0.4823	0.4100	2.20	1.0454	1.1499
1.21	0.1739	0.1052	1.71	0.4908	0.4197	2.21	1.0596	1.1709
1.22	0.1782	0.1087	1.72	0.4995	0.4296	2.22	1.0741	1.1923
1.23	0.1826	0.1123	1.73	0.5083	0.4397	2.23	1.0887	1.2139
1.24	0.1871	0.1160	1.74	0.5171	0.4499	2.24	1.1034	1.2358
1.25	0.1917	0.1198	1.75	0.5261	0.4603	2.25	1.1183	1.2580
1.26	0.1963	0.1237	1.76	0.5352	0.4710	2.26	1.1332	1.2806
1.27	0.2011	0.1277	1.77	0.5444	0.4818	2.27	1.1483	1.3034
1.28	0.2058	0.1317	1.78	0.5536	0.4927	2.28	1.1636	1.3265
1.29	0.2107	0.1359	1.79	0.5630	0.5039	2.29	1.1790	1.3499
1.30	0.2157	0.1402	1.80	0.5726	0.5153	2.30	1.1945	1.3737
1.31	0.2207	0.1445	1.81	0.5821	0.5268	2.31	1.2101	1.3977
1.32	0.2258	0.1490	1.82	0.5918	0.5385	2.32	1.2259	1.4234
1.33	0.2309	0.1535	1.83	0.6016	0.5505	2.33	1.2418	1.4468
1.34	0.2362	0.1582	1.84	0.6115	0.5626	2.34	1.2579	1.4718
1.35	0.2415	0.1630	1.85	0.6216	0.5749	2.35	1.2741	1.4971
1.36	0.2469	0.1679	1.86	0.6317	0.5875	2.36	1.2904	1.5227
1.37	0.2524	0.1729	1.87	0.6419	0.6002	2.37	1.3069	1.5487
1.38	0.2580	0.1780	1.88	0.6524	0.6132	2.38	1.3235	1.5750
1.39	0.2636	0.1832	1.89	0.6628	0.6263	2.39	1.3403	1.6016
1.40	0.2694	0.1886	1.90	0.6734	0.6397	2.40	1.3572	1.6286
1.41	0.2752	0.1940	1.91	0.6840	0.6532	2.41	1.3742	1.6559
1.42	0.2811	0.1995	1.92	0.6948	0.6670	2.42	1.3914	1.6836
1.43	0.2870	0.2052	1.93	0.7057	0.6810	2.43	1.4087	1.7116
1.44	0.2931	0.2110	1.94	0.7168	0.6953	2.44	1.4262	1.7399
1.45	0.2993	0.2170	1.95	0.7279	0.7097	2.45	1.4438	1.7686
1.46	0.3055	0.2230	1.96	0.7392	0.7244	2.46	1.4615	1.7977
1.47	0.3118	0.2292	1.97	0.7505	0.7393	2.47	1.4794	1.8271
1.48	0.3182	0.2355	1.98	0.7620	0.7544	2.48	1.4975	1.8526
1.49	0.3247	0.2419	1.99	0.7736	0.7698	2.49	1.5156	1.8870

MODUL TIẾT DIỆN VÀ MOMENT QUÁN TÍNH CỦA TRỤC TRÒN

SECTION MODULUS AND MOMENTS OF INERTIA FOR ROUND SHAFTS

Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia
2.50	1.5340	1.9175	3.00	2.6510	3.9761	3.50	4.2090	7.3662
2.51	1.5525	1.9483	3.01	2.6773	4.0293	3.51	4.2455	7.4507
2.52	1.5711	1.9796	3.02	2.7041	4.0831	3.52	4.2818	7.5360
2.53	1.5899	2.0112	3.03	2.7310	4.1375	3.53	4.3184	7.6220
2.54	1.6088	2.0431	3.04	2.7581	4.1924	3.54	4.3552	7.7087
2.55	1.6279	2.0755	3.05	2.7855	4.2478	3.55	4.3922	7.7962
2.56	1.6471	2.1083	3.06	2.8130	4.3038	3.56	4.4294	7.8845
2.57	1.6665	2.1414	3.07	2.8406	4.3604	3.57	4.4669	7.9734
2.58	1.6860	2.1749	3.08	2.8685	4.4175	3.58	4.5045	8.0631
2.59	1.7057	2.2088	3.09	2.8965	4.4751	3.59	4.5424	8.1536
2.60	1.7260	2.2432	3.10	2.9250	4.5333	3.60	4.5804	8.2448
2.61	1.7455	2.2779	3.11	2.9531	4.5921	3.61	4.6187	8.3367
2.62	1.7656	2.3130	3.12	2.9817	4.6514	3.62	4.6572	8.4296
2.63	1.7859	2.3485	3.13	3.0104	4.7113	3.63	4.6959	8.5231
2.64	1.8064	2.3844	3.14	3.0394	4.7718	3.64	4.7347	8.6174
2.65	1.8270	2.4208	3.15	3.0685	4.8330	3.65	4.7740	8.7125
2.66	1.8478	2.4575	3.16	3.0978	4.8946	3.66	4.8133	8.8084
2.67	1.8686	2.4947	3.17	3.1274	4.9568	3.67	4.8529	8.9050
2.68	1.8897	2.5322	3.18	3.1570	5.0197	3.68	4.8926	9.0035
2.69	1.9110	2.5702	3.19	3.1869	5.0832	3.69	4.9325	9.1007
2.70	1.9320	2.6087	3.20	3.2170	5.1472	3.70	4.9730	9.1998
2.71	1.9539	2.6476	3.21	3.2472	5.2119	3.71	5.0133	9.2996
2.72	1.9756	2.6868	3.22	3.2777	5.2771	3.72	5.0540	9.4003
2.73	1.9975	2.7266	3.23	3.3083	5.3430	3.73	5.0948	9.5018
2.74	2.0195	2.7668	3.24	3.3391	5.4094	3.74	5.1359	9.6041
2.75	2.0417	2.8074	3.25	3.3701	5.4765	3.75	5.1771	9.7072
2.76	2.0641	2.8484	3.26	3.4014	5.5442	3.76	5.2187	9.8112
2.77	2.0866	2.8899	3.27	3.4328	5.6126	3.77	5.2605	9.9160
2.78	2.1093	2.9319	3.28	3.4644	5.6815	3.78	5.3024	10.0216
2.79	2.1321	2.9743	3.29	3.4961	5.7511	3.79	5.3444	10.1286
2.80	2.1550	3.0172	3.30	3.5280	5.8214	3.80	5.3870	10.2350
2.81	2.1783	3.0605	3.31	3.5603	5.8923	3.81	5.4297	10.3436
2.82	2.2016	3.1043	3.32	3.5926	5.9638	3.82	5.4726	10.4526
2.83	2.2251	3.1486	3.33	3.6252	6.0363	3.83	5.5156	10.5624
2.84	2.2488	3.1933	3.34	3.6580	6.1088	3.84	5.5590	10.6732
2.85	2.2727	3.2385	3.35	3.6909	6.1823	3.85	5.6025	10.7848
2.86	2.2966	3.2842	3.36	3.7241	6.2564	3.86	5.6462	10.8970
2.87	2.3208	3.3304	3.37	3.7575	6.3312	3.87	5.6903	11.0110
2.88	2.3452	3.3771	3.38	3.7909	6.4067	3.88	5.7345	11.1250
2.89	2.3697	3.4242	3.39	3.8246	6.4829	3.89	5.7789	11.2400
2.90	2.3940	3.4719	3.40	3.8590	6.5597	3.90	5.8240	11.3560
2.91	2.4192	3.5200	3.41	3.8928	6.6372	3.91	5.8685	11.4730
2.92	2.4442	3.5686	3.42	3.9272	6.7154	3.92	5.9137	11.5910
2.93	2.4695	3.6178	3.43	3.9617	6.7943	3.93	5.9590	11.7100
2.94	2.4949	3.6674	3.44	3.9965	6.8739	3.94	6.0046	11.8290
2.95	2.5204	3.7175	3.45	4.0314	6.9542	3.95	6.0505	11.9500
2.96	2.5461	3.7682	3.46	4.0666	7.0352	3.96	6.0966	12.0690
2.97	2.5720	3.8196	3.47	4.1019	7.1168	3.97	6.1429	12.1930
2.98	2.5981	3.8711	3.48	4.1375	7.1976	3.98	6.1894	12.3170
2.99	2.6243	3.9233	3.49	4.1732	7.2824	3.99	6.2361	12.4410

MODUL TIẾT DIỆN VÀ MOMENT QUÁN TÍNH CỦA TRỤC TRÒN

SECTION MODULUS AND MOMENTS OF INERTIA FOR ROUND SHAFTS

Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia	Diam.	Section Modulus	Moment of Inertia
4.00	6.2830	12.566	4.50	8.946	20.129	5.00	12.272	30.680
4.01	6.3304	12.692	4.51	9.006	20.308	5.01	12.345	30.926
4.02	6.3779	12.820	4.52	9.066	20.489	5.02	12.420	31.173
4.03	6.4256	12.948	4.53	9.126	20.671	5.03	12.493	31.423
4.04	6.4736	13.077	4.54	9.186	20.854	5.04	12.568	31.673
4.05	6.5217	13.207	4.55	9.247	21.039	5.05	12.644	31.925
4.06	6.5701	13.337	4.56	9.308	21.224	5.06	12.718	32.179
4.07	6.6188	13.469	4.57	9.370	21.411	5.07	12.794	32.434
4.08	6.6677	13.602	4.58	9.431	21.599	5.08	12.870	32.691
4.09	6.7169	13.736	4.59	9.493	21.788	5.09	12.946	32.949
4.10	6.7660	13.871	4.60	9.556	21.979	5.10	13.023	33.209
4.11	6.8159	14.007	4.61	9.618	22.170	5.11	13.099	33.470
4.12	6.8657	14.143	4.62	9.681	22.363	5.12	13.177	33.733
4.13	6.9164	14.281	4.63	9.744	22.557	5.13	13.254	33.997
4.14	6.9663	14.420	4.64	9.807	22.753	5.14	13.332	34.263
4.15	7.0169	14.560	4.65	9.870	22.950	5.15	13.410	34.530
4.16	7.0677	14.701	4.66	9.934	23.148	5.16	13.488	34.799
4.17	7.1188	14.843	4.67	9.998	23.347	5.17	13.567	35.070
4.18	7.1702	14.985	4.68	10.063	23.548	5.18	13.645	35.342
4.19	7.2217	15.129	4.69	10.127	23.750	5.19	13.725	35.615
4.20	7.2740	15.274	4.70	10.193	23.953	5.20	13.804	35.891
4.21	7.3256	15.420	4.71	10.258	24.157	5.21	13.884	36.168
4.22	7.3779	15.568	4.72	10.323	24.363	5.22	13.964	36.446
4.23	7.4305	15.715	4.73	10.389	24.570	5.23	14.045	36.726
4.24	7.4833	15.865	4.74	10.455	24.779	5.24	14.125	37.008
4.25	7.5364	16.015	4.75	10.522	24.989	5.25	14.206	37.291
4.26	7.5898	16.166	4.76	10.588	25.200	5.26	14.287	37.576
4.27	7.6433	16.319	4.77	10.655	25.412	5.27	14.369	37.863
4.28	7.6972	16.472	4.78	10.722	25.626	5.28	14.451	38.151
4.29	7.7513	16.626	4.79	10.790	25.841	5.29	14.534	38.440
4.30	7.8060	16.782	4.80	10.857	26.058	5.30	14.616	38.732
4.31	7.8602	16.938	4.81	10.925	26.275	5.31	14.699	39.025
4.32	7.9149	17.096	4.82	10.994	26.495	5.32	14.782	39.320
4.33	7.9701	17.255	4.83	11.062	26.715	5.33	14.866	39.617
4.34	8.0254	17.415	4.84	11.131	26.937	5.34	14.949	39.915
4.35	8.0810	17.576	4.85	11.200	27.160	5.35	15.034	40.215
4.36	8.1369	17.738	4.86	11.269	27.385	5.36	15.118	40.516
4.37	8.1930	17.902	4.87	11.339	27.611	5.37	15.202	40.819
4.38	8.2494	18.066	4.88	11.409	27.839	5.38	15.288	41.124
4.39	8.3060	18.231	4.89	11.479	28.067	5.39	15.373	41.431
4.40	8.3630	18.398	4.90	11.550	28.298	5.40	15.459	41.739
4.41	8.4200	18.566	4.91	11.621	28.530	5.41	15.545	42.049
4.42	8.4775	18.735	4.92	11.692	28.763	5.42	15.631	42.361
4.43	8.5351	18.905	4.93	11.763	28.997	5.43	15.718	42.674
4.44	8.5930	19.077	4.94	11.835	29.233	5.44	15.805	42.990
4.45	8.6513	19.249	4.95	11.907	29.471	5.45	15.893	43.307
4.46	8.7097	19.423	4.96	11.979	29.710	5.46	15.980	43.626
4.47	8.7685	19.598	4.97	12.052	29.950	5.47	16.068	43.946
4.48	8.8274	19.773	4.98	12.124	30.192	5.48	16.157	44.268
4.49	8.8867	19.950	4.99	12.198	30.435	5.49	16.245	44.592

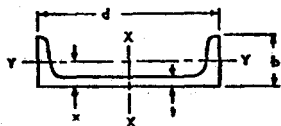
TIÊU CHUẨN MỸ CHO THÉP XÂY DỰNG TIẾT DIỆN U

AMERICAN STANDARD STRUCTURAL CHANNELS

These channels are commonly designated by nominal depth, group symbol, and weight per foot, thus:

9L13.4

indicates a 9 x 2½-inch channel weighing 13.4 pounds per foot.



Nominal Size	Weight per Foot	Area	Depth, d	Flange		Web Thickness, t	Axis X-X			Axis Y-Y			
				Width, b	Average Thickness		I	Z	r	I	Z	r	x
In.	Lb.	In. ²	In.	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.
*18 x 4	58.0	16.98	18.00	4.200	.625	.700	670.7	74.5	6.29	18.5	5.6	1.04	.88
	51.9	15.18	18.00	4.100	.625	.600	622.1	69.1	6.40	17.1	5.3	1.06	.87
	45.8	13.38	18.00	4.000	.625	.500	573.5	63.7	6.55	15.8	5.1	1.09	.89
	42.7	12.48	18.00	3.950	.625	.450	549.2	61.0	6.64	15.0	4.9	1.10	.90
15 x 3¾	50.0	14.64	15.00	3.716	.650	.716	401.4	53.6	5.24	11.2	3.8	.87	.80
	40.0	11.70	15.00	3.520	.650	.520	346.3	46.2	5.44	9.3	3.4	.89	.78
	33.9	9.90	15.00	3.400	.650	.400	312.6	41.7	5.62	8.2	3.2	.91	.79
12 x 3	30.0	8.79	12.00	3.170	.501	.510	161.2	26.9	4.28	5.2	2.1	.77	.68
	25.0	7.32	12.00	3.047	.501	.387	143.5	23.9	4.43	4.5	1.9	.79	.68
	20.7	6.03	12.00	2.940	.501	.280	128.1	21.4	4.61	3.9	1.7	.81	.70
10 x 2½	30.0	8.80	10.00	3.033	.436	.673	103.0	20.6	3.42	4.0	1.7	.67	.65
	25.0	7.33	10.00	2.886	.436	.526	90.7	18.1	3.52	3.4	1.5	.68	.62
	20.0	5.86	10.00	2.739	.436	.379	78.5	15.7	3.66	2.8	1.3	.70	.61
	15.3	4.47	10.00	2.600	.436	.240	66.9	13.4	3.87	2.3	1.2	.72	.64
9 x 2½	20.0	5.86	9.00	2.648	.413	.448	60.6	13.5	3.22	2.4	1.2	.65	.59
	15.0	4.39	9.00	2.485	.413	.285	50.7	11.3	3.40	1.9	1.0	.67	.59
	13.4	3.89	9.00	2.430	.413	.230	47.3	10.5	3.49	1.8	.97	.67	.61
8 x 2½	18.75	5.49	8.00	2.527	.390	.487	43.7	10.9	2.82	2.0	1.0	.60	.57
	13.75	4.02	8.00	2.343	.390	.303	35.8	9.0	2.99	1.5	.86	.62	.56
	11.5	3.36	8.00	2.260	.390	.220	32.3	8.1	3.10	1.3	.79	.63	.58
7 x 2½	14.75	4.32	7.00	2.299	.366	.419	27.1	7.7	2.51	1.4	.79	.57	.53
	12.25	3.58	7.00	2.194	.366	.314	24.1	6.9	2.59	1.2	.71	.58	.53
	9.8	2.85	7.00	2.090	.366	.210	21.1	6.0	2.72	.98	.63	.59	.55
6 x 2	13.0	3.81	6.00	2.157	.343	.437	17.3	5.8	2.13	1.1	.65	.53	.52
	10.5	3.07	6.00	2.034	.343	.314	15.1	5.0	2.22	.87	.57	.53	.50
	8.2	2.39	6.00	1.920	.343	.200	13.0	4.3	2.34	.70	.50	.54	.52
5 x 1¾	9.0	2.63	5.00	1.885	.320	.325	8.8	3.5	1.83	.64	.45	.49	.48
	6.7	1.95	5.00	1.750	.320	.190	7.4	3.0	1.95	.48	.38	.50	.49
4 x 1¾	7.25	2.12	4.00	1.720	.296	.320	4.5	2.3	1.47	.44	.35	.46	.46
	5.4	1.56	4.00	1.580	.296	.180	3.8	1.9	1.56	.32	.29	.45	.46
3 x 1¾	6.0	1.75	3.00	1.596	.273	.356	2.1	1.4	1.08	.31	.27	.42	.46
	5.0	1.46	3.00	1.498	.273	.258	1.8	1.2	1.12	.25	.24	.41	.44
	4.1	1.19	3.00	1.410	.273	.170	1.6	1.1	1.17	.20	.21	.41	.44

† Data from American Institute of Steel Construction Manual, Fifth Edition, 1950.

* Car and Shipbuilding Channel; not an American Standard.

Meaning of symbols: I = moment of inertia; Z = section modulus; r = radius of gyration.

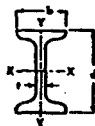
TIÊU CHUẨN MỸ CHO THANH I

AMERICAN STANDARD I-BEAMS

These beams are commonly designated by nominal depth, group symbol and weight per foot, thus:

15I 42.9

indicates a 15 x 5½-inch beam weighing 42.9 pounds per foot.



Nominal Size	Weight per Foot	Area	Depth, d	Flange		Web Thickness, t	Axis X-X			Axis Y-Y		
				Width, b	Thickness, t_f		I	Z	r	I	Z	r
In.	Lb.	In. ²	In.	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.
24 x 7½	120.0 105.9	35.13 30.98	24.00 24.00	8.048 7.875	1.102 1.102	.798 .625	3010.8 2811.5	250.9 234.3	9.26 9.53	84.9 78.9	21.1 20.0	1.56 1.60
24 x 7	100.0 90.0 79.9	29.25 26.30 23.33	24.00 24.00 24.00	7.247 7.124 7.000	.871 .871 .871	.747 .624 .500	2371.8 2230.1 2087.2	197.6 185.8 173.9	9.05 9.21 9.46	48.4 45.5 42.9	13.4 12.8 12.2	1.29 1.32 1.36
20 x 7	95.0 85.0	27.74 24.80	20.00 20.00	7.200 7.053	.916 .916	.800 .653	1599.7 1501.7	160.0 150.2	7.59 7.78	50.5 47.0	14.0 13.3	1.35 1.38
20 x 6½	75.0 65.4	21.90 19.08	20.00 20.00	6.391 6.250	.789 .789	.641 .500	1263.5 1169.5	126.3 116.9	7.60 7.83	30.1 27.9	9.4 8.9	1.17 1.21
18 x 6	70.0 54.7	20.46 15.94	18.00 18.00	6.251 6.000	.691 .691	.711 .460	917.5 795.5	101.9 88.4	6.70 7.07	24.5 21.2	7.8 7.1	1.09 1.15
15 x 5½	50.0 42.9	14.59 12.49	15.00 15.00	5.640 5.500	.622 .622	.550 .410	481.1 441.8	64.2 58.9	5.74 5.95	16.0 14.6	5.7 5.3	1.05 1.08
12 x 5½	50.0 40.8	14.57 11.84	12.00 12.00	5.477 5.250	.659 .659	.687 .460	301.6 268.9	50.3 44.8	4.55 4.77	16.0 13.8	5.8 5.3	1.05 1.08
12 x 5	35.0 31.8	10.20 9.26	12.00 12.00	5.078 5.000	.544 .544	.428 .350	227.0 215.8	37.8 36.0	4.72 4.83	10.0 9.5	3.9 3.8	.99 1.01
10 x 4½	35.0 25.4	10.22 7.38	10.00 10.00	4.944 4.660	.491 .491	.594 .310	145.8 122.1	29.2 24.4	3.78 4.07	8.5 6.9	3.4 3.0	.91 .97
8 x 4	23.0 18.4	6.71 5.34	8.00 8.00	4.171 4.000	.425 .425	.441 .270	64.2 56.9	16.0 14.2	3.09 3.26	4.4 3.8	2.1 1.9	.81 .84
7 x 3½	20.0 15.3	5.83 4.43	7.00 7.00	3.860 3.660	.392 .392	.430 .250	41.9 36.2	12.0 10.4	2.68 2.86	3.1 2.7	1.6 1.5	.74 .78
6 x 3½	17.25 12.5	5.02 3.61	6.00 6.00	3.565 3.330	.359 .359	.465 .230	26.0 21.8	8.7 7.3	2.28 2.46	2.3 1.8	1.3 1.1	.68 .72
5 x 3	14.75 10.0	4.29 2.87	5.00 5.00	3.284 3.000	.326 .326	.494 .210	15.0 12.1	6.0 4.8	1.87 2.05	1.7 1.2	1.0 .82	.63 .65
4 x 2½	9.5 7.7	2.76 2.21	4.00 4.00	2.796 2.660	.293 .293	.326 .190	6.7 6.0	3.3 3.0	1.56 1.64	.91 .77	.65 .58	.58 .59
3 x 2½	7.5 5.7	2.17 1.64	3.00 3.00	2.509 2.330	.260 .260	.349 .170	2.9 2.5	1.9 1.7	1.15 1.23	.59 .46	.47 .40	.52 .53

† Data from American Institute of Steel Construction Manual, Fifth Edition, 1950.

Meaning of symbols: I = moment of inertia; Z = section modulus; r = radius of gyration.

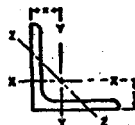
CÁC THÀNH PHẦN CỦA THÉP GÓC ĐỀU

ELEMENTS OF ANGLES WITH EQUAL LEGS

These angles are commonly designated by group symbol, width of each leg, and thickness, thus:

L 3x3x 1/4

indicates a 3 x 3-inch angle of 1/4-inch thickness.



Size	Thick-ness	Weight per Foot	Area	Axis X-X & Y-Y				Z-Z	Size	Thick-ness	Weight per Foot	Area	Axis X-X & Y-Y				Z-Z
				I	r	z or y	r						I	r	z or y	r	
In.	In.	Lb.	In. ²	In. ⁴	In.	In.	In.	In.	In.	In.	Lb.	In. ²	In. ⁴	In.	In.	In.	In.
3x3	1 1/4	56.9	16.73	98.0	2.42	2.41	1.56		3x3	1/4	9.4	2.75	2.2	.90	.93	.58	
	1	51.0	15.00	89.0	2.44	2.37	1.56			3/16	8.3	2.43	2.0	.91	.91	.58	
	3/4	45.0	13.23	79.6	2.45	2.32	1.57			3/8	7.2	2.11	1.8	.91	.89	.58	
	3/8	38.9	11.44	69.7	2.47	2.28	1.57			1/2	6.1	1.78	1.5	.92	.87	.59	
	5/16	32.7	9.61	59.4	2.49	2.23	1.58			3/4	4.9	1.44	1.2	.93	.84	.59	
	1/2	26.6	8.68	54.1	2.50	2.21	1.58			5/8	3.71	1.09	.96	.94	.82	.59	
3x3	1 1/4	56.9	16.73	98.0	2.42	2.41	1.56		2 1/2 x 2 1/2	1/4	7.7	2.25	1.2	.74	.81	.49	
	1	51.0	15.00	89.0	2.44	2.37	1.56			3/8	5.9	1.73	.98	.75	.76	.49	
	3/4	45.0	13.23	79.6	2.45	2.32	1.57			1/2	5.0	1.47	.85	.76	.74	.49	
	3/8	38.9	11.44	69.7	2.47	2.28	1.57			3/4	4.1	1.19	.70	.77	.72	.49	
	5/16	32.7	9.61	59.4	2.49	2.23	1.58			5/8	3.07	.90	.55	.78	.69	.49	
	1/2	26.6	8.68	54.1	2.50	2.21	1.58			3/4	4.7	1.36	.48	.59	.64	.39	
3x3	1 1/4	56.9	16.73	98.0	2.42	2.41	1.56		2 x 2	1/4	3.92	1.15	.42	.60	.61	.39	
	1	51.0	15.00	89.0	2.44	2.37	1.56			3/8	3.19	.94	.35	.61	.59	.39	
	3/4	45.0	13.23	79.6	2.45	2.32	1.57			1/2	2.44	.71	.27	.62	.57	.39	
	3/8	38.9	11.44	69.7	2.47	2.28	1.57			3/4	1.65	.48	.19	.63	.55	.40	
	5/16	32.7	9.61	59.4	2.49	2.23	1.58			1/4	2.77	.81	.23	.53	.53	.34	
	1/2	26.6	8.68	54.1	2.50	2.21	1.58			3/8	2.12	.62	.18	.54	.51	.34	
3x3	1 1/4	56.9	16.73	98.0	2.42	2.41	1.56		1 1/2 x 1 1/2	1/4	1.44	.42	.13	.55	.48	.35	
	1	51.0	15.00	89.0	2.44	2.37	1.56			3/8	1.23	.36	.08	.47	.42	.30	
	3/4	45.0	13.23	79.6	2.45	2.32	1.57			1/2	1.92	.56	.08	.37	.40	.24	
	3/8	38.9	11.44	69.7	2.47	2.28	1.57			3/4	1.48	.43	.06	.38	.38	.24	
	5/16	32.7	9.61	59.4	2.49	2.23	1.58			1/2	1.01	.30	.04	.38	.36	.25	
	1/2	26.6	8.68	54.1	2.50	2.21	1.58			3/4	1.49	.44	.04	.29	.34	.20	
3x3	1 1/4	56.9	16.73	98.0	2.42	2.41	1.56		1 x 1	1/4	1.16	.34	.03	.30	.32	.19	
	1	51.0	15.00	89.0	2.44	2.37	1.56			3/8	.80	.23	.02	.30	.30	.20	
	3/4	45.0	13.23	79.6	2.45	2.32	1.57			1/2	...	...	...	...	...	...	
	3/8	38.9	11.44	69.7	2.47	2.28	1.57			3/4	...	...	...	...	...	...	
	5/16	32.7	9.61	59.4	2.49	2.23	1.58			1/2	...	...	...	...	...	...	
	1/2	26.6	8.68	54.1	2.50	2.21	1.58			3/4	...	...	...	...	...	...	
3x3	1 1/4	56.9	16.73	98.0	2.42	2.41	1.56		3/4 x 3/4	1/4	11.1	3.25	3.6	1.06	1.06	.68	
	1	51.0	15.00	89.0	2.44	2.37	1.56			3/8	9.8	2.87	3.3	1.07	1.04	.68	
	3/4	45.0	13.23	79.6	2.45	2.32	1.57			5/16	8.5	2.48	2.9	1.07	1.01	.69	
	3/8	38.9	11.44	69.7	2.47	2.28	1.57			3/4	7.2	2.09	2.5	1.08	.99	.69	
	5/16	32.7	9.61	59.4	2.49	2.23	1.58			1/2	5.8	1.69	2.0	1.09	.97	.69	
	1/2	26.6	8.68	54.1	2.50	2.21	1.58			3/4	...	...	...	...	...	...	

† Data from American Institute of Steel Construction Manual, Fifth Edition, 1950.
Meaning of symbols: I = moment of inertia; r = radius of gyration.

CÁC THÀNH PHẦN CỦA THÉP GÓC KHÔNG ĐỀU

ELEMENTS OF ANGLES WITH UNEQUAL LEGS

These angles are commonly designated by group symbol, width of each leg, and thickness, thus:

L 7x4x½

indicates a 7 x 4-inch angle of ½-inch thickness.



Size	Thick-ness	Weight per Foot	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				I	Z	r	y	I	Z	r	z	r	Tan A
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.	
9 x 4	I	40.8	12.00	97.0	17.6	2.84	3.50	12.0	4.0	1.00	1.00	.83	.203
	¾	36.1	10.61	86.8	15.7	2.86	3.45	10.8	3.6	1.01	.95	.84	.208
	¾	31.3	9.19	76.1	13.6	2.88	3.41	9.6	3.1	1.02	.91	.84	.212
	¾	26.3	7.73	64.9	11.5	2.90	3.36	8.3	2.6	1.04	.86	.85	.216
	½	23.8	7.00	59.1	10.4	2.91	3.33	7.6	2.4	1.04	.83	.85	.218
	¼	21.3	6.25	53.2	9.3	2.92	3.31	6.9	2.2	1.05	.81	.85	.220
8 x 6	I	44.2	13.00	80.8	15.1	2.49	2.65	38.8	8.9	1.73	1.65	1.28	.543
	¾	39.1	11.48	72.3	13.4	2.51	2.61	34.9	7.9	1.74	1.61	1.28	.547
	¾	33.8	9.94	63.4	11.7	2.53	2.56	30.7	6.9	1.76	1.56	1.29	.551
	¾	28.5	8.36	54.1	9.9	2.54	2.52	26.3	5.9	1.77	1.52	1.29	.554
	½	25.7	7.56	49.3	9.0	2.55	2.50	24.0	5.3	1.78	1.50	1.30	.556
	¼	23.0	6.75	44.3	8.0	2.56	2.47	21.7	4.6	1.79	1.47	1.30	.558
8 x 4	I	20.2	5.93	39.2	7.1	2.57	2.45	19.3	4.2	1.80	1.45	1.31	.560
	¾	37.4	11.00	69.6	14.1	2.52	3.05	11.6	3.9	1.03	1.05	.85	.247
	¾	33.1	9.73	62.5	12.5	2.53	3.00	10.5	3.5	1.04	1.00	.85	.253
	¾	28.7	8.44	54.9	10.9	2.55	2.95	9.4	3.1	1.05	.95	.85	.258
	¾	24.2	7.11	46.9	9.2	2.57	2.91	8.1	2.6	1.07	.91	.86	.262
	½	21.9	6.43	42.8	8.4	2.58	2.88	7.4	2.4	1.07	.88	.86	.265
7 x 4	¾	19.6	5.75	38.5	7.5	2.59	2.86	6.7	2.2	1.08	.86	.86	.267
	½	17.2	5.06	34.1	6.6	2.60	2.83	6.0	1.9	1.09	.83	.87	.269
	¾	30.2	8.86	42.9	9.7	2.20	2.55	10.2	3.5	1.07	1.05	.86	.318
	¾	26.2	7.69	37.8	8.4	2.22	2.51	9.1	3.0	1.09	1.01	.86	.324
	¾	22.1	6.48	32.4	7.1	2.24	2.46	7.8	2.6	1.10	.96	.86	.329
	½	20.0	5.87	29.6	6.5	2.24	2.44	7.2	2.4	1.11	.94	.87	.332
6 x 4	¾	17.9	5.25	26.7	5.8	2.25	2.42	6.5	2.1	1.11	.92	.87	.335
	½	15.8	4.62	23.7	5.1	2.26	2.39	5.8	1.9	1.12	.89	.88	.337
	¾	13.6	3.98	20.6	4.4	2.27	2.37	5.1	1.6	1.13	.87	.88	.339
	¾	27.2	7.98	27.7	7.2	1.86	2.12	9.8	3.4	1.11	1.12	.86	.421
	¾	23.6	6.94	24.5	6.3	1.88	2.08	8.7	3.0	1.12	1.08	.86	.428
	½	20.0	5.86	21.1	5.3	1.90	2.03	7.5	2.5	1.13	1.03	.86	.435
6 x 3½	¾	18.1	5.31	19.3	4.8	1.90	2.01	6.9	2.3	1.14	1.01	.87	.438
	¾	16.2	4.75	17.4	4.3	1.91	1.99	6.3	2.1	1.15	.99	.87	.440
	½	14.3	4.18	15.5	3.8	1.92	1.96	5.6	1.9	1.16	.96	.87	.443
	¾	12.3	3.61	13.5	3.3	1.93	1.94	4.9	1.6	1.17	.94	.88	.446
	½	10.3	3.03	11.4	2.8	1.94	1.92	4.2	1.4	1.17	.92	.88	.449
	¾	15.3	4.50	16.6	4.2	1.92	2.08	4.3	1.6	.97	.83	.76	.344
5 x 3½	¾	11.7	3.42	12.9	3.2	1.94	2.04	3.3	1.2	.99	.79	.77	.350
	½	9.8	2.87	10.9	2.7	1.95	2.01	2.9	1.0	1.00	.76	.77	.352
	¾	7.9	2.31	8.9	2.2	1.96	1.99	2.3	.85	1.01	.74	.78	.355
	¾	19.8	5.81	13.9	4.3	1.55	1.75	5.6	2.2	.98	1.00	.75	.464
	¾	16.8	4.92	12.0	3.7	1.56	1.70	4.8	1.9	.99	.95	.75	.472
	½	13.6	4.00	10.0	3.0	1.58	1.66	4.1	1.6	1.01	.91	.75	.479
5 x 3	¾	12.0	3.53	8.9	2.6	1.59	1.63	3.6	1.4	1.01	.88	.76	.482
	¾	10.4	3.05	7.8	2.3	1.60	1.61	3.2	1.2	1.02	.86	.76	.486
	½	8.7	2.56	6.6	1.9	1.61	1.59	2.7	1.0	1.03	.84	.76	.489
	¾	7.0	2.06	5.4	1.6	1.61	1.56	2.2	.83	1.04	.81	.76	.492

† See footnotes at end of table on next page.

CÁC THÀNH PHẦN CỦA THÉP GÓC KHÔNG ĐỀU

ELEMENTS OF ANGLES WITH UNEQUAL LEGS

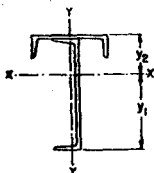
Size	Thickness	Weight per foot	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				I	Z	r	y	I	Z	r	s	r	Tan A
In.	In.	Lb.	In. ²	In. ⁴	In. ²	In.	In.	In. ⁴	In. ²	In.	In.	In.	
5 x 3	1/2	12.8	3.75	9.5	2.9	1.59	1.75	2.6	1.1	.83	.75	.65	.357
	3/4	11.3	3.31	8.4	2.6	1.60	1.73	2.3	1.0	.84	.73	.65	.361
	1	9.8	2.86	7.4	2.2	1.61	1.70	2.0	.89	.84	.70	.65	.364
	1 1/4	8.2	2.40	6.3	1.9	1.61	1.68	1.8	.75	.85	.58	.65	.368
4 x 3 1/2	1/2	6.6	1.94	5.1	1.5	1.62	1.66	1.4	.61	.86	.66	.66	.371
	3/4	14.7	4.30	6.4	2.4	1.22	1.29	4.5	1.8	1.03	1.04	.72	.745
	1	11.9	3.50	5.3	1.9	1.23	1.25	3.8	1.5	1.04	1.00	.72	.750
	1 1/4	10.6	3.09	4.8	1.7	1.24	1.23	3.4	1.4	1.05	.98	.72	.753
4 x 3	1/2	9.1	2.67	4.2	1.5	1.25	1.21	3.0	1.2	1.06	.96	.73	.755
	3/4	7.7	2.25	3.6	1.3	1.26	1.18	2.6	1.0	1.07	.93	.73	.757
	1	6.2	1.81	2.9	1.0	1.27	1.16	2.1	.81	1.07	.91	.73	.759
	1 1/4	13.6	3.98	6.0	2.3	1.23	1.37	2.9	1.4	.85	.87	.64	.534
3 1/2 x 3	1/2	11.1	3.25	5.1	1.9	1.25	1.33	2.4	1.1	.86	.83	.64	.543
	3/4	9.8	2.87	4.5	1.7	1.25	1.30	2.2	1.0	.87	.80	.64	.547
	1	8.5	2.48	4.0	1.5	1.26	1.28	1.9	.87	.88	.78	.64	.551
	1 1/4	7.2	2.09	3.4	1.2	1.27	1.26	1.7	.73	.89	.76	.65	.554
3 1/2 x 2 1/2	1/2	5.8	1.69	2.8	1.0	1.28	1.24	1.4	.60	.90	.74	.65	.558
	3/4	10.2	3.00	3.5	1.5	1.07	1.13	2.3	1.1	.88	.88	.62	.714
	1	9.1	2.65	3.1	1.3	1.08	1.10	2.1	.98	.89	.85	.62	.718
	1 1/4	7.9	2.30	2.7	1.1	1.09	1.08	1.9	.85	.90	.83	.62	.721
3 1/2 x 2	1/2	6.6	1.93	2.3	.95	1.10	1.06	1.6	.72	.90	.81	.63	.724
	3/4	5.4	1.56	1.9	.78	1.11	1.04	1.3	.59	.91	.79	.63	.727
	1	9.4	2.75	3.2	1.4	1.09	1.20	1.4	.76	.70	.70	.53	.486
	1 1/4	8.3	2.43	2.9	1.3	1.09	1.18	1.2	.68	.71	.68	.54	.491
3 x 2 1/2	1/2	7.2	2.11	2.6	1.1	1.10	1.16	1.1	.59	.72	.66	.54	.496
	3/4	6.1	1.78	2.2	.93	1.11	1.14	.94	.50	.73	.64	.54	.501
	1	4.9	1.44	1.8	.75	1.12	1.11	.78	.41	.74	.61	.54	.506
	1 1/4	8.5	2.50	2.1	1.0	.91	1.00	1.3	.74	.72	.75	.52	.667
3 x 2	1/2	7.6	2.21	1.9	.93	.92	.98	1.2	.66	.73	.73	.52	.672
	3/4	6.6	1.92	1.7	.81	.93	.96	1.0	.58	.74	.71	.52	.676
	1	5.6	1.62	1.4	.69	.94	.93	.90	.49	.74	.68	.53	.680
	1 1/4	4.5	1.31	1.2	.56	.95	.91	.74	.40	.75	.66	.53	.684
3 x 1 1/2	1/2	7.7	2.25	1.9	1.0	.92	1.08	.67	.47	.55	.58	.43	.414
	3/4	6.8	2.00	1.7	.89	.93	1.06	.61	.42	.55	.56	.43	.421
	1	5.9	1.73	1.5	.78	.94	1.04	.54	.37	.50	.54	.43	.428
	1 1/4	5.0	1.47	1.3	.66	.95	1.02	.47	.32	.57	.52	.43	.435
2 1/2 x 2	1/2	4.1	1.19	1.1	.54	.95	.99	.39	.26	.57	.49	.43	.440
	3/4	3.07	.90	.84	.41	.97	.97	.31	.20	.58	.47	.44	.446
	1	5.3	1.55	.91	.55	.77	.83	.51	.36	.58	.58	.42	.614
	1 1/4	4.5	1.31	.79	.47	.78	.81	.45	.31	.58	.56	.42	.620
2 1/2 x 1 1/2	1/2	3.62	1.06	.65	.38	.78	.79	.37	.25	.59	.54	.42	.626
	3/4	2.75	.81	.51	.29	.79	.70	.29	.20	.60	.51	.43	.631
	1	4.7	1.36	.82	.52	.78	.92	.22	.20	.40	.42	.32	.340
	1 1/4	3.92	1.15	.71	.44	.79	.90	.19	.17	.41	.40	.32	.349
2 x 1 1/2	1/2	3.19	.94	.59	.36	.79	.88	.16	.14	.41	.38	.32	.357
	3/4	2.44	.72	.46	.28	.80	.85	.13	.11	.42	.35	.33	.364
	1	2.77	.81	.32	.24	.62	.66	.15	.14	.43	.41	.32	.543
	1 1/4	2.12	.62	.25	.18	.63	.64	.12	.11	.44	.39	.32	.551
2 x 1 1/4	1/2	1.44	.42	.17	.13	.64	.62	.09	.08	.45	.37	.33	.558
	3/4	2.34	.69	.20	.18	.54	.60	.09	.10	.35	.35	.27	.486
	1	1.80	.53	.16	.14	.55	.58	.07	.08	.36	.33	.27	.496
	1 1/4	1.23	.36	.11	.09	.56	.56	.05	.05	.37	.31	.27	.506

† Data from American Institute of Steel Construction Manual, Fifth Edition, 1950.

Meaning of symbols: I = moment of inertia; Z = section modulus; r = radius of gyration.

CÁC THÀNH PHẦN CỦA THÉP 2 LÒNG MÁNG

ELEMENTS OF TWO CHANNELS



Data from American Institute of Steel
Construction Manual, 5th Ed.

I = moment of inertia;

S , S_1 , and S_2 = section moduli;

r = radius of gyration.

Vertical Channel Size and Weight	Horizontal Channel Size and Weight	Total Area	Weight per Foot	Axis X-X						Axis Y-Y		
				I	$S_1 = \frac{I}{y_1}$	$S_2 = \frac{I}{y_2}$	r	y_1		I	S	r
				In. ⁴	In. ³	In. ³	In.	In.		In. ⁴	In. ³	In.
3"-4.1	4"-5.4	2.75	9.5	2.9	1.3	3.0	1.03	2.19	4.0	2.0	1.21	
4"-5.4	5"-6.7	3.12	10.8	6.4	2.2	4.9	1.44	2.86	4.1	2.1	1.15	
5"-6.7	6"-8.2	3.51	12.1	6.8	2.3	5.4	1.39	2.94	7.7	3.1	1.48	
6"-8.2	7"-9.8	3.90	13.4	12.6	3.5	7.9	1.80	3.60	7.9	3.2	1.42	
7"-9.8	8"-11.5	4.34	14.9	13.2	3.6	8.8	1.74	3.70	13.5	4.5	1.76	
8"-11.5	9"-13.4	4.80	16.5	13.8	3.7	9.6	1.69	3.78	21.6	6.8	2.12	
9"-13.4	10"-15.3	5.24	18.0	21.3	5.1	10.8	2.22	4.21	8.1	3.2	1.37	
10"-15.3	11"-17.2	5.75	19.7	22.3	5.1	12.0	2.16	4.34	13.7	4.6	1.69	
11"-17.2	12"-20.7	6.28	21.6	23.2	5.2	13.2	2.10	4.45	21.8	6.2	2.04	
12"-20.7	13"-22.7	6.86	23.5	24.0	5.3	14.3	2.04	4.54	33.0	8.2	2.40	
13"-22.7	14"-26.8	7.32	25.1	25.0	5.4	15.5	1.99	4.62	48.0	10.7	2.76	
14"-26.8	15"-30.9	7.78	26.8	25.8	5.5	16.7	1.94	4.69	67.6	13.5	3.14	
15"-30.9	16"-35.3	8.24	28.6	35.0	7.1	15.5	2.58	4.95	14.0	4.7	1.69	
16"-35.3	17"-40.7	8.70	30.6	36.3	7.2	17.0	2.52	5.08	22.1	6.3	1.97	
17"-40.7	18"-47.7	9.19	32.7	37.6	7.2	18.6	2.46	5.20	33.3	8.3	2.31	
18"-47.7	19"-55.8	9.71	35.0	38.9	7.4	20.2	2.40	5.30	48.3	10.7	2.68	
19"-55.8	20"-64.6	10.25	37.5	40.2	7.4	21.7	2.34	5.39	67.9	13.6	3.05	
20"-64.6	21"-74.2	10.77	40.1	51.9	9.4	19.4	3.00	5.53	14.3	4.8	1.58	
21"-74.2	22"-84.7	11.31	42.7	53.9	9.5	21.3	2.95	5.68	22.4	6.4	1.90	
22"-84.7	23"-96.0	11.86	45.4	55.9	9.6	23.3	2.88	5.82	33.6	8.4	2.24	
23"-96.0	24"-108.0	12.42	48.2	57.8	9.7	25.2	2.82	5.94	48.6	10.8	2.59	
24"-108.0	25"-120.7	12.99	51.1	59.5	9.8	27.2	2.76	6.05	68.2	13.6	2.95	
25"-120.7	26"-134.4	13.57	54.1	61.8	10.1	32.2	2.61	6.30	129.4	21.6	3.71	
26"-134.4	27"-149.8	14.17	57.2	76.8	12.3	26.0	3.37	6.26	22.9	6.5	1.84	
27"-149.8	28"-176.8	14.78	60.4	79.5	12.4	28.4	3.31	6.42	34.1	8.5	2.17	
28"-176.8	29"-195.3	15.39	63.7	82.1	12.5	30.8	3.25	6.56	49.1	10.9	2.51	
29"-195.3	30"-220.7	15.99	67.1	84.6	12.6	33.2	3.18	6.69	68.7	13.7	2.87	
30"-220.7	31"-247.7	16.60	70.6	90.6	13.0	39.4	3.02	6.98	129.9	21.6	3.62	
31"-247.7	32"-276.8	17.22	74.2	109.5	15.7	33.9	3.74	6.99	34.6	8.6	2.10	
32"-276.8	33"-307.7	17.85	77.9	113.1	15.8	36.7	3.68	7.15	49.6	11.0	2.44	
33"-307.7	34"-339.9	18.49	81.7	116.5	16.0	39.6	3.61	7.30	69.2	13.8	2.78	
34"-339.9	35"-373.2	19.14	85.6	124.7	16.3	47.0	3.45	7.63	130.4	21.7	3.41	
35"-373.2	36"-407.7	19.80	89.6	140.4	17.2	63.2	3.13	8.18	314.9	42.0	4.68	
36"-407.7	37"-443.2	20.47	93.7	204.7	25.0	50.8	4.54	8.20	51.2	11.4	2.27	
37"-443.2	38"-480.7	21.15	97.9	211.0	25.2	54.7	4.48	8.38	70.8	14.2	2.60	
38"-480.7	39"-519.2	21.84	102.2	225.9	25.7	64.7	4.33	8.79	132.0	22.0	3.31	
39"-519.2	40"-559.7	22.54	106.6	261.0	26.8	87.3	3.99	9.49	316.5	42.2	4.46	
40"-559.7	41"-601.2	23.25	111.1	261.1	26.8	85.0	5.72	9.71	75.1	15.0	2.29	
41"-601.2	42"-643.7	23.97	115.7	270.7	27.1	98.9	5.63	10.18	136.3	22.7	2.93	
42"-643.7	43"-687.2	24.70	120.4	270.7	27.1	131.5	5.37	11.06	320.8	42.8	4.02	
43"-687.2	44"-731.7	25.44	125.1	602.1	52.7	149.8	5.19	11.43	557.2	61.9	4.99	
44"-731.7	45"-777.2	26.19	129.9	852.0	72.2	131.5	6.78	11.80	143.1	23.8	2.78	
45"-777.2	46"-823.7	26.95	134.7	966.4	75.4	172.9	6.57	12.81	327.6	43.7	3.83	
46"-823.7	47"-871.2	27.72	139.6	1020.7	76.9	197.0	6.39	13.27	564.0	62.7	4.75	

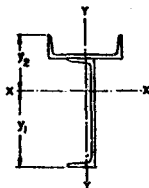
Centers of gravity of both channels are in the same vertical line.

CÁC THÀNH PHẦN CỦA THÉP 2 LÒNG MÁNG

ELEMENTS OF TWO CHANNELS

Data from American Institute of Steel
Construction Manual, 5th Ed.

I = moment of inertia;
 S , S_1 , and S_2 = section moduli;
 r = radius of gyration.

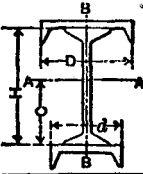


Vertical Channel Size and Weight	Horizontal Channel Size and Weight	Total Area	Weight per Foot	Axis X-X						Axis Y-Y		
				I	$S_1 = \frac{I}{y_1}$	$S_2 = \frac{I}{y_2}$	r	r_1		I	S	r
		In. ²	Lb	In. ⁴	In. ³	In. ³	In.	In.		In. ⁴	In. ³	In.
3'-4.1	4'-5.4	2.75	9.5	4.5	1.7	2.3	1.28	2.61	4.0	2.0	1.21	
4'-5.4	4'-5.4	3.12	10.8	8.8	2.7	3.8	1.69	3.23	4.1	2.1	1.15	
	5'-6.7	3.51	12.1	9.7	2.9	4.1	1.66	3.38	7.7	3.1	1.48	
5'-6.7	5'-6.7	3.90	13.4	16.6	4.2	6.0	2.06	3.99	7.9	3.2	1.42	
	6'-8.2	4.34	14.9	17.9	4.3	6.5	2.03	4.16	13.5	4.5	1.76	
	7'-9.8	4.80	16.5	19.1	4.4	6.9	1.99	4.31	21.6	6.2	2.12	
6'-8.2	6'-8.2	4.34	14.9	26.6	5.8	8.4	2.47	4.57	8.1	3.2	1.37	
	7'-9.8	4.78	16.4	28.5	6.0	9.0	2.44	4.76	13.7	4.6	1.69	
	8'-11.5	5.24	18.0	30.4	6.2	9.6	2.41	4.93	21.8	6.2	2.04	
	9'-13.4	5.75	19.7	32.2	6.3	10.2	2.37	5.09	33.0	8.2	2.40	
	10'-15.3	6.28	21.6	34.0	6.5	10.7	2.33	5.24	48.0	10.7	2.76	
7'-9.8	7'-9.8	5.24	18.0	42.8	8.0	11.9	2.86	5.33	14.0	4.7	1.69	
	8'-11.5	5.70	19.6	45.5	8.2	12.8	2.82	5.52	22.1	6.3	1.97	
	9'-13.4	6.21	21.3	48.0	8.4	13.5	2.78	5.71	33.3	8.3	2.31	
	10'-15.3	6.74	23.2	50.7	8.6	14.2	2.74	5.87	48.3	10.7	2.68	
8'-11.5	8'-11.5	5.75	19.7	61.5	10.5	15.2	3.27	5.88	14.3	4.8	1.58	
	9'-13.4	6.21	21.3	65.2	10.7	16.3	3.24	6.09	22.4	6.4	1.90	
	10'-15.3	6.72	23.0	68.8	10.9	17.3	3.20	6.29	33.6	8.4	2.24	
	11'-17.1	7.25	24.9	72.5	11.2	18.3	3.16	6.47	48.6	10.8	2.59	
	12'-20.7	7.83	26.8	75.9	11.4	19.2	3.11	6.65	68.2	13.6	2.95	
9'-13.4	9'-13.4	7.25	24.9	83.8	11.9	21.4	2.99	7.02	129.4	21.6	3.71	
	10'-15.3	7.78	26.8	90.2	13.6	20.3	3.66	6.64	22.9	6.5	1.84	
	11'-17.1	8.36	28.7	95.2	13.9	21.6	3.62	6.85	34.1	8.5	2.17	
	12'-20.7	8.96	30.6	99.8	14.1	22.8	3.58	7.06	49.1	10.9	2.51	
10'-15.3	10'-15.3	8.36	28.7	104.5	14.4	24.0	3.54	7.25	68.7	13.7	2.87	
	11'-17.1	8.92	30.6	115.2	15.0	26.9	3.41	7.66	129.9	21.6	3.62	
	12'-20.7	9.52	32.2	127.8	17.3	26.3	4.04	7.40	34.6	8.6	2.70	
	13'-24.3	10.10	33.9	134.2	17.6	27.8	4.01	7.61	49.6	11.0	2.44	
11'-17.1	11'-17.1	9.52	32.2	140.3	17.9	29.4	3.96	7.82	69.2	13.8	2.78	
	12'-20.7	10.10	33.9	154.3	18.7	33.0	3.83	8.27	130.4	21.7	3.52	
	13'-24.3	10.60	35.0	161.4	19.8	40.4	3.52	8.99	314.9	42.0	4.68	
12'-20.7	12'-20.7	9.92	34.1	233.2	27.2	39.9	4.85	8.59	51.2	11.4	2.27	
	13'-24.3	10.50	36.0	243.5	27.6	42.2	4.82	8.83	70.8	14.2	2.60	
	14'-28.1	11.00	37.0	267.3	28.6	47.8	4.71	9.35	132.0	22.0	3.31	
13'-24.3	13'-24.3	11.00	37.0	309.0	30.2	59.7	4.40	10.22	316.5	42.2	4.46	
	14'-28.1	11.53	38.3	329.2	31.8	68.6	4.01	10.03	75.1	15.0	2.29	
14'-28.1	14'-28.1	11.53	38.3	358.7	33.6	77.5	3.97	10.60	136.3	22.7	2.93	
	15'-32.9	12.00	39.0	361.4	34.0	97.8	3.78	11.64	320.8	42.8	4.02	
	16'-36.7	12.38	39.0	361.4	34.0	106.0	3.66	12.18	557.2	61.9	4.99	
15'-32.9	15'-32.9	12.38	39.0	435.4	36.9	106.5	3.66	12.18	143.1	23.8	2.78	
	16'-36.7	12.96	40.0	435.4	36.9	134.6	3.66	13.33	327.6	43.7	3.33	
16'-36.7	16'-36.7	12.96	40.0	435.4	36.9	147.0	3.66	13.95	564.0	62.7	4.75	

Centers of gravity of both channels are in the same vertical line.

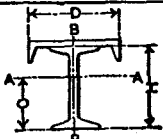
MẶT CẮT CỦA THÉP LÀM RAY CHO CẦN TRỤC VÀ CÁP TREO

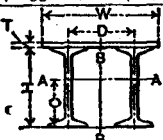
SECTIONS FOR CRANE AND TELPHER RUNWAYS

						Properties of Sections Consisting of One I-beam and Two Channels							
Upper Channel		I-beam		Lower Channel		Section Modulus				Moment of Inertia	Distance, C		
D, Inches	Weight per Foot, Pounds	H, Inches	Weight per Foot, Pounds	d, Inches	Weight per Foot, Pounds	Upper Chord, Axis A-A	Lower Chord, Axis A-A	Upper Chord, Axis B-B	Lower Chord, Axis B-B				
10	15	10	25	8	11.25	62.87	43.62	14.09	8.97	321.89	5.12		
12	20.5	10	25	10	15	76.93	50.92	21.98	14.09	394.66	5.15		
12	20.5	12	31.5	10	15	99.54	68.40	22.19	14.35	603.23	6.22		
12	20.5	15	42	10	15	139.08	100.03	22.62	14.86	1040.34	7.80		
15	33	15	42	12	20.5	185.61	119.97	22.65	22.62	1336.49	8.20		
12	20.5	18	55	10	15	185.03	138.27	23.16	15.52	1652.32	9.35		
15	33	18	55	12	20.5	241.06	163.01	23.16	23.16	2075.17	9.79		

MẶT CẮT CỦA THÉP LÀM RAY CHO CẦN TRỤC VÀ CÁP TREO

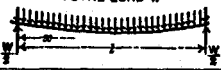
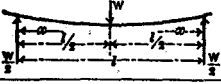
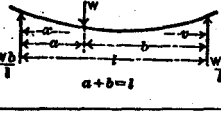
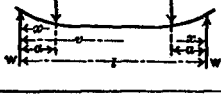
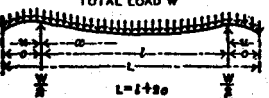
SECTIONS FOR CRANE AND TELPHER RUNWAYS

				Properties of Sections Consisting of One I-beam and One Channel				
Channel		I-beam		Section Modulus			Moment of Inertia	Distance C
D, Inches	Weight per Foot, Lbs.	H, Inches	Weight per Foot, Lbs.	Upper Chord, Axis A-A	Lower Chord, Axis A-A	Upper Chord, Axis B-B		
10	15	10	25	52.06	27.15	14.09	182.72	6.73
10	15	12	31.5	70.22	39.97	14.35	311.78	7.80
12	20.5	12	31.5	81.71	40.66	22.19	333.39	8.20
12	20.5	12	40	90.41	50.31	22.55	396.91	7.89
10	15	15	42	103.55	64.87	14.86	607.83	9.37
12	20.5	15	42	118.80	66.06	22.62	648.68	9.82
15	33	15	42	151.94	68.18	42.65	724.77	10.63
12	25	15	50	135.28	75.02	25.33	742.67	9.90
12	20.5	15	60	140.17	90.13	23.56	838.22	9.30
15	33	15	60	173.59	93.20	43.43	933.90	10.02
12	20.5	18	55	161.57	99.11	23.16	1122.90	11.33
15	33	18	55	203.18	102.50	43.11	1253.60	12.23
15	33	15	80	197.81	120.17	44.48	1151.27	9.58
12	20.5	20	65	199.98	129.60	23.72	1594.03	12.30
15	33	20	65	247.50	133.85	43.56	1772.11	13.24
15	33	20	80	278.43	164.98	44.52	2113.31	12.81
15	40	20	80	305.44	168.05	49.12	2226.62	13.25
15	33	24	80	339.17	196.13	44.56	3032.18	15.46
15	55	24	100	455.00	239.53	60.64	3894.80	16.26

				Properties of Sections Consisting of Two I-beams and One Connecting Plate					
Plate		I-beam		Section Modulus			Distance, D	Moment of Inertia	Distance, C
W, Inches	T, Inches	H, Inches	Weight per Foot, Lbs.	Upper Chord, Axis A-A	Lower Chord, Axis A-A	Upper Chord, Axis B-B			
12	3/8	10	25	81.01	54.18	20.27	5.75	337.02	6.22
14	1/2	12	31.5	131.53	81.72	36.30	7.50	630.03	7.71
14	1/2	12	40	147.64	100.75	40.38	7.25	748.53	7.43
14	1/2	15	42	192.53	131.50	40.03	7.00	1211.00	9.21
15	1/2	15	60	239.39	179.40	55.30	7.50	1589.54	8.86
15	1/2	15	70	251.22	196.35	61.22	7.50	1708.27	8.70
15	1/2	15	80	285.65	230.98	65.55	7.25	1979.53	8.57
16	1/2	18	55	279.02	197.60	60.51	8.50	2140.06	10.83
16	1/2	20	65	347.57	257.80	65.48	8.25	3034.28	11.77
16	1/2	20	80	406.10	318.45	67.99	7.50	3658.97	11.49
18	1/2	24	80	504.42	379.58	90.22	9.50	5306.49	13.98
18	1/2	24	100	545.59	435.11	106.12	9.50	5930.54	13.63

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH

STRESSES AND DEFLECTIONS IN BEAMS

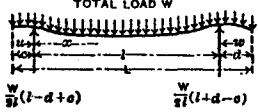
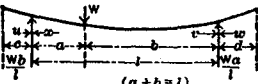
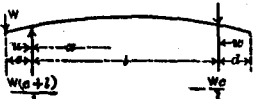
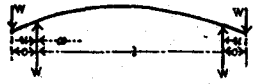
Type of Beam	Stresses	
Case 1. — Supported at Both Ends, Uniform Load TOTAL LOAD W 	General Formula for Stress at any Point $s = -\frac{W}{2Zl} x(l-x)$	Stresses at Critical Points Stress at center, $-\frac{Wl}{8Z}$ If cross-section is constant, this is the maximum stress.
Case 2. — Supported at Both Ends, Load at Center 	Between each support and load, $s = -\frac{Wx}{2Z}$	Stress at center, $-\frac{Wl}{4Z}$ If cross-section is constant, this is the maximum stress.
Case 3. — Supported at Both Ends, Load at any Point 	For segment of length a , $s = -\frac{Wbx}{Zl}$ For segment of length b , $s = -\frac{Wax}{Zl}$	Stress at load, $-\frac{Wab}{Zl}$ If cross-section is constant, this is the maximum stress.
Case 4. — Supported at Both Ends, Two Symmetrical Loads 	Between each support and adjacent load, $s = -\frac{Wx}{Z}$ Between loads, $s = -\frac{Wx}{Z}$	Stress at each load, and at all points between, $-\frac{Wa}{Z}$
Case 5. — Both Ends Overhanging Supports Symmetrically, Uniform Load TOTAL LOAD W 	Between each support and adjacent end, $s = -\frac{W}{2Zl} (c-x)^2$ Between supports, $s = -\frac{W}{2Zl} [c^2 - x(l-x)]$	Stress at each support, $\frac{Wc^2}{2Zl}$ Stress at center, $\frac{W}{2Zl} (c^2 - \frac{1}{4}l^2)$ If cross-section is constant, the greater of these is the maximum stress. If l is greater than $2c$, the stress is zero at points $\sqrt{\frac{1}{4}l^2 - c^2}$ on both sides of the center. If cross-section is constant and if $l = 2.828c$, the stresses at supports and center are equal and opposite, and are $\pm \frac{Wl}{46.62Z}$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH STRESSES AND DEFLECTIONS IN BEAMS

Deflections	
General Formula for Deflection at any Point	Deflections at Critical Points
$y = \frac{Wx(l-x)}{24EI} [3^2 + x(l-x)]$	Maximum deflection, at center, $\frac{5}{384} \frac{Wl^3}{EI}$
Between each support and load, $y = \frac{Wx}{48EI} (3l^2 - 4x^2)$	Maximum deflection, at load, $\frac{Wl^3}{48EI}$
For segment of length a , $y = \frac{Wbx}{6EI} (l^2 - x^2 - b^2)$ For segment of length b , $y = \frac{Wax}{6EI} (l^2 - x^2 - a^2)$	Deflection at load, $\frac{Wab^3}{3EI}$ Let a be the length of the shorter segment and b of the longer one. The maximum deflection is in the longer segment, at $v = b \sqrt{\frac{l}{3} + \frac{2a}{3b}} = v_1, \text{ and is } \frac{Wab^2}{3EI}$
Between each support and adjacent load, $y = \frac{Wx}{6EI} [3a(l-a) - x^2]$ Between loads, $y = \frac{Wx}{6EI} [3v(l-v) - x^2]$	Maximum deflection at center, $\frac{Wa}{24EI} (3l^2 - 4a^2)$ Deflection at loads $\frac{Wab^2}{6EI} (3l - 4a)$
Between each support and adjacent end, $y = \frac{Wu}{24EIL} [6c^2(l+u) - u^2(4c-u) - l^3]$ Between supports, $y = \frac{Wx(l-x)}{24EIL} [x(l-x) + l^2 - 6c^2]$	Deflection at ends, $\frac{Wc}{24EIL} [3c^2(c+2l) - l^3]$ Deflection at center, $\frac{Wl^3}{384EIL} (5l^2 - 24c^2)$ If l is between $2c$ and $2.449c$, there are maximum upward deflections at points $\sqrt{3}(\frac{1}{2}l - c^2)$ on both sides of the center, which are, $-\frac{W}{96EIL} (6c^2 - l^2)^2$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH

STRESSES AND DEFLECTIONS IN BEAMS

Type of Beam	Stresses	
Case 6. — Both Ends Overhanging Supports Unsymmetrically, Uniform Load  $\frac{W}{2}(l-d+a)$ $\frac{W}{2}(l+d-a)$	General Formula for Stress at any Point For overhanging end of length c, $s = \frac{W}{2ZL} (c - x)^2$ Between supports, $s = \frac{W}{2ZL} \left\{ c^2 \left(\frac{l-x}{l} \right) + d^2 \frac{x}{l} - x(l-x) \right\}$ For overhanging end of length d, $s = \frac{W}{2ZL} (d - w)^2$	Stresses at Critical Points Stress at support next end of length c, $\frac{Wc^2}{2ZL}$ Critical stress between supports is at $x = \frac{c^2 + d^2 - l^2}{2l} = x_1$ and is $\frac{W}{2ZL} (c^2 - x_1^2)$ Stress at support next end of length d, $\frac{Wd^2}{2ZL}$ If cross-section is constant, the greatest of these three is the maximum stress. If $x_1 > c$, the stress is zero at points $\sqrt{x_1^2 - c^2}$ on both sides of $x = x_1$.
Case 7. — Both Ends Overhanging Supports, Load at any Point Between  $(a+b=l)$	Between supports: For segment of length a, $s = -\frac{Wbx}{Zl}$ For segment of length b, $s = -\frac{Wax}{Zl}$ Beyond supports $s = 0$.	Stress at load, $-\frac{Wab}{Zl}$ If cross-section is constant, this is the maximum stress.
Case 8. — Both Ends Overhanging Supports, Single Overhanging Load  $W(a+l)$	Between load and adjacent support, $s = \frac{W}{Z} (c - w)$ Between supports, $s = \frac{Wc}{Zl} (l - x)$ Between unloaded end and adjacent support, $s = 0$.	Stress at support adjacent to load, $\frac{Wc}{Z}$ If cross-section is constant, this is the maximum stress. Stress is zero at other support.
Case 9. — Both Ends Overhanging Supports, Symmetrical Overhanging Loads 	Between each load and adjacent support, $s = \frac{W}{Z} (c - u)$ Between supports, $s = \frac{Wc}{Z}$	Stress at supports and at all points between, $\frac{Wc}{Z}$ If cross-section is constant, this is the maximum stress.

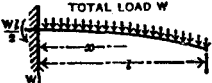
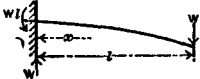
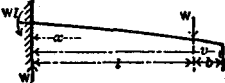
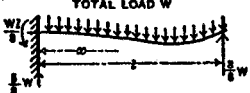
ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH

STRESSES AND DEFLECTIONS IN BEAMS

Deflections	
General Formula for Deflections at any Point	Deflections at Critical Points
For overhanging end of length c, $y = \frac{Wu}{24 EIL} [2l (d^2 + 2c^2) + 6c^2u - u^2 (4c - u) - l^3]$ Between supports, $y = \frac{Wx(l-x)}{24 EIL} \left\{ x(l-x) + l^2 - 2(d^2 + c^2) - \frac{2}{l} [d^2x + c^2(l-x)] \right\}$ For overhanging end of length d, $y = \frac{Ww}{24 EIL} [2l (c^2 + 2d^2) + 6d^2w - w^2 (4d - w) - l^3]$	Deflection at end c, $\frac{Wc}{24 EIL} [2l (d^2 + 2c^2) + 3c^3 - l^3]$ Deflection at end d, $\frac{Wd}{24 EIL} [2l (c^2 + 2d^2) + 3d^3 - l^3]$ This case is so complicated that convenient general expressions for the critical deflections between supports cannot be obtained.
Between supports, same as Case 3. For overhanging end of length c, $y = -\frac{Wabu}{6 EIL} (l+b)$ For overhanging end of length d, $y = -\frac{Wabw}{6 EIL} (l+a)$	Between supports, same as Case 3. Deflection at end c, $-\frac{Wabc}{6 EIL} (l+b)$ Deflection at end d, $-\frac{Wabd}{6 EIL} (l+a)$
Between load and adjacent support, $y = \frac{Wu}{6 EI} (3cu - u^2 + 2cl)$ Between supports, $y = -\frac{Wcx}{6 EIL} (l-x)(2l-x)$ Between unloaded end and adjacent support, $y = \frac{Wclw}{6 EI}$	Deflection at load, $\frac{Wc^2}{3 EI} (c+l)$ Maximum upward deflection is at $x = 0.42265 l$, and is $-\frac{Wc^2}{15.55 EI}$ Deflection at unloaded end, $\frac{Wcd}{6 EI}$
Between each load and adjacent support, $y = \frac{Wu}{6 EI} [3c(l+u) - u^2]$ Between supports, $y = -\frac{Wcx}{2 EI} (l-x)$	Deflections at loads, $\frac{Wc^2}{6 EI} (2c+3l)$ Deflection at center, $-\frac{Wcl^2}{8 EI}$
The above expressions involve the usual approximations of the theory of flexure, and hold only for small deflections. Exact expressions for deflections of any magnitude are as follows: Between supports, the curve is a circle of radius $r = \frac{EI}{Wc}$; $y = \sqrt{r^2 - \frac{1}{4} l^2} - \sqrt{r^2 - (\frac{1}{2} l - x)^2}$ Deflection at center, $\sqrt{r^2 - \frac{1}{4} l^2} - r$	

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH

STRESSES AND DEFLECTIONS IN BEAMS

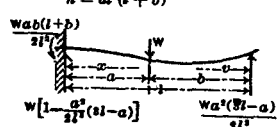
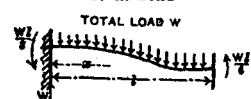
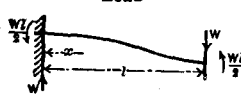
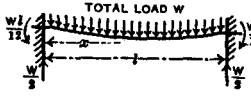
Type of Beam	Stresses	
	General Formula for Stress at any Point	Stresses at Critical Points
Case 10. — Fixed at One End, Uniform Load 	$s = \frac{W}{2Zl} (l - x)^2$	Stress at support, $\frac{Wl}{2Z}$ If cross-section is constant, this is the maximum stress.
Case 11. — Fixed at One End, Load at Other 	$s = \frac{W}{Z} (l - x)$	Stress at support, $\frac{Wl}{Z}$ If cross-section is constant, this is the maximum stress.
Case 12. — Fixed at One End, Intermediate Load 	Between support and load, $s = \frac{W}{Z} (l - x)$ Beyond load, $s = 0$.	Stress at support, $\frac{Wl}{Z}$ If cross-section is constant, this is the maximum stress.
Case 13. — Fixed at One End, Supported at the Other, Uniform Load 	$s = \frac{W(l-x)}{2Zl} \left(\frac{3}{4}l - x \right)$	Maximum stress at point of fixture, $\frac{Wl}{8Z}$ Stress is zero at $x = \frac{3}{4}l$. Greatest negative stress is at $x = \frac{5}{8}l$ and is $-\frac{9}{128} \frac{Wl}{Z}$
Case 14. — Fixed at One End, Supported at the Other, Load at Center 	Between point of fixture and load, $s = \frac{W}{16Z} (3l - 11x)$ Between support and load, $s = -\frac{5}{16} \frac{Wx}{Z}$	Maximum stress at point of fixture, $\frac{3}{16} \frac{Wl}{Z}$ Stress is zero at $x = \frac{3}{11}l$ Greatest negative stress at center, $-\frac{5}{32} \frac{Wl}{Z}$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH STRESSES AND DEFLECTIONS IN BEAMS

Deflections	
General Formula for Deflection at any Point	Deflections at Critical Points
$y = \frac{Wx^2}{24 EI} [2l^2 + (2l - x)^2]$	Maximum deflection, at end, $\frac{Wl^3}{8 EI}$
$y = \frac{Wx^2}{6 EI} (3l - x)$	Maximum deflection, at end, $\frac{Wl^3}{3 EI}$
Between support and load, $y = \frac{Wx^2}{6 EI} (3l - x)$ Beyond load, $y = \frac{Wl^2}{6 EI} (3x - l)$	Deflection at load, $\frac{Wl^3}{3 EI}$ Maximum deflection, at end, $\frac{Wl^3}{6 EI} (2l + 3b)$
$y = \frac{Wx^2 (l - x)}{48 EI} (3l - 2x)$	Maximum deflection is at $x = 0.5785 l$, and is $\frac{Wl^3}{185 EI}$ Deflection at center, $\frac{Wl^3}{192 EI}$ Deflection at point of greatest negative stress, at $x = \frac{5}{8} l$ is $\frac{Wl^3}{187 EI}$
Between point of fixture and load, $y = \frac{Wx^2}{96 EI} (9l - 11x)$ Between support and load, $y = \frac{Wx^2}{96 EI} (3l^2 - 5x^2)$	Maximum deflection is at $x = 0.4472 l$, and is $\frac{Wl^3}{107.33 EI}$ Deflection at load, $\frac{7}{768} \frac{Wl^3}{EI}$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH

STRESSES AND DEFLECTIONS IN BEAMS

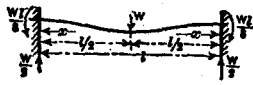
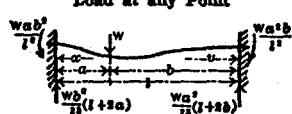
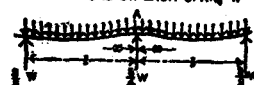
Type of Beam	Stresses	
	General Formula for Stress at any Point	Stresses at Critical Points
Case 15. — Fixed at One End, Supported at the Other, Load at any Point $m = (l + a)(l + b) + al$ $n = al(l + b)$  $wab(l+b)$ $w[1 - \frac{a^3}{3l^3}(3l-a)]$ $\frac{Wa^3(3l-a)}{3l^3}$	Between point of fixture and load, $s = \frac{Wb}{2Zl^3}(n - mx)$ Between support and load, $s = -\frac{Wa^3}{2Zl^3}(3l - a)$	Greatest positive stress, at point of fixture, $\frac{Wab}{2Zl^3}(l + b)$ Greatest negative stress, at load, $-\frac{Wa^3}{2Zl^3}(3l - a)$ If $a < 0.5858l$, the first is the maximum stress. If $a = 0.5858l$, the two are equal and are $\pm \frac{Wl}{5.83Z}$. If $a > 0.5858l$, the second is the maximum stress. Stress is zero at $x = \frac{n}{m}$
Case 16. — Fixed at One End, Free but Guided at the Other, Uniform Load  TOTAL LOAD W	$s = \frac{Wl}{Z} \left\{ \frac{1}{3} - \frac{x}{l} + \frac{1}{2} \left(\frac{x}{l} \right)^2 \right\}$	Maximum stress, at support, $\frac{Wl}{3Z}$ Stress is zero for $x = 0.4227l$ Greatest negative stress, at free end, $-\frac{Wl}{6Z}$
Case 17. — Fixed at One End, Free but Guided at the Other, with Load 	$s = \frac{W}{Z} \left(\frac{1}{2}l - x \right)$	Stress at support, $\frac{Wl}{2Z}$ Stress at free end $-\frac{Wl}{2Z}$ These are the maximum stresses and are equal and opposite. Stress is zero at center.
Case 18. — Fixed at Both Ends, Uniform Load  TOTAL LOAD W	$s = \frac{Wl}{2Z} \left\{ \frac{1}{6} - \frac{x}{l} + \left(\frac{x}{l} \right)^2 \right\}$	Maximum stress, at ends, $\frac{Wl}{12Z}$ Stress is zero at $x = 0.7887l$ and at $x = 0.2113l$ Greatest negative stress, at center, $-\frac{Wl}{24Z}$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH STRESSES AND DEFLECTIONS IN BEAMS

Deflections	
General Formula for Deflections at any Point	Deflections at Critical Points
Between point of fixture and load, $y = \frac{Wx^2b}{12EI^3} (3n - mx)$ Between support and load, $y = \frac{Wab^2}{12EI^3} [3Pb - n^2 (3l - a)]$	Deflection at load, $\frac{Wab^2}{12EI^3} (3l + b)$ If $a < 0.5858 l$, maximum deflection is between load and support, at $v = l \sqrt{\frac{b}{2l + b}} \text{ and is } \frac{Wab^2}{6EI} \sqrt{\frac{b}{2l + b}}$ If $a = 0.5858 l$, maximum deflection is at load and is $\frac{WP^2}{101.9 EI}$ If $a > 0.5858 l$, maximum deflection is between load and point of fixture, at $z = \frac{2n}{m}, \text{ and is } \frac{Wbn^2}{3EI m^2 l^2}$
$y = \frac{Wx^2}{24EI} (2l - x)^2$	Maximum deflection, at free end, $\frac{WP}{24EI}$
$y = \frac{Wx^2}{12EI} (3l - 2x)$	Maximum deflection, at free end, $\frac{WP}{12EI}$
$y = \frac{Wx^2}{24EI} (l - x)^2$	Maximum deflection, at center, $\frac{WP}{384EI}$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH

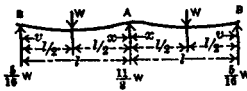
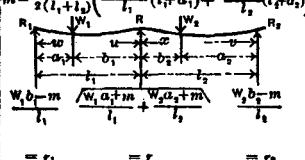
STRESSES AND DEFLECTIONS IN BEAMS

Type of Beam	Stresses	
General Formula for Stress at any Point	Stresses at Critical Points	
Case 19. — Fixed at Both Ends, Load at Center 	Between each end and load, $s = \frac{W}{2Z} \left(\frac{1}{2}l - x \right)$	Stress at ends $\frac{Wl}{8Z}$; at load $-\frac{Wl}{8Z}$ These are the maximum stresses and are equal and opposite. Stress is zero at $x = \frac{1}{4}l$
Case 20. — Fixed at Both Ends, Load at any Point 	For segment of length a , $s = \frac{Wb^3}{Zl^3} [al - x(l+2a)]$ For segment of length b , $s = \frac{Wa^3}{Zl^3} [bl - x(l+2b)]$	Stress at end next segment of length a , $\frac{Wab^3}{Zl^3}$ Stress at end next segment of length b , $\frac{Wab^3}{Zl^3}$ Maximum stress is at end next shorter segment. Stress is zero for $x = \frac{al}{l+2a}$ and $x = \frac{bl}{l+2b}$ Greatest negative stress, at load, $-\frac{2Wab^3}{Zl^3}$
Case 21. — Continuous Beam, with Two Equal Spans, Uniform Load TOTAL LOAD ON EACH SPAN, W 	$s = \frac{W(l-x)}{2Zl} \left(\frac{1}{2}l - x \right)$	Maximum stress at point A, $\frac{Wl}{8Z}$ Stress is zero at $x = \frac{1}{4}l$. Greatest negative stress is at $x = \frac{3}{8}l$ and is, $-\frac{9}{128} \frac{Wl}{Z}$
Case 22. — Continuous Beam, with Two Unequal Spans, Unequal, Uniform Loads TOTAL LOAD W_1 TOTAL LOAD W_2  $\frac{l_1 W_1 (3l_1 + 4l_2) - W_1 l_1^2}{l_1 (l_1 + l_2)} \quad \frac{l_2 W_2 (3l_2 + 4l_1) - W_2 l_2^2}{l_2 (l_1 + l_2)}$ $\left(\frac{W_1 + W_2}{2} \right) + \frac{1}{8} \left(\frac{W_1 l_1 + W_2 l_2}{l_1} \right)$	Between R_1 and R , $s = \frac{l_1 - x}{Z} \left\{ \frac{(l_1 - x) W_1}{2 l_1} - r_1 \right\}$ Between R_2 and R , $s = \frac{l_2 - u}{Z} \left\{ \frac{(l_2 - u) W_2}{2 l_2} - r_2 \right\}$	Stress at support R , $\frac{W_1 l_1^2 + W_2 l_2^2}{8Z (l_1 + l_2)}$ Greatest stress in the first span is at $x = \frac{l_1}{W_1} (W_1 - r_1)$, and is, $-\frac{r_1 l_1}{2ZW_1}$ Greatest stress in the second span is at $u = \frac{l_2}{W_2} (W_2 - r_2)$, and is, $-\frac{r_2 l_2}{2ZW_2}$

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH STRESSES AND DEFLECTIONS IN BEAMS

Deflections	
General Formula for Deflections at any Point	Deflections at Critical Points
$y = \frac{Wx^2}{48 EI} (3l - 4x)$	Maximum deflection, at load, $\frac{Wl^3}{192 EI}$
For segment of length a , $y = \frac{Wx^2 a^2}{6 EI^3} [2a(l - x) + l(a - x)]$ For segment of length b , $y = \frac{Wx^2 a^2}{6 EI^3} [2b(l - x) + l(b - x)]$	Deflection at load, $\frac{Wa^2 b^2}{3 EI l^3}$ Let b be the length of the longer segment and a of the shorter one. The maximum deflection is in the longer segment, at $x = \frac{2bl}{l + 2b}$, and is $\frac{2Wa^2 b^3}{3 EI (l + 2b)^3}$
$y = \frac{Wx^2 (l - x)}{48 EI} (3l - 2x)$	Maximum deflection is at $x = 0.5785 l$, and is $\frac{Wl^3}{185 EI}$ Deflection at center of span, $\frac{Wl^3}{192 EI}$ Deflection at point of greatest negative stress, at $x = \frac{5}{8} l$ is $\frac{Wl^3}{187 EI}$
Between R_1 and R , $y = \frac{x(l_1 - x)}{24 EI} \left\{ (2l_1 - x)(4r_1 - W_1) - \frac{W_1(l_1 - x)^2}{l_1} \right\}$ Between R_2 and R , $y = \frac{x(l_2 - x)}{24 EI} \left\{ (2l_2 - x)(4r_2 - W_2) - \frac{W_2(l_2 - x)^2}{l_2} \right\}$	This case is so complicated that convenient general expressions for the critical deflections cannot be obtained.

ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH STRESSES AND DEFLECTIONS IN BEAMS

Type of Beam	Stresses	
	General Formula for Stress at any Point	Stresses at Critical Points
Case 23. — Continuous Beam, with Two Equal Spans, Equal Loads at Center of Each 	Between point A and load, $s = \frac{W}{16Z} (3l - 11x)$ Between point B and load, $s = -\frac{5}{16} \frac{Wv}{Z}$	Maximum stress at point A, $\frac{3}{16} \frac{Wl}{Z}$ Stress is zero at $x = \frac{3}{11} l$ Greatest negative stress at center of span, $-\frac{5}{32} \frac{Wl}{Z}$
Case 24. — Continuous Beam, with Two Unequal Spans, Unequal Loads at any Point of Each  $m = \frac{1}{2(l_1 + l_2)} \left(\frac{W_1 a_1 b_1}{l_1} (l_1 + a_1) + \frac{W_2 a_2 b_2}{l_2} (l_2 + a_2) \right)$ $R_1 = R = R_2$	Between R_1 and W_1, $s = -\frac{W_1 r_1}{Z}$ Between R and W_1, $s = \frac{1}{l_1 Z} [m(l_1 - x) - W_1 a_1 x]$ Between R and W_2, $s = \frac{1}{l_2 Z} [m(l_2 - x) - W_2 a_2 x]$ Between R_2 and W_2, $s = -\frac{W_2 r_2}{Z}$	Stress at load W_1, $-\frac{a_1 r_1}{Z}$ Stress at support R, $\frac{m}{Z}$ Stress at load W_2, $-\frac{a_2 r_2}{Z}$ The greatest of these is the maximum stress.

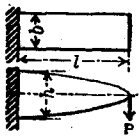
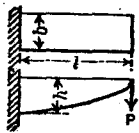
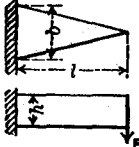
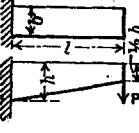
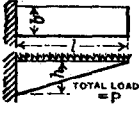
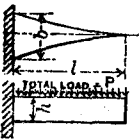
ỨNG SUẤT VÀ ĐỘ UỐN CỦA THANH STRESSES AND DEFLECTIONS IN BEAMS

Deflections	
General Formula for Deflections at any Point	Deflections at Critical Points
Between point A and load, $y = \frac{Wx^3}{96 EI} (9l - 11x)$ Between point B and load, $y = \frac{Wv}{96 EI} (3l^3 - 5v^3)$	Maximum deflection is at $v = 0.4472 l$, and is $\frac{Wl^3}{107.33 EI}$ Deflection at load, $\frac{7}{768} \frac{Wl^3}{EI}$
Between R_1 and W_1, $y = \frac{w}{6 EI} \left\{ (l_1 - w) (l_1 + w) r_1 - \frac{W_1 b_1^3}{l_1} \right\}$ Between R and W_1, $y = \frac{u}{6 EI l_1} [W_1 a_1 b_1 (l_1 + a_1) - W_1 a_1 u^2 - m (2 l_1 - u) (l_1 - u)]$ Between R and W_2, $y = \frac{x}{6 EI l_2} [W_2 a_2 b_2 (l_2 + a_2) - W_2 a_2 x^2 - m (2 l_2 - x) (l_2 - x)]$ Between R_2 and W_2, $y = \frac{v}{6 EI} \left\{ (l_2 - v) (l_2 + v) r_2 - \frac{W_2 b_2^3}{l_2} \right\}$	Deflection at load W_1, $\frac{a_1 b_1}{6 EI l_1} [2 a_1 b_1 W_1 - m (l_1 + a_1)]$ Deflection at load W_2, $\frac{a_2 b_2}{6 EI l_2} [2 a_2 b_2 W_2 - m (l_2 + a_2)]$ This case is so complicated that convenient general expressions for the maximum deflections cannot be obtained.

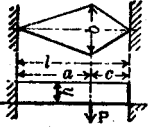
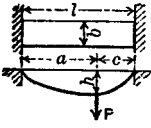
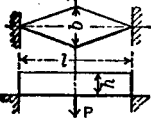
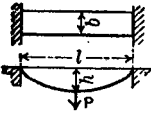
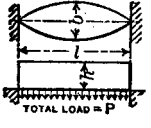
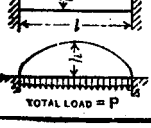
CÁC THANH CHỊU LỰC ĐỒNG NHẤT TRÊN SUỐT CHIỀU DÀI

BEAMS OF UNIFORM STRENGTH THROUGHOUT THEIR LENGTH

(All loads in pounds, All dimensions in inches.)

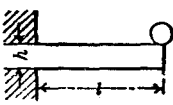
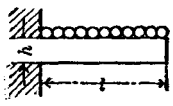
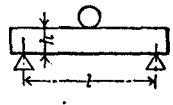
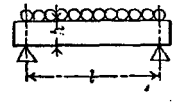
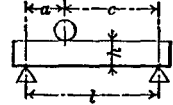
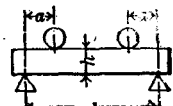
Type of Beam	Description	P = Carrying Capacity S = Safe Stress per Square Inch
	Load at one end. Width of beam uniform. Depth of beam decreasing towards loaded end. Outline of beam-shape, parabola with vertex at loaded end.	$P = \frac{Sbh^3}{6l}$
	Load at one end. Width of beam uniform. Depth of beam decreasing towards loaded end. Outline of beam, one-half of a parabola with vertex at loaded end. Beam may be reversed so that upper edge is parabolic.	$P = \frac{Sbh^3}{6l}$
	Load at one end. Depth of beam uniform. Width of beam decreasing towards loaded end. Outline of beam triangular, with apex at loaded end.	$P = \frac{Sbh^3}{6l}$
	Beam of <i>approximately</i> uniform strength. Load at one end. Width of beam uniform. Depth of beam decreasing towards loaded end, but not tapering to a sharp point.	$P = \frac{Sbh^3}{6l}$
	Uniformly distributed load. Width of beam uniform. Depth of beam decreasing towards outer end. Outline of beam, right-angled triangle.	$P = \frac{Sbh^3}{3l}$
	Uniformly distributed load. Depth of beam uniform. Width of beam gradually decreasing towards outer end. Outline of beam is formed by two parabolas which tangent each other at their vertices at the outer end of the beam.	$P = \frac{Sbh^3}{3l}$

Beams of Uniform Strength Throughout Their Length

Type of Beam	Description	P = Carrying Capacity S = Safe Stress per Square Inch
	Beam supported at both ends. Load concentrated at any point. Depth of beam uniform. Width of beam maximum at point of loading. Outline of beam, two triangles with apexes at points of support.	$P = \frac{Sbh^2l}{6ac}$
	Beam supported at both ends. Load concentrated at any point. Width of beam uniform. Depth of beam maximum at point of loading. Outline of beam is formed by two parabolas with their vertexes at points of support.	$P = \frac{Sbh^2l}{6ac}$
	Beam supported at both ends. Load concentrated in the middle. Depth of beam uniform. Width of beam maximum at point of loading. Outline of beam, two triangles with apexes at points of support.	$P = \frac{2Sbh^2}{3l}$
	Beam supported at both ends. Load concentrated at center. Width of beam uniform. Depth of beam maximum at point of loading. Outline of beam, two parabolas with vertexes at points of support.	$P = \frac{2Sbh^2}{3l}$
	Beam supported at both ends. Load uniformly distributed. Depth of beam uniform. Width of beam maximum at center. Outline of beam, two parabolas with vertexes at middle of beam.	$P = \frac{4Sbh^2}{3l}$
	Beam supported at both ends. Load uniformly distributed. Width of beam uniform. Depth of beam maximum at center. Outline of beam one-half of an ellipse.	$P = \frac{4Sbh^2}{3l}$

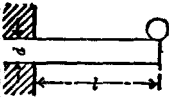
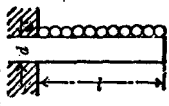
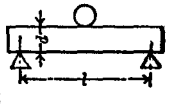
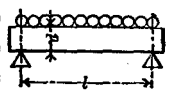
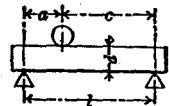
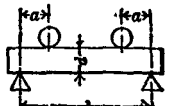
THANH ĐẶC TIẾT DIỆN CHỮ NHẬT

RECTANGULAR SOLID BEAMS

Style of Loading and Support	Breadth of Beam in Inches	Height of Beam in Inches	Stress per Sq. In. in Extreme Fibers of Beam	Length of Beam in Inches	Total Load in Pounds
	b	h	f	l	W
	Beam fixed at one end, loaded at the other				
	$\frac{6 l W}{f h^2} = b$	$\sqrt{\frac{6 l W}{b f}} = h$	$\frac{6 l W}{b h^2} = f$	$\frac{b f h^2}{6 W} = l$	$\frac{b f h^2}{6 l} = W$
	Beam fixed at one end, uniformly loaded				
	$\frac{3 l W}{f h^2} = b$	$\sqrt{\frac{3 l W}{b f}} = h$	$\frac{3 l W}{b h^2} = f$	$\frac{b f h^2}{3 W} = l$	$\frac{b f h^2}{3 l} = W$
	Beam supported at both ends, single load in middle				
	$\frac{3 l W}{2 f h^2} = b$	$\sqrt{\frac{3 l W}{2 b f}} = h$	$\frac{3 l W}{2 b h^2} = f$	$\frac{2 b f h^2}{3 W} = l$	$\frac{2 b f h^2}{3 l} = W$
	Beam supported at both ends, uniformly loaded				
	$\frac{3 l W}{4 f h^2} = b$	$\sqrt{\frac{3 l W}{4 b f}} = h$	$\frac{3 l W}{4 b h^2} = f$	$\frac{4 b f h^2}{3 W} = l$	$\frac{4 b f h^2}{3 l} = W$
	Beam supported at both ends, single unsymmetrical load				
	$\frac{6 W a c}{f h^2 l} = b$	$\sqrt{\frac{6 W a c}{b f l}} = h$	$\frac{6 W a c}{b h^2 l} = f$	$a + c = l$	$\frac{b h^2 f l}{6 a c} = W$
	Beam supported at both ends, two symmetrical loads				
	$\frac{3 W a}{f h^2} = b$	$\sqrt{\frac{3 W a}{b f}} = h$	$\frac{3 W a}{b h^2} = f$	l , any length $\frac{b h^2 f}{3 W} = a$	$\frac{b h^2 f}{3 a} = W$

THANH ĐẶC TIẾT DIỆN TRÒN

ROUND SOLID BEAMS

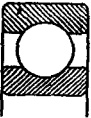
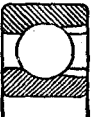
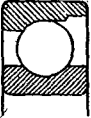
Style of Loading and Support	Diameter of Beam in Inches d	Stress per Sq. In. in Extreme Fibers of Beam f	Length of Beam in Inches l	Total Load in Pounds W
Beam fixed at one end, loaded at the other				
	$\sqrt[3]{\frac{10.18 l W}{f}} = d$	$\frac{10.18 l W}{d^3} = f$	$\frac{d^3 f}{10.18 W} = l$	$\frac{d^3 f}{10.18 l} = W$
Beam fixed at one end, uniformly loaded				
	$\sqrt[3]{\frac{5.092 W l}{f}} = d$	$\frac{5.092 W l}{d^3} = f$	$\frac{d^3 f}{5.092 W} = l$	$\frac{d^3 f}{5.092 l} = W$
Beam supported at both ends, single load in middle				
	$\sqrt[3]{\frac{2.546 W l}{f}} = d$	$\frac{2.546 W l}{d^3} = f$	$\frac{d^3 f}{2.546 W} = l$	$\frac{d^3 f}{2.546 l} = W$
Beam supported at both ends, uniformly loaded				
	$\sqrt[3]{\frac{1.273 W l}{f}} = d$	$\frac{1.273 W l}{d^3} = f$	$\frac{d^3 f}{1.273 W} = l$	$\frac{d^3 f}{1.273 l} = W$
Beam supported at both ends, single unsymmetrical load				
	$\sqrt[3]{\frac{10.18 W a c}{f l}} = d$	$\frac{10.18 W a c}{d^3 l} = f$	$a + c = l$	$\frac{d^3 f l}{10.18 a c} = W$
Beam supported at both ends, two symmetrical loads				
	$\sqrt[3]{\frac{5.092 W a}{f}} = d$	$\frac{5.092 W a}{d^3} = f$	$l, \text{ any length}$ $\frac{d^3 f}{5.092 W} = a$	$\frac{d^3 f}{5.092 a} = W$

BEARINGS

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(BẠC ĐẠN)

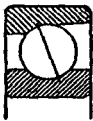
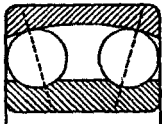
BẢNG 1 : CÁC KIỂU Ổ BỊ VÀ KHOẢNG KÍCH THƯỚC

Table 1. BALL BEARING TYPES AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Standard Sizes by Nominal Bore Diam.	Dimen.
SINGLE ROW RADIAL BALL BEARINGS				
Single row, radial, non-filling slot assembly. Metric dimensions.	BC		Series 10 (Extra-light) 10 to 320 mm Series 02 (Light) 4 to 320 mm Series 03 (Medium) 10 to 280 mm Series 04 (Heavy) 17 to 150 mm Series 19 15 to 300 mm	See Table 5
Inch dimensions.	BIC		0.0250 to 0.0937 inch $\frac{1}{8}$ to $1\frac{1}{2}$ inches	See Table 10
Single row, radial, filling slot assembly. Metric dimensions.	BL		Series 02 (Light) 10 to 320 mm Series 03 (Medium) 10 to 280 mm Series 04 (Heavy) 17 to 150 mm	See Table 5
Inch dimensions.	BIL		0.0250 to 0.0937 inch $\frac{1}{8}$ to $1\frac{1}{2}$ inches	See Table 10
Single row, radial, self-contained counterbored assembly. Metric dimensions.	BH		Series 10 (Extra-Light) 10 to 320 mm Series 02 (Light) 10 to 320 mm Series 03 (Medium) 10 to 280 mm Series 04 (Heavy) 17 to 150 mm	See Table 5
Inch dimensions.	BIH		$\frac{1}{8}$ to $1\frac{1}{2}$ inches	See Table 10
Single row, radial, separable assembly. Metric dimensions.	BM		Magneto Bearing Series 5 to 17 mm	See Table 9

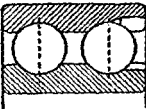
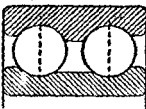
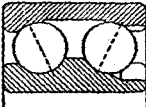
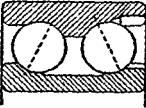
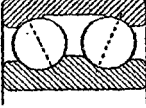
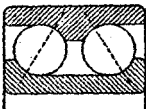
BẢNG 1: CÁC KIỂU Ô BÌ VÀ KHOẢNG KÍCH THƯỚC

Table 1. BALL BEARING TYPES AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Standard Sizes by Nominal Bore Diam.	Dimen.
SINGLE ROW ANGULAR CONTACT BALL BEARINGS*				
Single row, angular contact, self-contained, contact angle less than 22 deg. Metric dimensions. Inch dimensions.	BN BIN		<i>Metric Dimensions</i> Series 10 (Extra Light) 10 to 320 mm Series 02 (Light) 10 to 320 mm Series 03 (Medium) 10 to 280 mm Series 04 (Heavy) 17 to 150 mm	See Table 5
Single row, angular contact, self-contained, contact angle 22 to 32 deg., incl. Metric dimensions. Inch dimensions.	BA BIA		<i>Inch Dimensions</i> For BIN: 1/8 to 1 1/4 inches	See Table 6
Single row, angular contact, self-contained, contact angle larger than 32 but less than 45 deg. Metric dimensions. Inch dimensions.	BT BIT		For BIA and BIT: 0.0250 to 0.0937 inch 1/8 to 1 1/4 inches	
DOUBLE ROW SELF-ALIGNING BALL BEARINGS†				
Double row, radial, self-aligning, raceway of outer ring spherical. Metric dimensions.	BS		Series 02 (Light) 5 to 110 mm Series 03 (Medium) 10 to 110 mm Series 04 (Heavy) 17 to 90 mm Series 22 (Light) 10 to 320 mm Series 23 (Medium) 10 to 280 mm	See Table 5
Inch dimensions.	BIS		1/8 to 1 1/4 inches	See Table 6
* Other single row, angular contact ball bearings, for which data are not given in these tables, are: Type BY, split outer ring, metric dimensions; Type BIY, inch dimensions, otherwise similar to Type BY; Type BZ, split inner ring, metric dimensions; and Type BIZ, inch dimensions, otherwise similar to Type BZ. † Other self-aligning ball bearings for which data are not given in these tables, are: Type BCA, single row, radial, non-filling slot assembly, self-aligning by means of spherical outer diameter, metric dimensions; Type BLA, single row, radial, filling slot assembly, self-aligning by means of spherical outer diameter, metric dimensions; and Type BIB, single row, self-aligning, raceway of outer ring spherical, inch dimensions.				

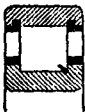
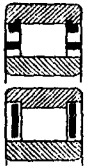
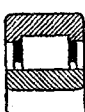
BẢNG 1: CÁC KIỂU Ổ BÌ VÀ KHOẢNG KÍCH THƯỚC

Table 1. BALL BEARING TYPES AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Standard Sizes by Nominal Bore Diam.	Dimen.
DOUBLE ROW, RADIAL OR ANGULAR CONTACT BALL BEARINGS*				
Double row, filling slot assembly, radial contact. Metric bore and O. D.	BF			See Table 5
Double row, non-filling slot assembly, radial contact. Metric bore and O. D. Inch bore and O. D.	BK BIK		<i>Metric Bore and O. D.</i> Series 32 (Light) 10 to 110 mm	
Double row, filling slot assembly, angular contact, vertex of contact angle inside bearing. Metric bore and O. D.	BD		Series 92 (Extended Light) 120 to 320 mm	
Double row, filling slot assembly, angular contact, vertex of contact angle outside bearing. Metric bore and O. D.	BE		Series 33 (Medium) 10 to 110 mm Series 93 (Extended Medium) 120 to 200 mm Series 34 (Heavy) 17 to 90 mm	
Double row, non-filling slot assembly, angular contact, vertex of contact angle inside bearing. Metric bore and O. D.	BJ		<i>Inch Bore and O. D.</i> 3/8 to 1 1/2 inches	
Double row, non-filling slot assembly, angular contact, vertex of contact angle outside bearing. Metric bore and O. D. Inch bore and O. D.	BG BIG			
* Other double row radial or angular contact bearings, for which data are not given in these tables, are: Type BAA, angular contact, self-contained, vertex of contact angle inside bearing, two-piece outer ring, metric dimensions; and Type BHA, radial, self-contained, two-piece outer ring, metric dimensions.				

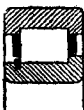
BẢNG 2: CÁC KIỂU Ô ĐÙA VÀ KHOẢNG KÍCH THƯỚC

Table 2. ROLLER BEARING TYPES AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Standard Sizes by Nominal Bore Diam.	Dimen.
NON-LOCATING CYLINDRICAL ROLLER BEARINGS*				
Single row, double ribbed inner ring. Rollers located by internal snap rings recessed in outer ring, non-separable. Metric bore and O. D.	RK		Series 02 (Light) 17 to 150 mm Series 03 (Medium) 15 to 200 mm Series 32 17 to 110 mm Series 92 120 to 320 mm Series 33 17 to 110 mm Series 93 120 to 200 mm	See Table 5
Single row, inner ring without ribs. Rollers located by cage, end rings or internal snap rings recessed in outer ring. Inner ring separable. Metric bore and O. D.	RM		Series 02 (Light) 15 to 150 mm Series 03 (Medium) 15 to 150 mm Series 32 17 to 110 mm Series 92 120 to 320 mm Series 33 17 to 110 mm Series 93 120 to 200 mm	See Table 5
Single row, double ribbed inner ring, outer ring without ribs. Outer ring separable. Metric bore and O. D.	RN		Series 10 17 to 320 mm Series 30 25 to 240 mm Series 02 (Light) 15 to 320 mm Series 03 (Medium) 15 to 200 mm Series 32 17 to 110 mm Series 92 120 to 320 mm Series 33 17 to 110 mm Series 93 120 to 200 mm	See Table 5
Single row, inner ring without ribs, double ribbed outer ring, inner ring separable. Metric bore and O. D.	RU		Series 10 17 to 320 mm Series 02 (Light) 17 to 320 mm Series 03 (Medium) 15 to 200 mm Series 32 17 to 110 mm Series 92 120 to 320 mm Series 33 17 to 110 mm Series 93 120 to 200 mm	See Table 5
* Other non-locating cylindrical roller bearings, for which data are not given in these tables, are: Type RR, single row, single ribbed inner ring, rollers located by snap rings recessed in outer ring, inner ring separable, metric bore and O. D.; Type RAB, single row, inner ring without ribs, single ribbed outer ring, both rings separable, metric dimensions; Type RNS, single row, double ribbed inner ring, outer ring without ribs, outer ring separable, self-aligning by means of spherical outer diameter, metric dimensions; and Type RUA, single row, double ribbed outer ring, inner ring without ribs, inner ring separable, self-aligning by means of spherical outer diameter, metric dimensions.				

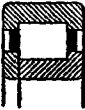
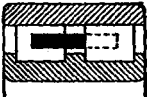
BẢNG 2: CÁC KIỂU Ô DỪA VÀ KHOẢNG KÍCH THƯỚC

Table 2. ROLLER BEARING TYPES AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Standard Sizes by Nominal Bore Diam.	Dimen.
ONE-DIRECTION LOCATING CYLINDRICAL ROLLER BEARINGS*				
Single row, double ribbed inner ring, single ribbed outer ring, outer ring separable. Metric bore and O. D.	RF		Series 02 (Light) 17 to 320 mm Series 03 (Medium) 15 to 200 mm	See Table 5
Single row, single ribbed inner ring, double ribbed outer ring, rollers located by snap ring recessed in inner ring, non-separable. Metric bore and O. D.	RG		Series 02 (Light) 15 to 320 mm Series 03 (Medium) 15 to 200 mm	See Table 5
Single row, double ribbed outer ring, single ribbed inner ring, inner ring separable. Metric bore and O. D.	RJ		Series 02 (Light) 17 to 320 mm Series 03 (Medium) 15 to 200 mm	See Table 5
Single row, single ribbed inner and outer rings, rollers located by rib and single snap ring recessed in outer ring, inner ring separable. Metric bore and O. D.	RS		Series 02 (Light) 15 to 150 mm Series 03 (Medium) 15 to 150 mm	See Table 5
Single row, double ribbed inner ring, single ribbed outer ring, rollers located by rib and snap ring recessed in outer ring, non-separable. Metric bore and O. D.	RY		Series 02 (Light) 15 to 150 mm Series 03 (Medium) 15 to 150 mm	See Table 5
* Another type of one-direction locating cylindrical roller bearing, for which data are not given in these tables, is Type RAA, single row, single ribbed inner and outer rings, either ring separable, metric bore and O. D.				

BẢNG 2: CÁC KIỂU Ô ĐŨA VÀ KHOẢNG KÍCH THƯỚC

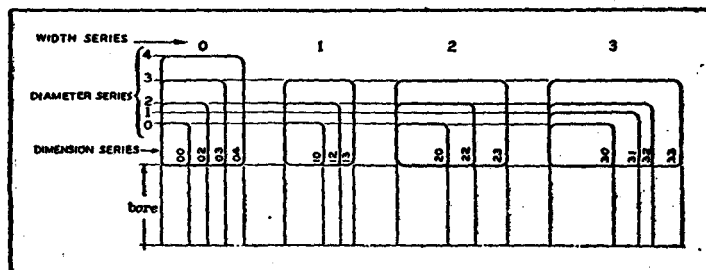
Table 2. ROLLER BEARING TYPES AND RANGES OF SIZES

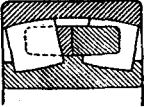
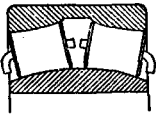
General Description	Type	Cross-section	Range of Standard Sizes by Nominal Bore Diam.	Dimen.
TWO-DIRECTION CYLINDRICAL ROLLER BEARINGS*				
Single row, double ribbed inner and outer rings, non-separable. Metric bore and O. D.	RC		Series 02 (Light) 15 to 320 mm Series 03 (Medium) 15 to 200 mm	See Table 5
Single row, double ribbed inner ring, double ribbed outer ring with one loose rib, outer ring separable. Metric bore and O. D.	RP		Series 02 (Light) 15 to 320 mm Series 03 (Medium) 15 to 200 mm	See Table 5
Single row, double ribbed inner ring with one loose rib, double ribbed outer ring, inner ring separable. Metric bore and O. D.	RT		Series 02 (Light) 15 to 320 mm Series 03 (Medium) 15 to 200 mm	See Table 5
DOUBLE ROW NON-LOCATING CYLINDRICAL ROLLER BEARINGS†				
Double row, ribbed inner ring, outer ring without ribs, outer ring separable. Metric bore and O. D.	RD		Series 30 25 to 240 mm	See Table 5

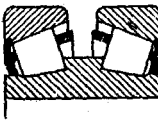
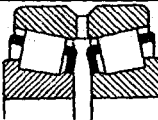
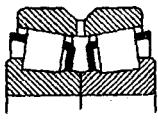
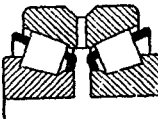
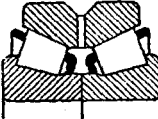
*Another type of two-direction cylindrical roller bearing, for which data are not given in these tables, is Type RCS, single row, double ribbed inner and outer rings, non-separable, self-aligning by means of spherical outside diameter, metric dimensions.

†Other double row, non-locating cylindrical roller bearings, for which data are not given in these tables, are: Type RA, inner ring without ribs, ribbed outer ring, inner ring separable, metric bore and O. D.; and Type RB, ribbed inner ring, rollers located by snap rings recessed in outer ring, non-separable, metric bore and O. D.

Relative Proportions of Bearing Dimension Series

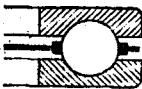
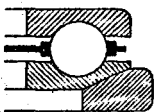
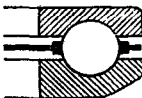
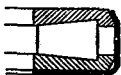
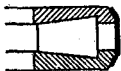
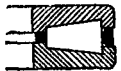


General Description	Type	Cross-section	Range of Std. Sizes by Nominal Bore Diam.	Dimen.
SELF-ALIGNING ROLLER BEARINGS*				
Double row, raceway of outer ring spherical. Metric dimensions.	SD		Series 02 30 to 100 mm Series 03 35 to 100 mm Series 22 80 to 320 mm Series 23 40 to 280 mm Series 30 120 to 900 mm Series 31 110 to 850 mm Series 32 100 to 750 mm	See Table 5
Double row, raceway of inner ring spherical. Metric dimensions.	SW		Series 22 80 to 320 mm Series 23 40 to 280 mm Series 30 120 to 500 mm Series 31 110 to 500 mm Series 32 220 to 500 mm	See Table 5
TAPERED ROLLER BEARINGS†				
Single row, with or without cage. Inch dimensions.	TS		0.3750 to 12.5000 inches	See Table 11
Single row, with or without cage, steep contact angle. Inch dimensions.	TSS		0.6250 to 12.5000 inches	
*Other self-aligning roller bearings, for which data are not given in these tables, are: Type SR, single row, radial contact, raceway of outer ring spherical, metric dimensions; Type SA, single row, angular contact, raceway of outer ring spherical, metric dimensions; and Type SB, single row, angular contact, raceway of inner ring spherical, metric dimensions. †Any single cone listed in the TS and TSS tables can be used with flanged outer race (Type TSF) or double row (Type TDO) in the same series.				

General Description	Type	Cross-section	Range of Std. Sizes by Nominal Bore Diam.	Dimen.
TAPERED ROLLER BEARINGS (Continued)				
Single row, tapered bore, with or without cage. Inch dimensions.	TST		0.9375 to 9.1875 inches	
Single row, flanged cup (outer races), with or without cage. Inch dimensions.	TSP		0.4720 to 9.5000 inches	
Double row, double cone (inner races), single cups (outer races), with or without cage. Inch dimensions.	TDI		1.8750 to 9.5000 inches	
Double row, single cones (inner races), double cup (outer races), with or without cage.* Inch dimensions.	TDO		0.7500 to 9.5000 inches	
Double row, single cones (inner races), double cup (outer races), non-adjustable, with or without cage. Inch dimensions.	TNA		0.7500 to 9.500 inches	
Double row, single cones (inner races), double cup (outer races), steep angle, with or without cage.* Inch dimensions.	TDOS		0.7500 to 8.9945 inches	
Double row, single cones (inner races), double cup (outer races), steep angle, non-adjustable, with or without cage. Inch dimensions.	TNAS		0.7500 to 4.500 inches	
*Any single cone listed in the TS and TSS tables can be used with flanged outer race (Type TSP) or double row (Type TDO) in the same series.				

BẢNG 3: KIỂU LOẠI VÀ KHOẢNG KÍCH THƯỚC CỦA Ổ BÌ VÀ Ổ ĐŨA CHẶN

*Table 3. BALL AND ROLLER THRUST BEARING TYPES
AND RANGES OF SIZES*

General Description	Type	Cross-section	Range of Std. Sizes by Nominal Bore Diam.	Dimen.
ONE-DIRECTION BALL THRUST BEARINGS				
Grooved raceways, flat seats. Metric dimensions.	TA		Series 11 35 to 280 mm Light Series 10 to 125 mm Medium Series 10 to 140 mm	See Table 15
Single or multiple grooved raceways with flat seats. Inch dimensions.	TB		Extra Light Series 1½ to 3½ inches Light Series ¼ to 12 inches Medium Series ¼ to 7¾ inches	See Table 17
Grooved raceways, one flat seat, one self-aligning seat with aligning washer. Metric dimensions.	TE		Series 200 10 to 140 mm	See Table 16
Grooved raceways, one flat seat, one self-aligning seat without aligning washer. Metric dimensions.	TF		Series 200 10 to 140 mm	See Table 16
TAPERED ROLLER THRUST BEARINGS				
Cageless thrust. A tapered roller thrust bearing with full retaining band and without cage. Inch dimensions.	TTC		1.2600 to 3.0100 inches	
Cageless thrust side. A tapered roller thrust bearing without cage and with an O. D. retaining band only. Inch dimensions.	TTCS		1.8850 to 3.0100 inches	
Heavy duty thrust. A tapered roller thrust bearing for heavy duty service without retaining band but with heavy-duty bronze cage. Inch dimensions.	TTHD		3.0000 to 9.0000 inches	
Tapered roller thrust bearing with retaining band and cage. Inch dimensions.	TTSP		0.6350 to 1.3850 inches	

BẢNG 3: KIỂU LOẠI VÀ KHOẢNG KÍCH THƯỚC CỦA Ổ BÌ VÀ Ổ ĐŨA CHẶN

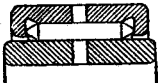
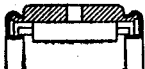
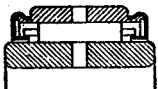
Table 3. BALL AND ROLLER THRUST BEARING TYPES

AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Std. Sizes by Nominal Bore Diam.	Dimen.
SPHERICAL ROLLER THRUST BEARINGS				
Spherical roller thrust bearing. Offset rings, flat seats. Metric dimensions.	TS		Series 93 110 to 530 mm Series 94 90 to 340 mm	See Table 18
CYLINDRICAL ROLLER THRUST BEARINGS*				
Roller thrust bearing. Cylindrical rollers, single direction, flat seats. Inch dimensions.	TP		Light Series 1/4 to 3 1/4 ins. Heavy Series 2 to 30 inches	See Table 21
Roller thrust bearing. Cylindrical rollers, single direction, one flat, one self-aligning seat with aligning washer. Inch dimensions.	TR		Light Series 1 to 3 1/4 inches Heavy Series 2 to 30 inches	See Table 22
*Other cylindrical roller thrust bearings, for which data are not given in these tables, are: Type TDR, two direction, two self-aligning seats with aligning washers, one center plate flat seat, one inside locating collar, two roller assemblies, inch dimensions; Type TDP, two direction, flat seats, one center plate, one inside locating collar, two roller assemblies, inch dimensions; Type TPS, two direction, flat seats, one inside locating collar, one outside locating collar, one roller assembly, inch dimensions; and Type TPC, one direction, flat seats, outside band attached to outside diameter of larger ring, length extends under over-all width of bearing, inch dimensions.				

BẢNG 4: CÁC KIỂU Ô KIM VÀ KHOẢNG KÍCH THUỐC

TABLE 4. NEEDLE BEARING TYPES AND RANGES OF SIZES

General Description	Type	Cross-section	Range of Std. Sizes by Nominal Bore Diams.	Dimen.
WITH ONE-PIECE CHANNEL-SHAPED ROLLER-GUIDING RACEWAY				
Single row, rollers retained by outer ring, no inner ring. Inch dimensions.	NAA		0.3750 to 9.2500 inches	See Table 13
Single row, rollers retained by outer ring, separable inner ring. Inch dimensions.	NAB		0.3750 to 8.0000 inches	See Table 13
WITH COMPOSITE ROLLER-GUIDING RACEWAY				
Single row, rollers retained by outer ring, no inner ring. Inch dimensions.	NBA		0.3750 to 9.2500 inches	See Table 13
Single row, rollers retained by outer ring, separable inner ring. Inch dimensions.	NBB		0.3750 to 8.0000 inches	See Table 13

BẢNG 5 : CÁC KÍCH THƯỚC GIỚI HẠN Ổ BỊ VÀ Ổ DÙA ĐỠ THEO CHUỖI HỆ MÉT TIÊU CHUẨN

Table 5. STANDARD METRIC SERIES ANNULAR BALL AND
ROLLER BEARING BOUNDARY DIMENSIONS

Bore Diameter		Out-side Diam.	Dimension Series Number								Out-side Diam.	Dimension Series Number									
			08	18	28	38	48	08	18 to 48	09		19	29	39	49	59	69	09	19 to 69		
Mm.	Inches		Width					Radius				Width								Radius	
10	0.3937	0.7480	.....	1968	.....	0.2756	.....	.....	0.012	0.8661	.....	0.2362	.....	0.3937	.....	0.6299	0.8661	.....	0.012		
12	0.4724	0.8268	.....	1968	.....	0.2756	.....	.....	0.012	0.9449	.....	0.2362	.....	0.3937	.....	0.6299	0.8661	.....	0.012		
15	0.5906	0.9449	.....	1968	.....	0.2756	.....	.....	0.012	1.1024	.....	0.2756	.....	0.3937	0.5118	0.7087	0.9055	.....	0.012		
17	0.6693	1.0236	.....	1968	.....	0.2756	.....	.....	0.012	1.1811	.....	0.2756	.....	0.3937	0.5118	0.7087	0.9055	.....	0.012		
20	0.7874	1.2598	1575	2756	.....	0.3937	.....	.....	0.012	1.4567	2756	0.3543	0.4331	0.5118	0.6693	0.9055	1.1811	0.012	0.012		
25	0.9843	1.4567	1575	2756	.....	0.3937	.....	.....	0.012	1.6535	2756	0.3543	0.4331	0.5118	0.6693	0.9055	1.1811	0.012	0.012		
30	1.1811	1.6535	1575	2756	.....	0.3937	.....	.....	0.012	1.8504	2756	0.3543	0.4331	0.5118	0.6693	0.9055	1.1811	0.012	0.012		
35	1.3780	1.8504	1575	2756	.....	0.3937	.....	.....	0.012	2.1654	2756	0.3937	0.5118	0.5906	0.7874	1.0630	1.4173	0.012	0.024		
40	1.5748	2.0473	1575	2756	.....	0.3937	.....	.....	0.012	2.4499	3150	0.4724	0.5512	0.6299	0.8661	1.1811	1.5748	0.012	0.024		
45	1.7717	2.2835	1575	2756	.....	0.3937	0.5118	0.012	0.012	2.6772	3150	0.4724	0.5512	0.6299	0.8661	1.1811	1.5748	0.012	0.024		
50	1.9685	2.5591	1968	2756	0.3937	0.4724	0.5906	0.012	0.012	2.8346	3150	0.4724	0.5512	0.6299	0.8661	1.1811	1.5748	0.012	0.024		
55	2.1654	2.8346	2756	3543	0.4331	0.5118	0.6693	0.012	0.012	3.1496	3543	0.5118	0.6299	0.7480	0.9843	1.3386	1.7717	0.012	0.039		
60	2.3622	3.0799	2756	3937	0.4724	0.5512	0.7087	0.012	0.012	3.3405	3543	0.5118	0.6299	0.7480	0.9843	1.3386	1.7717	0.012	0.039		
65	2.5591	3.3405	2756	3937	0.5118	0.5906	0.7874	0.012	0.024	3.5433	3543	0.5118	0.6299	0.7480	0.9843	1.3386	1.7717	0.012	0.039		
70	2.7559	3.5433	3150	3937	0.5118	0.5906	0.7874	0.012	0.024	3.9370	3937	0.6299	0.7480	0.9055	1.1811	1.5748	2.1260	0.024	0.039		
75	2.9528	3.7402	3150	3937	0.5118	0.5906	0.7874	0.012	0.024	4.1339	3937	0.6299	0.7480	0.9055	1.1811	1.5748	2.1260	0.024	0.039		
80	3.1496	3.9370	3150	3937	0.5118	0.5906	0.7874	0.012	0.024	4.3307	3937	0.6299	0.7480	0.9055	1.1811	1.5748	2.1260	0.024	0.039		
85	3.3405	4.3307	3543	5118	0.6299	0.7480	0.9843	0.012	0.039	4.7244	4331	0.7087	0.8661	1.0236	1.3780	1.8110	2.4803	0.024	0.039		
90	3.5433	4.5276	3543	5118	0.6299	0.7480	0.9843	0.012	0.039	4.9213	4331	0.7087	0.8661	1.0236	1.3780	1.8110	2.4803	0.024	0.039		
95	3.7402	4.7244	3543	5118	0.6299	0.7480	0.9843	0.012	0.039	5.1181	4331	0.7087	0.8661	1.0236	1.3780	1.8110	2.4803	0.024	0.039		
100	3.9370	4.9213	3543	5118	0.6299	0.7480	0.9843	0.012	0.039	5.5118	5118	0.7874	0.9449	1.1811	1.5748	2.1260	2.7953	0.024	0.039		
105	4.1339	5.1181	3543	5118	0.6299	0.7480	0.9843	0.012	0.039	5.7087	5118	0.7874	0.9449	1.1811	1.5748	2.1260	2.7953	0.024	0.039		
110	4.3307	5.5118	3937	6299	0.7480	0.9055	1.1811	0.024	0.039	5.9055	5118	0.7874	0.9449	1.1811	1.5748	2.1260	2.7953	0.024	0.039		
120	4.7244	5.9055	3937	6299	0.7480	0.9055	1.1811	0.024	0.039	6.4961	5512	0.8661	1.0630	1.3386	1.7717	2.3622	3.1496	0.024	0.039		
130	5.1181	6.4961	4331	7087	0.8661	1.0236	1.3780	0.024	0.039	7.0866	6299	0.9449	1.1811	1.4567	1.9685	2.6378	3.5433	0.039	0.059		
140	5.5118	6.8898	4331	7087	0.8661	1.0236	1.3780	0.024	0.039	7.4803	6299	0.9449	1.1811	1.4567	1.9685	2.6378	3.5433	0.039	0.059		
150	5.9055	7.4803	5118	7874	0.9449	1.1811	1.5748	0.024	0.039	8.2677	7480	1.1024	1.4173	1.7717	2.3622	3.1496	4.2913	0.039	0.079		

**BẢNG 5: CÁC KÍCH THƯỚC GIỚI HẠN Ổ BÌ VÀ Ổ ĐŨA ĐỜ
THEO CHUỖI HỆ MÉT TIÊU CHUẨN**

*Table 5. STANDARD METRIC SERIES ANNULAR BALL AND
ROLLER BEARING BOUNDARY DIMENSIONS*

Bore Diameter		Out-side Diam.	Dimension Series Number										Out-side Diam.	Dimension Series Number					
			00	10	20	30	40	50	60	00	10 to 60	01		11	21	31	01	11 to 31	
Mm.	Inch		Width								Radius			Width				Radius	
10	0.3937	1.0236	.....	0.3150	0.3937	0.4724	0.6299	0.8268	1.1417	.....	0.012	.....	.....	.....	.....	.....	.....	.....	
12	0.4724	1.1024	.....	0.3150	0.3937	0.4724	0.6299	0.8268	1.1417	.....	0.012	.....	.....	.....	.....	.....	.....	.....	
15	0.5906	1.2598	0.3150	0.3543	0.4331	0.5118	0.6693	0.9055	1.1811	0.012	0.012	.....	.....	.....	.....	.....	.....	.....	
17	0.6693	1.3780	0.3150	0.3937	0.4724	0.5512	0.7087	0.9449	1.2598	0.012	0.012	.....	.....	.....	.....	.....	.....	.....	
20	0.7874	1.6535	0.3150	0.4724	0.5512	0.6299	0.8661	1.1811	1.5748	0.012	0.024	.....	.....	.....	.....	.....	.....	.....	
25	0.9843	1.8504	0.3150	0.4724	0.5512	0.6299	0.8661	1.1811	1.5748	0.012	0.024	.....	.....	.....	.....	.....	.....	.....	
30	1.1811	2.1054	0.3543	0.5118	0.6299	0.7480	0.9843	1.3386	1.7717	0.012	0.039	.....	.....	.....	.....	.....	.....	.....	
35	1.3780	2.4409	0.3543	0.5512	0.6693	0.7874	1.0630	1.4173	1.8898	0.012	0.039	.....	.....	.....	.....	.....	.....	.....	
40	1.5748	2.6772	0.3543	0.5906	0.7087	0.8268	1.1024	1.4961	1.9685	0.012	0.039	.....	.....	.....	.....	.....	.....	.....	
45	1.7717	2.9528	0.3937	0.6299	0.7480	0.9055	1.1811	1.5748	2.1260	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
50	1.9685	3.1496	0.3937	0.6299	0.7480	0.9055	1.1811	1.5748	2.1260	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
55	2.1654	3.5433	0.4331	0.7087	0.8661	1.0236	1.3780	1.8110	2.4803	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
60	2.3622	3.7402	0.4331	0.7087	0.8661	1.0236	1.3780	1.8110	2.4803	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
65	2.5591	3.9370	0.4331	0.7087	0.8661	1.0236	1.3780	1.8110	2.4803	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
70	2.7559	4.3307	0.5118	0.7874	0.9449	1.1811	1.5748	2.1260	2.7953	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
75	2.9528	4.5276	0.5118	0.7874	0.9449	1.1811	1.5748	2.1260	2.7953	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
80	3.1496	4.9213	0.5512	0.8661	1.0630	1.3386	1.7716	2.3622	3.1496	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
85	3.3465	5.1181	0.5512	0.8661	1.0630	1.3386	1.7716	2.3622	3.1496	0.024	0.039	.....	.....	.....	.....	.....	.....	.....	
90	3.5433	5.5118	0.6299	0.9449	1.1811	1.4567	1.9685	2.6378	3.5433	0.039	0.059	.....	.....	.....	.....	.....	.....	.....	
95	3.7402	5.7086	0.6299	0.9449	1.1811	1.4567	1.9685	2.6378	3.5433	0.039	0.059	.....	.....	.....	.....	.....	.....	.....	
100	3.9370	5.9055	0.6299	0.9449	1.1811	1.4567	1.9685	2.6378	3.5433	0.039	0.059	6.4961	0.8268	1.1811	1.5354	2.0472	0.039	0.079	
105	4.1339	6.2992	0.7087	1.0236	1.2992	1.6142	2.2047	2.9528	3.9370	0.039	0.079	6.8898	0.8661	1.2992	1.6535	2.2047	0.039	0.079	
110	4.3307	6.6929	0.7480	1.1024	1.4173	1.7717	2.3622	3.1496	4.2913	0.039	0.079	7.0866	0.8661	1.2992	1.6535	2.2047	0.039	0.079	
120	4.7244	7.0866	0.7480	1.1024	1.4173	1.8110	2.3622	3.1496	4.2913	0.039	0.079	7.8740	0.9843	1.4961	1.8898	2.4409	0.059	0.079	
130	5.1181	7.8740	0.8661	1.2992	1.6535	2.0472	2.7165	3.7402	4.9213	0.039	0.079	8.2677	0.9843	1.4961	1.8898	2.5197	0.059	0.079	
140	5.5118	8.2677	0.8661	1.2992	1.6535	2.0866	2.7165	3.7402	4.9213	0.039	0.079	8.8583	1.0630	1.5748	1.9685	2.6772	0.059	0.079	
150	5.9055	8.8583	0.9449	1.3780	1.7717	2.2047	2.9528	3.9370	5.3543	0.039	0.079	9.8425	1.2205	1.8110	2.3622	3.1496	0.079	0.079	

BẢNG 5: CÁC KÍCH THƯỚC GIỚI HẠN Ổ BỊ VÀ Ổ ĐŨA ĐỠ THEO CHUỖI HỆ MÉT TIÊU CHUẨN

Table 5. STANDARD METRIC SERIES ANNULAR BALL AND
ROLLER BEARING BOUNDARY DIMENSIONS

Bore Diameter		Out-side Diam.	Dimension Series Number						Out-side Diam.	Dimension Series Number				Out-side Diam.	Dimen. Series No.				
			02	12	22	32	92	02 to 92		03	23	33	93		03 to 93	04	24	34	04 and 24
Mm.	Inch		Width					Radius		Width					Radius	Width			Radius
10	0.3937	1.1811	0.3543	....	0.5512	9/16	....	.024	1.3780	0.4331	0.6693	3/4	....	.024	....	....	....	....	....
12	0.4724	1.2598	0.3937	....	0.5512	9/8	....	.024	1.4567	0.4724	0.6693	3/4	....	.039	1.6535	0.5118	0.7480	....	.039
15	0.5906	1.3780	0.4331	....	0.5512	9/8	....	.024	1.6535	0.5118	0.6693	3/4	....	.039	2.0472	0.5906	0.9449	....	.039
17	0.6693	1.5748	0.4724	....	0.6299	1 1/16	....	.024	1.8504	0.5512	0.7480	7/8	....	.039	2.4409	0.6693	1.1417	1 1/16	.039
20	0.7874	1.8504	0.5512	....	0.7087	1 3/16	....	.039	2.0472	0.5906	0.8268	7/8	....	.039	2.8346	0.7480	1.2992	1 3/16	.039
25	0.9843	2.0472	0.5906	....	0.7087	1 3/16	....	.039	2.4409	0.6693	0.9449	1	....	.039	3.1496	0.8268	1.4173	1 3/16	.059
30	1.1811	2.4409	0.6299	....	0.7874	1 1/16	....	.039	2.8346	0.7480	1.0630	1 1/16	....	.039	3.5433	0.9055	1.5748	1 3/16	.059
35	1.3780	2.8346	0.6693	....	0.9055	1 1/16	....	.039	3.1496	0.8268	1.2205	1 3/16	....	.059	3.9370	0.9843	1.6929	1 3/16	.059
40	1.5748	3.1496	0.7087	....	0.9055	1 3/16	....	.039	3.5433	0.9055	1.2992	1 1/16	....	.059	4.3307	1.0630	1.8110	1 5/16	.079
45	1.7717	3.3465	0.7480	....	0.9055	1 3/16	....	.039	3.9370	0.9843	1.4173	1 1/16	....	.059	4.7244	1.1417	1.9685	2 1/8	.079
50	1.9685	3.5433	0.7874	....	0.9055	1 3/16	....	.039	4.3307	1.0630	1.5748	1 3/16	....	.079	5.1181	1.2205	2.0866	2 1/8	.079
55	2.1654	3.9370	0.8268	....	0.9843	1 3/16	....	.059	4.7244	1.1417	1.6929	1 3/16	....	.079	5.5118	1.2992	2.2441	2 1/8	.079
60	2.3622	4.3307	0.8661	....	1.1024	1 1/16	....	.059	5.1181	1.2205	1.8110	2 1/8	....	.079	5.9055	1.3780	2.3622	2 1/8	.079
65	2.5591	4.7244	0.9055	....	1.2205	1 1/2	....	.059	5.5118	1.2992	1.8898	2 1/8	....	.079	6.2992	1.4567	2.5197	2 3/16	.079
70	2.7559	4.9213	0.9449	....	1.2205	1 1/2	....	.059	5.9055	1.3780	2.0079	2 1/8	....	.079	7.0866	1.6535	2.9134	3 3/8	.098
75	2.9528	5.1181	0.9843	....	1.2205	1 1/2	....	.059	6.2992	1.4567	2.1654	2 3/16	....	.079	7.4803	1.7717	3.0315	3 3/8	.098
80	3.1496	5.5118	1.0236	....	1.2992	1 3/4	....	.079	6.6929	1.5354	2.2835	2 1/16	....	.079	7.8740	1.8898	3.1496	3 1/8	.098
85	3.3465	5.9055	1.1024	....	1.4173	1 5/16	....	.079	7.0866	1.6142	2.3622	2 3/8	....	.098	8.2677	2.0472	3.3588	3 3/8	.118
90	3.5433	6.2992	1.1811	....	1.5748	2 1/16	....	.079	7.4803	1.6929	2.5197	2 3/8	....	.098	8.5583	2.1260	3.5433	3 3/8	.118
95	3.7402	6.6929	1.2598	....	1.6929	2 1/8	....	.079	7.8740	1.7717	2.6378	3 1/8	....	.098	9.4488	2.1654	3.7402	....	.118
100	3.9370	7.0866	1.3386	....	1.8110	2 3/8	....	.079	8.4646	1.8504	2.8740	3 3/4	....	.098	9.8425	2.2835	3.8583	....	.118
105	4.1339	7.4803	1.4173	....	1.9685	2 1/2	....	.079	8.8583	1.9291	3.0315	3 1/8	....	.098	10.2362	2.3622	3.9370	....	.118
110	4.3307	7.8740	1.4961	....	2.0866	2 3/4	....	.079	9.4488	1.9685	3.1496	3 3/8	....	.098	11.0236	2.5591	4.2520	....	.118
120	4.7244	8.4646	1.5748	1.6535	2.2835	2.9921	3	.079	10.2362	2.1654	3.3858	4.1732	4 1/8	.098	12.2047	2.8346	4.6457	....	.157
130	5.1181	9.0551	1.5748	1.8110	2.5197	3.1496	3 1/8	.098	11.0236	2.2835	3.6614	4.4094	4 3/8	.118	13.3858	3.0709	5.0394	....	.157
140	5.5118	9.8425	1.6535	1.9685	2.6772	3.4046	3 3/4	.098	11.8110	2.4409	4.0157	4.6457	4 1/2	.118	14.1732	3.2283	5.1968	....	.157
150	5.9055	10.6299	1.7717	2.1260	2.8740	3.7795	3 1/2	.098	12.5984	2.5591	4.2520	5.0394	4 3/4	.118	14.9606	3.3465	5.4331	....	.157

BẢNG 6 : DUNG SAI ABEC-1 VÀ RBEC-1 CHO Ổ BÌ VÀ Ổ DÙ CHẶN THEO HỆ MÉT VÀ HỆ INCH

Table 6. ABEC-1 AND RBEC-1 TOLERANCES FOR METRIC AND
INCH DIMENSION ANNULAR BALL AND ROLLER BEARINGS

Inner Ring Bore Diameter				Bore Tolerance, ² inch						Radial Runout, ³ inch
Mm.		Inches								
Over	Incl.	Over	Incl.	$d_{aver.}$		$d_{min.}^4$		$d_{max.}^4$		
0	10	0.0000	0.3937	—	+0	—	—	+	—	.0003
10	18	0.3937	0.7087	—	+0	—	—	+	—	.0004
18	30	0.7087	1.1811	—	+0	—	—	+	—	.0005
30	50	1.1811	1.9685	—	+0	—	—	+	—	.0006
50	80	1.9685	3.1496	—	+0	—	—	+	—	.0008
80	120	3.1496	4.7244	—	+0	—	—	+	—	.0010
120	180	4.7244	7.0866	—	+0	—	—	+	—	.0012

Outer Ring Outside Diameter				Outside Diameter Tolerance, ² inch						Radial Runout, ³ Inch
Mm.		Inches		$D_{aver.}$		$D_{max.}^5$	$D_{min.}^5$	$D_{max.}^6$	$D_{min.}^6$	
Over	Incl.	Over	Incl.							
0	18	0.0000	0.7087	+0	—	—	—	+	—	.0006
18	30	0.7087	1.1811	+0	—	—	—	+	—	.0006
30	50	1.1811	1.9685	+0	—	—	—	+	—	.0008
50	80	1.9685	3.1496	+0	—	—	—	+	—	.0010
80	120	3.1496	4.7244	+0	—	—	—	+	—	.0012
120	150	4.7244	5.9055	+0	—	—	—	+	—	.0016
150	180	5.9055	7.0866	+0	—	—	—	+	—	.0018
180	250	7.0866	9.8425	+0	—	—	—	+	—	.0020
250	315	9.8425	12.4015	+0	—	—	—	+	—	.0024
315	400	12.4015	15.7480	+0	—	—	—	+	—	.0028

Width Tolerances							
Bearings other than Duplex				Duplex Bearings			
Nom. Inner Ring Bore, mm.		Width Tolerance, inch ⁷		Nom. Inner Ring Bore, mm.		Width Tolerance, inch ⁸	
Over	Incl.			Over	Incl.		
0	180	+0	—	0	80	+0	—
180	315	+0	—	80	180	+0	—
315	400	+0	—	180	315	+0	—
...	...	...	...	315	400	+0	—

Anti-Friction Bearing Manufacturers Association Standard.

For sizes beyond range of this table, see APBMA Standards, Section No. 3.

¹ Not included are Type BM (Magnet), Tapered Roller Bearings, and Roller Bearing Types SA, SIA, SB, SIB, SIY, SIV, SIM, SIN, SIC, and SIT. ² The amounts by which the maximum measured diameter, $d_{max.}$ or $D_{max.}$, the minimum measured diameter, $d_{min.}$ or $D_{min.}$, and the arithmetical average $d_{aver.}$ or $D_{aver.}$ of these two may vary from the nominal. ³ Total indicator reading. ⁴ These values apply to Diameter Series p, 2, 3, and 4; in Diameter Series o only up to and including $d = 40$ mm. ⁵ These values apply only to Diameter Series o, 2, 3, and 4 and before insertion of shields or seals, if any; in Diameter Series o up to and including $D = 80$ mm. and in Diameter Series 2 up to and including $D = 315$ mm. ⁶ Applicable to shielded or sealed bearings only in Diameter Series 2, 3, and 4. ⁷ Based on width of individual inner or outer ring. ⁸ Based on total width of inner or outer ring. If other than a pair of bearings is involved, the tolerance is in proportion to the number of bearings.

**BẢNG 7: DUNG SAI ABEC-5 VÀ ABEC-7 CHO Ổ BỊ CHẶN
THEO HỆ MÉT VÀ HỆ INCH**

**DUNG SAI RBEC-5 CHO Ổ ĐŨA CHẶN THEO HỆ MÉT VÀ
HỆ INCH**

Inner Ring Bore Diameter				Bore Tolerances, inch				Radial Runout, Inch		Parallelism of Sides, inch		Side Runout with Bore, inch		Groove Parallelism with side, inch	
Mm.		Inches		$d_{min.} \mid d_{max.}$		$d_{min.} \mid d_{max.}$		ABEC-5, RBEC-5	ABEC-7	ABEC-5, RBEC-5	ABEC-7	ABEC-5, RBEC-5	ABEC-7	ABEC-5, RBEC-5	ABEC-7
Over	Incl.	Over	Incl.	ABEC-5, RBEC-5		ABEC-7									
0	10	0.0000	0.3937	-.0002	+0	-.00015	+0	.0002	.0001	.0002	.0001	.0003	.0001	.0003	.0001
10	18	0.3937	0.7087	-.0002	+0	-.00015	+0	.0002	.0001	.0002	.0001	.0003	.0001	.0003	.0001
18	30	0.7087	1.1811	-.0002	+0	-.00015	+0	.0002	.00015	.0002	.0001	.0003	.00015	.0003	.00015
30	50	1.1811	1.9685	-.0002	+0	-.0002	+0	.0002	.00015	.0002	.0001	.0003	.00015	.0003	.00015
50	80	1.9685	3.1496	-.0003	+0	-.0002	+0	.0002	.00015	.0002	.00015	.0003	.0002	.0003	.00015
80	120	3.1496	4.7244	-.0003	+0	-.00025	+0	.0003	.0002	.0003	.00015	.0003	.0002	.0004	.0002
120	180	4.7244	7.0866	-.0004	+0	-.0003	+0	.0003	.0003	.0003	.0002	.0004	.0003	.0004	.0003

Outer Ring Outside Diameter				Outside Diameter Tolerance, inch				Radial Runout, Inch		Parallelism of Sides, inch		O.D. Squareness with Side, inch		Groove Parallelism with side, inch	
Mm.		Inches		$D_{max.} \mid D_{min.}$		$D_{max.} \mid D_{min.}$		ABEC-5, RBEC-5	ABEC-7	ABEC-5, RBEC-5	ABEC-7	ABEC-5, RBEC-5	ABEC-7	ABEC-5, RBEC-5	ABEC-7
Over	Incl.	Over	Incl.	ABEC-5, RBEC-5		ABEC-7									
10	18	0.0000	0.7087	+0	-.0002	+0	-.0002	.0002	.0002	.0002	.0001	.0003	.00015	.0003	.0002
18	30	0.7087	1.1811	+0	-.0002	+0	-.0002	.0002	.0002	.0002	.0001	.0003	.00015	.0003	.0002
30	50	1.1811	1.9685	+0	-.0002	+0	-.0002	.0002	.0002	.0002	.0001	.0003	.00015	.0003	.0002
50	80	1.9685	3.1496	+0	-.0003	+0	-.0002	.0003	.0002	.0002	.0001	.0003	.00015	.0004	.0002
80	120	3.1496	4.7244	+0	-.0003	+0	-.0003	.0004	.0002	.0003	.0002	.0003	.0002	.0005	.0002
120	150	4.7244	5.9055	+0	-.0004	+0	-.0004	.0004	.0003	.0003	.0002	.0004	.0002	.0005	.0003
150	180	5.9055	7.0866	+0	-.0005	+0	-.0004	.0005	.0003	.0003	.0002	.0004	.0002	.0006	.0003
180	250	7.0866	9.8425	+0	-.0005	+0	-.0004	.0005	.0004	.0004	.0003	.0004	.0003	.0006	.0004
250	315	9.8425	12.4015	+0	-.0005	+0	-.0005	.0006	.0004	.0005	.0003	.0005	.0003	.0007	.0004
315	400	12.4015	15.7480	+0	-.0006	+0	-.0005	.0007	.0005	.0005	.0003	.0005	.0004	.0008	.0005

BẢNG 8 : DUNG SAI ABEC-9 THEO HỆ MÉT VÀ HỆ INCH CHO Ổ BỊ HƯỚNG TÂM

Table 8. ABEC-9 TOLERANCES FOR METRIC AND INCH DIMENSION RADIAL BALL BEARINGS

Inner Ring									
Bore Diameter				Bore Tolerance, inch		Radial Run-out, ⁵ inch	Width Variation, inch	Side Runout with Bore, inch	Groove Runout with Side, ¹ inch
Mm.		Inches		$d_{min.}$	$d_{max.}$				
Over	Incl.	Over	Incl.						
0	10	0.0000	0.3937	-.0001	+0	.00005	.00005	.00005	.00005
10	18	0.3937	0.7087	-.0001	+0	.00005	.00005	.00005	.00005
18	30	0.7087	1.1811	-.0001	+0	.00005	.00005	.00005	.0001
30	50	1.1811	1.9685	-.0001	+0	.0001	.00005	.00005	.0001
50	80	1.9685	3.1496	-.00015	+0	.0001	.00005	.00005	.0001
80	120	3.1496	4.7244	-.0002	+0	.0001	.0001	.0001	.0001
120	150	4.7244	5.9055	-.00025	+0	.0001	.0001	.0001	.0001
150	180	5.9055	7.0866	-.00025	+0	.0002	.00015	.00015	.0002

Outer Ring									
Outside Diameter				Outside Diameter Tolerance, inch ²		Radial Run-out, ⁵ inch	Width Variations, inch	Outside Cylin. Surface Runout with Side, ³ inch	Groove Runout with Side, ¹ inch
Mm.		Inches		$D_{max.}$	$D_{min.}$				
Over	Incl.	Over	Incl.						
0	18	0	0.7087	+0	-.0001	.00005	.00005	.00005	.00005
18	30	0.7087	1.1811	+0	-.00015	.0001	.00005	.00005	.0001
30	50	1.1811	1.9685	+0	-.00015	.0001	.00005	.00005	.0001
50	80	1.9685	3.1496	+0	-.00015	.00015	.00005	.00005	.00015
80	120	3.1496	4.7244	+0	-.0002	.0002	.0001	.0001	.0002
120	150	4.7244	5.9055	+0	-.0002	.0002	.0001	.0001	.0002
150	180	5.9055	7.0866	+0	-.00025	.0002	.0001	.0001	.0002
180	250	7.0866	9.8425	+0	-.0003	.00025	.00015	.00015	.00025
250	315	9.8425	12.4015	+0	-.0003	.00025	.00015	.00015	.00025

Width Tolerance Limits										
Bearings other than Duplex — Width of Individual Inner or Outer Ring					Duplex Bearings — Total Width of a Pair of Inner or Outer Rings ⁴					
Nominal Inner Ring Bore *		Width Tolerance, inch			Nominal Inner Ring Bore		Width Tolerance, inch			
Millimeters										
Over	Incl.				Over	Incl.				
0	10	+0	-.0010	0	80	+0	-.0200			
10	80	+0	-.0050	80	180	+0	-.0300			

¹ Applies to groove type ball bearings only. "Side" is reference side.

² Outer ring tolerances apply before seals or shields are inserted.

³ Applies to Bearing Width Series 1, or narrower, as designated in ABMA Standards, Section No. 2 — Boundary Dimensions. "Side" is reference side.

⁴ If other than a pair of bearings is involved, the tolerance is in proportion to the number of bearings.

⁵ This is the difference between the maximum and minimum indicator readings taken on the bore when the inner ring is rotated one revolution.

⁶ This is the difference between the maximum and minimum indicator readings when the outer ring is rotated one revolution with the arbor stationary.

BẢNG 9 : KÍCH THƯỚC TIÊU CHUẨN BM. KÍCH THƯỚC GIỚI HẠN Ổ BỊ NGĂN CÁCH BẰNG TỪ TÍNH

Table 9. STANDARD TYPE BM (MAGNETO) SEPARABLE BALL
BEARING BOUNDARY DIMENSIONS

Bearing Number	Bore		Outside Diameter		Individual Ring Width		Fillet Radius ¹	
	Mm	Inch	Mm	Inch	Mm	Inch	Mm	Inch
5BMco2	5	.1969	16	0.6299	5	.1969	0.2	.008
6BMco2	6	.2362	24	0.9449	7	.2756	0.3	.012
7BMco2	7	.2756	24	0.9449	7	.2756	0.3	.012
8BMco16	8	.3150	24	0.9449	7	.2756	0.3	.012
9BMco1	9	.3543	28	1.1024	8	.3150	0.3	.012
10BMco1	10	.3937	28	1.1024	8	.3150	0.3	.012
11BMco2	11	.4331	32	1.2598	7	.2756	0.4	.016
12BMco2	12	.4724	32	1.2598	7	.2756	0.4	.016
13BMco1	13	.5118	30	1.1811	7	.2756	0.3	.012
14BMco1	14	.5512	35	1.3780	8	.3150	0.5	.020
15BMco1	15	.5906	35	1.3780	8	.3150	0.5	.020
16BMco1	16	.6299	38	1.4961	10	.3937	1.0	.040
17BMco3	17	.6693	44	1.7323	11 ²	.4331	1.0	.040

¹ The corner radius or chamfer on bearings must clear the maximum fillet radius given in the table. This specification does not control bearing corner contours.

² Outer ring width is 10 mm or .3937 inch.

BẢNG 10 : KÍCH THƯỚC GIỚI HẠN TIÊU CHUẨN Ổ BỊ THEO INCH

Table 10. STANDARD INCH DIMENSION BALL BEARING BOUNDARY DIMENSIONS

Bearing Number	Bore		Outside Diameter		Individual Ring Width				Fillet Radius
					Open		Shielded		
	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	
01BICooV	...	0.0250	...	0.100	1/32	.....	...	.....	.003
02BICooV	...	0.0400	1/8	.....	3/64	.....	...	.....	.005
03BICoo	...	0.0469	5/32	.....	1/16	.....	...	.....	.005
04BICoo	...	0.0550	3/16	.....	5/64	.....	...	.....	.005
05BICoo	...	0.0781	1/4	.....	3/32	.....	...	.....	.008
06BICoo	...	0.0937	5/16	.....	7/64	.....	...	.....	.008
2BICoo	1/8	0.1250	3/8	0.3750	5/32	.1562	5/32	.1562	.012
2BICo2	1/8	0.1250	1/2	0.5000	11/64	.1719	11/64	.1719	.012
3BICoo	3/16	0.1875	1/2	0.5000	9/32	.1562	...	.1960	.012
4BICoo	1/4	0.2500	5/8	0.6250	...	.1960	...	.1960	.012
4BICo2	1/4	0.2500	3/4	0.7500	7/32	.2188	5/32	.2812	.016
6BICoo	3/8	0.3750	1	0.8750	7/32	.2188	5/32	.2812	.016
8BICoo	1/2	0.5000	1 1/8	1.1250	1/4	.2500	5/16	.3125	.016
10BICoo	5/8	0.6250	1 3/8	1.3750	9/32	.2812	11/32	.3438	.031
12BICoo	3/4	0.7500	1 5/8	1.6250	5/16	.3125	7/16	.4375	.031
14BICoo	7/8	0.8750	1 7/8	1.8750	3/8	.3750	1/2	.5000	.031
16BICoo	1	1.0000	2	2.0000	3/8	.3750	1/2	.5000	.031
18BICoo	1 1/8	1.1250	2 1/8	2.1250	3/8	.3750	1/2	.5000	.031
20BICoo	1 1/4	1.2500	2 3/8	2.2500	3/8	.3750	1/2	.5000	.031
22BICoo	1 3/8	1.3750	2 5/8	2.5000	7/16	.4375	9/16	.5625	.031
24BICoo	1 1/2	1.5000	2 7/8	2.6250	7/16	.4375	9/16	.5625	.031

BẢNG 11: Ô CÔN KIỂU TS

Table 11. TYPE TS TAPERED ROLLER BEARINGS

Bore Diam., Inch	Outside Diam., Inch	Bearing Width, Inch	Cone Radius Inch	Cup Radius Inch	Bore Diam., Inch	Outside Diam., Inch	Bearing Width, Inch	Cone Radius Inch	Cup Radius Inch
0.3750	1.2595	0.3940	3/64	3/64	1.2500	2.4410	0.7150	3/64	3/64
0.4720	1.2595	0.3940	1/32	3/64	1.2500	2.6875	0.8750	3/64	1/16
0.5000	1.3775	0.4330	3/64	3/64	1.2500	2.7170	0.7813	3/64	3/64
0.5900	1.3775	0.4330	1/32	3/64	1.2500	2.7500	0.9375	3/64	3/64
0.6250	1.5745	0.4730	3/64	3/64	1.2500	2.8593	1.1875	3/64	1/8
0.6250	1.6875	0.6563	1/16	1/16	1.2500	2.8750	0.8750	3/64	1/8
0.6250	1.8504	0.5662	1/16	3/64	1.2500	2.8750	0.8750	3/64	1/8
0.6250	1.9380	0.9063	1/32	1/16	1.2500	3.1250	1.1563	3/64	1/8
0.6695	1.5745	0.4730	1/32	3/64	1.2500	3.1496	0.8268	1/32	3/64
0.7500	1.5745	0.4730	.040	3/64	1.2600	2.8345	0.7480	1/16	1/16
0.7500	1.8504	0.5662	3/64	3/64	1.3125	2.7170	0.7813	3/64	3/64
0.7500	1.9380	0.7100	3/64	3/64	1.3125	2.7500	0.9375	3/64	3/64
0.7500	1.9380	0.9063	3/64	1/16	1.3125	2.8593	1.1875	3/64	1/8
0.7500	2.2400	0.7625	1/16	3/64	1.3125	2.8750	0.8750	3/64	1/8
0.7870	1.8504	0.5662	1/16	3/64	1.3125	3.0000	0.9375	3/64	1/8
0.7874	1.9687	0.5313	1/16	.040	1.3125	3.0000	1.1563	.025	1/8
0.8125	1.9380	0.7813	1/16	1/16	1.3750	2.7170	0.7813	1/16	3/64
0.8125	2.4375	1.1250	3/32	1/8	1.3750	2.8750	0.8750	3/64	1/8
0.8750	2.0470	0.5910	3/64	3/64	1.3750	2.8750	0.8750	1/32	1/8
0.8750	2.1250	0.7625	1/16	1/16	1.3750	2.8750	0.9375	3/64	3/32
0.8750	2.2400	0.7625	3/64	3/64	1.3750	3.0000	0.9375	1/32	1/8
0.8750	2.2500	0.8750	1/32	1/16	1.3750	3.0000	1.1563	1/16	1/8
0.9375	2.2400	0.7625	1/32	3/64	1.3750	3.0000	1.1563	3/64	1/8
0.9375	2.4375	1.1250	3/32	1/8	1.3750	3.1250	1.1563	3/64	1/8
0.9375	2.6150	0.9375	1/32	3/64	1.3750	3.1496	0.8268	1/32	3/64
0.9375	2.8345	0.7480	3/32	1/16	1.3750	3.1562	1.1563	3/64	1/8
0.9835	2.0470	0.5910	1/16	3/64	1.3750	3.4843	1.0625	1/32	3/32
1.0000	2.0470	0.5910	.040	3/64	1.3750	3.7500	1.0938	1/32	3/32
1.0000	2.2500	0.6875	3/64	1/16	1.3770	2.8345	0.6700	1/16	1/16
1.0000	2.3125	0.7500	3/64	3/64	1.3779	3.1496	0.8268	1/32	3/64
1.0000	2.5000	0.8125	3/64	3/64	1.3779	3.1562	1.0000	1/32	1/8
1.0000	2.6150	0.9375	3/64	3/64	1.4365	3.0000	0.9375	3/64	1/8
1.0000	2.8345	0.7480	1/16	1/16	1.4375	2.8345	0.6700	1/16	1/16
1.0000	2.8592	1.1875	1/32	1/8	1.4375	2.8345	0.7480	3/64	1/16
1.0625	2.2500	0.6875	3/64	1/16	1.4375	3.3750	1.1875	1/32	1/8
1.1250	2.3125	0.7500	1/32	3/64	1.5000	2.5625	0.5000	1/16	1/32
1.1250	2.5000	0.8125	3/64	3/64	1.5000	2.7170	0.7500	3/64	3/32
1.1250	2.6150	0.9375	3/64	3/64	1.5000	2.8345	0.6700	.060	1/16
1.1250	2.6875	0.8750	1/32	1/16	1.5000	2.8440	0.8125	3/64	3/64
1.1250	2.7500	0.9375	3/32	3/64	1.5000	3.0000	0.9375	3/64	1/8
1.1250	2.8345	0.7480	1/16	1/16	1.5000	3.1250	1.1563	3/64	1/8
1.1250	2.8593	1.1875	3/64	1/8	1.5000	3.1495	0.8270	3/64	1/16
1.1250	2.8570	0.8750	1/32	1/8	1.5000	3.1495	0.8268	1/32	3/64
1.1562	2.6150	0.9375	3/64	3/64	1.5000	3.1562	1.1563	3/64	1/8
1.1805	2.4410	0.6300	1/16	1/16	1.5000	3.3750	1.1875	3/64	1/8
1.1805	2.5000	0.8125	3/64	3/64	1.5000	3.4843	1.0625	3/64	1/16
1.1810	2.7170	0.7813	3/64	3/64	1.5000	3.6875	1.2500	3/64	1/8
1.1875	2.4410	0.6300	1/16	1/16	1.5000	3.7500	1.0938	3/64	3/32
1.1875	2.7500	0.9375	3/32	3/64	1.5000	4.2500	1.4375	3/64	1/8
1.1875	2.8593	1.1875	3/64	1/8	1.5625	3.1562	1.0000	3/64	1/8
1.1895	2.5000	0.8125	3/64	3/64	1.5625	3.1562	1.1563	3/64	1/8
1.1900	2.7170	0.7813	1/32	3/64	1.5625	3.4843	1.0625	3/64	1/16
1.2450	2.6250	0.8125	1/16	1/16	1.5740	3.0000	0.7090	1/16	1/16
1.2500	2.3125	0.5781	.040	.040	1.5748	3.1495	0.8270	1/16	1/16

BẢNG II : Ô CÔN KIỆT TS

Table II. TYPE TS TAPERED ROLLER BEARINGS

Bore Diam., Inch	Outside Diam., Inch	Bearing Width, Inch	Cone Radius, Inch	Cup Radius, Inch	Bore Diam., Inch	Outside Diam., Inch	Bearing Width, Inch	Cone Radius, Inch	Cup Radius, Inch
1.5748	3.1496	0.8268	3/64	3/64	1.9685	3.5000	0.8125	3/32	3/64
1.5748	3.4843	1.0625	3/64	1/4	1.9685	4.1250	1.1875	3/32	1/8
1.6250	3.0000	0.8750	3/64	3/32	2.0000	3.3750	0.7500	.060	.060
1.6250	3.1495	0.7090	1/16	1/16	2.0000	3.5000	0.8125	1/16	3/64
1.6250	3.1496	0.8268	3/64	3/64	2.0000	3.5000	0.8125	3/64	3/64
1.6250	3.1562	1.0000	3/64	1/8	2.0000	3.6718	1.1875	3/64	1/8
1.6250	3.3750	1.1875	3/64	1/8	2.0000	3.8125	0.8750	3/32	1/16
1.6250	3.4375	1.1875	3/64	1/8	2.0000	4.0000	1.2500	3/64	1/8
1.6250	3.4843	1.0625	3/64	1/16	2.0000	4.0000	1.3750	3/64	1/8
1.6250	3.5625	1.5625	3/64	1/8	2.0000	4.1250	1.1875	1/32	1/8
1.6250	3.6875	1.2500	3/64	1/8	2.0000	4.1250	1.4375	3/64	1/8
1.6250	3.6875	1.2500	1/32	1/8	2.0000	4.1250	1.5625	3/64	1/8
1.6250	3.7500	1.0938	3/64	3/32	2.0000	4.2500	1.4375	3/64	1/8
1.6250	4.0000	1.3750	3/64	1/8	2.0000	4.4375	1.1875	3/64	1/8
1.6875	3.0312	0.6875	.060	.060	2.0000	4.7500	1.6250	3/64	1/8
1.6875	3.2650	0.9375	.090	3/32	2.0000	4.8750	1.5000	3/32	1/8
1.6875	3.4375	1.1875	3/64	1/8	2.0000	5.0000	2.0000	3/64	1/8
1.6880	3.1496	0.8268	3/64	3/64	2.0625	3.6718	1.1875	3/32	1/8
1.6880	3.1562	1.0000	3/64	1/8	2.0625	3.7500	1.0938	1/16	3/32
1.6880	3.2650	0.9375	3/64	3/32	2.0625	3.8125	0.8750	3/32	1/16
1.7500	3.0312	0.6875	.060	.060	2.0625	4.2500	1.4375	3/64	1/8
1.7500	3.1875	0.7500	0	1/16	2.1250	3.8750	0.8268	1/32	1/32
1.7500	3.2650	0.8750	3/64	3/32	2.1250	4.1250	1.1875	3/64	1/8
1.7500	3.2650	0.9375	3/64	3/32	2.1250	4.1250	1.5625	3/64	1/8
1.7500	3.3464	0.8125	3/32	3/64	2.1250	4.2500	1.4375	3/64	1/8
1.7500	3.4375	1.1875	3/64	1/8	2.1250	4.7500	1.6250	3/64	1/8
1.7500	3.6875	1.2500	3/64	1/8	2.1250	4.8750	1.5000	3/64	1/8
1.7500	3.6875	1.2500	3/64	1/8	2.1250	5.0000	2.0000	3/64	1/8
1.7500	3.7500	1.0938	3/64	3/32	2.1250	5.3750	1.6250	3/64	1/8
1.7500	4.0000	1.3750	3/64	1/8	2.1653	3.8750	0.8268	3/32	1/32
1.7500	4.1250	1.1875	3/64	1/8	2.1875	4.1250	1.1875	3/32	1/8
1.7500	4.1250	1.4375	3/64	1/8	2.1880	3.8750	0.8268	3/32	1/32
1.7500	4.2500	1.4375	3/64	1/8	2.2500	3.8437	0.9688	3/64	1/32
1.7500	4.5000	1.7500	3/64	3/32	2.2500	3.8750	0.8268	3/32	1/32
1.7500	4.7500	1.6250	3/64	1/8	2.2500	3.8750	0.8268	3/64	1/32
1.7710	3.2650	0.9375	1/16	3/32	2.2500	4.1250	1.1875	3/32	1/8
1.7710	3.6718	1.1875	3/64	1/8	2.2500	4.3307	0.8601	3/32	3/64
1.7716	3.3464	0.8125	1/16	3/64	2.2500	4.4375	1.1875	3/64	1/8
1.7716	3.8125	0.8750	1/32	1/16	2.2500	4.7500	1.6250	3/64	1/8
1.8125	3.1250	0.6875	3/64	1/16	2.2500	4.8750	1.5000	3/64	1/8
1.8125	3.1875	0.7500	1/32	1/16	2.2500	5.0000	1.7500	3/64	1/8
1.8125	3.3464	0.8125	3/32	3/64	2.2500	5.3447	2.1250	1/16	1/8
1.8125	3.3464	1.0000	3/64	3/64	2.3622	4.2500	1.0000	1/32	1/8
1.8125	3.7500	1.0938	3/64	3/32	2.3622	4.3307	0.8601	1/32	3/64
1.8750	3.5000	0.8125	3/64	3/64	2.3750	4.0000	1.0000	3/64	1/8
1.8750	3.6718	1.1875	1/8	1/8	2.3750	4.4375	1.1875	3/64	1/8
1.8750	3.6718	1.1875	3/64	1/8	2.3750	4.8125	1.7188	1/32	1/8
1.8750	4.0000	1.2500	3/64	1/8	2.3750	5.3447	2.1250	3/64	1/8
1.8750	4.0000	1.3750	3/64	1/8	2.5000	4.1250	0.8438	.080	.080
1.8750	4.0625	1.7188	3/64	1/8	2.5000	4.3307	0.8601	3/64	3/64
1.8750	4.1250	1.1875	1/16	1/8	2.5000	4.4375	1.1875	3/64	1/8
1.8750	4.2500	1.4375	3/64	1/8	2.5000	4.6250	1.1875	1/32	1/8
1.8750	4.7500	1.6250	3/64	1/8	2.5000	4.7244	1.1418	1/32	1/8
1.9375	3.6718	1.1875	3/64	1/8	2.5000	4.8125	1.7188	3/64	1/8
1.9375	4.0625	1.7188	3/64	1/8	2.5000	4.8750	1.5000	3/64	1/8

BẢNG 11: Ô CÔN KIỂU TS

Table 11. TYPE TS TAPERED ROLLER BEARINGS

Bore Diam., Inch	Outside Diam., Inch	Bearing Width, Inch	Cone Radius Inch	Cup Radius Inch	Bore Diam., Inch	Outside Diam., Inch	Bearing Width, Inch	Cone Radius Inch	Cup Radius Inch
2.5000	5.0000	1.4375	964	36	3.3750	5.3750	1.1875	964	36
2.5000	5.3750	1.6250	964	36	3.3750	6.0000	1.5625	964	36
2.5625	5.3447	2.1250	964	36	3.3750	6.0000	1.6250	964	36
2.6250	4.3307	0.8661	964	964	3.5000	5.8437	1.1250	120	120
2.6250	4.4375	1.1875	964	36	3.5000	6.0000	1.5625	964	36
2.6250	4.6250	1.1875	964	36	3.5000	6.3750	1.8750	964	36
2.6250	4.7244	1.1418	362	36	3.5000	6.3750	2.1250	964	36
2.6250	4.8750	1.5000	964	36	3.5000	7.5000	2.2500	516	36
2.6250	5.3447	2.1250	1364	36	3.5430	6.3030	1.1860	362	36
2.6250	5.3750	1.6250	964	36	3.6250	5.7500	1.3125	964	36
2.6875	4.3307	0.8661	362	964	3.6250	5.8437	1.1250	964	120
2.6875	4.7244	1.1418	964	36	3.6250	6.0000	1.5625	964	36
2.6875	4.8750	1.5000	964	36	3.6250	6.7500	1.8750	964	36
2.6875	5.0000	1.4375	964	36	3.6875	5.8437	1.1250	120	120
2.7500	4.6250	1.1875	964	36	3.7500	5.8437	1.1250	120	120
2.7500	4.7244	1.1418	964	36	3.7500	6.0000	1.5625	964	36
2.7500	5.0000	1.4375	964	36	3.7500	6.6250	1.6250	964	36
2.7500	5.3750	1.6250	964	36	3.7500	6.7500	1.8750	964	36
2.7500	5.8750	2.1250	1364	36	3.7500	7.5000	2.2500	516	36
2.7500	6.0000	1.6250	964	36	3.8750	6.1875	1.4375	964	36
2.7500	6.6250	2.1250	964	36	3.8750	6.6250	1.6250	964	36
2.7559	4.7812	0.9688	080	080	3.8750	7.1250	1.8750	964	36
2.8125	4.6250	1.1875	964	36	4.0000	6.1875	1.4375	964	36
2.8125	5.0000	1.4375	964	36	4.0000	6.6250	1.6250	964	36
2.8125	5.3750	1.6250	36	36	4.0000	7.1250	1.8750	964	36
2.8750	5.0000	1.4375	964	36	4.0000	7.5000	2.2500	516	36
2.8750	5.8750	2.1250	964	36	4.1250	7.1250	1.8750	964	36
2.8750	5.9090	1.7500	964	36	4.1875	6.5000	1.4375	964	36
2.8750	6.0000	1.6250	964	36	4.2500	6.2500	0.9063	964	36
2.9062	5.0000	1.4375	362	36	4.2500	6.5000	1.4375	964	36
3.0000	4.7812	0.9688	080	080	4.2500	7.5000	1.8750	964	36
3.0000	5.0000	1.1875	964	36	4.2500	8.3750	2.6250	516	36
3.0000	5.2500	1.3125	362	36	4.3304	7.0000	1.6250	964	36
3.0000	5.3750	1.1875	964	36	4.3750	7.5000	1.8750	964	36
3.0000	5.5115	1.4375	964	36	4.5000	7.0000	1.6250	964	36
3.0000	5.8750	2.1250	964	36	4.5000	7.5000	1.8750	964	36
3.0000	5.9090	1.7500	964	36	4.5000	8.3750	2.6250	516	36
3.0000	6.0000	1.6250	964	36	4.6250	7.1250	1.3750	964	36
3.0000	6.3750	2.1250	964	36	4.7500	8.1250	1.8750	36	36
3.0000	6.6250	2.1250	36	36	4.7500	10.0000	3.0625	36	36
3.0625	4.7812	0.9688	964	080	5.0000	8.0000	1.8125	964	36
3.1875	5.2500	1.3125	964	36	5.0000	8.5000	1.8750	964	36
3.1875	5.3750	1.1875	964	36	5.0000	9.2500	2.5000	36	36
3.1875	5.5115	1.4375	964	36	5.0000	9.7500	2.5000	36	36
3.1875	5.9090	1.7500	1364	36	5.0000	10.0000	3.0625	36	36
3.1875	6.6250	2.1250	362	36	5.0000	11.6250	3.2500	120	36
3.2500	5.2500	1.3125	964	36	5.0000	11.6250	3.3750	36	36
3.2500	5.3750	1.1875	964	36	5.0000	12.0000	3.1250	36	36
3.2500	5.5115	1.4375	964	36	5.0000	12.0000	2.3750	36	36
3.2500	6.0000	1.6250	964	36	5.0625	7.5000	1.3750	964	36
3.2500	6.3750	2.1250	964	36	5.0625	8.1250	1.8750	36	36
3.2500	6.6250	2.1250	964	36	5.1181	8.1250	1.8750	964	36
3.2813	4.9375	1.0000	964	36	5.2500	8.0000	1.8125	964	36
3.3125	5.3750	1.1875	964	36	5.2500	8.5000	1.8750	964	36
3.3475	5.9090	1.7500	964	36	5.2500	9.2500	2.5000	36	36

BẢNG 12: DUNG SAI TIÊU CHUẨN CHO Ổ CÔN VÀ Ổ ĐŨA TỰ LỰA

*Table 12. AFBMA STANDARD TOLERANCES FOR TAPERED
ROLLER BEARINGS. AND SELF-ALIGNING ROLLER BEARINGS.*

	Class 4		Class 2		Class 3		Class 0		Class 00	
Cone Bore	Cone Bore Tolerances, Inches									
Up to 2½ in., incl.	+ .0005, -0	+ .0005, -0	+ .0005, -0	+ .0005, -0	+ .0005, -0	+ .0005, -0	+ .0005, -0	+ .0003, -0	+ .0003, -0	+ .0003, -0
Over 2½ to 12 in., incl.	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0
Over 12 to 24 in., incl.	+ .002, -0	+ .002, -0	+ .002, -0	+ .002, -0	+ .002, -0	+ .002, -0	....	....	....	....
Cup Outside Diameter	Cup Outside Diameter Tolerances, Inches									
Up to 12 in., incl.	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0	+ .001, -0
Over 12 to 24 in., incl.	+ .002, -0	+ .002, -0	+ .002, -0	+ .002, -0	+ .002, -0	+ .002, -0	....	....	....	....
Over 24 to 36 in., incl.	+ .003, -0	+ .003, -0	+ .003, -0	+ .003, -0	+ .003, -0	+ .003, -0	....	....	....	....
Bearing Type and Size	Overall Bearing Width Tolerances, Inches**									
TS, TSF, TSS, TSSF, and TST	+	-	+	-	+	-	+	-	+	-
To 4-in. bore, incl.†	.008	.000	.008	.000	.008	.008	.008	.008	.008	.008
Over 4- to 12-in. bore, incl.	.014	.010	.008	.000	.008	.008	.008	.008	.008	.008
Over 12-in. bore; up to 20-in. cup O.D., incl.	.015	.015	.015	.015	.008	.008	...	...	...	...
Over 12-in. bore; over 20-in. cup O.D.	.015	.015	.015	.015	.015	.015	...	...	...	...
TNA and TNAS										
To 5-in. bore, incl.	.010	.000	.010	.000	.010	.000	...	...	...	...
Over 5-in. bore	.030	.000	.030	.000	.030	.000	...	...	...	...
TDI, TDO, TDIS & TDOS										
To 4-in. bore, incl.	.016	.000	.016	.000	.016	.016	.016	.016	.016	.016
Over 4-in. to 12-in. bore, incl.	.028	.020	.016	.016	.016	.016	.016	.016	.016	.016
Over 12-in. bore; up to 20-in. cup O.D., incl.	.030	.030	.030	.030	.016	.016	...	...	...	...
Over 12-in. bore; over 20-in. cup O.D.	.030	.030	.030	.030	.030	.030	...	...	...	...

Bearing Outside Diameter	Class 4	Class 2	Class 3	Class 0	Class 00
	Assembled Bearing Maximum Runout, Inches				
Up to 12 in., incl.	.0020	.0015	.0003	.00015	.000075
Over 12 to 24 in., incl.	.0020	.0015	.0007	....	....
Over 24 to 36 in., incl.	.0030	.0020	.0020	....	....

Radius tolerance is +¼ in., -0.

* Self-aligning Types SA, SIA, SB, SIB, SIY, SIV, SIM, SIN, SIC, and SIT.

** For TSF and TSSF bearings, width tolerances apply to dimension from back face of cup flange to back face of cone.

† For Class 4B bearings tolerance is +.014 in., -.010 in.

BANG 13: Ô KIM KIEU NAA, NAB, NBA, NBB

Table 13. TYPES NAA, NAB, NBA, AND NBB NEEDLE ROLLER BEARINGS

TYPES NAA AND NBA				TYPES NAB AND NBB					
Bore Diam.	Outside Diam.	Width	Fillet Radius	Bore Diam.	Outside Diam.	Inner Ring O. D.	Outer Ring O. D.	Overall Width	Fillet Radius
Inches	Inches	Inches	Inch	Inches	Inches	Inches	Inches	Inches	Inch
0.3750	0.8125	0.750	.025	0.3750	1.1250	0.625	0.750	0.760	.025
0.5000	1.0000	0.750	.025	0.5000	1.2500	0.750	0.750	0.760	.040
0.6250	1.1250	0.750	.025	0.6250	1.3750	0.875	0.750	0.760	.040
0.7500	1.2500	0.750	.040	0.7500	1.5000	1.000	1.000	1.010	.040
0.8750	1.3750	0.750	.040	0.8750	1.6250	1.125	1.000	1.010	.040
1.0000	1.5000	1.000	.040	1.0000	1.7500	1.250	1.000	1.010	.040
1.1250	1.6250	1.000	.040	1.1250	1.8750	1.375	1.000	1.010	.040
1.2500	1.7500	1.000	.040	1.2500	2.0625	1.500	1.250	1.260	.060
1.3750	1.8750	1.000	.040	1.3750	2.1875	1.625	1.250	1.260	.060
1.5000	2.0625	1.250	.060	1.5000	2.3125	1.750	1.250	1.260	.060
1.6250	2.1875	1.250	.060	1.6250	2.5625	2.000	1.250	1.260	.060
1.7500	2.3125	1.250	.060	1.7500	3.0000	2.250	1.500	1.510	.060
1.8750	2.4375	1.250	.060	2.0000	3.2500	2.500	1.500	1.510	.080
2.0000	2.5625	1.250	.060	2.2500	3.5000	2.750	1.500	1.510	.080
2.2500	3.0000	1.500	.060	2.5000	3.7500	3.000	1.500	1.510	.080
2.5000	3.2500	1.500	.080	2.7500	4.2500	3.250	2.000	2.010	.080
2.7500	3.5000	1.500	.080	3.0000	4.5000	3.500	2.000	2.010	.080
3.0000	3.7500	1.500	.080	3.2500	5.0000	4.000	2.000	2.010	.100
3.2500	4.2500	2.000	.080	3.5000	5.2500	4.250	2.000	2.010	.100
3.5000	4.5000	2.000	.080	3.7500	6.0000	4.500	2.500	2.515	.100
3.7500	4.7500	2.000	.100	4.0000	6.5000	5.000	2.500	2.515	.100
4.0000	5.0000	2.000	.100	4.5000	7.0000	5.500	2.500	2.515	.100
4.2500	5.2500	2.000	.100	5.0000	7.5000	6.000	2.500	2.515	.120
4.5000	6.0000	2.500	.100	5.5000	8.0000	6.500	2.500	2.515	.120
5.0000	6.5000	2.500	.100	6.0000	9.1250	7.250	3.000	3.015	.120
5.5000	7.0000	2.500	.100	6.5000	9.6250	7.750	3.000	3.015	.120
6.0000	7.5000	2.500	.120	7.0000	10.1250	8.250	3.000	3.015	.120
6.5000	8.0000	2.500	.120	7.5000	10.6250	8.750	3.000	3.015	.160
7.2500	9.1250	3.000	.120	8.0000	11.1250	9.250	3.000	3.015	.160
7.7500	9.6250	3.000	.120	.....	.....	.....	.....	.....	.....
8.2500	10.1250	3.000	.120	.....	.....	.....	.....	.....	.....
8.7500	10.6250	3.000	.160	.....	.....	.....	.....	.....	.....
9.2500	11.1250	3.000	.160	.....	.....	.....	.....	.....	.....

BANG 14: DUNG SAI TIÊU CHUẨN AFBMA CHO Ô KIM CÔNG NGHIỆP

Table 14. AFBMA STANDARD TOLERANCES FOR INDUSTRIAL NEEDLE ROLLER BEARINGS

Bore or Outside Diameter			Bearing Widths			Shaft Diameter (Series NAA and NBA)		
Dimension, Inches		Tolerance, Inch	Size, Inches		Tolerance, Inch	Size, Inches		Tolerance, Inch
Over	Incl.	+0.0000				From	To	+0.0000
0.0000	0.7500	-0.0004	Outer Ring, all sizes		+0.000	0	4	-0.0005
0.7500	2.0000	-0.0005				4	6	-0.0007
2.0000	3.2500	-0.0006				6	—	-0.0010
3.2500	4.7500	-0.0008	Inner Ring, 5-in. O. D. or less		+0.005	...	...	.....
4.7500	7.2500	-0.0010				...	...	.....
7.2500	10.2500	-0.0012				...	...	.....
10.2500	12.5000	-0.0014	Over 5-in. O. D.		+0.010	...	...	.....
					+0.015	...	...	.....

BẢNG 15 : Ô BỊ CHẶN MỘT HƯỚNG KIỂU TA KÍCH THƯỚC THEO HỆ MÉT

Table 15. TYPE TA ONE-DIRECTION BALL THRUST BEARINGS -
METRIC DIMENSIONS

Bearing Number	Small Bore Diam., Nom.		Large Bore Diam., Nom.		Outside Diam., Nom.		Height, Nominal		Fillet Radius*
	Mm.	Inches	Mm.	Inches	Mm.	Inches	Mm.	Inches	
DIMENSION SERIES II									
35TAII	35	1.3780	36	1.417	53	2.0866	12	0.472	.024
40TAII	40	1.5748	42	1.654	60	2.3622	13	0.512	.024
45TAII	45	1.7717	47	1.850	65	2.5591	14	0.551	.024
50TAII	50	1.9685	52	2.047	70	2.7559	14	0.551	.024
55TAII	55	2.1654	57	2.244	78	3.0709	16	0.630	.024
60TAII	60	2.3622	62	2.441	85	3.3465	17	0.669	.039
65TAII	65	2.5591	67	2.638	90	3.5433	18	0.709	.039
70TAII	70	2.7559	72	2.835	95	3.7402	18	0.709	.039
75TAII	75	2.9528	77	3.031	100	3.9370	19	0.748	.039
80TAII	80	3.1496	82	3.228	105	4.1339	19	0.748	.039
85TAII	85	3.3465	88	3.465	110	4.3307	19	0.748	.039
90TAII	90	3.5433	93	3.661	120	4.7244	22	0.866	.039
100TAII	100	3.9370	103	4.055	135	5.3150	25	0.984	.039
110TAII	110	4.3307	113	4.449	145	5.7087	25	0.984	.039
120TAII	120	4.7244	123	4.843	155	6.1024	25	0.984	.039
130TAII	130	5.1181	133	5.236	170	6.6929	30	1.181	.039
140TAII	140	5.5118	143	5.630	180	7.0866	31	1.220	.039
150TAII	150	5.9055	153	6.024	190	7.4803	31	1.220	.039
160TAII	160	6.2992	163	6.417	200	7.8740	31	1.220	.039
170TAII	170	6.6929	173	6.811	215	8.4646	34	1.339	.039
180TAII	180	7.0866	183	7.205	225	8.8583	34	1.339	.039
190TAII	190	7.4803	193	7.598	240	9.4488	37	1.457	.039
200TAII	200	7.8740	203	7.992	250	9.8425	37	1.457	.039
220TAII	220	8.6614	223	8.780	270	10.6299	37	1.457	.039
240TAII	240	9.4488	243	9.567	300	11.8110	45	1.772	.059
260TAII	260	10.2362	263	10.354	320	12.5984	45	1.772	.059
280TAII	280	11.0236	283	11.142	350	13.7795	53	2.087	.059
LIGHT SERIES									
10TA025	10	0.3937	10.2	0.4016	26	1.0236	12	0.4724	.02
12TA025	12	0.4724	12.2	0.4803	28	1.1024	12	0.4724	.02
15TA025	15	0.5906	15.2	0.5985	31	1.2205	12	0.4724	.02
18TA025	18	0.7087	18.2	0.7166	35	1.3780	12	0.4724	.02
20TA025	20	0.7874	20.2	0.7953	37	1.4567	12	0.4724	.02
25TA025	25	0.9843	25.2	0.9922	45	1.7717	14	0.5512	.02
30TA025	30	1.1811	30.2	1.1890	50	1.9685	14	0.5512	.02
35TA025	35	1.3780	35.2	1.3859	55	2.1654	16	0.6299	.02
40TA025	40	1.5748	40.2	1.5827	60	2.3622	16	0.6299	.02
45TA025	45	1.7717	45.2	1.7796	68	2.6772	16	0.6299	.02
50TA025	50	1.9685	50.2	1.9764	74	2.9134	18	0.7087	.02
55TA025	55	2.1654	55.2	2.1733	78	3.0709	18	0.7087	.02
60TA025	60	2.3622	60.2	2.3701	82	3.2284	18	0.7087	.02
65TA025	65	2.5591	65.2	2.5670	90	3.5433	20	0.7874	.02
70TA025	70	2.7559	70.2	2.7638	95	3.7402	20	0.7874	.02
75TA025	75	2.9528	75.2	2.9607	100	3.9370	20	0.7874	.02
80TA025	80	3.1496	80.2	3.1575	110	4.3307	22	0.8661	.02
85TA025	85	3.3465	85.2	3.3544	115	4.5276	22	0.8661	.02
90TAII	90	3.5433	90.2	3.5512	120	4.7244	22	0.8661	.02
95TA025	95	3.7402	95.2	3.7481	130	5.1181	25	0.9843	.02
100TAII	100	3.9370	100.2	3.9449	135	5.3150	25	0.9843	.02
105TA025	105	4.1339	105.2	4.1418	140	5.5118	25	0.9843	.02
110TA011	110	4.3307	110.2	4.3386	145	5.7087	25	0.9843	.02
115TA025	115	4.5276	115.2	4.5355	150	5.9055	25	0.9843	.02
120TA025	120	4.7244	120.2	4.7323	160	6.2992	27	1.0630	.02
125TA025	125	4.9213	125.2	4.9292	165	6.4961	27	1.0630	.02

* For tolerances see Table 19. See also footnote at end of table.

BẢNG 15 : Ổ BỊ CHẶN MỘT HƯỚNG KIỂU TA KÍCH THƯỚC THEO HỆ MÉT

Table 15. TYPE TA ONE-DIRECTION BALL THRUST BEARINGS - METRIC DIMENSIONS

Bearing Number	Small Bore Diam., Nom.		Large Bore Diam., Min.		Outside Diam., Nom.		Height, Nominal		Fillet Radius
	mm.	Inches	mm.	Inches	mm.	Inches	mm.	Inches	Inch
MEDIUM SERIES									
10TA026	10	0.3937	10.2	0.4016	30	1.1811	12	0.4724	.02
15TA026	15	0.5906	15.2	0.5985	35	1.3780	14	0.5512	.02
20TA12	20	0.7874	20.2	0.7953	40	1.5748	14	0.5512	.02
25TA026	25	0.9843	25.2	0.9922	48	1.8898	15.5	0.6103	.02
30TA026	30	1.1811	30.2	1.1890	53	2.0866	15.5	0.6103	.02
35TA12	35	1.3780	35.2	1.3859	62	2.4409	18	0.7087	.02
40TA026	40	1.5748	40.2	1.5827	64	2.5197	18	0.7087	.02
45TA026	45	1.7717	45.2	1.7796	73	2.8740	22	0.8661	.02
50TA12	50	1.9685	50.2	1.9764	78	3.0709	22	0.8661	.02
55TA026	55	2.1654	55.2	2.1733	88	3.4646	24.5	0.9646	.02
60TA026	60	2.3622	60.2	2.3701	90	3.5433	24.5	0.9646	.02
65TA12	65	2.5591	65.2	2.5670	100	3.9370	27	1.0630	.04
70TA026	70	2.7559	70.2	2.7638	103	4.0551	27	1.0630	.04
75TA12	75	2.9528	75.2	2.9607	110	4.3307	27	1.0630	.04
8TA026	80	3.1496	80.2	3.1575	115	4.5276	29	1.1417	.04
85TA026	85	3.3465	85.2	3.3544	125	4.9213	30.5	1.2008	.04
90TA026	90	3.5433	90.2	3.5512	135	5.3150	30.5	1.2008	.04
95TA026	95	3.7402	95.2	3.7481	140	5.5118	32.5	1.2795	.04
100TA026	100	3.9370	100.2	3.9449	150	5.9055	32.5	1.2795	.04
105TA026	105	4.1339	105.2	4.1418	155	6.1024	40	1.5748	.04
115TA026	115	4.5276	115.2	4.5355	165	6.4961	43	1.6929	.04
125TA026	125	4.9213	125.2	4.9292	175	6.8898	46.5	1.8307	.04
140TA026	140	5.5118	140.2	5.5197	200	7.8740	52	2.0472	.04

BẢNG 16 : Ổ BỊ CHẶN TỰ LỰA MỘT HƯỚNG KIỂU TE VÀ TF. KÍCH THƯỚC THEO HỆ MÉT

Table 16. TYPES TE AND TF ONE-DIRECTION SELF-ALIGNING BALL THRUST BEARINGS - METRIC DIMENSIONS

Small Bore Diam., Nom.		Large Bore Diam., Min.		Outside Diam., Nominal	Aligning Washer O.D., Nom.	Height, Nominal	Aligning Seat Radius	Aligning Seat Center	Fillet Radius
mm.	Inches	mm.	Inches	Inches	Inches	Inches	Inches	Inches	Inch
10	0.3937	12	.472	1.1811	1.3780	0.5906	0.9843	0.402	.02
15	0.5906	17	.669	1.3780	1.4961	0.6093	1.1811	0.488	.02
20	0.7874	22	.866	1.5748	1.7717	0.7087	1.3780	0.638	.02
25	0.9843	27	1.063	1.8898	1.9685	0.7480	1.3780	0.492	.02
30	1.1811	32	1.260	2.0866	2.3228	0.7874	1.5748	0.630	.02
35	1.3780	37	1.457	2.4409	2.6378	0.9055	1.9685	0.913	.02
40	1.5748	42	1.654	2.5197	2.7165	0.9055	1.9685	0.882	.02
45	1.7717	47	1.850	2.8740	3.0709	1.0630	2.3622	1.126	.02
50	1.9685	52	2.047	3.0709	3.2677	1.0630	2.5591	1.299	.02
55	2.1654	57	2.244	3.4646	3.7008	1.1811	2.7559	1.276	.02
60	2.3622	62	2.441	3.5433	3.7795	1.1811	2.9528	1.496	.02
65	2.5591	67	2.638	3.9370	4.1339	1.3386	3.1496	1.516	.04
70	2.7559	72	2.835	4.0551	4.2913	1.3386	3.3465	1.677	.04
75	2.9528	77	3.031	4.3307	4.4882	1.3386	3.5433	1.819	.04
80	3.1496	82	3.228	4.5276	4.8819	1.4567	3.7402	1.913	.04
85	3.3465	88	3.465	4.9213	5.4331	1.5748	4.1339	2.161	.04
90	3.5433	93	3.661	5.3150	5.5512	1.5748	4.3307	2.260	.04
95	3.7402	98	3.858	5.5118	5.9449	1.7126	4.5276	2.370	.04
100	3.9370	103	4.055	5.9055	6.1417	1.7323	4.9213	2.717	.04
105	4.1339	108	4.252	6.1024	6.4173	1.9291	5.1181	2.732	.04
110	4.3307	...	...	6.2992	6.6929	1.9291	5.3150	2.902	.04
115	4.5276	118	4.646	6.4961	6.8110	2.0472	5.5118	2.957	.04
125	4.9213	128	5.039	6.8898	7.3228	2.2047	5.9055	3.142	.04
140	5.5118	143	5.630	7.8740	8.3464	2.4409	6.6929	3.583	.04

BẢNG 17: Ô BỊ CHẶN MỘT HƯỚNG TB KÍCH THƯỚC THEO INCH

Table 17. TYPE TB ONE-DIRECTION BALL THRUST BEARINGS-
INCH DIMENSIONS

DIMENSION SERIES 30 (EXTRA LIGHT)							
Bore Diam., Nominal	Outside Diam., Nominal	Height, Nominal	Fillet Radius	Bore Diam., Nominal	Outside Diam., Nominal	Height, Nominal	Fillet Radius
Inches	Inches	Inch	Inch	Inches	Inches	Inch	Inch
1/8	1 1/32	9/16	.030	1 1/8	3 1/32	1 1/16	.040
9/16	1 7/32	9/16	.030	1 15/16	3 7/32	1 1/16	.040
5/8	1 11/32	9/16	.030	2	3 11/32	1 1/16	.040
1 1/16	1 15/32	9/16	.030	2 1/16	3 15/32	1 1/16	.060
3/4	1 19/32	9/16	.030	2 1/8	3 19/32	1 1/16	.060
1 1/16	1 23/32	9/16	.030	2 1/4	3 23/32	1 1/16	.060
7/8	1 27/32	5/8	.030	2 3/8	3 27/32	1 1/16	.060
1 1/8	1 31/32	5/8	.030	2 1/2	3 31/32	1 1/16	.060
1	1 35/32	5/8	.030	2 5/8	3 35/32	1 1/16	.060
1 1/8	1 39/32	5/8	.030	2 3/4	3 39/32	1 1/16	.060
1 1/4	1 43/32	5/8	.030	2 7/8	3 43/32	1 1/16	.060
1 1/2	1 47/32	5/8	.030	2 5/4	3 47/32	1 1/16	.060
1 3/4	1 51/32	5/8	.030	2 3/2	3 51/32	1 1/16	.060
1 7/8	1 55/32	5/8	.030	2 1/1	3 55/32	1 1/16	.060
2	1 59/32	5/8	.030	2 1/2	3 59/32	1 1/16	.060
2 1/8	1 63/32	5/8	.030	2 3/4	3 63/32	1 1/16	.060
2 1/4	1 67/32	5/8	.030	2 5/4	3 67/32	1 1/16	.060
2 1/2	1 71/32	5/8	.030	2 3/2	3 71/32	1 1/16	.060
2 3/4	1 75/32	5/8	.030	2 5/4	3 75/32	1 1/16	.060
2 7/8	1 79/32	5/8	.030	2 3/2	3 79/32	1 1/16	.060
3	1 83/32	5/8	.030	2 1/1	3 83/32	1 1/16	.060
3 1/8	1 87/32	5/8	.030	2 1/2	3 87/32	1 1/16	.060
3 1/4	1 91/32	5/8	.030	2 3/4	3 91/32	1 1/16	.060
3 1/2	1 95/32	5/8	.030	2 5/4	3 95/32	1 1/16	.060
3 3/4	1 99/32	5/8	.030	2 3/2	3 99/32	1 1/16	.060
3 7/8	1 103/32	5/8	.030	2 5/4	3 103/32	1 1/16	.060
4	1 107/32	5/8	.030	2 3/2	3 107/32	1 1/16	.060
4 1/8	1 111/32	5/8	.030	2 5/4	3 111/32	1 1/16	.060
4 1/4	1 115/32	5/8	.030	2 3/2	3 115/32	1 1/16	.060
4 1/2	1 119/32	5/8	.030	2 5/4	3 119/32	1 1/16	.060
4 3/4	1 123/32	5/8	.030	2 3/2	3 123/32	1 1/16	.060
4 7/8	1 127/32	5/8	.030	2 5/4	3 127/32	1 1/16	.060
5	1 131/32	5/8	.030	2 3/2	3 131/32	1 1/16	.060
5 1/8	1 135/32	5/8	.030	2 5/4	3 135/32	1 1/16	.060
5 1/4	1 139/32	5/8	.030	2 3/2	3 139/32	1 1/16	.060
5 1/2	1 143/32	5/8	.030	2 5/4	3 143/32	1 1/16	.060
5 3/4	1 147/32	5/8	.030	2 3/2	3 147/32	1 1/16	.060
5 7/8	1 151/32	5/8	.030	2 5/4	3 151/32	1 1/16	.060
6	1 155/32	5/8	.030	2 3/2	3 155/32	1 1/16	.060
6 1/8	1 159/32	5/8	.030	2 5/4	3 159/32	1 1/16	.060
6 1/4	1 163/32	5/8	.030	2 3/2	3 163/32	1 1/16	.060
6 1/2	1 167/32	5/8	.030	2 5/4	3 167/32	1 1/16	.060
6 3/4	1 171/32	5/8	.030	2 3/2	3 171/32	1 1/16	.060
6 7/8	1 175/32	5/8	.030	2 5/4	3 175/32	1 1/16	.060
7	1 179/32	5/8	.030	2 3/2	3 179/32	1 1/16	.060
7 1/8	1 183/32	5/8	.030	2 5/4	3 183/32	1 1/16	.060
7 1/4	1 187/32	5/8	.030	2 3/2	3 187/32	1 1/16	.060
7 1/2	1 191/32	5/8	.030	2 5/4	3 191/32	1 1/16	.060
7 3/4	1 195/32	5/8	.030	2 3/2	3 195/32	1 1/16	.060
7 7/8	1 199/32	5/8	.030	2 5/4	3 199/32	1 1/16	.060
8	1 203/32	5/8	.030	2 3/2	3 203/32	1 1/16	.060
8 1/8	1 207/32	5/8	.030	2 5/4	3 207/32	1 1/16	.060
8 1/4	1 211/32	5/8	.030	2 3/2	3 211/32	1 1/16	.060
8 1/2	1 215/32	5/8	.030	2 5/4	3 215/32	1 1/16	.060
8 3/4	1 219/32	5/8	.030	2 3/2	3 219/32	1 1/16	.060
8 7/8	1 223/32	5/8	.030	2 5/4	3 223/32	1 1/16	.060
9	1 227/32	5/8	.030	2 3/2	3 227/32	1 1/16	.060
9 1/8	1 231/32	5/8	.030	2 5/4	3 231/32	1 1/16	.060
9 1/4	1 235/32	5/8	.030	2 3/2	3 235/32	1 1/16	.060
9 1/2	1 239/32	5/8	.030	2 5/4	3 239/32	1 1/16	.060
9 3/4	1 243/32	5/8	.030	2 3/2	3 243/32	1 1/16	.060
9 7/8	1 247/32	5/8	.030	2 5/4	3 247/32	1 1/16	.060
10	1 251/32	5/8	.030	2 3/2	3 251/32	1 1/16	.060
10 1/8	1 255/32	5/8	.030	2 5/4	3 255/32	1 1/16	.060
10 1/4	1 259/32	5/8	.030	2 3/2	3 259/32	1 1/16	.060
10 1/2	1 263/32	5/8	.030	2 5/4	3 263/32	1 1/16	.060
10 3/4	1 267/32	5/8	.030	2 3/2	3 267/32	1 1/16	.060
10 7/8	1 271/32	5/8	.030	2 5/4	3 271/32	1 1/16	.060
11	1 275/32	5/8	.030	2 3/2	3 275/32	1 1/16	.060
11 1/8	1 279/32	5/8	.030	2 5/4	3 279/32	1 1/16	.060
11 1/4	1 283/32	5/8	.030	2 3/2	3 283/32	1 1/16	.060
11 1/2	1 287/32	5/8	.030	2 5/4	3 287/32	1 1/16	.060
11 3/4	1 291/32	5/8	.030	2 3/2	3 291/32	1 1/16	.060
11 7/8	1 295/32	5/8	.030	2 5/4	3 295/32	1 1/16	.060
12	1 299/32	5/8	.030	2 3/2	3 299/32	1 1/16	.060

DIMENSION SERIES 31 (LIGHT)

Small Bore Diam., Nominal	Large Bore Diam., Minimum	Outside Diam., Nominal	Height, Nominal	Fillet Radius	Small Bore Diam., Nominal	Large Bore Diam., Minimum	Outside Diam., Nominal	Height, Nominal	Fillet Radius
Inch	Inch	Inches	Inch	Inch	Inches	Inches	Inches	Inches	Inch
1/4	9/32	1 1/16	3/8	.030	2 3/4	2 25/32	4 1/32	1	.060
5/16	1 1/32	1	1 7/32	.030	2 5/8	2 29/32	4 3/32	1	.060
3/8	1 1/16	1 1/16	1 1/32	.030	3	3 1/32	4 3/8	1 1/8	.080
1/2	1 1/8	1 1/8	1 1/8	.030	3 1/8	3 5/32	4 5/8	1 1/4	.080
5/8	1 1/4	1 1/4	1 1/4	.030	3 1/4	3 9/32	4 3/4	1 1/2	.080
3/4	1 1/2	1 1/2	1 1/2	.030	3 1/2	3 13/32	4 7/8	1 3/4	.080
7/8	1 5/8	1 5/8	1 5/8	.030	3 3/4	3 17/32	5 1/8	1 3/4	.080
1	1 3/4	1 3/4	1 3/4	.030	3 5/8	3 21/32	5 3/8	1 3/4	.080
1 1/8	1 7/8	1 7/8	1 7/8	.030	3 3/4	3 25/32	5 1/2	1 3/4	.080
1 1/4	1 15/8	1 15/8	1 15/8	.030	4	3 29/32	5 11/16	1 3/4	.080
1 1/2	1 13/4	1 13/4	1 13/4	.030	4 1/8	4 1/32	5 3/4	1 3/4	.080
1 3/4	1 11/4	1 11/4	1 11/4	.030	4 1/4	4 5/32	5 7/8	1 3/4	.120
1 7/8	1 5/4	1 5/4	1 5/4	.030	4 1/2	4 9/32	6 1/8	1 3/4	.120
2	1 11/8	1 11/8	1 11/8	.040	4 3/4	4 13/32	6 3/8	1 3/4	.120
2 1/8	1 5/8	1 5/8	1 5/8	.040	5	5 1/32	7 1/8	2	.120
2 1/4	1 9/8	1 9/8	1 9/8	.040	5 1/8	5 5/32	7 3/8	2	.120
2 1/2	1 13/8	1 13/8	1 13/8	.040	5 1/4	5 9/32	7 5/8	2	.120
2 3/4	1 11/4	1 11/4	1 11/4	.040	5 3/8	5 13/32	8 1/8	2 1/8	.120
2 7/8	1 5/4	1 5/4	1 5/4	.040	5 1/2	5 17/32	8 3/8	2 1/8	.120
3	1 11/8	1 11/8	1 11/8	.040	5 3/4	5 21/32	8 5/8	2 1/8	.120
3 1/8	1 5/8	1 5/8	1 5/8	.060	6	6 1/32	9 1/8	2 3/8	.120
3 1/4	1 9/8	1 9/8	1 9/8	.060	6 1/8	6 5/32	9 3/8	2 3/8	.160
3 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/4	6 9/32	9 5/8	2 3/8	.160
3 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/8	6 13/32	10 1/8	2 3/8	.160
3 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 17/32	10 3/8	2 3/8	.160
4	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 21/32	10 5/8	2 3/8	.160
4 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 25/32	10 7/8	2 3/8	.160
4 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 29/32	10 9/8	2 3/8	.160
4 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 33/32	10 11/8	2 3/8	.160
4 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 37/32	10 13/8	2 3/8	.160
4 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 41/32	10 15/8	2 3/8	.160
5	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 45/32	10 17/8	2 3/8	.160
5 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 49/32	10 19/8	2 3/8	.160
5 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 53/32	10 21/8	2 3/8	.160
5 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 57/32	10 23/8	2 3/8	.160
5 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 61/32	10 25/8	2 3/8	.160
5 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 65/32	10 27/8	2 3/8	.160
6	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 69/32	10 29/8	2 3/8	.160
6 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 73/32	10 31/8	2 3/8	.160
6 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 77/32	10 33/8	2 3/8	.160
6 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 81/32	10 35/8	2 3/8	.160
6 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 85/32	10 37/8	2 3/8	.160
6 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 89/32	10 39/8	2 3/8	.160
7	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 93/32	10 41/8	2 3/8	.160
7 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 97/32	10 43/8	2 3/8	.160
7 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 101/32	10 45/8	2 3/8	.160
7 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 105/32	10 47/8	2 3/8	.160
7 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 109/32	10 49/8	2 3/8	.160
7 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 113/32	10 51/8	2 3/8	.160
8	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 117/32	10 53/8	2 3/8	.160
8 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 121/32	10 55/8	2 3/8	.160
8 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 125/32	10 57/8	2 3/8	.160
8 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 129/32	10 59/8	2 3/8	.160
8 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 133/32	10 61/8	2 3/8	.160
8 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 137/32	10 63/8	2 3/8	.160
9	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 141/32	10 65/8	2 3/8	.160
9 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 145/32	10 67/8	2 3/8	.160
9 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 149/32	10 69/8	2 3/8	.160
9 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 153/32	10 71/8	2 3/8	.160
9 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 157/32	10 73/8	2 3/8	.160
9 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 161/32	10 75/8	2 3/8	.160
10	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 165/32	10 77/8	2 3/8	.160
10 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 169/32	10 79/8	2 3/8	.160
10 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 173/32	10 81/8	2 3/8	.160
10 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 177/32	10 83/8	2 3/8	.160
10 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 181/32	10 85/8	2 3/8	.160
10 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 185/32	10 87/8	2 3/8	.160
11	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 189/32	10 89/8	2 3/8	.160
11 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 193/32	10 91/8	2 3/8	.160
11 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 197/32	10 93/8	2 3/8	.160
11 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 201/32	10 95/8	2 3/8	.160
11 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 205/32	10 97/8	2 3/8	.160
11 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 209/32	10 99/8	2 3/8	.160
12	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 213/32	10 101/8	2 3/8	.160
12 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 217/32	10 103/8	2 3/8	.160
12 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 221/32	10 105/8	2 3/8	.160
12 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 225/32	10 107/8	2 3/8	.160
12 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 229/32	10 109/8	2 3/8	.160
12 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 233/32	10 111/8	2 3/8	.160
13	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 237/32	10 113/8	2 3/8	.160
13 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 241/32	10 115/8	2 3/8	.160
13 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 245/32	10 117/8	2 3/8	.160
13 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 249/32	10 119/8	2 3/8	.160
13 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 253/32	10 121/8	2 3/8	.160
13 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 257/32	10 123/8	2 3/8	.160
14	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 261/32	10 125/8	2 3/8	.160
14 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 265/32	10 127/8	2 3/8	.160
14 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 269/32	10 129/8	2 3/8	.160
14 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 273/32	10 131/8	2 3/8	.160
14 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 277/32	10 133/8	2 3/8	.160
14 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 281/32	10 135/8	2 3/8	.160
15	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 285/32	10 137/8	2 3/8	.160
15 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 289/32	10 139/8	2 3/8	.160
15 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 293/32	10 141/8	2 3/8	.160
15 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 297/32	10 143/8	2 3/8	.160
15 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 301/32	10 145/8	2 3/8	.160
15 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 305/32	10 147/8	2 3/8	.160
16	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 309/32	10 149/8	2 3/8	.160
16 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 313/32	10 151/8	2 3/8	.160
16 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 317/32	10 153/8	2 3/8	.160
16 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 321/32	10 155/8	2 3/8	.160
16 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 325/32	10 157/8	2 3/8	.160
16 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 329/32	10 159/8	2 3/8	.160
17	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 333/32	10 161/8	2 3/8	.160
17 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 337/32	10 163/8	2 3/8	.160
17 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 341/32	10 165/8	2 3/8	.160
17 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 345/32	10 167/8	2 3/8	.160
17 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 349/32	10 169/8	2 3/8	.160
17 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 353/32	10 171/8	2 3/8	.160
18	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 357/32	10 173/8	2 3/8	.160
18 1/8	1 5/8	1 5/8	1 5/8	.060	6 1/2	6 361/32	10 175/8	2 3/8	.160
18 1/4	1 9/8	1 9/8	1 9/8	.060	6 3/4	6 365/32	10 177/8	2 3/8	.160
18 1/2	1 13/8	1 13/8	1 13/8	.060	6 1/2	6 369/32	10 179/8	2 3/8	.160
18 3/4	1 11/4	1 11/4	1 11/4	.060	6 3/4	6 373/32	10 181/8	2 3/8	.160
18 7/8	1 5/4	1 5/4	1 5/4	.060	6 1/2	6 377/32	10 183/8	2 3/8	.160
19	1 11/8	1 11/8	1 11/8	.060	6 3/4	6 381/32	10 185/8	2 3/8	.160

BẢNG 17: Ô BỊ CHẶN MỘT HƯỚNG TB KÍCH THUỐC THEO INCH

DIMENSION SERIES 32 (MEDIUM)							
Bore Diameter, Nominal	Outside Diameter, Nominal	Height, Nominal	Fillet Radius	Bore Diameter, Nominal	Outside Diameter, Nominal	Height, Nominal	Fillet Radius
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch
1/2	1 1/2	5/8	.030	2 1/2	4 1/2	1 1/2	.060
9/16	1 7/8	5/8	.030	2 15/16	4 7/8	1 1/2	.080
5/8	1 9/8	5/8	.030	3	4 3/4	1 1/2	.080
1 1/16	1 9/8	5/8	.030	3 1/4	4 5/8	1 1/2	.080
3/4	1 11/16	5/8	.030	3 1/2	4 3/4	1 1/2	.080
13/16	1 11/16	5/8	.030	3 3/4	4 7/8	1 1/2	.080
7/8	1 5/8	5/8	.030	3 1/2	5	1 1/2	.080
15/16	1 5/8	5/8	.030	3 3/8	5 1/8	1 1/2	.080
1	2 1/16	5/8	.030	3 3/4	5 1/4	1 1/2	.080
1 1/16	2 1/8	5/8	.030	3 7/8	5 3/8	1 1/2	.080
1 1/8	2 1/8	5/8	.030	4	6	1 1/2	.080
1 1/4	2 1/8	5/8	.030	4 1/8	6 1/8	1 1/2	.120
1 1/2	2 1/8	5/8	.030	4 1/4	6 1/4	1 1/2	.120
1 3/4	2 1/8	5/8	.030	4 3/8	6 3/8	1 1/2	.120
1 7/8	2 1/8	5/8	.030	4 1/2	6 3/4	1 1/2	.120
2	2 1/8	5/8	.030	4 3/4	6 7/8	1 1/2	.120
2 1/16	2 1/8	5/8	.040	4 3/4	7	1 1/2	.120
2 1/8	2 1/8	5/8	.040	4 7/8	7 1/8	1 1/2	.120
2 1/4	2 3/16	7/8	.040	5	7 1/4	1 1/2	.120
2 1/2	2 3/16	7/8	.040	5 1/8	7 3/8	1 1/2	.120
2 3/4	2 3/16	7/8	.040	5 1/4	7 1/2	1 1/2	.120
3	3 1/16	7/8	.040	5 3/8	7 5/8	1 1/2	.120
3 1/8	3 1/16	7/8	.040	5 1/2	8 1/4	1 1/2	.120
3 1/4	3 1/16	7/8	.040	5 3/4	8 3/8	1 1/2	.120
3 1/2	3 1/16	7/8	.040	5 3/4	8 1/2	1 1/2	.120
3 3/4	3 1/16	7/8	.040	5 7/8	8 5/8	1 1/2	.120
4	3 1/8	7/8	.060	6	8 3/4	1 1/2	.120
4 1/8	3 1/8	7/8	.060	6 1/8	8 7/8	1 1/2	.160
4 1/4	3 1/8	7/8	.060	6 1/4	9	1 1/2	.160
4 1/2	3 1/8	7/8	.060	6 3/8	9 1/8	1 1/2	.160
4 3/4	3 1/8	7/8	.060	6 1/2	9 1/4	2 1/4	.160
5	3 1/8	7/8	.060	6 3/4	9 3/8	2 1/4	.160
5 1/8	4	1 1/8	.060	6 3/4	9 1/2	2 1/4	.160
5 1/4	4	1 1/8	.060	6 7/8	9 3/4	2 1/4	.160
5 1/2	4 1/8	1 1/8	.060	7	10	2 1/4	.160
5 3/4	4 1/8	1 1/8	.060	7 1/8	10 1/8	2 1/4	.160
6	4 1/4	1 1/8	.060	7 1/4	10 1/4	2 1/4	.160
6 1/8	4 1/4	1 1/8	.060	7 3/8	10 3/8	2 1/4	.160

BẢNG 18: Ô ĐÙA CẦU CHẶN KÍU TS KÍCH THUỐC THEO HẸ MẸT

DIMENSION SERIES 93					DIMENSION SERIES 94				
Bore Diam., Nominal	Outside Diam., Nom.	Height, Nominal	Fillet Radius*		Bore Diam., Nominal	Outside Diam., Nom.	Height, Nominal	Fillet Radius*	
Mm.	Inches	Inches	Inch		Mm.	Inches	Inches	Inch	
110	4.3307	7.4803	1.890	.079	90	3.5433	7.4803	2.362	.079
130	5.1181	8.8583	2.283	.079	100	3.9370	8.2677	2.638	.098
150	5.9055	9.8425	2.362	.079	110	4.3307	9.0551	2.874	.098
170	6.6929	11.0236	2.638	.098	120	4.7244	9.8425	3.071	.118
190	7.4803	12.5984	3.071	.118	130	5.1181	10.6299	3.346	.118
220	8.6614	14.1732	3.346	.118	150	5.9055	11.8110	3.543	.118
240	9.4488	14.9606	3.346	.118	170	6.6929	13.3858	4.055	.157
260	10.2362	16.5354	3.740	.157	190	7.4803	14.9606	4.528	.157
300	11.8110	18.8976	4.291	.157	200	7.8740	15.7480	4.803	.157
320	12.5984	19.6850	4.291	.157	220	8.6614	16.5354	4.803	.197
360	14.1732	22.0472	4.803	.157	260	10.2362	18.8976	5.197	.197
400	15.7480	24.4094	5.197	.197	300	11.8110	21.2598	5.709	.197
460	18.1102	27.9528	5.906	.197	340	13.3858	24.4094	6.693	.236
530	20.8661	31.4061	6.299	.236					

* The corner radius or chamfer on these bearings must clear this fillet radius.

BẢNG 19 : DUNG SAI Ổ BỊ CHẶN - CHUỐI KÍCH THƯỚC THEO HỆ MÉT

DIMENSION SERIES WITH 2-DIGIT NUMBERS															
Bore Diam., <i>d</i>				Inside Diam., <i>d</i> ₄	Height, <i>H</i>		Height, <i>H</i> ₁		Outside Diameters						
Nominal		Tolerances		Tolerances	Tolerances		Tolerances		Nominal		Tolerances		Tolerances		
Over	Incl.	+	-	+	-	+	-	+	-	Over	Incl.	+	-	+	-
Mm.		Inch		Inch		Inch		Inch		Mm.		Inch		Inch	
0	18	.0002	.0003	.0028	0	0	.0030	.0020	.0030	10	18	0	.0004	0	.0012
18	30	.0003	.0004	.0028	0	0	.0030	.0020	.0030	18	30	0	.0005	0	.0012
30	50	.0004	.0005	.0033	0	0	.0039	.0020	.0039	30	50	0	.0006	0	.0014
50	80	.0005	.0006	.0039	0	0	.0049	.0030	.0049	50	80	0	.0007	0	.0018
80	120	.0006	.0008	.0047	0	0	.0059	.0030	.0059	80	120	0	.0009	0	.0024
120	180	.0007	.0010	.0055	0	0	.0069	.0039	.0069	120	180	0	.0010	0	.0030
180	250	.0009	.0012	.0055	0	0	.0079	.0039	.0079	180	250	0	.0012	0	.0035
250	315	.0010	.0014	.0063	0	0	.0089	.0049	.0089	250	315	0	.0014	0	.0041
315	400	.0011	.0016	.0071	0	0	.0118	.0059	.0108	315	400	0	.0016	0	.0047

DIMENSION SERIES WITH 3-DIGIT NUMBERS														
Bore Diameter, <i>d</i>				Heights <i>H</i> & <i>H</i> ₁				Outside Diams. <i>D</i> & <i>D</i> ₁						
Nominal		Tolerances		Tolerances				Nominal		Tolerances				
Over	Incl.	+	-	+	-	+	-	Over	Incl.	+	-	+	-	
Millimeters		Inch	Inch	Inch	Inch	Inch		Millimeters		Inch	Inch	Inch		
0	18	.0002	.0003	.005	.005			10	18	0	.0004			
18	30	.0003	.0004	.005	.005			18	30	0	.0005			
30	50	.0004	.0005	.005	.005			30	50	0	.0006			
50	80	.0005	.0006	.005	.005			50	80	0	.0007			
80	120	.0006	.0008	.010	.010			80	120	0	.0009			

DIMENSION SERIES WITH 3-DIGIT NUMBERS

Bore Diameter, d				Heights H & H_1				Outside Diams. D & D_1			
Nominal		Tolerances		Tolerances		Tolerances		Nominal		Tolerances	
Over	Incl.	+	-	+	-	+	-	Over	Incl.	+	-
Millimeters	Inch	Inch	Inch	Inch	Inch	Millimeters	Inch	Inch	Inch	Inch	Inch
0	18	.0002	.0003	.005	.005	10	18	0	.0004		
18	30	.0003	.0004	.005	.005	18	30	0	.0005		
30	50	.0004	.0005	.005	.005	30	50	0	.0006		
50	80	.0005	.0006	.005	.005	50	80	0	.0007		
80	120	.0006	.0008	.005	.010	80	120	0	.0009		

* Anti-Friction Bearing Manufacturers Standard.

Diameter d_4 is the inside diameter of the aligning washer; D is the outside diameter of the bearing rings; D_1 is the outside diameter of the aligning washer; H is the height of the assembled bearing without the aligning washer; H_1 is the height of the assembled bearing and the aligning washer.

BẢNG 20 : GIỚI HẠN VÀ DUNG SAI CHO Ổ BỊ CHẶN - CHUỐI KÍCH THƯỚC THEO INCH

Bore Diameter				Height		Outside Diameter			
Nominal		Limits		Tolerance		Nominal		Tolerance	
Over	Incl.	Min.	Max.	+	-	Over	Incl.	+	-
Inches	Inches	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch
DIMENSION SERIES 030									
0	1 1/16	Nom. + .004	Nom. + .006	.005	.005	0	4 3/32	0	.002
1 1/16	1 1/8	" + .005	" + .007	.005	.005	4 3/32	5 1/32	0	.002
1 1/8	3	" + .006	" + .008	.005	.005	...	...	...	...
3	3 1/2	" + .008	" + .010	.010	.010	...	...	...	...
DIMENSION SERIES 031									
0	1 3/8	Nominal	Nom. + .0008	.005	.005	0	5 1/8	0	.002
1 3/8	2 3/8	"	" + .0010	.005	.005	5 1/8	1 7/8	0	.003
2 3/8	3	"	" + .0012	.005	.005	...	...	...	...
3	12	"	" + .0012	.010	.010	...	...	...	...
DIMENSION SERIES 032									
0	1 3/8	Nom. + .004	Nom. + .006	.005	.005	0	5	0	.002
1 3/8	1 3/4	" + .005	" + .007	.005	.005	5	10 3/8	0	.003
1 3/4	3	" + .006	" + .008	.005	.005	...	...	...	...
3	3 3/8	" + .006	" + .008	.010	.010	...	...	...	...
3 3/8	7 3/8	" + .008	" + .010	.010	.010	...	...	...	...

* Anti-Friction Bearing Manufacturers Association Standard.

**BẢNG 21 : Ổ ĐUA CHẶN TRỤ KIỂU TP - KÍCH THƯỚC
THEO INCH**

Bearing Number	Bore Diam. Inch	Outside Diam. Inch	Height Inch	Bearing Number	Bore Diam. Inch	Outside Diam. Inch	Height Inch
LIGHT SERIES							
14TP030	$\frac{3}{8}$	$1\frac{1}{2}\frac{1}{2}$	$\frac{5}{8}$	28TP131	$1\frac{3}{4}$	$3\frac{3}{8}$	1
15TP030	$\frac{1}{2}$	$1\frac{3}{4}$	$\frac{5}{8}$	29TP030	$1\frac{1}{4}$	$3\frac{3}{8}$	$1\frac{1}{4}$
16TP030	1	$1\frac{3}{4}$	$\frac{5}{8}$	29TP131	$1\frac{3}{4}$	$3\frac{3}{8}$	1
16TP131	1	$2\frac{1}{8}$	$1\frac{3}{8}$	30TP030	$1\frac{1}{8}$	$3\frac{3}{8}$	$1\frac{1}{8}$
17TP030	$1\frac{1}{8}$	$1\frac{3}{4}$	$\frac{5}{8}$	30TP131	$1\frac{1}{8}$	$3\frac{3}{8}$	1
17TP131	$1\frac{1}{8}$	$2\frac{1}{8}$	$1\frac{3}{8}$	31TP030	$1\frac{1}{2}$	$3\frac{3}{8}$	$1\frac{1}{2}$
18TP030	$1\frac{1}{8}$	$2\frac{3}{8}$	$\frac{5}{8}$	31TP131	$1\frac{1}{2}$	$3\frac{3}{8}$	1
18TP131	$1\frac{1}{8}$	$2\frac{1}{4}$	$1\frac{3}{8}$	32TP030	2	$3\frac{1}{2}$	$1\frac{3}{8}$
19TP030	$1\frac{1}{8}$	$2\frac{3}{8}$	$\frac{5}{8}$	32TP131	2	$3\frac{3}{8}$	1
19TP131	$1\frac{1}{8}$	$2\frac{1}{4}$	$1\frac{3}{8}$	34TP030	$2\frac{1}{8}$	$3\frac{1}{2}$	$1\frac{3}{8}$
20TP030	$1\frac{1}{4}$	$2\frac{1}{2}$	$\frac{5}{8}$	34TP131	$2\frac{1}{8}$	$3\frac{3}{4}$	1
20TP131	$1\frac{1}{4}$	$2\frac{3}{8}$	$1\frac{3}{8}$	35TP030	$2\frac{1}{8}$	$3\frac{1}{2}$	$1\frac{3}{8}$
21TP030	$1\frac{1}{8}$	$2\frac{1}{2}$	$\frac{5}{8}$	36TP030	$2\frac{1}{4}$	$3\frac{3}{8}$	$1\frac{3}{8}$
21TP131	$1\frac{1}{8}$	$2\frac{3}{8}$	$1\frac{3}{8}$	36TP131	$2\frac{1}{4}$	$3\frac{1}{8}$	1
22TP030	$1\frac{3}{8}$	$2\frac{1}{2}$	$\frac{5}{8}$	38TP030	$2\frac{3}{8}$	$3\frac{1}{2}$	$1\frac{3}{8}$
22TP131	$1\frac{3}{8}$	$2\frac{1}{8}$	$1\frac{3}{8}$	38TP131	$2\frac{3}{8}$	4	1
23TP030	$1\frac{1}{2}$	$2\frac{1}{2}$	$\frac{5}{8}$	39TP030	$2\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{3}{8}$
23TP131	$1\frac{1}{2}$	$2\frac{3}{8}$	$1\frac{3}{8}$	40TP030	$2\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{3}{8}$
24TP030	$1\frac{1}{2}$	$2\frac{1}{2}$	$\frac{5}{8}$	40TP131	$2\frac{1}{2}$	$4\frac{1}{8}$	1
24TP131	$1\frac{1}{2}$	3	$1\frac{3}{8}$	42TP030	$2\frac{3}{8}$	$4\frac{1}{2}$	1
25TP030	$1\frac{1}{8}$	$2\frac{1}{2}$	$\frac{5}{8}$	44TP030	$2\frac{3}{4}$	$4\frac{1}{2}$	1
25TP131	$1\frac{1}{8}$	3	$1\frac{3}{8}$	48TP030	3	$4\frac{1}{2}$	1
26TP030	$1\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{3}{8}$	52TP030	$3\frac{1}{4}$	$4\frac{1}{2}$	1
26TP131	$1\frac{3}{8}$	$3\frac{1}{4}$	1	55TP131	$3\frac{1}{8}$	$5\frac{1}{8}$	1
27TP030	$1\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{3}{8}$	56TP030	$3\frac{1}{2}$	$5\frac{1}{8}$	1
27TP131	$1\frac{1}{4}$	$3\frac{1}{4}$	1	57TP131	$3\frac{1}{8}$	$5\frac{1}{8}$	1
28TP030	$1\frac{3}{4}$	$3\frac{3}{8}$	$1\frac{3}{8}$	.....	.....	.....	.....

**BẢNG 22 : Ổ ĐUA CHẶN TRỤ KIỂU TR - KÍCH THƯỚC
THEO INCH**

Bearing Number	Bore Diam.	Outside Diameter		Total Height	Bearing Number	Bore Diam.	Outside Diameter		Total Height
		Bear- ing	Seat Ring				Bear- ing	Seat Ring	
	Inch	Inch	Inch	Inch		Inch	Inch	Inch	Inch
LIGHT SERIES									
16TR400	1	2½	2¼	1½	29TR400	1½½	3½	3½	1½
17TR400	1½	2½	2¼	1½	30TR400	1½	3½	3½	1½
18TR400	1½	2½	2½	1½	31TR400	1½½	3½	3½	1½
19TR400	1½	2½	2½	1½	32TR400	2	3½	3¾	1½
20TR400	1¼	2½	2½	1½	34TR400	2½	3½½	3¾	1½
21TR400	1½	2½	2½	1½	36TR400	2¼	3½½	4	1½
22TR400	1½	2½½	3	1½	38TR400	2½	3½½	4½	1½
23TR400	1½	2½½	3	1½	40TR400	2½	4½	4½	1½
24TR400	1½	2½	3½	1½	42TR400	2½	4½½	4½½	1½
25TR400	1½	2½½	3½	1½	44TR400	2¾	4½½	4½½	1½
26TR400	1½	3½	3½	1½	48TR400	3	4½½	4½½	1½
27TR400	1½½	3½	3½	1½	52TR400	3¼	4½½	5½	1½
28TR400	1¾	3½	3½	1½	56TR400	3½	5½½	5½½	1½

**BẢNG 23: CÁC ĐƯỜNG KÍNH TIÊU CHUẨN AFBMA CỦA
BỊCH CHẶN TRỤC CỤC TIÊU VÀ BỊCH CHẶN LỖ CỤC ĐẠI
ĐỐI VỚI Ổ BÌ**

Metric Annular Ball Bearings*								
Bore, Mm.	Minimum Shaft Shoulder Diameter, Inches				Maximum Housing Shoulder Diameter, Inches			
	10 Series	02 Series	03 Series	04 Series	10 Series	02 Series	03 Series	04 Series
10	0.47	0.50	0.50	...	0.95	0.98	1.18	...
12	0.55	0.58	0.63	...	1.02	1.06	1.22	...
15	0.67	0.69	0.75	...	1.18	1.18	1.42	...
17	0.75	0.77	0.83	0.95	1.30	1.34	1.61	2.17
20	0.89	0.94	0.94	1.06	1.46	1.61	1.77	2.56
25	1.08	1.14	1.14	1.34	1.65	1.81	2.17	2.80
30	1.34	1.34	1.34	1.54	1.93	2.21	2.56	3.19
35	1.53	1.53	1.69	1.73	2.21	2.56	2.80	3.58
40	1.73	1.73	1.93	1.97	2.44	2.87	3.19	3.94
45	1.94	1.94	2.13	2.17	2.72	3.07	3.58	4.33
50	2.13	2.13	2.36	2.44	2.91	3.27	3.94	4.65
55	2.33	2.41	2.56	2.64	3.27	3.58	4.33	5.04
60	2.53	2.67	2.84	2.84	3.47	3.98	4.65	5.43
65	2.72	2.86	3.03	3.03	3.66	4.37	5.04	5.83
70	2.91	3.06	3.23	3.31	4.06	4.57	5.43	6.54
75	3.11	3.25	3.43	3.50	4.25	4.76	5.83	6.93
80	3.31	3.55	3.62	3.70	4.65	5.12	6.22	7.32
85	3.50	3.75	3.90	4.06	4.84	5.51	6.54	7.56
90	3.84	3.94	4.09	4.25	5.16	5.91	6.93	8.15
95	4.05	4.21	4.29	...	5.35	6.22	7.32	...
100	4.23	4.41	4.49	...	5.55	6.61	7.91	...
105	4.53	4.61	4.69	...	5.91	7.01	8.31	...
110	4.72	4.80	4.88	...	6.30	7.40	8.90	...
120	5.12	5.20	5.28	...	6.69	7.99	9.69	...
130	5.51	5.67	5.83	...	7.48	8.50	10.32	...
140	5.91	6.06	6.22	...	7.87	9.29	11.10	...
150	6.38	6.46	6.61	...	8.39	10.08	11.89	...
160	6.77	6.85	7.01	...	8.98	10.87	12.68	...
170	7.17	7.40	7.40	...	9.76	11.50	13.47	...
180	7.56	7.80	7.80	...	10.55	11.89	14.25	...
190	7.95	8.19	8.35	...	10.95	12.68	14.88	...
200	8.35	8.58	8.74	...	11.73	13.47	15.67	...

Type BM Ball Bearings			Type BIC Ball Bearings			
Bore, Mm.	Min. Shaft Shoulder Diam., In.	Max. Shaft Shoulder Diam., In.	Bearing Size, Inches			Max. Housing Shoulder Diam., In.
			Bore	O.D.	Width	
5	1/4	3/4	1/4	3/4	5/32	5/16
6	5/16	7/8	3/8	1 1/2	5/32	7/16
7	3/8	1 1/4	1/2	5/8	0.196	9/16
8	5/8	1 1/2	3/4	1 1/2	11/64	7/8
9	7/8	1 3/4	1 1/4	3/4	7/32	1 1/8
10	1 1/8	1 3/4	1 1/2	7/8	7/32	1 3/8
11	1 3/8	1 3/4	1 3/4	1 1/2	1/4	1 1/2
12	1 1/2	1 3/4	1 3/4	1 3/4	7/32	1 3/4
13	1 3/4	1 3/4	1 3/4	1 3/4	1/2	1 3/4
14	1 3/4	1 3/4	1 3/4	1 3/4	1 1/8	1 3/4
15	1 3/4	1 3/4	1 3/4	2	3/8	1 3/4
16	1 3/4	1 3/4	1 3/4	2 1/8	3/8	2
17	1 3/4	1 3/4	1 3/4	2 1/4	3/8	2 1/8
19	1 3/4	1 3/4	1 3/4	2 1/2	7/16	2 3/8
20	1 3/4	1 3/4	1 3/4	2 3/8	7/16	2 3/4
25	1 3/4	1 3/4	...	...	...	...

* Also given in this standard are similar data for sizes of 4 to 9 mm bore and 220 to 320 mm bore.

**BẢNG 24 : CÁC ĐƯỜNG KÍNH TIÊU CHUẨN AFBMA CỦA
BỊCH CHẶN TRỤC CỤC TIÊU VÀ BỊCH CHẶN LỖ CỤC ĐẠI
CHO Ổ ĐŨA TRỤ**

*Table 24. AFBMA STANDARD MINIMUM SHAFT SHOULDER
AND MAXIMUM HOUSING SHOULDER DIAMETERS
FOR CYLINDRICAL ROLLER BEARINGS*

Bore, Mm.	Minimum Shaft Shoulder Diameter, ¹ inches				Maximum Housing Shoulder Diameters, ² inches			
	Dimen. Series 19	Dimen. Series 10	Dimen. Series 02	Dimen. Series 03	Dimen. Series 19	Dimen. Series 10	Dimen. Series 02	Dimen. Series 03
10	.....	.52	.55	.58	.....	.92	1.05	1.19
12	.....	.60	.62	.67	.....	1.00	1.11	1.26
15	.....	.72	.74	.81	.....	1.15	1.23	1.45
17	.....	.82	.82	.90	.....	1.26	1.43	1.63
20	.92	.96	1.02	1.02	1.33	1.45	1.68	1.82
25	1.12	1.15	1.20	1.24	1.53	1.71	1.85	2.20
30	1.31	1.38	1.42	1.49	1.73	1.98	2.22	2.52
35	1.55	1.59	1.64	1.72	2.00	2.24	2.57	2.81
40	1.74	1.80	1.86	1.93	2.29	2.47	2.87	3.20
45	1.95	2.00	2.08	2.20	2.51	2.73	3.08	3.56
50	2.13	2.21	2.27	2.40	2.68	2.93	3.26	3.90
55	2.36	2.44	2.52	2.62	2.96	3.29	3.60	4.28
60	2.56	2.64	2.73	2.87	3.16	3.49	3.99	4.64
65	2.76	2.84	3.03	3.10	3.36	3.69	4.33	5.00
70	2.99	3.05	3.22	3.32	3.72	4.07	4.55	5.34
75	3.18	3.25	3.37	3.56	3.92	4.27	4.73	5.74
80	3.38	3.48	3.59	3.78	4.11	4.63	5.09	6.08
85	3.63	3.68	3.86	4.05	4.48	4.83	5.48	6.47
90	3.82	3.92	4.06	4.26	4.67	5.18	5.81	6.80
95	4.02	4.11	4.29	4.53	4.87	5.38	6.18	7.16
100	4.22	4.31	4.57	4.82	5.25	5.58	6.58	7.66
105	4.41	4.56	4.78	5.04	5.44	5.91	6.90	8.01
110	4.61	4.80	5.01	5.35	5.64	6.27	7.24	8.55
120	5.11	5.20	5.48	5.82	6.21	6.66	7.83	9.26
130	5.48	5.63	5.87	6.31	6.76	7.41	8.42	10.02
140	5.87	6.05	6.36	6.77	7.15	7.80	9.15	10.68
150	6.36	6.47	6.86	7.13	7.84	8.36	9.88	11.50
160	6.76	6.91	7.31	7.70	8.24	8.92	10.61	12.16
170	7.15	7.41	7.76	8.12	8.63	9.61	11.32	12.93
180	7.60	7.86	8.17	8.63	9.38	10.35	11.74	13.60
190	7.99	8.25	8.67	9.04	9.78	10.74	12.46	14.07
200	8.48	8.70	9.15	9.57	10.49	11.47	13.17	14.72
220	9.27	9.62	10.08	....	11.28	12.55	14.65	....
240	10.05	10.40	11.00	....	12.07	13.37	16.08	....
260	11.01	11.35	11.97	....	13.50	14.82	17.56	....
280	11.80	12.14	12.67	....	14.29	15.61	18.26	....
300	12.77	13.08	13.80	....	15.72	17.08	19.80	....
320	13.56	13.86	14.70	....	16.51	17.83	21.18	....

¹ Minimum shaft shoulder diameter which will satisfy the maximum inner race corner contour.

² Maximum housing shoulder diameter which will satisfy the maximum outer race corner contour.

Shoulder diameters outside these limits may be used upon advice of the particular manufacturer whose bearings are to be used.

GEARING

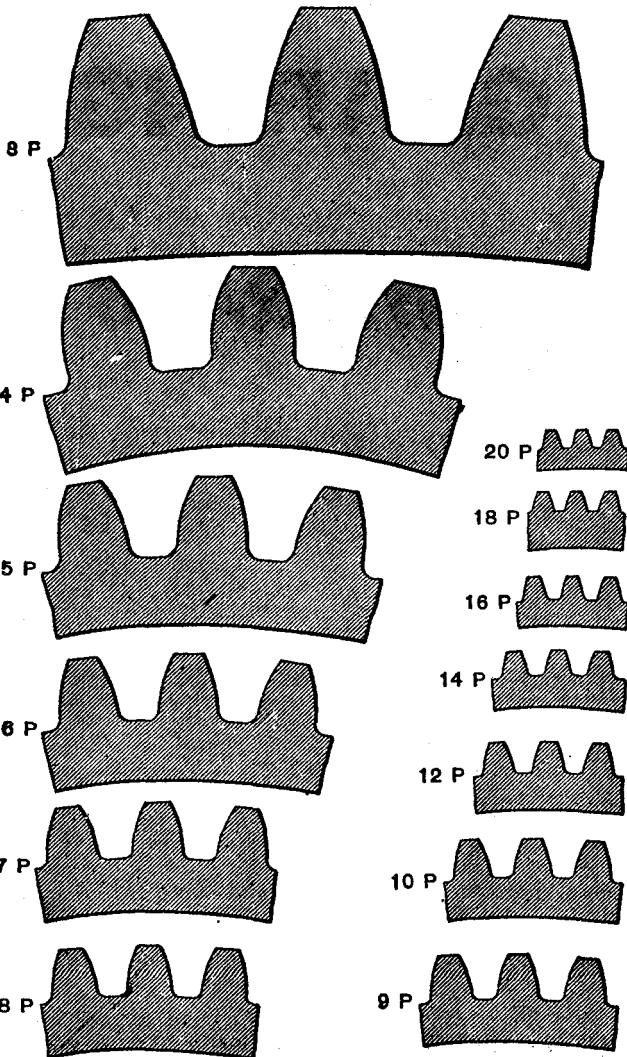
BÁNH RĂNG

BÁNH RĂNG

GEARING

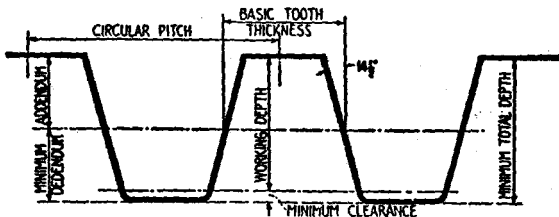
RĂNG VỚI CÁC BƯỚC ĐƯỜNG KÍNH, KÍCH CỠ TOÀN PHẦN

GEAR TEETH OF DIFFERENT DIAMETRAL PITCH, FULL SIZE

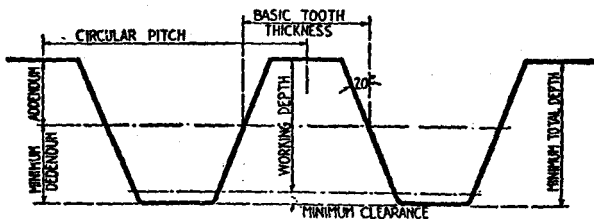


I. BÁNH RĂNG TRỤ THẲNG SPUR GEARING

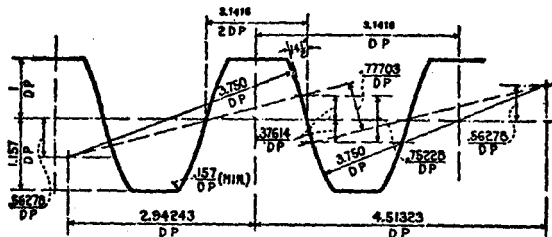
TIÊU CHUẨN MỸ VỀ DẠNG RĂNG TRỤ THẲNG AMERICAN STANDARD SPUR GEAR TOOTH FORMS



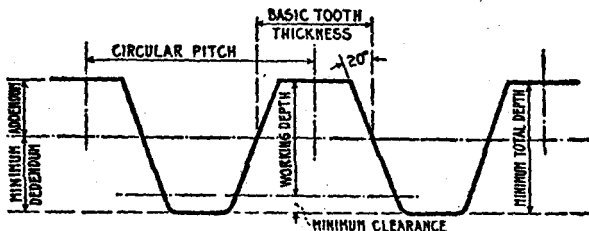
Basic Rack of the 14 1/2-Degree Full-Depth Involute System



Basic Rack of the 20-Degree Full-Depth Involute System



Approximation of Basic Rack for the 14 1/2-Degree Composite System



Basic Rack of the 20-Degree Stub Involute System

CÔNG THỨC RĂNG - DẠNG RĂNG TRỤ THẲNG TIÊU CHUẨN MỸ
FORMULAS FOR TOOTH PARTS - AMERICAN STANDARD SPUR GEAR TOOTH FORMS

To Find	Diametral Pitch, P Known	Circular Pitch, p Known
14½-DEGREE INVOLUTE FULL-DEPTH TEETH 14½-DEGREE COMPOSITE FULL-DEPTH TEETH 20-DEGREE INVOLUTE FULL-DEPTH TEETH		
Addendum	$a = 1.000 \div P$	$a = 0.3183 \times p$
Minimum Dedendum	$b = 1.157 \div P$	$b = 0.3683 \times p$
Working Depth	$h_k = 2.000 \div P$	$h_k = 0.6366 \times p$
Minimum Whole Depth	$h_t = 2.157 \div P$	$h_t = 0.6866 \times p$
Basic Tooth Thickness on Pitch Line	$t = 1.5708 \div P$	$t = 0.500 \times p$
Minimum Clearance	$c = 0.157 \div P$	$c = 0.050 \times p$
20-DEGREE INVOLUTE FINE-PITCH TEETH		
Addendum	$a = 1.000 \div P$	$a = 0.3183 \times p$
Dedendum	$b = (1.200 \div P) + 0.002$	$b = (0.3820 \times p) + 0.002$
Working Depth	$h_k = (2.000 \div P)$	$h_k = (0.6366 \times p)$
Whole Depth	$h_t = (2.200 \div P) + 0.002$	$h_t = (0.7003 \times p) + 0.002$
Basic Tooth Thickness on Pitch Line	$t = 1.5708 \div P$	$t = 0.500 \times p$
Clearance	$c = (0.200 \div P) + 0.002$	$c = (0.0637 \times p) + 0.002$
20-DEGREE INVOLUTE STUB TEETH		
Addendum	$a = 0.800 \div P$	$a = 0.2546 \times p$
Minimum Dedendum	$b = 1.000 \div P$	$b = 0.3183 \times p$
Working Depth	$h_k = 1.600 \div P$	$h_k = 0.5092 \times p$
Minimum Whole Depth	$h_t = 1.800 \div P$	$h_t = 0.5729 \times p$
Basic Tooth Thickness on Pitch Line	$t = 1.5708 \div P$	$t = 0.500 \times p$
Minimum Clearance	$c = 0.200 \div P$	$c = 0.0637 \times p$
<i>Note:</i> Radius of fillet equals $1\frac{1}{4} \times$ clearance for 14½-degree full-depth teeth and $1\frac{1}{4} \times$ clearance for 20-degree full-depth teeth.		
<i>Note:</i> A suitable working tolerance should be considered in connection with all minimum recommendations. Minimum clearance between the top of the gear tooth and the bottom of the mating gear space is specified as minimum so as to allow for necessary cutter clearance for all methods of producing gears.		

PHẦN RĂNG - TIÊU CHUẨN MỸ ĐƯỜNG THÂN KHAI

CHIỀU SÂU TOÀN PHẦN 14¹₂ VÀ 20 ĐỘ

(BANH RĂNG bước đường kính)

Diam- etral Pitch	Equivalent Circular Pitch	Standard Circular Thickness	Standard Addendum	Working Depth of Tooth	Standard Dedendum	Whole Depth of Tooth
<i>P</i>	<i>p</i>	<i>t</i>	<i>a</i>	<i>h_k</i>	<i>b</i>	<i>h_t</i>
1/4	6.2832	3.1416	1.0000	4.0000	2.3142	4.3142
3/4	4.1888	2.0944	1.3333	2.6666	1.5428	2.8761
1	3.1416	1.5708	1.0000	2.0000	1.1571	2.1571
1 1/4	2.5133	1.2566	0.8000	1.6000	0.9257	1.7257
1 1/2	2.0944	1.0472	0.6666	1.3333	0.7714	1.4381
1 3/4	1.7952	0.8976	0.5714	1.1429	0.6612	1.2326
2	1.5708	0.7854	0.5000	1.0000	0.5785	1.0785
2 1/4	1.3963	0.6981	0.4444	0.8888	0.5143	0.9587
2 1/2	1.2566	0.6283	0.4000	0.8000	0.4628	0.8628
2 3/4	1.1424	0.5712	0.3636	0.7273	0.4208	0.7844
3	1.0472	0.5236	0.3333	0.6666	0.3857	0.7190
3 1/2	0.8976	0.4488	0.2857	0.5714	0.3306	0.6163
4	0.7854	0.3927	0.2500	0.5000	0.2893	0.5393
5	0.6283	0.3142	0.2000	0.4000	0.2314	0.4314
6	0.5236	0.2618	0.1666	0.3333	0.1928	0.3595
7	0.4488	0.2244	0.1429	0.2857	0.1653	0.3081
8	0.3927	0.1963	0.1250	0.2500	0.1446	0.2696
9	0.3491	0.1745	0.1111	0.2222	0.1286	0.2397
10	0.3142	0.1571	0.1000	0.2000	0.1157	0.2157
11	0.2856	0.1428	0.0909	0.1818	0.1052	0.1961
12	0.2618	0.1309	0.0833	0.1666	0.0964	0.1798
13	0.2417	0.1208	0.0769	0.1538	0.0890	0.1659
14	0.2244	0.1122	0.0714	0.1429	0.0826	0.1541
15	0.2094	0.1047	0.0666	0.1333	0.0771	0.1438
16	0.1963	0.0982	0.0625	0.1250	0.0723	0.1348
17	0.1848	0.0924	0.0588	0.1176	0.0681	0.1269
18	0.1745	0.0873	0.0555	0.1111	0.0643	0.1198
19	0.1653	0.0827	0.0526	0.1053	0.0609	0.1135
20	0.1571	0.0785	0.0500	0.1000	0.0579	0.1079
22	0.1428	0.0714	0.0455	0.0909	0.0526	0.0980
24	0.1309	0.0654	0.0417	0.0833	0.0482	0.0898
26	0.1208	0.0604	0.0385	0.0769	0.0445	0.0829
28	0.1122	0.0561	0.0357	0.0714	0.0413	0.0770
30	0.1047	0.0524	0.0333	0.0666	0.0386	0.0719
32	0.0982	0.0491	0.0312	0.0625	0.0362	0.0674
34	0.0924	0.0462	0.0294	0.0588	0.0340	0.0634
36	0.0873	0.0436	0.0278	0.0555	0.0321	0.0599
38	0.0827	0.0413	0.0263	0.0526	0.0304	0.0568
40	0.0785	0.0393	0.0250	0.0500	0.0289	0.0539
42	0.0745	0.0374	0.0238	0.0476	0.0275	0.0514
44	0.0714	0.0357	0.0227	0.0455	0.0263	0.0490
46	0.0683	0.0341	0.0217	0.0435	0.0252	0.0469
48	0.0654	0.0327	0.0208	0.0417	0.0241	0.0449
50	0.0628	0.0314	0.0200	0.0400	0.0231	0.0431

* For 20-degree full-depth teeth of 20 diametral pitch and finer see tables beginning on page 659.

PHÂN RĂNG - TIÊU CHUẨN MỸ, ĐƯỜNG THÂN KHAI

CHIỀU SÂU TOÀN PHẦN 14 $\frac{1}{2}$ VÀ 20 ĐỘ

(BANH RĂNG bước chu vi)

Circular Pitch	Equivalent Diametral Pitch	Standard Circular Thickness	Standard Addendum	Working Depth of Tooth	Standard Dedendum	Whole Depth of Tooth
p	P	t	a	h_k	b	h_t
4	0.7854	2.0000	1.2732	2.5464	1.4732	2.7464
3½	0.8976	1.7500	1.1140	2.2281	1.2890	2.4031
3	1.0472	1.5000	0.9549	1.9098	1.1049	2.0598
2½	1.1424	1.3750	0.8753	1.7506	1.0128	1.8881
2½	1.2566	1.2500	0.7957	1.5915	0.9207	1.7165
2¼	1.3963	1.1250	0.7162	1.4323	0.8287	1.5448
2	1.5708	1.0000	0.6366	1.2732	0.7366	1.3732
1½	1.6755	0.9375	0.5968	1.1937	0.6906	1.2874
1½	1.7952	0.8750	0.5570	1.1141	0.6445	1.2016
1½	1.9333	0.8125	0.5173	1.0345	0.5985	1.1158
1½	2.0944	0.7500	0.4775	0.9549	0.5525	1.0299
1½	2.1855	0.7187	0.4576	0.9151	0.5294	0.9870
1½	2.2848	0.6875	0.4377	0.8754	0.5064	0.9441
1½	2.3936	0.6562	0.4178	0.8356	0.4834	0.9012
1½	2.5133	0.6250	0.3979	0.7958	0.4604	0.8583
1½	2.6456	0.5937	0.3780	0.7560	0.4374	0.8154
1½	2.7925	0.5625	0.3581	0.7162	0.4143	0.7724
1½	2.9568	0.5312	0.3382	0.6764	0.3913	0.7295
1	3.1416	0.5000	0.3183	0.6366	0.3683	0.6866
1½	3.3510	0.4687	0.2984	0.5968	0.3453	0.6437
¾	3.5904	0.4375	0.2785	0.5570	0.3223	0.6007
1½	3.8666	0.4062	0.2586	0.5173	0.2993	0.5579
¾	4.1888	0.3750	0.2387	0.4775	0.2762	0.5150
1½	4.5696	0.3437	0.2189	0.4377	0.2532	0.4720
¾	4.7124	0.3333	0.2122	0.4244	0.2455	0.4577
¾	5.0265	0.3125	0.1989	0.3979	0.2301	0.4291
¾	5.5851	0.2812	0.1790	0.3581	0.2071	0.3862
¾	6.2832	0.2500	0.1592	0.3183	0.1842	0.3433
¾	7.1808	0.2187	0.1393	0.2785	0.1611	0.3003
¾	7.8540	0.2000	0.1273	0.2546	0.1473	0.2746
¾	8.3776	0.1875	0.1194	0.2387	0.1381	0.2575
¾	9.4248	0.1666	0.1061	0.2122	0.1228	0.2289
¾	10.0531	0.1562	0.0995	0.1989	0.1151	0.2146
¾	10.9956	0.1429	0.0909	0.1819	0.1052	0.1962
¾	12.5664	0.1250	0.0796	0.1591	0.0921	0.1716
¾	14.1372	0.1111	0.0707	0.1415	0.0818	0.1526
¾	15.7080	0.1000	0.0637	0.1273	0.0737	0.1373
¾	16.7552	0.0937	0.0597	0.1194	0.0690	0.1287
¾	18.8496	0.0833	0.0531	0.1061	0.0614	0.1144
¾	21.9911	0.0714	0.0455	0.0910	0.0526	0.0981
¾	25.1327	0.0625	0.0398	0.0796	0.0460	0.0858
¾	28.2743	0.0555	0.0354	0.0707	0.0409	0.0763
¾	31.4159	0.0500	0.0318	0.0637	0.0368	0.0687
¾	35.0655	0.0312	0.0199	0.0398	0.0230	0.0429

* For 20-degree full-depth teeth of 20 diametral pitch and finer see tables beginning on page 659.

PHẦN RĂNG - TIÊU CHUẨN MỸ, HỆ THỐNG 1 - BƯỚC MẶT
THÂN KHAI 20 ĐỘ

GEAR TOOTH PARTS - AMERICAN STANDARD 20-DEGREE INVOLUTE FINE-PITCH SYSTEM - I

Diameter: Pitch	Circular Pitch	Standard Circular Thickness	Standard Addendum	Working Depth	Standard Dedendum	Whole Depth
<i>P</i>	<i>p</i>	<i>t</i>	<i>a</i>	<i>h_k</i>	<i>b</i>	<i>h_t</i>
20	0.15708	0.07854	0.0500	0.1000	0.0620	0.1120
21	0.14960	0.07480	0.0476	0.0952	0.0591	0.1068
22	0.14280	0.07140	0.0455	0.0909	0.0565	0.1020
23	0.13659	0.06830	0.0435	0.0870	0.0542	0.0977
24	0.13090	0.06545	0.0417	0.0833	0.0520	0.0937
25	0.12566	0.06283	0.0400	0.0800	0.0500	0.0900
26	0.12083	0.06042	0.0385	0.0769	0.0482	0.0866
27	0.11636	0.05818	0.0370	0.0741	0.0464	0.0835
28	0.11220	0.05610	0.0357	0.0714	0.0449	0.0806
29	0.10833	0.05417	0.0345	0.0690	0.0434	0.0779
30	0.10472	0.05236	0.0333	0.0667	0.0420	0.0753
31	0.10134	0.05067	0.0323	0.0645	0.0407	0.0730
32	0.09818	0.04909	0.0313	0.0625	0.0395	0.0708
33	0.09520	0.04760	0.0303	0.0606	0.0384	0.0687
34	0.09240	0.04620	0.0294	0.0588	0.0373	0.0667
35	0.08976	0.04488	0.0286	0.0571	0.0363	0.0649
36	0.08727	0.04363	0.0278	0.0556	0.0353	0.0631
37	0.08491	0.04245	0.0270	0.0541	0.0344	0.0615
38	0.08267	0.04134	0.0263	0.0526	0.0336	0.0599
39	0.08055	0.04028	0.0256	0.0513	0.0328	0.0584
40	0.07854	0.03927	0.0250	0.0500	0.0320	0.0570
41	0.07662	0.03831	0.0244	0.0488	0.0313	0.0557
42	0.07480	0.03740	0.0238	0.0476	0.0306	0.0544
43	0.07306	0.03653	0.0233	0.0465	0.0299	0.0532
44	0.07140	0.03570	0.0227	0.0455	0.0293	0.0520
45	0.06981	0.03491	0.0222	0.0444	0.0287	0.0509
46	0.06830	0.03415	0.0217	0.0435	0.0281	0.0498
47	0.06684	0.03342	0.0213	0.0426	0.0275	0.0488
48	0.06545	0.03272	0.0208	0.0417	0.0270	0.0478
49	0.06411	0.03206	0.0204	0.0408	0.0265	0.0469
50	0.06283	0.03142	0.0200	0.0400	0.0260	0.0460
51	0.06160	0.03080	0.0196	0.0392	0.0255	0.0451
52	0.06042	0.03021	0.0192	0.0385	0.0251	0.0443
53	0.05928	0.02964	0.0189	0.0377	0.0246	0.0435
54	0.05818	0.02909	0.0185	0.0370	0.0242	0.0427
55	0.05712	0.02856	0.0182	0.0364	0.0238	0.0420
56	0.05610	0.02805	0.0179	0.0357	0.0234	0.0413
57	0.05512	0.02756	0.0175	0.0351	0.0231	0.0406
58	0.05417	0.02708	0.0172	0.0345	0.0227	0.0399
59	0.05325	0.02662	0.0169	0.0339	0.0223	0.0393
60	0.05236	0.02618	0.0167	0.0333	0.0220	0.0387
61	0.05150	0.02575	0.0164	0.0328	0.0217	0.0381
62	0.05067	0.02534	0.0161	0.0323	0.0214	0.0375
63	0.04987	0.02493	0.0159	0.0317	0.0210	0.0369
64	0.04909	0.02454	0.0156	0.0312	0.0208	0.0364
65	0.04833	0.02417	0.0154	0.0308	0.0205	0.0358
66	0.04760	0.02380	0.0152	0.0303	0.0202	0.0353
67	0.04689	0.02344	0.0149	0.0299	0.0199	0.0348
68	0.04620	0.02310	0.0147	0.0294	0.0196	0.0344
69	0.04553	0.02277	0.0145	0.0290	0.0194	0.0339
70	0.04488	0.02244	0.0143	0.0286	0.0191	0.0334
71	0.04425	0.02212	0.0141	0.0282	0.0189	0.0330
72	0.04363	0.02182	0.0139	0.0278	0.0187	0.0326
73	0.04304	0.02152	0.0137	0.0274	0.0184	0.0321
74	0.04245	0.02123	0.0135	0.0270	0.0182	0.0317
75	0.04189	0.02094	0.0133	0.0267	0.0180	0.0313
76	0.04134	0.02067	0.0132	0.0263	0.0178	0.0309
77	0.04080	0.02040	0.0130	0.0260	0.0176	0.0306
78	0.04028	0.02014	0.0128	0.0256	0.0174	0.0302
79	0.03977	0.01988	0.0127	0.0253	0.0172	0.0298

All dimensions are in inches.

PHẦN RĂNG - TIÊU CHUẨN MỸ, HỆ THỐNG 2 - BƯỚC

THÂN KHAI MINH

GEAR TOOTH PARTS - AMERICAN STANDARD 20-DEGREE INVOLUTE FINE-PITCH SYSTEM - 2

Diametral Pitch	Circular Pitch	Standard Circular Thickness	Standard Addendum	Working Depth	Standard Dedendum	Whole Depth
<i>P</i>	<i>p</i>	<i>t</i>	<i>a</i>	<i>h_k</i>	<i>b</i>	<i>h_t</i>
80	0.03927	0.01964	0.0125	0.0250	0.0170	0.0295
81	0.03879	0.01939	0.0123	0.0247	0.0168	0.0292
82	0.03831	0.01916	0.0122	0.0244	0.0166	0.0288
83	0.03785	0.01893	0.0120	0.0241	0.0165	0.0285
84	0.03740	0.01870	0.0119	0.0238	0.0163	0.0282
85	0.03696	0.01848	0.0118	0.0235	0.0161	0.0279
86	0.03653	0.01827	0.0116	0.0233	0.0160	0.0276
87	0.03611	0.01806	0.0115	0.0230	0.0158	0.0273
88	0.03570	0.01785	0.0114	0.0227	0.0156	0.0270
89	0.03530	0.01765	0.0112	0.0225	0.0155	0.0267
90	0.03491	0.01745	0.0111	0.0222	0.0153	0.0264
91	0.03452	0.01726	0.0110	0.0220	0.0152	0.0262
92	0.03415	0.01707	0.0109	0.0217	0.0150	0.0259
93	0.03378	0.01689	0.0108	0.0215	0.0149	0.0257
94	0.03342	0.01671	0.0106	0.0213	0.0148	0.0254
95	0.03307	0.01653	0.0105	0.0211	0.0146	0.0252
96	0.03272	0.01636	0.0104	0.0208	0.0145	0.0249
97	0.03239	0.01619	0.0103	0.0206	0.0144	0.0247
98	0.03206	0.01603	0.0102	0.0204	0.0142	0.0244
99	0.03173	0.01587	0.0101	0.0202	0.0141	0.0242
100	0.03142	0.01571	0.0100	0.0200	0.0140	0.0240
101	0.03110	0.01555	0.0099	0.0198	0.0139	0.0238
102	0.03080	0.01540	0.0098	0.0196	0.0138	0.0236
103	0.03050	0.01525	0.0097	0.0194	0.0137	0.0234
104	0.03021	0.01510	0.0096	0.0192	0.0135	0.0232
105	0.02992	0.01496	0.0095	0.0190	0.0134	0.0230
106	0.02964	0.01482	0.0094	0.0189	0.0133	0.0228
107	0.02936	0.01468	0.0093	0.0187	0.0132	0.0226
108	0.02909	0.01454	0.0093	0.0185	0.0131	0.0224
109	0.02882	0.01441	0.0092	0.0183	0.0130	0.0222
110	0.02856	0.01428	0.0091	0.0182	0.0129	0.0220
111	0.02830	0.01415	0.0090	0.0180	0.0128	0.0218
112	0.02805	0.01402	0.0089	0.0179	0.0127	0.0216
113	0.02780	0.01390	0.0088	0.0177	0.0126	0.0215
114	0.02756	0.01378	0.0088	0.0175	0.0125	0.0213
115	0.02732	0.01366	0.0087	0.0174	0.0124	0.0211
116	0.02708	0.01354	0.0086	0.0172	0.0123	0.0210
117	0.02685	0.01343	0.0085	0.0171	0.0123	0.0208
118	0.02662	0.01331	0.0085	0.0169	0.0122	0.0206
119	0.02640	0.01320	0.0084	0.0168	0.0121	0.0205
120	0.02618	0.01309	0.0083	0.0167	0.0120	0.0203
121	0.02596	0.01298	0.0083	0.0165	0.0119	0.0202
122	0.02575	0.01288	0.0082	0.0164	0.0118	0.0200
123	0.02554	0.01277	0.0081	0.0163	0.0118	0.0199
124	0.02534	0.01267	0.0081	0.0161	0.0117	0.0197
125	0.02513	0.01257	0.0080	0.0160	0.0116	0.0196
126	0.02493	0.01247	0.0079	0.0159	0.0115	0.0195
127	0.02474	0.01237	0.0079	0.0157	0.0114	0.0193
128	0.02454	0.01227	0.0078	0.0156	0.0114	0.0192
129	0.02435	0.01218	0.0078	0.0155	0.0113	0.0191
130	0.02417	0.01208	0.0077	0.0154	0.0112	0.0189
131	0.02398	0.01199	0.0076	0.0153	0.0112	0.0188
132	0.02380	0.01190	0.0076	0.0152	0.0111	0.0187
133	0.02362	0.01181	0.0075	0.0150	0.0110	0.0185
134	0.02344	0.01172	0.0075	0.0149	0.0110	0.0184
135	0.02327	0.01164	0.0074	0.0148	0.0109	0.0183
136	0.02310	0.01155	0.0074	0.0147	0.0108	0.0182
137	0.02293	0.01147	0.0073	0.0146	0.0108	0.0181
138	0.02277	0.01138	0.0072	0.0145	0.0107	0.0179
139	0.02260	0.01130	0.0072	0.0144	0.0106	0.0178

All dimensions are in inches.

PHẦN RĂNG - TIÊU CHUẨN MỸ, HỆ THỐNG 3 - BƯỚC

THÂN KHAI MỊN

GEAR TOOTH PARTS - AMERICAN STANDARD 20-DEGREE INVOLUTE FINE-PITCH SYSTEM - 3

Diametral Pitch	Circular Pitch	Standard Circular Thickness	Standard Addendum	Working Depth	Standard Dedendum	Whole Depth
<i>P</i>	<i>p</i>	<i>t</i>	<i>s</i>	<i>h_k</i>	<i>b</i>	<i>h_i</i>
140	0.02244	0.01122	0.0071	0.0143	0.0106	0.0177
141	0.02228	0.01114	0.0071	0.0142	0.0105	0.0176
142	0.02212	0.01106	0.0070	0.0141	0.0105	0.0175
143	0.02197	0.01098	0.0070	0.0140	0.0104	0.0174
144	0.02182	0.01091	0.0069	0.0139	0.0103	0.0173
145	0.02167	0.01083	0.0069	0.0138	0.0103	0.0172
146	0.02152	0.01076	0.0068	0.0137	0.0102	0.0171
147	0.02137	0.01069	0.0068	0.0135	0.0102	0.0170
148	0.02123	0.01061	0.0068	0.0135	0.0101	0.0169
149	0.02108	0.01054	0.0067	0.0134	0.0101	0.0168
150	0.02094	0.01047	0.0067	0.0133	0.0100	0.0167
151	0.02081	0.01040	0.0066	0.0132	0.0099	0.0166
152	0.02067	0.01033	0.0066	0.0132	0.0099	0.0165
153	0.02053	0.01027	0.0065	0.0131	0.0098	0.0164
154	0.02040	0.01020	0.0065	0.0130	0.0098	0.0163
155	0.02027	0.01013	0.0065	0.0129	0.0097	0.0162
156	0.02014	0.01007	0.0064	0.0128	0.0097	0.0161
157	0.02001	0.01001	0.0064	0.0127	0.0096	0.0160
158	0.01988	0.00994	0.0063	0.0127	0.0096	0.0159
159	0.01976	0.00988	0.0063	0.0126	0.0095	0.0158
160	0.01964	0.00982	0.0063	0.0125	0.0095	0.0158
161	0.01951	0.00976	0.0062	0.0124	0.0095	0.0157
162	0.01939	0.00970	0.0062	0.0123	0.0094	0.0156
163	0.01927	0.00964	0.0061	0.0123	0.0094	0.0155
164	0.01916	0.00958	0.0061	0.0122	0.0093	0.0154
165	0.01904	0.00952	0.0061	0.0121	0.0093	0.0153
166	0.01893	0.00946	0.0060	0.0120	0.0092	0.0153
167	0.01881	0.00941	0.0060	0.0120	0.0092	0.0152
168	0.01870	0.00935	0.0060	0.0119	0.0091	0.0151
169	0.01859	0.00929	0.0059	0.0118	0.0091	0.0150
170	0.01848	0.00924	0.0059	0.0118	0.0091	0.0149
171	0.01837	0.00919	0.0058	0.0117	0.0090	0.0149
172	0.01827	0.00913	0.0058	0.0116	0.0090	0.0148
173	0.01816	0.00908	0.0058	0.0116	0.0089	0.0147
174	0.01806	0.00903	0.0057	0.0115	0.0089	0.0146
175	0.01795	0.00898	0.0057	0.0114	0.0089	0.0146
176	0.01785	0.00893	0.0057	0.0114	0.0088	0.0145
177	0.01775	0.00887	0.0056	0.0113	0.0088	0.0144
178	0.01765	0.00882	0.0056	0.0112	0.0087	0.0144
179	0.01755	0.00878	0.0056	0.0112	0.0087	0.0143
180	0.01745	0.00873	0.0056	0.0111	0.0087	0.0142
181	0.01736	0.00868	0.0055	0.0110	0.0086	0.0142
182	0.01726	0.00863	0.0055	0.0110	0.0086	0.0141
183	0.01717	0.00858	0.0055	0.0109	0.0086	0.0140
184	0.01707	0.00854	0.0054	0.0109	0.0085	0.0140
185	0.01698	0.00849	0.0054	0.0108	0.0085	0.0139
186	0.01689	0.00845	0.0054	0.0108	0.0085	0.0138
187	0.01680	0.00840	0.0053	0.0107	0.0084	0.0138
188	0.01671	0.00836	0.0053	0.0106	0.0084	0.0137
189	0.01662	0.00831	0.0053	0.0106	0.0083	0.0136
190	0.01653	0.00827	0.0053	0.0105	0.0083	0.0136
191	0.01645	0.00822	0.0052	0.0105	0.0083	0.0135
192	0.01636	0.00818	0.0052	0.0104	0.0082	0.0135
193	0.01628	0.00814	0.0052	0.0104	0.0082	0.0134
194	0.01619	0.00810	0.0052	0.0103	0.0082	0.0133
195	0.01611	0.00806	0.0051	0.0103	0.0082	0.0133
196	0.01603	0.00801	0.0051	0.0102	0.0081	0.0132
197	0.01595	0.00797	0.0051	0.0102	0.0081	0.0132
198	0.01587	0.00793	0.0051	0.0101	0.0081	0.0131
199	0.01579	0.00789	0.0050	0.0101	0.0080	0.0131
200	0.01571	0.00785	0.0050	0.0100	0.0080	0.0130

All dimensions are in inches.

TIÊU CHUẨN MỸ, HỆ THỐNG THÂN KHAI
CHÂN RĂNG 20 ĐỘ
AMERICAN STANDARD 2-DEGREE INVOLUTE STUB
TOOTH SYSTEM

Diametral Pitch	Circular Pitch	Standard Circular Thickness	Standard Addendum	Working Depth of Tooth	Standard Dedendum	Whole Depth of Tooth
<i>P</i>	<i>p</i>	<i>t</i>	<i>a</i>	<i>h_k</i>	<i>b</i>	<i>h_t</i>
1/4	6.2832	3.1416	1.6000	3.2000	2.0000	3.6000
3/4	4.1888	2.0944	1.0667	2.1334	1.3333	2.4000
1	3.1416	1.5708	.8000	1.6000	1.0000	1.8000
1 1/4	2.5133	1.2566	.6400	1.2800	.8000	1.4400
1 1/2	2.0944	1.0472	.5333	1.0666	.6667	1.2000
1 3/4	1.7952	.8976	.4571	.9142	.5714	1.0285
2	1.5708	.7854	.4000	.8000	.5000	.9000
2 1/4	1.3963	.6981	.3556	.7112	.4444	.8000
2 1/2	1.2566	.6283	.3200	.6400	.4000	.7200
2 3/4	1.1424	.5712	.2909	.5818	.3636	.6545
3	1.0472	.5236	.2667	.5334	.3333	.6000
3 1/4	.8976	.4488	.2286	.4572	.2857	.5143
4	.7854	.3927	.2000	.4000	.2500	.4500
5	.6283	.3142	.1600	.3200	.2000	.3600
6	.5236	.2618	.1333	.2666	.1667	.3000
7	.4488	.2244	.1143	.2286	.1428	.2571
8	.3927	.1963	.1000	.2000	.1250	.2250
9	.3491	.1745	.0889	.1778	.1111	.2000
10	.3142	.1571	.0800	.1600	.1000	.1800
11	.2856	.1428	.0727	.1454	.0909	.1636
12	.2618	.1309	.0667	.1334	.0833	.1500
13	.2417	.1208	.0615	.1230	.0769	.1384
14	.2244	.1122	.0571	.1142	.0714	.1285
15	.2094	.1047	.0533	.1066	.0667	.1200
16	.1963	.0982	.0500	.1000	.0625	.1125
17	.1848	.0924	.0470	.0940	.0588	.1058
18	.1745	.0873	.0444	.0888	.0556	.1000
19	.1653	.0827	.0421	.0842	.0526	.0947
20	.1571	.0785	.0400	.0800	.0500	.0900
22	.1428	.0714	.0364	.0728	.0454	.0818
24	.1309	.0654	.0333	.0666	.0417	.0750
26	.1208	.0604	.0308	.0616	.0384	.0692
28	.1122	.0561	.0286	.0572	.0357	.0643
30	.1047	.0524	.0267	.0534	.0333	.0600
32	.0982	.0491	.0250	.0500	.0312	.0562
34	.0924	.0462	.0236	.0472	.0294	.0530
36	.0873	.0436	.0222	.0444	.0278	.0500
38	.0827	.0413	.0210	.0420	.0263	.0473
40	.0785	.0393	.0200	.0400	.0250	.0450

HỆ THỐNG CHÂN RĂNG ẪN KHỚP

GEAR TOOTH PARTS - FELLOWS STUB TOOTH SYSTEM

Diametral Pitch	Circular Thickness	Addendum	Working Depth	Dedendum	Whole Depth
34	0.5236	0.2500	0.5000	0.3125	0.5625
36	0.3927	0.2000	0.4000	0.2500	0.4500
38	0.3142	0.1429	0.2858	0.1786	0.3215
40	0.2618	0.1250	0.2500	0.1563	0.2813
42	0.2244	0.1111	0.2222	0.1389	0.2500
44	0.1964	0.1000	0.2000	0.1250	0.2250
46	0.1745	0.0909	0.1818	0.1137	0.2046
48	0.1571	0.0833	0.1666	0.1042	0.1875
50	0.1428	0.0714	0.1428	0.0893	0.1607
52	0.1309	0.0714	0.1428	0.0893	0.1607
54	0.1208	0.0625	0.1250	0.0781	0.1406
56	0.1122	0.0556	0.1112	0.0694	0.1250
58	0.0982	0.0476	0.0952	0.0591	0.1068
60	0.0873	0.0417	0.0834	0.0520	0.0937
62	0.0785	0.0385	0.0770	0.0482	0.0866
64	0.0714	0.0345	0.0690	0.0434	0.0779
66	0.0655	0.0313	0.0626	0.0395	0.0708
68	0.0604	0.0286	0.0576	0.0363	0.0649
70	0.0561	0.0270	0.0540	0.0344	0.0615
72	0.0524	0.0250	0.0500	0.0320	0.0570
74	0.0491	0.0238	0.0476	0.0306	0.0544
76	0.0462	0.0222	0.0444	0.0287	0.0509
78	0.0436	0.0208	0.0416	0.0270	0.0478
80	0.0413	0.0200	0.0400	0.0260	0.0460
82	0.0393	0.0185	0.0370	0.0242	0.0427

Gear Tooth Parts — Nuttall Stub Tooth System

(Based on: addendum = $0.250 \times$ circular pitch; dedendum = $0.300 \times$ circular pitch.)

Diametral Pitch	Equivalent Circular Pitch	Circular Thickness	Addendum	Working Depth	Dedendum	Whole Depth
1 1/2	6.2832	3.1416	1.5708	3.1416	1.8849	3.4557
3/4	4.1888	2.0944	1.0472	2.0944	1.2566	2.3038
1	3.1416	1.5708	0.7854	1.5708	0.9424	1.7278
1 1/4	2.5133	1.2566	0.6283	1.2566	0.7539	1.3822
1 1/2	2.0944	1.0472	0.5236	1.0472	0.6283	1.1519
1 3/4	1.7952	0.8976	0.4488	0.8976	0.5385	0.9873
2	1.5708	0.7854	0.3927	0.7854	0.4712	0.8639
2 1/4	1.3963	0.6981	0.3490	0.6981	0.4188	0.7678
2 1/2	1.2566	0.6283	0.3141	0.6283	0.3769	0.6910
2 3/4	1.1424	0.5712	0.2856	0.5712	0.3427	0.6283
3	1.0472	0.5236	0.2618	0.5236	0.3141	0.5759
3 1/2	0.8976	0.4488	0.2244	0.4488	0.2692	0.4936
4	0.7854	0.3927	0.1963	0.3927	0.2355	0.4318
5	0.6283	0.3141	0.1570	0.3142	0.1884	0.3454
6	0.5236	0.2618	0.1309	0.2618	0.1571	0.2880
7	0.4488	0.2244	0.1122	0.2244	0.1346	0.2468
8	0.3927	0.1963	0.0981	0.1963	0.1177	0.2158
9	0.3491	0.1745	0.0872	0.1745	0.1046	0.1918
10	0.3142	0.1571	0.0785	0.1571	0.0942	0.1727
11	0.2856	0.1428	0.0714	0.1428	0.0857	0.1571
12	0.2618	0.1309	0.0654	0.1309	0.0785	0.1439
13	0.2417	0.1208	0.0604	0.1208	0.0725	0.1329
14	0.2244	0.1122	0.0561	0.1122	0.0673	0.1234
15	0.2094	0.1047	0.0523	0.1047	0.0627	0.1150
16	0.1963	0.0982	0.0491	0.0982	0.0589	0.1080
17	0.1848	0.0924	0.0462	0.0924	0.0554	0.1016
18	0.1745	0.0873	0.0436	0.0873	0.0523	0.0959
19	0.1653	0.0827	0.0413	0.0827	0.0495	0.0908
20	0.1571	0.0785	0.0392	0.0785	0.0470	0.0862
22	0.1428	0.0714	0.0357	0.0714	0.0423	0.0785

CÔNG THỨC ĐỂ TÍNH KÍCH THƯỚC BÁNH RĂNG TRỤ

THANG - 1

FORMULAS FOR DIMESIONS OF STANDARD SPUR GEARS-1

Notation

ϕ = Pressure Angle	F = Face Width
a = Addendum	h_a = Working Depth of Tooth
b = Dedendum	h_t = Whole Depth of Tooth
c = Clearance	N = Number of Teeth
C = Center Distance	If both gear and pinion are referred to:
D = Pitch Diameter	N_G = Number of Teeth in Gear
D_b = Base Circle Diameter	N_P = Number of Teeth in Pinion
D_O = Outside Diameter	ϕ = Circular Pitch
D_R = Root Diameter	P = Diametral Pitch

No.	To Find	Formula	No.	To Find	Formula
General Formulas					
1	Base Circle Diameter	$D_b = D \cos \phi$	6a	Outside Diameter (Full-depth Teeth)	$D_O = \frac{N+2}{P}$
2a	Circular Pitch	$\phi = \frac{3.1416D}{N}$	6b	Outside Diameter (Full-depth Teeth)	$D_O = \frac{(N+2)\phi}{3.1416}$
2b	Circular Pitch	$\phi = \frac{3.1416}{P}$	7a	Outside Diameter (Amer. Std. Stub Teeth)	$D_O = \frac{N+1.6}{P}$
3a	Center Distance	$C = \frac{N_G + N_P}{2P}$	7b	Outside Diameter (Amer. Std. Stub Teeth)	$D_O = \frac{(N+1.6)\phi}{3.1416}$
3b	Center Distance	$C = \frac{(N_G + N_P)\phi}{6.2832}$	8	Outside Diameter	$D_O = D + 2a$
4a	Diametral Pitch	$P = \frac{3.1416}{\phi}$	9a	Pitch Diameter	$D = \frac{N}{P}$
4b	Diametral Pitch	$P = \frac{N}{D}$	9b	Pitch Diameter	$D = \frac{N\phi}{3.1416}$
5a	Number of Teeth	$N = P \times D$	10	Root Diameter*	$D_R = D - 2b$
5b	Number of Teeth	$N = \frac{3.1416D}{\phi}$			

CÔNG THỨC ĐỂ TÍNH KÍCH THƯỚC BÁNH RĂNG TRỤ

THANG - 2

FORMULAS FOR DIMENSIONS OF STANDARD SPUR GEARS - 2

No.	To Find	Formula	No.	To Find	Formula
Formulas for 14½-degree Involute and Composite Full-Depth Teeth and 20-degree Involute Full-Depth Teeth					
11a	Addendum	$a = 1.000 + P$	14a	Total Depth*	$h_t = 2.157 + P$
11b	Addendum	$a = 0.3183 \times p$	14b	Total Depth*	$h_t = 0.6866 \times p$
12a	Clearance	$c = 0.157 + P$	14c	Total Depth*	$h_t = a + b$
12b	Clearance	$c = 0.050 \times p$	15a	Working Depth	$h_k = 2.000 + P$
13a	Dedendum*	$b = 1.157 + P$	15b	Working Depth	$h_k = 0.6366 \times p$
13b	Dedendum*	$b = 0.3683 \times p$			
Formulas for 20-degree Involute Fine-Pitch Teeth					
16a	Addendum	$a = 1.000 + P$	19a	Total Depth*	$h_t = \frac{2.200}{P} + 0.002$
16b	Addendum	$a = 0.3183 \times p$	19b	Total Depth*	$h_t = (0.7003 \times p) + 0.002$
17a	Clearance	$c = \frac{0.200}{P} + 0.002$	19c	Total Depth*	$h_t = a + b$
17b	Clearance	$c = (0.0637 \times p) + 0.002$	20a	Working Depth	$h_k = \frac{2.000}{P}$
18a	Dedendum*	$b = \frac{1.200}{P} + 0.002$	20b	Working Depth	$h_k = 0.6366 \times p$
18b	Dedendum*	$b = (0.3820 \times p) + 0.002$			
Formulas for 20-degree Involute Stub Teeth					
21a	Addendum	$a = 0.800 + P$	24a	Total Depth*	$h_t = 1.800 + P$
21b	Addendum	$a = 0.2546 \times p$	24b	Total Depth*	$h_t = 0.5729 \times p$
22a	Clearance	$c = 0.200 + P$	24c	Total Depth*	$h_t = a + b$
22b	Clearance	$c = 0.0637 \times p$	25a	Working Depth	$h_k = 1.600 + P$
23a	Dedendum*	$b = 1.000 + P$	25b	Working Depth	$h_k = 0.5092 \times p$
23b	Dedendum*	$b = 0.3183 \times p$			

BẢNG 1: CÔNG THỨC TÍNH ĐƯỜNG KÍNH NGOÀI VÀ ĐƯỜNG KÍNH CHÂN RĂNG TRỤ THẲNG

		Notation	
D	= Pitch Diameter	a	= Standard Addendum
D_O	= Outside Diameter	b	= Standard Dedendum
D_R	= Root Diameter	b_s	= Dedendum for Shaping
P	= Diametral Pitch	b_{ps}	= Dedendum for Pre-shaving

14½- AND 20-DEGREE INVOLUTE FULL-DEPTH TEETH (19P and coarser)	
$D_O = D + 2a = \frac{N}{P} + \left(2 \times \frac{1}{P}\right)$	
$D_R = D - 2b = \frac{N}{P} - \left(2 \times \frac{1.157}{P}\right)$	(Hobbed)*
$D_R = D - 2b_s = \frac{N}{P} - \left(2 \times \frac{1.25}{P}\right)$	(Shaped)
$D_R = D - 2b_{ps} = \frac{N}{P} - \left(2 \times \frac{1.35}{P}\right)$	(Pre-shaved) ¹
$D_R = D - 2b_{ps} = \frac{N}{P} - \left(2 \times \frac{1.45}{P}\right)$	(Pre-shaved) ²
20-DEGREE INVOLUTE FINE-PITCH FULL-DEPTH TEETH (20P and finer)	
$D_O = D + 2a = \frac{N}{P} + \left(2 \times \frac{1}{P}\right)$	
$D_R = D - 2b = \frac{N}{P} - 2 \left(\frac{1.2}{P} + 0.002\right)$	(Hobbed or Shaped)
$D_R = D - 2b_{ps} = \frac{N}{P} - 2 \left(\frac{1.35}{P} + 0.002\right)$	(Pre-shaved) ³
20-DEGREE INVOLUTE STUB TEETH	
$D_O = D + 2a = \frac{N}{P} + \left(2 \times \frac{0.8}{P}\right)$	
$D_R = D - 2b = \frac{N}{P} - \left(2 \times \frac{1}{P}\right)$	(Hobbed)
$D_R = D - 2b_{ps} = \frac{N}{P} - \left(2 \times \frac{1.35}{P}\right)$	(Pre-shaved) ¹
20-DEGREE INVOLUTE FELLOWS STUB TEETH	
$D_O = D + 2a = \frac{N}{P} + \left(2 \times \frac{1}{P'}\right)$	
$D_R = D - 2b = \frac{N}{P} - \left(2 \times \frac{1.25}{P'}\right)$	(Shaped)
$D_R = D - 2b_{ps} = \frac{N}{P} - \left(2 \times \frac{1.35}{P'}\right)$	Pre-shaved) ¹

P is the numerator and P' is the denominator in the Fellows stub tooth designation.

* For 14½-degree involute full-depth teeth of 20 diametral pitch and finer, some companies use hobs that produce a dedendum of $(1.200 + P) + 0.002$.

¹ Using pre-shaved dedendum of $1.35 + P$ recommended by Michigan Tool Co.

An approximate relationship of $1.35 + P$ for the dedenda of pre-shaved gears is recommended by National Branch & Machine Co. for spur gears. Specific dedendum values based upon clearances recommended by this company for different diametral pitches and different types of teeth will be found in Tables 3, 4, and 6.

² Using pre-shaved dedendum of $1.45 + P$, which provides the additional depth for pre-shaving by shaping, recommended by The Fellows Gear Shaper Co. for gears of 5 to 19 diametral pitch having 13 to 30 teeth with 14½-degrees pressure angle or 13 to 20 teeth with 20-degree pressure angle. For 14½-degree gears with over 30 teeth and for 20-degree gears with over 20 teeth, this company recommends a special protuberance-type cutter for pre-shaving.

³ Using pre-shaved dedendum of $(1.35 + P) + 0.002$ indicated in ASA B6.7-1956.

⁴ For enlarged pinions having 17 or fewer teeth, see pages 686-690.

BẢNG 2: ĐƯỜNG KÍNH BƯỚC CHO BÁNH RĂNG

BƯỚC KÍNH

Table 2. PITCH DIAMETERS OF DIAMETRAL PITCH GEARS

No. of Teeth	Diametral Pitch									
	2.5	3	3.5	4	4.5	5	6	7	8	9
	Pitch Diameter									
10	4.0000	3.3333	2.8571	2.5000	2.2222	2.0000	1.6667	1.4286	1.2500	1.1111
11	4.4000	3.6667	3.1429	2.7500	2.4444	2.2000	1.8333	1.5714	1.3750	1.2222
12	4.8000	4.0000	3.4286	3.0000	2.6667	2.4000	2.0000	1.7143	1.5000	1.3333
13	5.2000	4.3333	3.7143	3.2500	2.8889	2.6000	2.1667	1.8571	1.6250	1.4444
14	5.6000	4.6667	4.0000	3.5000	3.1111	2.8000	2.3333	2.0000	1.7500	1.5556
15	6.0000	5.0000	4.2857	3.7500	3.3333	3.0000	2.5000	2.1429	1.8750	1.6667
16	6.4000	5.3333	4.5714	4.0000	3.5556	3.2000	2.6667	2.2857	2.0000	1.7778
17	6.8000	5.6667	4.8571	4.2500	3.7778	3.4000	2.8333	2.4286	2.1250	1.8889
18	7.2000	6.0000	5.1429	4.5000	4.0000	3.6000	3.0000	2.5714	2.2500	2.0000
19	7.6000	6.3333	5.4286	4.7500	4.2222	3.8000	3.1667	2.7143	2.3750	2.1111
20	8.0000	6.6667	5.7143	5.0000	4.4444	4.0000	3.3333	2.8571	2.5000	2.2222
21	8.4000	7.0000	6.0000	5.2500	4.6667	4.2000	3.5000	3.0000	2.6250	2.3333
22	8.8000	7.3333	6.2857	5.5000	4.8889	4.4000	3.6667	3.1429	2.7500	2.4444
23	9.2000	7.6667	6.5714	5.7500	5.1111	4.6000	3.8333	3.2857	2.8750	2.5556
24	9.6000	8.0000	6.8571	6.0000	5.3333	4.8000	4.0000	3.4286	3.0000	2.6667
25	10.0000	8.3333	7.1429	6.2500	5.5556	5.0000	4.1667	3.5714	3.1250	2.7778
26	10.4000	8.6667	7.4286	6.5000	5.7778	5.2000	4.3333	3.7143	3.2500	2.8889
27	10.8000	9.0000	7.7143	6.7500	6.0000	5.4000	4.5000	3.8571	3.3750	3.0000
28	11.2000	9.3333	8.0000	7.0000	6.2222	5.6000	4.6667	4.0000	3.5000	3.1111
29	11.6000	9.6667	8.2857	7.2500	6.4444	5.8000	4.8333	4.1429	3.6250	3.2222
30	12.0000	10.0000	8.5714	7.5000	6.6667	6.0000	5.0000	4.2857	3.7500	3.3333
31	12.4000	10.3333	8.8571	7.7500	6.8889	6.2000	5.1667	4.4286	3.8750	3.4444
32	12.8000	10.6667	9.1429	8.0000	7.1111	6.4000	5.3333	4.5714	4.0000	3.5556
33	13.2000	11.0000	9.4286	8.2500	7.3333	6.6000	5.5000	4.7143	4.1250	3.6667
34	13.6000	11.3333	9.7143	8.5000	7.5556	6.8000	5.6667	4.8571	4.2500	3.7778
35	14.0000	11.6667	10.0000	8.7500	7.7778	7.0000	5.8333	5.0000	4.3750	3.8889
36	14.4000	12.0000	10.2857	9.0000	8.0000	7.2000	6.0000	5.1429	4.5000	4.0000
37	14.8000	12.3333	10.5714	9.2500	8.2222	7.4000	6.1667	5.2857	4.6250	4.1111
38	15.2000	12.6667	10.8571	9.5000	8.4444	7.6000	6.3333	5.4286	4.7500	4.2222
39	15.6000	13.0000	11.1429	9.7500	8.6667	7.8000	6.5000	5.5714	4.8750	4.3333
40	16.0000	13.3333	11.4286	10.0000	8.8889	8.0000	6.6667	5.7143	5.0000	4.4444
41	16.4000	13.6667	11.7143	10.2500	9.1111	8.2000	6.8333	5.8571	5.1250	4.5556
42	16.8000	14.0000	12.0000	10.5000	9.3333	8.4000	7.0000	6.0000	5.2500	4.6667
43	17.2000	14.3333	12.2857	10.7500	9.5556	8.6000	7.1667	6.1429	5.3750	4.7778
44	17.6000	14.6667	12.5714	11.0000	9.7778	8.8000	7.3333	6.2857	5.5000	4.8889
45	18.0000	15.0000	12.8571	11.2500	10.0000	9.0000	7.5000	6.4286	5.6250	5.0000
46	18.4000	15.3333	13.1429	11.5000	10.2222	9.2000	7.6667	6.5714	5.7500	5.1111
47	18.8000	15.6667	13.4286	11.7500	10.4444	9.4000	7.8333	6.7143	5.8750	5.2222
48	19.2000	16.0000	13.7143	12.0000	10.6667	9.6000	8.0000	6.8571	6.0000	5.3333
49	19.6000	16.3333	14.0000	12.2500	10.8889	9.8000	8.1667	7.0000	6.1250	5.4444
50	20.0000	16.6667	14.2857	12.5000	11.1111	10.0000	8.3333	7.1429	6.2500	5.5556
51	20.4000	17.0000	14.5714	12.7500	11.3333	10.2000	8.5000	7.2857	6.3750	5.6667
52	20.8000	17.3333	14.8571	13.0000	11.5556	10.4000	8.6667	7.4286	6.5000	5.7778
53	21.2000	17.6667	15.1429	13.2500	11.7778	10.6000	8.8333	7.5714	6.6250	5.8889
54	21.6000	18.0000	15.4286	13.5000	12.0000	10.8000	9.0000	7.7143	6.7500	6.0000
55	22.0000	18.3333	15.7143	13.7500	12.2222	11.0000	9.1667	7.8571	6.8750	6.1111
56	22.4000	18.6667	16.0000	14.0000	12.4444	11.2000	9.3333	8.0000	7.0000	6.2222
57	22.8000	19.0000	16.2857	14.2500	12.6667	11.4000	9.5000	8.1429	7.1250	6.3333
58	23.2000	19.3333	16.5714	14.5000	12.8889	11.6000	9.6667	8.2857	7.2500	6.4444
59	23.6000	19.6667	16.8571	14.7500	13.1111	11.8000	9.8333	8.4286	7.3750	6.5556
60	24.0000	20.0000	17.1429	15.0000	13.3333	12.0000	10.0000	8.5714	7.5000	6.6667
61	24.4000	20.3333	17.4286	15.2500	13.5556	12.2000	10.1667	8.7143	7.6250	6.7778
62	24.8000	20.6667	17.7143	15.5000	13.7778	12.4000	10.3333	8.8571	7.7500	6.8889
63	25.2000	21.0000	18.0000	15.7500	14.0000	12.6000	10.5000	9.0000	7.8750	7.0000
64	25.6000	21.3333	18.2857	16.0000	14.2222	12.8000	10.6667	9.1429	8.0000	7.1111
65	26.0000	21.6667	18.5714	16.2500	14.4444	13.0000	10.8333	9.2857	8.1250	7.2222
66	26.4000	22.0000	18.8571	16.5000	14.6667	13.2000	11.0000	9.4286	8.2500	7.3333
67	26.8000	22.3333	19.1429	16.7500	14.8889	13.4000	11.1667	9.5714	8.3750	7.4444
68	27.2000	22.6667	19.4286	17.0000	15.1111	13.6000	11.3333	9.7143	8.5000	7.5556
69	27.6000	23.0000	19.7143	17.2500	15.3333	13.8000	11.5000	9.8571	8.6250	7.6667
70	28.0000	23.3333	20.0000	17.5000	15.5556	14.0000	11.6667	10.0000	8.7500	7.7778

Outside diameter of a standard full-depth gear equals the pitch diameter for a gear of the same diametral pitch but with 2 more teeth.

BẢNG 2 : ĐƯỜNG KÍNH BƯỚC CHO BÁNH RĂNG

BƯỚC KÍNH

Table 2. PITCH DIAMETERS OF DIAMETRAL PITCH GEARS

No. of Teeth	Diametral Pitch									
	2.5	3	3.5	4	4.5	5	6	7	8	9
	Pitch Diameter									
71	28.4000	23.6667	20.2857	17.7500	15.7778	14.2000	11.8333	10.1429	8.8750	7.8889
72	28.8000	24.0000	20.5714	18.0000	16.0000	14.4000	12.0000	10.2857	9.0000	8.0000
73	29.2000	24.3333	20.8571	18.2500	16.2222	14.6000	12.1667	10.4286	9.1250	8.1111
74	29.6000	24.6667	21.1429	18.5000	16.4444	14.8000	12.3333	10.5714	9.2500	8.2222
75	30.0000	25.0000	21.4286	18.7500	16.6667	15.0000	12.5000	10.7143	9.3750	8.3333
76	30.4000	25.3333	21.7143	19.0000	16.8889	15.2000	12.6667	10.8571	9.5000	8.4444
77	30.8000	25.6667	22.0000	19.2500	17.1111	15.4000	12.8333	11.0000	9.6250	8.5556
78	31.2000	26.0000	22.2857	19.5000	17.3333	15.6000	13.0000	11.1429	9.7500	8.6667
79	31.6000	26.3333	22.5714	19.7500	17.5556	15.8000	13.1667	11.2857	9.8750	8.7778
80	32.0000	26.6667	22.8571	20.0000	17.7778	16.0000	13.3333	11.4286	10.0000	8.8889
81	32.4000	27.0000	23.1429	20.2500	18.0000	16.2000	13.5000	11.5714	10.1250	9.0000
82	32.8000	27.3333	23.4286	20.5000	18.2222	16.4000	13.6667	11.7143	10.2500	9.1111
83	33.2000	27.6667	23.7143	20.7500	18.4444	16.6000	13.8333	11.8571	10.3750	9.2222
84	33.6000	28.0000	24.0000	21.0000	18.6667	16.8000	14.0000	12.0000	10.5000	9.3333
85	34.0000	28.3333	24.2857	21.2500	18.8889	17.0000	14.1667	12.1429	10.6250	9.4444
86	34.4000	28.6667	24.5714	21.5000	19.1111	17.2000	14.3333	12.2857	10.7500	9.5556
87	34.8000	29.0000	24.8571	21.7500	19.3333	17.4000	14.5000	12.4286	10.8750	9.6667
88	35.2000	29.3333	25.1429	22.0000	19.5556	17.6000	14.6667	12.5714	11.0000	9.7778
89	35.6000	29.6667	25.4286	22.2500	19.7778	17.8000	14.8333	12.7143	11.1250	9.8889
90	36.0000	30.0000	25.7143	22.5000	20.0000	18.0000	15.0000	12.8571	11.2500	10.0000
91	36.4000	30.3333	26.0000	22.7500	20.2222	18.2000	15.1667	13.0000	11.3750	10.1111
92	36.8000	30.6667	26.2857	23.0000	20.4444	18.4000	15.3333	13.1429	11.5000	10.2222
93	37.2000	31.0000	26.5714	23.2500	20.6667	18.6000	15.5000	13.2857	11.6250	10.3333
94	37.6000	31.3333	26.8571	23.5000	20.8889	18.8000	15.6667	13.4286	11.7500	10.4444
95	38.0000	31.6667	27.1429	23.7500	21.1111	19.0000	15.8333	13.5714	11.8750	10.5556
96	38.4000	32.0000	27.4286	24.0000	21.3333	19.2000	16.0000	13.7143	12.0000	10.6667
97	38.8000	32.3333	27.7143	24.2500	21.5556	19.4000	16.1667	13.8571	12.1250	10.7778
98	39.2000	32.6667	28.0000	24.5000	21.7778	19.6000	16.3333	14.0000	12.2500	10.8889
99	39.6000	33.0000	28.2857	24.7500	22.0000	19.8000	16.5000	14.1429	12.3750	11.0000
100	40.0000	33.3333	28.5714	25.0000	22.2222	20.0000	16.6667	14.2857	12.5000	11.1111
101	40.4000	33.6667	28.8571	25.2500	22.4444	20.2000	16.8333	14.4286	12.6250	11.2222
102	40.8000	34.0000	29.1429	25.5000	22.6667	20.4000	17.0000	14.5714	12.7500	11.3333
103	41.2000	34.3333	29.4286	25.7500	22.8889	20.6000	17.1667	14.7143	12.8750	11.4444
104	41.6000	34.6667	29.7143	26.0000	23.1111	20.8000	17.3333	14.8571	13.0000	11.5556
105	42.0000	35.0000	30.0000	26.2500	23.3333	21.0000	17.5000	15.0000	13.1250	11.6667
106	42.4000	35.3333	30.2857	26.5000	23.5556	21.2000	17.6667	15.1429	13.2500	11.7778
107	42.8000	35.6667	30.5714	26.7500	23.7778	21.4000	17.8333	15.2857	13.3750	11.8889
108	43.2000	36.0000	30.8571	27.0000	24.0000	21.6000	18.0000	15.4286	13.5000	12.0000
109	43.6000	36.3333	31.1429	27.2500	24.2222	21.8000	18.1667	15.5714	13.6250	12.1111
110	44.0000	36.6667	31.4286	27.5000	24.4444	22.0000	18.3333	15.7143	13.7500	12.2222
111	44.4000	37.0000	31.7143	27.7500	24.6667	22.2000	18.5000	15.8571	13.8750	12.3333
112	44.8000	37.3333	32.0000	28.0000	24.8889	22.4000	18.6667	16.0000	14.0000	12.4444
113	45.2000	37.6667	32.2857	28.2500	25.1111	22.6000	18.8333	16.1429	14.1250	12.5556
114	45.6000	38.0000	32.5714	28.5000	25.3333	22.8000	19.0000	16.2857	14.2500	12.6667
115	46.0000	38.3333	32.8571	28.7500	25.5556	23.0000	19.1667	16.4286	14.3750	12.7778
116	46.4000	38.6667	33.1429	29.0000	25.7778	23.2000	19.3333	16.5714	14.5000	12.8889
117	46.8000	39.0000	33.4286	29.2500	26.0000	23.4000	19.5000	16.7143	14.6250	13.0000
118	47.2000	39.3333	33.7143	29.5000	26.2222	23.6000	19.6667	16.8571	14.7500	13.1111
119	47.6000	39.6667	34.0000	29.7500	26.4444	23.8000	19.8333	17.0000	14.8750	13.2222
120	48.0000	40.0000	34.2857	30.0000	26.6667	24.0000	20.0000	17.1429	15.0000	13.3333
121	48.4000	40.3333	34.5714	30.2500	26.8889	24.2000	20.1667	17.2857	15.1250	13.4444
122	48.8000	40.6667	34.8571	30.5000	27.1111	24.4000	20.3333	17.4286	15.2500	13.5556
123	49.2000	41.0000	35.1429	30.7500	27.3333	24.6000	20.5000	17.5714	15.3750	13.6667
124	49.6000	41.3333	35.4286	31.0000	27.5556	24.8000	20.6667	17.7143	15.5000	13.7778
125	50.0000	41.6667	35.7143	31.2500	27.7778	25.0000	20.8333	17.8571	15.6250	13.8889
126	50.4000	42.0000	36.0000	31.5000	28.0000	25.2000	21.0000	18.0000	15.7500	14.0000
127	50.8000	42.3333	36.2857	31.7500	28.2222	25.4000	21.1667	18.1429	15.8750	14.1111
128	51.2000	42.6667	36.5714	32.0000	28.4444	25.6000	21.3333	18.2857	16.0000	14.2222
129	51.6000	43.0000	36.8571	32.2500	28.6667	25.8000	21.5000	18.4286	16.1250	14.3333
130	52.0000	43.3333	37.1429	32.5000	28.8889	26.0000	21.6667	18.5714	16.2500	14.4444

Outside diameter of a standard full-depth gear equals the pitch diameter for a gear of the same diametral pitch but with 2 more teeth

BẢNG 2 : ĐƯỜNG KÍNH BƯỚC CHO BÁNH RĂNG

BƯỚC KÍNH

Table 2. PITCH DIAMETERS OF DIAMETRAL PITCH GEARS

No. of Teeth	Diametral Pitch										
	10	11	12	14	16	18	20	22	24	28	32
	Pitch Diameter										
10	1.0000	0.9091	0.8333	0.7143	0.6250	0.5556	0.5000	0.4545	0.4167	0.3571	0.3125
11	1.1000	1.0000	0.9167	0.7857	0.6875	0.6111	0.5500	0.5000	0.4583	0.3929	0.3438
12	1.2000	1.0909	1.0000	0.8571	0.7500	0.6667	0.6000	0.5455	0.5000	0.4286	0.3750
13	1.3000	1.1818	1.0833	0.9286	0.8125	0.7222	0.6500	0.5909	0.5417	0.4643	0.4062
14	1.4000	1.2727	1.1667	1.0000	0.8750	0.7778	0.7000	0.6364	0.5833	0.5000	0.4375
15	1.5000	1.3636	1.2500	1.0714	0.9375	0.8333	0.7500	0.6818	0.6250	0.5357	0.4688
16	1.6000	1.4545	1.3333	1.1429	1.0000	0.8889	0.8000	0.7273	0.6667	0.5714	0.5000
17	1.7000	1.5455	1.4167	1.2143	1.0625	0.9444	0.8500	0.7727	0.7083	0.6071	0.5312
18	1.8000	1.6364	1.5000	1.2857	1.1250	1.0000	0.9000	0.8182	0.7500	0.6429	0.5625
19	1.9000	1.7273	1.5833	1.3571	1.1875	1.0556	0.9500	0.8636	0.7917	0.6786	0.5938
20	2.0000	1.8182	1.6667	1.4286	1.2500	1.1111	1.0000	0.9091	0.8333	0.7143	0.6250
21	2.1000	1.9091	1.7500	1.5000	1.3125	1.1667	1.0500	0.9545	0.8750	0.7500	0.6562
22	2.2000	2.0000	1.8333	1.5714	1.3750	1.2222	1.1000	1.0000	0.9167	0.7857	0.6875
23	2.3000	2.0909	1.9167	1.6429	1.4375	1.2778	1.1500	1.0455	0.9583	0.8214	0.7188
24	2.4000	2.1818	2.0000	1.7143	1.5000	1.3333	1.2000	1.0909	1.0000	0.8571	0.7500
25	2.5000	2.2727	2.0833	1.7857	1.5625	1.3889	1.2500	1.1364	1.0417	0.8929	0.7812
26	2.6000	2.3636	2.1667	1.8571	1.6250	1.4444	1.3000	1.1818	1.0833	0.9286	0.8125
27	2.7000	2.4545	2.2500	1.9286	1.6875	1.5000	1.3500	1.2273	1.1250	0.9643	0.8438
28	2.8000	2.5455	2.3333	2.0000	1.7500	1.5556	1.4000	1.2727	1.1667	1.0000	0.8750
29	2.9000	2.6364	2.4167	2.0714	1.8125	1.6111	1.4500	1.3182	1.2083	1.0357	0.9062
30	3.0000	2.7273	2.5000	2.1429	1.8750	1.6667	1.5000	1.3636	1.2500	1.0714	0.9375
31	3.1000	2.8182	2.5833	2.2143	1.9375	1.7222	1.5500	1.4091	1.2917	1.1071	0.9688
32	3.2000	2.9091	2.6667	2.2857	2.0000	1.7778	1.6000	1.4545	1.3333	1.1429	1.0000
33	3.3000	3.0000	2.7500	2.3571	2.0625	1.8333	1.6500	1.5000	1.3750	1.1786	1.0312
34	3.4000	3.0909	2.8333	2.4286	2.1250	1.8889	1.7000	1.5455	1.4167	1.2143	1.0625
35	3.5000	3.1818	2.9167	2.5000	2.1875	1.9444	1.7500	1.5909	1.4583	1.2500	1.0938
36	3.6000	3.2727	3.0000	2.5714	2.2500	2.0000	1.8000	1.6364	1.5000	1.2857	1.1250
37	3.7000	3.3636	3.0833	2.6429	2.3125	2.0556	1.8500	1.6818	1.5417	1.3214	1.1562
38	3.8000	3.4545	3.1667	2.7143	2.3750	2.1111	1.9000	1.7273	1.5833	1.3571	1.1875
39	3.9000	3.5455	3.2500	2.7857	2.4375	2.1667	1.9500	1.7727	1.6250	1.3929	1.2188
40	4.0000	3.6364	3.3333	2.8571	2.5000	2.2222	2.0000	1.8182	1.6667	1.4286	1.2500
41	4.1000	3.7273	3.4167	2.9286	2.5625	2.2778	2.0500	1.8636	1.7083	1.4643	1.2812
42	4.2000	3.8182	3.5000	3.0000	2.6250	2.3333	2.1000	1.9091	1.7500	1.5000	1.3125
43	4.3000	3.9091	3.5833	3.0714	2.6875	2.3889	2.1500	1.9545	1.7917	1.5357	1.3438
44	4.4000	4.0000	3.6667	3.1429	2.7500	2.4444	2.2000	2.0000	1.8333	1.5714	1.3750
45	4.5000	4.0909	3.7500	3.2143	2.8125	2.5000	2.2500	2.0455	1.8750	1.6071	1.4062
46	4.6000	4.1818	3.8333	3.2857	2.8750	2.5556	2.3000	2.0909	1.9167	1.6429	1.4375
47	4.7000	4.2727	3.9167	3.3571	2.9375	2.6111	2.3500	2.1364	1.9583	1.6786	1.4688
48	4.8000	4.3636	4.0000	3.4286	3.0000	2.6667	2.4000	2.1818	2.0000	1.7143	1.5000
49	4.9000	4.4545	4.0833	3.5000	3.0625	2.7222	2.4500	2.2273	2.0417	1.7500	1.5312
50	5.0000	4.5455	4.1667	3.5714	3.1250	2.7778	2.5000	2.2727	2.0833	1.7857	1.5625
51	5.1000	4.6364	4.2500	3.6429	3.1875	2.8333	2.5500	2.3122	2.1250	1.8214	1.5938
52	5.2000	4.7273	4.3333	3.7143	3.2500	2.8889	2.6000	2.3636	2.1667	1.8571	1.6250
53	5.3000	4.8182	4.4167	3.7857	3.3125	2.9444	2.6500	2.4091	2.2083	1.8929	1.6562
54	5.4000	4.9091	4.5000	3.8571	3.3750	3.0000	2.7000	2.4545	2.2500	1.9286	1.6875
55	5.5000	5.0000	4.5833	3.9286	3.4375	3.0556	2.7500	2.5000	2.2917	1.9643	1.7188
56	5.6000	5.0909	4.6667	4.0000	3.5000	3.1111	2.8000	2.5455	2.3333	2.0000	1.7500
57	5.7000	5.1818	4.7500	4.0714	3.5625	3.1667	2.8500	2.5909	2.3750	2.0357	1.7812
58	5.8000	5.2727	4.8333	4.1429	3.6250	3.2222	2.9000	2.6364	2.4167	2.0714	1.8125
59	5.9000	5.3636	4.9167	4.2143	3.6875	3.2778	2.9500	2.6818	2.4583	2.1071	1.8438
60	6.0000	5.4545	5.0000	4.2857	3.7500	3.3333	3.0000	2.7273	2.5000	2.1429	1.8750
61	6.1000	5.5455	5.0833	4.3571	3.8125	3.3889	3.0500	2.7727	2.5417	2.1786	1.9062
62	6.2000	5.6364	5.1667	4.4286	3.8750	3.4444	3.1000	2.8182	2.5833	2.2143	1.9375
63	6.3000	5.7273	5.2500	4.5000	3.9375	3.5000	3.1500	2.8636	2.6250	2.2500	1.9688
64	6.4000	5.8182	5.3333	4.5714	4.0000	3.5556	3.2000	2.9091	2.6667	2.2857	2.0000
65	6.5000	5.9091	5.4167	4.6429	4.0625	3.6111	3.2500	2.9545	2.7083	2.3214	2.0312
66	6.6000	6.0000	5.5000	4.7143	4.1250	3.6667	3.3000	3.0000	2.7500	2.3571	2.0625
67	6.7000	6.0909	5.5833	4.7857	4.1875	3.7222	3.3500	3.0455	2.7917	2.3929	2.0938
68	6.8000	6.1818	5.6667	4.8571	4.2500	3.7778	3.4000	3.0909	2.8333	2.4286	2.1250
69	6.9000	6.2727	5.7500	4.9286	4.3125	3.8333	3.4500	3.1364	2.8750	2.4643	2.1562
70	7.0000	6.3636	5.8333	5.0000	4.3750	3.8889	3.5000	3.1818	2.9167	2.5000	2.1875

Outside diameter of a standard full-depth gear equals the pitch diameter for a gear of the same diametral pitch but with 2 more teeth.

BẢNG 2 : ĐƯỜNG KÍNH BƯỚC CHO BÁNH RĂNG

BƯỚC KÍNH

Table 2. PITCH DIAMETERS OF DIAMETRAL PITCH GEARS

No. of Teeth	Diametral Pitch											
	10	11	12	14	16	18	20	22	24	28	32	
	Pitch Diameter											
71	7.1000	6.4545	5.9167	5.0714	4.4375	3.9444	3.5500	3.2273	2.9583	2.5357	2.2188	
72	7.2000	6.5455	6.0000	5.1429	4.5000	4.0000	3.6000	3.2727	3.0000	2.5714	2.2500	
73	7.3000	6.6304	6.0833	5.2143	4.5625	4.0556	3.6500	3.3182	3.0417	2.6071	2.2812	
74	7.4000	6.7273	6.1667	5.2857	4.6250	4.1111	3.7000	3.3636	3.0833	2.6429	2.3125	
75	7.5000	6.8182	6.2500	5.3571	4.6875	4.1667	3.7500	3.4091	3.1250	2.6786	2.3438	
76	7.6000	6.9091	6.3333	5.4286	4.7500	4.2222	3.8000	3.4545	3.1667	2.7143	2.3750	
77	7.7000	7.0000	6.4167	5.5000	4.8125	4.2778	3.8500	3.5000	3.2083	2.7500	2.4062	
78	7.8000	7.0909	6.5000	5.5714	4.8750	4.3333	3.9000	3.5455	3.2500	2.7857	2.4375	
79	7.9000	7.1818	6.5833	5.6429	4.9375	4.3889	3.9500	3.5909	3.2917	2.8214	2.4688	
80	8.0000	7.2727	6.6667	5.7143	5.0000	4.4444	4.0000	3.6364	3.3333	2.8571	2.5000	
81	8.1000	7.3636	6.7500	5.7857	5.0625	4.5000	4.0500	3.6818	3.3750	2.8929	2.5312	
82	8.2000	7.4545	6.8333	5.8571	5.1250	4.5556	4.1000	3.7373	3.4167	2.9286	2.5625	
83	8.3000	7.5455	6.9167	5.9286	5.1875	4.6111	4.1500	3.7727	3.4583	2.9643	2.5938	
84	8.4000	7.6364	7.0000	6.0000	5.2500	4.6667	4.2000	3.8182	3.5000	3.0000	2.6250	
85	8.5000	7.7273	7.0833	6.0714	5.3125	4.7222	4.2500	3.8636	3.5417	3.0357	2.6562	
86	8.6000	7.8182	7.1667	6.1429	5.3750	4.7778	4.3000	3.9091	3.5833	3.0714	2.6875	
87	8.7000	7.9091	7.2500	6.2143	5.4375	4.8333	4.3500	3.9545	3.6250	3.1071	2.7188	
88	8.8000	8.0000	7.3333	6.2857	5.5000	4.8889	4.4000	4.0000	3.6667	3.1429	2.7500	
89	8.9000	8.0909	7.4167	6.3571	5.5625	4.9444	4.4500	4.0455	3.7083	3.1786	2.7812	
90	9.0000	8.1818	7.5000	6.4286	5.6250	5.0000	4.5000	4.0909	3.7500	3.2143	2.8125	
91	9.1000	8.2727	7.5833	6.5000	5.6875	5.0556	4.5500	4.1364	3.7917	3.2500	2.8438	
92	9.2000	8.3636	7.6667	6.5714	5.7500	5.1111	4.6000	4.1818	3.8333	3.2857	2.8750	
93	9.3000	8.4545	7.7500	6.6429	5.8125	5.1667	4.6500	4.2273	3.8750	3.3214	2.9062	
94	9.4000	8.5455	7.8333	6.7143	5.8750	5.2222	4.7000	4.2727	3.9167	3.3571	2.9375	
95	9.5000	8.6364	7.9167	6.7857	5.9375	5.2778	4.7500	4.3182	3.9583	3.3929	2.9688	
96	9.6000	8.7273	8.0000	6.8571	6.0000	5.3333	4.8000	4.3636	4.0000	3.4286	3.0000	
97	9.7000	8.8182	8.0833	6.9286	6.0625	5.3889	4.8500	4.4091	4.0417	3.4643	3.0312	
98	9.8000	8.9091	8.1667	7.0000	6.1250	5.4444	4.9000	4.4545	4.0833	3.5000	3.0625	
99	9.9000	9.0000	8.2500	7.0714	6.1875	5.5000	4.9500	4.5000	4.1250	3.5357	3.0938	
100	10.0000	9.0909	8.3333	7.1429	6.2500	5.5556	5.0000	4.5455	4.1667	3.5714	3.1250	
101	10.1000	9.1818	8.4167	7.2143	6.3125	5.6111	5.0500	4.5909	4.2083	3.6071	3.1562	
102	10.2000	9.2727	8.5000	7.2857	6.3750	5.6667	5.1000	4.6364	4.2500	3.6429	3.1875	
103	10.3000	9.3636	8.5833	7.3571	6.4375	5.7222	5.1500	4.6818	4.2917	3.6786	3.2188	
104	10.4000	9.4545	8.6667	7.4286	6.5000	5.7778	5.2000	4.7273	4.3333	3.7143	3.2500	
105	10.5000	9.5455	8.7500	7.5000	6.5625	5.8333	5.2500	4.7727	4.3750	3.7500	3.2812	
106	10.6000	9.6364	8.8333	7.5714	6.6250	5.8889	5.3000	4.8182	4.4167	3.7857	3.3125	
107	10.7000	9.7273	8.9167	7.6429	6.6875	5.9444	5.3500	4.8636	4.4583	3.8214	3.3438	
108	10.8000	9.8182	9.0000	7.7143	6.7500	6.0000	5.4000	4.9091	4.5000	3.8571	3.3750	
109	10.9000	9.9091	9.0833	7.7857	6.8125	6.0556	5.4500	4.9545	4.5417	3.8929	3.4062	
110	11.0000	10.0000	9.1667	7.8571	6.8750	6.1111	5.5000	5.0000	4.5833	3.9286	3.4375	
111	11.1000	10.0909	9.2500	7.9286	6.9375	6.1667	5.5500	5.0455	4.6250	3.9643	3.4688	
112	11.2000	10.1818	9.3333	8.0000	7.0000	6.2222	5.6000	5.0909	4.6667	4.0000	3.5000	
113	11.3000	10.2727	9.4167	8.0714	7.0625	6.2778	5.6500	5.1364	4.7083	4.0357	3.5312	
114	11.4000	10.3636	9.5000	8.1429	7.1250	6.3333	5.7000	5.1818	4.7500	4.0714	3.5625	
115	11.5000	10.4545	9.5833	8.2143	7.1875	6.3889	5.7500	5.2273	4.7917	4.1071	3.5938	
116	11.6000	10.5455	9.6667	8.2857	7.2500	6.4444	5.8000	5.2727	4.8333	4.1429	3.6250	
117	11.7000	10.6364	9.7500	8.3571	7.3125	6.5000	5.8500	5.3182	4.8750	4.1786	3.6562	
118	11.8000	10.7273	9.8333	8.4286	7.3750	6.5556	5.9000	5.3636	4.9167	4.2143	3.6875	
119	11.9000	10.8182	9.9167	8.5000	7.4375	6.6111	5.9500	5.4091	4.9583	4.2500	3.7188	
120	12.0000	10.9091	10.0000	8.5714	7.5000	6.6667	6.0000	5.4545	5.0000	4.2857	3.7500	
121	12.1000	11.0000	10.0833	8.6429	7.5625	6.7222	6.0500	5.5000	5.0417	4.3214	3.7812	
122	12.2000	11.0909	10.1667	8.7143	7.6250	6.7778	6.1000	5.5455	5.0833	4.3571	3.8125	
123	12.3000	11.1818	10.2500	8.7857	7.6875	6.8333	6.1500	5.5909	5.1250	4.3929	3.8438	
124	12.4000	11.2727	10.3333	8.8571	7.7500	6.8889	6.2000	5.6364	5.1667	4.4286	3.8750	
125	12.5000	11.3636	10.4167	8.9286	7.8125	6.9444	6.2500	5.6818	5.2083	4.4643	3.9062	
126	12.6000	11.4545	10.5000	9.0000	7.8750	7.0000	6.3000	5.7273	5.2500	4.5000	3.9375	
127	12.7000	11.5455	10.5833	9.0714	7.9375	7.0556	6.3500	5.7727	5.2917	4.5357	3.9688	
128	12.8000	11.6364	10.6667	9.1429	8.0000	7.1111	6.4000	5.8182	5.3333	4.5714	4.0000	
129	12.9000	11.7273	10.7500	9.2143	8.0625	7.1667	6.4500	5.8636	5.3750	4.6071	4.0312	
130	13.0000	11.8182	10.8333	9.2857	8.1250	7.2222	6.5000	5.9091	5.4167	4.6429	4.0625	

Outside diameter of a standard full-depth gear equals the pitch diameter for a gear of the same diametral pitch but with 2 more teeth.

BẢNG 2 : ĐƯỜNG KÍNH BƯỚC CHO BÁNH RĂNG

BƯỚC KÍNH

Table 2. PITCH DIAMETERS OF DIAMETRAL PITCH GEARS

No. of Teeth	Diametral Pitch											
	36	40	44	48	56	64	72	80	96	120	128	
	Pitch Diameter											
10	0.2778	0.2500	0.2273	0.2083	0.1786	0.1562	0.1389	0.1250	0.1042	0.0833	0.0781	
11	0.3056	0.2750	0.2500	0.2292	0.1964	0.1719	0.1528	0.1375	0.1146	0.0917	0.0859	
12	0.3333	0.3000	0.2727	0.2500	0.2143	0.1875	0.1667	0.1500	0.1250	0.1000	0.0938	
13	0.3611	0.3250	0.2955	0.2708	0.2321	0.2031	0.1806	0.1625	0.1354	0.1083	0.1016	
14	0.3889	0.3500	0.3182	0.2917	0.2500	0.2188	0.1944	0.1750	0.1458	0.1167	0.1094	
15	0.4167	0.3750	0.3409	0.3125	0.2679	0.2344	0.2083	0.1875	0.1562	0.1250	0.1172	
16	0.4444	0.4000	0.3636	0.3333	0.2857	0.2500	0.2222	0.2000	0.1667	0.1333	0.1250	
17	0.4722	0.4250	0.3864	0.3542	0.3036	0.2656	0.2361	0.2125	0.1771	0.1417	0.1328	
18	0.5000	0.4500	0.4091	0.3750	0.3214	0.2812	0.2500	0.2250	0.1875	0.1500	0.1406	
19	0.5278	0.4750	0.4318	0.3958	0.3393	0.2969	0.2639	0.2375	0.1979	0.1583	0.1484	
20	0.5556	0.5000	0.4545	0.4167	0.3571	0.3125	0.2778	0.2500	0.2083	0.1667	0.1562	
21	0.5833	0.5250	0.4773	0.4375	0.3750	0.3281	0.2917	0.2625	0.2187	0.1750	0.1641	
22	0.6111	0.5500	0.5000	0.4583	0.3929	0.3438	0.3056	0.2750	0.2292	0.1833	0.1719	
23	0.6389	0.5750	0.5227	0.4792	0.4107	0.3594	0.3194	0.2875	0.2396	0.1917	0.1797	
24	0.6667	0.6000	0.5455	0.5000	0.4286	0.3750	0.3333	0.3000	0.2500	0.2000	0.1875	
25	0.6944	0.6250	0.5682	0.5208	0.4464	0.3906	0.3472	0.3125	0.2604	0.2083	0.1953	
26	0.7222	0.6500	0.5909	0.5417	0.4643	0.4062	0.3611	0.3250	0.2708	0.2167	0.2031	
27	0.7500	0.6750	0.6136	0.5625	0.4821	0.4219	0.3750	0.3375	0.2812	0.2250	0.2109	
28	0.7778	0.7000	0.6304	0.5833	0.5000	0.4375	0.3889	0.3500	0.2917	0.2333	0.2188	
29	0.8056	0.7250	0.6591	0.6042	0.5179	0.4531	0.4028	0.3625	0.3021	0.2417	0.2266	
30	0.8333	0.7500	0.6818	0.6250	0.5357	0.4688	0.4167	0.3750	0.3125	0.2500	0.2344	
31	0.8611	0.7750	0.7045	0.6458	0.5536	0.4844	0.4306	0.3875	0.3229	0.2583	0.2422	
32	0.8889	0.8000	0.7273	0.6667	0.5714	0.5000	0.4444	0.4000	0.3333	0.2667	0.2500	
33	0.9167	0.8250	0.7500	0.6875	0.5893	0.5156	0.4583	0.4125	0.3437	0.2750	0.2578	
34	0.9444	0.8500	0.7727	0.7083	0.6071	0.5312	0.4722	0.4250	0.3542	0.2833	0.2656	
35	0.9722	0.8750	0.7955	0.7292	0.6250	0.5469	0.4861	0.4375	0.3646	0.2917	0.2734	
36	1.0000	0.9000	0.8182	0.7500	0.6429	0.5625	0.5000	0.4500	0.3750	0.3000	0.2812	
37	1.0278	0.9250	0.8409	0.7708	0.6607	0.5781	0.5139	0.4625	0.3854	0.3083	0.2891	
38	1.0556	0.9500	0.8636	0.7917	0.6786	0.5938	0.5278	0.4750	0.3958	0.3167	0.2969	
39	1.0833	0.9750	0.8864	0.8125	0.6964	0.6094	0.5417	0.4875	0.4062	0.3250	0.3047	
40	1.1111	1.0000	0.9091	0.8333	0.7143	0.6250	0.5556	0.5000	0.4167	0.3333	0.3125	
41	1.1389	1.0250	0.9318	0.8542	0.7321	0.6406	0.5694	0.5125	0.4271	0.3417	0.3203	
42	1.1667	1.0500	0.9545	0.8750	0.7500	0.6562	0.5833	0.5250	0.4375	0.3500	0.3281	
43	1.1944	1.0750	0.9773	0.8958	0.7679	0.6719	0.5972	0.5375	0.4479	0.3583	0.3359	
44	1.2222	1.1000	1.0000	0.9167	0.7857	0.6875	0.6111	0.5500	0.4583	0.3667	0.3438	
45	1.2500	1.1250	1.0227	0.9375	0.8036	0.7031	0.6250	0.5625	0.4687	0.3750	0.3516	
46	1.2778	1.1500	1.0455	0.9583	0.8214	0.7188	0.6389	0.5750	0.4792	0.3833	0.3594	
47	1.3056	1.1750	1.0682	0.9792	0.8393	0.7344	0.6528	0.5875	0.4896	0.3917	0.3672	
48	1.3333	1.2000	1.0909	1.0000	0.8571	0.7500	0.6667	0.6000	0.5000	0.4000	0.3750	
49	1.3611	1.2250	1.1136	1.0208	0.8750	0.7656	0.6806	0.6125	0.5104	0.4083	0.3828	
50	1.3889	1.2500	1.1364	1.0417	0.8929	0.7812	0.6944	0.6250	0.5208	0.4167	0.3906	
51	1.4167	1.2750	1.1591	1.0625	0.9107	0.7969	0.7083	0.6375	0.5312	0.4250	0.3984	
52	1.4444	1.3000	1.1818	1.0833	0.9286	0.8125	0.7222	0.6500	0.5417	0.4333	0.4062	
53	1.4722	1.3250	1.2045	1.1042	0.9464	0.8281	0.7361	0.6625	0.5521	0.4417	0.4141	
54	1.5000	1.3500	1.2273	1.1250	0.9643	0.8438	0.7500	0.6750	0.5625	0.4500	0.4219	
55	1.5278	1.3750	1.2500	1.1458	0.9821	0.8594	0.7639	0.6875	0.5729	0.4583	0.4297	
56	1.5556	1.4000	1.2727	1.1667	1.0000	0.8750	0.7778	0.7000	0.5833	0.4667	0.4375	
57	1.5833	1.4250	1.2955	1.1875	1.0179	0.8906	0.7917	0.7125	0.5937	0.4750	0.4453	
58	1.6111	1.4500	1.3182	1.2083	1.0357	0.9062	0.8056	0.7250	0.6042	0.4833	0.4531	
59	1.6389	1.4750	1.3409	1.2292	1.0536	0.9219	0.8194	0.7375	0.6146	0.4917	0.4609	
60	1.6667	1.5000	1.3636	1.2500	1.0714	0.9375	0.8333	0.7500	0.6250	0.5000	0.4688	
61	1.6944	1.5250	1.3864	1.2708	1.0893	0.9531	0.8472	0.7625	0.6354	0.5083	0.4766	
62	1.7222	1.5500	1.4091	1.2917	1.1071	0.9688	0.8611	0.7750	0.6458	0.5167	0.4844	
63	1.7500	1.5750	1.4318	1.3125	1.1250	0.9844	0.8750	0.7875	0.6562	0.5250	0.4922	
64	1.7778	1.6000	1.4545	1.3333	1.1429	1.0000	0.8889	0.8000	0.6667	0.5333	0.5000	
65	1.8056	1.6250	1.4773	1.3542	1.1607	1.0156	0.9028	0.8125	0.6771	0.5417	0.5078	
66	1.8333	1.6500	1.5000	1.3750	1.1786	1.0312	0.9167	0.8250	0.6875	0.5500	0.5156	
67	1.8611	1.6750	1.5227	1.3958	1.1964	1.0469	0.9306	0.8375	0.6979	0.5583	0.5234	
68	1.8889	1.7000	1.5455	1.4167	1.2143	1.0625	0.9444	0.8500	0.7083	0.5667	0.5312	
69	1.9167	1.7250	1.5682	1.4375	1.2321	1.0781	0.9593	0.8625	0.7187	0.5750	0.5391	
70	1.9444	1.7500	1.5909	1.4583	1.2500	1.0938	0.9722	0.8750	0.7292	0.5833	0.5469	

Outside diameter of a standard full-depth gear equals the pitch diameter for a gear of the same diametral pitch but with 2 more teeth.

BẢNG 2: ĐƯỜNG KÍNH BƯỚC CHO BÁNH RĂNG

BƯỚC KÍNH

Table 2. PITCH DIAMETERS OF DIAMETRAL PITCH GEARS

No. of Teeth	Diametral Pitch											
	36	40	44	48	56	64	72	80	96	120	128	
	Pitch Diameter											
71	1.9722	1.7750	1.6136	1.4792	1.2679	1.1094	0.9861	0.8875	0.7396	0.5917	0.5547	
72	2.0000	1.8000	1.6364	1.5000	1.2857	1.1250	1.0000	0.9000	0.7500	0.6000	0.5625	
73	2.0278	1.8250	1.6591	1.5208	1.3036	1.1406	1.0139	0.9125	0.7604	0.6083	0.5703	
74	2.0556	1.8500	1.6818	1.5417	1.3214	1.1562	1.0278	0.9250	0.7708	0.6167	0.5781	
75	2.0833	1.8750	1.7045	1.5625	1.3393	1.1719	1.0417	0.9375	0.7812	0.6250	0.5859	
76	2.1111	1.9000	1.7273	1.5833	1.3571	1.1875	1.0556	0.9500	0.7917	0.6333	0.5938	
77	2.1389	1.9250	1.7500	1.6042	1.3750	1.2031	1.0694	0.9625	0.8021	0.6417	0.6016	
78	2.1667	1.9500	1.7727	1.6250	1.3929	1.2188	1.0833	0.9750	0.8125	0.6500	0.6094	
79	2.1944	1.9750	1.7955	1.6458	1.4107	1.2344	1.0972	0.9875	0.8229	0.6583	0.6172	
80	2.2222	2.0000	1.8182	1.6667	1.4286	1.2500	1.1111	1.0000	0.8333	0.6667	0.6250	
81	2.2500	2.0250	1.8409	1.6875	1.4464	1.2656	1.1250	1.0125	0.8437	0.6750	0.6328	
82	2.2778	2.0500	1.8636	1.7083	1.4643	1.2812	1.1389	1.0250	0.8542	0.6833	0.6406	
83	2.3056	2.0750	1.8864	1.7292	1.4821	1.2969	1.1528	1.0375	0.8646	0.6917	0.6484	
84	2.3333	2.1000	1.9091	1.7500	1.5000	1.3125	1.1667	1.0500	0.8750	0.7000	0.6562	
85	2.3611	2.1250	1.9318	1.7708	1.5179	1.3281	1.1806	1.0625	0.8854	0.7083	0.6641	
86	2.3889	2.1500	1.9545	1.7917	1.5357	1.3438	1.1944	1.0750	0.8958	0.7167	0.6719	
87	2.4167	2.1750	1.9773	1.8125	1.5536	1.3594	1.2083	1.0875	0.9062	0.7250	0.6797	
88	2.4444	2.2000	2.0000	1.8333	1.5714	1.3750	1.2222	1.1000	0.9167	0.7333	0.6875	
89	2.4722	2.2250	2.0227	1.8542	1.5893	1.3906	1.2361	1.1125	0.9271	0.7417	0.6953	
90	2.5000	2.2500	2.0455	1.8750	1.6071	1.4062	1.2500	1.1250	0.9375	0.7500	0.7031	
91	2.5278	2.2750	2.0682	1.8958	1.6250	1.4219	1.2639	1.1375	0.9479	0.7583	0.7109	
92	2.5556	2.3000	2.0909	1.9167	1.6429	1.4375	1.2778	1.1500	0.9583	0.7667	0.7188	
93	2.5833	2.3250	2.1136	1.9375	1.6607	1.4531	1.2917	1.1625	0.9687	0.7750	0.7266	
94	2.6111	2.3500	2.1364	1.9583	1.6786	1.4688	1.3056	1.1750	0.9792	0.7833	0.7344	
95	2.6389	2.3750	2.1591	1.9792	1.6964	1.4844	1.3194	1.1875	0.9896	0.7917	0.7422	
96	2.6667	2.4000	2.1818	2.0000	1.7143	1.5000	1.3333	1.2000	1.0000	0.8000	0.7500	
97	2.6944	2.4250	2.2045	2.0208	1.7321	1.5156	1.3472	1.2125	1.0104	0.8083	0.7578	
98	2.7222	2.4500	2.2273	2.0417	1.7500	1.5312	1.3611	1.2250	1.0208	0.8167	0.7656	
99	2.7500	2.4750	2.2500	2.0625	1.7679	1.5469	1.3750	1.2375	1.0312	0.8250	0.7734	
100	2.7778	2.5000	2.2727	2.0833	1.7857	1.5625	1.3889	1.2500	1.0417	0.8333	0.7812	
101	2.8056	2.5250	2.2955	2.1042	1.8036	1.5781	1.4028	1.2625	1.0521	0.8417	0.7891	
102	2.8333	2.5500	2.3182	2.1250	1.8214	1.5938	1.4167	1.2750	1.0625	0.8500	0.7969	
103	2.8611	2.5750	2.3409	2.1458	1.8393	1.6094	1.4306	1.2875	1.0729	0.8583	0.8047	
104	2.8889	2.6000	2.3636	2.1667	1.8571	1.6250	1.4444	1.3000	1.0833	0.8667	0.8125	
105	2.9167	2.6250	2.3864	2.1875	1.8750	1.6406	1.4583	1.3125	1.0937	0.8750	0.8203	
106	2.9444	2.6500	2.4091	2.2083	1.8929	1.6562	1.4722	1.3250	1.1042	0.8833	0.8281	
107	2.9722	2.6750	2.4318	2.2292	1.9107	1.6719	1.4861	1.3375	1.1146	0.8917	0.8359	
108	3.0000	2.7000	2.4545	2.2500	1.9286	1.6875	1.5000	1.3500	1.1250	0.9000	0.8438	
109	3.0278	2.7250	2.4773	2.2708	1.9464	1.7031	1.5139	1.3625	1.1354	0.9083	0.8516	
110	3.0556	2.7500	2.5000	2.2917	1.9643	1.7188	1.5278	1.3750	1.1458	0.9167	0.8594	
111	3.0833	2.7750	2.5227	2.3125	1.9821	1.7344	1.5417	1.3875	1.1562	0.9250	0.8672	
112	3.1111	2.8000	2.5455	2.3333	2.0000	1.7500	1.5556	1.4000	1.1667	0.9333	0.8750	
113	3.1389	2.8250	2.5682	2.3542	2.0179	1.7656	1.5694	1.4125	1.1771	0.9417	0.8828	
114	3.1667	2.8500	2.5909	2.3750	2.0357	1.7812	1.5833	1.4250	1.1875	0.9500	0.8906	
115	3.1944	2.8750	2.6136	2.3958	2.0536	1.7969	1.5972	1.4375	1.1979	0.9583	0.8984	
116	3.2222	2.9000	2.6364	2.4167	2.0714	1.8125	1.6111	1.4500	1.2083	0.9667	0.9062	
117	3.2500	2.9250	2.6591	2.4375	2.0893	1.8281	1.6250	1.4625	1.2187	0.9750	0.9141	
118	3.2778	2.9500	2.6818	2.4583	2.1071	1.8438	1.6389	1.4750	1.2292	0.9833	0.9219	
119	3.3056	2.9750	2.7045	2.4792	2.1250	1.8594	1.6528	1.4875	1.2396	0.9917	0.9297	
120	3.3333	3.0000	2.7273	2.5000	2.1429	1.8750	1.6667	1.5000	1.2500	1.0000	0.9375	
121	3.3611	3.0250	2.7500	2.5208	2.1607	1.8906	1.6806	1.5125	1.2604	1.0083	0.9453	
122	3.3889	3.0500	2.7727	2.5417	2.1786	1.9062	1.6944	1.5250	1.2708	1.0167	0.9531	
123	3.4167	3.0750	2.7955	2.5625	2.1964	1.9219	1.7083	1.5375	1.2812	1.0250	0.9609	
124	3.4444	3.1000	2.8182	2.5833	2.2143	1.9375	1.7222	1.5500	1.2917	1.0333	0.9688	
125	3.4722	3.1250	2.8409	2.6042	2.2321	1.9531	1.7361	1.5625	1.3021	1.0417	0.9766	
126	3.5000	3.1500	2.8636	2.6250	2.2500	1.9688	1.7500	1.5750	1.3125	1.0500	0.9844	
127	3.5278	3.1750	2.8864	2.6458	2.2679	1.9844	1.7639	1.5875	1.3229	1.0583	0.9922	
128	3.5556	3.2000	2.9091	2.6667	2.2857	2.0000	1.7778	1.6000	1.3333	1.0667	1.0000	
129	3.5833	3.2250	2.9318	2.6875	2.3036	2.0156	1.7917	1.6125	1.3437	1.0750	1.0078	
130	3.6111	3.2500	2.9545	2.7083	2.3214	2.0312	1.8056	1.6250	1.3542	1.0833	1.0156	

Outside diameter of a standard full-depth gear equals the pitch diameter for a gear of the same diametral pitch but with 2 more teeth.

BẢNG 3 : ĐÀU RĂNG VÀ CHIỀU CAO CHÂN RĂNG CỦA CÁC RĂNG CHIỀU SÂU THÂN KHAI TOÀN PHẦN TIÊU

CHUẨN 14 ¹/₂ VÀ 20 ĐỘ (19P VÀ THỎ HƠN)

Dia- metral Pitch, P	St'd. Adden.	St'd. Min. Deden.	Shaping Deden.	Pre-shaving Dedendum		
	$\frac{1}{P}$	$\frac{1.157}{P}$	$\frac{1.25}{P}$	$\frac{1.35}{P}$	$\frac{1.45}{P}$	—
		Note 1	Note 2	Note 3	Note 4	Note 5
2.5	0.4000	0.4628	0.5000	0.5400	0.5800	0.4900
3	0.3333	0.3857	0.4167	0.4500	0.4833	0.4163
3.5	0.2857	0.3306	0.3571	0.3857	0.4143	0.3597
4	0.2500	0.2892	0.3125	0.3375	0.3625	0.3180
4.5	0.2222	0.2571	0.2778	0.3000	0.3222	0.2822
5	0.2000	0.2314	0.2500	0.2700	0.2900	0.2560
6	0.1667	0.1928	0.2083	0.2250	0.2417	0.2167
7	0.1429	0.1653	0.1786	0.1929	0.2071	0.1869
8	0.1250	0.1446	0.1562	0.1688	0.1812	0.1650
9	0.1111	0.1286	0.1389	0.1500	0.1611	0.1491
10	0.1000	0.1157	0.1250	0.1350	0.1450	0.1350
11	0.0909	0.1052	0.1136	0.1227	0.1318	0.1229
12	0.0833	0.0964	0.1042	0.1125	0.1208	0.1113
14	0.0714	0.0826	0.0893	0.0964	0.1036	0.0974
16	0.0625	0.0723	0.0781	0.0844	0.0906	0.0855
18	0.0556	0.0643	0.0694	0.0750	0.0806	0.0766

Note 1: Standard Minimum dedendums. Used for finish-hobbed gears.

Note 2: Dedendums recommended for shaped gears.

Note 3: Dedendums recommended by Michigan Tool Co. for pre-shaved gears.

Note 4: Dedendums recommended by the Fellows Gear Shaper Co. for pre-shaved gears of 13 to 30 teeth with 14½-degree pressure angle or 13 to 20 teeth with 20-degree pressure angle. These dedendums provide additional depth for pre-shaving by shaping. For 14½-degree gears with over 30 teeth and 20-degree gears with over 20 teeth this company recommends a special protuberance-type cutter for pre-shaving.

Note 5: Dedendums based upon clearances recommended for pre-shaved gears by National Broach & Machine Co.

BẢNG 4 : ĐÀU RĂNG VÀ CHIỀU CAO CHÂN RĂNG CỦA CÁC RĂNG , CHIỀU SÂU THÂN KHAI TOÀN PHẦN,

BƯỚC MỊN. TIÊU CHUẨN 20 ĐỘ (20P VÀ MỊN HƠN)

Dia- metral Pitch, P	St'd. Adden.	St'd. Deden.	Pre-shaving Dedendum		Dia- metral Pitch, P	St'd. Adden.	St'd. Deden.	Pre-shaving Dedendum	
	$\frac{1}{P}$	$\frac{1.2}{P} + .002$	$\frac{1.35}{P} + .002$	—		$\frac{1}{P}$	$\frac{1.2}{P} + .002$	$\frac{1.35}{P} + .002$	—
20	0.0500	0.0620	0.0695	0.0700	48	0.0208	0.0270	0.0301	0.0338
22	0.0454	0.0566	0.0634	0.0654	50	0.0179	0.0234	0.0261	0.0288
24	0.0417	0.0520	0.0582	0.0597	64	0.0156	0.0208	0.0231	0.0256
28	0.0357	0.0449	0.0502	0.0547	72	0.0139	0.0190	0.0207	0.0239
32	0.0312	0.0395	0.0442	0.0492	80	0.0125	0.0170	0.0189	...
36	0.0278	0.0353	0.0395	0.0438	96	0.0104	0.0145	0.0161	...
40	0.0250	0.0320	0.0357	0.0400	120	0.0083	0.0120	0.0132	...
44	0.0227	0.0293	0.0326	0.0367	128	0.0078	0.0114	0.0125	...

**BẢNG 5 : ĐẦU RĂNG VÀ CHIỀU CHÂN RĂNG CỦA CÁC
RĂNG GỐC THÂN KHAI TIÊU CHUẨN 20 ĐỘ**

*Table 5. ADDENDUMS AND DEDENDUMS OF STANDARD
20-DEGREE INVOLUTE STUB TEETH*

Dia- metral Pitch, P	St'd. Adden.	St'd. Min. Deden.	Pre-shaving Deden.	Dia- metral Pitch, P	St'd. Adden.	St'd. Min. Deden.	Pre-shaving Deden.
	$\frac{0.8}{P}$	$\frac{1}{P}$	$\frac{1.35}{P}$		$\frac{0.8}{P}$	$\frac{1}{P}$	$\frac{1.35}{P}$
		Note 1	Note 2			Note 1	Note 2
2.5	0.3200	0.4000	0.5400	8	0.1000	0.1250	0.1688
3	0.2667	0.3333	0.4500	9	0.0889	0.1111	0.1500
3.5	0.2286	0.2857	0.3857	10	0.0800	0.1000	0.1350
4	0.2000	0.2500	0.3375	11	0.0727	0.0909	0.1227
4.5	0.1778	0.2222	0.3000	12	0.0667	0.0833	0.1125
5	0.1600	0.2000	0.2700	14	0.0571	0.0714	0.0964
6	0.1333	0.1667	0.2250	16	0.0500	0.0625	0.0844
7	0.1143	0.1429	0.1929	18	0.0444	0.0556	0.0750

**BẢNG 6 : ĐẦU RĂNG VÀ CHIỀU CAO CHÂN RĂNG CỦA
CÁC RĂNG CHÂN ĂN KHỚP THÂN KHAI
TIÊU CHUẨN 20 ĐỘ**

Dia- metral Pitch P/P'	St'd. Adden.	St'd. Deden.	Pre-shaving Dedendum		Dia- metral Pitch P/P'	St'd. Adden.	St'd. Deden.	Pre-shaving Dedendum	
	$\frac{1}{P'}$	$\frac{1.25}{P'}$	$\frac{1.35}{P'}$	—		$\frac{1}{P'}$	$\frac{1.25}{P'}$	$\frac{1.35}{P'}$	—
		Note 1	Note 2	Note 3			Note 1	Note 2	Note 3
34	0.2500	0.3125	0.3375	0.3330	1944	0.0417	0.0521	0.0562	0.0627
36	0.2000	0.2500	0.2700	0.2680	2046	0.0385	0.0481	0.0519	0.0585
38	0.1429	0.1786	0.1929	0.1989	2249	0.0345	0.0431	0.0466	0.0545
40	0.1250	0.1562	0.1688	0.1750	2452	0.0312	0.0391	0.0422	0.0513
42	0.1111	0.1389	0.1500	0.1551	2656	0.0286	0.0357	0.0386	0.0476
44	0.1000	0.1250	0.1350	0.1400	2857	0.0270	0.0338	0.0365	0.0460
46	0.0909	0.1136	0.1227	0.1289	3060	0.0250	0.0312	0.0338	0.0430
48	0.0833	0.1042	0.1125	0.1183	3262	0.0238	0.0298	0.0321	0.0418
50	0.0714	0.0893	0.0964	0.1014	3465	0.0222	0.0278	0.0300	0.0392
52	0.0714	0.0893	0.0964	0.1014	3668	0.0208	0.0260	0.0281	0.0368
54	0.0625	0.0781	0.0844	....	3860	0.0200	0.0250	0.0270	0.0360
56	0.0556	0.0694	0.0750	0.0816	4064	0.0185	0.0231	0.0250	0.0335
58	0.0476	0.0595	0.0643	0.0706	....	....	....	....	....

Note 1: Standard dedendums for shaped gears.

Note 2: Dedendums recommended by Michigan Tool Co. for pre-shaved gears.

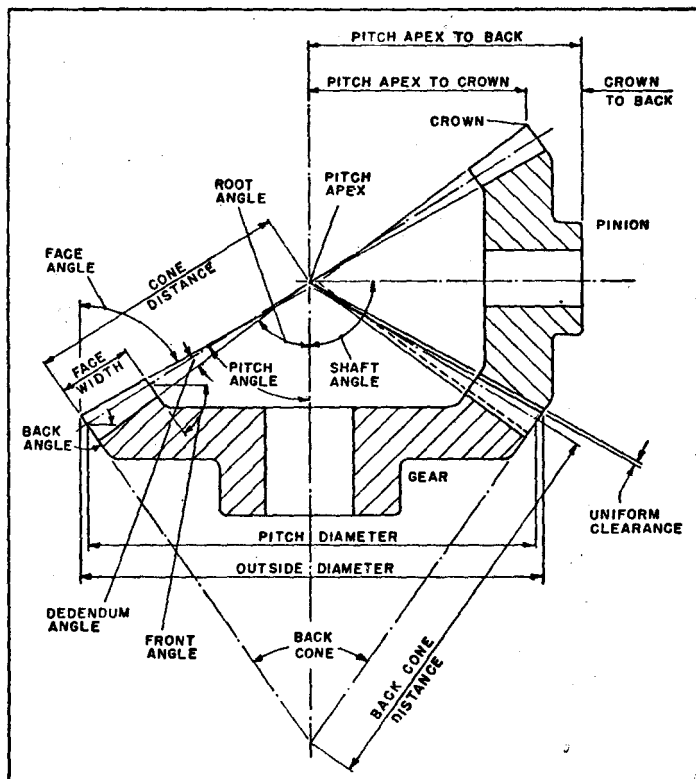
Note 3: Dedendums based on clearances recommended for pre-shaved gears by National Broach & Machine Co.

2. BÃNH RĂNG CÔN

BEVEL GEARING

CHỈ DANH CỦA BÃNH RĂNG CÔN

BEVEL GEAR NOMENCLATURE



American Standard System for Straight Bevel Gears (ASA B6.13-1955). — This system for the design of straight bevel gears is a development from a system originated by the Gleason Works and adopted by the American Gear Manufacturers Association in 1922 and revised in 1940. The general basis of the system and the formulas used to obtain the tooth proportions and blank dimensions are the same as in the revised (1954) Gleason Straight Bevel Gear System which follows:

Working Depth: The working depth is equal to 2.000 inches ÷ diametral pitch. The use of stub teeth is not recommended because the reduction in contact increases noise and decreases wear resistance.

BẢNG 1: CÔNG THỨC CỦA BÃNH RĂNG CÔN THẲNG 20 ĐỘ - GÓC TRỤC 90 ĐỘ

Table 1. FORMULAS FOR 20-DEGREE STRAIGHT BEVEL GEARS -
90-DEGREE SHAFT ANGLE

Given			
1	Number of Pinion Teeth, n	4	Face Width, F
2	Number of Gear Teeth, N	5	Pressure Angle, $\phi = 20^\circ$
3	Diametral Pitch, P	6	Shaft Angle, $\Sigma = 90^\circ$
To Find			
No.	Item	Formula	
		PINION	GEAR
7	Working Depth	$h_k = \frac{2.000}{P}$	Same as pinion
8	Whole Depth	$h_t = \frac{2.188}{P} + 0.002$	Same as pinion
9	Pitch Diameter	$d = \frac{n}{P}$	$D = \frac{N}{P}$
10	Pitch Angle	$\gamma = \tan^{-1} \frac{n}{N}$	$\Gamma = 90^\circ - \gamma$
11	Cone Distance	$A_O = \frac{D}{2 \sin \Gamma}$	Same as pinion
12	Circular Pitch	$p = \frac{3.1416}{P}$	Same as pinion
13	Addendum	$a_P = h_k - a_G$	$a_G = \frac{\text{Table 2}}{P}$
14	Dedendum (See Note 1)	$b_P = \frac{2.188}{P} - a_P$	$b_G = \frac{2.188}{P} - a_G$
15	Clearance	$c = h_t - h_k$	Same as pinion
16	Dedendum Angle	$\delta_R = \tan^{-1} \frac{b_P}{A_O}$	$\delta_G = \tan^{-1} \frac{b_G}{A_O}$
17	Face Angle of Blank	$\gamma_O = \gamma + \delta_G$	$\Gamma_O = \Gamma + \delta_P$
18	Root Angle	$\gamma_R = \gamma - \delta_P$	$\Gamma_R = \Gamma - \delta_G$
19	Outside Diameter	$d_O = d + 2a_P \cos \gamma$	$D_O = D + 2a_G \cos \Gamma$
20	Pitch Apex to Crown	$x_O = \frac{D}{2} - a_P \sin \gamma$	$X_O = \frac{d}{2} - a_G \sin \Gamma$
21	Circular Thickness	$t = p - T$	$T = \frac{p}{2} - (a_P - a_G) \tan \phi$
22	Backlash (See Note 2)	$B = (\text{See Table on page 692})$	
23	Chordal Thickness (See Note 2)	$t_C = t - \frac{t^3}{6d^3} - \frac{B}{2}$	$T_C = T - \frac{T^3}{6D^3} - \frac{B}{2}$
24	Chordal Addendum	$a_{CP} = a_P + \frac{t^2 \cos \gamma}{4d}$	$a_{CG} = a_G + \frac{T^2 \cos \Gamma}{4D}$
25	Tooth Angle	$\frac{3438}{A_O} \left(\frac{t}{2} + b_P \tan \phi \right)$ Minutes	Same as pinion
26	Limit Point Width	$\frac{A_O - F}{A_O} (T - 2b_P \tan \phi) - 0.0015$	Same as pinion
27	Tool Advance	0.002	Same as pinion

All linear dimensions are in inches. Calculation of linear dimensions which affect angular values should be carried to 4 or 5 decimal places.

Note 1: The actual dedendum will be 0.002-inch greater than calculated due to Item 27.

Note 2: The American Standard for Fine-pitch Straight Bevel Gears does not indicate values for B since most fine-pitch bevel gears operate with little backlash.

BẢNG 2 : CHIỀU CAO CHÂN RĂNG CỦA CÁC BÁNH RĂNG CÔN THẲNG CHỦ ĐỘNG

Table 2. GEAR ADDENDA FOR GENERATED STRAIGHT

BEVEL GEARS

(for i diametral pitch and various

gear-to-pinion ratios)

Ratio = Number of teeth in gear + Number of teeth in pinion											
Ratios		Addendum, Inch	Ratios		Addendum, Inch	Ratios		Addendum, Inch	Ratios		Addendum, Inch
From	to		From	to		From	to		From	to	
1.00	1.00	1.000	1.15	1.17	0.880	1.42	1.45	0.760	2.06	2.16	0.640
1.00	1.02	0.990	1.17	1.19	0.870	1.45	1.48	0.750	2.16	2.27	0.630
1.02	1.03	0.980	1.19	1.21	0.860	1.48	1.52	0.740	2.27	2.41	0.620
1.03	1.04	0.970	1.21	1.23	0.850	1.52	1.56	0.730	2.41	2.58	0.610
1.04	1.05	0.960	1.23	1.25	0.840	1.56	1.60	0.720	2.58	2.78	0.600
1.05	1.06	0.950	1.25	1.27	0.830	1.60	1.65	0.710	2.78	3.05	0.590
1.06	1.08	0.940	1.27	1.29	0.820	1.65	1.70	0.700	3.05	3.41	0.580
1.08	1.09	0.930	1.29	1.31	0.810	1.70	1.76	0.690	3.41	3.94	0.570
1.09	1.11	0.920	1.31	1.33	0.800	1.76	1.82	0.680	3.94	4.82	0.560
1.11	1.12	0.910	1.33	1.36	0.790	1.82	1.89	0.670	4.82	6.81	0.550
1.12	1.14	0.900	1.36	1.39	0.780	1.89	1.97	0.660	6.81	∞	0.540
1.14	1.15	0.890	1.39	1.42	0.770	1.97	2.06	0.650	.....	.....	.....

* Select addendum according to ratio of gearing. In case of choice, use the *larger* addendum.

As in the original system, long and short addenda have been adopted for all ratios except those with equal numbers of teeth. A long-addendum pinion and a short-addendum gear have more action in recess than in approach (with pinion driving). have stronger pinion teeth, and can have a lower pressure angle without undercut.

BẢNG 3 : CÔNG THỨC CHO HỆ GLEASON GÓC ÁP SUẤT 20 ĐỘ, BÁNH RĂNG CÔN XOẮN - GÓC TRỤC 90⁽¹⁾

*Table 3. FORMULAS FOR GLEASON SYSTEM 20-DEGREE PRES-
SURE ANGLE, SPIRAL BEVEL
GEARS - 90-DEGREE SHAFT ANGLE*

Given			
1	Number of Pinion Teeth, n	4	Face Width, F
2	Number of Gear Teeth, N	5	Pressure Angle, $\phi = 20^\circ$
3	Diametral Pitch, P	6	Shaft Angle, $\Sigma = 90^\circ$
To Find			
No.	Item	Formula	
		PINION	GEAR
7	Working Depth	$h_k = \frac{1.700}{P}$	Same as pinion
8	Whole Depth	$h_t = \frac{1.888}{P}$	Same as pinion
9	Pitch Diameter	$d = \frac{n}{P}$	$D = \frac{N}{P}$
10	Pitch Angle	$\gamma = \tan^{-1} \frac{n}{N}$	$\Gamma = 90 - \gamma$
11	Cone Distance	$A_O = \frac{D}{2 \sin \Gamma}$	Same as pinion
12	Circular Pitch	$p = \frac{3.1416}{P}$	Same as pinion
13	Addendum	$a_P = h_k - a_G$	$a_G = \frac{\text{Table 4}}{P}$
14	Dedendum	$b_P = h_t - a_P$	$b_G = h_t - a_G$
15	Clearance	$c = h_t - h_k$	Same as pinion
16	Dedendum Angle	$\delta_P = \tan^{-1} \frac{b_P}{A_O}$	$\delta_G = \tan^{-1} \frac{b_G}{A_O}$
17	Face Angle of Blank	$\gamma_O = \gamma + \delta_G$	$\Gamma_O = \Gamma + \delta_P$
18	Root Angle	$\gamma_R = \gamma - \delta_P$	$\Gamma_R = \Gamma - \delta_G$
19	Outside Diameter	$d_O = d + 2a_P \cos \gamma$	$D_O = D + 2a_G \cos \Gamma$
20	Pitch Apex to Crown	$x_O = \frac{D}{2} - a_P \sin \gamma$	$X_O = \frac{d}{2} - a_G \sin \Gamma$
21	Circular Thickness	$t = p - T$	$T = \frac{p}{2} - 1.22(a_P - a_G) \tan \phi$ $\frac{K(\text{Chart 1})}{P}$
22	Backlash*	$B = (\text{See table on page 693})$	

* When the gear is cut spread-blade, all the backlash is taken from the pinion thickness. When both members are cut single-side, each thickness is reduced by half the backlash.

BẢNG 4 : CHIỀU CAO CHÂN RĂNG CỦA CÁC BÁNH RĂNG CÔN XOẮN HỆ GLEASON

Table 4. GEAR ADDENDA FOR GLEASON SYSTEM SPIRAL

BEVEL GEARS

Gearing ratio = Number of gear teeth ÷ Number of pinion teeth											
Ratios		Addendum, Inch	Ratios		Addendum, Inch	Ratios		Addendum, Inch	Ratios		Addendum, Inch
From	to		From	to		From	to		From	to	
1.00	1.00	0.850	1.15	1.17	0.750	1.41	1.44	0.650	1.99	2.10	0.550
1.00	1.02	0.840	1.17	1.19	0.740	1.44	1.48	0.640	2.10	2.23	0.540
1.02	1.03	0.830	1.19	1.21	0.730	1.48	1.52	0.630	2.23	2.38	0.530
1.03	1.05	0.820	1.21	1.23	0.720	1.52	1.57	0.620	2.38	2.58	0.520
1.05	1.06	0.810	1.23	1.26	0.710	1.57	1.63	0.610	2.58	2.82	0.510
1.06	1.08	0.800	1.26	1.28	0.700	1.63	1.68	0.600	2.82	3.17	0.500
1.08	1.09	0.790	1.28	1.31	0.690	1.68	1.75	0.590	3.17	3.67	0.490
1.09	1.11	0.780	1.31	1.34	0.680	1.75	1.82	0.580	3.67	4.56	0.480
1.11	1.13	0.770	1.34	1.37	0.670	1.82	1.90	0.570	4.56	7.00	0.470
1.13	1.15	0.760	1.37	1.41	0.660	1.90	1.99	0.560	7.00	∞	0.460

* Select addendum according to ratio of gearing. In case of choice, use the larger addendum.

CÔNG THỨC CHO CÁC THÀNH PHẦN TIẾP TUYẾN, TRỤC CỦA TẢI DANH NGHĨA CHO CÁC BÁNH RĂNG CÔN THẲNG VÀ XOẮN

FORMULAS FOR TANGENTIAL, AXIAL, AND SEPARATING COM- PONENTS OF THE NORMAL TOOTH LOAD FOR STRAIGHT AND SPIRAL BEBEL GEARS

W_t = tangential load on driving gear at its mean pitch diameter, in pounds; also equal to the tangential load on the driven gear at its mean pitch diameter; W_x = axial thrust load, in pounds; W_s = separating component in pounds; d_m = mean pitch diameter of driving member in inches = $d - F \sin \gamma_d$.		where d = pitch diameter of driving member, F = face width, and γ_d = pitch angle; n = speed of driving member in rpm; P = horsepower transmitted; ϕ = normal pressure angle; ψ = spiral angle; γ_d = pitch angle of driving member; γ_D = pitch angle of driven member.	
Component of Normal Tooth Load to be Computed	Hand of Spiral and Direction of Rotation of Driving Member		
	Right-hand Spiral and Clockwise Rotation, or Left-hand Spiral and Counter-clockwise Rotation	Right-hand Spiral and Counter-clockwise Rotation, or Left-hand Spiral and Clockwise Rotation	
Tangential, W_t Driving Member and Driven Member	$W_t = \frac{126,050 P}{n d_m}$		
*Axial, W_x Driving Member	$W_x = \frac{W_t}{\cos \psi} (\tan \phi \sin \gamma_d - \sin \psi \cos \gamma_d)$	$W_x = \frac{W_t}{\cos \psi} (\tan \phi \sin \gamma_d + \sin \psi \cos \gamma_d)$	
Driven Member	$W_x = \frac{W_t}{\cos \psi} (\tan \phi \sin \gamma_D + \sin \psi \cos \gamma_D)$	$W_x = \frac{W_t}{\cos \psi} (\tan \phi \sin \gamma_D - \sin \psi \cos \gamma_D)$	
†Separating, W_s Driving Member	$W_s = \frac{W_t}{\cos \psi} (\tan \phi \cos \gamma_d + \sin \psi \sin \gamma_d)$	$W_s = \frac{W_t}{\cos \psi} (\tan \phi \cos \gamma_d - \sin \psi \sin \gamma_d)$	
Driven Member	$W_s = \frac{W_t}{\cos \psi} (\tan \phi \cos \gamma_D - \sin \psi \sin \gamma_D)$	$W_s = \frac{W_t}{\cos \psi} (\tan \phi \cos \gamma_D + \sin \psi \sin \gamma_D)$	
* If the computed value of W_x is positive, then the thrust is away from the cone center. A negative value indicates the thrust is toward the cone center. † If the computed value of W_s is positive, then the force is away from the mating member (separating force). A negative value indicates the force is toward the mating member (attracting force).			

THÉP THƯỜNG DÙNG ĐỂ CHẾ TẠO BÁNH RĂNG CÔN THƯỜNG REPRESENTATIVE STEELS USED FOR BEVEL GEAR APPLICATIONS

CARBURIZING STEELS					
SAE or AISI No.	Type of Steel	Purchase Specifications			Remarks
		Preliminary Heat Treatment	Brinell Hardness Number	ASTM Grain Size	
1024	Manganese	Normalize			Low Alloy — oil quench limited to thin sections
2512	Nickel Alloy	Normalize — Anneal	163-228	5-8	Aircraft quality
3310 3312X	Nickel-Chromium (Krupp) Nickel-Chromium	Normalize, then heat to 1450°F, cool in furnace. Reheat to 1170°F — cool in air	163-228	5-8	Used for maximum resistance to wear and fatigue
4028	Molybdenum	Normalize	163-217		Low Alloy
4615 4620	Nickel-Molybdenum Nickel-Molybdenum	Normalize — 1700°F-1750°F	163-217	5-8	Good machining qualities. Well adapted to direct quench — gives tough core with minimum distortion
4815 4820	Nickel-Molybdenum Nickel-Molybdenum	Normalize	163-241	5-8	For aircraft and heavily loaded service
5120	Chromium	Normalize	163-217	5-8	
8615 8620 8715 8720	Chromium-Nickel-Molybdenum	Normalize — cool at hammer	163-217	5-8	Used as an alternate for 4620
OIL HARDENING AND FLAME HARDENING STEELS					
1141	Sulphurized free cutting carbon steel	Normalize Heat treated	179-228 255-269	5 or Coarser	Free cutting steel used for unhardened gears, oil treated gears, and for gears to be surface hardened where stresses are low
4140	Chromium-Molybdenum	For oil hardening: Normalize — Anneal	179-212		Used for heat-treated, oil hardened, and surface hardened gears. Machining qualities of 4640 are superior to 4140, and it is the preferred steel for flame hardening
4640	Nickel-Molybdenum	For surface hardening: Normalize, reheat, quench and draw	235-269 269-302 302-341		
6145	Chromium-Vanadium	Normalize — reheat, quench, and draw	235-269 269-302 302-341		Fair machining qualities. Used for surface hardened gears when 4640 is not available
8640 8739	Chromium-Nickel-Molybdenum	Same as for 4640			Used as an alternate for 4640
NITRIDING STEELS					
Nitralloy H & G	Special Alloy	Anneal	163-192		Normal hardness range for cutting is 20-28 Rockwell C

* Any other steels equivalent to those listed in the table may also be used.

CÁC NGUYÊN LÝ VÀ CÔNG THỨC ĐỂ TÍNH TOÁN KÍCH THƯỚC KHI GIA CÔNG PHAY BÁNH RĂNG CÔN

RULES AND FORMULAS FOR CALCULATING DIMENSIONS OF MILLED BEVEL GEARS

To Find		Rule	Formula
These dimensions are the same for both gear and pinion.	Pitch Cone Angle of Pinion	Divide the sine of the shaft angle by the sum of the cosine of the shaft angle and the quotient obtained by dividing the number of teeth in the gear by the number of teeth in the pinion; this gives the tangent. <i>Note:</i> For shaft angles greater than 90° the cosine is negative.	$\tan \alpha_P = \frac{\sin \Sigma}{\frac{N_G}{N_P} + \cos \Sigma}$ For 90° shaft angle, $\tan \alpha_P = \frac{N_P}{N_G}$
	Pitch Cone Angle of Gear	Subtract the pitch cone angle of the pinion from the shaft angle.	$\alpha_G = \Sigma - \alpha_P$
	Pitch Diameter	Divide the number of teeth by the diametral pitch.	$D = N + P$
	Addendum	Divide 1 by the diametral pitch.	$S = 1 + P$
	Dedendum	Divide 1.157 by the diametral pitch.	$S + A = 1.157 + P$
	Whole Depth of Tooth	Divide 2.157 by the diametral pitch.	$W = 2.157 + P$
	Thickness of Tooth at Pitch Line	Divide 1.571 by the diametral pitch.	$T = 1.571 + P$
	Pitch Cone Radius	Divide the pitch diameter by twice the sine of the pitch cone angle.	$C = \frac{D}{2 \times \sin \alpha}$
	Addendum of Small End of Tooth	Subtract the width of face from the pitch cone radius, divide the remainder by the pitch cone radius and multiply by the addendum.	$s = S \times \frac{C - F}{C}$
	Thickness of Tooth at Pitch Line at Small End	Subtract the width of face from the pitch cone radius, divide the remainder by the pitch cone radius and multiply by the thickness of the tooth at pitch line.	$t = T \times \frac{C - F}{C}$
		Divide the addendum by the pitch cone radius to get the tangent.	$\tan \theta = \frac{S}{C}$
		Divide the dedendum by the pitch cone radius to get the tangent.	$\tan \phi = \frac{S + A}{C}$
		Divide the pitch cone radius by 3 or divide 8 by the diametral pitch, whichever gives the smaller value.	$F = \frac{C}{3} \text{ or } F = \frac{8}{P}$
		Divide 3.1416 by the diametral pitch.	$p = 3.1416 + P$
		Add the addendum angle to the pitch cone angle.	$\gamma = \alpha + \theta$
		Subtract both the pitch cone angle and the addendum angle from 90 degrees.	$\delta = 90^\circ - \alpha - \theta$
		Subtract the dedendum angle from the pitch cone angle.	$\zeta = \alpha - \phi$
		Multiply the addendum by the cosine of the pitch cone angle.	$K = S \times \cos \alpha$
		Add twice the angular addendum to the pitch diameter.	$O = D + 2K$
		Multiply one-half the outside diameter by the cotangent of the face angle.	$J = \frac{O}{2} \times \cot \gamma$
		Subtract the width of face from the pitch cone radius; divide the remainder by the pitch cone radius and multiply by the apex distance.	$i = J \times \frac{C - F}{C}$
		Divide the number of teeth by the cosine of the pitch cone angle.	$N' = \frac{N}{\cos \alpha}$

3. BÁNH VIT - TRỤC VIT WORM GEARING

BẢNG 1: CÔNG THỨC VỀ TỶ SỐ CHO BÁNH VIT - TRỤC VIT BƯỚC NHỎ THEO TIÊU CHUẨN MỸ

LETTER SYMBOLS

p = Circular pitch of worm gear
= axial pitch of the worm, p_x ,
in the central plane

p_x = Axial pitch of worm

p_n = Normal circular pitch of worm and
worm gear = $p_x \cos \lambda = p \cos \psi$

λ = Lead angle of worm

ψ = Helix angle of worm gear

n = Number of threads in worm

N = Number of teeth in worm gear
= nm_G

m_G = Ratio of gearing = $N + n$

Item

Formula

WORM DIMENSIONS

Lead

$$l = n p_x$$

Pitch Diameter

$$d = l + (\pi \tan \lambda)$$

Outside Diameter

$$d_o = d + 2a$$

Safe Minimum
Length of
Threaded Por-
tion of Worm*

$$F_W = \sqrt{D_o^2 - D^2}$$

Item

Formula

WORM GEAR DIMENSIONS**

Pitch Diameter

$$D = N p + \pi = N p_x + \pi$$

Outside Diameter

$$D_o = 2C - d + 2a$$

Face Width

$$F_{Gmin} = 1.125 \times \sqrt{(d_o + 2c)^2 - (d_o - 4a)^2}$$

DIMENSIONS FOR BOTH WORM AND WORM GEAR

Addendum

$$a = 0.3183 p_n$$

Whole Depth

$$h_t = 0.7003 p_n + 0.002$$

Working Depth

$$h_k = 0.6366 p_n$$

Clearance

$$c = h_t - h_k$$

Tooth thickness

$$t = 0.5 p_n$$

Approximate normal
pressure
angle†

$$\phi_n = 20 \text{ degrees}$$

Center distance

$$C = 0.5 (d + D)$$

All dimensions in inches unless otherwise indicated.

* This formula allows a sufficient length for fine-pitch worms.

** Current practice for fine-pitch worm gearing does not require the use of throated blanks. This results in the much simpler blank shown in the diagram which is quite similar to that for a spur or helical gear. The slight loss in contact resulting from the use of non-throated blanks has little effect on the load-carrying capacity of fine-pitch worm gears.

It is sometimes desirable to use topping hobs for producing worm gears in which the size relation between the outside and pitch diameters must be closely controlled. In such cases the blank is made slightly larger than D_o by an amount (usually from 0.010 to 0.020) depending on the pitch. Topped worm gears will appear to have a small throat which is the result of the hobbing operation. For all intents and purposes, this throating is negligible and a blank so made is not to be considered as being a throated blank.

† As stated in the text on page 775, the actual pressure angle will be slightly greater due to the manufacturing process.

**BẢNG 2 : CÁC ĐƯỜNG KÍNH BƯỚC CỦA TRỤC VÍT BƯỚC
NHỎ THEO TIÊU CHUẨN MỸ KẾT HỢP GIỮA TÀI
TRỌNG VÀ GÓC CHỤT TÀI**

*Table 2 : PITCH DIAMETERS OF FINE-PITCH WORMS FOR
AMERICAN STANDARD*

Lead in Inches, <i>l</i>	Number of Threads, <i>n</i>	Lead Angle λ in Degrees							
		0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0
		Pitch Diameter <i>d</i> in Inches							
0.030	1	1.0937	0.5472	0.3647	0.2735	.....	.....	.....	.....
0.040	1	1.4583	0.7297	0.4863	0.3646	0.2429	.....	.....	.....
0.050	1	1.8228	0.9121	0.6079	0.4558	0.3037	0.2276	.....	.....
0.060	2	2.1874	1.0945	0.7295	0.5469	0.3644	0.2731	.....	.....
0.065	1	.....	1.1857	0.7903	0.5925	0.3948	0.2959	0.2365	.....
0.080	1,2	.....	1.4593	0.9726	0.7293	0.4859	0.3641	0.2911	.....
0.090	3	.....	1.6417	1.0942	0.8204	0.5466	0.4097	0.3274	0.2333
0.100	1,2	.....	1.8242	1.2158	0.9116	0.6073	0.4552	0.3638	0.2592
0.120	3,4	.....	2.1890	1.4590	1.0939	0.7288	0.5462	0.4366	0.3111
0.130	1,2	.....	.....	1.5805	1.1851	0.7896	0.5917	0.4730	0.3370
0.150	3,5	.....	.....	1.8237	1.3674	0.9110	0.6828	0.5457	0.3889
0.160	1,2,4	.....	.....	1.9453	1.4585	0.9718	0.7283	0.5821	0.4148
0.180	6	.....	.....	2.1884	1.6408	1.0932	0.8193	0.6549	0.4667
0.195	3	.....	.....	.....	1.7776	1.1843	0.8876	0.7095	0.5055
0.200	2,4,5	.....	.....	.....	1.8232	1.2147	0.9104	0.7276	0.5185
0.210	7	.....	.....	.....	1.9143	1.2754	0.9559	0.7640	0.5444
0.240	3,6,8	.....	.....	.....	2.1878	1.4576	1.0924	0.8732	0.6222
0.250	5	For each lead shown in the first column, the numbers of threads given in the second column are those corresponding to standard axial pitches. The standard axial pitch for each pitch diameter shown in the body of the table is obtained by dividing the lead given in column 1 by the number of threads given in column 2. Thus, where more than one number of threads is given in column 2, there will be more than one standard axial pitch for the corresponding pitch diameter. <i>Example:</i> For a lead angle of 2.0 degrees and a lead of 0.240 inch, the corresponding pitch diameter is given in the table as 2.1878 inches. Since there are three values of <i>n</i> given in column 2, namely, 3, 6, and 8, there will also be three standard axial pitches available for this pitch diameter. These pitches are: $0.240 \div 3 = 0.080$; $0.240 \div 6 = 0.040$; and $0.240 \div 8 = 0.030$.				1.5184	1.1380	0.9096	0.6481
0.260	2,4					1.5791	1.1835	0.9459	0.6741
0.270	9					1.6398	1.2290	0.9823	0.7000
0.280	7					1.7006	1.2745	1.0187	0.7259
0.300	3,6,10	The standard axial pitch for each pitch diameter shown in the body of the table is obtained by dividing the lead given in column 1 by the number of threads given in column 2. Thus, where more than one number of threads is given in column 2, there will be more than one standard axial pitch for the corresponding pitch diameter. <i>Example:</i> For a lead angle of 2.0 degrees and a lead of 0.240 inch, the corresponding pitch diameter is given in the table as 2.1878 inches. Since there are three values of <i>n</i> given in column 2, namely, 3, 6, and 8, there will also be three standard axial pitches available for this pitch diameter. These pitches are: $0.240 \div 3 = 0.080$; $0.240 \div 6 = 0.040$; and $0.240 \div 8 = 0.030$.				1.8220	1.3656	1.0915	0.7778
0.320	2,4,8					1.9435	1.4566	1.1642	0.8296
0.325	5					1.9739	1.4794	1.1824	0.8426
0.350	7					2.1257	1.5932	1.2734	0.9074
0.360	9	The standard axial pitch for each pitch diameter shown in the body of the table is obtained by dividing the lead given in column 1 by the number of threads given in column 2. Thus, where more than one number of threads is given in column 2, there will be more than one standard axial pitch for the corresponding pitch diameter. <i>Example:</i> For a lead angle of 2.0 degrees and a lead of 0.240 inch, the corresponding pitch diameter is given in the table as 2.1878 inches. Since there are three values of <i>n</i> given in column 2, namely, 3, 6, and 8, there will also be three standard axial pitches available for this pitch diameter. These pitches are: $0.240 \div 3 = 0.080$; $0.240 \div 6 = 0.040$; and $0.240 \div 8 = 0.030$.				.....	1.6387	1.3098	0.9333
0.390	3,6					.....	1.7752	1.4189	1.0111
0.400	4,5,8,10					.....	1.8207	1.4553	1.0370
0.450	9					.....	2.0483	1.6372	1.1666
0.455	7	The standard axial pitch for each pitch diameter shown in the body of the table is obtained by dividing the lead given in column 1 by the number of threads given in column 2. Thus, where more than one number of threads is given in column 2, there will be more than one standard axial pitch for the corresponding pitch diameter. <i>Example:</i> For a lead angle of 2.0 degrees and a lead of 0.240 inch, the corresponding pitch diameter is given in the table as 2.1878 inches. Since there are three values of <i>n</i> given in column 2, namely, 3, 6, and 8, there will also be three standard axial pitches available for this pitch diameter. These pitches are: $0.240 \div 3 = 0.080$; $0.240 \div 6 = 0.040$; and $0.240 \div 8 = 0.030$.				.....	1.6554	1.1796	.....
0.480	3,6					.....	1.7463	1.2444	.....
0.500	5,10					.....	.....	1.8191	1.2963
0.520	4,8					.....	.....	1.8919	1.3481
0.560	7	The standard axial pitch for each pitch diameter shown in the body of the table is obtained by dividing the lead given in column 1 by the number of threads given in column 2. Thus, where more than one number of threads is given in column 2, there will be more than one standard axial pitch for the corresponding pitch diameter. <i>Example:</i> For a lead angle of 2.0 degrees and a lead of 0.240 inch, the corresponding pitch diameter is given in the table as 2.1878 inches. Since there are three values of <i>n</i> given in column 2, namely, 3, 6, and 8, there will also be three standard axial pitches available for this pitch diameter. These pitches are: $0.240 \div 3 = 0.080$; $0.240 \div 6 = 0.040$; and $0.240 \div 8 = 0.030$.				.....	2.0374	1.4510	.....
0.585	9					.....	.....	.....	1.5166
0.600	6					.....	.....	.....	1.5555
0.640	4,8					.....	.....	.....	1.6592
0.650	5,10					.....	.....	.....	1.6852
0.700	7	The standard axial pitch for each pitch diameter shown in the body of the table is obtained by dividing the lead given in column 1 by the number of threads given in column 2. Thus, where more than one number of threads is given in column 2, there will be more than one standard axial pitch for the corresponding pitch diameter. <i>Example:</i> For a lead angle of 2.0 degrees and a lead of 0.240 inch, the corresponding pitch diameter is given in the table as 2.1878 inches. Since there are three values of <i>n</i> given in column 2, namely, 3, 6, and 8, there will also be three standard axial pitches available for this pitch diameter. These pitches are: $0.240 \div 3 = 0.080$; $0.240 \div 6 = 0.040$; and $0.240 \div 8 = 0.030$.				.....	.....	1.8148	.....
0.720	9					.....	.....	.....	1.8666
0.780	6					.....	.....	.....	2.0222

**BẢNG 2: CÁC ĐƯỜNG KÍNH BƯỚC CỦA TRỤC VÍT BƯỚC
NHỎ THEO TIÊU CHUẨN MỸ KẾT HỢP GIỮA TÀI
TRỌNG VÀ GÓC CHỊU TẢI**

*Table 2: PITCH DIAMETERS OF FINE-PITCH WORMS FOR
AMERICAN STANDARD*

Lead in Inches, <i>l</i>	Number of Threads, <i>n</i>	Lead Angle λ in Degrees						
		9.0	11.0	14.0	17.0	21.0	25.0	30.0
		Pitch Diameter d in Inches						
0.120	3.4	0.2412	.....	.....	.....	.....	.....	.....
0.130	1.2	0.2613	.....	.....	.....	.....	.....	.....
0.150	3.5	0.3015	0.2456	.....	.....	.....	.....	.....
0.160	1,2,4	0.3216	0.2620	.....	.....	.....	.....	.....
0.180	6	0.3618	0.2948	.....	.....	.....	.....	.....
0.195	3	0.3919	0.3193	0.2490	.....	.....	.....	.....
0.200	2,4,5	0.4020	0.3275	0.2553	.....	.....	.....	.....
0.210	7	0.4221	0.3439	0.2681	.....	.....	.....	.....
0.240	3,6,8	0.4823	0.3930	0.3064	0.2499	.....	.....	.....
0.250	5	0.5024	0.4094	0.3192	0.2603	.....	.....	.....
0.260	2,4	0.5225	0.4258	0.3319	0.2707	.....	.....	.....
0.270	9	0.5426	0.4421	0.3447	0.2811	.....	.....	.....
0.280	7	0.5627	0.4585	0.3575	0.2915	.....	.....	.....
0.300	3,6,10	0.6029	0.4913	0.3830	0.3123	0.2488	.....	.....
0.320	2,4,8	0.6431	0.5240	0.4085	0.3332	0.2654	.....	.....
0.325	5	0.6532	0.5322	0.4149	0.3384	0.2695	.....	.....
0.350	7	0.7034	0.5731	0.4468	0.3644	0.2902	.....	.....
0.360	9	0.7235	0.5895	0.4596	0.3748	0.2985	0.2457	.....
0.390	3,6	0.7838	0.6387	0.4979	0.4060	0.3234	0.2662	.....
0.400	4,5,8,10	0.8039	0.6550	0.5107	0.4165	0.3317	0.2730	.....
0.450	9	0.9044	0.7369	0.5745	0.4685	0.3732	0.3072	0.2481
0.455	7	0.9144	0.7451	0.5809	0.4737	0.3773	0.3106	0.2509
0.480	3,6	0.9647	0.7860	0.6128	0.4998	0.3980	0.3277	0.2646
0.500	5,10	1.0049	0.8188	0.6383	0.5206	0.4146	0.3413	0.2757
0.520	4,8	1.0451	0.8515	0.6639	0.5414	0.4312	0.3550	0.2867
0.560	7	1.1255	0.9170	0.7149	0.5830	0.4644	0.3823	0.3087
0.585	9	1.1757	0.9580	0.7469	0.6091	0.4851	0.3993	0.3225
0.600	6	1.2059	0.9825	0.7660	0.6247	0.4975	0.4096	0.3308
0.640	4,8	1.2863	1.0480	0.8171	0.6663	0.5307	0.4369	0.3529
0.650	5,10	1.3064	1.0644	0.8298	0.6767	0.5390	0.4437	0.3584
0.700	7	1.4068	1.1463	0.8937	0.7288	0.5805	0.4778	0.3859
0.720	9	1.4470	1.1791	0.9192	0.7496	0.5971	0.4915	0.3970
0.780	6	1.5676	1.2773	0.9958	0.8121	0.6468	0.5324	0.4300
0.800	5,8,10	1.6078	1.3101	1.0213	0.8329	0.6634	0.5461	0.4411
0.900	9	1.8088	1.4738	1.1490	0.9370	0.7463	0.6144	0.4962
0.910	7	1.8289	1.4902	1.1618	0.9474	0.7546	0.6212	0.5017
0.960	6	1.9294	1.5721	1.2256	0.9995	0.7961	0.6553	0.5293
1.000	10	2.0098	1.6376	1.2767	1.0412	0.8292	0.6826	0.5513
1.040	8	.....	1.7031	1.3277	1.0828	0.8624	0.7099	0.5734
1.120	7	.....	1.8341	1.4299	1.1661	0.9287	0.7645	0.6175
1.170	9	.....	1.9160	1.4937	1.2181	0.9720	0.7987	0.6451
1.280	8	.....	2.0961	1.6341	1.3327	1.0614	0.8738	0.7057
1.300	10	.....	.....	1.6597	1.3535	1.0780	0.8874	0.7167
1.440	9	.....	.....	1.8384	1.4993	1.1941	0.9830	0.7939
1.600	10	.....	.....	2.0427	1.6658	1.3268	1.0922	0.8821

**BẢNG 3: TỶ SỐ RĂNG CỦA TRỤC VÍT BƯỚC NHỎ - BÁNH
VÍT THEO TIÊU CHUẨN MỸ**

Standard Axial Pitch in Inches, p_x	Tooth Parts*	Lead Angle λ in Degrees														
		0.5	1	1.5	2	3	4	5	7	9	11	14	17	21	25	30
		Dimensions of Tooth Parts in Inches†														
0.030	a	.0095	.0095	.0095	.0095	.0095	.0095	.0095	.0095	.0094	.0094	.0093	.0091	.0089	.....	.....
	h_t	.0229	.0229	.0229	.0229	.0229	.0229	.0229	.0229	.0227	.0227	.0225	.0220	.0216	.....	.....
	p_n	.0300	.0300	.0300	.0300	.0300	.0299	.0299	.0298	.0296	.0294	.0291	.0287	.0280	.....	.....
0.040	a	.0127	.0127	.0127	.0127	.0127	.0127	.0127	.0126	.0126	.0125	.0124	.0122	.0119	.0115	.....
	h_t	.0299	.0299	.0299	.0299	.0299	.0299	.0299	.0297	.0297	.0295	.0293	.0288	.0282	.0273	.....
	p_n	.0400	.0400	.0400	.0400	.0399	.0399	.0398	.0397	.0395	.0393	.0388	.0383	.0373	.0363	.....
0.050	a	.0159	.0159	.0159	.0159	.0159	.0159	.0159	.0158	.0157	.0156	.0154	.0152	.0149	.0144	.0138
	h_t	.0370	.0370	.0370	.0370	.0370	.0370	.0370	.0368	.0365	.0363	.0359	.0354	.0348	.0337	.0324
	p_n	.0500	.0500	.0500	.0500	.0499	.0499	.0498	.0496	.0494	.0491	.0485	.0478	.0467	.0453	.0433
0.065	a	.....	.0207	.0207	.0207	.0207	.0206	.0205	.0205	.0204	.0203	.0201	.0198	.0193	.0188	.0179
	h_t	.....	.0475	.0475	.0475	.0475	.0473	.0473	.0471	.0469	.0467	.0462	.0456	.0445	.0434	.0414
	p_n	.....	.0650	.0650	.0650	.0649	.0648	.0648	.0645	.0642	.0638	.0631	.0622	.0607	.0589	.0563
0.080	a	.....	.0255	.0255	.0254	.0254	.0254	.0254	.0253	.0252	.0250	.0247	.0244	.0238	.0231	.0221
	h_t	.....	.0581	.0581	.0579	.0579	.0579	.0577	.0577	.0574	.0570	.0563	.0557	.0544	.0528	.0506
	p_n	.....	.0800	.0800	.0800	.0799	.0798	.0797	.0794	.0790	.0785	.0776	.0765	.0747	.0725	.0693
0.100	a	.....	.0318	.0318	.0318	.0318	.0318	.0317	.0316	.0314	.0312	.0309	.0304	.0297	.0288	.0276
	h_t	.....	.0720	.0720	.0720	.0720	.0720	.0717	.0716	.0711	.0706	.0700	.0689	.0673	.0654	.0627
	p_n	.....	.1000	.1000	.0999	.0999	.0998	.0996	.0993	.0988	.0982	.0970	.0956	.0934	.0906	.0866
0.130	a	.....	.....	.0414	.0414	.0413	.0413	.0412	.0411	.0409	.0406	.0402	.0396	.0386	.0375	.0358
	h_t	.....	.....	.0931	.0931	.0929	.0929	.0926	.0924	.0920	.0913	.0904	.0891	.0869	.0845	.0808
	p_n	.....	.....	.1300	.1299	.1298	.1297	.1295	.1290	.1284	.1276	.1261	.1243	.1214	.1178	.1126
0.160	a	.....	.....	.0509	.0509	.0509	.0508	.0507	.0506	.0503	.0500	.0494	.0487	.0475	.0462	.0441
	h_t	.....	.....	.1140	.1140	.1140	.1138	.1135	.1133	.1127	.1120	.1107	.1091	.1065	.1036	.0990
	p_n	.....	.....	.1599	.1599	.1598	.1596	.1594	.1588	.1580	.1571	.1552	.1530	.1494	.1450	.1386

* a = addendum; h_t = whole depth; and p_n = normal circular pitch.

† Tooth proportions are based on the formulas given in Table 1.

NGUYÊN LÝ VÀ CÔNG THỨC CHO BÁNH VIT - I

RULES AND FORMULAS FOR WORM GEARING - I

No.	To Find	Rule	Formula
1	Addendum	Addendum may be affected by lead angle. See paragraph, Addendum and Dedendum.	
2	Center Distance	Add pitch diameter of worm-wheel to pitch diameter of worm, and divide sum by 2.	$C = \frac{(D + d)}{2}$
3		Divide number of worm threads by tangent lead angle, add number of wheel teeth and multiply sum by quotient obtained by dividing pitch by 6.2832.	$C = \frac{P}{6.2832} \left(\frac{t}{\tan L_a} + T \right)$
4	Dedendum	Dedendum may be affected by lead angle. See paragraph, Addendum and Dedendum.	
5	Clearance	British Standard — multiply cosine lead angle by 0.2 times module.	$c = 0.2 m \cos L_a$
6	Face Width, Worm-wheel	For single and double thread worms, multiply pitch by 2.38 and add 0.25. (Shell type worm.)	$F = 2.38 P + 0.25$
7		For triple and quadruple thread worm, multiply pitch by 2.15 and add 0.2. (Shell type.)	$F = 2.15 P + 0.2$
8		When worm threads are integral with shaft, face width of worm-wheel may equal $C^{0.975}$ divided by 3.	$F = \frac{C^{0.975}}{3}$
9	Lead of Worm Thread	Multiply pitch by number of worm threads or "starts."	$L = tP$
10		Multiply pitch circumference of worm by tangent of lead angle.	$L = \pi d \times \tan L_a$
11		Divide pitch circumference of worm-wheel by ratio.	$L = \pi D + R$
12	Lead Angle, Worm	Divide lead by pitch circumference of worm; quotient is tangent of lead angle.	$\tan L_a = \frac{L}{3.1416 d}$
13	Outside Diam., Worm	Add to pitch diameter twice the addendum. See paragraph, Pitch Diameter of Worm; also Addendum and Dedendum.	$d_o = d + 2a$
14	Outside Diam., Worm-wheel	For outside or over-all diameter of worm-wheel, see paragraph, Outside Diameter of Worm-wheel.	
15	Pitch of Worm and Wheel	Divide lead by number of threads or "starts" on worm = axial pitch of worm and circular pitch of worm-wheel.	$P = \frac{L}{t}$
16		Subtract the worm pitch diameter from twice the center distance. Multiply by 3.1416 and divide by number of wheel teeth.	$P = \frac{(2C - d) \times 3.1416}{T}$

NGUYỄN LÝ VÀ CÔNG THỨC CHO BÁNH VIT - 2

RULES AND FORMULAS FOR WORM GEARING - 2

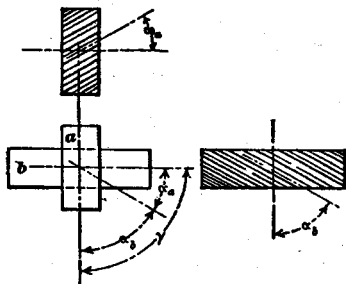
No.	To Find	Rule	Formula
17	Pitch of Worm, Normal	Multiply axial pitch by cosine of lead angle to find normal pitch.	$P_n = P \times \cos L_a$
18	Pitch Diam., Worm	Subtract pitch diameter of worm-wheel from twice the center distance.	$d = 2C - D$
19		Subtract twice the addendum from outside diameter. See Addendum and Dedendum.	$d = d_o - 2a$
20		Multiply lead by cotangent lead angle and divide product by 3.1416.	$d = \frac{L \times \cot L_a}{3.1416}$
21	Pitch Diam., Worm-wheel	Subtract pitch diameter of worm from twice the center distance.	$D = 2C - d$
22		Multiply number of wheel teeth by axial pitch of worm and divide product by 3.1416.	$D = \frac{TP}{3.1416}$
23	Radius of Rim Corner, Wheel	Multiply pitch by 0.25	$\text{Rad.} = 0.25 P$
24		British Standard: Radius = 0.5 module.	$\text{Rad.} = 0.5 m$
25	Ratio	Divide number of wheel teeth by number of worm threads.	$R = T + t$
26	Rubbing Speed, Ft. per Minute	Divide wheel pitch diameter by ratio; square quotient, and add to square of worm pitch diameter; multiply square root of this sum by $0.262 \times \text{R.P.M. of worm}$.	$V = 0.262 n \sqrt{d^2 + \left(\frac{D}{R}\right)^2}$
27		Multiply $0.262 \times$ pitch diameter of worm by R.P.M. of worm; then multiply product by secant of lead angle.	$V = 0.262 dn \times \sec L_a$
28	Throat Diam., Worm-wheel	Add twice the addendum to pitch diameter — see paragraph, Addendum and Dedendum.	$D_t = D + 2A$
29	Throat Radius, Worm-wheel	Subtract twice worm addendum from outside radius of worm.	$U = \frac{d_o}{2} - 2a$
30	Tooth Depth	Whole depth equals addendum + dedendum. See paragraph, Addendum and Dedendum.	$W = a + b \text{ or } A + B$
31	Worm Thread Length	Multiply the number of wheel teeth by 0.02, add 4.5 and multiply sum by pitch.	$G = P(4.5 + 0.02 T)$
32		British Standard — Subtract square of worm-wheel pitch diameter from square of outside diameter and extract square root of remainder.	$G = \sqrt{D_o^2 - D^2}$

4. BÁNH RĂNG XOẮN

HELICAL GEARING

NGUYÊN LÝ CƠ BẢN VÀ CÔNG THỨC TÍNH BÁNH RĂNG XOẮN

BASIC RULES AND FORMULAS FOR HELICAL GEAR CALCULATIONS



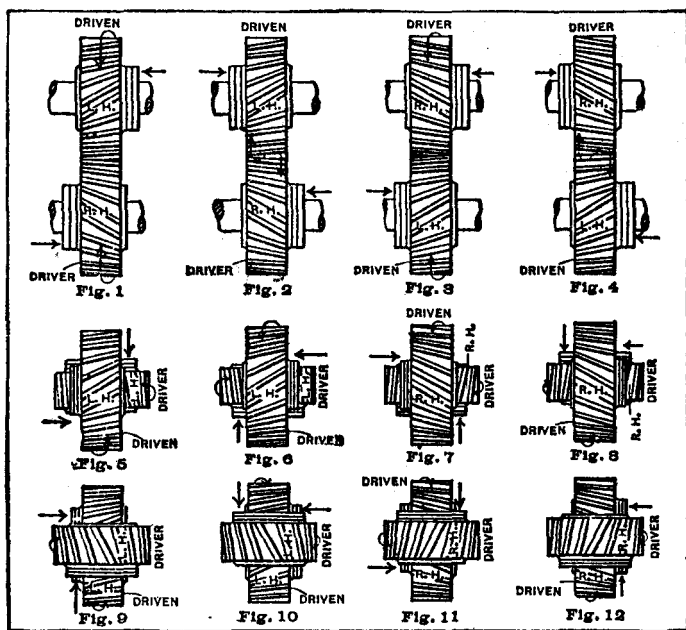
In the formulas, N , α , etc., are the numbers of teeth, helix angle, etc., for either gear or pinion; the notations N_a , N_b , α_a , α_b , etc., refer to the teeth or angles in the pinion or gear, respectively, in a pair of gears a and b .

No.	To Find	Rule	Formula
1	Relation between Shaft and Tooth Angles.	See rules at bottom of page 809.	
2	Pitch Diameter.	Divide the number of teeth by the product of the normal pitch and the cosine of the tooth angle.	$D = \frac{N}{P_n \cos \alpha}$
3	Center Distance.	Add together the pitch diameters of the two gears and divide by 2.	$C = \frac{D_a + D_b}{2}$
4	Checking Calculations in (2) and (3); for use when angle between shafts is 90 degrees.	To prove the calculations for pitch diameters and center distance, multiply the number of teeth in the first gear by the tangent of the tooth angle of that gear, and add the number of teeth in the second gear to the product; the sum should equal twice the product of the center distance multiplied by the normal diametral pitch, multiplied by the sine of the tooth angle of the first gear.	$N_b + (N_a \times \tan \alpha_a) = 2 CP_n \times \sin \alpha_a$
5	Number of Teeth for which to Select Formed Cutter.	Follow procedure outlined under heading "Selecting Cutter for Milling Helical Gears," page 827.	
6	Lead of Tooth Helix.	Multiply the pitch diameter by 3.1416 times the cotangent of the tooth angle.	$L = \pi D \times \cot \alpha$
7	Addendum.	Divide 1 by the normal diametral pitch.	$S = \frac{1}{P_n}$
8	Whole Depth of Tooth.	Divide 2.157 by the normal diametral pitch.*	$W = \frac{2.157}{P_n}$
9	Normal Tooth Thickness at Pitch Line.	Divide 1.571 by the normal diametral pitch.	$T_n = \frac{1.571}{P_n}$
10	Outside Diameter.	Add twice the addendum to the pitch diameter.	$O = D + 2S$

* For hobbled 20° pressure angle gears of 20 diametral pitch and finer, $W = (2.200 + P_n) + 0.002$.

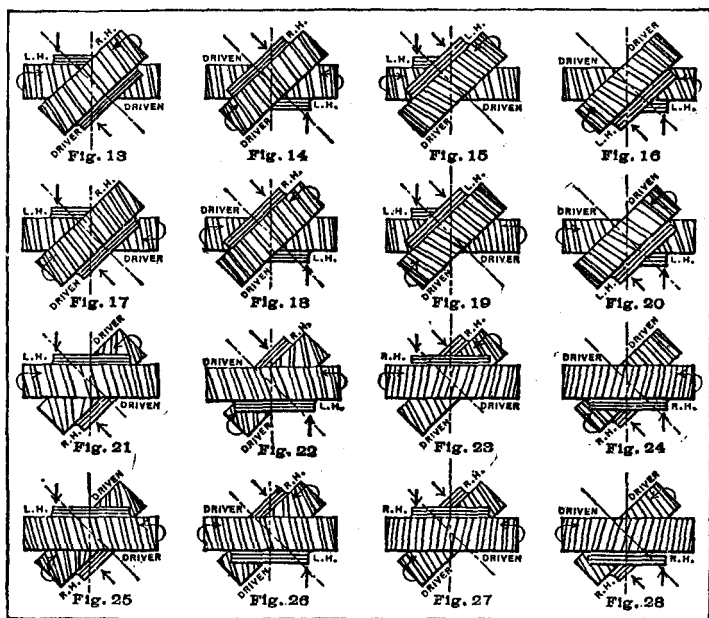
**HÌNH 1 - 12 : SƠ ĐỒ LỰC DẪY CỦA BÁNH RĂNG
XOẪN - HƯỚNG CỦA LỰC TÙY THUỘC VÀO CHIỀU QUAY,
VỊ TRÍ TƯƠNG ĐỐI GIỮA BÁNH BỊ ĐỘNG - CHỦ ĐỘNG,
HƯỚNG XOẪN**

*FIGS. 1 TO 12. THRUST DIAGRAMS FOR HELICAL GEARS - DI-
RECTION OF THRUST DEPENDS UPON DIRECTION OF ROTA-
TION. RELATIVE POSITION OF DRIVER AND DRIVEN GEAR,
AND DIRECTION OF HELIX*



**HÌNH 13 - 28 : SƠ ĐỒ LỰC ĐẨY CỦA BÁNH RĂNG
XOẮN - HƯỚNG CỦA LỰC TÙY THUỘC VÀO CHIỀU QUAY,
VỊ TRÍ TƯƠNG ĐỐI GIỮA BÁNH BỊ ĐỘNG - CHỦ ĐỘNG,
HƯỚNG XOẮN**

*FIGS. 13 TO 28. THRUST DIAGRAMS FOR HELICAL GEARS - DI-
RECTION OF THRUST DEPENDS UPON DIRECTION OF ROTA-
TION. RELATIVE POSITION OF DRIVER AND DRIVEN GEAR,
AND DIRECTION OF HELIX*



5. BÁNH RĂNG HÀNH TINH

PLANETARY GEARING

CÁC TỶ SỐ HÀNH TINH HOẶC ĂN KHỚP EPICYCLIC

RATIOS OF PLANETARY OR EPICYCLIC GEARING

D = rotation of *driver* per revolution of follower or driven member.

F = rotation of *follower* or driven member per revolution of driver. (In Figs. 1 to 4, inclusive, F = rotation of planet type follower about its axis.)

A = size of driving gear (use either number of teeth or pitch diameter). Note: When follower derives its motion both from A and from a secondary driving member, A = size of initial driving gear, and formula gives speed relationship between A and follower.

B = size of driven gear or follower (use either pitch diameter or number of teeth).

C = size of fixed gear (use either pitch diameter or number of teeth).

z = size of planet gear as shown by diagram (use either pitch diameter or number of teeth).

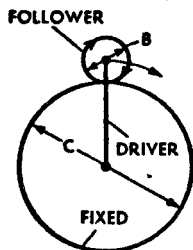
y = size of planet gear as shown by diagram (use either pitch diameter or number of teeth).

s = size of secondary or auxiliary driving gear, when follower derives its motion from two driving members.

S = rotation of secondary driver, per revolution of initial driver. S is negative when secondary and initial drivers rotate in opposite directions. (Formulas in which S is used, give speed relationship between follower and the initial driver.)

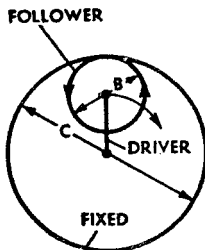
Note: In all cases, if D is known, $F = 1 + D$, or, if F is known, $D = 1 + F$.

Fig. 1



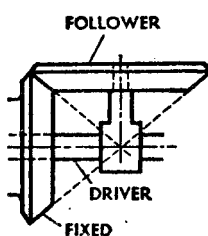
$$F = 1 + \frac{C}{B}$$

Fig. 2



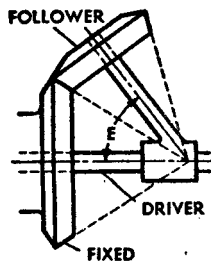
$$F = 1 - \frac{C}{B}$$

Fig. 3



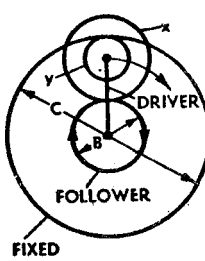
$$F = \frac{C}{B}$$

Fig. 4



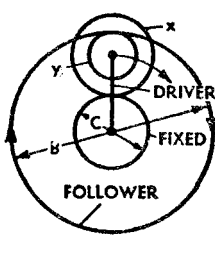
$$F = \cos E + \frac{C}{B}$$

Fig. 5



$$F = 1 + \frac{z \times C}{y \times B}$$

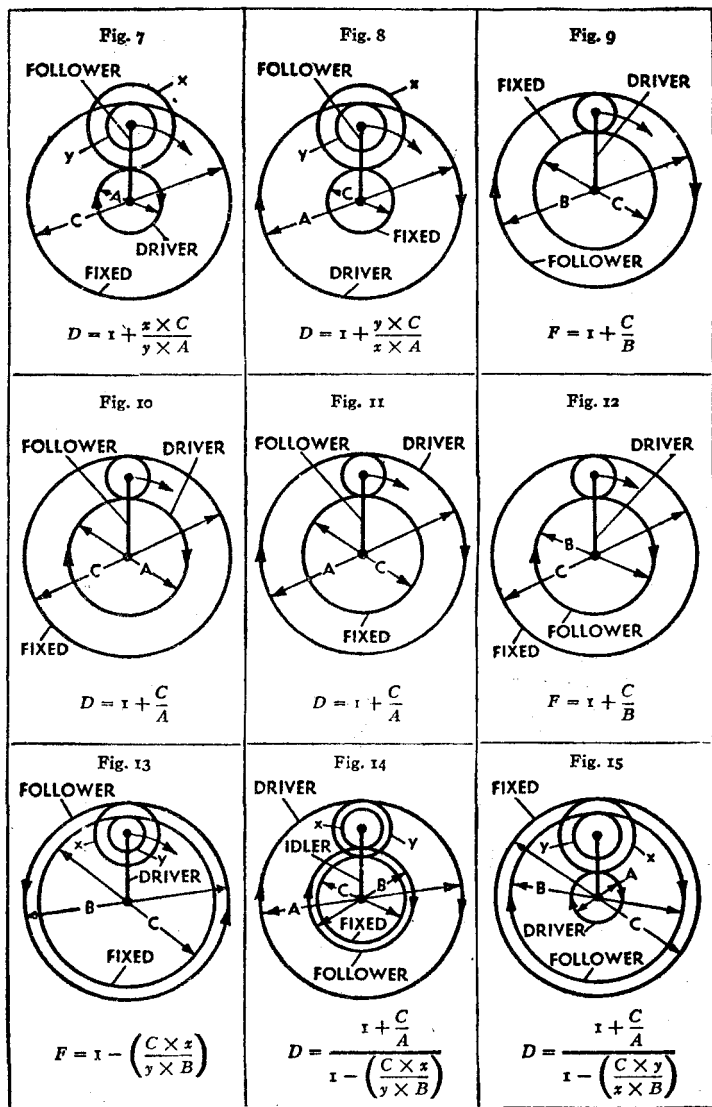
Fig. 6



$$F = 1 + \frac{y \times C}{z \times B}$$

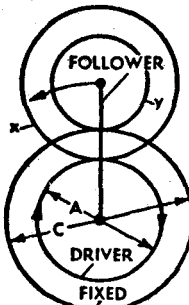
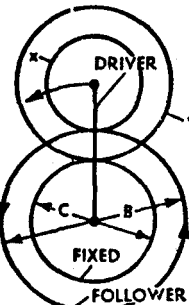
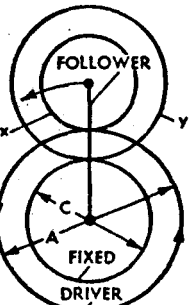
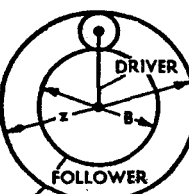
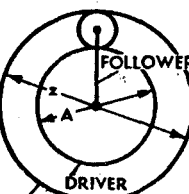
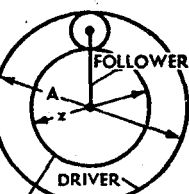
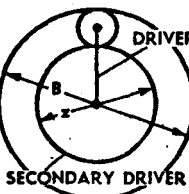
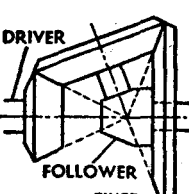
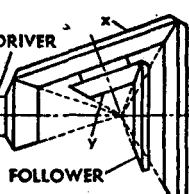
CÁC TỶ SỐ HÀNH TINH HOẶC ĂN KHỚP EPICYCLIC

RATIOS OF PLANETARY OR EPICYCLIC GEARING



CÁC TỶ SỐ HÀNH TINH HOẶC ĂN KHỚP EPICYCLIC

RATIOS OF PLANETARY OR EPICYCLIC GEARING

Fig. 16  $D = 1 - \left(\frac{C \times x}{y \times A} \right)$	Fig. 17  $F = 1 - \left(\frac{C \times x}{y \times B} \right)$	Fig. 18  $D = 1 - \left(\frac{C \times x}{y \times A} \right)$
Fig. 19  $F = 1 + \frac{x \times (x - S)}{B}$	Fig. 20  $D = \frac{A + x}{A + (S \times x)}$	Fig. 21  $D = \frac{A + x}{A + (S \times x)}$
Fig. 22  $F = 1 + \frac{x \times (x - S)}{B}$	Fig. 23  $D = 1 + \frac{C}{A}$	Fig. 24  $D = \frac{1 + \frac{C}{A}}{1 - \left(\frac{C \times y}{x \times B} \right)}$

TRANSMISSIONS

SỰ TRUYỀN ĐỘNG

ĐẠI PHẪNG VÀ RÒNG RỌC

FLAT BELTS AND PULLEYS

BẢNG 1: HỆ SỐ DUNG LƯỢNG ĐẠI: K

Table 1. BELT CAPACITY FACTOR, K-FLAT LEATHER BELTING

Belt Speed, Feet per Minute	SINGLE PLY		DOUBLE PLY			TRIPLE PLY	
	*1 $\frac{1}{4}$ "	*1 $\frac{3}{4}$ "	*1 $\frac{5}{8}$ "	*2 $\frac{1}{4}$ "	*2 $\frac{3}{4}$ "	*3 $\frac{1}{4}$ "	*3 $\frac{3}{4}$ "
	Medium	Heavy	Light	Medium	Heavy	Medium	Heavy
	Horsepower per Inch of Width, K — to be Corrected by Factors from Table 2						
600	1.1	1.2	1.5	1.8	2.2	2.5	2.8
800	1.4	1.7	2.0	2.4	2.9	3.3	3.6
1000	1.8	2.1	2.6	3.1	3.6	4.1	4.5
1200	2.1	2.5	3.1	3.7	4.3	4.9	5.4
1400	2.5	2.9	3.5	4.3	4.9	5.7	6.3
1600	2.8	3.3	4.0	4.9	5.6	6.5	7.1
1800	3.2	3.7	4.5	5.4	6.2	7.3	8.0
2000	3.5	4.1	4.9	6.0	6.9	8.1	8.9
2200	3.9	4.5	5.4	6.6	7.6	8.8	9.7
2400	4.2	4.9	5.9	7.1	8.2	9.5	10.5
2600	4.5	5.3	6.3	7.7	8.9	10.3	11.4
2800	4.9	5.6	6.8	8.2	9.5	11.0	12.1
3000	5.2	5.9	7.2	8.7	10.0	11.6	12.8
3200	5.4	6.3	7.6	9.2	10.6	12.3	13.5
3400	5.7	6.6	7.9	9.7	11.2	12.9	14.2
3600	5.9	6.9	8.3	10.1	11.7	13.4	14.8
3800	6.2	7.1	8.7	10.5	12.2	14.0	15.4
4000	6.4	7.4	9.0	10.9	12.6	14.5	16.0
4200	6.7	7.7	9.3	11.3	13.0	15.0	16.5
4400	6.9	7.9	9.6	11.7	13.4	15.4	16.9
4600	7.1	8.1	9.8	12.0	13.8	15.8	17.4
4800	7.2	8.3	10.1	12.3	14.1	16.2	17.8
5000	7.4	8.4	10.3	12.5	14.3	16.5	18.2
5200	7.5	8.6	10.5	12.8	14.6	16.8	18.5
5400	7.6	8.7	10.6	12.9	14.8	17.1	18.8
5600	7.7	8.8	10.8	13.1	15.0	17.3	19.0
5800	7.7	8.9	10.9	13.2	15.1	17.5	19.2
6000	7.8	8.9	10.9	13.2	15.2	17.6	19.3
Belt Speed, fpm	Minimum Allowable Pulley Diameter, Inch, For Belt Thicknesses Listed Above						
	2 $\frac{1}{4}$	3	4	5 $\frac{1}{2}$	8 $\frac{1}{2}$	16 $\frac{3}{4}$	20 $\frac{3}{4}$
	Up to 2500	3	4 $\frac{1}{4}$	6 $\frac{1}{2}$	9 $\frac{1}{2}$	18 $\frac{3}{4}$	22 $\frac{3}{4}$
	2500 to 4000	3 $\frac{1}{4}$	4	5	7 $\frac{1}{2}$	10 $\frac{1}{2}$	20 $\frac{3}{4}$
	4000 to 6000	3 $\frac{1}{4}$	4	5	7 $\frac{1}{2}$	10 $\frac{1}{2}$	24 $\frac{3}{4}$

* The belt thicknesses are average thicknesses. See paragraph on Thicknesses of Flat Leather Belting.

† For belt speeds over 6000 feet per minute, consult a leather belting manufacturer.

‡ For belts 8 inches wide and over, add 2 inches to minimum pulley diameter shown.

* For belts 8 inches wide and over, add 4 inches to minimum pulley diameter shown.

FLAT BELTS AND PULLEYS

Tolerances: Allowable tolerances for thicknesses of single and double ply belts are plus or minus $1/64$ inch, based on the nominal thickness. At no point shall single-ply belting be more than $3/64$ inch thicker or $2/64$ inch thinner than the average thickness. For double-ply belting, the variation in thickness shall not be greater than $2/64$ inch thicker or thinner than the average.

Triple-ply Belts: Most triple-ply belts are constructed for particular drive conditions. The manufacturer should be consulted for specific information concerning thickness and construction.

Pulleys. — On step-cone pulleys use a narrow, thick belt rather than a wide, thin belt of the same horsepower capacity. It is good practice to use pulleys with faces from $1/4$ to 2 inches (depending upon their diameters) wider than the belt required for the drive.

Use with Tension-Controlling Motor Base. — When used with an electric motor drive, a flat leather belt will give best results if the motor is mounted on some kind of a tension controlling base. Three types are generally available. Two of these are pivoted; one uses the weight of the motor to maintain the proper belt tension; the other utilizes the reaction torque of the motor to accomplish this. The third type has a sliding action and controls the belt tension by means of springs. The effect of all three types is to cause the belt to maintain a uniform pull around and across the pulleys.

BẢNG 2 : CÁC HỆ SỐ SỬ DỤNG M, P, F DÙNG ĐỂ XÁC ĐỊNH CÔNG SUẤT TIÊU THỤ

Table 2. SERVICE CORRECTION FACTORS M, P AND F USED IN DETERMINING HORSEPOWER RATING

Motor type and Starting Method	Squirrel cage, compensator starting	M
	Squirrel cage, line starting	1.5
	Slip ring and high starting torque	2.0
Diameter of Small Pulley	4 inches and under	2.5
	4 1/4 to 8 inches	P
	9 to 12 inches	0.5
	13 to 16 inches	0.6
	17 to 30 inches	0.7
	Over 30 inches	0.8
Operating Conditions	Oily, wet, or dusty atmosphere	0.9
	Vertical drives	1.0
	Jerky loads	F
	Shock and reversing loads	1.35

Horsepower Rating. — In Table 1 are given belt capacity factors for various types and thicknesses of flat leather belting and for various belt speeds in feet per minute. These factors are expressed in terms of horsepower per inch of width and are modified by service correction factors given in Table 2 as shown in the formula below. Where the pulley speed is known in terms of revolutions per minute, the corresponding belt speed in feet per minute can be found from Table 3.

The following formula is used to obtain the horsepower rating, H , of flat leather belt:

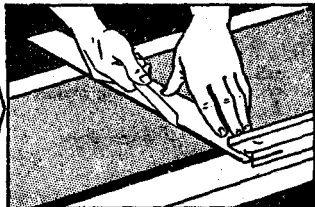
$$H = \frac{W \times K \times P}{M \times F} \quad (1)$$

**BẢNG 3 : CHUYỂN ĐỔI TỐC ĐỘ RÒNG RỌC TỪ
VÒNG/PHÚT - FT/MINUTE**

Pulley Diam. in Inches	Revolutions per Minute																				
	100	200	300	400	435	490	500	600	690	700	800	900	1000	1150	1200	1400	1500	1600	1750	1800	3600
	Velocity in Feet per Minute																				
1	26	52	79	105	114	128	131	157	181	183	209	236	262	301	314	367	393	419	458	471	942
2	52	105	157	209	228	257	262	314	361	367	419	471	524	602	628	733	785	838	916	942	1885
3	79	157	236	314	342	385	393	471	542	550	628	707	785	903	942	1100	1178	1257	1374	1414	2827
4	105	209	314	419	456	513	524	628	722	733	838	942	1047	1204	1257	1466	1571	1676	1833	1885	3770
5	131	262	393	524	570	641	654	785	903	916	1047	1178	1309	1505	1571	1833	1964	2094	2291	2356	4712
6	157	314	471	628	683	770	785	942	1084	1100	1257	1414	1571	1806	1885	2199	2356	2513	2749	2827	5655
7	183	367	550	733	797	898	916	1100	1264	1283	1466	1649	1833	2107	2199	2566	2749	2932	3207	3299	....
8	209	419	628	838	911	1026	1047	1257	1445	1466	1676	1885	2094	2409	2513	2932	3142	3351	3665	3770	....
9	236	471	707	942	1025	1154	1178	1414	1625	1649	1885	2121	2356	2710	2827	3299	3534	3770	4123	4241	....
10	262	524	785	1048	1139	1283	1309	1571	1806	1833	2094	2356	2618	3011	3142	3665	3927	4189	4582	4712	....
20	524	1047	1571	2094	2278	2566	2618	3142	3612	3665	4189	4712	5236	....	....	....	....	....	....	....	....
30	785	1571	2356	3142	3416	3848	3927	4712	5418	5498	....	....	....	....	....	....	....	....	....	....	....
0.1	3	5	8	10	11	13	13	16	18	18	21	24	26	30	31	37	39	42	46	47	94
0.2	5	10	16	21	23	26	26	31	36	37	42	47	52	60	63	73	79	84	92	94	188
0.3	8	16	24	31	34	38	39	47	54	55	63	71	79	90	94	110	118	126	137	141	283
0.4	10	21	31	42	46	51	52	63	72	73	84	94	105	120	126	147	157	168	183	188	377
0.5	13	26	39	52	57	64	65	79	90	92	105	118	131	151	157	183	196	209	229	236	471
0.6	16	31	47	63	68	77	78	94	108	110	126	141	157	181	188	220	236	251	275	283	565
0.7	18	37	55	73	80	90	92	110	126	128	147	165	183	211	220	257	275	293	321	330	660
0.8	21	42	63	84	91	103	105	126	144	147	168	189	209	241	251	293	314	335	367	377	754
0.9	24	47	71	94	102	115	118	141	163	165	188	212	236	271	283	330	353	377	412	424	848

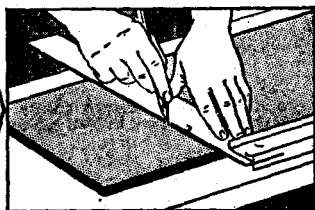
CẮT VÀ NỐI DAI PHẪNG

1. Shorten pulley centers to the minimum.
2. Take a steel tape measurement around the pulleys.
The ends of the belt should be cut square with its edge, using either a knife or a good belt cutter.
3. Prepare belt lap.

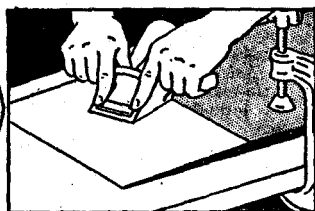


For Single Ply Belt

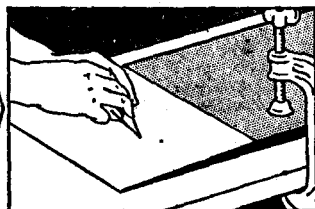
- (a) Draw a line across the heel of the lap. The lap should be planned to point in the same direction as the other laps in the belt.



- (b) Shave down belt ends tapering evenly from heels to points. Begin shaving at heel and work toward point.



- (c) Remove high spots with belt scraper and finish to feather edge so that the completed lap will be same thickness as body of the belt.

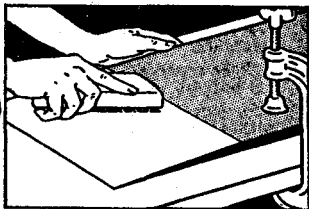


Splicing Flat Leather Belt

CẮT VÀ NỐI ĐAI PHẪNG

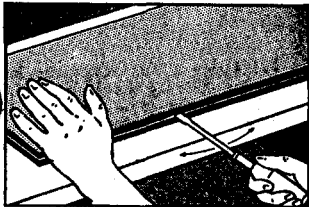
(d) Roughen belt fibres with scratcher. (Card clothing approximately No. 26 or 28).

(e) Brush off loose fibres.



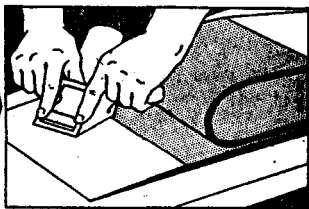
Double Ply Belt

(e) Separate plies on female end of belt for distance approximately three inches longer than overall lap length.



(b) Cut back the bottom ply an amount equal to the break. (For ease in splicing, the long leg of the female end should always be made on the top ply of the endless or field lap.)

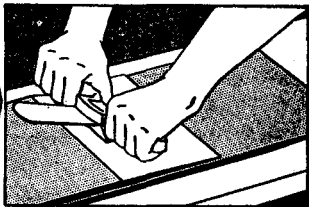
(c) Shave female end as shown in sketch.



(d) Shave outer surface of male end so that it matches in length with female end.

(e) Continue preparation of lap as for single-ply belt.

4. Place prepared belt around pulleys so as to run in the proper direction.

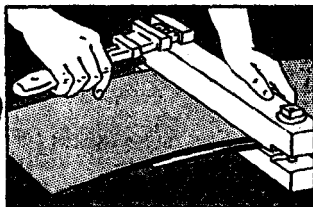


Splicing Flat Leather Belt (Continued)

CẮT VÀ NỐI DAI PHẪNG

5. Mark belt, using square, immediately beyond where clamps will be applied. This mark serves as a guide in keeping clamps at right angles to the belt edge, and as a check against any slippage of clamps.

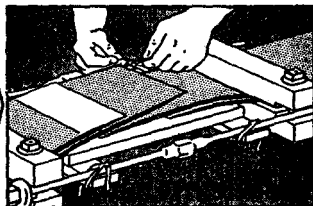
6. Place belt clamps centrally on belt and as far back as possible to allow ample takeup on rods.



7. Tighten rods making one turn at a time on each rod so that length on both edges of belt will be kept equal. Where possible rock or turn pulleys to work out all belt slack.

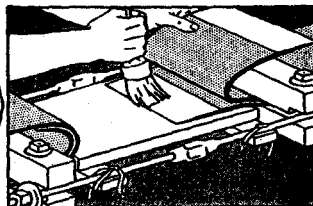
8. Fasten working platform.

9. If belt is drawn up further than anticipated, cut back male end to make laps match.



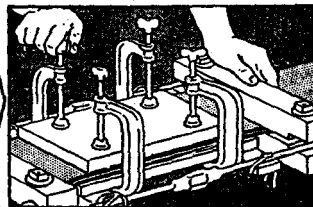
10. Apply waterproof cement sizing coat and let dry, usually about 30 minutes.

11. Apply the final or sticking coat of cement. Quickly place cemented ends together, matching carefully, and press between boards with C clamps. A few tacks hammered in splice will help to keep ends from shifting.



12. Let dry for 20 minutes before removing C clamps and boards. Take care not to disturb points of lap.

13. After allowing splice to dry thoroughly, for at least five hours, remove belt clamps and rods, as well as any tacks that might have been used.



Splicing Flat Leather Belt (Continued)

It may not be necessary or convenient to make certain belts, particularly those under six inches in width, endless with a cemented joint. In selecting the type of fastener to use, bear in mind that the joint should approximate as nearly as possible the endless belt.

Where joints are not cemented, lacing with rawhide or Indian tanned lace, explained in the following paragraph, makes one of the best joints for leather belts.

ĐẠI V VÀ RĂNG RÒNG RỌC

BẢNG 1 : KÍCH THƯỚC TIẾT DIỆN ĐẠI-V TÀI NHE

Table 1. LIGHT-DUTY V-BELT CROSS-SECTION DIMENSIONS

Cross Section	2L*	3L	4L	5L
Nominal Top Width	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{3}{4}$	$2\frac{1}{4}$
Nominal Thickness	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{8}$

* The 2L cross section is in limited usage and is not made by all manufacturers. All dimensions in inches.

BẢNG 2 : CHIỀU DÀI PHÍA NGOÀI TIÊU CHUẨN

ĐẠI V - TÀI NHE

Table 2. LIGHT-DUTY V-BELT STANDARD OUTSIDE LENGTHS

Nom. Out-side Length, Inches	Standard Outside Lengths			Effect. Out-side Length Variations, Inches	Nom. Out-side Length, Inches	Standard Outside Lengths			Effect. Out-side Length Variations, Inches	Nom. Out-side Length, Inches	Standard Outside Lengths			Effect. Out-side Length Variations, Inches
	2L	3L	4L			3L	4L	5L			3L	4L	5L	
8	*	..	..	+14, -96	34	*	*	*	+14, -96	63	..	*	*	+14, -96
9	..	..	..	+14, -96	35	..	..	..	+14, -96	64	..	..	..	+14, -96
10	..	..	..	+14, -96	36	..	..	..	+14, -96	65	..	..	..	+14, -96
11	..	..	..	+14, -96	37	..	..	..	+14, -96	66	..	..	..	+14, -96
12	..	..	..	+14, -96	38	..	..	..	+14, -96	67	..	..	..	+14, -96
13	..	..	..	+14, -96	39	..	..	..	+14, -96	68	..	..	..	+14, -96
14	..	..	..	+14, -96	40	..	..	..	+14, -96	69	..	..	..	+14, -96
15	..	..	..	+14, -96	41	..	..	..	+14, -96	70	..	..	..	+14, -96
16	..	..	..	+14, -96	42	..	..	..	+14, -96	71	..	..	..	+14, -96
17	..	..	..	+14, -96	43	..	..	..	+14, -96	72	..	..	..	+14, -96
18	..	..	..	+14, -96	44	..	..	..	+14, -96	73	..	..	..	+14, -96
19	..	..	..	+14, -96	45	..	..	..	+14, -96	74	..	..	..	+14, -96
20	..	..	..	+14, -96	46	..	..	..	+14, -96	75	..	..	..	+14, -96
					47	..	..	..	+14, -96	76	..	..	..	+14, -96
					48	..	..	..	+14, -96	77	..	..	..	+14, -96
					49	..	..	..	+14, -96	78	..	..	..	+14, -96
21	..	..	..	+14, -96	50	..	..	..	+14, -96	79	..	..	..	+14, -96
22	..	..	..	+14, -96	51	..	..	..	+14, -96	80	..	..	..	+14, -96
23	..	..	..	+14, -96	52	..	..	..	+14, -96	81	..	..	..	+14, -96
24	..	..	..	+14, -96	53	..	..	..	+14, -96	82	..	..	..	+14, -96
25	..	..	..	+14, -96	54	..	..	..	+14, -96	83	..	..	..	+14, -96
26	..	..	..	+14, -96	55	..	..	..	+14, -96	84	..	..	..	+14, -96
27	..	..	..	+14, -96	56	..	..	..	+14, -96	85	..	..	..	+14, -96
28	..	..	..	+14, -96	57	..	..	..	+14, -96	86	..	..	..	+14, -96
29	..	..	..	+14, -96	58	..	..	..	+14, -96	87	..	..	..	+14, -96
30	..	..	..	+14, -96	59	..	..	..	+14, -96	88	..	..	..	+14, -96
31	..	..	..	+14, -96	60	..	..	..	+14, -96	89	..	..	..	+14, -96
32	..	..	..	+14, -96	61	..	..	..	+14, -96	90	..	..	..	+14, -96
33	..	..	..	+14, -96	62	..	..	..	+14, -96	91	..	..	..	+14, -96
										92	..	..	..	+14, -96
										93	..	..	..	+14, -96
										94	..	..	..	+14, -96
										95	..	..	..	+14, -96
										96	..	..	..	+14, -96
										97	..	..	..	+14, -96
										98	..	..	..	+14, -96
										99	..	..	..	+14, -96
										100	..	..	..	+14, -96

**BẢNG 3 : KÍCH THƯỚC RĂNG RÒNG RỌC CHO
ĐAI V TÀI NHE**

BREAK CORNERS
WITH FILE

DIAMETER AT
DIMENSION W

V-belt Cross Section	Effective Outside Diameter, Inches	Groove Angle	W	D	2X	V-belt Cross Section	Effective Outside Diameter, Inches	Groove Angle	W	D	2X
2L	Under 1.5	32°	.240	.250	.10	4L	Under 2.65	30°	.485	.490	.20
	1.5-1.99	34°	.243				2.65-3.24	32°	.490		
	2.0-2.5	36°	.246				3.25-5.65	34°	.494		
	Over 2.5	38°	.250				Over 5.65	38°	.504		
3L	Under 2.2	32°	.360	.406	.15	5L	Under 3.95	30°	.624	.580	.30
	2.2-3.19	34°	.364				3.95-4.94	32°	.630		
	3.2-4.2	36°	.368				4.95-7.35	34°	.637		
	Over 4.20	38°	.372				Over 7.35	38°	.650		

All dimensions in inches except where otherwise indicated.

**BẢNG 4. KHOẢNG CÁCH TÂM CHO PHÉP TỐI THIỂU ĐỂ
LẮP ĐẶT VÀ THÁO ĐAI V TÀI NHE**

Lengths	Minimum Allowance Below (-) and Above (+) Standard Center Distance, Inches			
	2L	3L	4L	5L
8 to 18	-3/4, +1/4	-3/4, +1/4	.....	.....
18 to 25	-3/4, +1/4	-3/4, +1/4	-3/4, +1/4	.....
25 to 38	.....	-3/4, +1/4	-3/4, +1/4	-1, +1/4
38 to 61	.....	-3/4, +3/4	-3/4, +3/4	-1, +3/4
61 to 80	.....	.....	-1, +1 1/4	-1 1/4, +1 1/4
80 to 100, incl.	.....	.....	-1 1/4, +1 1/4	-1 1/4, +1 1/4
Note: Minus values are for shortening center distance for installation. Plus values are for lengthening center distance to compensate for stretch and wear.				

BẢNG 5 : TỶ SỐ CÔNG SUẤT TIÊU THỤ CỦA ĐAI V TÀI NHẹ

Table 5. HORSEPOWER RATINGS FOR LIGHT-DUTY V-BELTS

Belt Speed, Ft. per Min.	Effective Outside Diameter of Small Sheave, Inches																									
	1¼		1¾		2		2¼		2½		2¾		3		3¼		3½		3¾		4		4¼	4½	4¾	5
	3L	3L	3L	4L	3L	4L	3L	4L	3L	4L	3L*	4L	5L	4L	5L	4L	5L	4L	5L	4L*	5L	5L	5L	5L	5L	5L
	Horsepower Ratings																									
200	.05	.07	.08	.07	.09	.09	.10	.13	.10	.14	.11	.16	.13	.17	.16	.18	.19	.19	.19	.21	.21	.24	.26	.27	.29	.30
400	.08	.12	.14	.12	.16	.17	.18	.23	.19	.27	.20	.31	.23	.34	.29	.36	.35	.38	.40	.40	.45	.49	.52	.55	.58	.58
600	.11	.16	.20	.15	.23	.24	.25	.32	.27	.38	.29	.43	.30	.48	.41	.51	.49	.54	.57	.57	.64	.69	.75	.79	.83	.83
800	.12	.19	.24	.17	.28	.30	.31	.40	.33	.48	.36	.54	.36	.60	.50	.64	.62	.69	.72	.73	.80	.88	.95	1.01	1.07	1.07
1000	.13	.22	.28	.18	.33	.33	.37	.46	.40	.56	.43	.65	.40	.71	.57	.78	.72	.83	.84	.88	.95	1.05	1.14	1.21	1.28	1.28
1200	.14	.24	.32	.17	.38	.36	.43	.51	.47	.64	.50	.74	.42	.83	.63	.89	.80	.96	.96	1.01	1.09	1.20	1.31	1.40	1.48	1.48
1400	.15	.27	.35	.16	.42	.39	.48	.56	.52	.71	.56	.82	.43	.92	.67	1.01	.87	1.08	1.05	1.14	1.20	1.34	1.46	1.57	1.67	1.67
1600	.15	.28	.38	.14	.46	.40	.52	.60	.58	.77	.62	.90	.42	1.01	.69	1.11	.93	1.19	1.13	1.26	1.31	1.46	1.60	1.72	1.84	1.84
1800	.14	.29	.41	.11	.50	.40	.57	.62	.63	.81	.67	.96	.40	1.09	.71	1.19	.97	1.29	1.20	1.37	1.40	1.57	1.73	1.87	1.99	1.99
2000	.13	.30	.43	.08	.53	.39	.60	.64	.67	.86	.72	1.02	.36	1.16	.70	1.28	1.00	1.38	1.25	1.47	1.47	1.67	1.84	1.99	2.13	2.13
2200	.12	.30	.44	.04	.55	.39	.64	.67	.71	.90	.77	1.08	.31	1.24	.69	1.37	1.01	1.48	1.29	1.58	1.54	1.75	1.94	2.11	2.26	2.26
2400	.10	.30	.45	...	.57	.37	.66	.68	.74	.92	.81	1.12	.25	1.29	.66	1.43	1.01	1.55	1.32	1.66	1.58	1.81	2.02	2.21	2.37	2.37
2600	.07	.29	.40	...	.58	.34	.69	.66	.77	.93	.84	1.16	.17	1.33	.62	1.50	1.00	1.63	1.33	1.75	1.62	1.87	2.09	2.29	2.47	2.47
2800	.04	.28	.40	...	.59	.29	.70	.65	.79	.94	.87	1.18	.08	1.38	.56	1.54	.97	1.68	1.32	1.81	1.63	1.91	2.15	2.36	2.56	2.56
3000	.01	.26	.45	...	.60	.25	.72	.63	.81	.94	.89	1.19	...	1.40	.49	1.58	.93	1.74	1.31	1.87	1.64	1.93	2.19	2.42	2.63	2.63
3200	...	.23	.44	...	.59	.19	.72	.60	.82	.92	.91	1.20	...	1.42	.40	1.61	.87	1.78	1.27	1.92	1.63	1.94	2.21	2.46	2.68	2.68
3400	...	.20	.42	...	.59	.11	.72	.55	.83	.90	.92	1.19	...	1.43	.29	1.63	.79	1.80	1.22	1.96	1.60	1.92	2.22	2.48	2.72	2.72
3600	...	.16	.39	...	.57	.04	.71	.50	.83	.86	.92	1.16	...	1.42	.16	1.64	.69	1.82	1.15	1.98	1.54	1.89	2.20	2.48	2.73	2.73
3800	...	.12	.36	...	.54	...	.69	.43	.82	.81	.92	1.13	...	1.40	.17	1.63	.57	1.83	1.05	2.00	1.47	1.84	2.17	2.46	2.72	2.72
4000	...	.06	.31	...	.51	...	.67	.35	.80	.76	.91	1.09	...	1.38	...	1.61	.43	1.82	.93	2.00	1.37	1.76	2.11	2.42	2.69	2.69
4200	...	...	.26	...	.47	...	.64	.24	.77	.67	.89	1.03	...	1.32	...	1.58	.26	1.79	.80	1.98	1.26	1.67	2.03	2.35	2.64	2.64
4400	...	...	.21	...	.42	...	.60	.14	.74	.58	.86	.96	...	1.27	...	1.53	.08	1.76	.64	1.95	1.12	1.55	1.93	2.27	2.57	2.57
4600	...	...	.14	...	.37	...	.55	.01	.70	.48	.82	.87	...	1.19	...	1.40	...	1.70	.40	1.91	.97	1.41	1.81	2.16	2.48	2.48
4800	...	...	.06	...	.30	...	.49	...	.64	.36	.77	.70	...	1.10	...	1.39	...	1.64	.25	1.85	.78	1.25	1.66	2.03	2.36	2.36
5000	...	...	...	...	.22	...	.42	...	.58	.23	.72	.65	...	1.00	...	1.30	...	1.56	.02	1.78	.58	1.06	1.49	1.88	2.22	2.22
5200	...	...	...	...	.14	...	.34	...	.51	.08	.65	.51	...	.88	...	1.19	...	1.45	...	1.70	.34	.85	1.30	1.70	2.06	2.06
5400	...	...	...	...	.04	...	.26	...	.43	...	.58	.36	...	.74	...	1.07	...	1.35	...	1.59	.08	.61	1.07	1.49	1.86	1.86
5600	...	...	...	...	...	...	.16	...	.34	...	.49	.18	...	.58	...	.91	...	1.20	...	1.46	...	.34	.82	1.25	1.64	1.64
5800	...	...	...	...	...	...	.05	...	.24	...	.39	...	...	.38	...	.72	...	1.03	...	1.29	...	.04	.54	.99	1.39	1.39
6000	...	...	...	...	...	...	...	...	.12	...	.29	...	...	.18	...	.54	...	.84	...	1.11	...	...	.23	.69	1.11	1.11

* These horsepower ratings also hold for this belt size when used with sheaves of larger effective outside diameters.

BẢNG 6: CHIỀU DÀI BƯỚC TIÊU CHUẨN KHI DÙNG

ĐAI V NHIỀU ĐAI

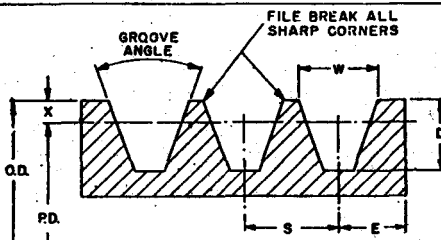
Table 6. STANDARD PITCH LENGTHS FOR MULTIPLE V-BELTS

Standard Length Designation*	Standard V-Belt Cross Sections					Permissible Deviations from Std. Pitch Length, Inches	Matching Limits for One Set, Inch
	A	B	C	D	E		
	Standard Pitch Lengths, Inches						
26	27.3	.....	.....	.....	.....	+ .7, - .3	.10
31	32.3	.....	.....	.....	.....	+ .7, - .3	.10
33	34.3	.....	.....	.....	.....	+ .8, - .4	.10
35	36.3	36.8	.....	.....	.....	+ .8, - .4	.10
38	39.3	39.8	.....	.....	.....	+ .8, - .4	.10
42	43.3	43.8	.....	.....	.....	+ .8, - .4	.10
46	47.3	47.8	.....	.....	.....	+ .8, - .4	.10
48	49.3	49.8	.....	.....	.....	+ .9, - .5	.10
51	52.3	52.8	53.9	.....	.....	+ .9, - .5	.10
53	54.3	54.8	.....	.....	.....	+ .9, - .5	.10
55	56.3	56.8	.....	.....	.....	+ .9, - .5	.10
60	61.3	61.8	62.9	.....	.....	+ .9, - .5	.20
62	63.3	63.8	.....	.....	.....	+ .9, - .5	.20
64	65.3	65.8	.....	.....	.....	+ .9, - .5	.20
66	67.3	67.8	.....	.....	.....	+ .9, - .5	.20
68	69.3	69.8	70.9	.....	.....	+ .9, - .5	.20
71	72.3	72.8	.....	.....	.....	+ .9, - .5	.20
75	76.3	76.8	77.9	.....	.....	+ .9, - .5	.20
78	79.3	79.8	.....	.....	.....	+ 1.0, - .5	.30
80	81.3	.....	.....	.....	.....	+ 1.0, - .5	.30
81	.....	82.8	83.9	.....	.....	+ 1.0, - .5	.30
83	.....	84.8	.....	.....	.....	+ 1.0, - .5	.30
85	86.3	86.8	87.9	.....	.....	+ 1.0, - .5	.30
90	91.3	91.8	92.9	.....	.....	+ 1.0, - .5	.30
96	97.3	.....	98.9	.....	.....	+ 1.0, - .5	.30
97	.....	98.8	.....	.....	.....	+ 1.0, - .5	.30
105	106.3	106.8	107.9	.....	.....	+ 1.1, - .5	.40
112	113.3	113.8	114.9	.....	.....	+ 1.1, - .5	.40
120	121.3	121.8	122.9	123.3	.....	+ 1.2, - .5	.40
128	129.3	129.8	130.9	131.3	.....	+ 1.3, - .6	.40
136	.....	137.8	138.9	.....	.....	+ 1.3, - .6	.40
144	.....	145.8	146.9	147.3	.....	+ 1.4, - .6	.40
158	.....	159.8	160.9	161.3	.....	+ 1.5, - .6	.40
162	.....	.....	164.9	165.3	.....	+ 1.6, - .6	.40
173	.....	174.8	175.9	176.3	.....	+ 1.7, - .7	.50
180	.....	181.8	182.9	183.3	184.5	+ 1.7, - .7	.50
195	.....	196.8	197.9	198.3	199.5	+ 1.8, - .8	.50
210	.....	211.8	212.9	213.3	214.5	+ 2.0, - .8	.50
240	.....	240.3	240.9	240.8	241.0	+ 2.2, - .9	.50
270	.....	270.3	270.9	270.8	271.0	+ 2.4, - 1.0	.50
300	.....	300.3	300.9	300.8	301.0	+ 2.5, - 1.2	.60
330	.....	.....	330.9	330.8	331.0	+ 2.5, - 1.2	.60
360	.....	.....	360.9	360.8	361.0	+ 2.5, - 1.2	.60
390	.....	.....	390.9	390.8	391.0	+ 3.0, - 1.5	.70
420	.....	.....	420.9	420.8	421.0	+ 3.5, - 2.0	.70
480	.....	.....	.....	480.8	481.0	+ 4.0, - 2.5	.70
540	.....	.....	.....	540.8	541.0	+ 4.5, - 3.0	.70
600	.....	.....	.....	600.8	601.0	+ 5.0, - 3.5	.70
660	.....	.....	.....	660.8	661.0	+ 6.0, - 4.0	.70

* To specify belt size use the Standard Length Designation prefixed by the letter indicating cross section, for example: B90.

† Maximum allowable difference in actual pitch lengths of longest and shortest V-belts in a given set.

**BẢNG 7 : KÍCH THƯỚC RĂNG VÀ DUNG SAI CHO RÒNG
RỌC NHIỀU ĐẠI V**



Belt	Pitch Diameter		Groove Angle	Standard Groove Dimensions					Deep Groove Dimensions				
	Minimum Recommended	Range		W	D	X	S ¹	E	W	D	X	S ¹	E
				(3)	±.031	...	±.031	(3)	(8)	±.031	...	±.031	(8)
A	3.0	2.6 to 5.4 Over 5.4	34° 38°	.494 .504	.490	.125	3/4	3/4	.589 .611	.645	.280	3/4	3/4
B	5.4	4.6 to 7.0 Over 7.0	34° 38°	.637 .650	.580	.175	3/4	3/4	.747 .774	.760	.355	3/4	3/4
C	9.0	7.0 to 7.99 8.0 to 12.0 Over 12.0	34° 36° 38°	.879 .887 .895	.780	.200	1	1 1/4	1.066 1.085 1.105	1.085	.505	1 1/4	1 1/4
D	13.0	12.0 to 12.99 13.0 to 17.0 Over 17.0	34° 36° 38°	1.259 1.271 1.283	1.050	.300	1 1/4	7/8	1.513 1.541 1.569	1.465	.715	1 1/4	1 1/4
E	21.0	18.0 to 24.0 Over 24.0	36° 38°	1.527 1.542	1.300	.400	1 3/4	1 1/4	1.816 1.849	1.745	.845	2 1/4	1 3/4

All dimensions in inches except groove angles are in degrees.

¹ Summation of the deviations from S for all grooves in any one sheave shall not exceed ±.063 inch.

² Tolerances for W: for A and B belts are ±.005 inch; for C and D belts, ±.007 inch; and for E belt, ±.010 inch.

³ Tolerances for E: for A belts are, +.070, -.000 inch; for B and C belts, +.150, -.000 inch; and for D and E belts, +.250, -.000 inch.

Outside Diameter Tolerances: Under 12 inches, ±.020 inch; 12.0 up to 24.0 inches, ±.040 inch; 24 up to 58 inches, .060 inch; 58.0 up to 72.0 inches, ±.120 inch; and for 72 inches and above, ±.250 inch.

Outside Diameter Eccentricity: For 10.0-inch pitch diameter and under, .010 inch. Add .0005 inch for each additional inch of pitch diameter up to and including 60.0-inch pitch diameter. Add .001 inch for each additional inch of pitch diameter above 60 inches.

Side Wobble and Runout: .001 inch per inch of pitch diameter up to 20 inches. Add .0005 inch for each additional inch of pitch diameter up to and including 60.0 inches. Add .001 inch for each additional inch of pitch diameter above 60.0 inches.

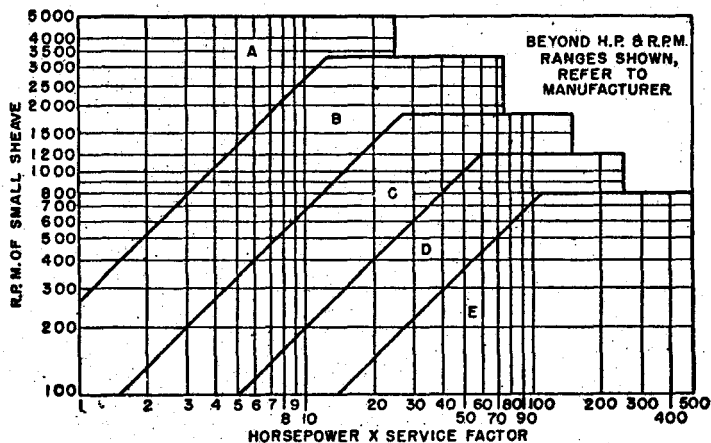
For standard key and keyway dimensions, see pages 869 and 870.

BẢNG 8 : KHOẢNG CÁCH TÂM TỐI THIỂU CHO PHÉP ĐỂ LẮP VÀ THÁO ĐAI V NHIỀU ĐAI

*Table 8. MINIMUM CENTER DISTANCE ALLOWANCES FOR
INSTALLATION AND TAKE-UP OF MULTIPLE V-BELTS*

Range of Standard Lengths	Minimum Allowance Below (–) and Above (+) Standard Center Distance				
	A	B	C	D	E
26 to 38	–¾, +1	–1, +1	.....	.....	.....
38 to 60	–¾, +1½	–1, +1½	–1½, +1½	.....	.....
60 to 90	–¾, +2	–1¾, +2	–1½, +2	.....	.....
90 to 120	–1, +2½	–1¾, +2½	–1½, +2½	.....	.....
120 to 158	–1, +3	–1¾, +3	–1½, +3	–2, +3	.....
158 to 195	.....	–1¾, +3½	–2, +3½	–2, +3½	–2½, +3½
195 to 240	.....	–1½, +4	–2, +4	–2, +4	–2½, +4
240 to 270	.....	.....	–2, +4½	–2½, +4½	–2½, +4½
270 to 330	.....	.....	–2, +5	–2½, +5	–3, +5
330 to 420	.....	.....	–2, +6	–2½, +6	–3, +6
420 and over	.....	.....	.....	–3,*	–3½,*

All dimensions in inches.
* For this belt size and lengths, 1.5 per cent of belt length above standard center distance for stretch and wear.



ĐỒ THỊ ĐỂ CHỌN ĐAI V VỚI TRUYỀN ĐỘNG CHO TRƯỚC

CHART FOR SELECTION OF V-BELT FOR GIVEN DRIVE

**BẢNG 9 : ỨNG DỤNG CÁC HỆ SỐ HOẠT ĐỘNG CỦA
ĐAI V NHIỀU ĐAI**

Table 9. SERVICE FACTORS FOR MULTIPLE V-BELT

APPLICATIONS

Applications	Electric Motors											Line Shaft and Clutch Shifting
	A.C.									D.C.		
	Squirrel Cage			Wound Rotor (Slip Ring)	Syn- chronous		Single Phase		Shunt Wound	Compound Wound		
	Normal Torque Line Start	Normal Torque Compensator Start	High Torque		Normal Torque	High Torque	Regulation and Split-Phase	Capacitor				
Service Factors												
Agitators —												
Paddle-Propeller												
Liquid.....	1.0	1.0	1.2	...	...	...	...	...	...	...	...	
Semi-Liquid.....	1.2	1.0	1.4	1.2	...	...	...	...	...	...	...	
Brick and Clay												
Machinery												
Auger Machines.....	...	1.2	1.4	1.4	...	...	...	...	1.4	...	2.0	
De-Airing Machines.....	...	1.2	1.4	1.4	...	...	...	...	1.4	...	2.0	
Cutting Table.....	...	1.2	1.4	1.4	...	...	...	...	...	...	2.0	
Pug Mill.....	1.5	1.3	1.8	1.5	...	...	...	...	...	...	...	
Mixer.....	...	1.2	1.6	1.4	...	...	...	...	...	...	...	
Granulator.....	...	1.2	1.4	1.4	...	...	...	...	...	...	...	
Dry Press.....	...	1.2	1.6	1.4	...	...	...	...	...	...	...	
Rolls.....	...	1.2	1.4	1.4	...	...	...	...	...	...	...	
Bakery Machinery												
Dough Mixer.....	1.2	...	...	...	...	...	1.2	1.0	...	...	...	
Compressors												
Centrifugal.....	1.2	1.2	...	1.4	1.4	...	...	...	1.2	...	...	
Rotary.....	1.2	1.2	...	1.4	1.4	...	1.2	1.2	1.2	...	...	
Reciprocating —												
3 or More Cyl.....	1.2	1.2	...	1.4	1.4	...	...	...	1.2	...	...	
1 or 2 Cyl.....	1.4	1.4	...	1.5	1.5	...	...	...	1.2	...	...	
Conveyors												
Apron.....	...	1.4	1.6	...	...	...	...	...	1.4	...	1.6	
Belt (Ore, Coal, Sand).....	...	1.2	1.4	...	...	...	...	...	1.2	...	1.4	
Belt (Light Package).....	...	1.0	1.1	...	...	...	...	...	1.0	...	1.2	

**BẢNG 9 : ỨNG DỤNG CÁC HỆ SỐ HOẠT ĐỘNG CỦA
ĐẠI V NHIỀU ĐẠI**

Applications	Electric Motors											
	A.C.									D.C.		
	Squirrel Cage			Wound Rotor (Slip Ring)	Syn- chronous		Single Phase		Shunt Wound	Compound Wound	Line Shaft and Clutch Shifting	
	Normal Torque Line Start	Normal Torque Compensator Start	High Torque		Normal Torque	High Torque	Repulsion and Split-Phase	Capacitor				
Service Factors												
Oven.....	...	1.0	1.1	...	...	...	...	...	1.0	...	1.2	
Screw.....	...	1.6	1.8	...	...	...	...	...	1.6	...	1.8	
Bucket.....	...	1.4	1.6	...	...	...	...	...	1.4	...	1.6	
Pan.....	...	1.4	1.6	...	...	...	...	...	1.4	...	1.6	
Flight.....	...	1.6	1.8	...	...	...	...	...	1.6	...	1.8	
Elevator.....	...	1.4	1.6	...	...	...	...	...	1.4	...	1.6	
Crushing Machinery												
Jaw Crushers.....	...	1.4	1.6	1.4	...	...	...	...	...	1.4	1.6	
Gyratory Crushers...	...	1.4	1.6	1.4	1.4	1.6	...	...	...	1.4	1.6	
Cone Crushers.....	...	1.4	1.6	1.4	...	...	...	...	...	1.6	1.6	
Crushing Rolls.....	...	1.4	1.6	1.4	...	...	...	...	...	1.4	1.6	
Ball-Pebble and.....	...	1.4	1.6	1.4	1.4	1.6	...	...	...	1.4	1.6	
Tube Mills.....	...	1.4	1.6	1.4	1.4	...	...	...	...	1.4	1.6	
Fan and Blowers												
Centrifugal.....	1.2	1.2	...	1.4	...	...	...	...	1.2	...	...	
Propeller.....	1.4	1.4	2.0	1.6	...	2.0	...	...	1.4	...	...	
Induced Draft.....	1.2	1.2	...	1.4	...	...	...	...	1.4	...	...	
Positive Blowers.....	1.6	1.6	...	2.0	2.0	2.0	...	...	...	...	...	
Exhausters.....	1.2	1.2	...	1.4	...	...	...	...	1.4	...	1.5	
Line Shafts.....	1.4	1.4	...	1.4	1.4	2.0	1.4	1.4	1.4	1.4	1.6	
Machine Tools												
Grinders.....	1.2	...	...	1.4	...	...	1.2	1.0	1.2	1.2	...	
Boring Mills.....	1.2	...	...	1.4	...	...	...	...	1.2	1.2	...	
Lathes.....	1.0	...	...	1.2	...	...	1.0	1.0	1.0	1.0	...	
Milling Machines.....	1.2	...	...	1.4	...	...	...	...	1.2	1.2	...	
Screw Machines.....	1.0	...	...	1.0	...	...	1.0	1.0	1.0	1.0	...	
Cam Cutters.....	1.0	...	...	1.0	...	...	...	...	1.0	1.0	...	
Planers.....	1.2	...	...	1.4	...	...	1.2	1.0	1.2	1.2	...	
Shapers.....	1.0	...	...	1.0	...	...	1.0	1.0	1.0	1.0	...	
Drill Press.....	1.0	...	...	1.0	...	...	1.0	1.0	1.0	1.0	...	
Drop Hammers.....	1.0	...	...	1.0	...	...	1.0	1.0	1.0	1.0	...	
Shears.....	1.2	...	...	1.4	...	...	1.2	1.2	1.2	1.0	...	
Mills												
Pebble.....	...	1.4	1.6	1.4	...	...	...	...	...	1.4	1.6	
Rod.....	...	1.4	1.6	1.4	...	...	...	...	...	1.4	1.6	
Ball.....	...	1.4	1.6	1.4	...	...	...	...	...	1.4	1.6	
Roller Mills.....	...	1.4	1.6	1.4	...	...	...	...	...	1.4	1.6	
Flaking Mills.....	...	1.6	1.6	1.4	...	...	...	...	...	1.4	1.6	
Tumbling Barrels....	...	1.6	1.6	1.4	...	...	...	...	...	1.4	1.6	

V-BELTS AND SHEAVES

Table 9 (Continued). Service Factors for Multiple V-Belt Applications

Applications	Electric Motors												Line Shaft and Clutch Shifting
	A.C.									D.C.			
	Squirrel Cage			Wound Rotor (Slip Ring)	Syn- chronous		Single Phase		Shunt Wound	Compound Wound			
	Normal Torque Line Start	Normal Torque Compensator Start	High Torque		Normal Torque	High Torque	Repulsion and Split-Phase	Capacitor					
Service Factors													
Paper Machinery													
Jordan Engines.....	1.5	1.3	1.8	1.5	1.6	1.8	...	...	1.5	1.5	...	...	
Beaters.....	1.4	1.4	...	1.4	...	...	...	...	1.4	1.4	1.8	...	
Calenders.....	1.2	1.2	...	1.2	...	...	...	...	1.2	1.2	...	...	
Agitators.....	1.2	1.0	1.4	1.2	...	...	...	...	1.2	1.2	1.6	...	
Dryers.....	1.2	1.2	...	1.2	...	...	...	...	1.2	1.2	...	...	
Paper Machines.....	1.4	1.4	...	1.5	...	...	...	...	1.5	1.5	1.6	...	
Pumps													
Centrifugal.....	1.2	1.2	1.4	1.4	...	...	1.2	1.2	...	...	...	...	
Gear.....	1.2	1.2	1.4	1.4	...	...	1.2	1.2	...	...	...	...	
Rotary.....	1.2	1.2	1.4	1.4	...	...	1.2	1.2	1.2	...	...	...	
Reciprocating —													
3 or more Cyl.....	1.2	1.2	...	1.4	1.4	1.6	...	...	...	...	...	...	
1 or 2 Cyl.....	1.4	1.4	...	1.6	1.6	1.8	...	...	...	...	...	...	

V-BELTS AND SHEAVES

Factors X, Y, and Z for Use in Formula 4

Factor	Regular Quality Belts					Premium Quality Belts				
	Belt Cross Section									
	A	B	C	D	E	A	B	C	D	E
	Values of X, Y, and Z to be Used in H.P. Formula									
	X	1.945	3.434	6.372	13.616	19.914	2.684	4.737	8.792	18.788	24.478
Y	3.801	9.830	26.948	93.899	177.74	5.326	13.962	38.819	137.70	263.04
Z	0.0136	0.0234	0.0416	0.0848	0.1222	0.0136	0.0234	0.0416	0.0848	0.1222

Example: Find the horsepower capacity of a standard quality A60 size V-belt for a drive in which the pitch diameter of the small sheave is 3 inches and that of the large, 9 inches.

The small sheave is to rotate at 1750 R.P.M.

1. Find center distance C (Formula 3, page 956)

$$C = \frac{b + \sqrt{b^2 - 32(D-d)^2}}{16}$$

where $b = 4L - 6.28(D + d)$

$L = 61.3$ inches (Table 8)

$$b = 4 \times 61.3 - 6.28(9 + 3) = 169.8$$

$$C = \frac{169.8 + \sqrt{169.8^2 - 32(9-3)^2}}{16} = 21.0 \text{ inches}$$

2. Find arc of contact, A (Formula 5, page 964)

$$A = 180^\circ - \frac{(D-d)60^\circ}{C} = 180^\circ - \frac{(9-3)60^\circ}{21.0} = 163^\circ$$

3. Find correction factors

Length correction factor = 0.98 (Table 12)

Arc of contact correction factor = 0.96 (Table 13)

Small diameter factor (Speed ratio = $9 \div 3 = 3$) = 1.14 (Table 14)

4. Compute belt speed in thousands of feet per minute:

$$S = \frac{3.14 \times \text{P.D.} \times \text{R.P.M.}}{12 \times 1000} = \frac{3.14 \times 3 \times 1750}{12 \times 1000} = 1.38$$

5. Compute equivalent diameter of small sheave

$$d_e = 3 \times 1.14 = 3.42 \text{ inches}$$

6. Compute belt H.P. using Formula 4:

$$\begin{aligned} \text{H.P.} &= 1.945S^{.91} - \frac{3.801S}{d_e} - .0136S^3 \\ &= 1.945 \times 1.38^{.91} - \frac{3.801 \times 1.38}{3.42} - .0136 \times 1.38^3 \\ &= 1.945 \times 1.34 - 1.535 - .034 = 1.04 \end{aligned}$$

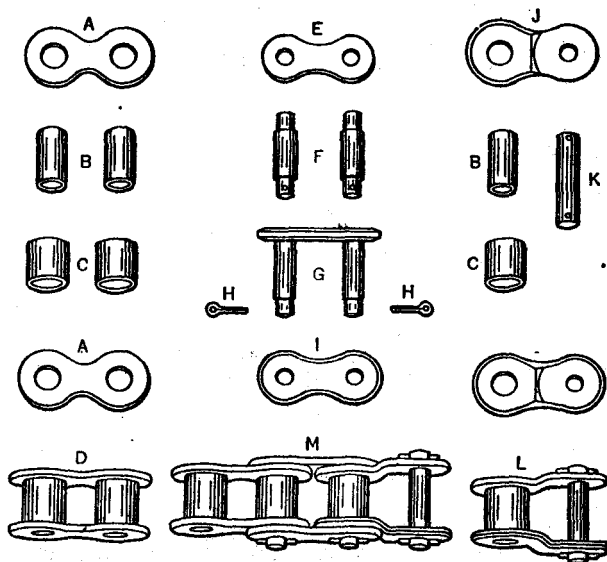
7. Apply length and arc of contact correction factors to get horsepower capacity:

$$1.04 \times 0.98 \times 0.96 = 0.98 \text{ H.P.}$$

8. Divide horsepower capacity into horsepower to be transmitted to obtain number of belts required for drive.

2. TRUYỀN ĐỘNG XÍCH TRANSMISSION ROLLER CHAIN

BẢNG 1 : CHỈ DANH THEO TIÊU CHUẨN MỸ CHO CÁC CHI TIẾT XÍCH LĂN



Roller Link D. — An inside link consisting of two inside plates, two bushings, and two rollers.

Pin Link G and E. — An outside link consisting of two pin-link plates assembled with two pins.

Inside Plate A. — One of the plates forming the tension members of a roller link.

Pin Link Plate E. — One of the plates forming the tension members of a pin link.

Pin F. — A stud articulating within a bushing of an inside link and secured at its ends by the pin-link plates.

Bushing B. — A cylindrical bearing in which the pin turns.

Roller C. — A ring or thimble which turns over a bushing.

Assembled Pins G. — Two pins assembled with one pin-link plate.

Connecting-Link G and I. — A pin link having one side plate detachable.

Connecting-Link Plate I. — The detachable pin-link plate belonging to a connecting link.

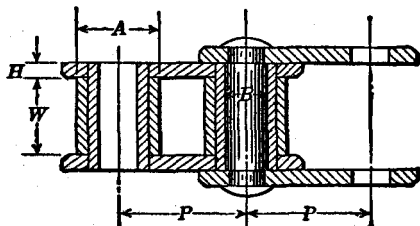
Offset Link L. — A link consisting of two offset plates assembled with a bushing and roller at one end and an offset link pin at the other.

Offset Plate J. — One of the plates forming the tension members of the offset link.

Offset Link Pin K. — A pin used in offset links.

BẢNG 2 : CÁC KÍCH THƯỚC TIÊU CHUẨN MỸ CỦA XÍCH LĂN

Table 2. AMERICAN STANDARD ROLLER CHAIN DIMENSIONS
(ASA B29.1957)



Roller Diameters A are approximately $\frac{5}{8} P$.

The width W is defined as the minimum distance between the link plates. In the wide series the width is the nearest common fraction to $\frac{5}{8} P$.

Pin Diameters B are approximately $\frac{1}{16} P$ or $\frac{1}{4}$ of the roller diameter.

Thickness H of Inside and Outside Link Plates for the standard series is approximately $\frac{1}{16} P$.

Thickness of Link Plates for the heavy series of any pitch is approximately that of the next larger pitch standard series chain.

Maximum Width of Roller Link Plates = 0.95 Pitch.

Maximum Width of Pin Link Plates = 0.82 Pitch.

Maximum Pin Diameter = nominal pin diameter + 0.0005 inch.

Minimum Hole in Bushing = nominal pin diameter + 0.0015 inch.

Maximum Width of Roller Link = nominal width of chain + $(2.12 \times \text{nominal link plate thickness})$

Minimum Distance between Pin Link Plates = maximum width of roller link + 0.002 inch.

Pitch P	Max. Roller Diam- eter A	Standard Series					Heavy Series
		Stand- ard Chain No.	Width W	Pin Diam- eter B	Thick- ness of Link Plates H	Measur- ing Load, Lb.	Thick- ness of Link Plates H
$\frac{1}{4}$	*0.130	25	$\frac{1}{8}$	0.0905	0.030	18	.....
$\frac{3}{8}$	*0.200	35	$\frac{3}{16}$	0.141	0.050	18	.....
$\frac{1}{2}$	$\frac{5}{16}$	40	$\frac{5}{16}$	0.156	0.060	31	.....
$\frac{5}{8}$	0.400	50	$\frac{3}{8}$	0.200	0.080	49	.....
$\frac{3}{4}$	$1\frac{1}{4}$	60	$\frac{1}{2}$	0.234	0.094	70	0.125
1	$\frac{5}{8}$	80	$\frac{5}{8}$	0.312	0.125	125	0.156
$1\frac{1}{4}$	$\frac{3}{4}$	100	$\frac{3}{4}$	0.375	0.156	195	0.187
$1\frac{3}{4}$	$\frac{7}{8}$	120	1	0.437	0.187	281	0.219
2	1	140	1	0.500	0.219	383	0.250
$2\frac{1}{4}$	$1\frac{1}{4}$	160	$1\frac{1}{4}$	0.562	0.250	500	0.281
$2\frac{3}{4}$	$1\frac{3}{4}$	180	$1\frac{3}{4}$	0.687	0.281	633	0.375
3	$1\frac{1}{2}$	200	$1\frac{1}{2}$	0.781	0.312	781	0.375
3	$1\frac{7}{8}$	240	$1\frac{7}{8}$	0.937	0.375	1125	0.500

* This size chain has no rollers.

BẢNG 3 : CÁC TIẾT DIỆN RĂNG TIÊU CHUẨN MỸ CỦA ĐĨA XÍCH LĂN

Table 3. AMERICAN STANDARD ROLLER-CHAIN SPROCKET TOOTH SECTIONS (ASA B29.1-1957)

SINGLE WIDTH				MULTIPLE WIDTH			
Width of Chain <i>W</i>	Max. Sprocket Thickness (<i>T</i>)			Sprocket Chamfer			
	Single Strand	Double, Triple Strand	4 Strand and Over	Pitch <i>P</i>	Depth of Chamfer <i>C</i>	Width of Chamfer <i>E</i>	Minimum Radius <i>R</i>
$\frac{3}{8}$	0.110	0.107	0.096	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{32}$	0.265
$\frac{7}{16}$	0.168	0.162	0.149	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{3}{64}$	0.398
$\frac{1}{2}$	0.227	.....	.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	0.531
$\frac{9}{16}$	0.284	0.275	0.256	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{3}{64}$	0.664
$\frac{5}{8}$	0.343	0.332	0.311	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{32}$	0.796
$\frac{3}{4}$	0.459	0.444	0.418	1	$\frac{3}{4}$	$\frac{1}{8}$	1.062
$\frac{7}{8}$	0.575	0.557	0.526	$1\frac{1}{8}$	$\frac{7}{8}$	$\frac{3}{16}$	1.327
$\frac{15}{16}$	0.692	0.669	0.633	$1\frac{1}{4}$	$\frac{15}{16}$	$\frac{1}{2}$	1.593
1	0.924	0.894	0.848	$1\frac{3}{4}$	$\frac{15}{8}$	$\frac{1}{2}$	1.858
$1\frac{1}{8}$	1.156	1.119	1.063	2	1	$\frac{3}{4}$	2.124
$1\frac{3}{8}$	1.301	1.259	1.197	$2\frac{1}{4}$	$1\frac{1}{8}$	$\frac{7}{8}$	2.392
$1\frac{1}{2}$	1.389	1.344	1.278	$2\frac{3}{4}$	$1\frac{1}{4}$	$\frac{15}{8}$	2.654
$1\frac{3}{4}$	1.738	1.682	1.601	3	$1\frac{3}{4}$	$\frac{3}{4}$	3.187

P = pitch of chain; *W* = chain width; *H* = nominal thickness of link plates (Table 4)
T = $0.93W - 0.006$ inch (maximum for single-width chains)
T = $0.90W - 0.006$ inch (maximum for double- and triple-width chains)
T = $0.86W - 0.012$ inch (maximum for quadruple-width chains and over)
C = $0.5P$ = depth of chamfer; *E* = $\frac{1}{8}P$ approximately, but not to exceed $\frac{W}{3}$
R (minimum) = $1.063P$ = chamfer radius; Maximum fillet radius = $0.04P$.
A = $W + 4.22H$ = transverse pitch for multiple strand chains
 Minus tolerance for overall measurement across one or more flange teeth = $0.01W + 0.006$ in. Maximum variation in thickness of any individual flange = $\frac{1}{16}$ tolerance for overall measurement.

H.2 : CÁC ĐƯỜNG KÍNH CỦA ĐĨA XÍCH

Fig 2. SPROCKET, DIAMETERS

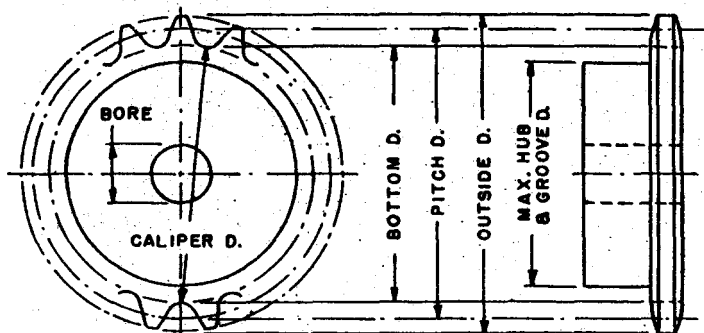


Fig. 2. Sprocket Diameters

BẢNG 4 : CÁC ĐƯỜNG KÍNH ĐĨA XÍCH LẮN THEO TIÊU CHUẨN MỸ

Table 4. AMERICAN STANDARD ROLLER CHAIN SPROCKET DIAMETERS (ASA B29.1.1957)

These diameters apply only to chains of 1-inch pitch. For any other pitch diameter or outside diameter, multiply the diameter given below by the pitch.

Caliper Diam. (even teeth) = Pitch Diameter - Roller Diam.

Caliper Diam. (odd teeth) = Caliper factor $\times$ Pitch - Roller Diam.

See Table 5 for tolerances on Caliper Diameters.

No. Teeth	Pitch Diameter	Outside Diameter	Caliper Factor	No. Teeth	Pitch Diameter	Outside Diameter	Caliper Factor
9	2.9238	3.348	2.8794	59	18.7892	19.363	18.7825
10	3.2361	3.678		60	19.1073	19.681	
11	3.5495	4.006	3.5133	61	19.4255	20.000	19.4190
12	3.8637	4.332		62	19.7437	20.318	
13	4.1786	4.657	4.1481	63	20.0618	20.637	20.0556
14	4.4940	4.981		64	20.3800	20.956	
15	4.8097	5.304	4.7834	65	20.6982	21.274	20.6921
16	5.1258	5.627		66	21.0164	21.593	
17	5.4422	5.949	5.4190	67	21.3346	21.911	21.3287
18	5.7588	6.271		68	21.6528	22.230	
19	6.0755	6.593	6.0548	69	21.9710	22.548	21.9653
20	6.3924	6.914		70	22.2892	22.867	
21	6.7095	7.235	6.6907	71	22.6074	23.185	22.6018
22	7.0267	7.555		72	22.9256	23.504	
23	7.3439	7.876	7.3268	73	23.2438	23.822	23.2384
24	7.6613	8.196		74	23.5620	24.141	
25	7.9787	8.516	7.9630	75	23.8802	24.459	23.8750
26	8.2962	8.836		76	24.1984	24.778	
27	8.6138	9.156	8.5992	77	24.5166	25.096	24.5116
28	8.9314	9.475		78	24.8349	25.415	
29	9.2491	9.795	9.2355	79	25.1531	25.733	25.1481
30	9.5668	10.114		80	25.4713	26.052	
31	9.8845	10.434	9.8718	81	25.7896	26.370	25.7847
32	10.2023	10.753		82	26.1078	26.689	
33	10.5201	11.073	10.5082	83	26.4260	27.007	26.4213
34	10.8379	11.392		84	26.7443	27.326	
35	11.1558	11.711	11.1446	85	27.0625	27.644	27.0579
36	11.4737	12.030		86	27.3807	27.962	
37	11.7916	12.349	11.7810	87	27.6990	28.281	27.6945
38	12.1095	12.668		88	28.0172	28.599	
39	12.4275	12.987	12.4174	89	28.3354	28.918	28.3310
40	12.7455	13.306		90	28.6537	29.236	
41	13.0635	13.625	13.0539	91	28.9719	29.555	28.9676
42	13.3815	13.944		92	29.2902	29.873	
43	13.6995	14.263	13.6904	93	29.6084	30.192	29.6042
44	14.0175	14.582		94	29.9267	30.510	
45	14.3355	14.901	14.3269	95	30.2449	30.828	30.2408
46	14.6536	15.219		96	30.5632	31.147	
47	14.9717	15.538	14.9634	97	30.8815	31.465	30.8774
48	15.2898	15.857		98	31.1997	31.784	
49	15.6079	16.176	15.5999	99	31.5180	32.102	31.5140
50	15.9260	16.495		100	31.8362	32.421	
51	16.2441	16.813	16.2364	101	32.1545	32.739	32.1506
52	16.5622	17.132		102	32.4727	33.057	
53	16.8803	17.451	16.8729	103	32.7910	33.376	32.7872
54	17.1984	17.769		104	33.1093	33.694	
55	17.5165	18.088	17.5094	105	33.4275	34.013	33.4238
56	17.8347	18.407		106	33.7458	34.331	
57	18.1528	18.725	18.1459	107	34.0641	34.649	34.0604
58	18.4710	19.044		108	34.3823	34.968	

**BẢNG 5 : DUNG SAI ÂM ĐƯỜNG KÍNH ĐÁY CỦA ĐĨA XÍCH
ĐƯỢC GIA CÔNG CẮT**

**TABLE 5. MINUS TOLERANCES ON THE BOTTOM DIAMETERS
OF CUT SPROCKETS**

Pitch	Number of Teeth				
	Up to 16	16-24	25-35	36-48	49-63
1/4	0.004	0.004	0.004	0.005	0.005
3/8	0.004	0.004	0.004	0.005	0.005
1/2	0.004	0.005	0.0055	0.006	0.0065
5/8	0.005	0.0055	0.006	0.007	0.008
3/4	0.005	0.006	0.007	0.008	0.009
1	0.006	0.007	0.008	0.009	0.010
1 1/4	0.007	0.008	0.009	0.010	0.012
1 1/2	0.007	0.009	0.0105	0.012	0.013
1 3/4	0.008	0.010	0.012	0.013	0.015
2	0.009	0.011	0.013	0.015	0.017
2 1/4	0.010	0.012	0.014	0.016	0.018
2 1/2	0.010	0.013	0.015	0.018	0.020
3	0.012	0.015	0.018	0.021	0.024

Pitch	Number of Teeth				
	64-80	81-99	100-120	121-143	144 up
1/4	0.005	0.005	0.006	0.006	0.006
3/8	0.006	0.006	0.006	0.007	0.007
1/2	0.007	0.0075	0.008	0.0085	0.009
5/8	0.009	0.009	0.009	0.010	0.011
3/4	0.010	0.010	0.011	0.012	0.013
1	0.011	0.012	0.013	0.014	0.015
1 1/4	0.013	0.014	0.016	0.017	0.018
1 1/2	0.015	0.016	0.018	0.019	0.021
1 3/4	0.017	0.019	0.020	0.022	0.024
2	0.019	0.021	0.023	0.025	0.027
2 1/4	0.021	0.023	0.025	0.028	0.030
2 1/2	0.023	0.025	0.028	0.030	0.033
3	0.027	0.030	0.033	0.036	0.039

BẢNG 6 : CÁC ĐƯỜNG KÍNH Ổ TRỤC CỤC ĐẠI NÊN DÙNG CHO ĐĨA XÍCH LĂN

**Table 6. RECOMMENDED ROLLER CHAIN SPROCKET MAXIMUM
BORE AND HUB DIAMETERS**

Silent Chain Pitch										
No. of Teeth	¾		1½		¾		¾		1	
	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.
11	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
12	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
13	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
14	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
15	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
16	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
17	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
18	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
19	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
20	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
21	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
22	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
23	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
24	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
25	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½

Silent Chain Pitch										
No. of Teeth	1¼		1½		1¾		2		2½	
	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.	Max. Bore	Max. Hub Dia.
11	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
12	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
13	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
14	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
15	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
16	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
17	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
18	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
19	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
20	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
21	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
22	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
23	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
24	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½
25	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½

* Association of Roller and Silent Chain Manufacturers.
All dimensions in inches.
For standard key dimensions see pages 868 to 870.

BẢNG 7: CÁC TỶ SỐ ĐẶC TRƯNG CHO CÁC ĐĨA ĐÚC MỘT HẰNG VÀ NHIỀU HẰNG RĂNG

Single Strand

Multiple Strand

Sprocket Web Thickness, T , for Various Pitches P

Single Strand

P	T	P	T	P	T	P	T
$\frac{3}{4}$	.312	$\frac{3}{4}$	.437	$1\frac{1}{4}$	.625	$2\frac{1}{4}$	1.000
$\frac{1}{2}$	.375	$1\frac{1}{4}$	.500	$1\frac{3}{4}$	.750	$2\frac{1}{2}$	1.125
$\frac{1}{4}$	.406	$1\frac{1}{2}$	.562	2	.875	3	1.250

Multiple Strand

P	T	P	T	P	T	P	T
$\frac{3}{4}$	.375	$\frac{3}{4}$	.500	$1\frac{1}{4}$	.750	$2\frac{1}{4}$	1.125
$\frac{1}{2}$	.406	$1\frac{1}{4}$	.562	$1\frac{3}{4}$	.875	$2\frac{1}{2}$	1.250
$\frac{1}{4}$	.437	2	.625	3	1.000	4	1.500

Formulas for Dimensions of Single and Multiple Sprockets

$$H = 0.375 + \frac{D}{6} + 0.01PD$$

$$L = 4H \text{ for semi-steel castings}$$

$$C = 0.5P$$

$$C' = 0.9P$$

All dimensions in inches.

$$E = 0.625P + 0.93W$$

$$F = 0.156 + 0.25P$$

$$G = 2T$$

$$R = 0.04P \text{ for single-strand sprockets}$$

$$R = 0.5T \text{ for multiple-strand sprockets}$$

BẢNG 8: CÁC TỶ SỐ ĐẶC TRƯNG CỦA ĐĨA XÍCH BẰNG THÉP

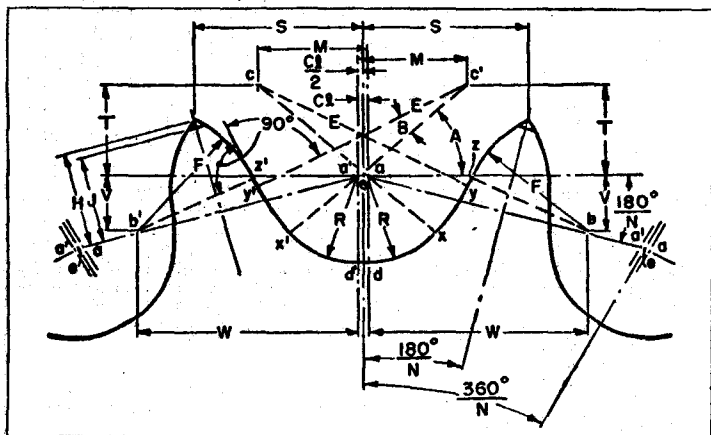
		$H = Z + D/6 + 0.01PD$ For PD up to 2 inches, $Z = 0.125$ inch; for 2-4 inches, $Z = 0.187$ inch; for 4-6 inches, 0.25 inch; and for over 6 inches, 0.375 inch. Hub length $L = 3.3H$, normally, with a minimum of $2.6H$. Hub diameter $HD = D + 2H$, but not more than the maximum hub diameter MHD given by the formula:
		$MHD = P \left(\cot \frac{180^\circ}{N} - 1 \right) - 0.030$
where:		P = Chain pitch, in inches N = Number of sprocket teeth

keyways to eliminate all backlash, especially on the fluctuating loads. A set screw should be located over a flat key to secure it against longitudinal displacement.

Where a set screw is to be used with a parallel key, the following sizes are recommended by the Association of Roller and Silent Chain Manufacturers. For a sprocket bore and shaft diameter in the range of $\frac{3}{4}$ through $\frac{7}{8}$ inch, a $\frac{3}{4}$ -inch set screw; for a range of $1\frac{1}{4}$ through $1\frac{3}{4}$ inches, a $\frac{3}{4}$ -inch set screw; for a range of $1\frac{3}{4}$ through $2\frac{1}{4}$ inches, a $\frac{3}{4}$ -inch set screw; for a range of $2\frac{1}{4}$ through $3\frac{1}{4}$ inches, a $\frac{3}{4}$ -inch set screw; for a range of $3\frac{1}{4}$ through $4\frac{1}{4}$ inches, a $\frac{3}{4}$ -inch set screw; for a range of $4\frac{1}{4}$ through $5\frac{1}{4}$ inches, a $\frac{3}{4}$ -inch set screw; for a range of $5\frac{1}{4}$ through $7\frac{1}{4}$ inches, a 1-inch set screw; and for $7\frac{1}{4}$ through $12\frac{1}{4}$ inches, a $1\frac{1}{4}$ -inch set screw.

BẢNG 9 : DẠNG RĂNG ĐĨA TIÊU CHUẨN MỸ CHO XÍCH LĂN

Table 9. AMERICAN STANDARD SPROCKET TOOTH FORM FOR ROLLER CHAIN (ASA B29.1-1957)



P = pitch (ee); N = number of teeth; D_r = nominal roller diameter
 D_s = seating curve diameter = $1.005 D_r + 0.003$; $R = \frac{1}{4} D_s$
 Cl = pitch line clearance = $0.07 (P - D_r) + 0.002$
 D_s and Cl have only plus tolerance, which equals $0.003 D_r + 0.005$
 $A = 35^\circ + (60^\circ + N)$; $B = 18^\circ - (56^\circ + N)$; $ac = 0.8 D_r$
 $M = 0.8 D_r \cos (35^\circ + (60^\circ + N))$
 $T = 0.8 D_r \sin (35^\circ + (60^\circ + N))$; $E = 1.3025 D_r + 0.0015$
Chord $xy = (2.605 D_r + 0.003) \sin (9^\circ - (28^\circ + N))$
 $ys = D_r [1.24 \sin (17^\circ - (64^\circ + N)) - 0.8 \sin (18^\circ - (56^\circ + N))]$
Length of a line between a and $b = 1.24 D_r$ (This line is parallel to ee)
Angle that line between a and b would make with horizontal = $180^\circ + N$
 $W = 1.24 D_r \cos (180^\circ + N)$; $V = 1.24 D_r \sin (180^\circ + N)$
 $F = D_r [0.8 \cos (18^\circ - (56^\circ + N)) + 1.24 \cos (17^\circ - (64^\circ + N)) - 1.3025] - 0.0015$
 $H = \sqrt{F^2 - [1.24 D_r - 0.5P + 0.5 Cl \cos (180^\circ + N)]^2 + 0.5 Cl \sin (180^\circ + N)}$
 $S = 0.5 P \cos (180^\circ + N) + H \sin (180^\circ + N)$
Approximate O.D. of sprocket when J is $0.3 P = P [0.6 + \cot (180^\circ + N)]$
O.D. of sprocket when tooth is pointed = $P \cot (180^\circ + N) + 2 H$
Pressure angle for new chain = $xab = 35^\circ - (120^\circ + N)$
Minimum pressure angle = $xab - B = 17^\circ - (64^\circ + N)$; Average pressure angle = $26^\circ - (92^\circ + N)$

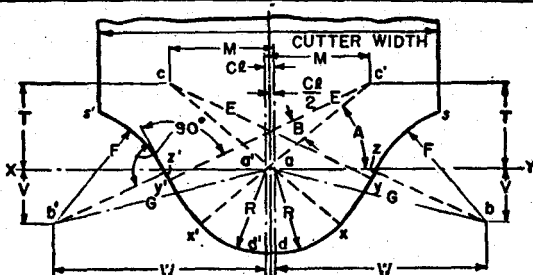
Seating Curve Data — Inches

P	D_r	Min. R	Min. Cl †	D_s, Cl Tol.*	P	D_r	Min. R	Min. Cl †	D_s, Cl Tol.*
$\frac{1}{4}$	0.130	0.0670	0.010	0.0055	$\frac{1}{4}$	$\frac{1}{4}$	0.3785	0.037	0.0070
$\frac{3}{8}$	0.200	0.1020	0.014	0.0055	$\frac{1}{2}$	$\frac{1}{2}$	0.4410	0.046	0.0075
$\frac{1}{2}$	0.306	0.1585	0.015	0.0060	$\frac{3}{4}$	$\frac{3}{4}$	0.5040	0.055	0.0080
$\frac{5}{8}$	$\frac{1}{2}$	0.1585	0.015	0.0060	1	1	0.5670	0.063	0.0085
$\frac{3}{4}$	0.400	0.2025	0.018	0.0060	$\frac{1}{2}$	$\frac{1}{2}$	0.7080	0.061	0.0090
$\frac{1}{2}$	$\frac{1}{2}$	0.2370	0.022	0.0065	$\frac{3}{4}$	$\frac{3}{4}$	0.7870	0.068	0.0095
1	$\frac{3}{4}$	0.3155	0.028	0.0070	3	$\frac{1}{2}$	0.9435	0.081	0.0105

* Tolerance on D_s and Cl is plus only. † Sprockets with pitch line clearance are known as Type I. Type II sprockets have zero pitch line clearance but otherwise are the same as Type I.

BẢNG 10 : DỤNG CỤ CẮT ĐỊNH HÌNH TIÊU CHUẨN ĐỂ CẮT Đĩa XÍCH LĂN

Table 10. STANDARD SPACE CUTTERS FOR ROLLER-CHAIN
SPROCKETS (ASA B29.1-1957)



Construction: Draw XY . With e as a center and a radius equal to R draw circular arc xd ; with e' as a center and with same radius draw circular arc $x'd'$. To complete seating curve xx' , draw $d'd$ tangent to $d'x'$ and dx . Locate c and c' from dimensions M and T in table below. With c and c' as centers describe arcs xy and $x'y'$. Draw ys perpendicular to cy and $y's'$ perpendicular to $c'y'$. Locate b and b' from dimensions W and V . Draw bs parallel to cy and $b's'$ parallel to $c'y'$. With radii bs and $b's'$ equal to F draw topping curves xs and $x's'$. The line ys is a common tangent to the two circular arcs xy and $x's'$, similarly $y's'$ is tangent to $x'y'$ and $s's'$.

Angle Yab is equal to $180^\circ + N$ when the cutter is made for a specific number of teeth, but has the values shown in the table below for cutters covering a given range of teeth. The following formulas are for cutters covering the standard ranges of teeth where N_a equals intermediate values given on page 979.

$$W = 1.24 D_r \cos Yab; \quad V = 1.24 D_r \sin Yab$$

$$ys = D_r \left[1.24 \sin \left(17^\circ + \frac{116^\circ}{N_a} - Yab \right) - 0.8 \sin \left(18^\circ - \frac{56^\circ}{N_a} \right) \right]$$

$$F = D_r \left[0.8 \cos \left(18^\circ - \frac{56^\circ}{N_a} \right) + 1.24 \cos \left(17^\circ + \frac{116^\circ}{N_a} - Yab \right) - 1.3025 \right] - 0.0015 \text{ in.}$$

For other points, use the value of N_a for N in the standard formulas in Table 8.

Data for Laying Out Space Cutter

Range of Teeth	M	T	W	V
7-8	$0.5848 D_r$	$0.5459 D_r$	$1.1328 D_r$	$0.5044 D_r$
9-11	$0.6032 D_r$	$0.5255 D_r$	$1.1782 D_r$	$0.3866 D_r$
12-17	$0.6194 D_r$	$0.5063 D_r$	$1.2129 D_r$	$0.2578 D_r$
18-34	$0.6343 D_r$	$0.4875 D_r$	$1.2353 D_r$	$0.1081 D_r$
35 up	$0.6466 D_r$	$0.4710 D_r$	$1.2400 D_r$	0

Range of Teeth	F	Chord xy	ys	Angle Yab
7-8	$0.7104 D_r - 0.0015$	$0.2384 D_r + 0.0003$	$0.0382 D_r$	24°
9-11	$0.6981 D_r - 0.0015$	$0.2800 D_r + 0.0003$	$0.0561 D_r$	$18^\circ 10'$
12-17	$0.6807 D_r - 0.0015$	$0.3181 D_r + 0.0004$	$0.0905 D_r$	12°
18-34	$0.6542 D_r - 0.0015$	$0.3540 D_r + 0.0004$	$0.1455 D_r$	5°
35 up	$0.6345 D_r - 0.0015$	$0.3850 D_r + 0.0004$	$0.1713 D_r$	0°

E (same for all ranges) = $1.3025 D_r + 0.0015$; G (same for all ranges) = $1.24 D_r$

BẢNG 11 : CÁC KÍCH CỠ DỤNG CỤ CẮT NÊN DÙNG ĐỂ GIA CÔNG Đĩa XÍCH LĂN

Table 11. RECOMMENDED SPACE CUTTER SIZES FOR ROLLER-CHAIN SPROCKETS

Pitch	Roller Diam.	Number of Teeth					
		6	7-8	9-11	12-17	18-34	35 up
		Cutter Diameter (Minimum)					
$\frac{1}{4}$	0.130	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$
$\frac{3}{8}$	0.200	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$
$\frac{1}{2}$ to $\frac{5}{8}$	0.313	3	3	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$
$\frac{5}{8}$	0.400	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$
$\frac{3}{4}$	0.469	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
1 to $1\frac{1}{4}$	0.625	$3\frac{3}{8}$	4	$4\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$4\frac{1}{4}$
$1\frac{1}{4}$ to $1\frac{3}{4}$	0.750	$4\frac{1}{8}$	$4\frac{3}{8}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$
$1\frac{3}{4}$	0.875	$4\frac{3}{8}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$
$1\frac{3}{8}$	1.000	5	$5\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{1}{4}$
2	1.125	$5\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{3}{8}$	$5\frac{3}{8}$	$5\frac{3}{8}$	$5\frac{3}{8}$
$2\frac{1}{4}$	1.406	$5\frac{3}{8}$	6	$6\frac{1}{4}$	$6\frac{1}{4}$	$6\frac{1}{4}$	$6\frac{1}{4}$
$2\frac{3}{8}$	1.563	$6\frac{1}{8}$	$6\frac{3}{8}$	$6\frac{3}{4}$	$6\frac{3}{4}$	7	$7\frac{1}{8}$
3	1.875	$7\frac{1}{8}$	$7\frac{3}{8}$	$7\frac{3}{4}$	8	8	$8\frac{1}{4}$

Pitch	Roller Diam.	Cutter Width (Minimum)					
$\frac{1}{4}$	0.130	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{9}{32}$	$\frac{9}{32}$
$\frac{3}{8}$	0.200	$1\frac{1}{32}$	$1\frac{1}{32}$	$1\frac{1}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$1\frac{1}{16}$
$\frac{1}{2}$ to $\frac{5}{8}$	0.313	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$2\frac{3}{32}$	$1\frac{1}{16}$
$\frac{5}{8}$	0.400	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$2\frac{3}{32}$	$1\frac{1}{16}$
$\frac{3}{4}$	0.469	$2\frac{9}{32}$	$2\frac{9}{32}$	$2\frac{9}{32}$	$\frac{7}{8}$	$2\frac{9}{32}$	$1\frac{1}{16}$
1 to $1\frac{1}{4}$	0.625	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$
$1\frac{1}{4}$ to $1\frac{3}{4}$	0.750	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{3}{16}$	$1\frac{3}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$
$1\frac{3}{4}$	0.875	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{3}{16}$	$1\frac{3}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$
$1\frac{3}{8}$	1.000	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$1\frac{3}{16}$	$1\frac{1}{16}$
2	1.125	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{16}$
$2\frac{1}{4}$	1.406	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$
$2\frac{3}{8}$	1.563	3	3	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{4}$	$2\frac{1}{16}$
3	1.875	$3\frac{1}{16}$	$3\frac{1}{16}$	$3\frac{1}{16}$	$3\frac{1}{16}$	$3\frac{1}{16}$	$3\frac{1}{16}$

Where the same roller diameter is commonly used with chains of two different pitches it is recommended that stock cutters be made wide enough to cut sprockets for both chains.

Marking of Cutters. — All cutters are to be marked, giving pitch, roller diameter and range of teeth to be cut.

Bores for Sprocket Cutters (recommended practice) are approximately as calculated from the formula:

$$\text{Bore} = 0.7 \sqrt{(\text{Width of Cutter} + \text{Roller Diameter} + 0.7 \text{ Pitch})}$$

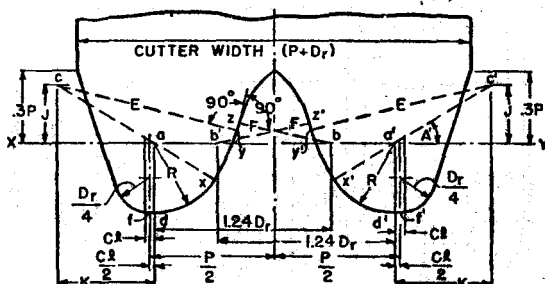
and are equal to 1 inch for $\frac{1}{4}$ -through $\frac{3}{4}$ -inch pitches; $1\frac{1}{4}$ inches for 1-through $1\frac{3}{4}$ -inch pitches; $1\frac{3}{4}$ inches for $1\frac{3}{4}$ -through $2\frac{1}{4}$ -inch pitches; $1\frac{3}{4}$ inches for $2\frac{1}{4}$ -inch pitch; and 2 inches for 3-inch pitch.

Minimum Outside Diameters of Space Cutters for 35 teeth and over (recommended practice) are approximately as calculated from the formula:

$$\text{Outside Diameter} = 1.2 (\text{Bore} + \text{Roller Diameter} + 0.7 \text{ Pitch}) + 1 \text{ in.}$$

BẢNG 12 : DAO CẮT LÚP TIÊU CHUẨN MỸ ĐỂ GIA CÔNG ĐĨA XÍCH LĂN

Table 12. AMERICAN STANDARD STRADDLE CUTTERS FOR
ROLLER-CHAIN SPROCKETS



Construction. — P = Pitch, D_r = roller diameter, and N = number of teeth on which cutter is based. Draw XY and the two seating-curve circles xd and $x'd'$ as explained in Table 9. Locate c and c' from the dimensions K and J as given in this table. Locate b and b' . Draw ca and $c'a'$, and with centers c and c' draw the working curves xy and $x'y'$. Draw yz and $y'z'$ perpendicular to cy and $c'y'$ respectively. Draw bs and $b's'$ parallel to cy and $c'y'$ respectively. With b and b' as centers and radius bs equal to F (see table), strike the arcs of the topping curves. Cutter width is $P + D_r$. Cutter diameters are as given in Table 11 for 35 and over teeth.

N = number of teeth on which cutter is based; $A' = 35^\circ - \frac{120^\circ}{N}$

$K = 0.8 D_r \cos A'$; $J = 0.8 D_r \sin A'$; $E = cx = 1.3025 D_r + 0.0015$

$F = D_r \left[0.8 \cos \left(18^\circ - \frac{56^\circ}{N} \right) + 1.24 \cos \left(17^\circ - \frac{64^\circ}{N} \right) - 1.3025 \right] - 0.0015$

Maximum pressure angle (new chain) $xab = 35^\circ - \frac{120^\circ}{N} = 24.1^\circ$ for "B" cutter and 32° for "A" cutter.

Minimum pressure angle $= xab - acy = 17^\circ - \frac{64^\circ}{N} = 11.2^\circ$ for "B" cutter and 15.4° for "A" cutter.

Average pressure angle $= 26^\circ - \frac{92^\circ}{N} = 17.6^\circ$ for "B" and 23.7° for "A" cutter.

There will be on the sprocket bottom diameter slight indentations for smaller, and slight projections for larger sprockets than the specific sprockets (11 and 40 teeth) for which cutters are designed.

Data for Laying Out Straddle Cutter

Cutter*	No. of Teeth to be Cut	K	J	F
B	17 and under	$0.730 D_r$	$0.327 D_r$	$0.6937 D_r - 0.0015$
A	18 and over	$0.678 D_r$	$0.424 D_r$	$0.6596 D_r - 0.0015$
Cutter*	No. of Teeth to be Cut	Chord xy	yz	E
B	17 and under	$0.2928 D_r + 0.0003$	$0.0617 D_r$	$1.3025 D_r + 0.0015$
A	18 and over	$0.3762 D_r + 0.0004$	$0.1007 D_r$	$1.3025 D_r + 0.0015$

* Only two cutters of this type are required to cover the entire range of teeth.

† Not recommended for Type II (see footnote to Table 9) sprockets.

**BẢNG 14 : SỐ VÒNG QUAY/PHÚT TỐI ĐA NÊN DÙNG CHO
CÁC ĐĨA XÍCH LĂN**

Table 14. RECOMMENDED MAXIMUM R.P.M. OF SPROCKETS

No. of Teeth	Chain No.						
	25	35	41	40	50	60	80
	Pitch						
	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
	Sprocket R.P.M.						
11	4310	2260	1020	1690	1220	920	580
12	4960	2590	1170	1940	1400	1050	670
13	5540	2900	1310	2180	1570	1180	750
14	6070	3170	1430	2380	1720	1290	820
15	6530	3420	1540	2560	1850	1390	880
16	6940	3630	1630	2720	1960	1480	935
17	7290	3810	1720	2860	2060	1550	985
18	7590	3970	1790	2980	2150	1610	1020
19	7840	4100	1850	3080	2220	1670	1060
20	8050	4210	1890	3160	2280	1720	1090
21	8230	4300	1940	3230	2330	1750	1110
22	8370	4380	1970	3290	2370	1780	1130
23	8480	4430	2000	3330	2400	1800	1150
24	8560	4480	2020	3360	2420	1820	1160
25	8610	4510	2030	3380	2440	1830	1160
30	8580	4490	2020	3370	2430	1830	1160
35	8200	4290	1930	3220	2320	1740	1110
40	7580	3970	1780	2970	2140	1610	1020
45	6820	3570	1600	2670	1930	1450	920
50	5950	3110	1400	2330	1680	1270	805
55	5010	2620	1180	1970	1420	1070	675
60	4020	2100	950	1580	1140	860	545

No. of Teeth	Chain No.						
	100	120	140	160	180	200	240
	Pitch						
	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	3
	Sprocket R.P.M.						
11	415	325	235	200	165	145	110
12	475	375	270	230	190	165	125
13	535	415	305	260	215	185	140
14	585	455	335	280	235	205	155
15	630	490	360	305	255	220	165
16	670	520	380	325	270	235	175
17	700	550	400	340	285	245	185
18	730	570	415	355	295	255	195
19	755	590	430	365	305	265	200
20	775	605	440	375	315	270	205
21	790	620	450	385	320	280	210
22	805	630	460	390	325	280	215
23	815	640	465	395	330	285	215
24	825	645	470	400	330	290	220
25	830	650	475	400	335	290	220
30	825	645	470	400	335	290	220
35	790	615	450	380	320	275	210
40	730	570	415	355	295	255	195
45	655	515	375	320	265	230	175
50	575	450	325	275	230	200	150
55	480	375	275	235	195	170	125
60	390	305	220	185	155	135	100

MACHINE DETAILS

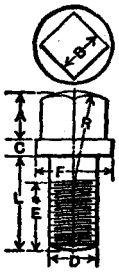
CHI TIẾT MÁY

CHI TIẾT MÁY

MACHINE DETAILS

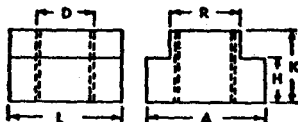
VIT CÓ CỔ

COLLAR SCREWS

	Outside Diameter of Screw, D	Number of Threads per Inch	Length of Head, A	Size of Square, B	Thickness of Collar, C	Diameter of Collar, F	Radius of Head, R
	1/4	40	1/4	1/4	1/16	1/4	1/4
	3/16	24	3/16	3/16	3/64	11/32	3/8
	1/8	20	1/8	1/8	5/64	1/4	1/4
	5/16	18	5/16	5/16	7/64	1/2	5/8
	3/8	16	3/8	3/8	1/8	5/8	3/4
	7/16	14	7/16	7/16	1/4	1 1/16	7/8
	1/2	12 or 13	1/2	1/2	3/8	1 1/8	1
	9/16	12	9/16	9/16	7/16	1 1/2	1 1/4
	5/8	11	5/8	5/8	1 1/4	1 3/4	1 1/2
	3/4	10	3/4	3/4	1 1/2	1 3/4	1 3/4

* On all screws four inches long and under, threads are cut 3/4 of the length L; longer than four inches, threads are cut half of the length L.

1. ĐAI ỐC - T TIÊU CHUẨN MỸ



Note: No definite provision has been made for the chamfering of corners. Chamfering or rounding is left to manufacturer's discretion.

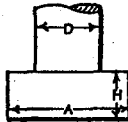
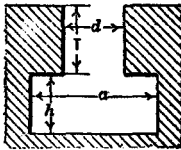
Thread Diameter D*	Width of T-slot Throat	Width of Tongue R		Width of Nut A		Height of Nut H		Total Thickness K	Length of Nut L
		Maximum (Basic)	Minimum	Maximum (Basic)	Minimum	Maximum (Basic)	Minimum		
1/4	1 1/32	0.330	0.320	3/16	17/32	3/16	1 1/4	9/16	3/16
5/16	1/8	0.418	0.408	1 1/16	2 1/32	1/4	1 5/8	3/8	1 1/16
3/8	9/16	0.543	0.533	1/4	2 1/32	5/16	1 5/8	1 1/32	3/8
1/2	1 1/16	0.668	0.658	1 1/8	1 3/4	1 1/4	2 3/8	5/8	1 1/8
5/8	1 1/8	0.783	0.773	1 5/16	1 5/8	1 1/2	2 3/8	2 3/8	1 5/8
3/4	1 1/8	1.033	1.018	1 11/16	2 1/32	1 1/2	2 3/8	1	1 11/16
1	1 5/8	1.273	1.258	2 1/16	2 1/8	1 5/8	2 3/8	1 1/8	2 1/8
1 1/4	1 5/8	1.523	1.508	2 1/2	2 1/8	1 5/8	1 5/8	1 5/8	2 1/2

* Thread diameter in T-nut is made smaller than corresponding T-bolt, to insure full strength of T-nut. A T-nut of given thread diameter requires the next size wider T-slot throat than does a T-bolt of the same thread diameter.

2. RÃNH T VÀ BU LÔNG T TIÊU CHUẨN MỸ

T-BOLTS AND SLOTS

AMERICAN STANDARD T-SLOTS AND T-BOLTS (ASA B5.1-1949)



Provision is made in this Standard for optional rounding or breaking of corners in slot and on bolt.

Diameter of T-bolt*	Width of Throat d†	Depth of Throat T		Head Space Dimensions and Tolerances					
				Width a			Depth h		
		Maximum	Minimum	Maximum (Basic)	Tolerance (Minus)	Minimum	Maximum (Basic)	Tolerance (Minus)	Minimum
3/4	3/4	3/4	3/4	3/4	0.063	3/4	1 5/8	0.031	1 5/8
3/4	1 1/4	3/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
3/4	3/4	3/4	3/4	3/4	0.063	3/4	1 5/8	0.031	1 5/8
3/4	3/4	1 1/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
3/4	1 1/4	3/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
3/4	1 1/4	1 1/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
1	1 1/4	1 1/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
1	1 1/4	1 1/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
1 1/4	1 1/4	1 1/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8
1 1/4	1 1/4	1 1/4	3/4	1 1/4	0.063	1 1/4	1 5/8	0.031	1 5/8

All dimensions in inches.

* In addition to the width of throat given, a secondary standard is recognized, having the width of throat the same as the nominal diameter of the T-bolt. This is to provide for the use, during the transition period, of this standard on machine tools where it is already established.

† A tolerance of plus 0.001 is allowed for width of throat when tongues or other parts must fit.

Diameter of T-bolt D	Threads per Inch	Bolt Head Dimensions and Tolerances						
		Width across Flats A			Width across Corners	Height H		
		Maxi- mum (Basic)	Toler- ance (Minus)	Mini- mum		Maxi- mum (Basic)	Toler- ance (Minus)	Mini- mum
3/4	20	1 1/4	0.031	3/4	0.663	5/8	0.016	9/4
5/8	18	3/4	0.031	1 1/4	0.796	3/4	0.016	1 1/4
3/4	16	1 1/4	0.031	1 1/4	0.972	3/4	0.016	1 1/4
3/4	13	3/4	0.031	1 1/4	1.238	5/8	0.016	1 1/4
3/4	11	1 1/4	0.031	1 1/4	1.591	1 1/4	0.016	2 1/4
3/4	10	1 1/4	0.031	1 1/4	1.856	1 1/4	0.031	1 1/4
1	8	1 1/4	0.031	1 1/4	2.387	1 1/4	0.031	1 1/4
1 1/4	7	2 1/4	0.031	2 1/4	2.917	1 1/4	0.031	2 1/4
1 1/4	6	2 1/4	0.031	2 1/4	3.536	1 1/4	0.031	1 1/4

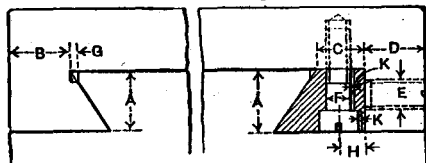
BẢNG TRƯỢT, SỐNG TRƯỢT

MACHINE SLIDES

CÁC KÍCH THƯỚC CỦA BẢNG TRƯỢT

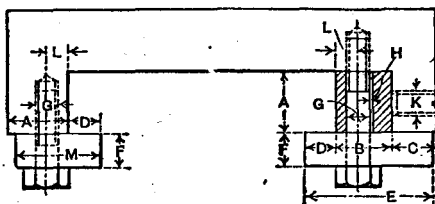
DIMENSIONS OF MACHINE SLIDES

Bedded Strips



A	B	C	D	E	F	G	H	K
$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{64}$	$\frac{1}{4}$	$\frac{1}{32}$
$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{128}$	$\frac{5}{16}$	$\frac{1}{16}$
$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{32}$	$\frac{3}{8}$	$\frac{1}{8}$
$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{4}$
$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{15}{16}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{3}{64}$	$\frac{5}{8}$	$\frac{1}{16}$
I	I	I	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{64}$	$1\frac{1}{16}$	$\frac{1}{4}$
$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$1\frac{3}{8}$	$\frac{1}{4}$
$1\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{1}{4}$	I	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{64}$	$\frac{3}{8}$	$\frac{1}{4}$
$1\frac{3}{4}$	$1\frac{5}{8}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{32}$	I	$\frac{1}{4}$
2	$1\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{3}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{64}$	I	$\frac{1}{4}$
$2\frac{1}{4}$	$2\frac{1}{4}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{8}$	$1\frac{1}{4}$	$\frac{1}{4}$
$2\frac{1}{2}$	$2\frac{1}{2}$	2	$1\frac{1}{4}$	$\frac{3}{4}$	I	$\frac{1}{8}$	$1\frac{3}{8}$	$\frac{1}{4}$
$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{1}{4}$	2	$\frac{7}{8}$	I	$\frac{5}{32}$	$1\frac{1}{2}$	$\frac{1}{4}$
$2\frac{1}{2}$	3	$2\frac{1}{2}$	$2\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{32}$	$1\frac{3}{4}$	$\frac{1}{4}$
3	$3\frac{1}{4}$	$2\frac{3}{4}$	$2\frac{1}{2}$	I	$1\frac{1}{8}$	$\frac{3}{16}$	2	$\frac{1}{4}$

Square Strips

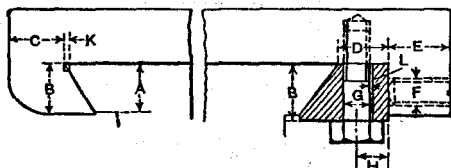


A	B	C	D	E	F	G	H	K	L	M
$\frac{1}{2}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$1\frac{1}{16}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{1}{32}$	$\frac{1}{4}$	$\frac{3}{16}$	$1\frac{3}{16}$
$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{3}{8}$	$\frac{5}{16}$	$\frac{1}{32}$	$\frac{5}{16}$	$\frac{1}{2}$	$1\frac{1}{16}$
$\frac{3}{4}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$2\frac{1}{16}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{32}$	$\frac{3}{8}$	$\frac{5}{16}$	$1\frac{1}{16}$
$\frac{7}{8}$	I	$\frac{3}{4}$	$\frac{3}{4}$	$2\frac{1}{8}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$1\frac{1}{8}$
I	$1\frac{1}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$2\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$1\frac{3}{4}$
$1\frac{1}{4}$	$1\frac{1}{4}$	I	I	$3\frac{1}{8}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$2\frac{1}{4}$
$1\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$3\frac{1}{2}$	I	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$2\frac{1}{2}$
$1\frac{3}{4}$	$1\frac{5}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$3\frac{3}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{3}{8}$	$\frac{5}{16}$	$2\frac{3}{8}$
2	$1\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$4\frac{1}{8}$	$1\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$3\frac{1}{8}$
$2\frac{1}{4}$	2	$1\frac{3}{4}$	$1\frac{3}{4}$	5	$1\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{4}$	$\frac{3}{4}$	$1\frac{1}{16}$	$3\frac{3}{8}$
$2\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$5\frac{1}{2}$	$1\frac{1}{2}$	I	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	4
$2\frac{3}{4}$	$2\frac{1}{2}$	$1\frac{7}{8}$	$1\frac{7}{8}$	6	$1\frac{3}{4}$	I	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$4\frac{1}{8}$
3	$2\frac{3}{4}$	2	2	$6\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{8}$	$\frac{1}{4}$	I	$\frac{3}{4}$	$4\frac{3}{4}$
$3\frac{1}{2}$	$3\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{4}$	$7\frac{1}{4}$	$1\frac{7}{8}$	$1\frac{1}{4}$	$\frac{1}{4}$	$1\frac{1}{8}$	I	$5\frac{3}{8}$
4	$3\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	8	2	$1\frac{1}{2}$	$\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	6

CÁC KÍCH THƯỚC CỦA BĂNG TRƯỢT

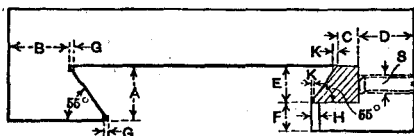
DIMENSIONS OF MACHINE SLIDES

Overhung Strips



A	B	C	D	E	F	G	H	K	L
1/4	3/8	5/16	3/8	1/4	1/8	3/16	1/4	1/64	1/32
3/8	15/32	7/16	1/2	5/16	3/16	1/4	5/16	5/128	1/32
1/2	1	5/8	3/4	3/8	1/4	5/16	3/8	1/32	1/32
5/8	1 1/16	3/4	3/4	1/2	5/16	3/8	1/2	3/64	1/32
3/4	1 1/8	3/4	15/16	5/8	5/16	1/2	5/8	3/64	1/32
7/8	1 5/8	1	1	3/4	3/8	1/2	1 1/16	3/64	1/16
1	1 7/8	1 1/4	1	7/8	3/8	1/2	1 1/8	1/16	1/16
1 1/4	1 3/4	1 1/2	1 1/8	1	1/2	3/8	3/4	5/64	1/16
1 1/2	1 5/8	1 3/4	1 1/4	1 1/8	1/2	3/8	7/8	5/64	1/16
1 3/4	1 7/8	2	1 1/2	1 1/4	5/8	3/4	1	5/64	1/16
2	2 1/16	2 1/4	1 3/4	1 1/2	3/4	3/4	1 1/4	1/8	1/16
2 1/4	2 1/2	2 1/2	2	1 5/8	3/4	7/8	1 1/2	1/8	1/8
2 1/2	2 3/4	2 3/4	2 1/4	1 3/4	7/8	1	1 3/4	5/64	1/8
2 3/4	3	3	2 1/2	1 7/8	7/8	1	1 7/8	5/64	1/8
3	3 1/4	3 1/4	2 3/4	2	1	1 1/8	2	5/16	1/8

Special Strips



A	B	C	D	E	F	G	H	K	S
1	1 1/16	1/2	5/8	3/4	1/2	1/16	3/16	3/64	3/8
1 1/8	1 3/16	5/16	1 1/16	7/8	5/16	1/16	3/16	3/64	3/8
1 1/4	1 1/2	5/8	1 1/8	1 1/16	5/8	1/16	3/16	3/64	3/8
1 3/8	1 7/16	1 1/16	7/8	1 1/8	1 1/16	3/32	1/4	3/64	1/2
1 1/2	1 9/16	3/4	1 1/8	1 1/8	3/4	3/32	1/4	3/64	1/2
1 5/8	1 11/16	13/16	1	1 1/4	1 1/8	3/32	1/4	3/64	1/2
1 3/4	1 13/16	7/8	1 1/8	1 1/2	7/8	1/8	1/2	3/32	5/8
1 7/8	1 15/16	15/16	1 1/4	1 3/4	1 1/2	1/8	3/4	3/32	5/8
2	2 1/8	1	1 1/4	1 1/2	1	1/8	1/2	3/32	5/8
2 1/4	2 3/8	1 1/8	1 3/8	1 1 1/16	1 1/8	1/8	1/2	3/32	5/8
2 1/2	2 5/8	1 1/4	1 1/2	1 3/4	1 1/4	3/16	1/2	1/8	7/8
2 3/4	2 7/8	1 3/8	1 3/4	2 1/16	1 3/8	3/16	3/4	1/8	7/8
3	3 1/16	1 1/2	1 3/8	2 1/4	1 1/2	3/16	3/4	1/8	1
3 1/4	3 3/16	1 5/8	2	2 1/16	1 5/8	3/16	3/4	1/8	1 1/8
3 1/2	3 11/16	1 3/4	2 1/8	2 3/8	1 3/4	1/4	3/4	3/16	1 1/4
3 3/4	3 13/16	1 7/8	2 3/8	2 1 1/16	1 7/8	1/4	3/4	3/16	1 1/4
4	4 1/4	2	2 1/2	3	2	1/4	3/4	3/16	1 1/2

American Standard Grooved Pins (ASA B5.20-1958)

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CÁC CHỐT CÓ RÀNH

GROOVED PINS

TYPE A														
TYPE C														
TYPE F														
Nominal Size, In.	$\frac{3}{64}$	$\frac{1}{8}$	$\frac{3}{64}$	$\frac{1}{2}$	$\frac{3}{64}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
Diameter, A, Max. In.	0.0469	0.0625	0.0781	0.0938	0.1094	0.1250	0.1563	0.1875	0.2188	0.2500	0.3125	0.3750	0.4375	0.5000
Diameter, A, Min. In.	0.0459	0.0615	0.0771	0.0928	0.1084	0.1230	0.1543	0.1855	0.2168	0.2480	0.3105	0.3730	0.4355	0.4980
Recommended Hole, Max. In.	0.0478	0.0640	0.0798	0.0956	0.1113	0.1271	0.1587	0.1903	0.2219	0.2534	0.3166	0.3797	0.4428	0.5060
Recommended Hole, Min. In.	0.0465	0.0625	0.0781	0.0938	0.1094	0.1250	0.1563	0.1875	0.2188	0.2500	0.3125	0.3750	0.4375	0.5000
Crown Height, E, In.	0.0000	0.0065	0.0087	0.0091	0.0110	0.0130	0.0170	0.0180	0.0220	0.0260	0.0340	0.0390	0.0470	0.0520
Radius, R, In., ± 0.010	.....	$\frac{3}{64}$	$\frac{1}{32}$	$\frac{1}{8}$	$\frac{3}{64}$	$\frac{1}{32}$	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{8}$
Pilot Length, C, In.	.....	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Chamfer Length, D, In.†	.....	$\frac{1}{64}$	$\frac{1}{64}$	$\frac{1}{64}$	$\frac{1}{64}$	$\frac{1}{64}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{64}$	$\frac{1}{64}$	$\frac{1}{64}$	$\frac{1}{64}$
TYPE B														
TYPE D														
TYPE E														
Nominal Size, In.	$\frac{3}{64}$	$\frac{1}{8}$	$\frac{3}{64}$	$\frac{1}{2}$	$\frac{3}{64}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
Diameter, A, Max. In.	0.0469	0.0625	0.0781	0.0938	0.1094	0.1250	0.1563	0.1875	0.2188	0.2500	0.3125	0.3750	0.4375	0.5000
Diameter, A, Min. In.	0.0459	0.0615	0.0771	0.0928	0.1084	0.1230	0.1543	0.1855	0.2168	0.2480	0.3105	0.3730	0.4355	0.4980
Recommended Hole, Max. In.	0.0478	0.0640	0.0798	0.0956	0.1113	0.1271	0.1587	0.1903	0.2219	0.2534	0.3166	0.3797	0.4428	0.5060
Recommended Hole, Min. In.	0.0465	0.0625	0.0781	0.0938	0.1094	0.1250	0.1563	0.1875	0.2188	0.2500	0.3125	0.3750	0.4375	0.5000
Crown Height, E, In.	0.0000	0.0065	0.0087	0.0091	0.0110	0.0130	0.0170	0.0180	0.0220	0.0260	0.0340	0.0390	0.0470	0.0520
Radius, R, In., ± 0.010	.....	$\frac{3}{64}$	$\frac{1}{32}$	$\frac{1}{8}$	$\frac{3}{64}$	$\frac{1}{32}$	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{8}$

All dimensions in inches. * Type F is for hopper feeding. † For $\frac{1}{4}$ -inch size and below, a suitable radius may be substituted by agreement between user and supplier.

CHIỀU DÀI CHỐT RĂNG TIÊU CHUẨN MỸ

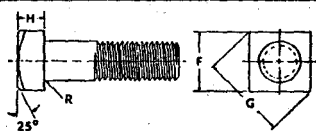
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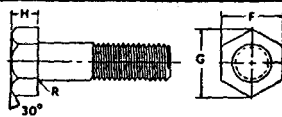
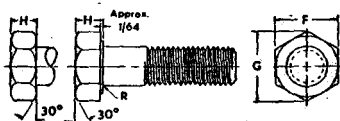
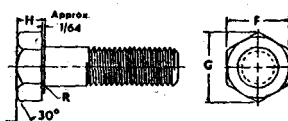
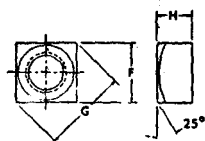
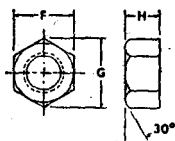
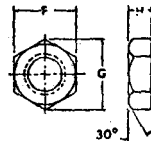
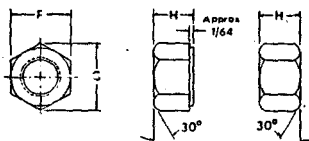
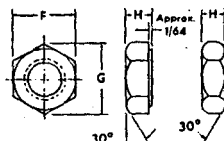
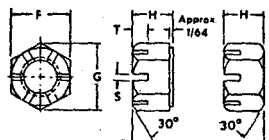
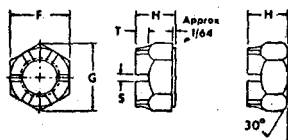
BU LÔNG VÀ ĐAI ỐC

BOLTS AND NUTS

BU LÔNG - ĐAI ỐC ĐẦU VUÔNG VÀ ĐẦU LỤC GIÁC TIÊU CHUẨN MỸ



Regular Square Bolts (4)

Regular Hexagon Bolts (1)
Heavy Hexagon Bolts (1)Finished Hexagon Bolts (3)
Hexagon Head Cap Screws (3)Regular Semifinished Hexagon Bolts (1)
Heavy Semifinished Hexagon Bolts (1)
Heavy Finished Hexagon Bolts (2)Regular Square Nuts (5)
Heavy Square Nuts (10)Regular Hexagon Nuts (5)
Heavy Hexagon Nuts (10)Regular Hexagon Jam Nuts (5)
Heavy Hexagon Jam Nuts (10)Regular Semifinished Hexagon Nuts (8)
Heavy Semifinished Hexagon Nuts (9)
Finished Hexagon Thick Nuts (7)Regular Semifinished Hexagon Jam Nuts (8)
Heavy Semifinished Hexagon Jam Nuts (9)
Finished Hexagon Jam Nuts (6)Regular Semifinished Hexagon Slotted Nuts (8)
Heavy Semifinished Hexagon Slotted Nuts (9)
Finished Hexagon Slotted Nuts (6)
Finished Hexagon Thick Slotted Nuts (7)

Finished Hexagon Castle Nuts (7)

Numbers in parentheses are table numbers.

BẢNG 1: TIÊU CHUẨN MỸ: BU LÔNG LỤC GIÁC ĐỀU, BU LÔNG LỤC GIÁC BÁN TINH, BU LÔNG LỤC GIÁC CHỤ LỰC, BU LÔNG LỤC GIÁC CHỤ LỰC BÁN TINH

*Table 1. AMERICAN STANDARD REGULAR HEXAGON BOLTS, REGULAR SEMIFINISHED HEXAGON BOLTS, HEAVY HEXAGON BOLTS, AND HEAVY SEMIFINISHED HEXAGON BOLTS
(ASA B18.2-1960 INCORPORATING APPENDIX V-1962)*

Nominal Size, D	Body Diam., Max.†	Width Across Flats		Width Across Corners		Height of Head			
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
REGULAR BOLTS AND REGULAR SEMIFINISHED BOLTS						REGULAR BOLTS		REG. SEMI- FIN. BOLTS	
1/4	0.260	3/16	0.425	0.505	0.484	0.188	0.150	0.163	0.150
5/16	0.324	1/4	0.484	0.577	0.552	0.235	0.195	0.211	0.195
3/8	0.388	5/16	0.544	0.650	0.620	0.268	0.226	0.243	0.226
1/2	0.452	3/8	0.603	0.722	0.687	0.316	0.272	0.291	0.272
5/8	0.515	1/2	0.725	0.866	0.826	0.364	0.302	0.323	0.302
3/4	0.642	5/8	0.906	1.083	1.033	0.444	0.378	0.403	0.378
7/8	0.768	1 1/8	1.088	1.299	1.240	0.524	0.455	0.483	0.455
1	0.895	1 1/4	1.269	1.516	1.447	0.604	0.531	0.563	0.531
1 1/8	1.022	1 1/2	1.450	1.732	1.663	0.700	0.591	0.627	0.591
1 1/4	1.149	1 3/4	1.631	1.949	1.859	0.780	0.658	0.718	0.658
1 1/2	1.277	2	1.812	2.165	2.066	0.876	0.749	0.813	0.749
1 3/4	1.404	2 1/4	1.994	2.382	2.273	0.940	0.810	0.878	0.810
2	1.531	2 1/2	2.175	2.598	2.480	1.036	0.902	0.974	0.902
2 1/4	1.785	3	2.538	3.031	2.893	1.196	1.054	1.134	1.054
2 1/2	2.039	3 1/2	2.900	3.464	3.306	1.368	1.175	1.263	1.175
3	2.305	4	3.262	3.897	3.719	1.548	1.327	1.423	1.327
3 1/2	2.559	4 1/2	3.625	4.330	4.133	1.708	1.479	1.583	1.479
4	2.827	5	3.988	4.763	4.546	1.869	1.632	1.744	1.632
4 1/2	3.081	5 1/2	4.350	5.196	4.959	2.060	1.815	1.935	1.815
5	3.335	6	4.712	5.629	5.372	2.251	1.936	2.064	1.936
5 1/2	3.589	6 1/2	5.075	6.062	5.786	2.390	2.067	2.193	2.067
6	3.858	7	5.437	6.495	6.198	2.572	2.241	2.385	2.241
6 1/2	4.111	7 1/2	5.800	6.928	6.612	2.764	2.424	2.576	2.424
HEAVY BOLTS AND HEAVY SEMIFINISHED BOLTS						HEAVY BOLTS		HEAVY SEMI- FIN. BOLTS	
1/2	0.515	5/8	0.850	1.010	0.960	0.364	0.302	0.323	0.302
5/8	0.642	1 1/8	1.031	1.227	1.175	0.444	0.378	0.403	0.378
3/4	0.768	1 1/4	1.212	1.443	1.383	0.524	0.455	0.483	0.455
7/8	0.895	1 1/2	1.394	1.660	1.599	0.604	0.531	0.563	0.531
1	1.022	1 3/4	1.575	1.876	1.796	0.700	0.591	0.627	0.591
1 1/8	1.149	2	1.756	2.093	2.003	0.780	0.591	0.718	0.591
1 1/4	1.277	2 1/4	1.938	2.309	2.209	0.876	0.749	0.813	0.749
1 1/2	1.404	2 1/2	2.119	2.526	2.416	0.940	0.810	0.878	0.810
1 3/4	1.531	3	2.300	2.743	2.633	1.036	0.902	0.974	0.902
2	1.658	3 1/2	2.481	2.959	2.828	1.100	0.962	1.034	0.962
2 1/4	1.785	4	2.662	3.175	3.045	1.196	1.054	1.134	1.054
2 1/2	1.912	4 1/2	2.844	3.392	3.242	1.260	1.114	1.186	1.114
3	2.039	5	3.025	3.606	3.440	1.388	1.175	1.263	1.175
3 1/2	2.305	5 1/2	3.388	4.041	3.862	1.548	1.327	1.423	1.327
4	2.559	6	3.750	4.474	4.275	1.708	1.479	1.583	1.479
4 1/2	2.827	6 1/2	4.112	4.907	4.688	1.869	1.632	1.744	1.632
5	3.081	7	4.475	5.340	5.102	2.060	1.815	1.935	1.815

BẢNG 2: TIÊU CHUẨN MỖ BU LÔNG LỤC GIÁC CHỊU LỰC TINH

Table 2. AMERICAN STANDARD HEAVY FINISHED

HEXAGON BOLTS (ASA B18.2-1960)

Dimensions of these bolts are the same as for *Heavy Semifinished Hexagon Bolts* (see lower half of Table 1) except that:

Maximum body diameter = nominal bolt size.

Minimum body diameter = nominal bolt size minus: 0.007 for $\frac{1}{4}$ -inch bolts; 0.008 for $\frac{3}{8}$ -inch bolts; 0.009 for $\frac{1}{2}$ - and $\frac{3}{4}$ -inch bolts; 0.010 for 1-inch bolts; 0.011 for 1 $\frac{1}{4}$ - and 1 $\frac{3}{4}$ -inch bolts; and 0.012 for 1 $\frac{1}{2}$ -inch and larger bolts.

Threads are Coarse-, Fine-, 8-thread series, Class 2A for plain (unplated) bolts. For plated bolts the diameters may be increased by the amount of Class 2A allowance.

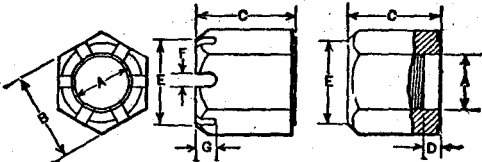
BẢNG 3: TIÊU CHUẨN MỖ BU LÔNG LỤC GIÁC TINH; CÁC VIT MŨ ĐẦU LỤC GIÁC

Table 3. AMERICAN STANDARD FINISHED HEXAGON BOLTS
(ASA B18.2-1960) AND AMERICAN STANDARD HEXAGON HEAD
CAP SCREWS (ASA B18.6.2-1956)

Nom- inal Size, D	Body Diam., Min.†	Width Across Flats		Width Across Corners		Height of Head	
		Max.	Min.††	Max.	Min.	Max.	Min.
FINISHED HEXAGON BOLTS AND HEXAGON HEAD CAP SCREWS							
$\frac{1}{4}$	0.2450	$\frac{7}{16}$	0.428	0.505	0.488	0.163	0.150
$\frac{3}{8}$	0.3065	$\frac{1}{2}$	0.489	0.577	0.557	0.211	0.195
$\frac{1}{2}$	0.3690	$\frac{5}{8}$	0.551	0.650	0.628	0.243	0.226
$\frac{3}{4}$	0.4305	$\frac{3}{4}$	0.613	0.723	0.698	0.291	0.272
$\frac{1}{2}$	0.4930	$\frac{13}{16}$	0.736	0.866	0.840	0.323	0.302
$\frac{3}{4}$	0.5545	1 $\frac{1}{16}$	0.798	0.938	0.910	0.371	0.348
$\frac{1}{2}$	0.6170	1 $\frac{1}{8}$	0.922	1.053	1.051	0.403	0.378
$\frac{3}{4}$	0.7410	1 $\frac{1}{4}$	1.100	1.299	1.254	0.483	0.455
$\frac{1}{2}$	0.8660	1 $\frac{3}{8}$	1.285	1.516	1.465	0.563	0.531
1	0.9900	1 $\frac{1}{2}$	1.469	1.732	1.675	0.627	0.591
1 $\frac{1}{4}$	1.1140	1 $\frac{3}{4}$	1.631	1.949	1.859	0.718	0.658
1 $\frac{3}{4}$	1.2390	1 $\frac{7}{8}$	1.812	2.165	2.066	0.813	0.749
1 $\frac{1}{2}$	1.3630	2 $\frac{1}{8}$	1.994	2.382	2.273	0.878	0.810
1 $\frac{3}{4}$	1.4880	2 $\frac{1}{4}$	2.175	2.598	2.480	0.974	0.902
FINISHED HEXAGON BOLTS ONLY							
1 $\frac{1}{4}$	1.7380	2 $\frac{3}{8}$	2.538	3.031	2.893	1.134	1.054
2	1.9880	3	2.900	3.464	3.306	1.263	1.175
2 $\frac{1}{4}$	2.2380	3 $\frac{1}{2}$	3.262	3.897	3.719	1.423	1.327
2 $\frac{1}{2}$	2.4880	3 $\frac{3}{4}$	3.625	4.330	4.133	1.583	1.479
2 $\frac{3}{4}$	2.7380	4 $\frac{1}{2}$	3.988	4.763	4.546	1.744	1.632
3	2.9880	4 $\frac{3}{4}$	4.350	5.196	4.959	1.935	1.815

ĐẠI ỐC NUTS

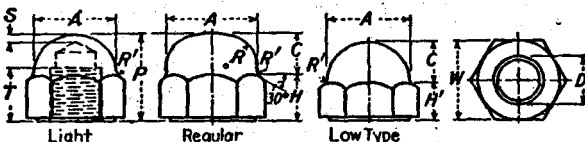
ĐẠI ỐC TIÊU CHUẨN S.A.E. CAO HIGH NUTS - S.A.E. STANDARD.



Nut Size A	Width Across Flats B	Nut Height C	Counter-bore Depth D*	Diam. at Top E	Slot Width F	Slot Depth G
1/4	7/16	3/8	1/16	23/64	5/64	3/32
5/16	1/2	29/64	5/64	29/64	5/32	5/32
3/8	9/16	17/32	3/32	23/64	1/4	1/8
7/16	5/8	29/64	7/64	27/64	1/8	5/32
1/2	3/4	1 1/16	1/8	1 1/16	5/32	5/32
5/8	7/8	49/64	9/64	51/64	5/32	3/16
3/4	1	27/32	5/32	55/64	3/16	7/32
7/8	1 1/8	1	3/16	59/64	3/16	1/4
1	1 1/4	1 5/8	7/32	1 5/32	3/16	3/4
1 1/8	1 5/8	1 7/8	1/4	1 7/16	1/4	9/32

* The counterbore indicated at the bottom of the nut is optional. All screw threads are to be in accordance with the Free Fit or Class 2 of the American Standard. (See pages 1147 to 1150 for the Fine-thread Series and the Coarse thread Series. See also page 1103.) The angle of chamfer shall not exceed 40 degrees with the top face of the nut.

MŨ ĐẠI ỐC - NỀN DÙNG THEO S.A.E



Nut Size D	Crown C	Width W Light	Width W Regular	Rad. R	S Min.	Thread Depth T	Height P	Diameter A
No. 6	3/16	5/16		9/64	1/32	9/64	19/64	Hex. Size Minus 1/32 in.
No. 8	3/16	5/16	.....	9/64	1/32	9/64	5/16	
No. 10	15/64	3/8	.....	11/64	1/32	3/16	29/64	
No. 12	15/64	3/8	.....	11/64	1/32	7/32	17/32	
1/4	1/4	7/16	7/16	3/16	9/64	1/4	19/32	
5/16	17/64	22	9/16	3/16	9/64	5/16	17/32	
3/8	19/64	9/16	9/8	15/64	9/64	3/8	5/8	
7/16	11/32	5/8	3/4	23/32	9/64	7/16	23/32	
1/2	3/8	3/4	19/16	21/8	9/64	1/2	19/16	
5/8	21/8	7/8	7/8	3/8	11/8	9/16	9/16	
3/4	1 1/8	19/16	1	3/8	1 1/8	5/8	59/64	Hex. Size Minus 1/16 in.
7/8	1 1/4	1 1/8	1 1/8	7/16	1 1/8	3/4	19/16	
1	1 1/2	1 1/2	1 1/2	23/32	3/4	1	19/16	
1 1/8	23/32	19/16	1 1/16	43/64	3/4	1 1/8	129/32	
1 1/4	27/32	1 3/4	1 7/8	47/64	3/4	1 1/4	19/16	

Height $H = D$ for No. 6 to No. 10 sizes, inc., and $7/8 D$ for larger sizes. Height H' for low nuts of the light series = $3/4 D$.

For low nuts, reduce usable thread depth T an amount equal to H minus H' .

Radius $R' = 1/64$ inch for sizes Nos. 6 to $1/16$, inc., and $1/32$ inch for larger sizes.

CHÌA KHÓA ĐÓNG - MỞ BU LÔNG - ĐẠI ỐC

WRENCH CLEARANCES

TIÊU CHUẨN MỸ ĐỐI VỚI CHÌA KHÓA

Max.* Width Across Flats of Nut	Wrench Opening		Max.* Width Across Flats of Nut	Wrench Opening		Max.* Width Across Flats of Nut	Wrench Opening	
	Min.	Max.		Min.	Max.		Min.	Max.
5/32	0.158	0.163	1/16	1.132	1.142	2 1/16	2.827	2.845
3/16	0.190	0.195	1/4	1.257	1.267	2 1/8	2.954	2.973
7/32	0.220	0.225	5/16	1.320	1.331	3	3.016	3.035
1/4	0.252	0.257	3/8	1.383	1.394	3 1/8	3.142	3.162
9/32	0.283	0.288	7/16	1.446	1.457	3 1/4	3.393	3.414
5/16	0.316	0.322	1/2	1.508	1.520	3 1/2	3.518	3.540
11/32	0.347	0.353	5/8	1.634	1.646	3 3/4	3.770	3.793
3/8	0.378	0.384	1 1/16	1.696	1.708	3 7/8	3.895	3.918
7/16	0.440	0.446	1 1/8	1.822	1.835	4	4.147	4.172
1/2	0.504	0.510	1 1/4	1.885	1.898	4 1/8	4.272	4.297
9/16	0.566	0.573	2	2.011	2.025	4 1/4	4.524	4.550
5/8	0.629	0.636	2 1/8	2.074	2.088	4 3/8	4.649	4.676
11/16	0.692	0.699	2 1/4	2.200	2.215	4 1/2	4.900	4.928
3/4	0.755	0.763	2 3/8	2.262	2.277	5	5.026	5.055
13/16	0.818	0.826	2 1/2	2.388	2.404	5 1/8	5.277	5.307
7/8	0.880	0.888	2 3/4	2.450	2.466	5 1/4	5.403	5.434
15/16	0.944	0.953	2 7/8	2.576	2.593	5 3/8	5.654	5.686
1	1.006	1.015	2 3/4	2.639	2.656	5 3/4	5.780	5.813
1 1/16	1.068	1.077	2 3/4	2.766	2.783	6	6.031	6.065

All dimensions given in inches.

* Wrenches shall be marked with the "Nominal Size of Wrench" which is equal to the basic or maximum width across flats of the corresponding bolt head or nut.

Minimum wrench opening equals $(1.005W + 0.001)$. Tolerance on wrench opening equals plus $(0.005W + 0.004)$ from minimum, where W equals nominal size of wrench.

Wrench Clearance Dimensions. — Wrench clearances are given in Tables 1 and 2. They are based on a wrench opening corresponding to the dimension across the flats of the fastener. The listed values were obtained from a composite study of the alloy steel wrenches that are commercially available and military specifications. They are suitable for general use as minimum requirements.

Table 1. Wrench Clearances for Box Wrench — 12 Point
(From SAE Aeronautical Drafting Manual).

WRENCH
OPENING

E = TORQUE THAT
WRENCH WILL
WITHSTAND IN
INCH-POUNDS

ALL DIMENSIONS IN
INCHES EXCEPT WHERE
OTHERWISE NOTED

Wrench Opening	A Min.	B Min.	C Ref.	D Max.	E Min.	Wrench Opening	A Min.	B Min.	C Ref.	D Max.	E Min.
.156	.190	.280	.030	.156	100	.781	.690	1.140	.030	.594	2600
.188	.200	.309	.030	.172	150	.812	.720	1.190	.030	.594	3000
.250	.270	.410	.030	.250	150	.875	.750	1.260	.030	.594	3300
.312	.300	.480	.030	.281	210	.938	.780	1.320	.030	.656	4100
.344	.300	.500	.030	.281	250	1.000	.810	1.390	.030	.718	4900
.375	.340	.560	.030	.344	370	1.062	.840	1.450	.030	.781	5400
.438	.400	.650	.030	.359	650	1.125	.950	1.600	.030	.844	5900
.500	.450	.740	.030	.375	1020	1.250	.980	1.700	.030	.875	7200
.562	.500	.830	.030	.406	1200	1.312	1.090	1.850	.030	.906	8000
.594	.530	.870	.030	.469	1200	1.438	1.220	2.050	.030	1.000	8400
.625	.560	.920	.030	.469	2000	1.500	1.270	2.140	.030	1.062	10450
.688	.590	.990	.030	.531	2300	1.625	1.340	2.280	.030	1.156	11750
.750	.660	1.090	.030	.594	2600	.....	.....	.....	.....	.....	.....

**BẢNG 2 : MIỆNG CHÌA KHÓA ĐỂ MỞ CỬA CHÌA KHÓA 150
VÀ CHÌA KHÓA ỒNG**



ĐINH VIT

CAP SCREWS

TIÊU CHUẨN MỸ VỀ ĐINH VIT ĐẦU MŨ TRÒN

Nominal Size	Body Diam. D		Head Diam. A		Head Ht. H		Slot Width J		T Max.
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
$\frac{1}{4}$	0.250	0.245	0.437	0.418	0.191	0.175	0.075	0.064	0.117
$\frac{5}{16}$	0.3125	0.307	0.562	0.540	0.245	0.226	0.084	0.078	0.151
$\frac{3}{8}$	0.375	0.369	0.625	0.603	0.273	0.252	0.094	0.081	0.168
$\frac{7}{16}$	0.4375	0.431	0.750	0.725	0.328	0.302	0.094	0.081	0.202
$\frac{1}{2}$	0.500	0.493	0.812	0.786	0.354	0.327	0.106	0.091	0.218
$\frac{9}{16}$	0.5625	0.555	0.937	0.909	0.409	0.378	0.118	0.102	0.252
$\frac{5}{8}$	0.625	0.617	1.000	0.970	0.437	0.405	0.133	0.116	0.270
$\frac{3}{4}$	0.750	0.742	1.250	1.215	0.546	0.507	0.149	0.131	0.338

Threads are Coarse, Fine, or 8-thread series, Class 2A. Minimum thread length $l = 2D + \frac{1}{4}$ inch.

TIÊU CHUẨN MỸ VỀ VIT ĐẦU TRÒN

Size, D	Threads per Inch†	Body Diam.*	Diameter of Head, A		Height of Head, H	
		Max.	Max.	Min.	Max.	Min.
No. 10	24	0.199	0.469	0.438	0.114	0.094
$\frac{1}{4}$	20	0.260	0.594	0.563	0.145	0.125
$\frac{5}{16}$	18	0.324	0.719	0.688	0.176	0.156
$\frac{3}{8}$	16	0.388	0.844	0.782	0.208	0.188
$\frac{7}{16}$	14	0.452	0.969	0.907	0.239	0.219
$\frac{1}{2}$	13	0.515	1.094	1.032	0.270	0.250
$\frac{5}{8}$	11	0.642	1.344	1.219	0.344	0.313
$\frac{3}{4}$	10	0.768	1.594	1.469	0.406	0.375
$\frac{7}{8}$	9	0.895	1.844	1.719	0.469	0.438
1	8	1.022	2.094	1.969	0.531	0.500

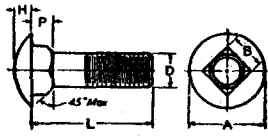
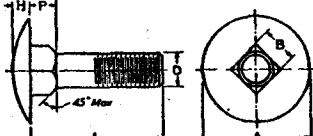
All dimensions are in inches.

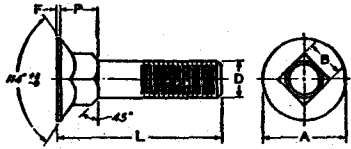
* Full-size body bolts are furnished unless user specifies undersize body bolts, in which case the body diameter approximately equals the pitch diameter of the thread.

† Threads are Coarse-thread series, Class 2A. Minimum thread length is $2D$ plus $\frac{1}{4}$ inch for bolts up to 6 inches long and $2D$ plus $\frac{1}{4}$ inch for bolts longer than 6 inches. For bolts shorter than $2D$ plus $\frac{1}{4}$ inch, thread is made as close to the head as practical.

TIÊU CHUẨN MỸ VỀ VIT ĐẦU TRÒN, CỔ VUÔNG, CÓ BẬC, VIT CHÌM

AMERICAN STANDARD ROUND HEAD SQUARE NECK CARRIAGE BOLTS, STEP BOLTS, AND 114 DEGREE COUNTERSUNK SQUATE NECK BOLTS (ASA B18.5-1952)

										
CARRIAGE BOLT					STEP BOLT					
Size D	Thds. per Inch†	Body Diam.*	Diameter of Head A		Height of Head H		Depth of Square P		Width of Square B	
		Max.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
CARRIAGE BOLTS										
No. 10	24	0.199	0.469	0.438	0.114	0.094	0.125	0.094	0.199	0.185
14	20	0.260	0.594	0.563	0.145	0.125	0.156	0.125	0.260	0.245
1/4	18	0.324	0.719	0.688	0.176	0.156	0.187	0.156	0.324	0.307
5/16	16	0.388	0.844	0.782	0.208	0.188	0.219	0.188	0.388	0.368
3/8	14	0.452	0.969	0.907	0.239	0.219	0.250	0.219	0.452	0.431
1/2	13	0.515	1.094	1.032	0.270	0.250	0.281	0.250	0.515	0.492
5/8	11	0.642	1.344	1.219	0.344	0.313	0.344	0.313	0.642	0.616
3/4	10	0.768	1.594	1.469	0.406	0.375	0.406	0.375	0.768	0.741
1	9	0.895	1.844	1.719	0.469	0.438	0.469	0.438	0.895	0.865
1 1/8	8	1.022	2.094	1.969	0.531	0.500	0.531	0.500	1.022	0.990
STEP BOLTS										
No. 10	24	0.199	0.656	0.625	0.114	0.094	0.125	0.094	0.199	0.185
14	20	0.260	0.844	0.813	0.145	0.125	0.156	0.125	0.260	0.245
1/4	18	0.324	1.031	1.000	0.176	0.156	0.187	0.156	0.324	0.307
5/16	16	0.388	1.219	1.188	0.208	0.188	0.219	0.188	0.388	0.368
3/8	14	0.452	1.406	1.375	0.239	0.219	0.250	0.219	0.452	0.431
1/2	13	0.515	1.594	1.563	0.270	0.250	0.281	0.250	0.515	0.492

									
114 DEGREE COUNTERSUNK SQUARE NECK BOLTS									
Size D	Thds. per Inch†	Body Diam.*	Diameter of Head A		Feed Thick- ness F	Depth of Square and Countersink P		Width of Square B	
		Max.	Max.	Min.		Max.	Min.	Max.	Min.
No. 10	24	0.199	0.520	0.500	0.016	0.250	0.219	0.199	0.185
14	20	0.260	0.645	0.625	0.016	0.312	0.281	0.260	0.245
1/4	18	0.324	0.770	0.750	0.031	0.375	0.344	0.324	0.307
5/16	16	0.388	0.895	0.875	0.031	0.437	0.406	0.388	0.368
3/8	14	0.452	1.020	1.000	0.031	0.500	0.469	0.452	0.431
1/2	13	0.515	1.145	1.125	0.031	0.562	0.531	0.515	0.492
5/8	11	0.642	1.400	1.375	0.031	0.687	0.656	0.642	0.616
3/4	10	0.768	1.650	1.625	0.047	0.812	0.781	0.768	0.741

* Full-size body bolts are furnished unless user specifies undersize body bolts.

† Threads are Coarse-thread series, Class 2A. Minimum thread length is 2D plus 1/4 inch for bolts up to 6 inches long and 2D plus 1/4 inch for bolts longer than 6 inches.

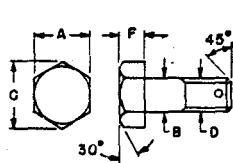
CHIỀU DÀI BULOÔNG

LENGTHS OF MACHINE BOLTS

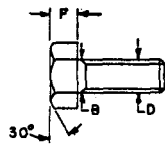
Lengths, Inches	Diameters, Inch									
	1/4	3/16	1/2	5/16	3/4	7/8	1	1 1/4	1 1/2	1 3/4
Square-head Machine Bolts — Stock Sizes (See footnote)										
1/4	..	..	..	..	..	..	..	..	..	..
1/2	..	..	..	..	..	..	..	..	..	..
3/4	..	..	..	..	..	..	..	..	..	..
1	..	..	..	..	..	..	..	..	..	..
1 1/4	..	..	..	..	..	..	..	..	..	..
1 1/2	..	..	..	..	..	..	..	..	..	..
1 3/4	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..
2 1/4	..	..	..	..	..	..	..	..	..	..
2 1/2	..	..	..	..	..	..	..	..	..	..
2 3/4	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..
3 1/4	..	..	..	..	..	..	..	..	..	..
3 1/2	..	..	..	..	..	..	..	..	..	..
3 3/4	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..
4 1/4	..	..	..	..	..	..	..	..	..	..
4 1/2	..	..	..	..	..	..	..	..	..	..
4 3/4	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..
5 1/4	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..
6 1/4	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..
7 1/4	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..
8 1/4	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..
9 1/4	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..
10 1/4	..	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..
11 1/4	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..
Hexagon-head Machine Bolts — Stock Sizes (See footnote)										
1/4	..	..	..	..	..	..	..	..	..	..
1/2	..	..	..	..	..	..	..	..	..	..
1	..	..	..	..	..	..	..	..	..	..
1 1/4	..	..	..	..	..	..	..	..	..	..
1 1/2	..	..	..	..	..	..	..	..	..	..
1 3/4	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..
2 1/4	..	..	..	..	..	..	..	..	..	..
2 1/2	..	..	..	..	..	..	..	..	..	..
2 3/4	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..
3 1/4	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..
4 1/4	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..
5 1/4	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..

One asterisk (*) represents stock sizes of maximum demand, and two asterisks (**) stock sizes least frequently used. All other sizes are considered specials.

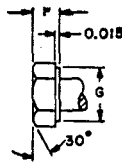
BU LÔNG LỤC GIÁC, ĐAI ỐC, VÒNG ĐỆM THEO TIÊU CHUẨN WHITWORTH (B.S.W.) CỦA ANH



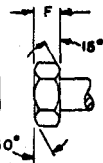
HEXAGON HEAD BOLT,
FULL BEARING



HEXAGON HEAD SCREW,
FULL BEARING

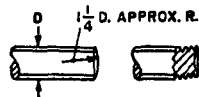


WASHER
FACED



DOUBLE
CHAMFERED

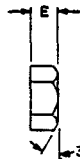
ALTERNATE HEADS



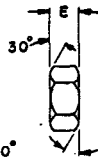
ROUNDED
END

ROLLED
THREAD
END

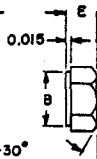
ALTERNATE ENDS



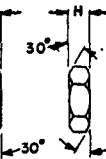
ORDINARY,
FULL
BEARING



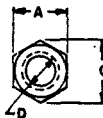
ORDINARY,
DOUBLE
CHAMFERED



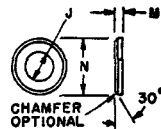
ORDINARY,
WASHER
FACED



LOCK



HEXAGON NUTS



PLAIN WASHER

For dimensions see table on opposite page.

**BU LÔNG LỤC GIÁC, ĐAI ỐC, VÒNG ĐỆM THEO TIÊU
CHUẨN WHITWORTH (B.S.W.) CỦA ANH**

Nominal Size D	Number of Threads per Inch		Bolts, Screws, and Nuts				Bolts and Screws				Nuts				Washers					
			Width		Diameter of Washer Face ¹ G	Diameter of Unthreaded Portion of Shank B	Thickness						Diameter of Hole J		Outside Dia. N	Thickness (approx.) ² M				
							Across Flats A	Across Corners C	Head F	Ordinary E	Lock H									
	B.S.W.	B.S.F.	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	S.W.G.	Equiv.			
2B.A.	....	..	0.324	0.319	0.37	0.319	0.309	0.1850	0.1820	0.139	0.132	0.167	0.157	0.123	0.113	0.202	0.197	1½	18	0.048
2B.A.	....	..														0.202	0.197	2¼	21	0.032
¼	20	26	0.445	0.438	0.51	0.428	0.418	0.2500	0.2465	0.19	0.18	0.200	0.190	0.133	0.123	0.270	0.265	9/16	17	0.056
⅕	18	22	0.525	0.518	0.61	0.508	0.498	0.3125	0.3090	0.22	0.21	0.250	0.240	0.166	0.156	0.333	0.328	¾	15	0.072
⅙	16	20	0.600	0.592	0.69	0.582	0.572	0.3750	0.3715	0.27	0.26	0.312	0.302	0.208	0.198	0.395	0.390	¾	15	0.072
⅙	14	18	0.710	0.702	0.82	0.690	0.680	0.4375	0.4335	0.33	0.32	0.375	0.365	0.250	0.240	0.458	0.453	¾	13	0.092
½	12	16	0.820	0.812	0.95	0.800	0.790	0.5000	0.4960	0.38	0.37	0.437	0.427	0.291	0.281	0.520	0.515	1	13	0.092
⅝	12	16	0.920	0.912	1.06	0.900	0.890	0.5625	0.5585	0.44	0.43	0.500	0.490	0.333	0.323	0.593	0.588	1½	12	0.104
¾	11	14	1.010	1.000	1.17	0.985	0.975	0.6250	0.6190	0.49	0.48	0.562	0.552	0.375	0.365	0.656	0.651	1¼	11	0.116
¾	10	12	1.200	1.190	1.39	1.175	1.165	0.7500	0.7440	0.60	0.59	0.687	0.677	0.458	0.448	0.781	0.776	1½	9	0.144
¾	9	11	1.300	1.288	1.50	1.273	1.263	0.8750	0.8670	0.66	0.65	0.750	0.740	0.500	0.490	0.906	0.901	1¾	9	0.144
1	8	10	1.480	1.468	1.71	1.453	1.443	1.0000	0.9920	0.77	0.76	0.875	0.865	0.583	0.573	1.031	1.026	1¾	8	0.160
1¼	7	9	1.670	1.658	1.93	1.638	1.628	1.1250	1.1170	0.88	0.87	1.000	0.990	0.666	0.656	1.156	1.151	2½	7	0.176
1½	7	9	1.860	1.845	2.15	1.825	1.815	1.2500	1.2420	0.98	0.96	1.125	1.105	0.750	0.730	1.281	1.276	2½	7	0.176
1¾	....	8	2.050	2.035	2.37	2.015	2.005	1.3750	1.3650	1.09	1.07	1.250	1.230	0.833	0.813	1.406	1.401	2¾	6	0.192
1¾	6	8	2.220	2.200	2.56	2.180	2.170	1.5000	1.4900	1.20	1.18	1.375	1.355	0.916	0.896	1.531	1.526	2¾	6	0.192
1¾	5	7	2.580	2.555	2.98	2.530	2.520	1.7500	1.7400	1.42	1.40	1.625	1.605	1.083	1.063	1.781	1.776	3¾	5	0.212
2	4.5	7	2.760	2.735	3.19	2.710	2.700	2.0000	1.9900	1.53	1.51	1.750	1.730	1.166	1.146	2.031	2.026	3¾	5	0.212

All dimensions in inches except where otherwise noted. ¹ Does not apply to nuts of 2 B.A. thread. ² The dimensions given for the thickness of the washers shall be subject to the normal manufacturing tolerances on sheet or strip. Thicknesses are given in Standard Wire Gage numbers and their decimal inch equivalents.

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VÍT CÂY

STUDS

TIÊU CHUẨN ANH VỀ VÍT CÂY ĐA CÔNG DỤNG

LIMITS FOR END SCREWED INTO COMPONENT (All threads except B.A.)															
Nom. Diam. D	Major Diam.		Threads per Inch	Major Diam.		Effective Diameter		Minor Diameter	Threads per Inch	Major Diam.		Effective Diameter		Minor Diameter	
	Max.	Min.		Max.	Min.	Max.	Min.			Max.	Min.	Max.	Min.		
UN TH'DS.			UNF THREADS					UNC THREADS							
1/4	2500	28	2435	2294	2265	2088	2037	20	2419	2201	2172	1913	1849		
5/16	3125	24	3053	2883	2852	2643	2586	18	3038	2793	2762	2472	2402		
3/8	3750	24	3678	3510	3478	3270	3211	16	3656	3375	3343	3014	2936		
1/2	4375	20	4294	4064	4050	3796	3729	14	4272	3945	3911	3533	3447		
5/8	5000	20	4919	4712	4675	4424	4350	13	4891	4537	4500	4093	4000		
3/4	5625	18	5538	5302	5264	4981	4907	12	5511	5122	5084	4641	4542		
7/8	6250	18	6163	5929	5889	5608	5533	11	6129	5700	5660	5175	5069		
1	7500	16	7406	7137	7094	6776	6693	10	7371	6893	6850	6316	6200		
1 1/8	8750	14	8647	8332	8286	7920	7828	9	8611	8074	8028	7433	7306		
1 1/4	1.0000	12	9886	9510	9459	9029	8925	8	9850	9239	9188	8517	8376		
1 1/2	1.1250	12	1.1136	1.0762	1.0709	1.0281	1.0176	7	1.1086	1.0375	1.0322	9550	9393		
1 3/4	1.2500	12	1.2386	1.2014	1.1959	1.1533	1.1427	7	1.2336	1.1627	1.1572	1.0802	1.0644		
1 7/8	1.3750	12	1.3636	1.3265	1.3209	1.2784	1.2677	6	1.3568	1.2723	1.2667	1.1761	1.1581		
2	1.5000	12	1.4886	1.4517	1.4459	1.4036	1.3928	6	1.4818	1.3975	1.3917	1.3013	1.2832		
B.S. TH'DS.			B.S.F. THREADS					B.S.W. THREADS							
1/4	2500	26	2455	2280	2251	2034	1984	20	2452	2206	2177	1886	1831		
5/16	3125	22	3077	2863	2832	2572	2517	18	3073	2798	2767	2442	2383		
3/8	3750	20	3699	3461	3429	3141	3083	16	3695	3381	3349	2981	2919		
1/2	4375	18	4320	4053	4019	3697	3635	14	4316	3952	3918	3495	3428		
5/8	5000	16	4942	4637	4600	4237	4172	12	4937	4503	4466	3969	3897		
3/4	5625	16	5566	5263	5225	4863	4797	12	5560	5129	5091	4595	4521		
7/8	6250	14	6187	5833	5793	5376	5305	11	6183	5708	5668	5126	5050		
1	7500	12	7432	7009	6966	6475	6398	10	7428	6903	6860	6263	6182		
1 1/8	8750	11	8678	8214	8168	7632	7551	9	8674	8085	8039	7374	7288		
1 1/4	1.0000	10	9924	9411	9360	8771	8686	8	9920	9251	9200	8451	8356		
1 1/2	1.1250	9	1.1171	1.0592	1.0539	9881	9792	7	1.1164	1.0388	1.0335	9473	9376		
1 3/4	1.2500	9	1.2419	1.1844	1.1789	1.1133	1.1042	7	1.2413	1.1640	1.1585	1.0725	1.0627		
1 7/8	1.3750	8	1.3665	1.3066	1.2950	1.2206	1.2110	6	1.3661	1.2723	1.2667	1.1761	1.1581		
2	1.5000	8	1.4913	1.4258	1.4200	1.3458	1.3360	6	1.4906	1.3991	1.3933	1.2924	1.2818		
LIMITS FOR END SCREWED INTO COMPONENT (B.A. Threads) ¹															
Designation No.	Pitch	Major Diameter		Effective Diameter		Minor Diameter									
		Max.	Min.	Max.	Min.	Max.	Min.								
2	.8100 mm	4.700 mm	4.580 mm	4.275 mm	4.200 mm	3.790 mm	3.620 mm								
	.03189 in.	1.850 in.	1.803 in.	1.654 in.	1.625 in.	1.492 in.	1.425 in.								
4	.6600 mm	3.600 mm	3.500 mm	3.260 mm	3.190 mm	2.865 mm	2.720 mm								
	.02598 in.	1.417 in.	1.378 in.	1.283 in.	1.256 in.	1.128 in.	1.071 in.								
MINIMUM NOMINAL LENGTHS OF STUDS ²															
Nom. Stud Diam.	For Thread Length (Component End) of		Nom. Stud Diam.	For Thread Length (Component End) of		Nom. Stud Diam.	For Thread Length (Component End) of								
	1D	1.5D		1D	1.5D		1D	1.5D							
1/4	1 1/4	1	1/4	2	2 3/4	1/4	4	4 3/4							
5/16	1 1/2	1 3/4	5/16	2 1/4	2 3/4	5/16	4 1/4	5 1/4							
3/8	1 3/4	1 3/4	3/8	2 3/4	3	3/8	5	5 3/4							
1/2	1 3/4	2	1/2	3 1/4	3 3/4	1/2	5 1/4	6							
5/8	1 3/4	2 1/4	5/8	3 1/2	4	...	...	...							

All dimensions are in inches except where otherwise noted.

¹ Approximate inch equivalents are shown below the dimensions given in mm.

² The standard also gives preferred and standard lengths of studs:

Preferred lengths of studs: 1/4, 1, 1 1/4, 1 1/2, 1 3/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 2 3/4, 3, 3 1/4, 3 1/2 and for lengths above 3 1/2 the preferred increment is 1/4.

Standard lengths of studs: 1/4, 1, 1 1/4, 1 1/2, 1 3/4, 1 1/2, 1 3/4, 1 1/2, 2, 2 1/4, 2 1/2, 2 3/4, 2 1/2, 2 3/4, 2 3/4, 3, 3 1/4, 3 1/2, 3 3/4 and for lengths above 3 1/2 the standard increment is 1/4.

Tolerance for length is $\pm 1/32$ for all lengths up to and including 4 and $\pm 1/16$ over 4.

WASHERS

American Standard Plain Washers. — The Standard (ASA B27.2-1958) covers two types of general-purpose plain washers (Type A and Type B). Table 1 gives Type A washers listed in ascending order of inside diameters, outside diameters, and thicknesses, without reference to the nominal screw or bolt size. Type B washers are listed in Table 2, which gives dimensions for narrow, regular, and wide washers for each screw or bolt size.

The inside diameter tolerances for Type A washers are approximately double those for Type B washers for sizes up to 1 inch; for sizes 1 inch and above they are the same. In general, the outside diameter tolerances for Type A washers are twice those for Type B washers for sizes up to 1/4 inch and the same for other sizes. For actual tolerances consult the footnotes of the tables.

Plain washers are made of ferrous or non-ferrous metals, plastics or other materials. The tolerances indicated in the tables are for metal washers only.

**BẢNG 1 : TIÊU CHUẨN MỸ VỀ CÁC VÒNG ĐỆM PHẪNG
KIỂU A**

Inside Diam- eter ¹	Outside Diam- eter ²	Thickness			Inside Diam- eter ¹	Outside Diam- eter ²	Thickness		
		Nom.	Max.	Min.			Nom.	Max.	Min.
5/64	3/16	0.020	0.025	0.016	5/8	1 1/2	0.109	0.132	0.086
3/32	7/32	0.020	0.025	0.016	5/8	2 1/8	0.134	0.160	0.108
3/32	7/32	0.020	0.025	0.016	2 1/2	1 1/4	0.095	0.121	0.074
1/4	1/2	0.022	0.028	0.017	1 1/2	1 1/2	0.134	0.160	0.108
1/4	5/8	0.032	0.040	0.025	1 1/2	1 3/4	0.134	0.160	0.108
5/32	5/8	0.035	0.048	0.027	1 1/2	2 1/8	0.165	0.192	0.136
5/32	5/8	0.049	0.065	0.036	1 1/2	1 3/4	0.134	0.160	0.108
1 1/64	1 3/32	0.049	0.065	0.036	1 1/2	1 3/4	0.148	0.177	0.122
3/8	3/4	0.049	0.065	0.036	2	2	0.148	0.177	0.122
3/8	3/4	0.049	0.065	0.036	1 3/4	2 1/8	0.165	0.192	0.136
1 3/64	1 3/32	0.049	0.065	0.036	1 3/4	1 3/4	0.134	0.160	0.108
7/32	7/16	0.049	0.065	0.036	1 3/4	2	0.165	0.192	0.136
7/32	7/16	0.049	0.065	0.036	1 3/4	2 1/4	0.165	0.192	0.136
1 1/64	1 3/32	0.049	0.065	0.036	1 3/4	3 3/8	0.180	0.213	0.153
1/2	1 1/2	0.049	0.065	0.036	1 1/2	2	0.134	0.160	0.108
1 1/2	4	0.049	0.065	0.036	1 1/2	2 1/4	0.165	0.192	0.136
1 1/2	4	0.065	0.080	0.051	1 1/2	2 1/2	0.165	0.192	0.136
1 1/2	4	0.049	0.065	0.036	1 1/2	3 1/8	0.238	0.280	0.210
9/32	5/8	0.065	0.080	0.051	1 3/4	2 1/8	0.165	0.192	0.136
9/32	5/8	0.065	0.080	0.051	1 3/4	2 3/4	0.165	0.192	0.136
5/8	7/8	0.065	0.080	0.051	1 3/4	2 3/4	0.165	0.192	0.136
1 1/32	1 1/16	0.065	0.080	0.051	1 3/4	3	0.165	0.192	0.136
3/4	3/4	0.065	0.080	0.051	1 1/2	3	0.180	0.213	0.153
3/4	7/8	0.083	0.104	0.064	1 1/2	3 1/4	0.180	0.213	0.153
3/4	1 1/8	0.065	0.080	0.051	1 3/4	3 1/4	0.180	0.213	0.153
1 3/32	1 3/16	0.065	0.080	0.051	1 3/4	3 1/2	0.180	0.213	0.153
7/16	7/8	0.083	0.104	0.064	1 1 1/2	3 1/2	0.180	0.213	0.153
7/16	1	0.083	0.104	0.064	1 3/4	3 3/4	0.180	0.213	0.153
7/16	1 3/8	0.083	0.104	0.064	1 1 1/2	3 3/4	0.180	0.213	0.153
1 3/32	1 3/16	0.065	0.080	0.051	1 7/8	4	0.180	0.213	0.153
1 1/2	1 1/2	0.083	0.104	0.064	1 1 1/2	4	0.180	0.213	0.153
1 1/2	1 1/2	0.083	0.104	0.064	2	4 1/4	0.180	0.213	0.153
1 1/2	1 1/2	0.083	0.104	0.064	2 1/4	4 1/4	0.180	0.213	0.153
1 1/2	1 1/2	0.095	0.121	0.074	2 1/4	4 1/2	0.180	0.213	0.153
9/8	1 1/4	0.109	0.132	0.086	2 3/8	4 3/4	0.220	0.248	0.193
9/8	1 3/8	0.109	0.132	0.086	2 3/8	5	0.238	0.280	0.210
9/8	1 3/8	0.109	0.132	0.086	2 3/8	5 1/4	0.259	0.310	0.228
1 3/32	1 3/16	0.095	0.121	0.074	3 1/8	5 1/2	0.284	0.327	0.249
5/8	1 3/8	0.109	0.132	0.086	.....	.....	.....	.....	.....

All dimensions are given in inches.

¹ Tolerance is ± 0.005 inch for inside diameters up to 7/32 inch, inclusive, and also for the two 1/4-inch inside diameters marked with an asterisk (*). Tolerance for all other inside diameters larger than 7/32 inch is ± 0.010 inch.

² Tolerance is ± 0.010 inch for all outside diameters.

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VÒNG ĐỆM

WASHERS

BẢNG 2: TIÊU CHUẨN MỸ VỀ VÒNG ĐỆM PHẪNG KIỂU B

Screw or Bolt Size ¹	Series ⁴	Inside Diam. ²	Outside Diam. ³	Thickness			Screw or Bolt Size ¹	Series ⁴	Inside Diam. ²	Outside Diam. ³	Thickness		
				Nom.	Max.	Min.					Nom.	Max.	Min.
.060	N	.068	3/16	.025	.028	.022	3/16	N	.540	1	.063	.071	.056
	R		9/32	.025	.028	.022		R		1 1/4	.100	.112	.090
	W		3/4	.025	.028	.022		W		1 3/4	.100	.112	.090
.073	N	.084	5/16	.025	.028	.022	9/16	N	.604	1 1/2	.063	.071	.056
	R		5/8	.025	.028	.022		R		1 5/8	.100	.112	.090
	W		3/4	.032	.036	.028		W		2	.100	.112	.090
.086	N	.094	5/16	.025	.028	.022	3/4	N	.666	1 1/4	.100	.112	.090
	R		3/4	.032	.036	.028		R		1 3/4	.100	.112	.090
	W		1 1/8	.032	.036	.028		W		2 1/4	.160	.174	.146
.099	N	.109	5/8	.025	.028	.022	1	N	.812	1 3/8	.100	.112	.090
	R		3/4	.032	.036	.028		R		2	.100	.112	.090
	W		1 1/8	.040	.045	.036		W		2 1/2	.160	.174	.146
.112	N	.125	3/4	.032	.036	.028	1 1/8	N	.938	1 5/8	.100	.112	.090
	R		7/8	.040	.045	.036		R		2 1/4	.160	.174	.146
	W		1 1/8	.040	.045	.036		W		2 3/4	.160	.174	.146
.125	N	.141	5/8	.032	.036	.028	1	N	1 1/8	1 3/4	.100	.112	.090
	R		1 1/8	.040	.045	.036		R		2 1/2	.160	.174	.146
	W		3/4	.040	.045	.036		W		3	.160	.174	.146
.138	N	.156	5/16	.032	.036	.028	1 1/8	N	1 3/8	2	.100	.112	.090
	R		3/4	.040	.045	.036		R		2 3/4	.160	.174	.146
	W		1 1/8	.040	.045	.036		W		3 1/4	.160	.174	.146
.164	N	.188	3/8	.040	.045	.036	1 1/4	N	1 5/8	2 1/4	.160	.174	.146
	R		1/2	.040	.045	.036		R		3	.160	.174	.146
	W		5/8	.063	.071	.056		W		3 1/2	.250	.266	.234
.190	N	.208	1 1/8	.040	.045	.036	1 3/8	N	1 7/8	2 1/2	.160	.174	.146
	R		5/8	.040	.045	.036		R		3 1/4	.160	.174	.146
	W		1 1/4	.063	.071	.056		W		3 3/4	.250	.266	.234
.216	N	.240	7/16	.040	.045	.036	1 1/2	N	1 9/8	2 3/4	.160	.174	.146
	R		5/8	.063	.071	.056		R		3 1/2	.250	.266	.234
	W		3/4	.063	.071	.056		W		4	.250	.266	.234
3/4	N	.281	3/8	.063	.071	.056	1 5/8	N	1 3/4	3	.160	.174	.146
	R		1 1/8	.063	.071	.056		R		3 3/4	.250	.266	.234
	W		1	.063	.071	.056		W		4 1/4	.250	.266	.234
5/16	N	.344	5/8	.063	.071	.056	1 3/4	N	1 7/8	3 1/4	.160	.174	.146
	R		3/4	.063	.071	.056		R		4	.250	.266	.234
	W		1 1/8	.063	.071	.056		W		4 1/2	.250	.266	.234
3/8	N	.406	1 1/8	.063	.071	.056	1 7/8	N	2	3 1/2	.250	.266	.234
	R		1 1/4	.063	.071	.056		R		4 1/4	.250	.266	.234
	W		1 3/4	.100	.112	.090		W		4 3/4	.250	.266	.234
1/2	N	.480	3/8	.063	.071	.056	2	N	2 1/8	3 3/4	.250	.266	.234
	R		1 1/8	.063	.071	.056		R		4 1/2	.250	.266	.234
	W		1 5/8	.100	.112	.090		W		5	.250	.266	.234

All dimensions in inches. The standard also includes data on washers for screw or bolt sizes 2 1/4 to 3 in., incl. ¹ The .060-, .073-, .086-, .099-, .112-, .125-, .138-, .164-, .190-, and .216-inch sizes are also known as No. 0, 1, 2, 3, 4, 5, 6, 8, 10, and 12 sizes, respectively. ² The inside diameter has a tolerance of -.005 in. for sizes .060 to .190 in., incl.; -.010 in. for .216 to 3/8 in., incl.; and ±.010 in. for all other sizes. ³ The outside diameter has a tolerance of ±.005 in. for narrow series sizes .060 to 5/16 in., incl.; regular series sizes .060 to .216 in., incl.; and wide series sizes .060 to .164 in., incl. All other outside diameters have a tolerance of ±.010 in. ⁴ The letters N, R, W signify narrow, regular and wide, respectively.

TIÊU CHUẨN MỸ VỀ VÒNG ĐỆM LÒ XO XOẮN

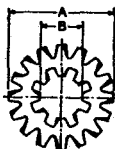
Nom. Size	Outside Diam. Max.				Inside Diam.	Clearance Bolt Size		Light		Med.		Heavy		Extra Heavy	
	Light	Med.	Heavy	Extra Heavy	Min.	Min.	Max.	Width	Thick- ness	Width	Thick- ness	Width	Thick- ness	Width	Thick- ness
0.086 (No.2)	0.165	0.175	0.185	0.211	0.088	0.002	0.011	0.030	0.015	0.035	0.020	0.040	0.025	0.053	0.027
0.099 (No.3)	0.188	0.198	0.212	0.242	0.101	0.002	0.011	0.035	0.020	0.040	0.025	0.047	0.031	0.062	0.034
0.112 (No.4)	0.202	0.212	0.226	0.256	0.115	0.003	0.012	0.035	0.020	0.040	0.025	0.047	0.031	0.062	0.034
0.125 (No.5)	0.225	0.239	0.255	0.303	0.128	0.003	0.012	0.040	0.025	0.047	0.031	0.055	0.040	0.079	0.045
0.138 (No.6)	0.239	0.253	0.269	0.317	0.141	0.003	0.013	0.040	0.025	0.047	0.031	0.055	0.040	0.079	0.045
0.164 (No.8)	0.280	0.296	0.310	0.378	0.168	0.004	0.014	0.047	0.031	0.055	0.040	0.062	0.047	0.096	0.057
0.190 (No.10)	0.323	0.337	0.353	0.437	0.194	0.004	0.015	0.055	0.040	0.062	0.047	0.070	0.050	0.112	0.068
0.216 (No.12)	0.364	0.380	0.394	0.500	0.221	0.005	0.016	0.062	0.047	0.070	0.050	0.077	0.063	0.130	0.080
1/4	0.489	0.493	0.495	0.539	0.255	0.005	0.017	0.107	0.047	0.109	0.062	0.110	0.077	0.132	0.084
5/16	0.575	0.591	0.601	0.627	0.319	0.006	0.020	0.117	0.056	0.125	0.078	0.130	0.097	0.143	0.108
3/8	0.678	0.688	0.696	0.746	0.382	0.007	0.023	0.136	0.070	0.141	0.094	0.145	0.115	0.170	0.123
7/16	0.780	0.784	0.792	0.844	0.446	0.008	0.026	0.154	0.085	0.156	0.109	0.160	0.133	0.186	0.143
1/2	0.877	0.879	0.889	0.945	0.509	0.009	0.029	0.170	0.099	0.171	0.125	0.176	0.151	0.204	0.162
5/8	0.975	0.979	0.989	1.049	0.573	0.010	0.032	0.186	0.113	0.188	0.141	0.193	0.170	0.223	0.182
3/4	1.082	1.086	1.100	1.164	0.636	0.011	0.035	0.201	0.126	0.203	0.156	0.210	0.189	0.242	0.202
7/8	1.178	1.184	1.200	1.266	0.700	0.012	0.038	0.216	0.138	0.219	0.172	0.227	0.207	0.260	0.221
1 1/8	1.277	1.279	1.299	1.369	0.763	0.013	0.041	0.233	0.153	0.234	0.188	0.244	0.226	0.279	0.241
1 1/4	1.375	1.377	1.401	1.473	0.827	0.014	0.044	0.249	0.168	0.250	0.203	0.262	0.246	0.298	0.261
1 1/2	1.470	1.474	1.504	1.586	0.890	0.015	0.047	0.264	0.179	0.266	0.219	0.281	0.266	0.322	0.285
1 3/4	1.562	1.570	1.604	1.698	0.954	0.016	0.050	0.277	0.191	0.281	0.234	0.298	0.284	0.345	0.308
2	1.656	1.672	1.710	1.810	1.017	0.017	0.053	0.289	0.202	0.297	0.250	0.319	0.306	0.366	0.330
2 1/8	1.746	1.768	1.820	1.922	1.081	0.018	0.056	0.301	0.213	0.312	0.266	0.338	0.326	0.389	0.352
2 1/4	1.837	1.865	1.921	2.031	1.144	0.019	0.059	0.314	0.224	0.328	0.281	0.356	0.345	0.411	0.375
2 1/2	1.923	1.963	2.021	2.137	1.208	0.020	0.062	0.324	0.234	0.344	0.297	0.373	0.364	0.431	0.396
2 3/4	2.012	2.058	2.126	2.244	1.271	0.021	0.065	0.336	0.244	0.359	0.312	0.393	0.384	0.452	0.417
3	2.098	2.156	2.226	2.350	1.335	0.022	0.068	0.346	0.254	0.375	0.328	0.410	0.403	0.472	0.438
3 1/8	2.183	2.253	2.325	2.453	1.398	0.023	0.071	0.356	0.264	0.391	0.344	0.427	0.422	0.491	0.458
3 1/4	2.269	2.349	2.421	2.555	1.462	0.024	0.074	0.366	0.273	0.406	0.359	0.442	0.440	0.509	0.478
3 1/2	2.352	2.446	2.518	2.654	1.525	0.025	0.077	0.375	0.282	0.422	0.375	0.458	0.458	0.526	0.496
3 3/4	2.509	.....	2.709	.....	1.650	0.025	0.077	0.391	0.344	.....	.....	0.491	0.458	.....	.....
4	2.634	.....	2.834	.....	1.775	0.025	0.077	0.391	0.344	.....	.....	0.491	0.458	.....	.....
4 1/8	2.763	.....	2.959	.....	1.900	0.025	0.077	0.393	0.384	.....	.....	0.491	0.458	.....	.....
4 1/4	2.888	.....	3.084	.....	2.025	0.025	0.077	0.393	0.384	.....	.....	0.491	0.458	.....	.....
4 1/2	3.206	.....	3.404	.....	2.275	0.025	0.077	0.427	0.422	.....	.....	0.526	0.496	.....	.....
4 3/4	3.456	.....	3.654	.....	2.525	0.025	0.077	0.427	0.422	.....	.....	0.526	0.496	.....	.....
5	3.768	.....	3.904	.....	2.775	0.025	0.077	0.458	0.458	.....	.....	0.526	0.496	.....	.....
5 1/8	4.018	.....	4.154	.....	3.025	0.025	0.077	0.458	0.458	.....	.....	0.526	0.496	.....	.....

TIÊU CHUẨN MỸ VỀ VÒNG ĐỆM KHÓA CÓ RĂNG

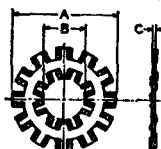
TRONG - NGOÀI

AMERICAN STANDARD INTERNAL-EXTERNAL TOOTH LOCK WASHERS (ASA B27.1-1958)

All dimensions are given in inches except whole numbers under "Size"



TYPE A



TYPE B

TYPE I						TYPE II							
Size	A		B		C		Size	A		B		C	
	Outside Diameter		Inside Diameter		Thickness			Outside Diameter		Inside Diameter		Thickness	
	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.	Max.	Min.
No. 4	.475	.460	.123	.115	.021	.017	1/16	.900	.865	.332	.320	.040	.032
	.510	.495						.985	.965				
	.610	.580						1.070	1.045				
No. 6	.510	.495	.150	.141	.028	.023	3/16	1.155	1.130	.332	.320	.050	.042
	.610	.580						.985	.965				
	.690	.670						1.070	1.045				
No. 8	.610	.580	.176	.168	.034	.028	7/16	1.155	1.130	.398	.384	.045	.037
	.690	.670						1.260	1.220				
	.760	.740						1.315	1.290				
No. 10	.610	.580	.204	.195	.040	.032	1/2	1.070	1.045	.464	.448	.050	.042
	.690	.670						1.155	1.130				
	.760	.740						1.260	1.220				
No. 12	.900	.880	.231	.221	.040	.032	5/8	1.315	1.290	.530	.512	.055	.047
	.985	.965						1.410	1.380				
	.985	.965						1.620	1.590				
1/4	.760	.725	.267	.256	.040	.032	3/4	1.315	1.290	.596	.576	.055	.047
	.900	.880						1.430	1.380				
	.985	.965						1.620	1.590				
1/2	1.070	1.045	.267	.256	.045	.037	7/8	1.830	1.797	.596	.576	.067	.059
								1.410	1.380				
								1.620	1.590				
							1.975	1.935					

TIÊU CHUẨN MỸ VỀ VÒNG ĐỆM CHỈ CÓ RĂNG TRONG VÀ CHỈ CÓ RĂNG NGOÀI

Internal Tooth

Type A

Type B

External Tooth

Type A

Type B

Countersunk External Tooth

Type A

Type B

Internal Tooth Lock Washers

	Size	#2	#3	#4	#5	#6	#8	#10	#12	1/4	5/16	3/8	7/16	1/2	9/16	5/8	1 1/16	3/4	1 1/8	1 1/4	1 3/4	
A	Max	0.200	0.232	0.270	0.280	0.295	0.340	0.381	0.410	0.478	0.610	0.692	0.789	0.900	0.985	1.071	1.166	1.245	1.315	1.410	1.637	1.830
	Min	0.175	0.215	0.255	0.245	0.275	0.325	0.365	0.394	0.460	0.594	0.670	0.740	0.867	0.957	1.045	1.130	1.220	1.290	1.364	1.590	1.799
B	Max	0.095	0.109	0.123	0.136	0.150	0.176	0.204	0.231	0.267	0.332	0.398	0.464	0.530	0.596	0.663	0.728	0.795	0.861	0.927	1.060	1.192
	Min	0.089	0.102	0.115	0.129	0.141	0.168	0.195	0.221	0.256	0.320	0.384	0.448	0.512	0.576	0.640	0.704	0.769	0.832	0.894	1.019	1.144
C	Max	0.015	0.019	0.019	0.021	0.021	0.023	0.025	0.025	0.028	0.034	0.040	0.040	0.045	0.045	0.050	0.050	0.055	0.055	0.060	0.067	0.067
	Min	0.010	0.012	0.015	0.017	0.017	0.018	0.020	0.020	0.023	0.028	0.032	0.032	0.037	0.037	0.042	0.042	0.047	0.047	0.052	0.059	0.059

External Tooth Lock Washers

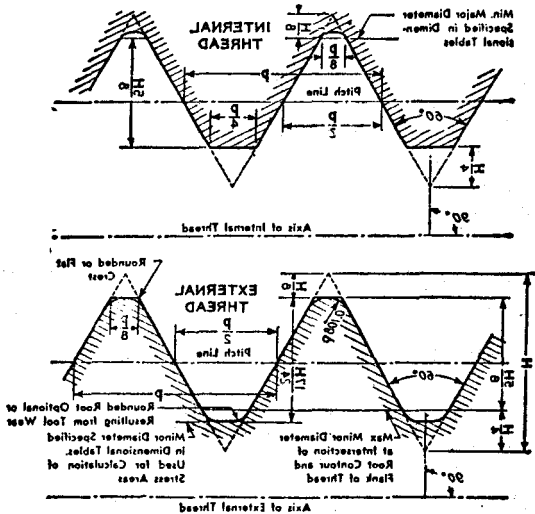
	Size	#4	#6	#8	#10	#12	1/4	5/16	3/8	7/16	1/2	9/16	5/8	1 1/16	3/4	1 1/8	1 1/4	1 3/4	1 3/4	1 3/4	1 3/4
A	Max	.....	.....	0.260	.....	0.320	0.381	0.410	0.475	0.510	0.610	0.694	0.760	0.900	0.985	1.070	1.155	1.260	1.315	1.410	1.620
	Min	.....	.....	0.245	.....	0.305	0.365	0.395	0.460	0.494	0.588	0.670	0.740	0.880	0.960	1.045	1.130	1.220	1.290	1.380	1.590
B	Max	.....	.....	0.123	.....	0.150	0.176	0.204	0.231	0.267	0.332	0.398	0.464	0.530	0.596	0.663	0.728	0.795	0.861	0.927	1.060
	Min	.....	.....	0.115	.....	0.141	0.168	0.195	0.221	0.256	0.320	0.384	0.448	0.512	0.576	0.641	0.704	0.768	0.832	0.897	1.025
C	Max	.....	.....	0.019	.....	0.022	0.023	0.025	0.028	0.028	0.034	0.040	0.040	0.045	0.045	0.050	0.050	0.055	0.055	0.060	0.067
	Min	.....	.....	0.015	.....	0.016	0.018	0.020	0.023	0.023	0.028	0.032	0.032	0.037	0.037	0.042	0.042	0.047	0.047	0.052	0.059

Heavy Internal Tooth Lock Washers

	Size	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8		Size	#4	#6	#8	#10	#12	1/4	5/16	3/8	7/16	1/2	
A	Max	0.536	0.607	0.748	0.858	0.924	1.034	1.135	1.265	1.447	B	Max	0.123	0.150	0.177	0.205	0.231	0.267	0.287	0.333	0.398	0.463
	Min	0.500	0.590	0.700	0.800	0.880	0.990	1.100	1.240	1.400		Min	0.113	0.140	0.167	0.195	0.220	0.255	0.273	0.318	0.383	0.448
B	Max	0.267	0.332	0.398	0.464	0.530	0.596	0.663	0.795	0.927	C	Max	0.019	0.021	0.021	0.025	0.025	0.025	0.028	0.028	0.034	0.045
	Min	0.256	0.320	0.384	0.448	0.512	0.576	0.640	0.768	0.894		Min	0.015	0.017	0.017	0.020	0.020	0.020	0.023	0.023	0.028	0.037
C	Max	0.045	0.050	0.050	0.067	0.067	0.067	0.067	0.084	0.084	D	Max	0.065	0.092	0.105	0.099	0.128	0.128	0.147	0.192	0.255	0.270
	Min	0.035	0.040	0.042	0.050	0.055	0.055	0.059	0.070	0.075		Min	0.050	0.082	0.088	0.083	0.118	0.113	0.137	0.165	0.242	0.294

All dimensions are given in inches.

TIÊU CHUẨN MỸ VỀ DẠNG REN TRONG VÀ REN NGOÀI
THỐNG NHẤT
AMERICAN STANDARD UNIFIED INTERNAL AND EXTERNAL
SCREW THREAD DESIGN FORMST
(maximum material condition)



(H = height of sharp V-thread = 0.86603 X pitch)

Crest truncation,
external thread = $0.10825 \times \text{pitch}$
= $H + 8$

Crest truncation,
internal thread = $0.21651 \times \text{pitch}$
= $H + 4$

*Root truncation,
external thread = $0.14334 \times \text{pitch}$
= $H + 6$

Root truncation,
internal thread = $0.10825 \times \text{pitch}$
= $H + 8$

Addendum,
external thread = $0.32476 \times \text{pitch}$
= $3H + 8$

$$\text{Pitch} = \frac{1}{\text{No. of threads per inch}}$$

Depth, external
thread = $0.61343 \times \text{pitch}$
= $1.7H + 24$

Depth, internal
thread = $0.54127 \times \text{pitch}$
= $2H + 8$

Flat at crest,
external thread = $0.125 \times \text{pitch}$

Flat at crest,
internal thread = $0.25 \times \text{pitch}$

Flat at root,
internal thread = $0.125 \times \text{pitch}$

† For numerical values given by the formulas, see Table 1.
* Used in calculating minor diameter and stress area values in the accompanying tables. See stress area formulas on page 1021.

BẢNG 1 : TIÊU CHUẨN MỸ VỀ VIT ĐẦU BẰNG 100 ĐỘ CÓ RÃNH

Table 1. AMERICAN STANDARD SLOTTED 100-DEGREE FLAT HEAD MACHINE SCREWS (ASA B18.6.3-1962)

Nom. Size	Basic D	Max. A Sharp	Min. A Sharp	Abs. Min. A	Max. H	Max. J	Min. J	Max. T	Min. T
4	.1120	.225	.207	.191	.049	.039	.031	.024	.017
6	.1380	.279	.257	.238	.060	.048	.039	.030	.022
8	.1640	.332	.308	.285	.072	.054	.045	.036	.027
10	.1900	.385	.359	.333	.083	.060	.050	.042	.031
14	.2500	.507	.477	.442	.110	.075	.064	.055	.042
1/8	.3125	.635	.600	.556	.138	.084	.072	.069	.053
3/8	.3750	.762	.722	.670	.165	.094	.081	.083	.065

All dimensions in inches. Edges of head may be rounded. Radius of fillet at base of head should be no greater than 40 per cent of the basic screw diameter. Diameter of unthreaded part should not be less than minimum pitch diameter nor more than the basic major diameter of thread.

**BẢNG 2 : TIÊU CHUẨN MỸ VỀ DUNG SAI VIT ĐẦU BẰNG
100 ĐỘ VÀ VIT ĐẦU BẰNG CÓ RÃNH**

**Table 2. AMERICAN STANDARD SLOTTED CLOSE TOLERANCE
100-DEGREE FLAT HEAD AND SLOTTED FLAT HEAD
MACHINE SCREWS (ASA B18.6.3-1962)**

Close Tolerance 100-Degree Flat Head Machine Screws									
Nom. Size	Basic D	Max. A Sharp	Min. A Sharp	Abs. Min. A	Max. H	Max. J	Min. J	Max. T	Min. T
4	.1120	.225	.215	.191	.049	.039	.031	.024	.017
6	.1380	.279	.267	.238	.060	.048	.039	.030	.022
8	.1640	.332	.319	.285	.072	.054	.045	.036	.027
10	.1900	.385	.371	.333	.083	.060	.050	.042	.031
1 1/4	.2500	.507	.491	.442	.110	.075	.064	.055	.042
1 1/8	.3125	.635	.616	.556	.138	.084	.072	.069	.053
3/8	.3750	.762	.741	.670	.165	.094	.081	.083	.065
7/16	.4375	.890	.866	.783	.193	.094	.081	.097	.076
1/2	.5000	1.017	.991	.897	.221	.106	.091	.111	.088
9/16	.5625	1.145	1.116	1.011	.249	.118	.102	.125	.099
5/8	.6250	1.272	1.241	1.124	.276	.133	.116	.139	.111
Flat Head Machine Screws*									
Nom. Size	Basic D	Max. A Sharp	Min. A Sharp	Abs. Min. A	Max. H	Max. J	Min. J	Max. T	Min. T
0	.0600	.119	.105	.099	.035	.023	.016	.015	.010
1	.0730	.146	.130	.123	.043	.026	.019	.019	.012
2	.0860	.172	.156	.147	.051	.031	.023	.023	.015
3	.0990	.199	.181	.171	.059	.035	.027	.027	.017
4	.1120	.225	.207	.195	.067	.039	.031	.030	.020
5	.1250	.252	.232	.220	.075	.043	.035	.034	.022
6	.1380	.279	.257	.244	.083	.048	.039	.038	.024
8	.1640	.332	.308	.292	.100	.054	.045	.045	.029
10	.1900	.385	.359	.340	.116	.060	.050	.053	.034
12	.2160	.438	.410	.389	.132	.067	.056	.060	.039
1 1/4	.2500	.507	.477	.452	.153	.075	.064	.070	.046
1 1/8	.3125	.635	.600	.568	.191	.084	.072	.088	.058
3/8	.3750	.762	.722	.685	.230	.094	.081	.106	.070
7/16	.4375	.812	.767	.723	.223	.094	.081	.103	.066
1/2	.5000	.875	.831	.775	.223	.106	.091	.103	.065
9/16	.5625	1.000	.950	.889	.260	.118	.102	.120	.077
5/8	.6250	1.125	1.069	1.002	.298	.133	.116	.137	.088
3/4	.7500	1.375	1.306	1.230	.372	.149	.131	.171	.111

All dimensions in inches.

Edges of head may be rounded.

Radius of fillet at base of head should be no greater than 40 per cent of the basic screw diameter.

Diameter of unthreaded part should not be less than minimum pitch diameter nor more than the basic major diameter of thread.

* Has 80 to 82 degree head angle. Short flat head machine screws are undercut. See Table 3 on page 1064 for limiting lengths of undercut screws and their dimensions.

**BẢNG 1 : CÁC THÔNG SỐ DẠNG REN THỐNG NHẤT THEO
TIÊU CHUẨN MỸ**

Threads per Inch	Pitch	Depth of Sharp V-Thread	Depth of External Thread	Depth of Internal Thread	Depth of Thread Engage- ment	Flat at External Thread Crest	Trunca- tion of External Thread Crest	Trunca- tion of External Thread Root	Flat at Internal Thread Crest	Trunca- tion of Internal Thread Crest	Flat at Internal Thread Root	Trunca- tion of Internal Thread Root	Adden- dum of External Thread
<i>n</i>	<i>p</i>	0.86603 <i>p</i>	0.61343 <i>p</i>	0.54127 <i>p</i>	0.54127 <i>p</i>	0.125 <i>p</i>	0.10825 <i>p</i>	0.14434 <i>p</i>	0.25 <i>p</i>	0.21651 <i>p</i>	0.125 <i>p</i>	0.10825 <i>p</i>	0.32476 <i>p</i>
80	0.01250	0.01083	0.00767	0.00677	0.00677	0.00156	0.00135	0.00180	0.00312	0.00271	0.00156	0.00135	0.00406
72	0.01389	0.01203	0.00852	0.00752	0.00752	0.00174	0.00150	0.00200	0.00347	0.00301	0.00174	0.00150	0.00451
64	0.01563	0.01353	0.00958	0.00846	0.00846	0.00195	0.00169	0.00226	0.00391	0.00338	0.00195	0.00169	0.00507
56	0.01786	0.01546	0.01095	0.00967	0.00967	0.00223	0.00193	0.00258	0.00440	0.00387	0.00223	0.00193	0.00580
48	0.02083	0.01804	0.01278	0.01128	0.01128	0.00260	0.00226	0.00301	0.00521	0.00451	0.00260	0.00226	0.00677
44	0.02273	0.01968	0.01394	0.01230	0.01230	0.00284	0.00246	0.00328	0.00568	0.00492	0.00284	0.00246	0.00738
40	0.02500	0.02165	0.01534	0.01353	0.01353	0.00312	0.00271	0.00361	0.00625	0.00541	0.00312	0.00271	0.00812
36	0.02778	0.02406	0.01704	0.01504	0.01504	0.00347	0.00301	0.00401	0.00694	0.00601	0.00347	0.00301	0.00902
32	0.03125	0.02706	0.01917	0.01691	0.01691	0.00391	0.00338	0.00451	0.00781	0.00677	0.00391	0.00338	0.01015
28	0.03571	0.03093	0.02191	0.01933	0.01933	0.00440	0.00387	0.00451	0.00893	0.00773	0.00440	0.00387	0.01160
24	0.04167	0.03608	0.02556	0.02255	0.02255	0.00521	0.00451	0.00601	0.01042	0.00902	0.00521	0.00451	0.01353
20	0.05000	0.04330	0.03067	0.02706	0.02706	0.00625	0.00541	0.00722	0.01250	0.01083	0.00625	0.00541	0.01624
18	0.05556	0.04811	0.03408	0.03007	0.03007	0.00694	0.00601	0.00802	0.01389	0.01203	0.00694	0.00601	0.01804
16	0.06250	0.05413	0.03834	0.03383	0.03383	0.00781	0.00677	0.00902	0.01562	0.01353	0.00781	0.00677	0.02030
14	0.07143	0.06186	0.04382	0.03866	0.03866	0.00893	0.00773	0.01031	0.01786	0.01546	0.00893	0.00773	0.02320
13	0.07692	0.06662	0.04719	0.04164	0.04164	0.00962	0.00833	0.01110	0.01923	0.01665	0.00962	0.00833	0.02498
12	0.08333	0.07217	0.05112	0.04511	0.04511	0.01042	0.00902	0.01203	0.02083	0.01804	0.01042	0.00902	0.02706
11½	0.08696	0.07531	0.05334	0.04707	0.04707	0.01087	0.00941	0.01255	0.02174	0.01883	0.01087	0.00941	0.02824
11	0.09091	0.07873	0.05577	0.04921	0.04921	0.01136	0.00984	0.01312	0.02273	0.01938	0.01136	0.00984	0.02952
10	0.10000	0.08660	0.06134	0.05413	0.05413	0.01250	0.01083	0.01443	0.02500	0.02165	0.01250	0.01083	0.03248
9	0.11111	0.09623	0.06816	0.06014	0.06014	0.01389	0.01203	0.01604	0.02778	0.02406	0.01389	0.01203	0.03608
8	0.12500	0.10825	0.07668	0.06766	0.06766	0.01562	0.01353	0.01804	0.03125	0.02706	0.01562	0.01353	0.04059
7	0.14286	0.12372	0.08763	0.07732	0.07732	0.01786	0.01546	0.02062	0.03571	0.03093	0.01786	0.01546	0.04639
6	0.16667	0.14434	0.10224	0.09021	0.09021	0.02083	0.01804	0.02406	0.04167	0.03608	0.02083	0.01804	0.05413
5	0.20000	0.17321	0.12869	0.10825	0.10825	0.02500	0.02165	0.02887	0.05000	0.04330	0.02500	0.02165	0.06495
4½	0.22222	0.19245	0.13632	0.12028	0.12028	0.02778	0.02406	0.03208	0.05556	0.04811	0.02778	0.02406	0.07217
4	0.25000	0.21651	0.15336	0.13532	0.13532	0.03125	0.02706	0.03608	0.06250	0.05413	0.03125	0.02706	0.08119

Twice the external thread addendum (last column) is equivalent to the "basic height" of the original American National form.

BẢNG 2 : TỔNG LƯỢNG BƯỚC ĐƯỜNG KÍNH CỦA CHUỖI TIÊU CHUẨN CÁC REN THỐNG NHẤT

Table 2. DIAMETER-PITCH COMBINATIONS FOR STANDARD
SERIES OF UNIFIED THREADS

Sizes†	Basic Major Diam.	Threads per Inch										
		Series with Graded Pitches			Series with Uniform (Constant) Pitches							
		Coarse UNC	Fine UNF	Extra fine UNEF	4UN	6UN	8UN	12UN	16UN	20UN	28UN	32UN
		UNC	UNF	UNEF								
0	0.0600	80										
(1)	0.0730	64	72									
2	0.0860	56	64									
(3)	0.0990	48	56									
4	0.1120	40	48									
5	0.1250	40	44									
6	0.1380	32	40									UNC
8	0.1640	32	36									UNC
10	0.1900	24	32									UNC
(12)	0.2160	24	28	32							UNF	UNEF
14	0.2500	20	28	32						UNC	UNF	UNEF
1/16	0.3125	18	24	32						20	28	32
3/16	0.3750	16	24	32					UNC	UNF	UNEF	32
1/8	0.4375	14	20	28					16	UNF	UNEF	32
1/4	0.5000	13	20	28				UNC	16	UNF	UNEF	32
5/16	0.5625	12	18	24				12	16	20	28	32
3/8	0.6250	11	18	24				12	16	20	28	32
(1 1/16)	0.6875	10	16	20				12	16	20	28	32
1/2	0.7500	10	16	20				12	UNF	UNEF	28	32
(1 1/8)	0.8125	9	14	20				12	16	UNEF	28	32
5/8	0.8750	9	14	20				12	16	UNEF	28	32
(1 1/2)	0.9375	8	12	20				12	16	UNEF	28	32
1	1.0000	8	12	20			UNC	UNF	16	UNEF	28	32
(1 1/4)	1.0625	7	12	18			8	12	16	20	28	
1 1/8	1.1250	7	12	18			8	UNF	16	20	28	
(1 3/8)	1.1875	7	12	18			8	12	16	20	28	
1 1/2	1.2500	7	12	18			8	UNF	16	20	28	
(1 5/8)	1.3125	6	12	18			8	12	16	20	28	
1 3/4	1.3750	6	12	18		UNC	8	UNF	16	20	28	
(1 7/8)	1.4375	6	12	18		6	8	12	16	20	28	
1 5/8	1.5000	6	12	18		UNC	8	UNF	16	20	28	
(1 9/8)	1.5625	6	12	18		6	8	12	16	20	28	
1 3/2	1.6250	6	12	18		6	8	12	16	20	28	
(1 11/8)	1.6875	5	12	18		6	8	12	16	20	28	
1 3/4	1.7500	5	12	18		6	8	12	16	20	28	
(1 5/4)	1.8125	5	12	18		6	8	12	16	20	28	
1 7/4	1.8750	5	12	18		6	8	12	16	20	28	
(1 9/4)	1.9375	4	12	18		6	8	12	16	20	28	
2	2.0000	4 1/2	12	18		6	8	12	16	20	28	
(2 1/4)	2.1250	4	12	18		6	8	12	16	20	28	
2 1/8	2.1875	4 1/2	12	18		6	8	12	16	20	28	
(2 3/8)	2.2500	4	12	18		6	8	12	16	20	28	
2 1/2	2.3125	4	12	18	UNC	6	8	12	16	20	28	
(2 5/8)	2.3750	4	12	18	4	6	8	12	16	20	28	
2 3/4	2.4375	4	12	18	UNC	6	8	12	16	20	28	
(2 7/8)	2.5000	4	12	18	4	6	8	12	16	20	28	
3	2.5625	4	12	18	UNC	6	8	12	16	20	28	
(3 1/4)	2.6250	4	12	18	4	6	8	12	16	20	28	
3 1/8	2.6875	4	12	18	UNC	6	8	12	16	20	28	
(3 3/8)	2.7500	4	12	18	4	6	8	12	16	20	28	
3 1/2	2.8125	4	12	18	UNC	6	8	12	16	20	28	
(3 5/8)	2.8750	4	12	18	4	6	8	12	16	20	28	
3 3/4	2.9375	4	12	18	UNC	6	8	12	16	20	28	
(3 7/8)	3.0000	4	12	18	4	6	8	12	16	20	28	
4	3.0625	4	12	18	UNC	6	8	12	16	20	28	

* Dimensions of these Standard Series threads for sizes up to 4 inches are given in Table 4.
† Sizes shown in parentheses are secondary sizes. Primary sizes of 4 1/4, 4 3/4, 4 7/8, 5, 5 1/4, 5 1/2, 5 3/4 and 6 inches also are in the 4, 6, 8, 12, and 16 thread series; secondary sizes of 4 1/8, 4 3/8, 4 5/8, 4 7/8, 5 1/8, 5 3/8, 5 5/8, and 5 7/8 also are in the 4, 6, 8, 12, and 16 thread series.
‡ For diameters over 1 1/4 inches, use 12-thread series.
§ For diameters over 1 1/8 inches, use 16-thread series.

BẢNG 3A : CÁC KÍCH THƯỚC CƠ BẢN CỦA CHUỖI REN THÔ, REN UNC VÀ REN NC

Table 3A. COARSE-THREAD SERIES, UNC AND NC - BASIC
DIMENSIONS

Sizes	Basic Major Diam., D	Thds. per Inch, n	Basic Pitch Diam., ^a E	Minor Diameter ^c		Lead Angle at Basic P.D.	Area of Minor Diam. at D-2A ₂	Tensile Stress Area ^b
				Ext. Thds., K _s	Int. Thds., K _n			
	Inches		Inches	Inches	Inches	Deg. Min.	Sq. In.	Sq. In.
1 (.073)*	0.0730	64	0.0629	0.0538	0.0561	4 31	0.00218	0.00268
2 (.086)	0.0860	56	0.0744	0.0641	0.0667	4 22	0.00310	0.00370
3 (.099)*	0.0990	48	0.0855	0.0734	0.0764	4 26	0.00406	0.00487
4 (.112)	0.1120	40	0.0958	0.0813	0.0849	4 45	0.00496	0.00604
5 (.125)	0.1250	40	0.1088	0.0943	0.0979	4 11	0.00672	0.00796
6 (.138)	0.1380	32	0.1177	0.0997	0.1042	4 50	0.00745	0.00909
8 (.164)	0.1640	32	0.1437	0.1257	0.1302	3 58	0.01196	0.0140
10 (.190)	0.1900	24	0.1629	0.1389	0.1449	4 39	0.01450	0.0176
12 (.216)*	0.2160	24	0.1880	0.1649	0.1709	4 1	0.0206	0.0242
1/16	0.2500	20	0.2175	0.1897	0.1959	4 11	0.0269	0.0318
3/32	0.3125	18	0.2764	0.2443	0.2524	3 40	0.0454	0.0524
1/8	0.3750	16	0.3344	0.2983	0.3073	3 24	0.0678	0.0775
5/32	0.4375	14	0.3911	0.3499	0.3602	3 20	0.0933	0.1063
3/16	0.5000	13	0.4500	0.4056	0.4167	3 7	0.1257	0.1419
7/32	0.5625	12	0.5084	0.4603	0.4723	2 59	0.162	0.182
1/2	0.6250	11	0.5690	0.5135	0.5266	2 56	0.202	0.226
9/32	0.7500	10	0.6850	0.6273	0.6417	2 40	0.302	0.334
5/8	0.8750	9	0.8028	0.7387	0.7547	2 31	0.419	0.462
1	1.0000	8	0.9188	0.8466	0.8647	2 29	0.551	0.606
1 1/16	1.1250	7	1.0322	0.9497	0.9704	2 31	0.693	0.763
1 1/8	1.2500	7	1.1572	1.0747	1.0954	2 15	0.890	0.989
1 1/4	1.3750	6	1.2667	1.1705	1.1948	2 24	1.054	1.155
1 3/8	1.5000	6	1.3917	1.2955	1.3196	2 11	1.294	1.405
1 1/2	1.7500	5	1.6201	1.5046	1.5335	2 15	1.74	1.90
2	2.0000	4 1/2	1.8557	1.7274	1.7594	2 11	2.30	2.50
2 1/8	2.2500	4 1/2	2.1057	1.9774	2.0094	1 55	3.02	3.25
2 1/4	2.5000	4	2.3376	2.1935	2.2294	1 57	3.72	4.00
2 3/8	2.7500	4	2.5876	2.4433	2.4794	1 46	4.63	4.93
2 1/2	3.0000	4	2.8376	2.6933	2.7294	1 36	5.62	5.97
3	3.2500	4	3.0876	2.9433	2.9794	1 29	6.72	7.10
3 1/8	3.5000	4	3.3376	3.1933	3.2294	1 22	7.92	8.33
3 1/4	3.7500	4	3.5876	3.4433	3.4794	1 16	9.21	9.66
4	4.0000	4	3.8376	3.6933	3.7294	1 11	10.61	11.08

* Secondary sizes.

^a British: Effective Diameter.

^b See formula, page 1051.

^c Design form. See diagram, page 1107.

Constant Pitch Series: The various constant-pitch series, UN, with 4, 6, 8, 12, 16, 20, 28 and 32 threads per inch, given in Table 4, offer a comprehensive range of diameter-pitch combinations for those purposes where the threads in the Coarse, Fine, and Extra-Fine series do not meet the particular requirements of the design.

When selecting threads from these constant-pitch series, preference should be given where ever possible to those tabulated in the 8, 12, or 16 thread series.

8-Thread Series: The 8-thread series (8UN) is a uniform-pitch series for large diameters. Although originally intended for high-pressure-joint bolts and nuts, it is now widely used as a substitute for the Coarse-Thread Series for diameters larger than 1 inch.

12-Thread Series: The 12-thread series (12UN) is a uniform pitch series for large diameters requiring threads of medium-fine pitch. Although originally intended for boiler practice, it is now used as a continuation of the Fine-Thread Series for diameters larger than 1 1/4 inches.

BẢNG 3B : CÁC KÍCH THƯỚC CƠ BẢN CỦA CHUỖI REN MỊN, REN UNF VÀ REN NF

Table 3B. FINE-THREAD SERIES, UNF AND NF - BASIC
DIMENSIONS

Size	Basic Major Diam., D	Thds. per Inch, n	Basic Pitch Diam., E	Minor Diameters		Lead Angle at Basic P.D.	Area of Minor Diam. at D-2h ₃	Tensile Stress Area ^b
				Ext. Thds., K _s	Int. Thds., K _n			
	Inches		Inches	Inches	Inches	Deg. Min.	Sq. In.	Sq. In.
0 (.060)	0.0600	80	0.0519	0.0447	0.0465	4 23	0.00151	0.00180
1 (.073)*	0.0730	72	0.0640	0.0560	0.0580	3 57	0.00237	0.00278
2 (.086)	0.0860	64	0.0759	0.0669	0.0691	3 45	0.00339	0.00394
3 (.099)*	0.0990	56	0.0874	0.0771	0.0797	3 43	0.00451	0.00523
4 (.112)	0.1120	48	0.0985	0.0864	0.0894	3 51	0.00566	0.00661
5 (.125)	0.1250	44	0.1102	0.0971	0.1004	3 45	0.00716	0.00830
6 (.138)	0.1380	40	0.1218	0.1073	0.1109	3 44	0.00874	0.01015
8 (.164)	0.1640	36	0.1460	0.1299	0.1339	3 28	0.01285	0.01474
10 (.190)	0.1900	32	0.1697	0.1517	0.1562	3 21	0.0175	0.0200
12 (.216)*	0.2160	28	0.1928	0.1722	0.1773	3 22	0.0226	0.0258
1/4	0.2500	28	0.2268	0.2062	0.2113	2 52	0.6326	0.0364
5/16	0.3125	24	0.2854	0.2614	0.2674	2 40	0.0524	0.0580
3/8	0.3750	24	0.3479	0.3239	0.3299	2 11	0.0809	0.0878
7/16	0.4375	20	0.4050	0.3762	0.3834	2 15	0.1090	0.1187
1/2	0.5000	20	0.4675	0.4387	0.4459	1 57	0.1486	0.1599
5/8	0.5625	18	0.5264	0.4943	0.5024	1 55	0.189	0.203
3/4	0.6250	18	0.5889	0.5568	0.5649	1 43	0.240	0.256
7/8	0.7500	16	0.7094	0.6733	0.6823	1 36	0.351	0.373
1	0.8750	14	0.8286	0.7874	0.7977	1 34	0.480	0.509
1 1/4	1.0000	12	0.9459	0.8978	0.9098	1 36	0.625	0.663
1 1/2	1.1250	12	1.0709	1.0228	1.0348	1 25	0.812	0.856
1 3/4	1.2500	12	1.1959	1.1478	1.1598	1 16	1.024	1.073
1 7/8	1.3750	12	1.3209	1.2728	1.2848	1 9	1.260	1.315
2	1.5000	12	1.4459	1.3978	1.4098	1 3	1.521	1.581

* Secondary sizes.
 * British: Effective Diameter.
 * See formula, page 1051.
 * Design form. See diagram, page 1107.

16-Thread Series: The 16-thread series (16UN) is a uniform pitch series for large diameters requiring fine-pitch threads. It is suitable for adjusting collars and retaining nuts, and also serves as a continuation of the Extra-fine Thread Series for diameters larger than 1 1/4 inches.

4-, 6-, 20-, 28-, and 32-Thread Series: These thread series have been used more or less widely in industry for various applications where the Standard Coarse, Fine or Extra-fine Series were not as applicable. They are now given recognition as Standard Unified Thread Series in a specified selection of diameters for each pitch as shown in Table 2.

Whenever a thread in a constant-pitch series also appears in the UNC, UNF, or UNEF series, the symbols and tolerances for limits of size of UNC, UNF, or UNEF series are applicable, as will be seen in Tables 2 and 4.

Fine Threads for Thin-Wall Tubing: Dimensions for a 27-thread series, ranging from 1/4- to 1-inch nominal size, also are included in Table 4. These threads are recommended for general use on thin-wall tubing. The minimum length of complete thread is one-third of the basic major diameter plus 5 threads (+0.185 in.).

High-Temperature, High-Strength Applications: For these applications the Coarse Thread Series is recommended in sizes from 1/4 to 1 inch and the 8-thread Series in sizes over 1 inch. Some high-temperature applications involving special physical characteristics or conditions may require modification of dimensions, and it is recommended that when such are necessary they be applied to the external thread.

MEASUREMENTS

ĐO LƯỜNG

1. *Các ký hiệu chuẩn về cơ khí, kỹ thuật xây dựng và vật liệu thử nghiệm.*
2. *Đo lường theo hệ Mét và hệ các nước Anh Mỹ .*

STANDARD SYMBOLS

American Standard Symbols for Mechanics,
Structural Engineering and Testing Materials

Acceleration, angular.....	α (alpha)	Neutral axis, distance to extreme fiber.....	c
Acceleration, due to gravity.....	g	Number of revolutions per unit of time.....	n
Acceleration, linear.....	a	Period (harmonic motion).....	T
Angular distance.....	θ (theta)	Power, horsepower.....	P
Angular velocity.....	ω (omega)	Pressure per unit of area.....	p
Area.....	A	Radius.....	r
Axes, through any point.....	$X-X$ $Y-Y$ $Z-Z$	Ratio between modulus of elasticity of steel and modulus of elasticity of concrete.....	n
Breadth.....	b	Ratio of the distance from the neutral axis to the outer fiber of a reinforced concrete beam to the distance from the outer fiber to the point of application of the resultant tensile stress.....	k
Center of rotation.....	O	Ratio of the lever arm of the resisting couple in a reinforced concrete beam to the distance between the outer compressive fiber and the point of application of the resultant tensile stress.....	j
Coefficient of sliding friction.....	f	Reactions.....	R
Concentrated load (same as force).....	F	Section modulus.....	Z or S
Constants.....	C	Static moment of any area about a given axis.....	Q
Curvature, radius of.....	ρ (rho)	Steel ratio, in reinforced concrete beams.....	ρ
Deflection.....	y	Stress, unit.....	s
Deflection of a panel point of a truss.....	Δ (delta)	Stress, unit compressive.....	s_c
Density.....	ρ (rho) or d	Stress, unit tensile.....	s_t
Depth.....	d	Stress, unit shear.....	s_s
Diameter.....	D	Stress, total tensile or total steel, in reinforced concrete.....	T
Distance, linear.....	s	Stress, total compressive or total concrete, in reinforced concrete.....	C
Eccentricity of application of load.....	e	Stress, total shear.....	V
Efficiency (hydraulic, mechanical, volumetric).....	e_h, e_m, e_v	Stress, unit concrete, in reinforced concrete.....	f_c
Elasticity, modulus of.....	E	Stress, unit steel, in reinforced concrete.....	f_s
Elongation, unit.....	δ (delta)	Stress, unit shear of concrete.....	τ
Force.....	F	Temperature, absolute.....	T
Force in any bar of a framed structure due to a load of unity applied at any point in any direction.....	u	Temperature, ordinary.....	t
Frequency (harmonic motion).....	f or n	Thickness.....	d or t
Gyration, radius of.....	k	Time.....	t
Head.....	H or h	Torque.....	T
Height.....	h	Velocity, linear.....	V or v
Inertia, rectangular moment of.....	I	Volume.....	V
Inertia, polar moment of.....	J	Work, or energy.....	W
Length.....	L		
Load per unit distance.....	w		
Load, total.....	W		
Mass.....	m		
Modulus of rupture.....	R		
Moment in inch-pounds at any section of a girder due to the moment of one inch-pound applied to the girder at any point.....	m		
Moment of force, including bending moment.....	M		

Approved by American Standards Association and sponsored by the American Society of Mechanical Engineers; American Association for the Advancement of Science; American Institute of Electrical Engineers; American Society of Civil Engineers; Society for the Promotion of Engineering Education.

WEIGHTS AND MEASURES

WEIGHTS AND MEASURES

Measures of Length

- 1 mile = 1760 yards = 5280 feet.
 1 yard = 3 feet = 36 inches. 1 foot = 12 inches.
 1 mil = 0.001 inch. 1 fathom = 2 yards = 6 feet.
 1 rod = 5.5 yards = 16.5 feet. 1 hand = 4 inches. 1 span = 9 inches.
 1 micro-inch = one millionth inch or 0.000001 inch. (1 micron = one millionth meter = 0.00003937 inch.)

Surveyor's Measure

- 1 mile = 8 furlongs = 80 chains.
 1 furlong = 10 chains = 220 yards.
 1 chain = 4 rods = 22 yards = 66 feet = 100 links.
 1 link = 7.92 inches.

Nautical Measure

- 1 league = 3 nautical miles.
 1 nautical mile = 6076.10 feet = 1.1508 statute miles. (The *knot*, which is a nautical unit of speed, is equivalent to a speed of 1 nautical mile per hour.)
 One degree at the equator = 60 nautical miles = 69.047 statute miles. 360 degrees = 21,600 nautical miles = 24,856.8 statute miles = circumference at equator.

Square Measure

- 1 square mile = 640 acres = 6400 square chains.
 1 acre = 10 square chains = 4840 square yards = 43,560 square feet.
 1 square chain = 16 square rods = 484 square yards = 4356 square feet.
 1 square rod = 30.25 square yards = 272.25 square feet = 625 square links.
 1 square yard = 9 square feet.
 1 square foot = 144 square inches.

An acre is equal to a square, the side of which is 208.7 feet.

Measure used for Diameters and Areas of Electric Wires

- 1 circular inch = area of circle 1 inch in diameter = 0.7854 square inch.
 1 circular inch = 1,000,000 circular mils.
 1 square inch = 1.2732 circular inch = 1,273,239 circular mils.
 A circular mil is the area of a circle 0.001 inch in diameter.

Cubic Measure

- 1 cubic yard = 27 cubic feet.
 1 cubic foot = 1728 cubic inches.
 The following measures are also used for wood and masonry:
 1 cord of wood = $4 \times 4 \times 8$ feet = 128 cubic feet.
 1 perch of masonry = $16\frac{1}{2} \times 1\frac{1}{2} \times 1$ foot = $24\frac{1}{4}$ cubic feet.

Shipping Measure

For measuring entire internal capacity of a vessel:

- 1 register ton = 100 cubic feet.

For measurement of cargo:

- Approximately 40 cubic feet of merchandise is considered a shipping ton, unless that bulk would weigh more than 2000 pounds, in which case the freight charge may be based upon weight.

40 cubic feet = 32.143 U. S. bushels = 31.16 Imperial bushels.

WEIGHTS AND MEASURES

Dry Measure

- 1 bushel (U. S. or Winchester struck bushel) = 1.2445 cubic foot = 2150.42 cubic inches.
- 1 bushel = 4 pecks = 32 quarts = 64 pints.
- 1 peck = 8 quarts = 16 pints.
- 1 quart = 2 pints.
- 1 heaped bushel = $1\frac{1}{4}$ struck bushel.
- 1 cubic foot = 0.8036 struck bushel.
- 1 British Imperial bushel = 8 Imperial gallons = 1.2837 cubic foot = 2218.19 cubic inches.

Liquid Measure

- 1 U. S. gallon = 0.1337 cubic foot = 231 cubic inches = 4 quarts = 8 pints.
- 1 quart = 2 pints = 8 gills.
- 1 pint = 4 gills.
- 1 British Imperial gallon = 1.2009 U. S. gallon = 277.42 cubic inches.
- 1 cubic foot = 7.48 U. S. gallons.

Old Liquid Measure

- 1 tun = 2 pipes = 3 puncheons.
- 1 pipe or butt = 2 hogsheads = 4 barrels = 126 gallons.
- 1 puncheon = 2 tierces = 84 gallons.
- 1 hogshead = 2 barrels = 63 gallons.
- 1 tierce = 42 gallons.
- 1 barrel = $31\frac{1}{2}$ gallons.

Apothecaries' Fluid Measure

- 1 U. S. fluid ounce = 8 drachms = 1.805 cubic inch = $\frac{1}{16}$ U. S. gallon.
- 1 fluid drachm = 60 minims.
- 1 British fluid ounce = 1.732 cubic inch.

Measures of Weight

Avoirdupois or Commercial Weight

- 1 gross or long ton = 2240 pounds.
 - 1 net or short ton = 2000 pounds.
 - 1 pound = 16 ounces = 7000 grains.
 - 1 ounce = 16 drachms = 437.5 grains.
- The following measures for weight are now seldom used in the United States:
- 1 hundred-weight = 4 quarters = 112 pounds (1 gross or long ton = 20 hundred-weights); 1 quarter = 28 pounds; 1 stone = 14 pounds; 1 quintal = 100 pounds.

Troy Weight, used for Weighing Gold and Silver

- 1 pound = 12 ounces = 5760 grains.
- 1 ounce = 20 pennyweights = 480 grains.
- 1 pennyweight = 24 grains.
- 1 carat (used in weighing diamonds) = 3.086 grains.
- 1 grain Troy = 1 grain avoirdupois = 1 grain apothecaries' weight.

WEIGHTS AND MEASURES

Apothecaries' Weight

- 1 pound = 12 ounces = 5760 grains.
 1 ounce = 8 drachms = 480 grains.
 1 drachm = 3 scruples = 60 grains.
 1 scruple = 20 grains.

Measures of Pressure

- 1 pound per square inch = 144 pounds per square foot = 0.068 atmosphere
 = 2.042 inches of mercury at 62 degrees F. = 27.7 inches of water at
 62 degrees F. = 2.31 feet of water at 62 degrees F.
 1 atmosphere = 30 inches of mercury at 62 degrees F. = 14.7 pounds per square
 inch = 2116.3 pounds per square foot = 33.95 feet of water at 62 degrees F.
 1 foot of water at 62 degrees F. = 62.355 pounds per square foot = 0.433 pound
 per square inch.
 1 inch of mercury at 62 degrees F. = 1.132 foot of water = 13.58 inches of
 water = 0.491 pound per square inch.

Miscellaneous

- 1 great gross = 12 gross = 144 dozen. 1 quire = 24 sheets.
 1 gross = 12 dozen = 144 units. 1 ream = 20 quires = 480 sheets.
 1 dozen = 12 units. 1 ream printing paper = 500 sheets.
 1 score = 20 units.

Decimal Equivalents of Fractions of an Inch

$\frac{1}{64}$ 0.015 625	$\frac{11}{64}$ 0.343 75	$\frac{49}{64}$ 0.771 875
$\frac{1}{32}$ 0.031 25	$\frac{29}{64}$ 0.359 375	$\frac{11}{16}$ 0.687 5
$\frac{3}{64}$ 0.046 875	$\frac{3}{8}$ 0.375	$\frac{49}{64}$ 0.703 125
$\frac{1}{16}$ 0.062 5	$\frac{25}{64}$ 0.390 625	$\frac{23}{32}$ 0.718 75
$\frac{5}{64}$ 0.078 125	$\frac{13}{32}$ 0.406 25	$\frac{47}{64}$ 0.734 375
$\frac{9}{64}$ 0.093 75	$\frac{27}{64}$ 0.421 875	$\frac{3}{4}$ 0.750
$\frac{1}{8}$ 0.109 375	$\frac{1}{16}$ 0.437 5	$\frac{49}{64}$ 0.765 625
$\frac{1}{4}$ 0.125	$\frac{29}{64}$ 0.453 125	$\frac{25}{32}$ 0.781 25
$\frac{5}{64}$ 0.140 625	$\frac{15}{32}$ 0.468 75	$\frac{51}{64}$ 0.796 875
$\frac{3}{16}$ 0.156 25	$\frac{81}{64}$ 0.484 375	$\frac{13}{16}$ 0.812 5
$\frac{11}{64}$ 0.171 875	$\frac{1}{2}$ 0.500	$\frac{53}{64}$ 0.828 125
$\frac{3}{16}$ 0.187 5	$\frac{53}{64}$ 0.515 625	$\frac{27}{32}$ 0.843 75
$\frac{13}{64}$ 0.203 125	$\frac{17}{32}$ 0.531 25	$\frac{55}{64}$ 0.859 375
$\frac{7}{32}$ 0.218 75	$\frac{35}{64}$ 0.546 875	$\frac{3}{8}$ 0.875
$\frac{15}{64}$ 0.234 375	$\frac{31}{64}$ 0.562 5	$\frac{57}{64}$ 0.890 625
$\frac{1}{2}$ 0.250	$\frac{37}{64}$ 0.578 125	$\frac{29}{32}$ 0.906 25
$\frac{17}{64}$ 0.265 625	$\frac{19}{32}$ 0.593 75	$\frac{59}{64}$ 0.921 875
$\frac{9}{32}$ 0.281 25	$\frac{39}{64}$ 0.609 375	$\frac{15}{16}$ 0.937 5
$\frac{19}{64}$ 0.296 875	$\frac{3}{4}$ 0.625	$\frac{61}{64}$ 0.953 125
$\frac{5}{16}$ 0.312 5	$\frac{41}{64}$ 0.640 625	$\frac{31}{32}$ 0.968 75
$\frac{21}{64}$ 0.328 125	$\frac{21}{32}$ 0.656 25	$\frac{63}{64}$ 0.984 375

Table of Decimal Equivalents of a Foot Corresponding to Inches and Fractions of Inches. — Assume, for example, that it is required to find the equivalent of $6\frac{1}{2}$ inches in decimals of a foot. Locate $\frac{1}{2}$ in the left-hand column and follow the horizontal line until the column headed "6" is reached. The figures 0.5182 read off in this column are the decimals of a foot corresponding to $6\frac{1}{2}$; in other words, $6\frac{1}{2}$ inches equals 0.5182 foot.

Inches into Decimals of a Foot

Inch	Inches											
	0	1	2	3	4	5	6	7	8	9	10	11
	Decimals of a Foot											
1/2	0.0026	0.0833	0.1667	0.2500	0.3333	0.4167	0.5000	0.5833	0.6667	0.7500	0.8333	0.9167
1/4	0.0052	0.0885	0.1719	0.2552	0.3385	0.4219	0.5052	0.5885	0.6719	0.7552	0.8385	0.9219
3/8	0.0078	0.0911	0.1745	0.2578	0.3411	0.4245	0.5078	0.5911	0.6745	0.7578	0.8411	0.9245
1/2	0.0104	0.0938	0.1771	0.2604	0.3438	0.4271	0.5104	0.5938	0.6771	0.7604	0.8438	0.9271
5/8	0.0130	0.0964	0.1797	0.2630	0.3464	0.4297	0.5130	0.5964	0.6797	0.7630	0.8464	0.9297
3/4	0.0156	0.0990	0.1823	0.2656	0.3490	0.4323	0.5156	0.5990	0.6823	0.7656	0.8490	0.9323
7/8	0.0182	0.1016	0.1849	0.2682	0.3516	0.4349	0.5182	0.6016	0.6849	0.7682	0.8516	0.9349
1	0.0208	0.1042	0.1875	0.2708	0.3542	0.4375	0.5208	0.6042	0.6875	0.7708	0.8542	0.9375
1 1/8	0.0234	0.1068	0.1901	0.2734	0.3568	0.4401	0.5234	0.6068	0.6901	0.7734	0.8568	0.9401
1 1/4	0.0260	0.1094	0.1927	0.2760	0.3594	0.4427	0.5260	0.6094	0.6927	0.7760	0.8594	0.9427
1 1/2	0.0286	0.1120	0.1953	0.2786	0.3620	0.4453	0.5286	0.6120	0.6953	0.7786	0.8620	0.9453
1 3/4	0.0313	0.1146	0.1979	0.2813	0.3646	0.4479	0.5313	0.6146	0.6979	0.7813	0.8646	0.9479
2	0.0339	0.1172	0.2005	0.2839	0.3672	0.4505	0.5339	0.6172	0.7005	0.7839	0.8672	0.9505
2 1/8	0.0365	0.1198	0.2031	0.2865	0.3698	0.4531	0.5365	0.6198	0.7031	0.7865	0.8698	0.9531
2 1/4	0.0391	0.1224	0.2057	0.2891	0.3724	0.4557	0.5391	0.6224	0.7057	0.7891	0.8724	0.9557
2 1/2	0.0417	0.1250	0.2083	0.2917	0.3750	0.4583	0.5417	0.6250	0.7083	0.7917	0.8750	0.9583
2 3/4	0.0443	0.1276	0.2109	0.2943	0.3776	0.4609	0.5443	0.6276	0.7109	0.7943	0.8776	0.9609
3	0.0469	0.1302	0.2135	0.2969	0.3802	0.4635	0.5469	0.6302	0.7135	0.7969	0.8802	0.9635
3 1/8	0.0495	0.1328	0.2161	0.2995	0.3828	0.4661	0.5495	0.6328	0.7161	0.7995	0.8828	0.9661
3 1/4	0.0521	0.1354	0.2188	0.3021	0.3854	0.4688	0.5521	0.6354	0.7188	0.8021	0.8854	0.9688
3 1/2	0.0547	0.1380	0.2214	0.3047	0.3880	0.4714	0.5547	0.6380	0.7214	0.8047	0.8880	0.9714
3 3/4	0.0573	0.1406	0.2240	0.3073	0.3906	0.4740	0.5573	0.6406	0.7240	0.8073	0.8906	0.9740
4	0.0599	0.1432	0.2266	0.3099	0.3932	0.4766	0.5599	0.6432	0.7266	0.8099	0.8932	0.9766
4 1/8	0.0625	0.1458	0.2292	0.3125	0.3958	0.4792	0.5625	0.6458	0.7292	0.8125	0.8958	0.9792
4 1/4	0.0651	0.1484	0.2318	0.3151	0.3984	0.4818	0.5651	0.6484	0.7318	0.8151	0.8984	0.9818
4 1/2	0.0677	0.1510	0.2344	0.3177	0.4010	0.4844	0.5677	0.6510	0.7344	0.8177	0.9010	0.9844
4 3/4	0.0703	0.1536	0.2370	0.3203	0.4036	0.4870	0.5703	0.6536	0.7370	0.8203	0.9036	0.9870
5	0.0729	0.1563	0.2396	0.3229	0.4063	0.4896	0.5729	0.6563	0.7396	0.8229	0.9063	0.9896
5 1/8	0.0755	0.1589	0.2422	0.3255	0.4089	0.4922	0.5755	0.6589	0.7422	0.8255	0.9089	0.9922
5 1/4	0.0781	0.1615	0.2448	0.3281	0.4115	0.4948	0.5781	0.6615	0.7448	0.8281	0.9115	0.9948
5 1/2	0.0807	0.1641	0.2474	0.3307	0.4141	0.4974	0.5807	0.6641	0.7474	0.8307	0.9141	0.9974

WEIGHTS AND MEASURES

Decimal Equivalents of 6ths, 12ths, and 24ths of an Inch

$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333
$\frac{1}{24}$ 0.041 667	$\frac{1}{12}$ 0.083 333	$\frac{1}{6}$ 0.166 667	$\frac{1}{4}$ 0.208 333	$\frac{1}{3}$ 0.25	$\frac{1}{2}$ 0.291 667	$\frac{3}{4}$ 0.333 333

Decimal Equivalents of 7ths, 14ths, and 28ths of an Inch

$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857
$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857	$\frac{1}{28}$ 0.035 714	$\frac{1}{14}$ 0.071 429	$\frac{1}{7}$ 0.107 143	$\frac{1}{4}$ 0.142 857

U. S. Gallons into Cubic Feet

Gallons	Cubic Feet	Gallons	Cubic Feet	Gallons	Cubic Feet	Gallons	Cubic Feet
1	0.134	20	2.674	300	40.10	4,000	534.72
2	0.267	30	4.010	400	53.47	5,000	668.40
3	0.401	40	5.347	500	66.84	6,000	802.08
4	0.535	50	6.684	600	80.21	7,000	935.76
5	0.668	60	8.021	700	93.58	8,000	1,069.44
6	0.802	70	9.358	800	106.94	9,000	1,203.12
7	0.936	80	10.694	900	120.31	10,000	1,336.81
8	1.069	90	12.031	1000	133.68	50,000	6,684.03
9	1.203	100	13.368	2000	267.36	100,000	13,368.06
10	1.337	200	26.736	3000	401.04	500,000	66,840.28

Cubic Feet into Gallons

(1 cubic foot = 7.4805 U. S. gallons; 1 gallon = 231 cubic inches = 0.13368 cubic foot.)

Cubic Feet	Gallons	Cubic Feet	Gallons	Cubic Feet	Gallons	Cubic Feet	Gallons
0.1	0.75	2	14.96	30	224.4	400	2,992.2
0.2	1.50	3	22.44	40	299.2	500	3,740.3
0.3	2.24	4	29.92	50	374.0	600	4,488.3
0.4	2.99	5	37.40	60	448.8	700	5,236.4
0.5	3.74	6	44.88	70	523.6	800	5,984.4
0.6	4.49	7	52.36	80	598.4	900	6,732.5
0.7	5.24	8	59.84	90	673.2	1,000	7,480.5
0.8	5.98	9	67.32	100	748.1	5,000	37,402.6
0.9	6.73	10	74.81	200	1,496.1	10,000	74,805
1.0	7.48	20	149.61	300	2,244.2	50,000	374,026 inches

WEIGHTS AND MEASURES

Contents in Cubic Feet and U. S. Gallons of Pipes and Cylinders
One Foot in Length

Diam. in Inches	For 1 Foot in Length		Diam. in Inches	For 1 Foot in Length		Diam. in Inches	For 1 Foot in Length	
	Cubic Feet	U. S. Gallons		Cubic Feet	U. S. Gallons		Cubic Feet	U. S. Gallons
¼	0.0003	0.0025	6¾	0.2485	1.859	19	1.969	14.73
⅜	0.0005	0.0040	7	0.2673	1.999	19½	2.074	15.51
½	0.0008	0.0057	7¼	0.2867	2.145	20	2.182	16.32
⅝	0.0010	0.0078	7½	0.3068	2.295	20½	2.292	17.15
¾	0.0014	0.0102	7¾	0.3276	2.450	21	2.405	17.99
⅞	0.0017	0.0129	8	0.3491	2.611	21½	2.521	18.86
1	0.0021	0.0159	8¼	0.3712	2.777	22	2.640	19.75
1¼	0.0026	0.0193	8½	0.3941	2.948	22½	2.761	20.66
1½	0.0031	0.0230	8¾	0.4176	3.125	23	2.885	21.58
1¾	0.0036	0.0269	9	0.4418	3.305	23½	3.012	22.53
2	0.0042	0.0312	9¼	0.4667	3.491	24	3.142	23.50
2¼	0.0048	0.0359	9½	0.4922	3.682	25	3.409	25.50
2½	0.0055	0.0408	9¾	0.5185	3.879	26	3.687	27.58
2¾	0.0085	0.0638	10	0.5454	4.080	27	3.976	29.74
3	0.0123	0.0918	10¼	0.5730	4.286	28	4.276	31.99
3¼	0.0167	0.1249	10½	0.6013	4.498	29	4.587	34.31
3½	0.0218	0.1632	10¾	0.6303	4.715	30	4.909	36.72
3¾	0.0276	0.2066	11	0.6600	4.937	31	5.241	39.21
4	0.0341	0.2550	11¼	0.6903	5.164	32	5.585	41.78
4¼	0.0412	0.3085	11½	0.7213	5.396	33	5.940	44.43
4½	0.0491	0.3672	11¾	0.7530	5.633	34	6.305	47.16
4¾	0.0576	0.4309	12	0.7854	5.875	35	6.681	49.98
5	0.0668	0.4998	12¼	0.8522	6.375	36	7.069	52.88
5¼	0.0767	0.5738	12½	0.9218	6.895	37	7.467	55.86
5½	0.0873	0.6528	12¾	0.9940	7.436	38	7.876	58.92
5¾	0.0985	0.7369	13	1.069	7.997	39	8.296	62.06
6	0.1104	0.8263	13¼	1.147	8.578	40	8.727	65.28
6¼	0.1231	0.9206	13½	1.227	9.180	41	9.168	68.58
6½	0.1364	1.020	13¾	1.310	9.801	42	9.621	71.97
6¾	0.1503	1.125	14	1.396	10.44	43	10.085	75.44
7	0.1650	1.234	14¼	1.485	11.11	44	10.559	78.99
7¼	0.1803	1.349	14½	1.576	11.79	45	11.045	82.62
7½	0.1963	1.469	14¾	1.670	12.49	46	11.541	86.33
7¾	0.2131	1.594	15	1.767	13.22	47	12.048	90.13
8	0.2304	1.724	15¼	1.867	13.96	48	12.566	94.00

One cubic foot of water at 39.1 degrees F. weighs 62.4245 pounds.

One cubic foot of air at 32 degrees F., atmospheric pressure, weighs 0.08073 pound.

One pound of water at 39.1 degrees F. has a volume of 0.01602 cubic foot.

One pound of air at 32 degrees F., atmospheric pressure, has a volume of 12.387 cubic feet.

One gallon of water at 62 degrees F. weighs 8.336 pounds.

One pound of water at 62 degrees F. has a volume of 0.1199 U. S. gallon.

WEIGHTS AND MEASURES

Contents of Cylindrical Tanks in U. S. Gallons

Depth of Tank, Feet	Diameter of Tank, Feet							
	5	6	7	8	9	10	11	12
	Contents of Tank, U. S. Gallons							
5	734	1058	1439	1880	2379	2,938	3,555	4,230
6	881	1269	1727	2256	2855	3,525	4,265	5,076
7	1028	1481	2015	2632	3331	4,113	4,976	5,922
8	1175	1692	2303	3008	3807	4,700	5,687	6,768
9	1322	1904	2591	3384	4283	5,288	6,398	7,614
10	1469	2115	2879	3760	4759	5,875	7,109	8,460
11	1616	2327	3167	4136	5235	6,463	7,820	9,306
12	1763	2538	3455	4512	5711	7,050	8,531	10,152
13	1909	2750	3742	4888	6187	7,638	9,242	10,998
14	2056	2961	4030	5264	6662	8,225	9,953	11,844
15	2203	3173	4318	5640	7138	8,813	10,664	12,690
16	2350	3384	4606	6016	7614	9,400	11,374	13,536
17	2497	3596	4894	6392	8090	9,988	12,085	14,383
18	2644	3807	5182	6768	8566	10,575	12,796	15,229
19	2791	4019	5480	7144	9042	11,163	13,507	16,075
20	2938	4230	5758	7520	9518	11,750	14,218	16,921
Depth of Tank, Feet	Diameter of Tank, Feet							
	14	15	16	18	20	22	24	25
	Contents of Tank, U. S. Gallons							
5	5,758	6,610	7,521	9,518	11,751	14,218	16,921	18,360
6	6,909	7,931	9,025	11,422	14,101	17,062	20,305	22,032
7	8,061	9,253	10,529	13,325	16,451	19,905	23,689	25,704
8	9,212	10,575	12,033	15,229	18,801	22,749	27,073	29,376
9	10,364	11,897	13,537	17,132	21,151	25,592	30,457	33,048
10	11,515	13,219	15,041	19,036	23,501	28,436	33,841	36,720
11	12,667	14,541	16,545	20,940	25,851	31,280	37,225	40,392
12	13,818	15,863	18,049	22,843	28,201	34,123	40,609	44,064
13	14,970	17,185	19,553	24,747	30,551	36,967	43,993	47,736
14	16,121	18,507	21,057	26,650	32,901	39,819	47,377	51,408
15	17,273	19,829	22,562	28,554	35,252	42,654	50,762	55,080
16	18,424	21,150	24,066	30,458	37,602	45,498	54,146	58,752
17	19,576	22,472	25,570	32,361	39,952	48,341	57,530	62,424
18	20,727	23,794	27,074	34,265	42,302	51,185	60,914	66,096
19	21,879	25,116	28,578	36,168	44,652	54,028	64,298	69,768
20	23,030	26,438	30,082	38,072	47,002	56,872	67,682	73,440

A cylinder 7 inches in diameter and 6 inches high contains one gallon within 0.1 of a cubic inch.

The volume, in U. S. gallons, of a cylinder, equals the square of the diameter in inches X height of cylinder in inches X 0.0034.

WEIGHTS AND MEASURES

Circular Mil Gage for Electrical Wires*

A.W.G. or B. & S. Gage	Diam. Mils	Circu- lar Mils	A.W.G. or B. & S. Gage	Diam. Mils	Circu- lar Mils	A.W.G. or B. & S. Gage	Diam. Mils	Circu- lar Mils
0000	460	212,000	12	81	6530	27	14.2	202.
000	410	168,000	13	72	5180	28	12.6	160.
00	365	133,000	14	64	4110	29	11.3	127.
0	325	106,000	15	57	3260	30	10.0	101.
1	289	83,700	16	51	2580	31	8.9	79.7
2	258	66,400	17	45	2050	32	8.0	63.2
3	229	52,600	18	40	1620	33	7.1	50.1
4	204	41,700	19	36	1290	34	6.3	39.8
5	182	33,100	20	32	1020	35	5.6	31.5
6	162	26,300	21	28.5	810	36	5.0	25.0
7	144	20,800	22	25.3	642	37	4.5	19.8
8	128	16,500	23	22.6	509	38	4.0	15.7
9	114	13,100	24	20.1	404	39	3.5	12.5
10	102	10,400	25	17.9	320	40	3.1	9.9
11	91	8,230	26	15.9	254	..	....	....

* A circular mil is a unit of area that is applied to electrical wires and cables and is equal to the area of a circle one mil (.001 inch) in diameter. The area of any circle in circular mils is equal to the square of its diameter in mils.

METRIC SYSTEM OF MEASUREMENTS

In the metric system of measurements, the principal unit for length is the meter; the principal unit for capacity, the liter; and the principal unit for weight, the gram. The following prefixes are used for sub-divisions and multiples: milli = $\frac{1}{1000}$; centi = $\frac{1}{100}$; deci = $\frac{1}{10}$; deka = 10; hecto = 100; kilo = 1000. In abbreviations, both the sub-divisions and the multiples are used with a small or lower case letter. At one time the multiples were used with a capital letter in some places where the metric system was used.

All the multiples and sub-divisions are not used commercially. Those ordinarily used for length are kilometer, meter, centimeter and millimeter; for capacity, square meter, square centimeter and square millimeter; for cubic measures, cubic meter, cubic decimeter (liter), cubic centimeter, and cubic millimeter. The most commonly used weights are the kilogram and gram. The metric system was legalized in the United States by an Act of Congress in 1866.

Measures of Length

10 millimeters (mm)	= 1 centimeter (cm).
10 centimeters	= 1 decimeter (dm).
10 decimeters	= 1 meter (m).
1000 meters	= 1 kilometer (km).

Square Measure

100 square millimeters (mm ²)	= 1 square centimeter (cm ²).
100 square centimeters	= 1 square decimeter (dm ²).
100 square decimeters	= 1 square meter (m ²).

Surveyor's Square Measure

100 square meters (m ²)	= 1 are (a).
100 ares	= 1 hectare (ha).
100 hectares	= 1 square kilometer (km ²).

WEIGHTS AND MEASURES

Cubic Measure

1000 cubic millimeters (mm ³)	= 1 cubic centimeter (cm ³).
1000 cubic centimeters	= 1 cubic decimeter (dm ³).
1000 cubic decimeters	= 1 cubic meter (m ³).

Dry and Liquid Measure

10 milliliters (ml)	= 1 centiliter (cl).
10 centiliters	= 1 deciliter (dl).
10 deciliters	= 1 liter (l).
100 liters	= 1 hectoliter (hl).

1 liter = 1 cubic decimeter = the volume of 1 kilogram of pure water at a temperature of 39.2 degrees F.

Measures of Weight

10 milligrams (mg)	= 1 centigram (cg).
10 centigrams	= 1 decigram (dg).
10 decigrams	= 1 gram (g).
10 grams	= 1 dekagram (dag).
10 dekagrams	= 1 hectogram (hg).
10 hectograms	= 1 kilogram (kg).
1000 kilograms	= 1 (metric) ton (t).

Metric and English Conversion Table

Linear Measure

1 kilometer	= 0.6214 mile.	1 mile	= 1.609 kilometers.
1 meter = {	39.37 inches.	1 yard	= 0.9144 meter.
	3.2808 feet.	1 foot	= 0.3048 meter.
	1.0936 yards.	1 foot	= 304.8 millimeters.
1 centimeter	= 0.3937 inch.	1 inch	= 2.54 centimeters.
1 millimeter	= 0.03937 inch.	1 inch	= 25.4 millimeters.

Square Measure

1 square kilometer	= 0.3861 square mile = 247.1 acres.
1 hectare	= 2.471 acres = 107,639 square feet.
1 are	= 0.0247 acre = 1076.4 square feet.
1 square meter	= 10.764 square feet = 1.196 square yards.
1 square centimeter	= 0.155 square inch.
1 square millimeter	= 0.00155 square inch.

1 square mile	= 2.5899 square kilometers.
1 acre	= 0.4047 hectare = 40.47 ares.
1 square yard	= 0.836 square meter.
1 square foot	= 0.0929 square meter = 929 square centimeters.
1 square inch	= 6.452 square centimeters = 645.2 square millimeters.

Cubic Measure

1 cubic meter	= 35.315 cubic feet = 1.308 cubic yards.
1 cubic meter	= 264.2 U. S. gallons.
1 cubic centimeter	= 0.061 cubic inch.
1 liter (cubic decimeter)	= 0.0353 cubic foot = 61.023 cubic inches.
1 liter	= 0.2642 U. S. gallon = 1.0567 U. S. quarts.

WEIGHTS AND MEASURES

- 1 cubic yard = 0.7646 cubic meter.
- 1 cubic foot = 0.02832 cubic meter = 28.317 liters.
- 1 cubic inch = 16.38706 cubic centimeters.
- 1 U. S. gallon = 3.785 liters.
- 1 U. S. quart = 0.946 liter.

Weight

- 1 metric ton = 0.9842 ton (of 2240 pounds) = 2204.6 pounds.
- 1 kilogram = 2.2046 pounds = 35.274 ounces avoirdupois.
- 1 gram = 0.03215 ounce troy = 0.03527 ounce avoirdupois.
- 1 gram = 15.432 grains.

-
- 1 ton (of 2240 pounds) = 1.016 metric ton = 1016 kilograms.
 - 1 pound = 0.4536 kilogram = 453.6 grams.
 - 1 ounce avoirdupois = 28.35 grams.
 - 1 ounce troy = 31.103 grams.
 - 1 grain = 0.0648 gram.
-

- 1 kilogram per square millimeter = 1422.32 pounds per square inch
- 1 kilogram per square centimeter = 14.223 pounds per square inch.
- 1 kilogram-meter = 7.233 foot-pounds.
- 1 pound per square inch = 0.0703 kilogram per square centimeter.
- 1 calorie (kilogram calorie) = 3.968 B.T.U. (British thermal unit).

The C.G.S. System of Measurement

The C.G.S. (centimeter-gram-second) system, frequently known as the absolute system of measurement, is based upon the length and weight units of the metric system, and the second as the time unit. In this system, the unit of distance is one centimeter, the unit of mass (or weight) is one gram, and the unit of time, one second. From these fundamental units are derived:

- Unit of velocity = 1 centimeter per second.
- Acceleration due to gravity (at Paris) = 981 centimeters per sec. per sec.
- Unit of force = 1 dyne = $\frac{1}{1000}$ gram.
- Unit of work = 1 erg = 1 dyne-centimeter.
- Unit of power = 1 watt = 10,000,000 ergs per second.

The C.G.S. system of power measurements is becoming more and more used in the engineering field. It is used exclusively for electrical machines and apparatus on account of the simple relationship which exists between the various units. It is likely to be soon adopted in many other fields. The unit of work, erg, is so small that in practical work the joule is usually employed instead. One joule equals 10,000,000 ergs.

Standard of Length. — In 1866 the United States, by act of Congress, passed a law making legal the meter, the only measure of length that has been legalized by the United States Government. The United States yard is defined by the relation: 1 yard = $\frac{3}{4}$ meter. The legal equivalent of the meter for commercial purposes was fixed as 39.37 inches, by law, in July, 1866, and experience having shown that this value was exact within the error of observation, the United States

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Office of Standard Weights and Measures was, in 1893, authorized to derive the yard from the meter by the use of this relation. The United States prototype meters Nos. 27 and 21 were received from the International Bureau of Weights and Measures in 1889. Meter No. 27, sealed in its metal case, is preserved in a fire-proof vault at the Bureau of Standards.

Comparisons made prior to 1893 indicated that the relation of the yard to the meter, fixed by the act of 1866, was by chance the exact relation between the international meter and the British imperial yard, within the error of observation. A subsequent comparison made between the standards just mentioned indicates that the legal relation adopted by Congress is in error 0.0001 inch; but, in view of the fact that certain comparisons made by the English Standards Office between the imperial yard and its authentic copies show variations as great if not greater than this, it cannot be said with certainty that there is a difference between the imperial yard of Great Britain and the United States yard derived from the meter. The bronze yard No. 11, which was an exact copy of the British imperial yard both in form and material, had shown changes when compared with the imperial yard in 1876 and 1888, which could not reasonably be said to be entirely due to changes in Bronze No. 11. On the other hand, the new meters represented the most advanced ideas of standards, and it therefore seemed that greater stability as well as higher accuracy would be secured by accepting the international meter as a fundamental standard of length.

Application of the Metric System. — In the practical application of the metric system in machine shop and drafting-room work, the part of the system with which the draftsman and machinist come into direct contact is the length measurements. The length units of the metric system that are most generally used in connection with any work relating to mechanical engineering are the meter, the centimeter, and the millimeter. The decimeter is not commonly used as a length measurement. On mechanical drawings all dimensions are generally given in millimeters, no matter how large they may be. In fact, dimensions of such machines as locomotives and large electrical apparatus are given exclusively in millimeters. This practice is adopted to avoid mistakes due to misplacing decimal points, or misreading dimensions if other units are used as well. When dimensions are given in millimeters, the majority can be given without resorting to decimal points, as a millimeter is only a trifle more than $\frac{1}{16}$ inch. Only dimensions of precision need be given in decimals of a millimeter; such dimensions are generally given in hundredths of a millimeter — for example, 0.02 millimeter. As 0.01 millimeter is equal to 0.0004 inch, it is seldom that dimensions would be given with greater accuracy than to hundredths of a millimeter.

Drawings made to the metric system are not made to scales of $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, etc., as in the case of drawings made to the English system. If the object cannot be drawn full size, it is generally drawn $\frac{1}{2}$ size, and, if this is too large, it is drawn $\frac{1}{4}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{40}$, $\frac{1}{100}$, $\frac{1}{200}$, $\frac{1}{400}$, or $\frac{1}{1000}$ size.

Tables of Metric Equivalents. — The following tables for the conversion of millimeters into inches and feet into millimeters and vice versa are based on one inch equals 25.4 millimeters, exactly. This is American Standard practice for industrial use and has also been adopted by industry in Canada, Great Britain, Germany, Italy, Russia, Switzerland, Sweden, and other countries. The conversion tables for feet into meters, miles into kilometers, square inches into square centimeters, and square feet into square meters are based on one meter equals 39.37 inches. The use of 25.4 millimeters equals one inch, exactly, results in an inch that is shorter than the inch based on one meter equals 39.37 inches by approximately two parts in one million.

WEIGHTS AND MEASURES

Use of Conversion Tables. — On this and following pages tables are given which permit conversion from English to metric units and vice versa over a wide range of values. Where the desired value cannot be obtained directly from these tables, a simple addition of two or more values taken directly from the table will suffice as shown in the following examples:

Example 1: Find the millimeter equivalent of 78 inches.

$$70 \text{ in.} = 1,778.000 \text{ mm}$$

$$8 \text{ in.} = 203.200 \text{ mm}$$

$$78 \text{ in.} = 1,981.200 \text{ mm}$$

Example 2: Find the inch equivalent of 84.9 mm.

$$80. \text{ mm} = 3.1496 \text{ in.}$$

$$4. \text{ mm} = 0.1575 \text{ in.}$$

$$0.9 \text{ mm} = 0.0354 \text{ in.}$$

$$84.9 \text{ mm} = 3.3425 \text{ in.}$$

Inch—Millimeter and Inch—Centimeter Conversion Table*
(Based on 1 inch = 25.4 millimeters, exactly)†

INCHES TO MILLIMETERS									
In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.
10	254.000	1	25.400	0.1	2.540	0.01	0.254	0.001	0.025
20	508.000	2	50.800	0.2	5.080	0.02	0.508	0.002	0.051
30	762.000	3	76.200	0.3	7.620	0.03	0.762	0.003	0.076
40	1,016.000	4	101.600	0.4	10.160	0.04	1.016	0.004	0.102
50	1,270.000	5	127.000	0.5	12.700	0.05	1.270	0.005	0.127
60	1,524.000	6	152.400	0.6	15.240	0.06	1.524	0.006	0.152
70	1,778.000	7	177.800	0.7	17.780	0.07	1.778	0.007	0.178
80	2,032.000	8	203.200	0.8	20.320	0.08	2.032	0.008	0.203
90	2,286.000	9	228.600	0.9	22.860	0.09	2.286	0.009	0.229
100	2,540.000	10	254.000	1.0	25.400	0.10	2.540	0.010	0.254

MILLIMETERS TO INCHES									
Mm.	In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.	In.
100	3.9370	10	0.3937	1	0.0394	0.1	0.0039	0.01	0.0004
200	7.8740	20	0.7874	2	0.0787	0.2	0.0079	0.02	0.0008
300	11.8110	30	1.1811	3	0.1181	0.3	0.0118	0.03	0.0012
400	15.7480	40	1.5748	4	0.1575	0.4	0.0157	0.04	0.0016
500	19.6850	50	1.9685	5	0.1968	0.5	0.0197	0.05	0.0020
600	23.6220	60	2.3622	6	0.2362	0.6	0.0236	0.06	0.0024
700	27.5591	70	2.7559	7	0.2756	0.7	0.0276	0.07	0.0028
800	31.4961	80	3.1496	8	0.3150	0.8	0.0315	0.08	0.0031
900	35.4331	90	3.5433	9	0.3543	0.9	0.0354	0.09	0.0035
1,000	39.3701	100	3.9370	10	0.3937	1.0	0.0394	0.10	0.0039

* For inches to centimeters, shift decimal point in mm column one place to left and read centimeters, thus:
40 in. = 1,016 mm = 101.6 cm

For centimeters to inches, shift decimal point of centimeter value one place to right and enter mm column, thus:
70 cm = 700 mm = 27.5591 inches

† American Standard Practice for Industrial Use (ASA B48.1)

WEIGHTS AND MEASURES

Decimals of an Inch to Millimeters
(Based on 1 inch = 25.4 millimeters, exactly)

Inches	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
	Millimeters									
0.000	...	0.0254	0.0508	0.0762	0.1016	0.1270	0.1524	0.1778	0.2032	0.2286
0.010	0.2540	0.2794	0.3048	0.3302	0.3556	0.3810	0.4064	0.4318	0.4572	0.4826
0.020	0.5080	0.5334	0.5588	0.5842	0.6096	0.6350	0.6604	0.6858	0.7112	0.7366
0.030	0.7620	0.7874	0.8128	0.8382	0.8636	0.8890	0.9144	0.9398	0.9652	0.9906
0.040	1.0160	1.0414	1.0668	1.0922	1.1176	1.1430	1.1684	1.1938	1.2192	1.2446
0.050	1.2700	1.2954	1.3208	1.3462	1.3716	1.3970	1.4224	1.4478	1.4732	1.4986
0.060	1.5240	1.5494	1.5748	1.6002	1.6256	1.6510	1.6764	1.7018	1.7272	1.7526
0.070	1.7780	1.8034	1.8288	1.8542	1.8796	1.9050	1.9304	1.9558	1.9812	2.0066
0.080	2.0320	2.0574	2.0828	2.1082	2.1336	2.1590	2.1844	2.2098	2.2352	2.2606
0.090	2.2860	2.3114	2.3368	2.3622	2.3876	2.4130	2.4384	2.4638	2.4892	2.5146
0.100	2.5400	2.5654	2.5908	2.6162	2.6416	2.6670	2.6924	2.7178	2.7432	2.7686
0.110	2.7940	2.8194	2.8448	2.8702	2.8956	2.9210	2.9464	2.9718	2.9972	3.0226
0.120	3.0480	3.0734	3.0988	3.1242	3.1496	3.1750	3.2004	3.2258	3.2512	3.2766
0.130	3.3020	3.3274	3.3528	3.3782	3.4036	3.4290	3.4544	3.4798	3.5052	3.5306
0.140	3.5560	3.5814	3.6068	3.6322	3.6576	3.6830	3.7084	3.7338	3.7592	3.7846
0.150	3.8100	3.8354	3.8608	3.8862	3.9116	3.9370	3.9624	3.9878	4.0132	4.0386
0.160	4.0640	4.0894	4.1148	4.1402	4.1656	4.1910	4.2164	4.2418	4.2672	4.2926
0.170	4.3180	4.3434	4.3688	4.3942	4.4196	4.4450	4.4704	4.4958	4.5212	4.5466
0.180	4.5720	4.5974	4.6228	4.6482	4.6736	4.6990	4.7244	4.7498	4.7752	4.8006
0.190	4.8260	4.8514	4.8768	4.9022	4.9276	4.9530	4.9784	5.0038	5.0292	5.0546
0.200	5.0800	5.1054	5.1308	5.1562	5.1816	5.2070	5.2324	5.2578	5.2832	5.3086
0.210	5.3340	5.3594	5.3848	5.4102	5.4356	5.4610	5.4864	5.5118	5.5372	5.5626
0.220	5.5880	5.6134	5.6388	5.6642	5.6896	5.7150	5.7404	5.7658	5.7912	5.8166
0.230	5.8420	5.8674	5.8928	5.9182	5.9436	5.9690	5.9944	6.0198	6.0452	6.0706
0.240	6.0960	6.1214	6.1468	6.1722	6.1976	6.2230	6.2484	6.2738	6.2992	6.3246
0.250	6.3500	6.3754	6.4008	6.4262	6.4516	6.4770	6.5024	6.5278	6.5532	6.5786
0.260	6.6040	6.6294	6.6548	6.6802	6.7056	6.7310	6.7564	6.7818	6.8072	6.8326
0.270	6.8580	6.8834	6.9088	6.9342	6.9596	6.9850	7.0104	7.0358	7.0612	7.0866
0.280	7.1120	7.1374	7.1628	7.1882	7.2136	7.2390	7.2644	7.2898	7.3152	7.3406
0.290	7.3660	7.3914	7.4168	7.4422	7.4676	7.4930	7.5184	7.5438	7.5692	7.5946
0.300	7.6200	7.6454	7.6708	7.6962	7.7216	7.7470	7.7724	7.7978	7.8232	7.8486
0.310	7.8740	7.8994	7.9248	7.9502	7.9756	8.0010	8.0264	8.0518	8.0772	8.1026
0.320	8.1280	8.1534	8.1788	8.2042	8.2296	8.2550	8.2804	8.3058	8.3312	8.3566
0.330	8.3820	8.4074	8.4328	8.4582	8.4836	8.5090	8.5344	8.5598	8.5852	8.6106
0.340	8.6360	8.6614	8.6868	8.7122	8.7376	8.7630	8.7884	8.8138	8.8392	8.8646
0.350	8.8900	8.9154	8.9408	8.9662	8.9916	9.0170	9.0424	9.0678	9.0932	9.1186
0.360	9.1440	9.1694	9.1948	9.2202	9.2456	9.2710	9.2964	9.3218	9.3472	9.3726
0.370	9.3980	9.4234	9.4488	9.4742	9.4996	9.5250	9.5504	9.5758	9.6012	9.6266
0.380	9.6520	9.6774	9.7028	9.7282	9.7536	9.7790	9.8044	9.8298	9.8552	9.8806
0.390	9.9060	9.9314	9.9568	9.9822	10.0076	10.0330	10.0584	10.0838	10.1092	10.1346
0.400	10.1600	10.1854	10.2108	10.2362	10.2616	10.2870	10.3124	10.3378	10.3632	10.3886
0.410	10.4140	10.4394	10.4648	10.4902	10.5156	10.5410	10.5664	10.5918	10.6172	10.6426
0.420	10.6680	10.6934	10.7188	10.7442	10.7696	10.7950	10.8204	10.8458	10.8712	10.8966
0.430	10.9220	10.9474	10.9728	10.9982	11.0236	11.0490	11.0744	11.0998	11.1252	11.1506
0.440	11.1760	11.2014	11.2268	11.2522	11.2776	11.3030	11.3284	11.3538	11.3792	11.4046
0.450	11.4300	11.4554	11.4808	11.5062	11.5316	11.5570	11.5824	11.6078	11.6332	11.6586
0.460	11.6840	11.7094	11.7348	11.7602	11.7856	11.8110	11.8364	11.8618	11.8872	11.9126
0.470	11.9380	11.9634	11.9888	12.0142	12.0396	12.0650	12.0904	12.1158	12.1412	12.1666
0.480	12.1920	12.2174	12.2428	12.2682	12.2936	12.3190	12.3444	12.3698	12.3952	12.4206
0.490	12.4460	12.4714	12.4968	12.5222	12.5476	12.5730	12.5984	12.6238	12.6492	12.6746

Use previous table to obtain whole inch equivalents to add to decimal equivalents above. All values given in this table are exact; figures to the right of the last place figures are all zeros.

WEIGHTS AND MEASURES

Decimals of an Inch to Millimeters
(Based on 1 inch = 25.4 millimeters, exactly)

Inches	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
	Millimeters									
0.500	12.7000	12.7254	12.7508	12.7762	12.8016	12.8270	12.8524	12.8778	12.9032	12.9286
0.510	12.9540	12.9794	13.0048	13.0302	13.0556	13.0810	13.1064	13.1318	13.1572	13.1826
0.520	13.2080	13.2334	13.2588	13.2842	13.3096	13.3350	13.3604	13.3858	13.4112	13.4366
0.530	13.4620	13.4874	13.5128	13.5382	13.5636	13.5890	13.6144	13.6398	13.6652	13.6906
0.540	13.7160	13.7414	13.7668	13.7922	13.8176	13.8430	13.8684	13.8938	13.9192	13.9446
0.550	13.9700	13.9954	14.0208	14.0462	14.0716	14.0970	14.1224	14.1478	14.1732	14.1986
0.560	14.2240	14.2494	14.2748	14.3002	14.3256	14.3510	14.3764	14.4018	14.4272	14.4526
0.570	14.4780	14.5034	14.5288	14.5542	14.5796	14.6050	14.6304	14.6558	14.6812	14.7066
0.580	14.7320	14.7574	14.7828	14.8082	14.8336	14.8590	14.8844	14.9098	14.9352	14.9606
0.590	14.9860	15.0114	15.0368	15.0622	15.0876	15.1130	15.1384	15.1638	15.1892	15.2146
0.600	15.2400	15.2654	15.2908	15.3162	15.3416	15.3670	15.3924	15.4178	15.4432	15.4686
0.610	15.4940	15.5194	15.5448	15.5702	15.5956	15.6210	15.6464	15.6718	15.6972	15.7226
0.620	15.7480	15.7734	15.7988	15.8242	15.8496	15.8750	15.9004	15.9258	15.9512	15.9766
0.630	16.0020	16.0274	16.0528	16.0782	16.1036	16.1290	16.1544	16.1798	16.2052	16.2306
0.640	16.2560	16.2814	16.3068	16.3322	16.3576	16.3830	16.4084	16.4338	16.4592	16.4846
0.650	16.5100	16.5354	16.5608	16.5862	16.6116	16.6370	16.6624	16.6878	16.7132	16.7386
0.660	16.7640	16.7894	16.8148	16.8402	16.8656	16.8910	16.9164	16.9418	16.9672	16.9926
0.670	17.0180	17.0434	17.0688	17.0942	17.1196	17.1450	17.1704	17.1958	17.2212	17.2466
0.680	17.2720	17.2974	17.3228	17.3482	17.3736	17.3990	17.4244	17.4498	17.4752	17.5006
0.690	17.5260	17.5514	17.5768	17.6022	17.6276	17.6530	17.6784	17.7038	17.7292	17.7546
0.700	17.7800	17.8054	17.8308	17.8562	17.8816	17.9070	17.9324	17.9578	17.9832	18.0086
0.710	18.0340	18.0594	18.0848	18.1102	18.1356	18.1610	18.1864	18.2118	18.2372	18.2626
0.720	18.2880	18.3134	18.3388	18.3642	18.3896	18.4150	18.4404	18.4658	18.4912	18.5166
0.730	18.5420	18.5674	18.5928	18.6182	18.6436	18.6690	18.6944	18.7198	18.7452	18.7706
0.740	18.7960	18.8214	18.8468	18.8722	18.8976	18.9230	18.9484	18.9738	18.9992	19.0246
0.750	19.0500	19.0754	19.1008	19.1262	19.1516	19.1770	19.2024	19.2278	19.2532	19.2786
0.760	19.3040	19.3294	19.3548	19.3802	19.4056	19.4310	19.4564	19.4818	19.5072	19.5326
0.770	19.5580	19.5834	19.6088	19.6342	19.6596	19.6850	19.7104	19.7358	19.7612	19.7866
0.780	19.8120	19.8374	19.8628	19.8882	19.9136	19.9390	19.9644	19.9898	20.0152	20.0406
0.790	20.0660	20.0914	20.1168	20.1422	20.1676	20.1930	20.2184	20.2438	20.2692	20.2946
0.800	20.3200	20.3454	20.3708	20.3962	20.4216	20.4470	20.4724	20.4978	20.5232	20.5486
0.810	20.5740	20.5994	20.6248	20.6502	20.6756	20.7010	20.7264	20.7518	20.7772	20.8026
0.820	20.8280	20.8534	20.8788	20.9042	20.9296	20.9550	20.9804	21.0058	21.0312	21.0566
0.830	21.0820	21.1074	21.1328	21.1582	21.1836	21.2090	21.2344	21.2598	21.2852	21.3106
0.840	21.3360	21.3614	21.3868	21.4122	21.4376	21.4630	21.4884	21.5138	21.5392	21.5646
0.850	21.5900	21.6154	21.6408	21.6662	21.6916	21.7170	21.7424	21.7678	21.7932	21.8186
0.860	21.8440	21.8694	21.8948	21.9202	21.9456	21.9710	21.9964	22.0218	22.0472	22.0726
0.870	22.0980	22.1234	22.1488	22.1742	22.1996	22.2250	22.2504	22.2758	22.3012	22.3266
0.880	22.3520	22.3774	22.4028	22.4282	22.4536	22.4790	22.5044	22.5298	22.5552	22.5806
0.890	22.6060	22.6314	22.6568	22.6822	22.7076	22.7330	22.7584	22.7838	22.8092	22.8346
0.900	22.8600	22.8854	22.9108	22.9362	22.9616	22.9870	23.0124	23.0378	23.0632	23.0886
0.910	23.1140	23.1394	23.1648	23.1902	23.2156	23.2410	23.2664	23.2918	23.3172	23.3426
0.920	23.3680	23.3934	23.4188	23.4442	23.4696	23.4950	23.5204	23.5458	23.5712	23.5966
0.930	23.6220	23.6474	23.6728	23.6982	23.7236	23.7490	23.7744	23.7998	23.8252	23.8506
0.940	23.8760	23.9014	23.9268	23.9522	23.9776	24.0030	24.0284	24.0538	24.0792	24.1046
0.950	24.1300	24.1554	24.1808	24.2062	24.2316	24.2570	24.2824	24.3078	24.3332	24.3586
0.960	24.3840	24.4094	24.4348	24.4602	24.4856	24.5110	24.5364	24.5618	24.5872	24.6126
0.970	24.6380	24.6634	24.6888	24.7142	24.7396	24.7650	24.7904	24.8158	24.8412	24.8666
0.980	24.8920	24.9174	24.9428	24.9682	24.9936	25.0190	25.0444	25.0698	25.0952	25.1206
0.990	25.1460	25.1714	25.1968	25.2222	25.2476	25.2730	25.2984	25.3238	25.3492	25.3746
1.000	25.4000	...	...	...	...	...	...	...	...	...

Use previous table to obtain whole inch equivalents to add to decimal equivalents above. All values given in this table are exact; figures to the right of the last place figures are all zeros.

WEIGHTS AND MEASURES

Millimeters to Inches
(Based on 1 inch = 25.4 millimeters, exactly)

Milli- meters	0	1	2	3	4	5	6	7	8	9
	Inches									
0	...	0.03937	0.07874	0.11811	0.15748	0.19685	0.23622	0.27559	0.31496	0.35433
10	0.39370	0.43307	0.47244	0.51181	0.55118	0.59055	0.62992	0.66929	0.70866	0.74803
20	0.78740	0.82677	0.86614	0.90551	0.94488	0.98425	1.02362	1.06299	1.10236	1.14173
30	1.18110	1.22047	1.25984	1.29921	1.33858	1.37795	1.41732	1.45669	1.49606	1.53543
40	1.57480	1.61417	1.65354	1.69291	1.73228	1.77165	1.81102	1.85039	1.88976	1.92913
50	1.96850	2.00787	2.04724	2.08661	2.12598	2.16535	2.20472	2.24409	2.28346	2.32283
60	2.36220	2.40157	2.44094	2.48031	2.51968	2.55906	2.59843	2.63780	2.67717	2.71654
70	2.75591	2.79528	2.83465	2.87402	2.91339	2.95276	2.99213	3.03150	3.07087	3.11024
80	3.14961	3.18898	3.22835	3.26772	3.30709	3.34646	3.38583	3.42520	3.46457	3.50394
90	3.54331	3.58268	3.62205	3.66142	3.70079	3.74016	3.77953	3.81890	3.85827	3.89764
100	3.93701	3.97638	4.01575	4.05512	4.09449	4.13386	4.17323	4.21260	4.25197	4.29134
110	4.33071	4.37008	4.40945	4.44882	4.48819	4.52756	4.56693	4.60630	4.64567	4.68504
120	4.72441	4.76378	4.80315	4.84252	4.88189	4.92126	4.96063	5.00000	5.03937	5.07874
130	5.11811	5.15748	5.19685	5.23622	5.27559	5.31496	5.35433	5.39370	5.43307	5.47244
140	5.51181	5.55118	5.59055	5.62992	5.66929	5.70866	5.74803	5.78740	5.82677	5.86614
150	5.90551	5.94488	5.98425	6.02362	6.06299	6.10236	6.14173	6.18110	6.22047	6.25984
160	6.29921	6.33858	6.37795	6.41732	6.45669	6.49606	6.53543	6.57480	6.61417	6.65354
170	6.69291	6.73228	6.77165	6.81102	6.85039	6.88976	6.92913	6.96850	7.00787	7.04724
180	7.08661	7.12598	7.16535	7.20472	7.24409	7.28346	7.32283	7.36220	7.40157	7.44094
190	7.48031	7.51969	7.55906	7.59843	7.63780	7.67717	7.71654	7.75591	7.79528	7.83465
200	7.87402	7.91339	7.95276	7.99213	8.03150	8.07087	8.11024	8.14961	8.18898	8.22835
210	8.26772	8.30709	8.34646	8.38583	8.42520	8.46457	8.50394	8.54331	8.58268	8.62205
220	8.66142	8.70079	8.74016	8.77953	8.81890	8.85827	8.89764	8.93701	8.97638	9.01575
230	9.05512	9.09449	9.13386	9.17323	9.21260	9.25197	9.29134	9.33071	9.37008	9.40945
240	9.44882	9.48819	9.52756	9.56693	9.60630	9.64567	9.68504	9.72441	9.76378	9.80315
250	9.84252	9.88189	9.92126	9.96063	10.00000	10.0394	10.0787	10.1181	10.1575	10.1969
260	10.2362	10.2756	10.3150	10.3543	10.3937	10.4331	10.4724	10.5118	10.5512	10.5906
270	10.6299	10.6693	10.7087	10.7480	10.7874	10.8268	10.8661	10.9055	10.9449	10.9843
280	11.0236	11.0630	11.1024	11.1417	11.1811	11.2205	11.2598	11.2992	11.3386	11.3780
290	11.4173	11.4567	11.4961	11.5354	11.5748	11.6142	11.6535	11.6929	11.7323	11.7717
300	11.8110	11.8504	11.8898	11.9291	11.9685	12.0079	12.0472	12.0866	12.1260	12.1654
310	12.2047	12.2441	12.2835	12.3228	12.3622	12.4016	12.4409	12.4803	12.5197	12.5591
320	12.5984	12.6378	12.6772	12.7165	12.7559	12.7953	12.8346	12.8740	12.9134	12.9528
330	12.9921	13.0315	13.0709	13.1102	13.1496	13.1890	13.2283	13.2677	13.3071	13.3465
340	13.3858	13.4252	13.4646	13.5039	13.5433	13.5827	13.6220	13.6614	13.7008	13.7402
350	13.7795	13.8189	13.8583	13.8976	13.9370	13.9764	14.0157	14.0551	14.0945	14.1339
360	14.1732	14.2126	14.2520	14.2913	14.3307	14.3701	14.4094	14.4488	14.4882	14.5276
370	14.5669	14.6063	14.6457	14.6850	14.7244	14.7638	14.8031	14.8425	14.8819	14.9213
380	14.9606	15.0000	15.0394	15.0787	15.1181	15.1575	15.1969	15.2362	15.2756	15.3150
390	15.3543	15.3937	15.4331	15.4724	15.5118	15.5512	15.5906	15.6299	15.6693	15.7087
400	15.7480	15.7874	15.8268	15.8661	15.9055	15.9449	15.9843	16.0236	16.0630	16.1024
410	16.1417	16.1811	16.2205	16.2598	16.2992	16.3386	16.3780	16.4173	16.4567	16.4961
420	16.5354	16.5748	16.6142	16.6535	16.6929	16.7323	16.7717	16.8110	16.8504	16.8898
430	16.9291	16.9685	17.0079	17.0472	17.0866	17.1260	17.1654	17.2047	17.2441	17.2835
440	17.3228	17.3622	17.4016	17.4409	17.4803	17.5197	17.5591	17.5984	17.6378	17.6772
450	17.7165	17.7559	17.7953	17.8346	17.8740	17.9134	17.9528	17.9921	18.0315	18.0709
460	18.1102	18.1496	18.1890	18.2283	18.2677	18.3071	18.3465	18.3858	18.4252	18.4646
470	18.5039	18.5433	18.5827	18.6220	18.6614	18.7008	18.7402	18.7795	18.8189	18.8583
480	18.8976	18.9370	18.9764	19.0157	19.0551	19.0945	19.1339	19.1732	19.2126	19.2520
490	19.2913	19.3307	19.3701	19.4094	19.4488	19.4882	19.5276	19.5669	19.6063	19.6457

WEIGHTS AND MEASURES

Fractional Inch—Millimeter and Foot—Millimeter Conversion Tables

(Based on 1 inch = 25.4 millimeters, exactly)*

FRACTIONAL INCH TO MILLIMETERS

In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.
$\frac{1}{16}$	0.397	$\frac{1}{4}$	6.747	$\frac{3}{16}$	13.097	$\frac{1}{2}$	19.447
$\frac{1}{8}$	0.794	$\frac{3}{8}$	7.144	$\frac{1}{2}$	13.494	$\frac{5}{8}$	19.844
$\frac{3}{16}$	1.191	$\frac{1}{2}$	7.541	$\frac{3}{8}$	13.891	$\frac{3}{4}$	20.241
$\frac{1}{4}$	1.588	$\frac{5}{8}$	7.938	$\frac{1}{2}$	14.288	$\frac{7}{8}$	20.638
$\frac{5}{16}$	1.984	$\frac{3}{4}$	8.334	$\frac{3}{4}$	14.684	$\frac{15}{16}$	21.034
$\frac{3}{8}$	2.381	$\frac{7}{8}$	8.731	$\frac{7}{8}$	15.081	$\frac{15}{16}$	21.431
$\frac{1}{2}$	2.778	$\frac{15}{16}$	9.128	$\frac{15}{16}$	15.478	$\frac{15}{16}$	21.828
$\frac{5}{8}$	3.175	$\frac{15}{16}$	9.525	$\frac{15}{16}$	15.875	$\frac{15}{16}$	22.225
$\frac{3}{4}$	3.572	$\frac{15}{16}$	9.922	$\frac{15}{16}$	16.272	$\frac{15}{16}$	22.622
$\frac{7}{8}$	3.969	$\frac{15}{16}$	10.319	$\frac{15}{16}$	16.669	$\frac{15}{16}$	23.019
$\frac{15}{16}$	4.366	$\frac{15}{16}$	10.716	$\frac{15}{16}$	17.066	$\frac{15}{16}$	23.416
$\frac{15}{16}$	4.762	$\frac{15}{16}$	11.112	$\frac{15}{16}$	17.462	$\frac{15}{16}$	23.812
$\frac{15}{16}$	5.159	$\frac{15}{16}$	11.509	$\frac{15}{16}$	17.859	$\frac{15}{16}$	24.209
$\frac{15}{16}$	5.556	$\frac{15}{16}$	11.906	$\frac{15}{16}$	18.256	$\frac{15}{16}$	24.606
$\frac{15}{16}$	5.953	$\frac{15}{16}$	12.303	$\frac{15}{16}$	18.653	$\frac{15}{16}$	25.003
$\frac{15}{16}$	6.350	$\frac{15}{16}$	12.700	$\frac{15}{16}$	19.050	$\frac{15}{16}$	25.400

INCHES TO MILLIMETERS

In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.
1	25.4	3	76.2	5	127.0	7	177.8	9	228.6
2	50.8	4	101.6	6	152.4	8	203.2	10	254.0
								11	279.4
								12	304.8

FEET TO MILLIMETERS

Ft.	Mm.	Ft.	Mm.	Ft.	Mm.	Ft.	Mm.	Ft.	Mm.
100	30,480	10	3,048	1	304.8	0.1	30.48	0.01	3.048
200	60,960	20	6,096	2	609.6	0.2	60.96	0.02	6.096
300	91,440	30	9,144	3	914.4	0.3	91.44	0.03	9.144
400	121,920	40	12,192	4	1,219.2	0.4	121.92	0.04	12.192
500	152,400	50	15,240	5	1,524.0	0.5	152.40	0.05	15.240
600	182,880	60	18,288	6	1,828.8	0.6	182.88	0.06	18.288
700	213,360	70	21,336	7	2,133.6	0.7	213.36	0.07	21.336
800	243,840	80	24,384	8	2,438.4	0.8	243.84	0.08	24.384
900	274,320	90	27,432	9	2,743.2	0.9	274.32	0.09	27.432
1,000	304,800	100	30,480	10	3,048.0	1.0	304.80	0.10	30.480

* American Standard Practice for Industrial Use (ASA B48.1)

Example 1: Find millimeter equivalent of 293 feet, $5\frac{1}{4}$ inches.

290 ft	=	60,960	mm
90 ft	=	27,432	mm
3 ft	=	914.4	mm
5 in.	=	127.0	mm
$5\frac{1}{4}$ in.	=	18.653	mm
293 ft, $5\frac{1}{4}$ in.	=	89,432.053	mm

Example 2: Find millimeter equivalent of 71.86 feet.

70. ft	=	21,336	mm
1. ft	=	304.8	mm
.80 ft	=	243.84	mm
.06 ft	=	18.288	mm
71.86 ft	=	21,902.928	mm

WEIGHTS AND MEASURES

Foot—Meter and Mile—Kilometer Conversion Tables

(Based on 1 meter = 39.37 inches)*

FEET TO METERS (1 ft. = 0.304801 m.)									
Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
100	30.480	10	3.048	1	0.305	0.1	0.030	0.01	0.003
200	60.960	20	6.096	2	0.610	0.2	0.061	0.02	0.006
300	91.440	30	9.144	3	0.914	0.3	0.091	0.03	0.009
400	121.920	40	12.192	4	1.219	0.4	0.122	0.04	0.012
500	152.400	50	15.240	5	1.524	0.5	0.152	0.05	0.015
600	182.880	60	18.288	6	1.829	0.6	0.183	0.06	0.018
700	213.361	70	21.336	7	2.134	0.7	0.213	0.07	0.021
800	243.841	80	24.384	8	2.438	0.8	0.244	0.08	0.024
900	274.321	90	27.432	9	2.743	0.9	0.274	0.09	0.027
1,000	304.801	100	30.480	10	3.048	1.0	0.305	0.10	0.030
METERS TO FEET (1 m. = 3.280833 ft.)									
Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet
100	328.083	10	32.808	1	3.281	0.1	0.328	0.01	0.033
200	656.167	20	65.617	2	6.562	0.2	0.656	0.02	0.066
300	984.250	30	98.425	3	9.842	0.3	0.984	0.03	0.098
400	1,312.333	40	131.233	4	13.123	0.4	1.312	0.04	0.131
500	1,640.416	50	164.042	5	16.404	0.5	1.640	0.05	0.164
600	1,968.500	60	196.850	6	19.685	0.6	1.968	0.06	0.197
700	2,296.583	70	229.658	7	22.966	0.7	2.297	0.07	0.230
800	2,624.667	80	262.467	8	26.247	0.8	2.625	0.08	0.262
900	2,952.750	90	295.275	9	29.528	0.9	2.953	0.09	0.295
1,000	3,280.833	100	328.083	10	32.808	1.0	3.281	0.10	0.328
MILES TO KILOMETERS (1 mile = 1.609347 km.)									
Miles	Km.	Miles	Km.	Miles	Km.	Miles	Km.	Miles	Km.
1,000	1,609.35	100	160.93	10	16.09	1	1.61	0.1	0.16
2,000	3,218.69	200	321.87	20	32.19	2	3.22	0.2	0.32
3,000	4,828.04	300	482.80	30	48.28	3	4.83	0.3	0.48
4,000	6,437.39	400	643.74	40	64.37	4	6.44	0.4	0.64
5,000	8,046.74	500	804.67	50	80.47	5	8.05	0.5	0.80
6,000	9,656.08	600	965.61	60	96.56	6	9.66	0.6	0.97
7,000	11,265.43	700	1,126.54	70	112.65	7	11.27	0.7	1.13
8,000	12,874.78	800	1,287.48	80	128.75	8	12.87	0.8	1.29
9,000	14,484.12	900	1,448.41	90	144.84	9	14.48	0.9	1.45
10,000	16,093.47	1,000	1,609.35	100	160.93	10	16.09	1.0	1.61
KILOMETERS TO MILES (1 km. = 0.621370 mile)									
Km.	Miles	Km.	Miles	Km.	Miles	Km.	Miles	Km.	Miles
1,000	621.37	100	62.14	10	6.21	1	0.62	0.1	0.06
2,000	1,242.74	200	124.27	20	12.43	2	1.24	0.2	0.12
3,000	1,864.11	300	186.41	30	18.64	3	1.86	0.3	0.19
4,000	2,485.48	400	248.55	40	24.86	4	2.49	0.4	0.25
5,000	3,106.85	500	310.68	50	31.07	5	3.11	0.5	0.31
6,000	3,728.22	600	372.82	60	37.28	6	3.73	0.6	0.37
7,000	4,349.59	700	434.96	70	43.50	7	4.35	0.7	0.43
8,000	4,970.96	800	497.10	80	49.71	8	4.97	0.8	0.50
9,000	5,592.33	900	559.23	90	55.92	9	5.59	0.9	0.56
10,000	6,213.70	1,000	621.37	100	62.14	10	6.21	1.0	0.62

* Act of U. S. Congress, 1866. On this basis 1 inch = 25.40005 mm, approximately.

WEIGHTS AND MEASURES

Square Inch—Square Centimeter and Square Foot—Square Meter Conversion Tables
(Based on 1 meter = 39.37 inches)*

SQUARE INCHES TO SQUARE CENTIMETERS (1 sq. in. = 6.45163 sq. cm.)									
Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.
100	645.16	10	64.52	1	6.45	0.1	0.65	0.01	0.06
200	1,290.33	20	129.03	2	12.90	0.2	1.29	0.02	0.13
300	1,935.49	30	193.55	3	19.35	0.3	1.94	0.03	0.19
400	2,580.65	40	258.07	4	25.81	0.4	2.58	0.04	0.26
500	3,225.82	50	322.58	5	32.26	0.5	3.23	0.05	0.32
600	3,870.98	60	387.10	6	38.71	0.6	3.87	0.06	0.39
700	4,516.14	70	451.61	7	45.16	0.7	4.52	0.07	0.45
800	5,161.30	80	516.13	8	51.61	0.8	5.16	0.08	0.52
900	5,806.47	90	580.65	9	58.06	0.9	5.81	0.09	0.58
1,000	6,451.63	100	645.16	10	64.52	1.0	6.45	0.10	0.65
SQUARE CENTIMETERS TO SQUARE INCHES (1 sq. cm. = 0.155000 sq. in.)									
Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.	Sq. Cm.	Sq. In.
100	15.500	10	1.550	1	0.155	0.1	0.015	0.01	0.002
200	31.000	20	3.100	2	0.310	0.2	0.031	0.02	0.003
300	46.500	30	4.650	3	0.465	0.3	0.046	0.03	0.005
400	62.000	40	6.200	4	0.620	0.4	0.062	0.04	0.006
500	77.500	50	7.750	5	0.775	0.5	0.078	0.05	0.008
600	93.000	60	9.300	6	0.930	0.6	0.093	0.06	0.009
700	108.500	70	10.850	7	1.085	0.7	0.108	0.07	0.011
800	124.000	80	12.400	8	1.240	0.8	0.124	0.08	0.012
900	139.500	90	13.950	9	1.395	0.9	0.140	0.09	0.014
1,000	155.000	100	15.500	10	1.550	1.0	0.155	0.10	0.016
SQUARE FEET TO SQUARE METERS (1 sq. ft. = 0.0929034 sq. m.)									
Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.
1,000	92.903	100	9.290	10	0.929	1	0.093	0.1	0.009
2,000	185.807	200	18.581	20	1.858	2	0.186	0.2	0.019
3,000	278.710	300	27.871	30	2.787	3	0.279	0.3	0.028
4,000	371.614	400	37.161	40	3.716	4	0.372	0.4	0.037
5,000	464.517	500	46.452	50	4.645	5	0.465	0.5	0.046
6,000	557.420	600	55.742	60	5.574	6	0.557	0.6	0.056
7,000	650.324	700	65.032	70	6.503	7	0.650	0.7	0.065
8,000	743.227	800	74.323	80	7.432	8	0.743	0.8	0.074
9,000	836.131	900	83.613	90	8.361	9	0.836	0.9	0.084
10,000	929.034	1,000	92.903	100	9.290	10	0.929	1.0	0.093
SQUARE METERS TO SQUARE FEET (1 sq. m. = 10.76387 sq. ft.)									
Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.	Sq. M.	Sq. Ft.
100	1,076.39	10	107.64	1	10.76	0.1	1.08	0.01	0.11
200	2,152.77	20	215.28	2	21.53	0.2	2.15	0.02	0.22
300	3,229.16	30	322.92	3	32.29	0.3	3.23	0.03	0.32
400	4,305.55	40	430.56	4	43.06	0.4	4.31	0.04	0.43
500	5,381.94	50	538.19	5	53.82	0.5	5.38	0.05	0.54
600	6,458.32	60	645.83	6	64.58	0.6	6.46	0.06	0.65
700	7,534.71	70	753.47	7	75.35	0.7	7.53	0.07	0.75
800	8,611.10	80	861.11	8	86.11	0.8	8.61	0.08	0.86
900	9,687.48	90	968.75	9	96.87	0.9	9.69	0.09	0.97
1,000	10,763.87	100	1,076.39	10	107.64	1.0	10.76	0.10	1.08

* Act of U. S. Congress, 1866. On this basis 1 inch = 25.40005 mm, approximately.

WEIGHTS AND MEASURES

Cubic Inch—Cubic Centimeter and Cubic Foot—Cubic Meter Conversion Tables

(Based on 1 meter = 39.37 inches)*

CUBIC INCHES TO CUBIC CENTIMETERS (1 cu. in. = 16.38716 cu. cm.)									
Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.
100	1,638.72	10	163.87	1	16.39	0.1	1.64	0.01	0.16
200	3,277.43	20	327.74	2	32.77	0.2	3.28	0.02	0.33
300	4,916.15	30	491.62	3	49.16	0.3	4.92	0.03	0.49
400	6,554.86	40	655.49	4	65.55	0.4	6.56	0.04	0.66
500	8,193.58	50	819.36	5	81.94	0.5	8.19	0.05	0.82
600	9,832.30	60	983.23	6	98.32	0.6	9.83	0.06	0.98
700	11,471.01	70	1,147.10	7	114.71	0.7	11.47	0.07	1.15
800	13,109.73	80	1,310.97	8	131.10	0.8	13.11	0.08	1.31
900	14,748.44	90	1,474.84	9	147.48	0.9	14.75	0.09	1.47
1,000	16,387.16	100	1,638.72	10	163.87	1.0	16.39	0.10	1.64
CUBIC CENTIMETERS TO CUBIC INCHES (1 cu. cm. = 0.0610234 cu. in.)									
Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.	Cu. Cm.	Cu. In.
1,000	61.023	100	6.102	10	0.610	1	0.061	0.1	0.006
2,000	122.047	200	12.205	20	1.220	2	0.122	0.2	0.012
3,000	183.070	300	18.307	30	1.831	3	0.183	0.3	0.018
4,000	244.094	400	24.409	40	2.441	4	0.244	0.4	0.024
5,000	305.117	500	30.512	50	3.051	5	0.305	0.5	0.031
6,000	366.140	600	36.614	60	3.661	6	0.366	0.6	0.037
7,000	427.164	700	42.716	70	4.272	7	0.427	0.7	0.043
8,000	488.187	800	48.819	80	4.882	8	0.488	0.8	0.049
9,000	549.211	900	54.921	90	5.492	9	0.549	0.9	0.055
10,000	610.234	1,000	61.023	100	6.102	10	0.610	1.0	0.061
CUBIC FEET TO CUBIC METERS (1 cu. ft. = 0.0283170 cu. m.)									
Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.
1,000	28.317	100	2.832	10	0.283	1	0.028	0.1	0.003
2,000	56.634	200	5.663	20	0.566	2	0.057	0.2	0.006
3,000	84.951	300	8.495	30	0.850	3	0.085	0.3	0.008
4,000	113.268	400	11.327	40	1.133	4	0.113	0.4	0.011
5,000	141.585	500	14.158	50	1.416	5	0.142	0.5	0.014
6,000	169.902	600	16.990	60	1.699	6	0.170	0.6	0.017
7,000	198.219	700	19.822	70	1.982	7	0.198	0.7	0.020
8,000	226.536	800	22.654	80	2.265	8	0.227	0.8	0.023
9,000	254.853	900	25.485	90	2.549	9	0.255	0.9	0.025
10,000	283.170	1,000	28.317	100	2.832	10	0.283	1.0	0.028
CUBIC METERS TO CUBIC FEET (1 cu. m. = 35.31445 cu. ft.)									
Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.	Cu. M.	Cu. Ft.
100	3,531.44	10	353.14	1	35.31	0.1	3.53	0.01	0.35
200	7,062.89	20	706.29	2	70.63	0.2	7.06	0.02	0.71
300	10,594.34	30	1,059.43	3	105.94	0.3	10.59	0.03	1.06
400	14,125.78	40	1,412.58	4	141.26	0.4	14.13	0.04	1.41
500	17,657.22	50	1,765.72	5	176.57	0.5	17.66	0.05	1.77
600	21,188.67	60	2,118.87	6	211.89	0.6	21.19	0.06	2.12
700	24,720.12	70	2,472.01	7	247.20	0.7	24.72	0.07	2.47
800	28,251.56	80	2,825.16	8	282.52	0.8	28.25	0.08	2.83
900	31,783.00	90	3,178.30	9	317.83	0.9	31.78	0.09	3.18
1,000	35,314.45	100	3,531.44	10	353.14	1.0	35.31	0.10	3.53

* Act of U. S. Congress, 1866. On this basis 1 inch = 25.40005 mm. approximately.

WEIGHTS AND MEASURES

Cubic Foot—Liter and Gallon—Liter Conversion Tables

(Based on 1 liter = 1000.028 cubic centimeters)*

CUBIC FEET TO LITERS (1 cu. ft. = 28.31622 liters)									
Cu. Ft.	Liters	Cu. Ft.	Liters	Cu. Ft.	Liters	Cu. Ft.	Liters	Cu. Ft.	Liters
100	2,831.62	10	283.16	1	28.32	0.1	2.83	0.01	0.28
200	5,663.24	20	566.32	2	56.63	0.2	5.66	0.02	0.57
300	8,494.87	30	849.49	3	84.93	0.3	8.49	0.03	0.85
400	11,326.49	40	1,132.65	4	113.26	0.4	11.33	0.04	1.13
500	14,158.11	50	1,415.81	5	141.58	0.5	14.16	0.05	1.42
600	16,989.73	60	1,698.97	6	169.90	0.6	16.99	0.06	1.70
700	19,821.35	70	1,982.14	7	198.21	0.7	19.82	0.07	1.98
800	22,652.98	80	2,265.30	8	226.53	0.8	22.65	0.08	2.27
900	25,484.60	90	2,548.46	9	254.85	0.9	25.48	0.09	2.55
1,000	28,316.22	100	2,831.62	10	283.16	1.0	28.32	0.10	2.83
LITERS TO CUBIC FEET (1 liter = 0.0353154 cu. ft.)									
Liters	Cu. Ft.	Liters	Cu. Ft.	Liters	Cu. Ft.	Liters	Cu. Ft.	Liters	Cu. Ft.
1,000	35.315	100	3.532	10	0.353	1	0.035	0.1	0.004
2,000	70.631	200	7.063	20	0.706	2	0.071	0.2	0.007
3,000	105.946	300	10.595	30	1.059	3	0.106	0.3	0.011
4,000	141.262	400	14.126	40	1.413	4	0.141	0.4	0.014
5,000	176.577	500	17.658	50	1.766	5	0.177	0.5	0.018
6,000	211.892	600	21.189	60	2.119	6	0.212	0.6	0.021
7,000	247.208	700	24.721	70	2.472	7	0.247	0.7	0.025
8,000	282.523	800	28.252	80	2.825	8	0.283	0.8	0.028
9,000	317.839	900	31.784	90	3.178	9	0.318	0.9	0.032
10,000	353.154	1,000	35.315	100	3.532	10	0.353	1.0	0.035
U. S. GALLONS TO LITERS (1 U. S. gallon = 3.785329 liters)									
Gals.	Liters	Gals.	Liters	Gals.	Liters	Gals.	Liters	Gals.	Liters
1,000	3,785.33	100	378.53	10	37.85	1	3.79	0.1	0.38
2,000	7,570.66	200	757.07	20	75.71	2	7.57	0.2	0.76
3,000	11,355.99	300	1,135.60	30	113.56	3	11.36	0.3	1.14
4,000	15,141.32	400	1,514.13	40	151.41	4	15.14	0.4	1.52
5,000	18,926.64	500	1,892.66	50	189.27	5	18.93	0.5	1.89
6,000	22,711.97	600	2,271.20	60	227.12	6	22.71	0.6	2.27
7,000	26,497.30	700	2,649.73	70	264.97	7	26.50	0.7	2.65
8,000	30,282.63	800	3,028.26	80	302.83	8	30.28	0.8	3.03
9,000	34,067.96	900	3,406.80	90	340.68	9	34.07	0.9	3.41
10,000	37,853.29	1,000	3,785.33	100	378.53	10	37.85	1.0	3.79
LITERS TO U. S. GALLONS (1 liter = 0.264178 U. S. gallon)									
Liters	Gals.	Liters	Gals.	Liters	Gals.	Liters	Gals.	Liters	Gals.
1,000	264.18	100	26.42	10	2.64	1	0.26	0.1	0.03
2,000	528.36	200	52.84	20	5.28	2	0.53	0.2	0.05
3,000	792.53	300	79.25	30	7.93	3	0.79	0.3	0.08
4,000	1,056.71	400	105.67	40	10.57	4	1.06	0.4	0.11
5,000	1,320.89	500	132.09	50	13.21	5	1.32	0.5	0.13
6,000	1,585.07	600	158.51	60	15.85	6	1.59	0.6	0.16
7,000	1,849.25	700	184.92	70	18.49	7	1.85	0.7	0.18
8,000	2,113.42	800	211.34	80	21.13	8	2.11	0.8	0.21
9,000	2,377.60	900	237.70	90	23.78	9	2.38	0.9	0.24
10,000	2,641.78	1,000	264.18	100	26.42	10	2.64	1.0	0.26

*For practical purposes in some applications 1 liter is taken as being equal to 1,000 cubic centimeters, exactly.

WEIGHTS AND MEASURES

Pound—Kilogram and Ounce—Gram Conversion Tables

POUNDS TO KILOGRAMS (1 pound = 0.453592 kilogram)									
Lb.	Kg.	Lb.	Kg.	Lb.	Kg.	Lb.	Kg.	Lb.	Kg.
1,000	453.59	100	45.36	10	4.54	1	0.45	0.1	0.05
2,000	907.18	200	90.72	20	9.07	2	0.91	0.2	0.09
3,000	1,360.78	300	136.08	30	13.61	3	1.36	0.3	0.14
4,000	1,814.37	400	181.44	40	18.14	4	1.81	0.4	0.18
5,000	2,267.96	500	226.80	50	22.68	5	2.27	0.5	0.23
6,000	2,721.55	600	272.16	60	27.22	6	2.72	0.6	0.27
7,000	3,175.14	700	317.51	70	31.75	7	3.18	0.7	0.32
8,000	3,628.74	800	362.87	80	36.29	8	3.63	0.8	0.36
9,000	4,082.33	900	408.23	90	40.82	9	4.08	0.9	0.41
10,000	4,535.92	1,000	453.59	100	45.36	10	4.54	1.0	0.45
KILOGRAMS TO POUNDS (1 kilogram = 2.204622 pounds)									
Kg.	Lb.	Kg.	Lb.	Kg.	Lb.	Kg.	Lb.	Kg.	Lb.
1,000	2,204.62	100	220.46	10	22.05	1	2.20	0.1	0.22
2,000	4,409.24	200	440.92	20	44.09	2	4.41	0.2	0.44
3,000	6,613.87	300	661.39	30	66.14	3	6.61	0.3	0.66
4,000	8,818.49	400	881.85	40	88.18	4	8.82	0.4	0.88
5,000	11,023.11	500	1,102.31	50	110.23	5	11.02	0.5	1.10
6,000	13,227.73	600	1,322.77	60	132.28	6	13.23	0.6	1.32
7,000	15,432.35	700	1,543.24	70	154.32	7	15.43	0.7	1.54
8,000	17,636.98	800	1,763.70	80	176.37	8	17.64	0.8	1.76
9,000	19,841.60	900	1,984.16	90	198.42	9	19.84	0.9	1.98
10,000	22,046.22	1,000	2,204.62	100	220.46	10	22.05	1.0	2.20
OUNCES TO GRAMS (1 ounce = 28.3495 grams)									
Oz.	G.	Oz.	G.	Oz.	G.	Oz.	G.	Oz.	G.
10	283.50	1	28.35	0.1	2.84	0.01	0.28	0.001	0.03
20	566.99	2	56.70	0.2	5.67	0.02	0.57	0.002	0.06
30	850.48	3	85.05	0.3	8.50	0.03	0.85	0.003	0.09
40	1,133.98	4	113.40	0.4	11.34	0.04	1.13	0.004	0.11
50	1,417.48	5	141.75	0.5	14.17	0.05	1.42	0.005	0.14
60	1,700.97	6	170.10	0.6	17.01	0.06	1.70	0.006	0.17
70	1,984.46	7	198.45	0.7	19.84	0.07	1.98	0.007	0.20
80	2,267.96	8	226.80	0.8	22.68	0.08	2.27	0.008	0.23
90	2,551.46	9	255.15	0.9	25.51	0.09	2.55	0.009	0.26
100	2,834.95	10	283.50	1.0	28.35	0.10	2.83	0.010	0.28
GRAMS TO OUNCES (1 gram = 0.035274 ounce)									
G.	Oz.	G.	Oz.	G.	Oz.	G.	Oz.	G.	Oz.
100	3.527	10	0.353	1	0.035	0.1	0.004	0.01	0.000
200	7.055	20	0.706	2	0.071	0.2	0.007	0.02	0.001
300	10.582	30	1.058	3	0.106	0.3	0.011	0.03	0.001
400	14.110	40	1.411	4	0.141	0.4	0.014	0.04	0.001
500	17.637	50	1.764	5	0.176	0.5	0.018	0.05	0.002
600	21.164	60	2.116	6	0.212	0.6	0.021	0.06	0.002
700	24.692	70	2.469	7	0.247	0.7	0.025	0.07	0.002
800	28.219	80	2.822	8	0.282	0.8	0.028	0.08	0.003
900	31.747	90	3.175	9	0.317	0.9	0.032	0.09	0.003
1,000	35.274	100	3.527	10	0.353	1.0	0.035	0.10	0.004

WEIGHTS AND MEASURES

Pounds per Square Inch—Kilograms per Square Centimeter and
Pounds per Square Foot—Kilograms per Square Meter Conversion Tables

POUNDS PER SQUARE INCH TO KILOGRAMS PER SQUARE CENTIMETER
(1 lb. per sq. in. = 0.0703066 kg. per sq. cm.)

Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²
1,000	70.307	100	7.031	10	0.703	1	0.070	0.1	0.007
2,000	140.613	200	14.061	20	1.406	2	0.141	0.2	0.014
3,000	210.920	300	21.092	30	2.109	3	0.211	0.3	0.021
4,000	281.226	400	28.123	40	2.812	4	0.281	0.4	0.028
5,000	351.533	500	35.153	50	3.515	5	0.352	0.5	0.035
6,000	421.840	600	42.184	60	4.218	6	0.422	0.6	0.042
7,000	492.146	700	49.215	70	4.921	7	0.492	0.7	0.049
8,000	562.453	800	56.245	80	5.625	8	0.562	0.8	0.056
9,000	632.759	900	63.276	90	6.328	9	0.633	0.9	0.063
10,000	703.066	1,000	70.307	100	7.031	10	0.703	1.0	0.070

KILOGRAMS PER SQUARE CENTIMETER TO POUNDS PER SQUARE INCH
(1 kg. per sq. cm. = 14.22340 lb. per sq. in.)

Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²	Kg/cm ²	Lb/in. ²
100	1,422.34	10	142.23	1	14.22	0.1	1.42	0.01	0.14
200	2,844.68	20	284.47	2	28.45	0.2	2.84	0.02	0.28
300	4,267.02	30	426.70	3	42.67	0.3	4.27	0.03	0.43
400	5,689.36	40	568.94	4	56.89	0.4	5.69	0.04	0.57
500	7,111.70	50	711.17	5	71.12	0.5	7.11	0.05	0.71
600	8,534.04	60	853.40	6	85.34	0.6	8.53	0.06	0.85
700	9,956.38	70	995.64	7	99.56	0.7	9.96	0.07	1.00
800	11,378.72	80	1,137.87	8	113.79	0.8	11.38	0.08	1.14
900	12,801.06	90	1,280.11	9	128.01	0.9	12.80	0.09	1.28
1,000	14,223.40	100	1,422.34	10	142.23	1.0	14.22	0.10	1.42

POUNDS PER SQUARE FOOT TO KILOGRAMS PER SQUARE METER
(1 lb. per sq. ft. = 4.882409 kg. per sq. m.)

Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²
1,000	4,882.41	100	488.24	10	48.82	1	4.88	0.1	0.49
2,000	9,764.82	200	976.48	20	97.65	2	9.76	0.2	0.98
3,000	14,647.23	300	1,464.72	30	146.47	3	14.65	0.3	1.46
4,000	19,529.64	400	1,952.96	40	195.30	4	19.53	0.4	1.95
5,000	24,412.04	500	2,441.20	50	244.12	5	24.41	0.5	2.44
6,000	29,294.45	600	2,929.44	60	292.94	6	29.29	0.6	2.93
7,000	34,176.86	700	3,417.69	70	341.77	7	34.18	0.7	3.42
8,000	39,059.27	800	3,905.93	80	390.59	8	39.06	0.8	3.91
9,000	43,941.68	900	4,394.17	90	439.42	9	43.94	0.9	4.39
10,000	48,824.09	1,000	4,882.41	100	488.24	10	48.82	1.0	4.88

KILOGRAMS PER SQUARE METER TO POUNDS PER SQUARE FOOT
(1 kg. per sq. m. = 0.204817 lb. per sq. ft.)

Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²	Kg/m ²	Lb/ft ²
1,000	204.82	100	20.48	10	2.05	1	0.20	0.1	0.02
2,000	409.63	200	40.96	20	4.10	2	0.41	0.2	0.04
3,000	614.45	300	61.44	30	6.14	3	0.61	0.3	0.06
4,000	819.27	400	81.93	40	8.19	4	0.82	0.4	0.08
5,000	1,024.08	500	102.41	50	10.24	5	1.02	0.5	0.10
6,000	1,228.90	600	122.89	60	12.29	6	1.23	0.6	0.12
7,000	1,433.72	700	143.37	70	14.34	7	1.43	0.7	0.14
8,000	1,638.54	800	163.85	80	16.39	8	1.64	0.8	0.16
9,000	1,843.35	900	184.34	90	18.43	9	1.84	0.9	0.18
10,000	2,048.17	1,000	204.82	100	20.48	10	2.05	1.0	0.20

WEIGHTS AND MEASURES

Pounds per Cubic Inch—Grams per Cubic Centimeter and Pounds per Cubic Foot—Kilograms per Cubic Meter Conversion Tables

POUNDS PER CUBIC INCH TO GRAMS PER CUBIC CENTIMETER
(1 lb. per cu. in. = 27.67974 g. per cu. cm.)

Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³
100	2,767.97	10	276.80	1	27.68	0.1	2.77	0.01	0.28
200	5,535.95	20	553.60	2	55.36	0.2	5.54	0.02	0.55
300	8,303.92	30	830.39	3	83.04	0.3	8.30	0.03	0.83
400	11,071.90	40	1,107.19	4	110.72	0.4	11.07	0.04	1.11
500	13,839.87	50	1,383.99	5	138.40	0.5	13.84	0.05	1.38
600	16,607.84	60	1,660.78	6	166.08	0.6	16.61	0.06	1.66
700	19,375.82	70	1,937.58	7	193.76	0.7	19.38	0.07	1.94
800	22,143.79	80	2,214.38	8	221.44	0.8	22.14	0.08	2.21
900	24,911.77	90	2,491.18	9	249.12	0.9	24.91	0.09	2.49
1,000	27,679.74	100	2,767.97	10	276.80	1.0	27.68	0.10	2.77

GRAMS PER CUBIC CENTIMETER TO POUNDS PER CUBIC INCH
(1 g. per cu. cm. = 0.0361273 lb. per cu. in.)

G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³	G./cm. ³	Lb./in. ³
1,000	36.128	100	3.613	10	0.362	1	0.036	0.1	0.004
2,000	72.255	200	7.226	20	0.723	2	0.072	0.2	0.007
3,000	108.382	300	10.838	30	1.084	3	0.108	0.3	0.011
4,000	144.510	400	14.451	40	1.445	4	0.145	0.4	0.014
5,000	180.638	500	18.064	50	1.806	5	0.181	0.5	0.018
6,000	216.765	600	21.676	60	2.168	6	0.217	0.6	0.022
7,000	252.892	700	25.289	70	2.529	7	0.253	0.7	0.025
8,000	289.020	800	28.902	80	2.890	8	0.289	0.8	0.029
9,000	325.148	900	32.515	90	3.251	9	0.325	0.9	0.033
10,000	361.275	1,000	36.128	100	3.613	10	0.361	1.0	0.036

POUNDS PER CUBIC FOOT TO KILOGRAMS PER CUBIC METER
(1 lb. per cu. ft. = 16.01837 kg. per cu. m.)

Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³
100	1,601.84	10	166.18	1	16.02	0.1	1.60	0.01	0.16
200	3,203.67	20	320.37	2	32.04	0.2	3.20	0.02	0.32
300	4,805.51	30	480.55	3	48.06	0.3	4.81	0.03	0.48
400	6,407.35	40	640.73	4	64.07	0.4	6.41	0.04	0.64
500	8,009.18	50	800.92	5	80.09	0.5	8.01	0.05	0.80
600	9,611.02	60	961.10	6	96.11	0.6	9.61	0.06	0.96
700	11,212.86	70	1,121.29	7	112.13	0.7	11.21	0.07	1.12
800	12,814.70	80	1,281.47	8	128.15	0.8	12.81	0.08	1.28
900	14,416.53	90	1,441.65	9	144.17	0.9	14.42	0.09	1.44
1,000	16,018.37	100	1,601.84	10	160.18	1.0	16.02	0.10	1.60

KILOGRAMS PER CUBIC METER TO POUNDS PER CUBIC FOOT
(1 kg. per cu. m. = 0.0624283 lb. per cu. ft.)

Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³	Kg./m. ³	Lb./ft. ³
1,000	62.428	100	6.243	10	0.624	1	0.062	0.1	0.006
2,000	124.857	200	12.486	20	1.249	2	0.125	0.2	0.012
3,000	187.285	300	18.728	30	1.873	3	0.187	0.3	0.019
4,000	249.713	400	24.971	40	2.497	4	0.250	0.4	0.025
5,000	312.142	500	31.214	50	3.121	5	0.312	0.5	0.031
6,000	374.570	600	37.457	60	3.746	6	0.375	0.6	0.037
7,000	436.998	700	43.700	70	4.370	7	0.437	0.7	0.044
8,000	499.426	800	49.943	80	4.994	8	0.499	0.8	0.050
9,000	561.855	900	56.186	90	5.619	9	0.562	0.9	0.056
10,000	624.283	1,000	62.428	100	6.243	10	0.624	1.0	0.062

WEIGHTS AND MEASURES

British Thermal Unit—Foot Pound and Horsepower—Kilowatt Conversion Tables

BRITISH THERMAL UNITS TO FOOT-POUNDS (1 Btu = 778.26 ft.-lb.)*									
Btu	Ft.-lb.	Btu	Ft.-lb.	Btu	Ft.-lb.	Btu	Ft.-lb.	Btu	Ft.-lb.
100	77,826	10	7,783	1	778	0.1	78	0.01	8
200	155,652	20	15,565	2	1,557	0.2	156	0.02	16
300	233,478	30	23,348	3	2,335	0.3	233	0.03	23
400	311,304	40	31,130	4	3,113	0.4	311	0.04	31
500	389,130	50	38,913	5	3,891	0.5	389	0.05	39
600	466,956	60	46,696	6	4,670	0.6	467	0.06	47
700	544,782	70	54,478	7	5,448	0.7	545	0.07	54
800	622,608	80	62,261	8	6,226	0.8	623	0.08	62
900	700,434	90	70,043	9	7,004	0.9	700	0.09	70
1,000	778,260	100	77,826	10	7,783	1.0	778	0.10	78

FOOT-POUNDS TO BRITISH THERMAL UNITS (1 ft.-lb. = 0.00128492 Btu)*									
Ft.-lb.	Btu	Ft.-lb.	Btu	Ft.-lb.	Btu	Ft.-lb.	Btu	Ft.-lb.	Btu
10,000	12.849	1,000	1.285	100	0.128	10	0.013	1	0.001
20,000	25.698	2,000	2.570	200	0.257	20	0.026	2	0.003
30,000	38.548	3,000	3.855	300	0.385	30	0.039	3	0.004
40,000	51.397	4,000	5.140	400	0.514	40	0.051	4	0.005
50,000	64.246	5,000	6.425	500	0.642	50	0.064	5	0.006
60,000	77.095	6,000	7.710	600	0.771	60	0.077	6	0.008
70,000	89.944	7,000	8.994	700	0.899	70	0.090	7	0.009
80,000	102.794	8,000	10.279	800	1.028	80	0.103	8	0.010
90,000	115.643	9,000	11.564	900	1.156	90	0.116	9	0.012
100,000	128.492	10,000	12.849	1,000	1.285	100	0.128	10	0.013

HORSEPOWER TO KILOWATTS (1 hp. = 0.74570 kw.)†							
Hp.	Kw.	Hp.	Kw.	Hp.	Kw.	Hp.	Kw.
1,000	745.7	100	74.6	10	7.5	1	0.7
2,000	1,491.4	200	149.1	20	14.9	2	1.5
3,000	2,237.1	300	223.7	30	22.4	3	2.2
4,000	2,982.8	400	298.3	40	29.8	4	3.0
5,000	3,728.5	500	372.8	50	37.3	5	3.7
6,000	4,474.2	600	447.4	60	44.7	6	4.5
7,000	5,219.9	700	522.0	70	52.2	7	5.2
8,000	5,965.6	800	596.6	80	59.7	8	6.0
9,000	6,711.3	900	671.1	90	67.1	9	6.7
10,000	7,457.0	1,000	745.7	100	74.6	10	7.5

KILOWATTS TO HORSEPOWER (1 kw. = 1.34102 hp.)†							
Kw.	Hp.	Kw.	Hp.	Kw.	Hp.	Kw.	Hp.
1,000	1,341.0	100	134.1	10	13.4	1	1.3
2,000	2,682.0	200	268.2	20	26.8	2	2.7
3,000	4,023.1	300	402.3	30	40.2	3	4.0
4,000	5,364.1	400	536.4	40	53.6	4	5.4
5,000	6,705.1	500	670.5	50	67.1	5	6.7
6,000	8,046.1	600	804.6	60	80.5	6	8.0
7,000	9,387.1	700	938.7	70	93.9	7	9.4
8,000	10,728.2	800	1,072.8	80	107.3	8	10.7
9,000	12,069.2	900	1,206.9	90	120.7	9	12.1
10,000	13,410.2	1,000	1,341.0	100	134.1	10	13.4

* Conversion factor defined by International Steam Table Conference, 1929.

† Based on 1 horsepower = 550 foot-pounds per second.

WEIGHTS AND MEASURES

Fundamental Electrical Units.—The fundamental electrical units of the *International System* were, by international agreement, superseded by those of the *Absolute System* derived from the fundamental mechanical units of length, mass, and time by use of accepted principles of electromagnetism with the value of the permeability of space taken as 0.0000001 in the meter-kilogram-second system.

The relations between the mean international units and the absolute units are: one mean international ohm equals 1.00049 absolute ohm; one mean international volt equals 1.00034 absolute volt. This change became effective on January 1, 1948.

The *Ampere* (unit of electric current).—The absolute ampere is the constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular sections, and placed 1 meter apart in a vacuum, will produce between these conductors a force equal to 0.0000002 meter-kilogram-second unit (newton) of force per meter of length.

The *Volt* (unit of difference of potential and of electromotive force).—The volt is the difference of electric potential between two points of a conducting wire carrying a constant current of 1 ampere, when the power dissipated between these points is equal to 1 watt.

The *Ohm* (unit of electric resistance).—The ohm is the electric resistance between two points of a conductor when a constant difference of potential of 1 volt, applied between these two points, produces in this conductor a current of 1 ampere, this conductor not being the seat of any electromotive force.

The *Coulomb* (unit of quantity of electricity).—The coulomb is the quantity of electricity transported in 1 second by a current of 1 ampere.

The *Farad* (unit of electric capacitance).—The farad is the capacitance of a capacitor between the plates of which there appears a difference of potential of 1 volt when it is charged by a quantity of electricity equal to 1 coulomb.

The *Henry* (unit of electric inductance).—The henry is the inductance of a closed circuit in which an electromotive force of 1 volt is produced when the electric current in the circuit varies uniformly at a rate of 1 ampere per second.

Power and Heat Equivalents

- 1 horsepower-hour = 0.746 kilowatt-hour = 1,980,000 foot-pounds = 2545 Btu (British thermal units) = 2.64 pounds of water evaporated at 212° F. = 17 pounds of water raised from 62° to 212° F.
- 1 kilowatt-hour = 1000 watt-hours = 1.34 horsepower-hour = 2,655,200 foot-pounds = 3,600,000 joules = 3415 Btu = 3.54 pounds of water evaporated at 212° F. = 22.8 pounds of water raised from 62° to 212° F.
- 1 horsepower = 746 watts = 0.746 kilowatt = 33,000 foot-pounds per minute = 550 foot-pounds per second = 2545 Btu per hour = 42.4 Btu per minute = 0.71 Btu per second = 2.64 lbs. of water evaporated per hour at 212° F.
- 1 kilowatt = 1000 watts = 1.34 horsepower = 2,655,200 foot-pounds per hour = 44,200 foot-pounds per minute = 737 foot-pounds per second = 3415 Btu per hour = 57 Btu per minute = 0.95 Btu per second = 3.54 pounds of water evaporated per hour at 212° F.
- 1 watt = 1 joule per second = 0.00134 horsepower = 0.001 kilowatt = 3.42 Btu per hour = 44.22 foot-pounds per minute = 0.74 foot-pounds per second = 0.0035 pound of water evaporated per hour at 212° F.
- 1 Btu (British thermal unit) = 1052 watt-seconds = 778 foot-pounds = 0.252 kilogram-calorie = 0.000292 kilowatt-hour = 0.000393 horsepower-hour = 0.00104 pound of water evaporated at 212° F.
- 1 foot-pound = 1.36 joule = 0.00000377 kilowatt-hour = 0.00129 Btu = 0.000005 horsepower-hour.
- 1 joule = 1 watt-second = 0.00000278 kilowatt-hour = 0.00095 Btu = 0.74 foot-pound.

ANH NGỮ THỰC HÀNH

Sổ Tay Tiếng Anh Kỹ Thuật **A Handbook of ENGINEERING English**

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ABS

Acrylonitrile-Butadiene-
Styrene

LCD

Liquid Crystal Display

PCM

Pulse Code Modulation

