PROPERTIES OF BRONZES. B.

Al. Bronze Average.	Al. Brass Average.	Mg. Bronze Cast.	Mg. Bronze Rolled.
Break. Strength.			
Tension	58,400	60,800	61,000	80,000
Compress.	—	—	135,500 (K)	—
Shear	—	—	104,500	66,700
Elast. Strength.			
Tension	20,530	32,000	35,100	59,300
Compress.	—	—	—	—
Shear	—	—	—	—
Working Stress. Dead Load.		Using Factor of Safety of 6.		
Tension	9,733	10,130	10,170	13,300
Compress.	—	—	22,000	—
Bend.	—	—	—	—
Shear	—	—	17,400	—
Torsion	—	—	—	—
Var. Load O to Max.		Using ½ Dead Load Stress.		
Tension	4,867	5,065	5,090	6,650
Compress.	—	—	11,300	—

Bend.	—	—	—	—
Shear	—	—	—	—
Torsion	—	—	8,700	—
			—	—
Var. Load L to—L.		Using ½ Dead Load Value		
Tension-Com. ...	3,240	3,380	3,390	4,430
Bending	—	—	—	—
Shear	—	—	5,800	—
Torsion	—	—	—	—
Mod. of Elast.				
Direct	13,100,000	—	—	—
Transverse	—	—	—	—
Abrasive Hard	—	—	—	—
Coeff. of Expans. ...	—	—	—	—
Conduct. Heat	—	—	—	—
Wgt. per Cu. Ft. ...	481.25 lbs.	—	—	—
Wgt. per Cu. In. ...	·278 „	—	—	—
Special Qual.	—	—	—	—
Special Qual.	—	—	Can be Forged.	
Cost per Lb.	21 cts. Ingot.	—	—	—
Authorities.	Wat. Ars. Rep.—Kent.—Low—Haswell.—Eng. News.		17 cts. Ingot.	—

PROPERTIES OF BELTING MATERIALS. A.

	Leather Average.	Leather Maximum.	Leather Minimum.	Cotton Average.	Cotton Maximum.	Cotton Minimum.
Break. Strength						
Tension	4,314	5,994	1,577	4,094	7,750	2,618
Conpression	—	—	—	—	—	—
Shear	—	—	—	—	—	—
Elastic Strength	—	—	—	—	—	—
Tension	507	—	—	667	—	—
Compression	—	—	—	—	—	—
Shear	—	—	—	—	—	—
Working Stress	—	—	—	—	—	—
Dead Load	—	—	—	—	—	—
Tension	—	—	—	—	—	—
Compression	—	—	—	—	—	—
Bending	—	—	—	—	—	—
Shear	—	—	—	—	—	—
Torsion	—	—	—	—	—	—
Var. Load O to Max.						
Tension	212	—	—	212	—	—
Compression	—	—	—	—	—	—

Bending	—	—	—	—	—	—
Shear	—	—	—	—	—	—
Torsion	—	—	—	—	—	—
Var, Load+L to−L. Tension-Compress.						
Bending	—	—	—	—	—	—
Shear	—	—	—	—	—	—
Torsion	—	—	—	—	—	—
Mod.of Elas.						
Direct	16,100	23,000	11,000	9,140	24,000	4,700
Transverse	—	—	—	—	—	—
Abrasive Hard	—	—	—	—	—	—
Coeff. of Expan....	—	—	—	—	—	—
Conduct. Heat	—	—	—	—	—	—
Wgt. per Cu. Ft.	—	—	—	—	—	—
Wgt. per Cu. In.	—	—	—	—	—	—
Special Qual.	·034	·037	·031	·032	·042	·025
Special Qual.	—	—	—	—	—	—
Cost per Lb.	1·50	—	—	—	—	—
Authorities...	Wat. Ars. Rep.	F. W. Taylor in T.A.S. M.E.	Kirkaldys Tests.			

PROPERTIES OF BELTING MATERIALS. B.

	Rubber.			Rawhide.		
	Average.	Maximum.	Manimum.	Average.	Maximum.	Minimum.
Break. Strength.						
Tension	3,160	3,860	2,381	—	—	—
Compression.						
Shear	—	—	—	—	—	—
Elastic Strength.						
Tension	617	—	—	—	—	—
Compression						
Shear	—	—	—	—	—	—
Working Stress.						
Dead Load...	—	—	—	—	—	—
Tension	—	—	—	—	—	—
Compression.						
Bending	—	—	—	—	—	—
Shear	—	—	—	—	—	—
Torsion	—	—	—	—	—	—
Var. Load. O to Max,						
Tension	212	—	—	260	—	—

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Compression.						
Bending	—	—	—	—	—	—
Shear...	—	—	—	—	—	—
Torsion	—	—	—	—	—	—
Var. Load + L to — L.						
Tension-Compress.						
Bending	—	—	—	—	—	—
Shear...	—	—	—	—	—	—
Torsion	—	—	—	—	—	—
Mod. of Elas.						
Direct	12,216	18,000	8,700	—	—	—
Transverse	—	—	—	—	—	—
Abrasive Hard.						
Coeff. of Expan ...	—	—	—	—	—	—
Conduct. Heat	—	—	—	—	—	—
Wgt. per Cu. Ft.						
Wgt. per Cu. In.	·043	·045	·040			
Special Qual.	—	—	—	—	—	—
Special Qual.	—	—	—	—	—	—
Cost per Lb.	—	—	—	—	—	—
Authorities.	Watertown. Arc. Rep.: T.A.S.M.E.: Kirkaldys Tests.					

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STRENGTH OF

Materials.	Ultimate Resistance in lb.per sq. in.			Young's Modulus of Elasticity lb. per sq in.
	Tension 1,000×	Compression ×1,000	Shearing × 1,000	1,000,000 ×
Soft Steel (unhardened)	60 to 100	—	—	30
Soft Steel (hardened)	120	—	—	30
Cast Steel (untempered)	90 to 150	—	—	30
Cast Steel (tempered)	—	—	—	36
Steel Plates	60 to 80	—	—	--
Steel Bars...	100 to 130	—	—	29 to 42
Cast Steel (drawn)	120	—	—	27
Steel Wire (English), drawn	120 to 140	—	—	28
Steel Wire (Common), tempered blue	330	—	—	26—29
Steel Pianoforte Wire, English	340	—	—	—
Manganese Steel, Cast ...	85	—	—	—
Nickel Steel, unhardened.	75	—	—	—
Nickel Steel, hardened ...	190	—	—	—
Wrought Iron Bars and Bolts	55 to 70	50	50	29
Wrought Iron Plates, with fibre	51	—	—	25
Wrought Iron Plates (across fibre)	46	—	—	27
Wrought Iron Plates (mean)	48·5	—	—	26
Cast Iron	14 to 30	50 to 120	28·5	14 to 23
Aluminium	33	—	—	—
Aluminium (annealed) ...	13·5	—	—	—
Brass, Yellow	17·5	10·5	—	9
Brass, Sheet...	30	—	—	—
Brass, Tube	80 to 100	—	—	—
Brass, Cast	20	—	—	9·2
Brass, Wire	50	—	—	14·2
Copper, Wrought	33	58	—	15
Copper, Cast	20	—	—	—

MATERIALS. (*Perry.*)

Materials.	Ultimate Resistance in lb. per sq. in.			Young's Modulus of Elasticity lb. per sq. in.
	Tension × 1,000	Compression × 1,000	Shearing ×1,000	1,000,000 ×
Copper Wire, hard drawn.	58	—	—	—
Copper Wire, annealed ...	47	—	...	—
Zinc, Cast	7·5	—	—	—
Zinc, Sheet	30	—	—	—
Lead...	1·9	7·3	—	·72
Lead, Cast...	3	—	—	--
Tin	4·6	—	—	6
Platinum Wire...	50	—	—	24
Gold (drawn)	38 to 41	—	—	12
Silver (drawn)...	42	—	—	11
Phosphor Bronze (cast) ...	55	—	—	14
Phosphor Bronze Wire (hard)	100 to 150	—	—	-
Phosphor Bronze Wire (annealed)	50 to 60	—	—	—
Aluminium Bronze, Cu. 95 Al. 5	60	—	—	—
Aluminium Bronze, Cu. 90 Al. 10	100	—	—	—
Manganese Bronze	65 to 85	—	—	12
Delta Metal (cast)	47	—	—	13
Delte Metal (rolled) ...	74	—	—	—
Muntz Metal	45	—	—	—
Sterro Metal	60	—	—	10
Gun Metal...	25 to 50	—	—	—
Ebony	—	18	—	—
Oak, European...	14·5	10	2·3	1·5
Mahogany, Spanish... ...	15	—	—	1·4
Ash	17·5	—	—	1·6
Pitch Pine	12	6	·65	1·4
Red Pine	10·5	—	—	1·65
Birch...	14·5	—	—	—
Beech	11·5	—	—	1·35
Fire, Larch	11	—	—	1·1

STRENGTH OF MATERIALS.—*Continued.*

Material.	Ultimate Resistance in lb. per sq. in.			Young's Modulus of Elasticity lb. per sq. in 1,000,000 ×
	Tension 1,000 ×	Compression 1,000 ×	Shearing 1,000 ×	
Fire, Spruce	12.5	—	—	1.6
Hornbeam	15	12	—	2.4
Teak, Indian	15	7	—	—
Lancewood	20	—	—	—
Elm, British...	14	10	—	—
Ltgnum Vitæ	16	—	—	—
Sycamore	13	—	—	1.04
C dar of Lebanon ...	11.4	—	—	.48
Granite	—	17	—	7
Marble	.7	6	—	6
Limestone	--	5	—	—
Sandstone	.8	5	—	2
Slate	11	15	—	13
Br.ck, Red	.3	.8	—	—
Brick, Fire		2	—	—
Brickwork	—	.5	—	—
Concretete	—	2	—	—
Leather	4	—	—	.025
Hemp Rope (in ordinary state)	10	—	—	—
Glass, Plate	2.7	26	—	8
Ice...	—	—	—	8.5
Quartz Fibre (Professor Boy's)	140	—	—	—

CHAINS AND ROPES.

The following Tables give the Admiralty requirements as to chains :—

Admiralty Tests, &c., of Stud-Link Chain Cable.

Dia. of cable in inches.	Breaking strength in tons.	Proof load in tons.	Weight of 100 fathoms in cwts.	Dia. of cable in inches.	Breaking strength in tons.	Proof load in tons.	Weight of 100 fathoms in cwts.
$\frac{7}{16}$	4·90	3·5	9·25	$1\frac{1}{2}$	56·70	40·5	108·0
$\frac{1}{2}$	6·30	4·5	12·0	$1\frac{5}{8}$	66·50	47·5	126.7
$\frac{9}{16}$	7·70	5·5	15·25	$1\frac{3}{4}$	77·17	55·125	147.0
$\frac{5}{8}$	9·80	7·0	18·75	$1\frac{7}{8}$	88·55	63·25	168.7
$\frac{11}{16}$	11·90	8·5	22·75	2	100·80	72·0	192.0
$\frac{3}{4}$	14·17	10·125	27·0	$2\frac{1}{8}$	113·75	81·25	216.7
$\frac{7}{8}$	19·25	13·75	36·75	$2\frac{1}{4}$	127·57	91·125	243.0
1	25·20	18·0	48·0	$2\frac{3}{8}$	142·10	101·5	270.7
$1\frac{1}{8}$	31·85	22·75	60·75	$2\frac{1}{2}$	157·50	112·5	300.0
$1\frac{1}{4}$	39·37	28·125	75·0	$2\frac{3}{4}$	181·02	129·3	363.0
$1\frac{3}{8}$	47·60	34·0	90·75	3	204·12	145·8	432.0

Up to and including $2\frac{1}{2}$ inches diameter the above proof loads are equal to 630 lbsr per circular $\frac{1}{8}$ inch of section of one side of link, and are the same as those required by the China Cables and Anchors Acts; but for $2\frac{3}{4}$ inch diameter the load is reduced to 598.5 lbs. per circular $\frac{1}{8}$ inch, and for 3 inch diameter to 567 lbs. The formula for proof loads of chains up to $2\frac{1}{2}$ inches diameter may also be written,—

Proof load in tons $= 18 \times (\text{diameter in inches})^2$.

The breaking strengths are placed at 40 per cent. above the proof loads.

Table I. Ultimate and Elastic Strengths of Materials and Co-efficients of Elasticity, in lbs. per sq. in.

Material.	Breaking Strength.			Elastic Strength.			Co-efficient of Elasticity.	
	Tension.	Pressure.	Shearing.	Tension.	Pressure.	Shearing.	Direct. E.	Transverse. C.
Cast iron	30,500	130,000	12,000	—	—	—	23,000,000	7,600 000
	17,500	95,000	10,500	10,500(1)	21,000(1)	8,000(1)	17,000 000	6,300,000
	10,800	50,000	8,700	—	—	—	14,000,000	5,000,000
Wrought—iron bars ...	67,000	—	49,000(2)	—	—	—	31,000,000	—
	57,600	50,000	40,000	30,000	30,000	22,000	29,000,000	10,500,000
	33,500	—	22,400	—	—	—	27,000,000	—
Iron ship plates ||	49,000	—	—	—	—	—	—	—
Iron boiler plates || ...	47,000	—	36,000	24,000	24,000	15,000	26,000,000	14,000,000
" " " ⊥	41,500	—	—	—	—	—	27,000,000	—
Steel plates ¼% carbon ...	65,000	—	50,000	42,000	38,000	—		—
" " ½% ...	78,000	—	56,000	47,000	49,000	—	31,000,000	13,000,000
" " 1% " ...	110,000	—	83,000	67,000	71,000	—		—
Steel boiler plates	66,000	—	56,000	36,000	—	—	30,000,000	13,500,000
Rivet Steel	65,000	—	55,600	46,000	—	—	30,000,000	13,000,000
Cast Steel untempered ...	150,000	—	—	—	—	—	—	—
	120,000	—	—	80,000	80,000	64,000	30,000,000	12,000,000
	84,000	—	—	—	—	—	—	—
Cast Steel tempered ...	—	—	—	190,000	190,000	145,000	36,000,000	14,000,000
Steel Castings from ...	63 000	—	—	34,000	—	—	30,000,000	—
Steel Castings to	34,000	—	—	20,000	—	—	20,000,000	—
Copper Cast... from ...	19,000	—	—	—	—	—	12,000,000	—
Copper Cast... to	23,000	58,000	—	—	—	—	—	—

Material.	Breaking Strength.		
	Tension.	Pressure	Shearing.
Copper rolled plates... ...	31,000	—	—
„ anneaded wire ...	45,000	—	—
„ hard drawn wire...	58,000	—	—
Brass... ... ... from	17,500	—	—
Brass... ... ... to	29.000	—	—
Gunmetal or bronze ...	52,000	—	—
Gunmetal or bronze ...	27,000	—	—
Gunmetal or bronze ...	23,000	—	—
Delta metal, Cast	36,000	—	—
„ „ rolled	74.000	—	—
Phosphor bronze	58,000	—	43,000
Muntz metal	49.000	—	—
Cast zinc	7.500	—	—
Lead	2,500	7,000	—
Tin	4,700	—	—
Wood, pine ... from	6,700	3,400	—
Wood, pine ... to	13,000	7,000	630(3)
„ oak	15,000	10,000	2,240(3)
Leather	4,200	—	—

(1) Cast iron has properly no elastic limit. (2) The shearing resistance of wrought iron is much less along the fibre than across it. (3) These are along the fibres of the wood.

Continued.

Elastic Strength.			Co efficient of Elasticity.	
Tension.	Pressure.	Shearing.	Direct. E.	Transverse. C.
5,609	4,000	3,000	15,000,000	5,600,000
—	—	—	16,000,000	—
—	—	—	17,000,000	—
—	—	—	13,500,000	—
—	—	—	—	—
—	—	—	—	—
6,200	—	4,150	13,500,000	—
—	—	—	—	—
17,000	—	—	12,000,000	—
51,000	—	—	13,000,000	—
19,700	—	—	14.000,000	5,250,000
—	—	—	—	—
3,200	—	—	—	—
1,500	—	—	2,500,000	—
—	—	—	—	—
—	—	—	1,000,000	—
—	—	—	1,600,000	—
—	—	—	1,450,000	—
—	—	—	25,000	—

Table II. Ordinary Working Stress.

Case A. The straining action a permanent one.

Material.	Kind of Stress.				
	Tension.	Compression.	Bending.	Shear.	Torsion.
Cast iron	4,200	12,000	6,000 to 8,000	2,300	4,000 to 6,000
Wrought Iron :–					
„ Bar or forged.	15,000	15,000	15,000	12,000	7,500
„ Plate ‖	15,000	—	—	—	—
„ „ ⊥	12,000	—	—	10,000	—
Mild steel.....	13,000 to 17,000	13,000 to 17,000	13,000 to 17,000	10,000 to 13,000	8,000 to 12,000
Cast steel	17,000 to 21,000	17,000 to 21,000	17,000 to 21,000	13,000 to 17,000	12,000 to 16,000
Steel castings ...	8,000 to 12,000	12,000 to 16,000	10,000 to 14,000	7,000 to 12,000	7,000 to 12,000
Phosphor bronze.	10,000	—	—	7,000	4,200
Gunmetal	4,200	—	—	—	—
Rolled copper ...	4,000	—	—	2,400	—
Brass	3,000	—	—	—	—

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Case B. Straining action producing stress of one kind only, varying from zero to a greatest value frequently.

Material.	Tension.	Compression.	Bending.	Shear.	Torsion.
Cast iron	2,800	8,000	4,000 to 5,300	1,500	2,600 to 4,000
Bar iron	10,000	10,000	10,000	8,000	5,000
Plate iron ‖. ...	10,000	—	—	—	—
„ „ ⊥.....	8,000	—	—	6,500	—
Mild steel	8,600 to 11,400	8,600 to 11,400	8,600 to 11,400	6,500 to 8,600	5,300 to 8,000
Cast steel	11,400 to 14,000	11,400 to 14,000	11,400 to 14,000	8,600 to 11,400	8,000 to 10,600
Steel castings ...	5,300 to 8,000	8,000 to 10,600	6,600 to 9,400	4,700 to 8,000	4,700 to 8,000
Phosphor bronze.	6,600	—	—	4,600	2,800
Gunmetal	2,800	—	—	—	—
Rolled copper ...	2,600	—	—	1,600	—
Brass	2,000	—	—	—	—

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Case C. Straining action producing equal stresses of opposite sign alternately

Material.	Tension & Compression.	Bending.	Shear.	Torsion.
Cast iron	1,400	2,000 to 2,700	770	1,300 to 2,000
Bar iron	5,000	5,000	4,000	2,500
Mild steel	4,300 to 5,700	4,300 to 5,700	3,300 to 4,300	2,700 to 4,000
Cast steel	5,700 to 7,000	5,700 to 7,000	4,300 to 5,700	4,000 to 5,300
Steel Castings	2,700 to 4,000	3,300 to 4,700	2,300 to 4,000	2,300 to 4,000
Gunmetal	1,400	—	—	—

Table III. Working Stresses in Building Construction.

	Tension lbs. per sq. in.	Compression lbs. per sq. in.
Wrought iron	14,000	14,000
Cast iron	3,360	10,080
Oak	1,400	940,
Pine	1,120	800
Brickwork lime mortar.	—	36 to 72
Brickwork, Cement mortar.....	—	72 to 108
Rubble masonry, lime mortar...	—	58
,, Cement mortar.	—	72
Portland Cement Concrete	—	100
Pressed bricks in cement mortar	—	114 to 128

ADMIRALTY TESTS, &c., OF SHORT-LINK CHAIN.

Dia. of chain in inches.	Breaking strength in tons.	Proof load in tons.	Weight per fathom in pounds.
$\frac{1}{4}$	1·87	·75	3·0
$\frac{5}{16}$	2·93	1·17	5·5
$\frac{3}{8}$	4·22	1·69	8·0
$\frac{7}{16}$	5·74	2·30	10·5
$\frac{1}{2}$	7·50	3·00	14·0
$\frac{9}{16}$	9·49	3·80	18·0
$\frac{5}{8}$	11·72	4·69	22·0
$\frac{11}{16}$	14·18	5·67	27·0
$\frac{3}{4}$	16·87	6·75	32·0
$\frac{13}{16}$	19·80	7·92	37·0
$\frac{7}{8}$	22·97	9·19	43·0
$\frac{15}{16}$	26·37	10·55	49·0
1	30·00	12·00	56·0
$1\frac{1}{16}$	33·87	13·54	63·0
$1\frac{1}{8}$	37·97	15·18	71·0
$1\frac{3}{16}$	42·30	16·92	79·0
$1\frac{1}{4}$	46·87	18·75	87·0
$1\frac{5}{16}$	51·68	20·67	96·0
$1\frac{3}{8}$	56·72	22·68	106·0
$1\frac{7}{16}$	62·00	24·80	116·0
$1\frac{1}{2}$	67·50	27·00	127·0
...	...	...	...

The proof loads for short-link chains are $\frac{3}{5}$rds. those for stud-link chains.

The rule may be written,—**Proof load in tons = 12 × (diameter in inches)²**. The breaking strengths of short-link chains are placed at $2\frac{1}{2}$ times the proof loads.

Lloyd's requirements as to chain cables, &c., are given in Table 257; the proof loads and breaking strengths are those required by the Act of Parliament; the breaking strengths for chain above $1\frac{1}{2}$ inch diameter are the same as required by the Admiralty, but for chains of $1\frac{1}{8}$ inch diameter and under, Lloyd's require a slightly higher breaking strength.

LLOYD'S TESTS OF STUD-LINK CHAIN CABLES.

Diameter of chain in inches.	Proof load (Statutory) in tons.	Breaking strength (Statutory) in tons.	Diameter of chain in inches.	Proof load (Statutory) in tons.	Breaking strength (Statutory) in tons.
$\frac{1}{1}\frac{1}{6}$	8·5	12·75	$1\frac{5}{8}$	47·5	66·57
$\frac{3}{4}$	10·125	15·125	$1\frac{1}{1}\frac{1}{6}$	51·25	71·75
$\frac{1}{1}\frac{3}{6}$	11·875	17·8	$1\frac{3}{4}$	55·125	77·125
$\frac{7}{8}$	13·75	20·625	$1\frac{1}{1}\frac{3}{6}$	59·125	82·75
$\frac{1}{1}\frac{5}{6}$	15·8	23·7	$1\frac{7}{8}$	63·25	88·5
1	18·0	27·0	$1\frac{1}{1}\frac{5}{6}$	67·5	94·5
$1\frac{1}{1}\frac{1}{6}$	20·3	30·4	2	72·0	100·8
$1\frac{1}{8}$	22·75	34·125	$2\frac{1}{1}\frac{1}{6}$	76·5	107·1
$1\frac{3}{1}\frac{3}{6}$	25·375	38·0	$2\frac{1}{8}$	81·25	113·75
$1\frac{1}{4}$	28·125	42·125	$2\frac{3}{1}\frac{3}{6}$	86·125	120·5
$1\frac{5}{1}\frac{5}{6}$	31·0	46·5	$2\frac{1}{4}$	91·125	127·5
$1\frac{3}{8}$	34·0	51·0	$2\frac{5}{1}\frac{5}{6}$	96·25	134·75
$1\frac{7}{1}\frac{7}{6}$	37·125	55·625	$2\frac{3}{8}$	101·5	142·1
$1\frac{1}{2}$	40·5	58·7	$2\frac{7}{1}\frac{7}{6}$	107·0	149·7
$1\frac{9}{1}\frac{9}{6}$	43·9	61·4	$2\frac{1}{2}$	112·5	157·5

Note.—Unstudded close-link chains will be admitted as cables if proved to two-thirds the load required for stud-link chains, and if the breaking strength is not less than twice such proof load.

In some recent tests of the chain cables of large steamers a $2\frac{5}{8}$ inch cable gave an average ultimate strength of 212 tons, and a $2\frac{9}{1}\frac{9}{6}$ inch cable gave 223 tons as the lowest and 229 tons as the highest of seven tests.

The safe working load on chains should not be taken higher than half the proof load; if this proportion be adopted the formula becomes:—

Working load in tons = $\begin{cases} 9 \times (\text{dia. in inches})^2 \text{ for stud-link,} \\ 6 \times (\text{dia. in inches})^2 \text{ for close-link.} \end{cases}$

For ordinary crane chains and slings $4 \times (\text{diameter in inches})^2$ is high enough.

STRENGTH AND WEIGHT OF IRON CHAINS.—B.B.B.

Diameter.	Safe load. $\frac{1}{4}$ breaking load.		Breaking load.		Weight per fathom.
Inches.	Tons.	Cwts.	Tons.	Cwts.	Lbs.
$\frac{3}{1}\frac{3}{6}$	0	6·2	1	5	3
$\frac{1}{4}$	0	11·2	2	5	$4\frac{1}{2}$
$\frac{5}{1}\frac{5}{6}$	0	16·7	3	7	$6\frac{1}{2}$
$\frac{3}{8}$	1	4	4	15	9
$\frac{7}{1}\frac{7}{6}$	1	12·5	6	10	12
$\frac{1}{2}$	2	1	8	5	16
$\frac{9}{1}\frac{9}{6}$	2	11	10	5	20
$\frac{5}{8}$	3	1	12	5	25
$\frac{1}{1}\frac{1}{6}$	3	12	14	10	31
$\frac{3}{4}$	4	7	17	10	37
$\frac{1}{1}\frac{3}{6}$	5	0	20	0	42
$\frac{7}{8}$	5	11	22	5	48
$\frac{1}{1}\frac{5}{6}$	6	7	25	10	53
1	7	2	28	10	60
$1\frac{1}{1}\frac{1}{6}$	7	17	31	10	72
$1\frac{1}{8}$	8	12	34	10	90
$1\frac{1}{4}$	13	4	42	15	105
$1\frac{1}{2}$	14	7	57	10	120
$1\frac{3}{4}$	19	7	79	10	160
2	26	0	104	10	220

Note.—B.B. quality is about 20% **weaker than B.B.B.**

B. quality is about 30% **weaker than B.B.B.**

afe working load is one-fourth the breaking load.

id-link Chains.—Multiply safe load in table by 1·5.

CRANE CHAIN. "Machinery."

A	B	C	D	Lbs. per Foot.	Load in Pounds.	
					Ultimate.	Working.
in.	in.	in.	in.			
$\frac{1}{4}$	$\frac{7}{8}$	$1\frac{5}{16}$	$\frac{25}{32}$	·875	3360	670
$\frac{5}{16}$	$1\frac{1}{16}$	$1\frac{1}{2}$	$\frac{27}{32}$	1·000	5040	1000
$\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{3}{4}$	$\frac{31}{32}$	1·70	7280	1460
$\frac{7}{16}$	$1\frac{3}{8}$	$2\frac{1}{16}$	$1\frac{5}{32}$	2·00	10080	2020
$\frac{1}{2}$	$1\frac{11}{16}$	$2\frac{3}{8}$	$1\frac{11}{32}$	2·50	13440	2690
$\frac{9}{16}$	$1\frac{7}{8}$	$2\frac{5}{8}$	$1\frac{15}{32}$	3·20	16800	3360
$\frac{5}{8}$	$2\frac{1}{16}$	3	$1\frac{23}{32}$	4·125	20720	4140
$\frac{11}{16}$	$2\frac{1}{4}$	$3\frac{1}{4}$	$1\frac{27}{32}$	5·00	25200	5040
$\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{31}{32}$	5·875	30240	6050
$\frac{13}{16}$	$2\frac{11}{16}$	$3\frac{3}{4}$	$2\frac{3}{32}$	6·70	35280	7060
$\frac{7}{8}$	$2\frac{7}{8}$	4	$2\frac{7}{32}$	8·00	40880	8180
$\frac{15}{16}$	$3\frac{1}{16}$	$4\frac{3}{8}$	$2\frac{15}{32}$	9·00	47040	9410
1	$3\frac{1}{4}$	$4\frac{5}{8}$	$2\frac{19}{32}$	10·70	53760	10750
$1\frac{1}{16}$	$3\frac{9}{16}$	$4\frac{7}{8}$	$2\frac{23}{32}$	11·20	60480	12100
$1\frac{1}{8}$	$3\frac{3}{4}$	$5\frac{1}{8}$	$2\frac{27}{32}$	12·50	68320	13660
$1\frac{3}{16}$	$3\frac{7}{8}$	$5\frac{9}{16}$	$3\frac{5}{32}$	13·70	76160	15230
$1\frac{1}{4}$	$4\frac{1}{8}$	$5\frac{3}{4}$	$3\frac{7}{32}$	16·00	84000	17000
$1\frac{5}{16}$	$4\frac{3}{8}$	$6\frac{1}{8}$	$3\frac{15}{32}$	16·50	91840	18400
$1\frac{3}{8}$	$4\frac{9}{16}$	$6\frac{1}{8}$	$3\frac{5}{8}$	18·40	101360	20300
$1\frac{7}{16}$	$4\frac{3}{4}$	$6\frac{11}{16}$	$3\frac{25}{32}$	19·70	103760	21900
$1\frac{1}{2}$	5	7	$3\frac{31}{32}$	21·70	120960	24200

ADMIRALTY FLEXIBLE STEEL WIRE ROPES.

Size of rope (circumference) in inches.	Number of wires in each strand.	Weight per fathom in lbs.	Minimum breaking strength in tons.	Torsion test; No. of twists each wire must stand.	Ductility tests, &c.
8	30	53	148	9	Each rope to consist of 6 strands. Wires to be of best crucible steel galvanized with pure zinc. The rope is to be laid up evenly and uniformly as regards size and angle, and is to contain a proper sized hemp core. A latitude not exceeding 5 per cent. over or under the prescribed weights will be allowed. Elongation will be assumed to commence when one-sixth of the breaking-load has been applied. Test A (torsion).—Each wire to stand being twisted through the number of revolutions stated in column 5, in a length of 8 inches. Test B (bending).—Each wire to stand coiling around itself eight turns and back again. If, in being tested, one wire in seven fail, but the other six give fair and uniform results, the average being up to the standard, the rope will be considered satisfactory in that respect.
7	30	41	113	11	
$6\frac{1}{2}$	30	35	98	14	
6	30	31	84	15	
$5\frac{1}{2}$	24	28	71	16	
5	24	23	59	17	
$4\frac{1}{2}$	12	14	39	15	
4	12	12	31	17	
$3\frac{1}{2}$	12	9	24	18	
3	12	7	17	22	
$2\frac{3}{4}$	12	$5\frac{1}{2}$	$14\frac{1}{2}$	25	
$2\frac{1}{2}$	12	$4\frac{1}{4}$	$11\frac{3}{4}$	26	
$2\frac{1}{4}$	12	$3\frac{3}{4}$	9	28	
2	12	$2\frac{3}{4}$	7	33	
$1\frac{3}{4}$	12	2	$5\frac{1}{2}$	36	
$1\frac{1}{2}$	12	$1\frac{3}{4}$	4	41	
$1\frac{1}{4}$	12	$1\frac{1}{4}$	$2\frac{7}{8}$	47	
1	12	$\frac{3}{4}$	$1\frac{3}{4}$	60	

Proportions of links of chains.—The standard proportions of the links of chains, in terms of the diameter of the bar from which they are made, are as follows : —

	Overall length	Overall breadth
Stud-link	6 diameters	3·6 diameters
Close-link	5 „	3·5 „

The stud has usually a diameter at the centre of ·6 × diameter of chain and at the ends 1 × diameter of chain.

Weight of chains.—The weight of stud-link chain cables is given very nearly by the rule,—

$$W = 55d^2$$

where W = weight per fathom in pounds, and d = diameter of bar from which chain is made.

For close-link chain the rule becomes,—

$$W = 58d^2$$

The above rules give weights about mid-way between those required by the Admiralty and those required by Lloyd's. The weight is of course much affected by the length of the link used.

STEEL WIRE ROPES.

The Admiralty requirements with regard to flexible steel wire ropes are given in Table 260 on previous page.

Steel wire ropes for standing rigging are required to be made of fewer wires of larger diameter, are rather heavier, and must be of rather greater ultimate strength.

The following Table shows the breaking strengths that steel wire hawsers, &c. must show in order to be accepted by Lloyd's:—

BREAKING STRENGTHS OF STEEL WIRE ROPE BY LLOYD'S RULES.

Size (circumference) in inches.	Breaking strength in tons.	Size (cirumference) in inches.	Breaking strength in tons.
2	7	$3\frac{3}{4}$	29
$2\frac{1}{4}$	$9\frac{1}{2}$	4	33
$2\frac{1}{2}$	...	$4\frac{1}{4}$	35
$2\frac{3}{4}$	$15\frac{1}{2}$	$4\frac{1}{2}$	39
3	18	$4\frac{3}{4}$	47
$3\frac{1}{4}$	22	5	59
$3\frac{1}{2}$	26	$5\frac{1}{4}$	71

A short length of each of the wires composing the hawser, &c. will also be required, after being galvanized, to show a tensile strength equivalent to that given in the above Table, and the aggregate strength of the wires must not be less than 10 per cent. in excess of that strength.

Each wire must also be capable of being twisted around itself not less than eight times, and of being untwisted and straightened again without breaking.

The strength of steel wire ropes, relatively to their girth, depends not only on the quality of the wire used, but also on the amount of hemp core used; usually there is a central hemp core, and sometimes each strand has also a similar core, but there are no hemp cores at all. There would be no particular difficulty in obtaining ropes to stand twice the test given in the above Table, but such ropes would probably be wanting in flexibility, and would require drums of very large diameter if they were to work satisfactorily and to last any time.

HEMP ROPES.

Hemp is laid up right-handed in yarns; and yarns are laid up left-handed into strands.

A hawser is composed of three strands laid up right-handed.

A cable is composed of three hawsers laid up left-handed.

Shroud-laid rope has a core surrounded by four strands.

The strength of hemp ropes depends on the quality of the hemp used, on the type or make of the rope, and on its condition (*i. e.*, wet or dry, tarred or untarred).

The twist diminishes the strength, but increases the solidity and durability, and the strength therefore depends to some extent on the twist.

When a rope is wet or tarred its strength is reduced by about one- fourth.

The working strength is commonly taken is $\frac{1}{8}$th. of the breaking strength.

The Admiralty requirements as to various sizes of hawser-laid cordage in common use are gived in table 263; the 11-inch rope is specified to be of tarred Petersburg hemp, but all the smaller sizes are to be of tarred Riga hemp; all are to be three strand.

ADMIRALTY TARRED HEMP CORDAGE.

Size of rope (circumference) in inches.	Size of yarn.	Number of threads in the rope.	Standard breaking strength.		
			Tons.	cwt.	qrs
$\frac{1}{8}$	40	6	0	3	0
$\frac{3}{4}$	,,	12	0	6	0
1	,,	15	0	8	0
$1\frac{1}{2}$	,,	33	0	15	0
$1\frac{3}{4}$	,,	42	1	0	0
2	,,	54	1	7	0
$2\frac{1}{2}$	,,	84	2	0	0
3	,,	120	3	0	0
$3\frac{1}{2}$	30	123	3	18	0
4	,,	159	5	0	0
$4\frac{1}{2}$	,,	201	6	9	0
5	,,	249	7	18	0
11	25	1008	36	10	0

All sizes are specified to be formed at an angle of 27°, hardened at 37°, and finished at 42°.

If the smallest size be excluded, the above Table gives breaking strengths which approximate very closely to those given by the formula.—

Breaking strength in cwts. $=(6{\cdot}2 \times \text{girth in inches.}^2) \div 2$

The weight in pounds per farthom of hawser-laid hemp ropes is given approximately by the rule,—

Weight in lbs. per fathom $=\cdot 17 \times (\text{girth in inches})^3$ for dry ropes.

,, ,, $=\cdot 21 \times (\text{girth in inches})^3$ for wet or tarred ropes.

Strength and Weight of Mild Plough Steel Wire Crane Ropes (Black).

Wire calculated to take a Breaking Strain of 100 tons to the square inch.

(Bullivant and Co. Ltd.)

Size Circumference.	Diameter of Rope.	Flexible Steel Wire Rope, 6 Strands, each 12 Wires.			Extra Flexible Steel Wire Rope, 6 Strands, each 24 Wires.		Special Extra Flexible Steel Wire Rope, 6 Strands, each 37 Wires.	
		Approximate Weight per Fathom.	Diam. of Barrel or Sheave round which it may be at a Slow Speed Worked.	Guaranteed Breaking Strain.	Approximate Weight per Fathom.	Guaranteed Breaking Strain.	Approximate Weight. per Fathom.	Guaranteed Breaking Strain.
Ins.	Ins.	Lbs.	Ins.	Tons.	Lbs.	Tons.	Lbs.	Tons.
1	$\frac{11}{32}$	·63	6·0	1·75	0·88	3·25	—	—
$1\frac{1}{4}$	$\frac{13}{32}$	1·06	7·5	2·5	1·55	5·0	—	—
$1\frac{1}{2}$	$\frac{1}{2}$	1·44	9·0	4·0	1·88	7·5	2·0	8·0
$1\frac{3}{4}$	$\frac{9}{16}$	2·0	10·5	5·5	2·68	9·75	2·88	11·0
2	$\frac{21}{32}$	2·44	12·0	7·0	3·78	13·0	4·0	14·5
$2\frac{1}{4}$	$\frac{23}{32}$	3·37	13·5	9·0	4·75	16·25	5·2	17·5
$2\frac{1}{2}$	$\frac{13}{16}$	4·19	15·0	12·0	5·31	20·5	6·3	22·0
$2\frac{3}{4}$	$\frac{7}{8}$	5·25	16·5	15·0	6·12	24·0	6·81	26·5
3	$\frac{31}{32}$	6·25	18·0	18·0	8·0	28·5	8·81	32·25
$3\frac{1}{4}$	$1\frac{1}{16}$	7·06	19·5	22·0	9·37	34·0	10·38	37·5
$3\frac{1}{2}$	$1\frac{1}{8}$	8·25	21·0	26·0	10·75	39·0	11·9	43·0
$3\frac{3}{4}$	$1\frac{3}{16}$	9·87	22·5	29·0	12·19	45·5	13·5	50·0
4	$1\frac{5}{16}$	11·25	24·0	33·0	13·62	51·5	15·3	56·5
$4\frac{1}{4}$	$1\frac{3}{8}$	12·35	25·5	36 0	15·69	59·0	17·12	65·0
$4\frac{1}{2}$	$1\frac{7}{16}$	13·44	27·0	39·0	17·75	65·0	19·0	70·5
$4\frac{3}{4}$	$1\frac{1}{2}$	—	—	—	19·88	74·0	21·69	79 0
5	$1\frac{19}{32}$	—	—	—	22·5	82·5	24·38	88·0

Strength and Weight of Round Steel Wire Ropes for Mining, Hauling, Winding and similar purposes.

Showing the breaking strains obtained from different qualities of Wire Ropes, the weight per fathom being the same for all qualities.

(Bullivant & Co. Ltd.)

Size Circumference.	Diameter.	"Crucible" Steel.	Best Selected Improved "Crucible" Steel.	Best Selected "Mild Plough" Steel.	Best Selected "Extra Plough" Steel.	Approximate Weight per fathom.
		B.S. Tons.	B.S. Tons.	B.S. Tons.	B.S. Tons.	lbs.
1¼″	13/32″	4·5	4·75	5·25	5·75	1·75
1½″	½″	6	6·5	7·25	7·75	2·5
1¾″	9/16″	8·25	8·75	9·5	10·5	3·25
2″	21/32″	11	11·75	12·75	14·25	4
2¼″	23/32″	14·22	15	16·5	18	5·25
2½″	13/16″	17·5	18·25	20	22·5	6·25
2¾″	7/8″	21·25	22·5	24·75	27·25	7·5
3″	31/32″	24·75	26·5	29	31·75	9
3¼″	1 1/16″	29·75	31·75	35	38	10·5
3½″	1⅛″	34·5	36·75	40·25	44·25	13
3¾″	1 3/16″	39·5	42	46	50·75	14·5
4″	1 5/16″	45·5	48·5	53	58	16·5
4¼″	1⅜″	52·5	56	61·5	67	17·75
4½″	1 7/16″	57·5	61	67	73	20
4¾″	1½″	65	69	76	83	22
5″	1 9/32″	72	76	83	92	25

The diameter of drums and sheaves should be about thirty times the circumference of the rope.

For shaft winding at high speed one-tenth of the breaking strain of a rope is sometimes taken as a fair working load.

For inclines the proportion of load to breaking strain varies according to gradient conditions, and friction should be allowed for.

ADMIRALTY TENSILE TESTS.

Description of Material.	Minimum ultimate tensile strength, tons per square inch.	Maximum ultimate tensile strength, tons per square inch.	Minimum elongation in 8 inches per cent.
Not exposed to flame, & not flanged,	27	30	20%
Not exposed to flame & but flanged,	25	28	25%
Rivet bars, ...	24	27	25%
Fire box, &c., and steam-pipe plates, ..	24	26	26%
Corrugated or ribbed furnace, ...	23	25	27%
Tube strips (annealed),.....	21	24	25%
Pieces cut from tubes (annealed), ...	...	26	20%

BOARD OF TRADE TENSILE TESTS.

Description of material.	Minimum ultimate tensile strength, tons per square inch.	Maximum ultimate tensile strength, tons per square inch.	Elongation on 10 inches, per cent.
Plates not exposed to flame, ...	27	32	About 25%, not less than 18%.
Plates that are exposed to flame, ...	26	30	
Rivet bars, ...	26	30	Not less than 25%.
Stay bars,.....	27	32	About 25%, not less than 20%.
Rivets, ...	27	32	Contraction of area about 60%.

BOARD OF TRADE FACTORS OF SAFETY.

When all rivet holes are drilled in place after bending; *all* seams fitted with double butt-straps, each at least five-eighths the thickness of the plates they cover; all seams at least double riveted; and boilers open to inspection during construction.	F = 4·5
To be added when circumferential seams are lap and double riveted.	·1
To be added when longitudinal seams are lap and double riveted.	·2
To be added when longitudinal seams are lap and treble riveted.	·1
To be added, when boiler is of such length as to fire from both ends, unless middle circumferential seams are treble riveted.	·3

BOARD OF TRADE CONSTANTS FOR FLAT SURFACES.

Description of attachment of stay.	Plates not exposed to heat or flame.	Plates exposed to heat or flame and in contact with steam.	Plates exposed to heat or flame and in contact with water.
Stays with nuts and doubling strips, the latter of width equal to $\frac{2}{3}$rds. pitch and thickness equal to plates to which they are riveted.	200	...	...
Stays with nuts and riveted washer,—latter having diameter equal to $\frac{2}{3}$rds. pitch and thickness equal to plates to which they are riveted.	187·5	...	...

Stays with nuts and washers,—latter having diameter three times that of stay and thickness $\frac{2}{3}$rds. that of plate they cover.	125	75	...
Stays fitted with nuts only.	112·5	67·5	...
Stays screwed into plate and fitted with nuts.	...	...	100
Stays screwed into plate and riveted over.	...	39·6	66

FLAT SURFACE OF COMBUSTION CHAMBERS (B. of T.).

Pressure in lbs. per square inch.	Stays screwed into plates and fitted with nuts.					
	$\frac{1}{2}$-inch plates.		$\frac{9}{16}$inch plates.		$\frac{5}{8}$-inch plates.	
	Pitch.	Surface.	Pitch.	Surface.	Pitch.	Surface.
150	7·74	60·0	8·52	72·6	9·31	86·6
155	7·63	58·2	8·39	70·5	9·16	84·0
160	7·52	56·6	8·27	68·5	9·03	81·6
165	7·42	55·1	8·16	66·6	8·91	79·3
170	7·32	53·6	8·05	64·8	8·78	77·2
175	7·23	52·3	7·94	63·1	8·67	75·1
180	7·14	51·0	7·84	61·5	8·56	73·2
185	7·05	49·8	7·75	60·0	8·45	71·4
190	6·97	48·6	7·65	58·6	8·34	69·6
195	6·89	47·5	7·56	57·2	8·25	68·0
200	6·82	46·5	7·48	56·0	8·15	66·5

FLAT SURFACE OF BOILER ENDS IN STEAM SPACES (B. of T.).

Pressure in lbs. per square inch.	Stays fitted with nuts and riveted washers, latter having diameter equal to $\frac{2}{3}$ rds. pitch, and thickness equal to plate they cover, plates shielded from flame.							
	$\frac{13}{16}$-inch plate.		$\frac{7}{8}$-inch plate.		$\frac{15}{16}$-inch plate.		1-inch plate.	
	Pitch.	Surface.	Pitch.	Surface.	Pitch.	Surface.	Pitch.	Surface.
150	15·84	251·0	16·94	287·2	18·05	326·0	19·16	367·2
155	15·59	243·0	16·67	278·1	17·76	315·6	18·85	355·5
160	15·35	235·6	16·42	269·6	17·49	306·0	18·56	344·6
165	15·12	228·7	16·17	261·7	17·23	296·9	18·28	334·4
170	14·90	222·2	15·94	254·2	16·98	288·2	18·02	324·7
175	14·69	216·0	15·72	247·1	16·74	280·3	17·76	315·6
180	14·49	210·2	15·50	240·4	16·51	272·6	17·52	307·0
185	14·30	204·6	15·30	234·0	16·29	265·4	17·29	298·9
190	14·12	199·4	15·10	228·0	16·08	258·6	17·06	291·1
195	13·94	194·4	14·91	222·3	15·88	252·1	16·84	283·8
200	13·77	189·7	14·72	216·9	15·68	246·0	16·64	276·9

FLAT SURFACES OF BOILER ENDS IN STEAM SPACES (B. of T.).—*Continued.*

Pressure in lbs. per square inch.	Stays fitted with nuts and doubling strips, the latter of width equal to $\frac{2}{3}$rds pitch, and thickness same as plate to which they are riveted; plates shileded from flame.							
	$\frac{13}{16}$-inch plate.		$\frac{7}{8}$-inch plate.		$\frac{15}{16}$-inch plate.		1-inch plate.	
	Pitch.	Surface.	Pitch.	Surface.	Pitch.	Surface.	Pitch.	Surface.
150	16·35	267·3	17·49	306·0	18·63	347·3	19·78	391·3
155	16·09	258·9	17·21	296·3	18·34	336·3	19·46	378·9
160	15·84	251·0	16·94	287·2	18·05	326·0	19·16	367·2
165	15·61	243·6	16·69	278·7	17·78	316·3	18·88	356·3
170	15·38	236·6	16·45	270·7	17·53	307·2	18·60	346·0
175	15·16	230·0	16·22	263·1	17·28	298·6	18·34	336·3
180	14·96	223·8	16·00	256·0	17·04	290·4	18·09	327·1
185	14·76	217·9	15·79	249·2	16·81	282·7	17·84	318·4
190	14·57	212·3	15·58	242·8	16·59	275·4	17·64	310·2
195	14·38	207·0	15·38	236·7	16·38	268·5	17·39	302·4
200	14·21	202·0	15·19	231·0	16·18	262·0	17·17	295·0

Pressure in lbs. per square inch.	Screw stays fitted with nuts. Pitches in inches.			Plates protected from fire. Pitches in inches.									
				Double nuts and riveted washers. Diameter = $\frac{2}{3}$ pitch. Thickness = $\frac{1}{2}$ plate. C = 200.				Double nuts and riveted washers or strips. Diameter = $\frac{2}{3}$ pitch. Width = $\frac{2}{3}$ pitch of rows. Thickness = thick. of plate. C = 220.				Double nuts and riveted strips. Width = $\frac{2}{3}$ pitch. Thickness = thick. of plate. C = 240.			
	$\frac{1}{2}$-inch plates. C = 120.	$\frac{9}{16}$-inch plates. C = 135.	$\frac{5}{8}$-inch plates. C = 135.	Thickness of plate.				Thickness of plate.				Thickness of plate.			
				$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1
150	7·15	8·54	9·48	15·01	16·17	17·32	18·47	15·74	16·95	18·16	19·38	16·44	17·71	18·97	20·24
155	7·04	8·40	9·33	14·76	15·90	17·04	18·17	15·49	16·68	17·87	19·06	16·18	17·42	18·67	19·91
160	6·93	8·26	9·18	14·53	15·65	16·77	17·89	15·24	16·42	17·59	18·76	15·92	17·15	18·37	19·59
165	6·82	8·14	9·04	14·31	15·41	16·51	17·61	15·01	16·17	17·32	18·47	15·68	16·88	18·09	19·30
170	6·72	8·02	8·91	14·10	15·18	16·27	17·35	14·79	15·93	17·06	18·20	15·45	16·63	17·82	19·01
175	6·62	7·90	8·78	13·90	14·97	16·04	17·10	14·58	15·70	16·82	17·94	15·22	16·40	17·57	18·74
180	6·53	7·79	8·66	13·70	14·76	15·81	16·86	14·37	15·48	16·58	17·69	15·01	16·17	17·32	18·48
185	6·44	7·69	8·54	13·52	14·56	15·60	16·64	14·18	15·27	16·36	17·45	14·81	15·95	17·08	18·22
190	6·36	7·59	8·43	13·34	14·36	15·39	16·42	13·99	15·07	16·14	17·22	14·61	15·73	16·86	17·98
195	6·28	7·49	8·32	13·17	14·18	15·19	16·20	13·81	14·87	15·93	16·99	14·42	15·53	16·64	17·75
200	6·20	7·39	8·22	13·00	14·00	15·00	16·00	13·63	14·68	15·73	16·78	14·24	15·34	16·43	17·53

Note.—* If the pitches are to be unequal the mean of the two squares must not exceed the square of the pitch here given.

BOARD OF TRADE RULE REGARDING COMPRESSIVE STRESSES ON TUBE PLATES.

Working pressure (lbs. per square inch).

$$= \frac{(D-d)T \times 16{,}000}{W \times D}$$

where D = least horizontal distance between centres of tubes, in inches;
d = inside diameter of ordinary tube, in inches;
T = thickness of tube plate, *in inches*;
W = outside width of combustion chamber, in inches,—from tube plate to back of box, or from tube plate to tube plate in double-ended boilers, with common combustion chambers.

LLOYD'S RULE REGARDING COMPRESSIVE STRESSES ON TUBE-PLATES.

$$T = \frac{P \times W \times D}{1{,}600 \times (D-d)},$$

where P = working pressure in lbs. per square inch;
W = width of combustion chamber over plates,—in inches;
D = horizontal pitch of tubes in inches;
d = inside diameter of plain tube in inches;
T = thickness of tube-plate in *sixteenths of an inch.*

BOARD OF TRADE RULE FOR GIRDERS SUPPORTING COMBUSTION CHAMBER TOPS, &C.

Working pressure (lbs. per square inch).

$$= \frac{C \times d^2 \times T}{(W-P)D \times L},$$

where W = width of combustion chamber,—in inches;
P = pitch of supporting bolts ,,
D = distance from centre to centre of girders,—in inches;

Continued.

L = length of girder in feet;
d = depth of girder,—in inches;
T = thickness of girder ,,

$$C = \begin{cases} 550 \text{ when girder has one supporting bolt,} \\ 825 \text{ ,, ,, ,, two or three supporting bolt,} \\ 935 \text{ ,, ,, ,, four ,, ,,} \end{cases}$$

LLOYD'S RULE FOR GIRDERS SUPPOTING COMBUSTION CHAMBER TOPS, &C.

Working pressure (lbs. per square inch).

$$= \frac{C \times d^2 \times T}{(L-P)D \times L},$$

where L = width between tube-plates or tube-plate and back plate of chamber;
P = pitch of stays in girder;
D = distance from centre to centre of girder;
d = depth of girder at centre;
T = thickness of girder at centre;
} All in inches.

$$C = \begin{cases} 6{,}600 \text{ when each girder has one stay,} \\ 9{,}900 \text{ ,, ,, two or three stays,} \\ 11{,}000 \text{ ,, ,, four or five ,,} \\ 11{,}550 \text{ ,, ,, six or seven ,,} \\ 11{,}880 \text{ ,, ,, eight or more ,,} \end{cases}$$

ADMIRALTY REQUIREMENTS AS REGARDS STAYS.

At the test pressure steel stays under $1\frac{1}{2}$ inch diameter may carry a load of 16,000 lbs per square inch of net section, and those of $1\frac{1}{2}$ inch diameter and upwards, 18,000 lbs. Rivets or bolts used for securing stays must be at least 25 per cent. stronge than the stays.

SURFACE THAT MAY BE SUPPORTED BY ONE STAY. (Board of Trade rule.)

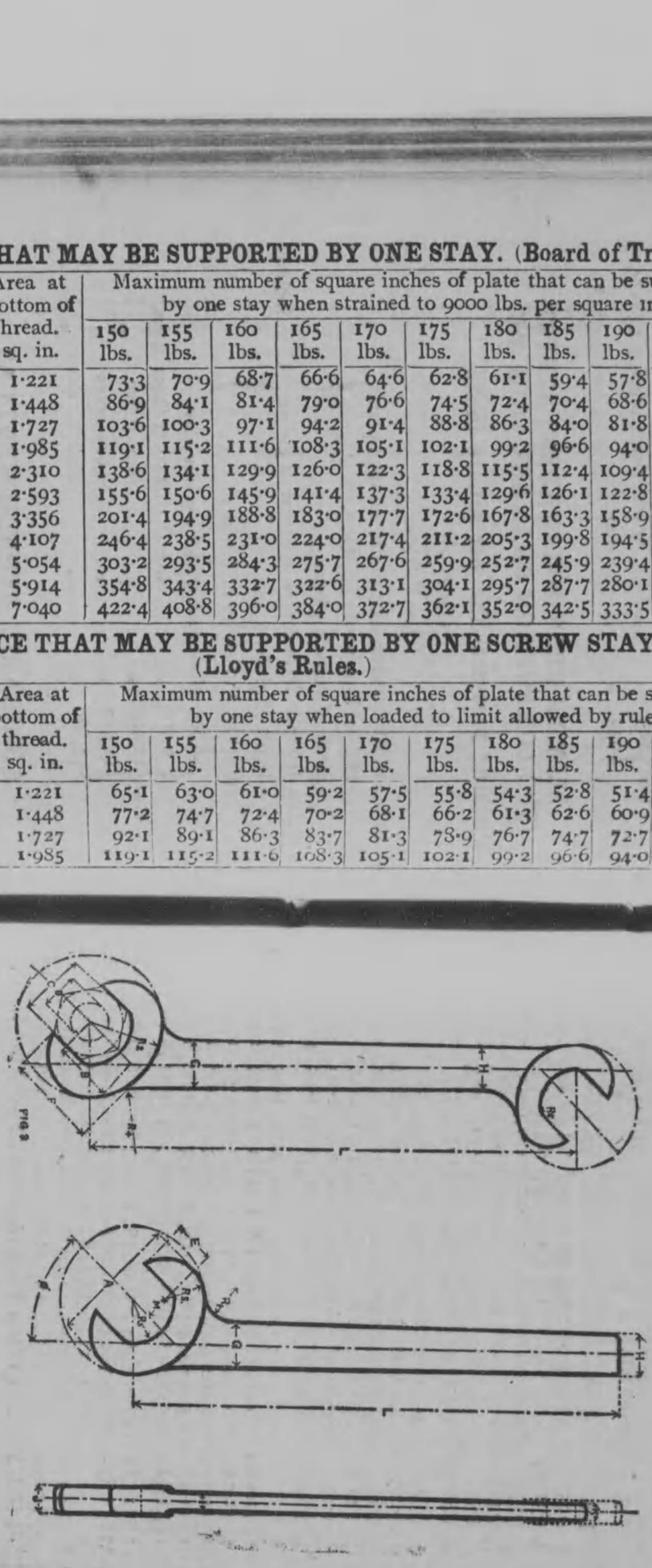
Diameter of stay.	No. of threads per inch.	Area at bottom of thread. sq. in.	Maximum number of square inches of plate that can be supported by one stay when strained to 9000 lbs. per square inch.										
			150 lbs.	155 lbs.	160 lbs.	165 lbs.	170 lbs.	175 lbs.	180 lbs.	185 lbs.	190 lbs.	195 lbs.	200 lbs.
1 3/8	10	1·221	73·3	70·9	68·7	66·6	64·6	62·8	61·1	59·4	57·8	56·3	54·9
1 1/2	9	1·448	86·9	84·1	81·4	79·0	76·6	74·5	72·4	70·4	68·6	66·8	65·1
1 5/8	9	1·727	103·6	100·3	97·1	94·2	91·4	88·8	86·3	84·0	81·8	79·7	77·7
1 3/4	8	1·985	119·1	115·2	111·6	108·3	105·1	102·1	99·2	96·6	94·0	91·6	89·3
1 7/8	8	2·310	138·6	134·1	129·9	126·0	122·3	118·8	115·5	112·4	109·4	106·6	103·9
2	7	2·593	155·6	150·6	145·9	141·4	137·3	133·4	129·6	126·1	122·8	119·7	116·7
2 1/4	7	3·356	201·4	194·9	188·8	183·0	177·7	172·6	167·8	163·3	158·9	154·9	151·0
2 1/2	6	4·107	246·4	238·5	231·0	224·0	217·4	211·2	205·3	199·8	194·5	189·5	184·8
2 3/4	6	5·054	303·2	293·5	284·3	275·7	267·6	259·9	252·7	245·9	239·4	233·3	227·4
3	5	5·914	354·8	343·4	332·7	322·6	313·1	304·1	295·7	287·7	280·1	272·9	266·1
3 1/4	5	7·040	422·4	408·8	396·0	384·0	372·7	362·1	352·0	342·5	333·5	324·9	316·8

SURFACE THAT MAY BE SUPPORTED BY ONE SCREW STAY. (Lloyd's Rules.)

Dia. of screw over thread.	No. of threads per inch.	Area at bottom of thread. sq. in.	Maximum number of square inches of plate that can be supported by one stay when loaded to limit allowed by rules.										
			150 lbs.	155 lbs.	160 lbs.	165 lbs.	170 lbs.	175 lbs.	180 lbs.	185 lbs.	190 lbs.	195 lbs.	200 lbs.
1 3/8	10	1·221	65·1	63·0	61·0	59·2	57·5	55·8	54·3	52·8	51·4	50·1	48·8
1 1/2	9	1·448	77·2	74·7	72·4	70·2	68·1	66·2	61·3	62·6	60·9	59·4	57·9
1 5/8	9	1·727	92·1	89·1	86·3	83·7	81·3	78·9	76·7	74·7	72·7	70·8	69·1
1 3/4	8	1·985	119·1	115·2	111·6	108·3	105·1	102·1	99·2	96·6	94·0	91·6	89·3

BRITISH STANDARD SPANNERS.

(Dimentions for Double-ended Spanners up to 2 ins. and Single-ended Spanners up to 3 ins.)



The figures in smaller type are only inserted for use in the Drawing Office. In practice it will be found sufficient to work to two places of decimals, with the exception of the dimensions specified in columns 2 and 3, which must be accurately observed. The dimensions in the Table are intended to apply to double-ended Spanners up to 2 ins., and single-ended Spanners up to 3 ins., and refer only to Spanners manufactured from Steel or Wrought Iron.

TABLE OF BRITISH STANDARD SPANNERS.

1	2	3	4	5	6	7	8	9	10
Diameter of Bolt.	Width of Jaws. C		A	B	E	F	G	H	I
D	Max.	Min.	2C	·896 C	·614 C	1·410 C	·746 C	·657 C	·268 C
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
¼ (·25)	·530	·527	1·06$_0$	·47$_5$	·32$_5$	·74$_7$	·39$_5$	·34$_8$	·14$_2$
5/16 (·3125)	·605	·602	1·21$_0$	·54$_2$	·37$_1$	·85$_3$	·45$_1$	·39$_8$	·16$_2$
3/8 (·375)	·715	·712	1·43$_0$	·64$_1$	·43$_9$	1·00$_8$	·53$_3$	·47$_0$	·19$_2$
7/16 (·4375)	·825	·822	1·65$_0$	·73$_9$	·50$_7$	1·16$_3$	·61$_5$	·54$_2$	·22$_1$
½ (·5)	·925	·922	1·85$_0$	·82$_9$	·56$_8$	1·30$_4$	·69$_0$	·60$_8$	·24$_8$
9/16 (·5625)	1·015	1·012	2·03$_0$	·90$_9$	·62$_3$	1·43$_1$	·75$_7$	·66$_7$	·27$_2$
5/8 (·625)	1·105	1·102	2·21$_0$	·99$_0$	·67$_8$	1·55$_8$	·82$_4$	·72$_6$	·29$_6$
11/16 (·6875)	1·205	1·202	2·41$_0$	1·08$_0$	·74$_0$	1·69$_9$	·89$_9$	·79$_2$	·32$_3$
¾ (·75)	1·305	1·302	2·61$_0$	1·16$_9$	·80$_1$	1·84$_0$	·97$_4$	·85$_7$	·35$_0$
13/16 (·8125)	1·395	1·392	2·79$_0$	1·25$_0$	·85$_7$	1·96$_7$	1·04$_1$	·91$_7$	·37$_4$
7/8 (·875)	1·485	1·482	2·97$_0$	1·33$_1$	·91$_2$	2·09$_4$	1·10$_8$	·97$_6$	·39$_8$
*15/16 (·9375)	1·585	1·582	3·17$_0$	1·42$_0$	·97$_3$	2·23$_5$	1·18$_2$	1·04$_1$	·42$_5$
1	1·675	1·672	3·35$_0$	1·50$_1$	1·02$_8$	2·36$_2$	1·25$_0$	1·10$_0$	·44$_9$
1⅛ (1·125)	1·870	1·864	3·74$_0$	1·67$_6$	1·14$_8$	2·63$_7$	1·39$_5$	1·22$_9$	·50$_1$
1¼ (1·25)	2·060	2·054	4·12$_0$	1·84$_6$	1·26$_5$	2·90$_5$	1·53$_7$	1·35$_3$	·55$_2$
1⅜ (1·375)	2·230	2·224	4·46$_0$	1·99$_8$	1·36$_9$	3·14$_5$	1·66$_4$	1·46$_5$	·59$_5$
1½ (1·5)	2·420	2·414	4·84$_0$	2·16$_8$	1·48$_6$	3·41$_2$	1·80$_5$	1·59$_0$	·64$_9$
1⅝ (1·625)	2·590	2·584	5·18$_0$	2·32$_1$	1·59$_0$	3·65$_2$	1·93$_2$	1·70$_2$	·69$_4$
1¾ (1·75)	2·770	2·764	5·54$_0$	2·48$_2$	1·70$_1$	3·90$_5$	2·06$_6$	1·82$_0$	·74$_2$
*1⅞ (1·875)	3·030	3·024	6·06$_0$	2·71$_5$	1·86$_0$	4·27$_2$	2·26$_0$	1·99$_1$	·81$_2$
2	3·160	3·154	6·32$_0$	2·83$_1$	1·94$_0$	4·45$_6$	2·35$_7$	2·07$_6$	·84$_7$
*2⅛ (2·125)	3·354	3·346	6·70$_8$	3·00$_5$	2·05$_9$	4·72$_9$	2·50$_2$	2·20$_4$	·89$_9$
2¼ (2·25)	3·564	3·556	7·12$_8$	3·19$_3$	2·18$_8$	5·02$_6$	2·65$_9$	2·34$_2$	·95$_5$
*2⅜ (2·375)	3·764	3·756	7·52$_8$	3·37$_3$	2·31$_1$	5·30$_8$	2·80$_5$	2·47$_3$	1·00$_9$
2½ (2·5)	3·904	3·896	7·80$_8$	3·49$_8$	2·39$_7$	5·50$_5$	2·91$_2$	2·56$_5$	1·04$_9$
*2⅝ (2·625)	4·064	4·056	8·12$_8$	3·64$_1$	2·49$_5$	5·73$_1$	3·03$_2$	2·67$_0$	1·08$_6$
2¾ (2·75)	4·194	4·186	8·38$_8$	3·75$_8$	2·57$_5$	5·91$_3$	3·12$_9$	2·75$_6$	1·12$_4$
*2⅞ (2·875)	4·354	4·346	8·70$_8$	3·90$_1$	2·67$_3$	6·14$_0$	3·24$_8$	2·86$_1$	1·16$_7$
3	4·544	4·536	9·08$_8$	4·07$_1$	2·79$_0$	6·40$_7$	3·39$_0$	2·98$_6$	1·21$_8$

* The Committee recommend that for general use these sizes be dispensed with.

Continued.

	11	12	13	14	15	16	17	18	19	20
Dia. of Bolt.	J	K	L	M	R_1	R_2	R_3	R_4	R_5	R_6
D	·400 C	·238 C	—	·374 C	·625 C	1·125 C	·625 C	1·79 C	·626 C	·125 C
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
¼	·21$_2$	·12$_6$	5	·19$_8$	·33$_1$	·59$_6$	·33$_1$	·94$_9$	·33$_2$	·06$_6$
5/16	·24$_2$	·14$_4$	5	·22$_6$	·37$_8$	·68$_1$	·37$_8$	1·08$_3$	·37$_9$	·07$_6$
3/8	·28$_6$	·17$_0$	6	·26$_7$	·44$_7$	·80$_4$	·44$_7$	1·28$_0$	·44$_8$	·08$_9$
7/16	·33$_0$	·19$_6$	6	·30$_9$	·51$_6$	·92$_8$	·51$_6$	1·47$_7$	·51$_6$	·10$_3$
½	·37$_0$	·22$_0$	8	·34$_6$	·57$_8$	1·04$_1$	·57$_8$	1·65$_6$	·57$_9$	·11$_6$
9/16	·40$_6$	·24$_2$	8	·38$_0$	·63$_4$	1·14$_2$	·63$_4$	1·81$_7$	·63$_5$	·12$_7$
5/8	·44$_2$	·26$_3$	9	·41$_3$	·69$_1$	1·24$_3$	·69$_1$	1·97$_8$	·69$_2$	·13$_8$
11/16	·48$_2$	·28$_7$	9	·45$_1$	·75$_3$	1·35$_6$	·75$_3$	2·15$_7$	·75$_4$	·15$_1$
¾	·52$_2$	·31$_1$	10	·48$_8$	·81$_6$	1·46$_8$	·81$_6$	2·33$_6$	·81$_7$	·16$_3$
13/16	·55$_8$	·33$_2$	10	·52$_2$	·87$_2$	1·56$_9$	·87$_2$	2·49$_7$	·87$_3$	·17$_4$
7/8	·59$_4$	·35$_3$	12	·55$_5$	·92$_8$	1·67$_1$	·92$_8$	2·65$_8$	·93$_0$	·18$_6$
*15/16	·63$_4$	·37$_7$	12	·59$_3$	·99$_1$	1·78$_3$	·99$_1$	2·83$_7$	·99$_2$	·19$_8$
1	·67$_0$	·39$_9$	15	·62$_6$	1·04$_7$	1·88$_4$	1·04$_7$	2·99$_5$	1·04$_9$	·20$_9$
1⅛	·74$_8$	·44$_5$	15	·69$_9$	1·16$_9$	2·10$_4$	1·16$_9$	3·34$_5$	1·17$_1$	·23$_4$
1¼	·82$_4$	·49$_0$	18	·77$_0$	1·28$_8$	2·31$_7$	1·28$_8$	3·68$_8$	1·29$_0$	·25$_7$
1⅜	·89$_2$	·53$_1$	18	·83$_4$	1·39$_4$	2·50$_9$	1·39$_4$	3·99$_2$	1·39$_6$	·27$_9$
1½	·96$_8$	·57$_6$	21	·90$_5$	1·51$_3$	2·72$_2$	1·51$_3$	4·33$_2$	1·51$_5$	·30$_2$
1⅝	1·03$_6$	·61$_6$	21	·96$_9$	1·61$_9$	2·91$_4$	1·61$_9$	4·63$_7$	1·62$_1$	·32$_4$
1¾	1·10$_8$	·65$_9$	23	1·03$_6$	1·73$_1$	3·11$_6$	1·73$_1$	4·95$_8$	1·73$_4$	·34$_6$
*1⅞	1·21$_2$	·72$_1$	23	1·13$_3$	1·89$_4$	3·40$_9$	1·89$_4$	5·42$_4$	1·89$_7$	·37$_9$
2	1·26$_4$	·75$_2$	26	1·18$_2$	1·97$_5$	3·55$_5$	1·97$_5$	5·65$_7$	1·97$_8$	·39$_5$
*2⅛	1·34$_2$	·79$_8$	26	1·25$_4$	2·09$_6$	3·77$_3$	2·09$_6$	6·00$_4$	2·10$_0$	·41$_9$
2¼	1·42$_6$	·84$_5$	28	1·33$_3$	2·22$_8$	4·01$_0$	2·22$_8$	6·38$_1$	2·23$_1$	·44$_6$
*2⅜	1·50$_6$	·89$_6$	28	1·40$_8$	2·35$_3$	4·23$_5$	2·35$_3$	6·73$_8$	2·35$_6$	·47$_1$
2½	1·56$_2$	·92$_9$	30	1·46$_0$	2·44$_0$	4·39$_3$	2·44$_0$	6·98$_8$	2·44$_4$	·48$_8$
*2⅝	1·62$_6$	·96$_7$	30	1·52$_0$	2·54$_0$	4·57$_2$	2·54$_0$	7·27$_5$	2·54$_4$	·50$_8$
2¾	1·67$_8$	·99$_8$	32	1·56$_9$	2·62$_1$	4·71$_8$	2·62$_1$	7·50$_7$	2·62$_5$	·52$_4$
*2⅞	1·74$_2$	1·03$_6$	32	1·62$_8$	2·72$_1$	4·89$_8$	2·72$_1$	7·79$_4$	2·72$_6$	·54$_4$
3	1·81$_8$	1·08$_1$	34	1·69$_9$	2·84$_0$	5·11$_2$	2·84$_0$	8·13$_4$	2·84$_5$	·56$_8$

THICKNESS OF BRASSES.

Diameter of gudgeon or pin.	Description of Bearing or Brasses.									
	Connecting rod gudgeon when in piston rod head.		Connecting rod gudgeon when on forked end of connect. rod.		Crank-pins.			Main Bearings.		
	Inner half. $\frac{D}{8}+\cdot2$	Outer half. $\frac{D}{7}+\cdot2$	Round brass's $\frac{D}{8}+\cdot2$	Flat backed brass's $\frac{D}{7}+\cdot2$	Round brasses. $\frac{D}{9}+\cdot2$	Flat backed brasses. $\frac{D}{8}+\cdot2$	White metal. $\cdot02D+\cdot125$	Round brasses. $\frac{D}{10}+\cdot25$	Flat backed brasses. $\frac{D}{9}+\cdot3$	White metal. $\cdot02D+\cdot125$
2	·45	·48	·45	·48	$\frac{D}{10}+\cdot12$ {·32 ·37 ·42 ·47	$\frac{D}{9}+\cdot15$ {·37 ·43 ·48 ·54	...	$\frac{D}{11}+\cdot12$ {·30 ·34 ·39 ·45	$\frac{D}{10}+\cdot15$ {·35 ·40 ·45 ·50	...
2½	·51	·56	·51	·56			...			...
3	·57	·63	·57	·63			...			...
3½	·64	·70	·64	·70			...			...
4	·70	·77	·70	·77	·64	·70	·20	·65	·74	·20
4½	·76	·84	·76	·84	·70	·76	·21	·70	·80	·21
5	·82	·91	·82	·91	·75	·82	·22	·75	·85	·22
5½	·89	·99	·89	·99	·81	·89	·23	·80	·91	·23
6	·95	1·06	·95	1·06	·87	·95	·24	·85	·97	·24
6½	1·01	1·13	1·01	1·13	·93	1·01	·25	·90	1·03	·25
7	1·07	1·20	1·07	1·20	·98	1·07	·26	·95	1·08	·26
7½	1·14	1·27	1·14	1·27	1·04	1·14	·27	1·00	1·14	·27
8	1·20	1·34	1·20	1·34	1·09	1·20	·28	1·05	1·19	·28
8½	...	...	1·26	1·41	1·15	1·26	·29	1·10	1·25	·29
9	...	...	1·32	1·48	1·20	1·32	·30	1·15	1·30	·30
9½	...	...	1·39	1·56	1·26	1·39	·31	1·20	1·36	·31
10	...	...	1·45	1·63	1·31	1·45	·32	1·25	1·41	·32
10½	...	...	1·51	1·70	1·37	1·51	·33	1·30	1·47	·33
11	...	...	1·57	1·77	1·42	1·57	·34	1·35	1·52	·34
12	...	...	1·70	1·91	1·53	1·70	·36	1·45	1·63	·36
13	...	...	1·82	2·06	1·64	1·82	·38	1·55	1·74	·38
14	...	...	...	...	1·75	1·95	·40	1·65	1·85	·40
15	...	...	...	...	1·87	2·08	·42	1·75	1·97	·42
16	...	...	...	...	1·98	2·20	·44	1·85	2·08	·44
17	...	...	...	...	2·09	2·33	·46	1·95	2·19	·46
18	...	...	...	...	2·20	2·45	·48	2·05	2·30	·48
19	...	...	...	...	2·31	2·58	·50	2·15	2·41	·50
20	...	...	...	...	2·42	2·70	·52	2·25	2·52	·52

Note.—Thicknesses given in above Table are *total* thicknesses, including white-metal, if any.

THICKNESSES OF COPPER PIPES (L.S.G.)

Diameter of pipe in inches.	Steam pipes. Boiler pressures in lbs						Auxiliary exhaust pipes.	Waste steam pipes.	Main water pipes.	Bilge suction and disch. feed suction and fire service.	Diameter of pipe in inches.	Main eduction and air-pump suction.
	200	180	155	125	85	50						
22	...	...	...	...	0	7	...	...	4	...	35	3
21	...	...	...	...	1	7	...	...	4	...	33	3
20	...	...	...	...	1	7	...	...	5	...	32	4
19	...	...	...	...	2	8	...	...	5	...	29	4
18	...	...	...	4/0	2	8	...	13	5	...	28	5
17	...	...	6/0	3/0	3	8	...	13	6	...	25	5
16	...	7/0	5/0	2/0	3	8	...	14	6	...	24	6
15	...	6/0	4/0	0	4	8	...	14	7	...	22	6
14	7/0	5/0	3/0	0	4	9	11	14	7	...	20	7
13	6/0	4/0	2/0	1	5	9	11	14	7	...	17	7
12	5/0	3/0	0	2	5	9	11	14	8	...	16	8
11	4/0	2/0	1	3	6	9	11	15	8	...	15	8
10	3/0	0	1	3	6	10	11	15	9	...	14	9
9	2/0	1	2	4	7	10	11	15	9	...	13	9
8	1	2	3	5	8	10	12	15	9	...	12	10
7	2	3	4	6	8	11	12	15	10	9	11	10
6	3	4	5	7	9	11	12	15	10	10	10	11
5	5	6	6	8	9	11	12	15	11	10	9	11
4	6	7	7	9	10	12	12	15	11	11	8	12
3	8	9	9	10	11	12	12	15	12	11	7	12
2	10	11	11	11	12	12	12	15	12	12	6	13
1	13	13	13	13	13	13	13	15	13	13	5	13

THICKNESS OF COPPER PIPES. (L.S.G.)

Continued.

Blow-off and scum pipes.									
Diameter of pipe in inches, ...	1	1¼	1½	1¾	2	2¼	2½	2¾	3
Thickness, L.S.G.	10	10	10	9	9	8	8	7	7

Feed discharge pipes to be as steam pipes for 30 per cent. higher pressure ; but in no case to be taken lower than 125 lbs.

Receiver pipes to be as steam pipes for half the test pressure of the cylinder to which they lead steam; but in no case to be taken lower than 50 lbs.

The above gauges refer to straight pipes only; bends to be suitably strengthened.

DELIVERY OF FEED PIPES.

Diameter of pipe.	Delivery in cubic feet per minute. (C)	Delivery in lbs. per hour.	Diameter of pipe.	Delivery in cubic feet per minute. (C)	Delivery in lbs. per hour.
1½	2·45	9,260	3½	20·43	77,200
1¾	3·60	13,600	3¾	24·30	91,800
2	5·04	19,050	4	28·63	108,200
2¼	6·79	25,660	4¼	33·30	125,800
2½	8·81	33,300	4½	38·42	145,200
2¾	11·22	42,400	5	50·00	189,000
3	13·94	52,700	5½	63·36	239,500
3¼	17·00	64,200	6	78·92	298,300

THICKNESS OF COPPER PIPES BY BOARD OF TRADE RULE.

Diameter of pipe in inches.	Thickness on Legal Standard Wire Gauge.											
	150 lbs.		160 lbs.		170 lbs.		180 lbs.		190 lbs.		200 lbs.	
	Brazed.	Solid.	Brazed.	Solid.	Brazed.	Solid.	Brazed.	Solid.	Brazed.	Solid.	Brazed.	Solid.
1	13	16	13	16	13	16	12	16	12	16	12	15
1¼	12	16	12	15	12	15	12	15	12	15	12	14
1½	12	15	12	15	11	14	11	14	11	14	11	13
1¾	11	14	11	14	11	13	11	13	10	13	10	13
2	11	13	11	13	10	13	10	13	10	12	9	12
2¼	10	13	10	13	10	12	9	12	9	12	9	11
2½	10	12	9	12	9	12	9	11	9	11	8	11
2¾	9	12	9	12	9	11	8	11	8	10	8	10
3	9	11	9	11	8	11	8	10	8	10	7	9
3¼	9	11	8	10	8	10	8	10	7	9	7	9
3½	8	10	8	10	7	9	7	9	7	9	6	8
3¾	8	10	7	9	7	9	7	9	6	8	6	8
4	7	9	7	9	7	9	6	8	6	8	5	7
4½	7	9	6	8	6	8	5	7	5	7	5	6
5	6	8	5	7	5	7	5	6	4	6	4	5
5½	5	7	5	6	4	6	4	5	3	5	3	4
6	5	6	4	6	4	5	3	5	3	4	2	4
6½	4	5	3	5	3	4	2	4	2	3	1	3
7	3	5	3	4	2	4	2	3	1	3	1	2
7½	3	4	2	4	2	3	1	2	1	2	0	1
8	2	4	2	3	1	2	0	2	0	1	2/0	1
8½	2	...	1	...	0	...	0	...	2/0	...	2/0	...
9	1	...	0	...	0	...	2/0	...	2/0	...	3/0	...
9½	1	...	0	...	2/0	...	2/0	...	3/0	...	4/0	...
10	0	...	2/0	...	2/0	...	3/0	...	4/0	...	4/0	...
10½	0	...	2/0	...	3/0	...	4/0	...	4/0	...	...	...
11	2/0	...	3/0	...	4/0	...	4/0	...	5/0	...	...	...
11½	3/0	...	3/0	...	4/0	...	5/0	...	...	...	...	...
12	3/0	...	4/0	...	5/0	...	5/0	...	...	...	...	...
12½	4/0	...	4/0	...	5/0	...	...	...	...	...	...	...
13	4/0	...	5/0	...	5/0	...	...	...	...	...	...	...
13½	4/0	...	5/0	...	...	...	...	...	...	...	...	...
14	5/0	...	6/0	...	...	...	...	...	...	...	...	...
14½	5/0	...	...	...	...	...	...	...	...	...	...	...
15	6/0	...	...	...	...	...	...	...	...	...	...	...

Note.—The Board of Trade rules state that "Feed pipes should be made sufficient for a pressure 20 per cent. in excess of the boiler pressure."

The thicknesses of wrought-iron lap-welded pipes requisite to comply with the Board of Trade rule are shown in the following Table :—

THICKNESS OF WROUGHT-IRON PIPES BY BOARD OF TRADE RULE.

Diameter of pip in inches.	Thickness in inches. (Decimal and nearest thirty-second above).											
	150 lbs.		160 lbs.		170 lbs.		180 lbs.		190 lbs.		200 lbs.	
5	·250	1/4	·250	1/4	·250	1/4	·250	1/4	·250	1/4	·250	1/4
5½	"	"	"	"	"	"	"	"	"	"	"	"
6	"	"	"	"	"	"	"	"	"	"	"	"
6½	"	"	"	"	"	"	"	"	"	"	"	"
7	"	"	"	"	"	"	"	"	"	"	"	"
7½	"	"	"	"	"	"	"	"	·250	1/4	·250	1/4
8	"	"	"	"	"	"	·250	1/4	·253	9/32	·267	9/32
8½	"	"	"	"	·250	1/4	·255	9/32	·269	9/32	·283	5/16
9	"	"	·250	1/4	·255	9/32	·270	9/32	·284	5/16	·300	5/16
9½	"	"	·253	9/32	·269	9/32	·285	5/16	·300	5/16	·317	11/32
10	·250	1/4	·267	9/32	·283	5/16	·300	5/16	·316	11/32	·333	11/32
10½	·2625	9/32	·280	9/32	·297	5/16	·315	11/32	·332	11/32	·350	3/8
11	·275	9/32	·293	5/16	·311	5/16	·330	11/32	·348	3/8	·367	3/8
11½	·2875	5/16	·307	5/16	·326	11/32	·345	3/8	·364	3/8	·383	13/32
12	·300	5/16	·320	11/32	·340	11/32	·360	3/8	·379	13/32	·400	13/32
12½	·3125	5/16	·333	11/32	·354	3/8	·375	3/8	·395	13/32	·417	7/16
13	·325	11/32	·347	3/8	·368	3/8	·390	13/32	·411	7/16	·433	7/16
13½	·3375	11/32	·360	3/8	·382	13/32	·405	13/32	·427	7/16	—	—
14	·350	3/8	·373	3/8	·396	13/32	·420	7/16	·443	15/32	—	—
14½	·3625	3/8	·387	13/32	·410	7/16	·435	7/16	—	—	—	—
15	·375	3/8	·400	13/32	·425	7/16	·450	15/32	—	—	—	—
15½	·3875	13/32	·413	7/16	·439	15/32	—	—	—	—	—	—
16	·400	13/32	·427	7/16	·453	15/32	—	—	—	—	—	—
16½	·4125	7/16	·440	15/32	—	—	—	—	—	—	—	—
17	·425	7/16	·453	15/32	—	—	—	—	—	—	—	—
17½	·4375	7/16	—	—	—	—	—	—	—	—	—	—
18	·450	15/32	—	—	—	—	—	—	—	—	—	—

Good proportions for the flanges of copper pipes for modern triple engines are given in the following Table :—

FLANGES FOR COPPER PIPES.

Diameter of pipe in inches.	Diameter of flange.	Thickness of flange.		Diameter of bolts.	Radius of bolt circle.	Number of bolts.			Pitch of bolts nearest sixteenth		
		Steam, feed, blow off, &c.	Auxiliary exhaust, water pipes, Waste and eduction, &c.			Steam, feed, blow-off, &c.	Auxiliary exhaust and water pipes.	Waste and eduction pipes.	Steam, feed, blow-off, &c.	Auxiliary exhaust and water pipes.	Waste and educt. pipes.
ins.	ins.	in.	in.	in.	ins.				ins.	ins.	ins
1	4	1/4	1/8	1/8	1 1/16	4	4	3	1 1/16	1 1/16	2 3/16
1¼	4¼	"	"	"	1 1/16	4	4	3	2 1/16	2 1/16	2 3/16
1½	4⅝	"	"	"	1 1/16	4	4	4	1 5/16	2 5/16	2 5/16
2	5	"	"	"	1 1/16	5	4	4	2 1/16	2 1/16	2 5/16
2¼	5⅞	"	"	"	1 1/16	5	5	4	2 3/16	2 3/16	2 5/16
2½	6⅜	"	"	"	1 1/16	5	5	4	2 3/16	2 3/16	3 5/16
2¾	6⅞	"	"	"	2 1/16	5	5	4	2 3/16	2 3/16	3 5/16
3	6⅞	1/16	1/16	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
3¼	7⅜	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
3½	7⅞	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
3¾	7⅞	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
4	8⅛	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
4½	8⅝	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
5	9⅛	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
5½	9⅝	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
6	10⅜	1/16	1/16	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
6½	10⅞	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
7	11⅜	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
7½	11⅞	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
8	12⅜	"	"	1/8	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
8½	12⅞	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
9	13⅜	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
9½	13⅞	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
10	14⅜	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
11	16¼	1/16	1/16	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
12	17¼	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
13	18½	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
14	19¼	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
15	20¼	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
16	21½	1	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
17	22½	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16
18	23½	"	"	"	2 1/16	6	5	4	2 3/16	2 3/16	3 5/16

THICKNESS OF GUN-METAL PIPES, T PIECES &C.

Diameter. in inches.	Plain pipes.				T pieces.			
	Calculated thickness.		Thickness to be.		Calculated thickness.		Thickness to be.	
	H.P.	L.P.	H.P.	L.P.	H.P.	L.P.	H.P.	L.P.
inches.	inch.	inch.	inch.	inch.	inch.	inch.	inch.	inch.
1	·09	·07	$\frac{1}{4}$	$\frac{1}{4}$	·10	·07	$\frac{1}{4}$	$\frac{1}{4}$
$1\frac{1}{4}$	·10	—	$\frac{1}{4}$	$\frac{1}{4}$	·11	—	$\frac{1}{4}$	$\frac{1}{4}$
$1\frac{1}{2}$	·11	·08	$\frac{1}{4}$	$\frac{1}{4}$	·12	·08	$\frac{1}{4}$	$\frac{1}{4}$
$1\frac{3}{4}$	·12	—	$\frac{1}{4}$	$\frac{1}{4}$	·13	—	$\frac{1}{4}$	$\frac{1}{4}$
2	·13	·09	$\frac{1}{4}$	$\frac{1}{4}$	·14	·09	$\frac{1}{4}$	$\frac{1}{4}$
$2\frac{1}{4}$	·14	—	$\frac{1}{4}$	$\frac{1}{4}$	·16	—	$\frac{1}{4}$	$\frac{1}{4}$
$2\frac{1}{2}$	·15	·10	$\frac{1}{4}$	$\frac{1}{4}$	·17	·10	$\frac{1}{4}$	$\frac{1}{4}$
$2\frac{3}{4}$	·16	—	$\frac{1}{4}$	$\frac{1}{4}$	·18	—	$\frac{1}{4}$	$\frac{1}{4}$
3	·17	·11	$\frac{1}{4}$	$\frac{1}{4}$	·19	·11	$\frac{1}{4}$	$\frac{1}{4}$
$3\frac{1}{4}$	·18	—	$\frac{1}{4}$	$\frac{1}{4}$	·20	—	$\frac{1}{4}$	$\frac{1}{4}$
$3\frac{1}{2}$	·19	·12	$\frac{5}{16}$	$\frac{1}{4}$	·21	·12	$\frac{5}{16}$	$\frac{1}{4}$
$3\frac{3}{4}$	·20	—	$\frac{5}{16}$	$\frac{1}{4}$	·22	—	$\frac{5}{16}$	$\frac{1}{4}$
4	·21	·13	$\frac{5}{16}$	$\frac{1}{4}$	·23	·13	$\frac{5}{16}$	$\frac{1}{4}$
$4\frac{1}{2}$	·23	·14	$\frac{5}{16}$	$\frac{1}{4}$	·26	·14	$\frac{5}{16}$	$\frac{1}{4}$
5	·25	·15	$\frac{5}{16}$	$\frac{1}{4}$	·28	·15	$\frac{5}{16}$	$\frac{1}{4}$
$5\frac{1}{2}$	·27	·16	$\frac{3}{8}$	$\frac{5}{16}$	·30	·16	$\frac{3}{8}$	$\frac{5}{16}$
6	·29	·17	$\frac{3}{8}$	$\frac{5}{16}$	·33	·17	$\frac{3}{8}$	$\frac{5}{16}$
$6\frac{1}{2}$	·31	·18	$\frac{3}{8}$	$\frac{5}{16}$	·35	·18	$\frac{3}{8}$	$\frac{5}{16}$
7	·33	·19	$\frac{3}{8}$	$\frac{5}{16}$	·37	·19	$\frac{3}{8}$	$\frac{5}{16}$
$7\frac{1}{2}$	·35	·20	$\frac{3}{8}$	$\frac{5}{16}$	·40	·20	$\frac{7}{16}$	$\frac{5}{16}$
8	·37	·21	$\frac{3}{8}$	$\frac{5}{16}$	·42	·21	$\frac{7}{16}$	$\frac{5}{16}$
$8\frac{1}{2}$	·39	·22	$\frac{7}{16}$	$\frac{5}{16}$	·44	·22	$\frac{7}{16}$	$\frac{5}{16}$
9	·41	·23	$\frac{7}{16}$	$\frac{5}{16}$	·46	·23	$\frac{1}{2}$	$\frac{5}{16}$
$9\frac{1}{2}$	·43	·24	$\frac{7}{13}$	$\frac{5}{16}$	·49	·24	$\frac{1}{2}$	$\frac{5}{16}$
10	·45	·25	$\frac{1}{2}$	$\frac{5}{16}$	·51	·25	$\frac{9}{16}$	$\frac{5}{16}$
$10\frac{1}{2}$	·47	·26	$\frac{1}{2}$	$\frac{3}{8}$	·53	·26	$\frac{9}{16}$	$\frac{3}{8}$
11	·49	·27	$\frac{1}{2}$	$\frac{3}{8}$	·56	·27	$\frac{9}{16}$	$\frac{3}{8}$
$11\frac{1}{2}$	·51	·28	$\frac{9}{16}$	$\frac{3}{8}$	·58	·28	$\frac{5}{8}$	$\frac{3}{8}$
12	·53	·29	$\frac{9}{16}$	$\frac{3}{8}$	·60	·29	$\frac{5}{8}$	$\frac{3}{8}$
$12\frac{1}{2}$	·55	·30	$\frac{9}{16}$	$\frac{3}{8}$	·63	·30	$\frac{5}{8}$	$\frac{3}{8}$
13	·57	·31	$\frac{5}{8}$	$\frac{3}{8}$	·65	·31	$\frac{11}{16}$	$\frac{3}{8}$
$13\frac{1}{2}$	·59	·32	$\frac{5}{8}$	$\frac{3}{8}$	·67	·32	$\frac{11}{16}$	$\frac{3}{8}$
14	·61	·33	$\frac{5}{8}$	$\frac{3}{8}$	·70	·33	$\frac{3}{4}$	$\frac{3}{8}$
$14\frac{1}{2}$	·63	·34	$\frac{11}{16}$	$\frac{3}{8}$	·72	·34	$\frac{3}{4}$	$\frac{3}{8}$
15	·65	·35	$\frac{11}{16}$	$\frac{3}{8}$	·74	·35	$\frac{3}{4}$	$\frac{3}{8}$
$15\frac{1}{2}$	·67	·36	$\frac{11}{16}$	$\frac{3}{8}$	·76	·36	$\frac{13}{16}$	$\frac{3}{8}$
16	·69	·37	$\frac{3}{4}$	$\frac{3}{8}$	·79	·37	$\frac{13}{16}$	$\frac{3}{8}$
$16\frac{1}{2}$	·71	·38	$\frac{3}{4}$	$\frac{7}{16}$	·81	·38	$\frac{13}{16}$	$\frac{7}{16}$
17	·73	·39	$\frac{3}{4}$	$\frac{7}{16}$	·83	·39	$\frac{7}{8}$	$\frac{7}{16}$
$17\frac{1}{2}$	·75	·40	$\frac{3}{4}$	$\frac{7}{16}$	·86	·40	$\frac{7}{8}$	$\frac{7}{16}$
18	·77	·41	$\frac{13}{16}$	$\frac{7}{16}$	·88	·41	$\frac{7}{8}$	$\frac{7}{16}$
$18\frac{1}{2}$	·79	·42	$\frac{13}{16}$	$\frac{7}{16}$	·90	·42	$\frac{15}{16}$	$\frac{7}{16}$

Steel Steam Pipes.

For steam pressures over 200 lbs. per square inch steel pipes are now being largely used. Up to 6 inches diameter they may be solid drawn, and above that, welded.

The thicknesses, whether for solid drawn or welded pipes, may be those given by the following rule :—

$$\frac{9000 \times (T - \frac{1}{16})}{D} = \text{Working pressure ;}$$

or, $$T = \frac{\text{Working pressure} \times \text{diameter}}{9000} + .1$$

where T = thickness in inches ;
and D = inside diameter in inches.

Table exhibits the thicknesses given by the above rule in inches, and also in Legal Standard Wire Gauge.

Thickness of Steel Steam Pipes.

Diameter of Pipe in inches.	Thickness in inches and nearest L.S.G.														
	200 lbs. $T = \frac{D}{45} + .1$		225 lbs. $T = \frac{D}{40} + .1$		250 lbs. $T = \frac{D}{36} + .1$		275 lbs. $T = \frac{D}{32.7} + .1$		300 lbs. $T = \frac{D}{30} + .1$		325 lbs. $T = \frac{D}{27.7} + .1$				
1	.122	11	.125	10	.128	10	.130	10	.133	10	.136	9			
1½	.133	10	.138	9	.142	9	.145	9	.150	9	.154	8			
2	.144	9	.150	9	.156	8	.161	8	.167	8	.172	7			
2½	.156	8	.162	8	.169	7	.176	7	.183	7	.190	6			
3	.167	8	.175	7	.183	7	.192	6	.200	6	.208	5			
3½	.178	7	.188	6	.197	6	.207	5	.217	5	.226	4			
4	.189	6	.200	6	.211	5	.222	4	.233	4	.244	3			
4½	.200	6	.212	5	.225	4	.237	4	.250	3	.262	3			
5	.211	5	.225	4	.239	3	.253	3	.267	3	.280	2			
6	.233	4	.250	3	.267	2	.283	2	.300	2	.317	0			
7	.256	3	.275	2	.294	1	.314	0	.333	0	.353	0			
8	.278	2	.300	1	.322	0	.344	0	.367	0	.389	0			
9	.300	1	.325	0	.350	0	.375	0	.400	0	.425	0			
10	.322	0	.350	0	.378	0	.406	0	.433	0	.461	0			
11	.344	0	.375	0	.406	0	.436	0	.467	0	.497	0			
12	.367	0	.400	0	.433	0	.467	0	.500	0	.533	0			
13	.389	0	.425	0	.461	0	.497	0	.533	0	.569	0			
14	.411	0	.450	0	.489	0	.528	0	.567	0	.605	0			
15	.433	0	.475	0	.517	0	.558	0	.600	0	.642	0			

DIMENSIONS OF STANDARD AND HEAVY BRASS FLANGES.

Size of Flange ... ... inches.																
Diameter of Flange	Standard... inches	2½	3	3½	4	4½	5	6	7	7½	8½	9	9½	10	11	12½	13½
	Heavy ... inches	2½	3	3½	4	4½	5	6	7	7½	8½	9	9½	10	11	12½	13½
Thickness of Flange... ...	Standard ... inch	9/32	11/32	13/32	15/32	17/32	9/16	5/8	11/16	23/32	25/32	27/32	29/32	31/32	1 1/16	1 1/8	1 3/16
	Heavy ... inch	11/32	13/32	7/16	1/2	17/32	9/16	5/8	11/16	23/32	25/32	27/32	29/32	31/32	1 1/16	1 1/8	1 3/16
Diameter of Bolt Circle ...	Standard . inches	1 1/16	2 1/16	2 1/2	3	3 3/8	3 7/8	4 3/4	5 1/2	6	7	7 1/2	7 3/4	8 1/2	9 1/2	10 3/4	11 7/8
	Heavy ... inches	1 1/16	2 1/16	2 1/2	2 7/8	3 3/8	3 7/8	4 3/4	5 1/2	6	7	7 1/2	7 3/4	8 1/2	9 1/2	10 3/4	11 7/8
Diameter of Bolts	Standard ... inch	3/8	3/8	3/8	7/16	7/16	1/2	1/2	5/8	5/8	5/8	3/4	3/4	3/4	3/4	3/4	3/4
	Heavy.. ... inch	3/8	3/8	7/16	7/16	1/2	1/2	5/8	5/8	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Length of Bolts	Standard...inches	1	1 1/8	1 1/4	1 1/4	1 1/4	1 1/2	1 3/4	1 3/4	1 3/4	2	2	2	2 1/4	2 1/2	2 3/4	2
	Heavy ... inches	1	1	1 1/4	1 1/2	1 1/2	1 3/4	2	2	2 1/4	2 1/4	2 1/2	2 1/2	2 1/2	2 3/4	2 3/4	3
Number of Bolts...	Standard	4	4	4	4	4	4	4	4	4	4	8	8	8	8	8	8
	Heavy	4	4	4	4	4	4	4	4	4	8	8	8	12	12	12	12

DIMENSIONS OF STANDARD IRON FLANGES.
For Working Pressures up to 125 Pounds.

Size of Flange... ... ...inches	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7
Diameter of Flange ... .. inches	4	4½	5	6	7	7½	8½	9	9¼	10	11	12¼
Thickness of Flange ... .. inches	7/16	1/2	9/16	5/8	11/16	3/4	13/16	15/16	15/16	1 5/16	1	1 1/16
Diameter of Bolt Circle...inches	3	3 3/8	3 7/8	4 3/4	5 1/2	6	7	7 1/2	7 3/4	8 1/2	9 1/2	10 3/4
Diameter of Bolts... ... ...inches	7/16	7/16	1/2	5/8	5/8	5/8	5/8	3/4	3/4	3/4	3/4	3/4
Length of Bolts ... ...inches	1 1/2	1 1/2	1 3/4	2	2 1/4	2 1/2	2 1/2	2 3/4	3	3	3	3 1/4
Number of Bolts...	4	4	4	4	4	4	4	4	8	8	8	8
Size of Flange .. .. inches	8	9	10	12	14	15	16	18	20	22	24	
Diameter of Flange ... ...inches	13½	15	16	19	21	22¼	23½	25	27½	29½	32	
Thickness of Flange ... .. inches	1 1/8	1 1/8	1 3/16	1 1/4	1 3/8	1 3/8	1 7/16	1 9/16	1 11/16	1 13/16	1 7/8	
Diameter of Bolt Circle ...inches	11 3/4	13 1/4	14 1/4	17	18 3/4	20	21 1/4	22 3/4	25	27 1/4	29 1/2	
Diameter of Bolts... ... ...inches	3/4	3/4	7/8	7/8	1 1/4	1	1	1 1/8	1 1/8	1 1/4	1 1/4	
Length of Bolts ... ...inches	3½	3½	3¾	3¾	4	4¼	4¼	4¾	5	5½	5½	
Number of Bolts	8	12	12	12	12	16	16	16	20	20	20	

DIMENSIONS OF BRITISH STANDARD PIPE FLANGES.

For Working Steam Pressures up to 55 Pounds per Square Inch, and For Water Pressures up to 200 Pounds per Square Inch.

This table does not apply to boiler feed pipes, or other water pipes subject to exceptional shocks.

Internal Diameter of Pipe.	Diameter of Flange.	Diameter of Bolt Circle.	Number of Bolts.	Diameter of Bolts.	Thickness of Flanges.		
					Cast-iron, and Steel or Iron Welded on.	Cast Steel and Bronze.	Stamped or F'rgd Wr'gt Iron or Steel.
inches	inches	inches		inches	inches	inches	inches
$\frac{1}{2}$	$3\frac{3}{4}$	$2\frac{5}{8}$	4	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{16}$
$\frac{3}{4}$	4	$2\frac{7}{8}$	4	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{16}$
1	$4\frac{1}{2}$	$3\frac{1}{4}$	4	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{16}$
$1\frac{1}{4}$	$4\frac{3}{4}$	$3\frac{7}{16}$	4	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{4}$
$1\frac{1}{2}$	$5\frac{1}{4}$	$3\frac{7}{8}$	4	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{4}$
2	6	$4\frac{1}{2}$	4	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{16}$
$2\frac{1}{2}$	$6\frac{1}{2}$	5	4	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{16}$
3	$7\frac{1}{4}$	$5\frac{3}{4}$	4	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{3}{8}$
$3\frac{1}{2}$	8	$6\frac{1}{2}$	4	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{3}{8}$
4	$8\frac{1}{2}$	7	4	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{11}{16}$	$\frac{3}{8}$
$4\frac{1}{2}$	9	$7\frac{1}{2}$	8	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{11}{16}$	$\frac{7}{16}$
5	10	$8\frac{1}{4}$	8	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{11}{16}$	$\frac{1}{2}$
6	11	$9\frac{1}{4}$	8	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{11}{16}$	$\frac{1}{2}$
7	12	$10\frac{1}{4}$	8	$\frac{5}{8}$	1	$\frac{3}{4}$	$\frac{1}{2}$
8	$13\frac{1}{4}$	$11\frac{1}{2}$	8	$\frac{5}{8}$	1	$\frac{3}{4}$	$\frac{5}{8}$
9	$14\frac{1}{2}$	$12\frac{3}{4}$	8	$\frac{5}{8}$	1	$\frac{3}{4}$	$\frac{5}{8}$
10	16	14	8	$\frac{3}{4}$	1	$\frac{3}{4}$	$\frac{5}{8}$
12	18	16	12	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{3}{4}$
14	$20\frac{3}{4}$	$18\frac{1}{2}$	12	$\frac{7}{8}$	$1\frac{1}{4}$	1	$\frac{3}{4}$
15	$21\frac{3}{4}$	$19\frac{1}{2}$	12	$\frac{7}{8}$	$1\frac{1}{4}$	1	$\frac{3}{4}$
16	$22\frac{3}{4}$	$20\frac{1}{2}$	12	$\frac{7}{8}$	$1\frac{1}{4}$	1	$\frac{3}{4}$
18	$25\frac{1}{4}$	23	12	$\frac{7}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$	$\frac{7}{8}$
20	$27\frac{3}{4}$	$25\frac{1}{4}$	16	1	$1\frac{1}{2}$	$1\frac{1}{4}$	1
24	$32\frac{1}{2}$	$29\frac{3}{4}$	16	1	$1\frac{5}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$

Bolt-holes.—For $\frac{1}{2}$ inch and $\frac{5}{8}$ inch bolts the diameters of the holes to be $\frac{1}{16}$-inch larger than the diameters of the bolts, and for larger sizes of bolts, $\frac{1}{8}$-inch. Bolt-holes to be drilled off center lines.

DIMENTIONS OF BRITISH STANDARD PIPE FLANGES.

For Working pressures up to 125 Pounds, 225 Pounds and 325 Pounds per Square Inch.

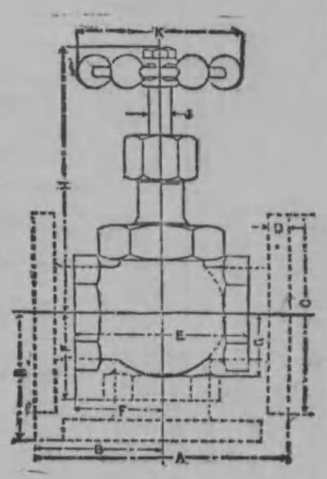
Internal Dia. of Pipe.	Dia. of flange.	Dia. of Bolt Circle.	No. of Bolts.	Diameter of Bolts.		Thickness of Flanges.					
						Cast-iron, and Steel or Iron Welded on.			Steel (Cast or Riveted on) and Bronze.		
	125 lbs. 225 lbs. 325 lbs.	125 lbs. 225 lbs. 325 lbs.	125 lbs. 225 lbs. 325 lbs.	125 lbs. 225 lbs.	325 lbs.	125 lbs.	225 lbs.	325 lbs.	125 lbs.	225 lbs.	325 lbs.
In.	In.	In.		In.	In.	In.	In.	In.	In.	In.	In.
$\frac{1}{2}$	$3\frac{3}{4}$	$2\frac{5}{8}$	4	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{5}{8}$
$\frac{3}{4}$	4	$2\frac{7}{8}$	4	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{5}{8}$
1	$4\frac{3}{4}$	$3\frac{7}{16}$	4	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{11}{16}$
$1\frac{1}{4}$	$5\frac{1}{4}$	$3\frac{7}{8}$	4	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{11}{16}$
$1\frac{1}{2}$	$5\frac{1}{2}$	$4\frac{1}{8}$	4	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{3}{4}$
2	$6\frac{1}{2}$	5	4	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{7}{8}$
$2\frac{1}{2}$	$7\frac{1}{4}$	$5\frac{3}{4}$	8	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{7}{8}$
3	8	$6\frac{1}{2}$	8	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{4}$	$\frac{5}{8}$	$\frac{11}{16}$	1
$3\frac{1}{2}$	$8\frac{1}{2}$	7	8	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1
4	9	$7\frac{1}{2}$	8	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
$4\frac{1}{2}$	10	$8\frac{1}{4}$	8	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
5	11	$9\frac{1}{4}$	8	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
6	12	$10\frac{1}{4}$	12	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
7	$13\frac{1}{4}$	$11\frac{1}{2}$	12	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
8	$14\frac{1}{2}$	$12\frac{3}{4}$	12	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
9	16	14	12	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
10	17	15	12	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
12	$19\frac{1}{4}$	$17\frac{1}{4}$	16	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	1	$1\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$
14	$21\frac{3}{4}$	$19\frac{1}{2}$	16	$\frac{7}{8}$	1	1	$1\frac{1}{8}$	$1\frac{1}{4}$	1	1	$1\frac{1}{4}$
15	$22\frac{3}{4}$	$20\frac{1}{2}$	16	$\frac{7}{8}$	1	1	$1\frac{1}{8}$	$1\frac{1}{4}$	1	1	$1\frac{1}{4}$
16	24	$21\frac{3}{4}$	20	$\frac{7}{8}$	1	1	$1\frac{1}{8}$	$1\frac{1}{4}$	1	1	$1\frac{1}{4}$
18	$26\frac{1}{4}$	24	20	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$
20	29	$26\frac{1}{2}$	24	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$
22	31	$28\frac{1}{2}$	24	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$
24	$33\frac{1}{2}$	$30\frac{3}{4}$	24	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$

Bolt-holes:—For $\frac{1}{2}$-inch and $\frac{5}{8}$-inch bolts the diameters of the holes to be $\frac{1}{16}$-inch larger than the diameters of the bolts, and for larger sizes of bolts, $\frac{1}{8}$-inch. Bolt-holes to be drilled off center lines.

REGRINDING GLOBE, ANGLE AND CROSS VALVES.

Medium Pattern. For Working Pressures up to 200 Pounds.

Brass.



Leading Dimensions.

	Size of Valve.	In.	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
A	Face to Face Flange End Globe Valve.	In.	—	—	2 6/8	3 3/16	3 5/8	4 1/16	4 6/8	5 2/16	5 6/8	6 13/16	7 7/8	8 15/16	10 1/16
B	Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve.	In.	—	—	1 15/16	2 1/16	2 3/16	2 5/16	2 6/8	3 1/16	3 3/16	3 5/16	3 6/8	4 1/16	4 3/16
C	Diameter of Flanges.	In.	—	—	2 1/2	3	3 1/2	4	4 1/2	5	6	7	7 1/2	8 1/2	9
D	Thickne-s of Flanges.	In.	—	—	9/32	11/32	13/32	15/32	17/32	9/16	5/8	11/16	23/32	25/32	13/16
E	Face to Face Screw End Globe Valve.	In.	1 9/16	2 1/16	2 5/16	2 7/8	3 5/16	3 13/16	4 5/16	4 13/16	5 5/16	5 13/16	6 5/16	6 13/16	7 5/16
F	Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve.	In.	25/32	1 1/16	1 3/16	1 5/16	1 7/16	1 9/16	1 11/16	1 13/16	1 15/16	2 1/16	2 3/16	2 5/16	2 7/16
G	Center of Port to Bottom of Body.	In.	7/16	9/16	9/16	11/16	13/16	15/16	1 1/16	1 3/16	1 5/16	1 7/16	1 9/16	1 11/16	1 13/16
H	Center of Port to Top of Stem, when open.	In.	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16	5 15/16	6 7/16	6 15/16	7 7/16	7 15/16	8 7/16	8 15/16
H	Centre of Port to Top of Stem, when closed	In.	2 3/4	3 1/16	3 5/16	3 11/16	4 1/16	4 5/16	4 11/16	5 1/16	5 5/16	5 11/16	6 1/16	6 5/16	6 11/16
J	Diameter of Stem.	In.	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
K	Diam. of Handwheel.	In.	1 11/16	2	2 1/16	2 3/16	2 5/16	2 7/16	2 9/16	2 11/16	2 13/16	2 15/16	3 1/16	3 3/16	3 5/16

Angle and Cross Patterns shown in dotted lines.

REGRINDING GLOBE, ANGLE AND CROSS VALVES.

Extra Heavy Pattern.

For Working Pressures up to 300 Pounds.

Leading Dimensions. *Continued*

	Size of Valve. ... ... inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
A	Face to Face Flange End Globe Valve, ... inches	.....	3 1/4	3 7/8	4 1/2	4 3/4	5 1/4	6 3/8	7 3/8	8 9/16	9 3/8	9 13/16	10 3/4
B	Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve,... ... inches	.....	1 23/32	2 1/32	2 5/16	2 5/8	2 29/32	3 3/16	3 3/4	4 5/16	4 11/16	5 5/16	5 13/16
C	Diameter of Flanges, ... inches	.....	2 1/2	3	3 1/2	4	4 1/2	5	6	7	7 1/2	8 1/2	9
D	Thickness of Flanges,... ... inch	.....	11/32	13/32	7/16	1/2	17/32	9/16	5/8	11/16	23/32	25/32	13/16
E	Face to Face Screw End Globe Valve, ... inches	2 1/4	2 7/16	2 23/32	3 7/32	3 3/4	4 9/32	4 7/8	5 7/8	7 1/16	7 7/8	9	10 1/16
F	Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,... ... inches	1	1 3/16	1 9/32	1 9/16	1 13/16	2 3/32	2 3/8	2 25/32	3 11/16	4 1/8	4 1/2	5 1/32
G	Center of Port to Bottom of Body, inches	5/8	11/16	13/16	1 1/16	1 1/4	1 1/2	1 5/8	2 1/16	2 1/2	2 7/8	3 1/2	3 15/16
H	Center of Port to Top of Stem, when open.... ... ...inches	4 3/16	4 3/16	4 11/16	5 7/16	6 3/8	6 15/16	7 3/4	9 1/8	10 1/4	11 1/16	12 3/4	14
H	Center of Port to Top of Stem, when closed, ...inches	3 7/8	3 7/4	4 5/16	5 1/16	5 15/16	6 1/2	7 3/16	8 5/16	9 5/16	11 1/16	11 9/16	12 11/16
J	Diameter of Stem, ...inches	3/8	3/8	13/32	29/64	1/2	9/16	37/64	43/64	3/4	27/32	1 1/32	1 1/16
K	Diameter of Hand Wheel, inches	2	2	2 7/16	2 15/16	3 3/8	3 13/16	4	4 3/4	5 1/2	6	12	14

Angle and Cross Patterns shown in dotted lines.

"RENEWO" GLOBE, ANGLE AND CROSS VALVES.

For Working Pressures up to 200 Pounds.

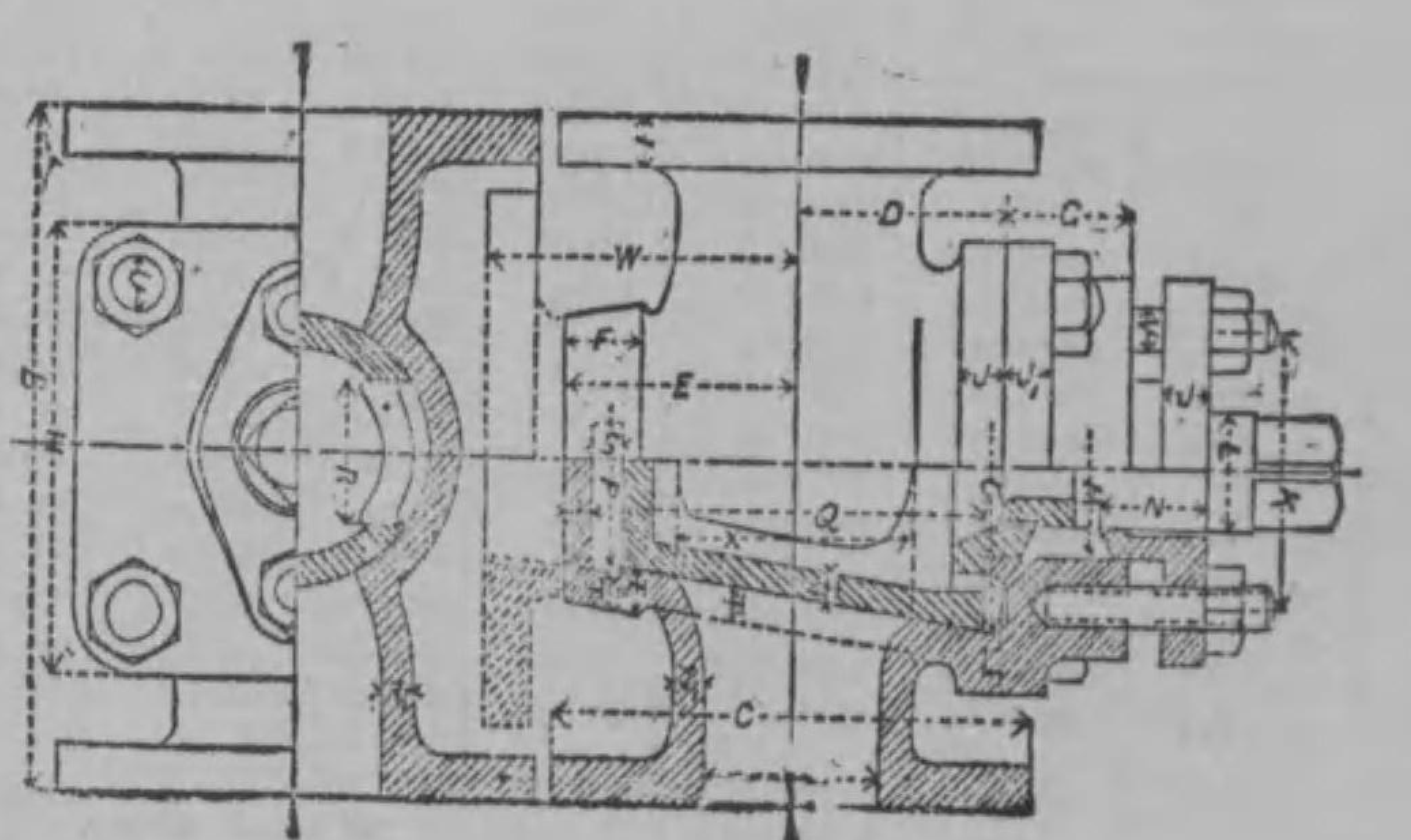
Leading Dimensions.

	Size of Valve ... ... inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
A	Face to Face Flange End Globe Valve, ins.	......	3	3½	3⅞	4½	4 15/16	5½	7¼	8½	9
B	Center to Face of Inlet or outlet of Flange End Angle or Cross Valve, ... inches	......	1⅝	2	2 3/16	2½	2¾	3 1/16	3⅝	4 3/16	4½
C	Diameter of Flanges, ... inches	......	2½	3	3½	4	4½	5	6	7	7½
D	Thickness of Flanges, ... inch.	......	9/32	11/32	⅜	13/32	7/16	15/32	½	9/16	19/32
E	Face to Face Screw End Glove Valve, ins.	2⅛	2¼	2 9/16	3¼	3¾	4¼	4¾	5¾	6 13/16	7¾
F	Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve, ... inches	1	1 1/16	1¼	1½	1 11/16	1 15/16	2 3/16	2⅝	3 5/16	3 13/16
G	Center of Port to Bottom of Body ... inches	9/16	⅝	¾	15/16	1⅛	1 5/16	1½	1⅞	2 5/16	2 11/16
H	Center of Port to Top of Stem, when open, inch	3⅞	3⅞	4 5/16	5 13/16	6 5/16	7	7⅝	8 11/16	9⅞	10 15/16
H	Center of Port to Top of Stem, when closed, inch	3⅝	3⅝	4	5⅜	5 13/16	6¾	6⅞	7¾	8¾	9⅝
J	Diameter of Stem, ... inch	5/16	5/16	23/64	13/32	29/64	33/64	35/64	41/64	23/32	25/32
K	Diameter of Handwheel, ...inches	2	2	2 7/16	2 15/16	3⅜	3 13/16	4	4¾	5½	6

Angle and Cross Petterns shown in dotted lines.

All genuine Valves have the name LUNKENHEIMER cast on the body.

TABLE OF COCK.



A	1¼	2	2¼	2½	N	1 3/16	1¼	1 5/16	1⅜
B	7¼	7⅞	8½	9	O	3	3⅜	3 13/16	4 3/16
C	5	5¾	6	6⅜	P	2 1/16	2⅜	2 11/16	3
D	1⅞	2 3/16	2⅝	2¾	Q	3½	4	4½	5
E	2 7/16	2¾	2 15/16	3 5/16	R	1 5/16	1½	1 11/16	1 13/16
F	⅞	1	1	1⅛	S	⅜	⅜	⅜	7/16
G	1⅜	1 7/16	1½	1 9/16	T	⅜	⅜	7/16	7/16
H	4½	5¼	5⅝	6	T_1	5/16	5/16	⅜	⅜
I	½	17/32	9/16	⅝	T_3	7/16	7/16	½	½
J	½	17/32	9/16	⅝	U	½	⅝	⅜	⅝
J_1	7/16	15/32	½	9/16	V	½	½	½	⅝
K	2⅞	3¼	3⅜	3 1/16	W	3⅜	3¾	3⅞	4⅛
L	1¼	1⅜	1 7/16	1½	X	2¼	2 9/16	2⅞	3⅛
M	1⅞	2	2 3/16	2¼					

TRANSVERSE STRENGTH OF JAPANESE TIMBER (A)

NAMES.		LOCALTY.	Approximate age of the timcer	Weight in lbs. per cub. ft.	Ultimate Strength *f* in lbs. per sq. inch.			Modulus of direct elasticity *E* in lbs. per sq. inch.			Number of p eces tested.
					Smallest value.	Larg st va ue.	Aver-age.	Samallest value	Largest vale.	Average.	
Hinoki.	檜	木曾山	135	23·02	7859	9354	8548	930100	1454000	1061000	9
,,	全	大和國吉野	73	30·87	9441	13570	11860	1297000	1637000	1404000	19
,,	全	紀伊國新宮	68	29·86	9030	11800	11150	1226000	1447000	1310000	5
,,	全	熊本縣山鹿郡	50	28·76	9354	11580	10920	1002000	1155000	1082000	6
,,	全	山城國嶺峨	137	29·79	7321	11070	9892	891500	1363000	1124000	18
Sugi.	杉	群馬縣利根郡	110	24·89	7318	7502	7395	771500	898100	840300	4
,,	全	陸中國仙臺附近	120	24·36	9041	9707	9288	874500	1241000	1136000	4
,,	全	群馬縣利根郡	175	30·96	3097	9615	9312	967000	1175000	1053000	3
,,	全	山城國嶺峨	50	30·62	7740	11820	9329	806600	1202000	974800	15
,,	全	廣島縣山縣郡	170	26·68	7749	9721	8478	861700	1033000	932200	6
,,	全	熊本縣上益城郡	86	25·75	8272	10970	9739	976300	1249000	1077000	13
,,	全	伊勢國宮川	35	20·18	4585	7318	6432	661800	991300	736300	18
Matsu.	松	群馬縣利根郡	83	35·05	10080	12410	11260	1090000	1343000	1203000	4
,,	全	大和國吉野	110	38·61	9698	15230	12390	1100000	1443000	1230000	20
,,	全	伊豫國北郡	160	34·79	12290	12680	12450	1227000	1330000	1270000	3
,,	全	廣島縣山縣郡	90	31·85	7405	13280	10420	992800	1396000	1228000	4
,,	全	肥後國新號田附近	160	34·57	9990	12490	11260	1182000	1356000	1275000	4
,,	全	熊本縣球磨郡	60	39·54	8781	14510	12780	1123000	1577000	1341000	9
Kuri.	栗	廣島郡山縣郡	0	41·93	8994	12070	10360	788800	1148000	971800	8
,,	全	陸中國仙臺附近	5	49·40	10390	12220	11180	1032000	1131000	1098000	4
Hiba.	椹	陸奥國青森附近	0	27·09	7891	11070	9140	900700	971000	939800	3

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TRANSVERS ESTRNGTH OF JAPANESE TIMBER. (B)

NAMES.		LOCALITY.	Approxi-mate age of the timber.	Weight in lbs. per cub. ft	Breadth *b* in inches.	Depth *h* in inches.	Total breaking load *W* in lbs.	Ultimate Strength *f* in lbs. per sq. in.	Modulus of direct elasticity *E* in lbs. per sq. in.	Number of pieces tested.
Hinoki.	檜	木曾山	135	25·89	$4\frac{1}{2}$	7	12450	4732	904100	1
,,	全	大和國吉野	73	31·95	5	$7\frac{1}{2}$	21840	6508	1488000	1
,,	全	紀伊國新宮	68	31·86	$4\frac{1}{2}$	$6\frac{1}{2}$	14250	6651	1276000	1
,,	全	熊本縣山鹿郡	50	31·98	4	$6\frac{7}{16}$	13050	6598		1
Sugi.	杉	山城國嶺峨	137	32.13	$4\frac{15}{16}$	7	14040	5569	788300	1
,,	全	群馬縣利根郡	110	36·76	$5\frac{3}{8}$	8	13740	3348	1170000	1
,,	全	陸中國仙臺附近	120	27·40	5	$7\frac{1}{2}$	13320	3969	992400	1
,,	全	群馬縣利根郡	175	34·80	$5\frac{5}{16}$	8	17100	4215	1184000	1
,,	全	山城國嶺峨	50	26·00	$4\frac{1}{2}$	7	12615	4795	904100	1
,,	全	廣島縣山縣郡	170	29·72	$4\frac{1}{2}$	$7\frac{7}{8}$	13905	4176	952500	1
,,	全	熊本縣上益城郡	86	27·30	$5\frac{3}{8}$	8	20055	4886	1087000	1
Matsu.	松	伊勢國宮川	35	20·10	$4\frac{1}{2}$	$6\frac{7}{8}$	9600	3783	1431000	1
,,	全	群馬縣利根郡	83	34·68	$5\frac{5}{16}$	8	20625	5084	1184000	1
,,	全	大和國吉野	110	38·35	$4\frac{1}{2}$	6	13605	7039	1641000	1
,,	全	伊豫國北郡	160	36·35	$5\frac{1}{8}$	8	22980	5872	1196000	1
,,	全	廣島縣山縣郡	90	32·38	5	$7\frac{1}{2}$	19125	5699	992300	1
,,	全	肥後國新發田附近	160	34·26	5	$7\frac{1}{2}$	20385	6075	1489000	1
Kuri.	栗	熊本縣球磨郡	60	45·96	$4\frac{1}{2}$	7	16110	6122	1526000	1
,,	全	廣島縣山縣郡	80	47·92	$4\frac{5}{16}$	6	11100	5992	1192000	1
Hiba.	椹	陸中國仙臺附近	45	57·81	5	$7\frac{1}{2}$	22530	6714	851900	1
		陸奥國青森附近	190	33·05	$4\frac{1}{8}$	$7\frac{3}{8}$	17145	5420	1160000	1

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ngineering Laboratory of the College of Engineering Tokyo, Japan, by

some of the Committee of the Earthquake Investigation Board (Shinsai Yobo Chosakwai). The test pieces were appro-

ximately square in section, the dimensions of the sides ranging from 1 $\frac{15}{16}$″ to 2 $\frac{3}{16}$″, and the length about 36″. Each piece

was supported in the testing machine by two paralled edges 32 inches apart and the load was gradually applied at the cen-

tre by means of sliding weight till the piece broke. The values of the ultimate strength f were calculated from the formula

$$W = \frac{2}{3} f \frac{bh^2}{l},$$

where W is the breaking load in lbs. applied at the centre, f the breaking stress in lbs. per sq. in., b the breadth of test piece in inches, h the depth in inches and l the distance between the two supports. The values of the modulus of direct elasticity E were calculated from the formula

$$\delta = \frac{Pl^3}{40h^3E}$$

where δ is the deflection in inches measured at the middle while the deflection is proportional to the load producing it, E the modulus of elasticity in lbs. per square inch, and the three other letters have the same meaning as before. The values of δ and P were taken from the stress-strain diagrams obtained by a self-recording arrangement attached to the testing machine.

(B)

These tests were carried out in 1894 in the Imperial Naval Dock yard at Yokosuka, Japan, by some of the Committee of the Earthquake Investigation Board. The testing machine employed was that manufactured by Greenwood and Batley, Leeds, England, capable of exerting a maximum force of 180,000 lbs. All the test pieces which were prepared from the same timber as in Table A, were supported by parallel edges 55$\frac{1}{2}$″ apart, each end projecting about 9″ beyond the support and the load was gradually applied at the middle by means of a pressure pump worked by hand power, till the piece broke. The formulae for calculating the values of f and E were the same as in Table A.

日本帝國々立製鐵所製品目錄

鋼質試驗法（製鐵所規定）

シーメンマルチン鋼及ベセマー鋼

各出鋼番號（同一爐ニテ同時ニ熔製若クハ吹製セシ鋼全量ニ附シタル番號）毎ニ下記四種ノ試製品ヨリ夫々試驗片ヲ作リ之ヲ試驗シタル成績ニ依リ同番號鋼ヨリ製出シタル製品ノ鋼質ヲ定ムルモノトス但シ製品ノ寸法丸角鋼十三粍以上形鋼厚サ八粍以上ハ第一種．丸角鋼十三粍未滿形鋼厚サ八粍未滿ハ第二種．鋼板厚サ八粍以上ハ第二種同厚サ八粍未滿ハ第四種試驗片試驗成績ニ依ルモノトス但丸角徑十粍未滿形鋼及板厚サ六粍未滿ハ强弱試驗ヲ行ハズ

種別	試製品寸法	試驗片寸法	標點距離
第一種	丸角 20-25 粍又ハ形鋼厚 8 粍以上	徑 20-25 粍又ハ形鋼原厚幅 30-50 粍	200 粍
第二種	丸角 13-16 粍又ハ形鋼厚 6-8 粍	徑 13-16 粍又ハ形鋼原厚幅 30-50 粍	200 〃
第三種	板厚 13-15 粍	厚 13-15 粍 幅 30-45 粍	200 〃
第四種	板厚 6-8 粍	厚 6-8 粍 幅 35-50 粍	200 〃

鋼質ハ下記六種ニ區別ス（A ハ第一．第三種 B ハ第二．第四種ノ試驗片ニ依ルモノナリ）

鋼質	番號	抗張力 平方粍瓩	抗張力 平方吋噸	最低延伸 A	最低延伸 B	燒入	鍛合	屈曲	在庫別色
No. 1	極軟鋼	<37·8	<24·0	25%	20%	否	良	同	白
No. 2	軟鋼	37·8-42·5	24·0-27·0	22%	18%	同	同	同	黃
No. 3	半軟鋼	44·0-50·0	28·0-32·0	20%	16%	可	同	同	赤
No. 4	半硬鋼	52·0-60·0	33·0-38·0	15%	12%	同	可	同	白
No. 5	硬鋼	61·0-71·0	39·0-45·0	12%	9%	良	否	否	黃
No. 6	最硬鋼	>73·0	>46	8%	6%	同	同	同	黃

用途

極軟鋼　リベット材　蹄鐵材　鋼線材
軟鋼　リベット材　建築材　橋梁材　汽罐材
半軟鋼　造船材　建築材　橋梁材　汽罐外板
半硬鋼　建築材　シャフト材
硬鋼　シャフト材　普通工具用材
最硬鋼　普通工具材

標點距離100及50m/mニ於ケル延伸ハ次ノ割合表ニ依リ換算ス(但シ200粍ニ於ケル延伸ヲ100トス)			
鋼質 ＼ 標點距離	200粍	100粍	50粍
No. 1 — No. 3	100	135	156
No. 4 — No. 6	100	125	150

製鐵所製「シーメンス、マルチン」鋼の含炭素量ト抗張力ノ關係

次ノ對照表ハ最近製造ノ鋼ノ一千「チヤーヂ」ニ付抗張力試驗ヲナシタル結果ナリトス
炭素以外ノ含有元素ノ抗張力ニ對スル影響ハ比較中ヨリ除外シタリ何トナレバ「マンガン」燐・硫黄其他ノ主ナル含有元素ハ同一ノ炭素ヲ含有スル鋼中ニ於テ其變化甚ダ少ナク特殊ノ鋼(例ヘバ高「マンガン」鋼「ニツケル」鋼ノ如キモノ)ヲ除キテハ其製造方法ト原料ニ著シキ變化ナキ限リハ炭素ノ多少ノミニ依テ比較スルコトヲ得レバナリ

炭素%	抗張力 平方吋噸	抗張力 平方粍瓩	伸張標點200m/m %	斷面收縮 %	炭素%	抗張力 平方吋噸	抗張力 平方粍瓩	伸張標點200m/m %	斷面收縮 %
0·10	23·5	37·0	27·1	67·0	0·26	28·9	45·5	22·3	46·0
0·11	23·8	37·5	26·8	66·0	0·27	29·2	46·0	22·0	45·0
0·12	24·0	38·0	26·5	64·0	0·28	29·5	46·5	21·7	44·0
0·13	24·4	38·5	26·2	63·0	0·29	29·8	47·0	21·4	43·0
0·14	24·1	39·0	25·9	62·0	0·30	30·0	47·5	21·1	42·0
0·15	25·0	39·5	25·6	61·0	0·31	30·4	48·0	20·8	40·0
0·16	25·4	40·0	25·3	59·0	0·32	31·1	49·0	20·5	39·0
0·17	25·7	40·5	25·0	58·0	0·33	31·4	49·5	20·2	38·0
0·18	26·0	41·0	24·7	57·0	0·34	31·7	50·0	20·0	37·0
0·19	26·3	41·5	24·4	55·0	0·35	32·0	50·5	19·7	36·0
0·20	26·6	42·0	24·1	54·0	0·36	32·3	51·0	19·4	34·0
0·21	27·3	43·0	23·8	53·0	0·37	32·7	51·5	19·1	33·0
0·22	27·6	43·5	23·5	52·0	0·38	33·1	52·0	18·8	32·0
0·23	27·9	44·0	23·2	50·0	0·39	33·3	52·5	18·5	31·0
0·24	28·2	44·5	22·9	49·0	0·40	33·6	53·0	18·2	30·0
0·25	28·5	45·0	22·6	48·0					

上記分析及試驗ハ當所ノ分析所ト試驗所ニテ試驗シタルモノナリ

寸法表　備考第一

形鋼及棒鋼(丸・角・平・半丸ノ類)

一 寸法ハ吋ニ依ルモ重量ハ瓩ニ依ルヲ當所ノ通則トスルガ故ニ表ニ記載セル形鋼及棒鋼ノ重量ハ長サ一呎ニ付听及瓩ノ二樣ニ現ハセリ

二 表ニ記セル重量ハ均一ナル鋼ノ比重ヲ七・八五トシテ計算シタルモノナリ即チ一平方粍ノ斷面積ヲ有スルモノ長サ一米ニ付〇・七八五瓩又ハ一平方吋ノ斷面積ヲ有スルモノ長サ一呎ノ重量三・四听ニ相當ス

三 故ニ表ニ記入セル重量ハ唯理論ニシテ假定ノ重量タルニ過ギズ實物ニ於テハ通常此重量ニ對シ一本毎ニ就テハ正負百分ノ六全重量ニ就テハ正負百分ノ三ノ公差ヲ要ス

四 表ニ示セル斷面ノ寸法ハ可成的精確ヲ保タシムベシト雖ドモ「ロール」ノ磨滅ヨリ生ズル少許ノ變動ハ免カルヽ能ハズ故ニ形鋼ノ「フランヂ」(山形ハ兩邊)ノ長サニ於テ正負二「パーセント」形鋼ノ高サハ正負二「パーセント」(山形ヲ除ク)丸角ノ徑邊平鋼ノ幅ハ正負二「パーセント」「ユニバーサル」平鋼ノ幅ハ正負一「パーセント」ノ公差ヲ要ス

五 各形鋼及平鋼類ノ厚サハ第三項ノ重量制限ヲ脫セザル範圍ニテ於テ正負十「パーセント」ノ公差ヲ要スルモノトス

六 形鋼棒鋼等ノ長サニ付テハ正五吋ノ公差ヲ要ス

七 以上三乃至六項ノ公差ヲ更ニ制限セントスルニハ其都度特別ノ協定ヲ要ス

寸法表　備考第二

板類ノ備考

一 厚ハ通常吋又ハ一平方呎ノ重量ニテ定ム幅及長サハ呎トス　薄板亞鉛引平板同波形鐵板ハ B. G. 番號ヲ用ユ

二 板ノ重量ハ厚サ八分ノ一吋ノモノ一平方呎ノ重量ヲ五・一听又ハ二・三二瓩トシテ計算シタルモノナリ

三 實際重量ハ十枚以上ヲ平均シテ正負三「パーセント」ノ公差ヲ要ス但シ一枚毎ニ於テハ八分三吋以上ノ板ニテハ正

貮五%八分三吋及其以下ノモノニテハ正貮八%十六分三吋及以下ノ板ニ以テハ十「パーセント」ノ公差ヲ許容スルヲ要ス

四　板ノ幅ニ於テ幅三呎未滿ノモノハ正八分五吋幅三呎以上五呎未滿ノモノニ在リテハ正四分三吋幅五呎以上ノモノニ在リテハ正一吋ノ公差ヲ要ス

五　板ノ長サニ於テ長サ十五呎未滿ノモノハ正貮四分三吋十五呎以上三十呎未滿ノモノハ正貮一吋三十呎及以上ノモノニハ正貮一吋二分一ノ公差ヲ要ス

六　薄板ハ幅三呎未滿ノモノハ幅ニ於テ四分一吋幅三呎及以上ノモノハ幅ニ於テ八分五吋ノ公差ヲ要ス

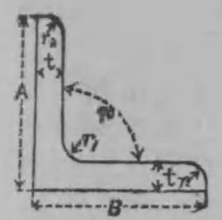
七　板ノ厚サハ可成的均一ニ保タシムベシト雖實際製作上部分ニ依リ厚サヲ異ニスルコトヲ免レズ通常最厚部分ト最薄部分トノ差ヲ下表ノ範圍内ニ於テ製作スベシ

厚サ		吋	$\frac{3}{16}$—$\frac{17}{64}$	$\frac{9}{32}$—$\frac{25}{64}$	$\frac{13}{32}$—$\frac{3}{4}$	$\frac{25}{32}$以上
		粍	5—6·9	7—9·9	10·0—19·9	20·0以上
重量		粍	8—11	11—16	16·1—32·0	32·1以上
幅	3′—3′-11″		1·0粍	1·0粍	0·9粍	0·8粍
	4′—4′-11″		1·2 〃	1·1 〃	1·0 〃	0·9 〃
	5′—5′-11″			1·8 〃	1·7 〃	1·6 〃
	6′以上			2·4 〃	2·2 〃	2·2 〃

八　以上三乃至七項ノ公差ヲ更ニ制限セントスルトキハ其ノ都度特別ノ協定ヲ要ス

寸法表　備考第三

軌條附屬品（繼目板ヲ除ク）鑛山用軌條附屬品及一般用「リベット」、「ボルト」類ノ如キ小形ノモノニテ多數ヲ集メテ取扱フモノハ重量ニ依テ注文スベシ然シテ抽出標本ニ依テ平均單重ヲ測リ全量ノ個數ヲ算出ス但シ重量公差ヲ全體ニ對シ正貮百分ノ五トス



等邊山形鋼

製作シ得ル最大長サハ
BSEA 1ヨリ 4迄100呎
〃 5ヨリ 9迄 50呎
〃 10ヨリ 14迄 90呎
規定ノ長サ十五呎以上四十呎迄各呎

番號	A×B		規定ノ厚サ(t)(吋)			壓延シ得ル厚サ		半徑(吋)	
	吋	粍	最小	普通	最大	最小	最大	r_1	r_2
BSEA									
1	1×1	25·4×25·4	0·125	—	0·250	0·125	0·300	0·175	0·125
2	$1\frac{1}{4}\times1\frac{1}{4}$	32×32	0·125	—	0·250	0·125	0·300	0·200	0·150
3	$1\frac{1}{2}\times1\frac{1}{2}$	38×38	0·125	—	0·250	0·125	0·350	0·200	0·150
4	$1\frac{3}{4}\times1\frac{3}{4}$	44×44	0·175	—	0·300	0·175	0·375	0·225	0·150
5	2×2	51×51	0·175	—	0·300	0·175	0·400	0·250	0·175
6	$2\frac{1}{4}\times2\frac{1}{4}$	57×57	0·175	—	0·300	0·175	0·450	0·250	0·175
7	$2\frac{1}{2}\times2\frac{1}{2}$	64×64	0·250	0·375	0·500	0·200	0·500	0·275	0·200
8	$2\frac{3}{4}\times2\frac{3}{4}$	70×70	0·250	0·375	0·500	0·225	0·525	0·275	0·200
9	3×3	76×76	0·250	0·375	0·500	0·250	0·525	0·300	0·200
10	$3\frac{1}{2}\times3\frac{1}{2}$	89×89	0·300	0·425	0·500	0·275	0·575	0·325	0·225
11	4×4	102×102	0·300	0·425	0·500	0·300	0·625	0·350	0·250
12	$4\frac{1}{2}\times4\frac{1}{2}$	114×114	0·375	—	0·500	0·325	0·650	0·400	0·275
13	5×5	127×127	0·375	—	0·500	0·350	0·700	0·425	0·300
14	6×6	152×152	0·450	—	0·625	0·425	0·775	0·475	0·325

(一)表ニ示シタル二種又ハ三種ノ規定ノ厚サノ山形ハ全體ノ形狀最モ正確ニ近キヲ得レドモ若シ此ノ規定ヨリ脫シタル厚サノモノヲ要スルトキハ兩邊ノ外偶ニ於テ正角ヲ保ツ能ハズ規定ヨリ薄キハ突出スベク厚キハ丸ミヲ有スベシ

但シ兩邊トモ厚サハ同一ナルベシ

(二)注文ノトキ厚サハ寸法又ハ單重ニテ指定スルコトヲ得レドモ双方ヲ同時ニ指定スルコトヲ得ズ

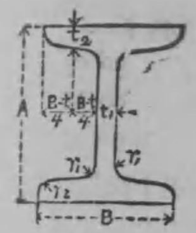
不等邊山形鋼

製作シ得ル最大長サハ
BSUA 4 ヨリ 8 迄 50 呎
〃 9 ヨリ 26 迄 90 呎
規定ノ長サハ十五呎以上四十呎迄各呎

番號	A×B 吋	A×B 粍	規定ノ厚サ(t)(吋) 最小	普通	最大	壓延シ得ル厚サ(吋) 最小	最大	半徑(吋) r_1	r_2
BSUA									
4	2×1½	51× 38	0·175	—	0·300	0·175	0·375	0·225	0·150
5	2½×2	64× 51	0·175	—	0·300	0·175	0·450	0·250	0·175
6	3×2	76× 51	0·250	0·375	0·500	0·200	0·500	0·275	0·200
7	3×2½	76× 64	0·250	0·375	0·500	0·225	0·525	0·275	0·200
8	3½×2½	89× 64	0·250	0·375	0·500	0·250	0·525	0·300	0·200
9	3½×3	89× 76	0·250	0·375	0·500	0·250	0·550	0·325	0·225
10	4×2½	102× 64	0·250	0·375	0·500	0·250	0·550	0·325	0·225
11	4×3	102× 76	0·300	0·425	0·500	0·275	0·575	0·325	0·225
12	4×3½	102× 89	0·300	0·425	0·500	0·275	0·600	0·350	0·250
13	4½×3	114× 76	0·300	0·425	0·500	0·275	0·600	0·350	0·250
14	4½×3½	114× 89	0·300	0·425	0·500	0·300	0·625	0·350	0·250
15	5×3	127× 76	0·300	0·425	0·500	0·300	0·625	0·350	0·250
16	5×3½	127× 89	0·375	—	0·500	0·325	0·625	0·375	0·250
17	5×4	127×102	0·375	—	0·500	0·325	0·650	0·400	0·275
19	5½×3½	140× 89	0·375	—	0·500	0·325	0·650	0·400	0·275
20	6×3½	152× 89	0·375	—	0·500	0·350	0·675	0·400	0·275
21	6×4	152×102	0·375	—	0·500	0·350	0·700	0·425	0·300
22	6½×3½	165× 89	0·375	—	0·500	0·350	0·700	0·425	0·300
23	6½×4	165×102	—	0·525	—	0·375	0·725	0·425	0·300
24	6½×4½	165×115	—	0·550	—	0·400	0·750	0·450	0·325
25	7×3½	178× 89	—	0·525	—	0·375	0·725	0·425	0·300
26	7×4	178×102	—	0·550	—	0·400	0·750	0·450	0·325

(一)表ニ示シタル二種又ハ三種ノ規定ノ厚サノ山形ハ全體ノ形狀最モ正確ニ近キヲ得レドモ若シ此規定ヨリ脫シタル厚サノモノヲ要スルトキハ兩邊ノ外隅ニ於テ正角ヲ保ツ能ハズ規定ヨリ薄キハ突出シ厚キハ丸ミヲ有スベシ
但兩邊ノ厚サハ同一ナルヲ得ズ
(二)注文ノトキ厚サハ寸法又ハ單重ニテ指定スルヲ得レドモ双方同時ニ指定スルヲ得ズ

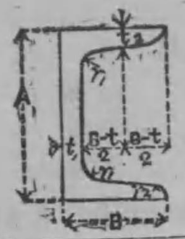
工形鋼



製作シ得ル最大長サハ
BSB 2 ヨリ 5 迄 50 呎
〃 6 ヨリ 21 迄 90 呎
NP 10 ヨリ 30 迄 30 呎
規定ノ長サハ二十呎以上四十呎迄 各五呎

番號	A×B 吋	A×B 粍	規定ノ厚(吋) t_1	t_2	半徑(吋) r_1	r_2	長サ一呎ノ重量(斤)	
BSB 2	3 ×3	76× 76	0·200	0·332	0·300	0·150	—	—
3	4 ×1¾	102× 44	0·170	0·240	0·270	0·135	—	—
4	4 ×3	102× 76	0·220	0·336	0·320	0·160	—	—
5	4¼ ×1¾	121× 44	0·180	0·325	0·280	0·140	—	—
6	5 ×3	127× 76	0·220	0·376	0·320	0·160	—	—
7	5 ×4½	127×114	0·290	0·448	0·390	0·195	—	—
8	6 ×3	152× 76	0·260	0·348	0·360	0·180	—	—
9	6 ×4½	152×114	0·170	0·431	0·470	0·235	—	—
10	6 ×5	152×127	0·410	0·520	0·510	0·255	—	—
11	7 ×4	178×102	0·250	0·387	0·350	0·175	—	—
12	8 ×4	203×102	0·280	0·402	0·380	0·190	—	—
13	8 ×5	203×127	0·350	0·575	0·450	0·225	—	—
14	8 ×6	203×152	0·440	0·597	0·540	0·270	—	—
15	9 ×4	229×102	0·300	0·460	0·400	0·200	—	—
16	9 ×7	229×178	0·550	0·924	0·650	0·325	—	—
17	10 ×5	254×127	0·360	0·552	0·560	0·230	—	—
18	10 ×6	254×152	0·400	0·376	0·500	0·250	—	—
19	10 ×8	254×203	0·600	0·970	0·700	0·350	—	—
20	12 ×5	305×127	0·350	0·550	0·450	0·225	—	—
21	12 ×6	305×152	0·400	0·717	0·500	0·250	—	—
NP 10	3 15/16 ×2	100× 50	0·177	0·267	—	—	—	—
12	4 23/32 ×2 5/16	120× 58	0·200	0·303	—	—	—	—
15	5 15/16 ×2 13/16	150× 70	0·236	0·354	—	—	—	—
18	7 1/16 ×3½	180× 82	0·271	0·409	—	—	—	—
20	7 7/8 ×3 9/16	200× 90	0·295	0·444	—	—	—	—
22	8 11/16 ×3 7/8	220× 98	0·318	0·480	—	—	—	—
24	9 ½ ×4 3/16	240×106	0·342	0·515	—	—	—	—
26	10 ¼ ×4½	260×113	0·370	0·555	—	—	—	—
28	11 1/16 ×4 11/16	280×119	0·397	0·598	—	—	—	—
30	11 13/16 ×4 11/16	300×125	0·425	0·637	—	—	—	—

溝形鋼



製作シ得ル最大長サハ

BSC	1	ヨリ 2 迄	50 呎
〃	3	ヨリ 24 迄	90 呎
AP. NP			90 呎

規定ノ長サハ二十呎以上四十呎迄各五呎

番號	A×B 吋	A×B 粍	規定ノ厚(吋) t_1	規定ノ厚(吋) t_2	t_1(吋) 最大	t_1(吋) 最小	半徑(吋) r_1	半徑(吋) r_2
BSC 1	3 × 1 1/2	76× 38	0·250	0·312			0·312	0·220
2	3 1/2 × 2	89× 51	0·250	0·312			0·312	0·220
3	4 × 2	102× 51	0·250	0·375			0·375	0·260
4	5 × 2 1/2	127× 64	0·312	0·375			0·375	0·260
5	6 × 2 1/2	152× 64	0·312	0·375			0·375	0·260
6	6 × 3	152× 76	0·312	0·437			0·437	0·300
7	6 × 3	152× 76	0·375	0·475	0·575	0·375	0·475	0·325
9	7 × 3	178× 76	0·375	0·475	0·575	0·375	0·475	0·325
10	7 × 3 1/2	178× 89	0·400	0·500	0·600	0·400	0·500	0·350
11	8 × 2 1/2	203× 64	0·312	0·437			0·437	0·300
12	8 × 3	203× 76	0·375	0·500			0·500	0·350
13	8 × 3 1/2	203× 89	0·425	0·525	0·625	0·425	0·525	0·375
14	8 × 4	203× 102	0·450	0·550	0·650	0·450	0·550	0·375
15	9 × 3	229× 76	0·375	0·437			0·537	0·350
16	9 × 3 1/2	229× 89	0·375	0·500			0·500	0·350
18	9 × 4	229× 102	0·475	0·575	0·675	0·475	0·575	0·400
19	10 × 3 1/2	254× 89	0·375	0·500			0·500	0·350
20	10 × 3 1/2	254× 89	0·475	0·575	0·675	0·475	0·575	0·400
21	10 × 4	254× 102	0·475	0·575	0·675	0·475	0·575	0·400
22	11 × 3 1/2	279× 89	0·475	0·575	0·675	0·475	0·575	0·400
23	11 × 4	279× 102	0·500	0·600	0·700	0·500	0·600	0·425
24	12 × 3 1/2	305× 89	0·375	0·500			0·500	0·350
AP 10 1/2	4 3/16 × 2 1/16	105× 65	0·315	0·315				
〃 11	4 11/16 × 2 9/16	117·5× 65	0·393	0·393				
〃 14 1/2	5 3/4 × 2 3/8	145× 60	0·315	0·315				
NP 18	7 1/8 × 2 1/8	180× 70	0·315	0·433				
AP 23 1/2	9 5/16 × 3 1/16	235× 90	0·393	0·472				
NP 26	10 1/4 × 3 1/16	260× 90	0·393	0·551				

(一) 表ニ示シタル規定ノ厚サノ工形鋼及溝形鋼ハ全體ノ形狀最モ正確ニ近キヲ得レドモ若シ此規定ヨリ脫シタル厚サノモノヲ要スルトキハ邊「フランヂ」ノ幅ハ增減スベシ

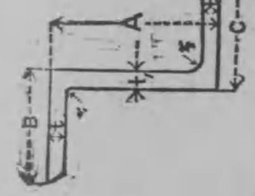
(二) 工形鋼及溝形鋼ノ注文ノ時ハ高サ「フランヂ」ノ幅及「ウエブ」ノ厚サヲ指定スルカ又ハ高サ幅及單重ヲ指定スルコトヲ得レドモ厚サト單重トヲ共ニ指定スルコトヲ得ズ

Z 形 鋼

製作シ得ル最大長サハ

全部 90 呎

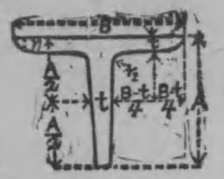
規定ノ長サハ二十呎以上四十呎迄 各五呎



番號	A×B×C 吋	A×B×C 粍	規定ノ厚サ(吋) t_1	規定ノ厚サ(吋) t_2	t_1(吋) 最大	t_1(吋) 最小	半徑(吋) r_1	半徑(吋) r_2	長一呎ノ重量(斤)
BSZ 1	3×2 1/2×3	76×64×76	0·300	0·400	0·500	0·300	0·325	0·225	
2	4×2 1/2×3	102×64×76	0·325	0·425	0·525	0·325	0·350	0·225	
3	5×3 ×3	127×76×76	0·350	0·450	0·550	0·350	0·375	0·250	
4	6×3 1/2×3 1/2	152×89×89	0·375	0·475	0·575	0·375	0·425	0·300	
5	7×3 1/2×3 1/2	179×89×89	0·400	0·500	0·600	0·400	0·450	0·300	
6	8×3 1/2×3 1/2	203×89×89	0·425	0·525	0·625	0·425	0·450	0·325	
7	9×3 1/2×3 1/2	229×89×89	0·450	0·550	0·650	0·450	0·475	0·350	
8	10×3 1/2×3 1/2	254×89×89	0·475	0·575	0·675	0·475	0·500	0·350	

(一) 表ニ示セル規定ノ厚サノZ形鋼ハ其形狀最モ正確ニ近キヲ得レドモ若シ此規定ヨリ脫シタル厚サノモノヲ要スルトキハ高サ幅モ多少增減スベク又四邊ノ外隅ニ於テ正角ヲ保ツ能ハズ

(二) 注文ノトキハ「ウエブ」ノ厚サ(t_1)又ハ單重ノ何レカヲ指定スルコトヲ得レドモ「フランヂ」ノ厚サ(t_2)又ハ厚サト單重トヲ同時ニ指定シ又ハ厚サト單重トヲ



T 形 鋼

製作シ得ル最大長サハ
BST 3 ヨリ 11 迄 50 呎
〃 14 ヨリ 21 迄 90 呎
規定ノ長サハ二十呎以上四十呎迄
各五呎

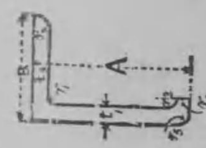
番號	B×A		規定ノ厚サ(吋)			半徑(吋)		最一呎ノ重量(斤)	
	吋	粍	最小	普通	最大	r_1	r_2		
BST									
1	1×1	25× 25	0·125	0·187	—	0·175	0·125		
3	1½×1½	38× 38	0·187	0·250	—	0·200	0·150		
6	2×2	51× 51	0·250	0·312	0·375	0·250	0·175		
8	2½×2½	64× 64	0·250	0·312	0·375	0·275	0·200		
9	3×2	76× 51	0·312	0·375	—	0·275	0·200		
11	3×3	76× 76	0·312	0·375	0·437	0·300	0·200		
14	4×3	102× 76	0·375	0·500	—	0·325	0·225		
15	4×4	102×102	0·375	0·500	—	0·350	0·250		
16	4×5	102×127	0·375	0·500	—	0·400	0·275		
17	5×3	127× 76	0·375	0·500	—	0·350	0·250		
18	5×3½	127× 89	0·500	—	—	0·375	0·250		
19	5×4	127×102	0·500	—	—	0·400	0·275		
20	6×3	152× 76	0·375	0·500	—	0·400	0·275		
21	6×4	152×102	0·500	—	—	0·425	0·300		

(一) 表ニ示セル一種乃至三種ノ規定ノ厚サノ T 形鋼ハ全體ノ形狀最モ正確ニ近キ得ベシ

(二) 注文ノトキ厚サハ寸法又ハ單重ニテ指定スルコトヲ得ルノ外厚サ又ハ單重ニテ指定スルコトヲ得ズ、双方同時ニ指定スルコトヲ得ルモノトス

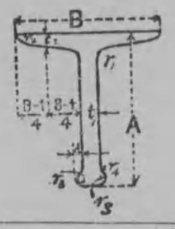
球 山 形 鋼

製作シ得ル最大長サハ
各種トモ 90 呎
規定ノ長サハ二十呎以上四十呎迄 各五呎



番號	A×B		規定ノ厚(吋)	壓延シ得ル厚 t_1(吋)		半徑(吋)				最一呎ノ重量(斤)
	吋	粍	t_1 t_2	最大	最小	r_1	r_2	r_3	r_4	r_5	
BSBA 1	4×2½	102×64	0·300	0·500	0·300	0·300	0·200	0·525	0·300	0·250	
2	5×2½	127×64	0·325	0·525	0·325	0·350	0·250	0·600	0·350	0·300	
3	5½×3	140×76	0·350	0·550	0·350	0·375	0·250	0·650	0·375	0·325	
4	6×3	152×76	0·375	0·575	0·375	0·400	0·275	0·675	0·400	0·325	
5	6½×3	165×76	0·375	0·575	0·375	0·425	0·275	0·700	0·425	0·350	
6	6½×3½	165×89	0·400	0·600	0·400	0·425	0·300	0·700	0·425	0·350	
7	7×3	179×76	0·400	0·600	0·400	0·450	0·300	0·750	0·450	0·375	
8	7×3½	179×89	0·425	0·625	0·425	0·450	0·300	0·750	0·450	0·375	
9	7½×3	191×76	0·425	0·625	0·425	0·475	0·325	0·800	0·475	0·400	
10	7½×3½	191×89	0·425	0·625	0·425	0·475	0·325	0·800	0·475	0·400	
11	8×3	203×76	0·425	0·625	0·425	0·500	0·325	0·825	0·500	0·400	
12	8×3½	203×89	0·450	0·650	0·425	0·500	0·325	0·825	0·500	0·400	
13	8½×3	216×76	0·450	0·650	0·450	0·500	0·350	0·850	0·525	0·425	
14	8½×3½	216×89	0·475	0·675	0·450	0·525	0·350	0·850	0·525	0·425	
15	9×3	229×76	0·475	0·675	0·475	0·525	0·350	0·900	0·550	0·450	
16	9×3½	229×89	0·475	0·675	0·475	0·550	0·350	0·900	0·550	0·450	

(一)表ニ示セル規定ノ厚サノ球山形鋼ハ全體ノ形狀最モ正確ニ近キヲ得レドモ若シ此規定ヲ脫シタル厚サノモノヲ要スルトキハ邊ノ幅ト球形部ノ幅トヲ增減スベク邊ノ外隅ニ於テ正角ヲ保ツ能ハズ規定ヨリ薄キハ突出スベク厚キハ丸ミヲ有スベシ
但此場合ニハ t_1 ト t_2 トノ厚サハ同一ナラズ
(二)注文ノ時厚サハ寸法又ハ單重ニテ指定スルコトヲ得レドモ双方ヲ同時ニ指定スルコトヲ得ズ



球 T 形 鋼

製作シ得ル最大長サハ
各種トモ 90 呎
規定ノ長サハ二十呎以上四十呎迄 各五呎

番號	A×B		規定ノ厚サ(吋)		壓延シ得ル厚 t_1(吋)		d	半徑				長一呎ノ重量(听)	
	吋	粍	t_1	t_2	最大	最小		r_1	r_2	r_3	r_4		
BSBT 1	7×5	179×129	0·425	0·425	0·500	0·350	0·450	0·600	0·200	0·800	0·300	—	—
2	8×5½	203×140	0·450	0·450	0·525	0·375	0·500	0·675	0·225	0·900	0·355	—	—
3	9×5½	229×140	0·475	0·500	0·550	0·400	0·575	0·750	0·250	1·000	0·375	—	—
4	10×6	254×152	0·500	0·550	0·575	0·425	0·625	0·825	0·275	1·100	0·400	—	—
5	11×6½	279×165	0·550	0·600	0·625	0·475	0·675	0·900	0·300	1·200	0·450	—	—
6	12×6½	305×165	0·575	0·650	0·650	0·500	0·725	0·975	0·325	1·300	0·475	—	—

(一)表ニ示セル規定ノ厚サノ球T形鋼ハ全體ノ形狀最モ正確ニ近キヲ得レドモ若シ此規定ヨリ脫シタル厚サノモノヲ要スルトキハ邊高サ球形部ノ幅モ增減スベシ
(二)注文ノトキ「ウエブ」ノ厚サ又ハ單重ニテ指定スルコトヲ得レドモ双方ヲ同時ニ指定スルコトヲ得ズ

「ユニバーサル」平鋼最大寸法表

厚(吋) / 幅(吋)	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1	1¼	1½	1⅝
	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)	長(呎)
6	10	12	15	20	30	30	30	30	30	30	30	26	24
7	10	12	15	20	30	30	30	30	30	30	31	28	26
8	10	12	22	30	37	37	37	37	37	37	31	28	28
9	12	15	22	30	37	37	37	37	37	37	31	28	28
10	12	15	22	30	37	37	37	37	37	37	31	28	28
11	12	15	22	30	37	37	37	37	37	37	31	28	28
12	12	15	22	30	37	37	37	37	37	37	31	28	28
13	12	15	22	30	37	37	37	37	37	37	31	28	28
14	12	15	22	30	37	37	37	37	37	37	31	30	28
15	12	15	22	30	37	37	37	37	37	37	32	27	24
16	15	15	16	18	40	40	40	40	35	30	24	19	18
17	15	15	16	18	40	40	40	40	35	30	24	19	18
18	15	15	16	18	40	40	40	40	35	30	24	19	18
19	15	15	16	18	40	40	40	40	35	30	24	19	18
20	15	15	16	18	40	40	40	40	35	30	24	19	18
21	15	15	16	18	40	40	40	40	35	27	21	17	16
22	15	15	16	18	40	40	40	40	35	27	21	17	16
23	15	15	16	18	40	40	40	40	37	31	24	19	18

鋼板最大寸法表

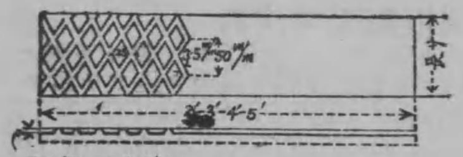
普通尺ハ 3′×6′, 4′×8′, 5′×10′, ノ三種トス 但シ下表ハ 24″ 乃至 90″ 迄ノ各種ノ幅ニテ製作シ得ル最大ノ長サヲ示ス

厚 吋 / 幅 吋	24″		30″		36″		48″		60″		78″		84″		90″	
	長(呎)		長(呎)		長(呎)		長(呎)		長(呎)		長(呎)		長(呎)		長(呎)	
3/16	12	25	12	25	12	25	10	20	—	12	—	—	—	—	—	—
1/4	25	25	25	30	30	30	24	24	15	15	—	—	—	—	—	—
5/16	25	25	36	36	26	30	18	18	15	15	—	—	—	—	—	—
3/8	28	30	30	30	33	33	33	33	28	28	23	28	20	23	20	20
7/16	30	30	30	30	36	36	38	38	32	32	28	28	23	23	18	18
1/2	30	30	30	30	40	40	40	40	35	35	30	30	25	25	20	20
9/16	30	30	30	30	40	40	40	40	35	35	30	30	25	25	20	20
5/8	25	20	25	25	35	30	40	30	35	30	30	30	25	25	20	20
3/4	20	15	20	15	30	25	30	25	30	25	25	25	20	20	15	15
7/8	15	15	15	15	25	20	25	20	25	20	20	20	18	18	15	15
1	15	15	15	15	20	20	20	20	20	20	18	18	18	18	15	15
1 1/8	15	15	15	15	20	20	20	20	20	20	18	18	18	18	15	15
1 1/4	15	15	15	15	20	20	20	20	20	20	18	18	18	18	15	15
1 3/8	15	15	15	15	20	20	20	20	20	20	18	18	18	18	15	15
1 1/2	15	15	15	15	20	20	20	20	20	20	18	18	18	18	15	15

薄鋼板最大寸法表

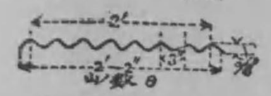
厚 ＼ 幅			2′	3′	4′
BG No.	吋	粍	長（呎）	長（呎）	長（呎）
28	0·0156	0·397	6	6	—
26	0·0196	0·498	6	6	—
23	0·0278	0·707	8	8	8
20	0·0392	0·996	10	10	10
16	0·0625	1·587	10	10	10
13	0·0882	2·240	10	10	10
12	0·0991	2·517	10	10	10
10	0·1250	3·175	12	12	12

網目鋼板最大寸法表



幅（呎） ＼ 厚（吋）	2 長（呎）	3 長（呎）	4 長（呎）	5 長（呎）	一平方呎ノ重量 斤	瓩
3/16	6	6	—	—	8·8	4·00
1/4	12	12	12	10	11·3	5·126
5/16	15	15	15	12	13·8	6·26
3/8	20	20	16	12	16·3	7·394
7/16	20	18	15	10	18·9	8·574
1/2	20	15	12	10	21·4	9·708
9/16	18	12	10	8	26·75	12·13
5/8	16	10	8	6	32·1	14·56

亞鉛引波形鋼板（ナマコ板）



（長サ六呎 … 七呎）

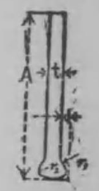
亞鉛引平鋼板

普通尺ハ 3′×6′ 及 3′×7′ノ二種

厚サ No. BG	粍	重量 2′-2″×6′ 斤	瓩	2′-2″×7′ 斤	瓩
18	1·257	32·1	14·6	37·4	17·0
19	1·118	28·8	13·1	33·6	15·3
20	·996	25·7	11·8	29·9	13·8
21	·886	23·1	10·5	26·9	12·3
22	·794	21·1	9·6	24·6	11·2
23	·707	18·9	8·4	21·9	10·0
24	·629	17·1	7·8	19·9	9·0
26	·498	13·9	6·3	16·2	7·4
28	·396	11·5	5·2	13·4	6·1

厚サ No. BG	重量 一平方呎 斤	瓩	3′×6′ 斤	瓩	3′×7′ 斤	瓩
18	2·14	·972	38·5	17·5	44·1	20·4
19	1·92	·872	34·6	15·7	40·3	18·3
20	1·71	·777	30·8	14·0	35·9	16·3
21	1·54	·700	27·7	12·6	32·3	14·7
22	1·41	·639	25·3	11·5	29·5	13·4
23	1·26	·572	22·7	10·3	26·4	12·0
24	1·14	·517	20·5	9·3	23·9	10·9
26	·930	·422	16·7	7·6	19·5	8·9
28	·771	·350	13·8	6·3	16·1	7·4

球鋼板



製作シ得ル最大長サハ

各種トモ 9〇 呎

規定ノ長サハ二十呎以上四十呎迄 各五呎

番號	A 吋	A 粍	規定ノ厚（吋） t	壓延シ得ル厚 t（吋） 最大	最小	d	半徑 r_1	半徑 r_2	長一呎ノ重量（听）	
BSBP 1	6	152	0·300	0·400	0·250	0·400	0·700	0·250	—	—
2	7	179	0·350	0·450	0·275	0·450	0·800	0·300	—	—
3	8	203	0·400	0·525	0·325	0·500	0·900	0·325	—	—
4	9	229	0·450	0·575	0·350	0·575	1·000	0·375	—	—
5	10	254	0·500	0·625	0·375	0·625	1·100	0·400	—	—
6	11	279	0·550	0·700	0·425	0·675	1·200	0·450	—	—
7	12	305	0·600	0·750	0·450	0·725	1·300	0·475	—	—

（一）表ニ示セル規定ノ厚サノ球鋼板ハ全體ノ形狀最モ正確ニ近キヲ得レドモ此規定ヨリ脫シタル厚サノモノヲ要スルトキハ球形部ノ幅モ增減スベシ

（二）注文ノトキ厚サ又ハ單重ニテ指定スルコトヲ得レドモ双方ヲ同時ニ指定スルコトヲ得ズ

線材鋼線及ピ亞鉛引鋼線

鋼線材一立方吋 0·2836 听，一立方呎 490·0 听

番號	SWG No.	直徑 吋	直徑 粍	一千呎ノ重量 听	一千呎ノ重量 瓩	一哩ノ重量 听	一千米ノ重量 瓩
1	0	·324	8·23	280·4	127·1	1480	417·5
2	1	·300	7·62	240·6	108·8	1226	358·3
3	2	·276	7·01	203·5	92·18	1075	303·0
4	3	·252	6·40	192·2	87·09	1005	286·2
5	4	·232	5·89	143·9	65·28	759·9	214·3
6	5	·212	5·39	120·1	54·48	634·2	178·8
7	6	·192	4·88	98·35	44·61	519·3	146·5
8	7	·176	4·47	82·70	37·51	436·6	123·1
9	8	·160	4·06	68·40	31·02	361·1	101·8
10	9	·144	3·66	55·47	25·16	292·8	82·60
11	10	·128	3·25	43·90	19·91	231·8	65·37
12	11	·116	2·95	36·07	16·36	190·4	53·71
13	12	·104	2·64	28·89	13·10	152·5	43·02
14	13	·092	2·34	22·63	10·26	119·5	33·72
15	14	·080	2·03	17·12	7·766	90·4	25·49
16	15	·072	1·83	13·85	6·283	73·1	20·62
17	16	·064	1·63	10·96	4·972	57·8	16·32
18	17	·056	1·42	8·371	3·797	44·2	12·46
19	18	·048	1·22	6·160	2·794	32·5	9·173
20	19	·040	1·02	4·288	1·945	22·6	6·385
21	20	·036	0·91	3·471	1·574	18·3	5·168
22	21	·032	0·81	2·736	1·241	14·4	5·074
23	22	·028	0·71	2·096	·9508	11·0	3·121
24	23	·024	0·61	1·538	·6976	8·1	2·290
25	24	·022	0·56	1·293	·5866	6·8	1·925

電信用鋼線

瓩數＝听數×·4536

番號	一哩ノ重量(听)	直徑 吋	直徑 粍	一千呎ノ重量 听	一千呎ノ重量 瓩
1	400	·171	4·36	75·76	34·39
2	200	·121	3·07	37·88	17·18
3	170	·110	2·80	32·20	14·61
4	100	·086	2·18	18·94	8·692
5	60	·066	1·67	11·36	5·154
6	30	·047	1·19	5·682	2·577

丸　　鋼 1. Wt. $\frac{I}{Y}$, & I.

斷面積 $= \frac{\pi}{4} D^2$

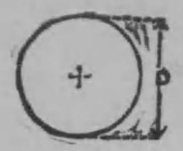
抵抗力率 $= \frac{\pi}{3^2} D^3 = R = \frac{I}{Y}$

物量力率 $= \frac{\pi}{64} D^4 = I$

丸鋼長一米ノ重量(瓩) ＝ 斷面積 × 0·785

番號	直徑 粍	面積 粍²	重量 長一呎ニ瓩	重量 長一米ニ瓩	重量 長一呎ニ听	抵抗力率 R 粍³	物量力率 I 粍⁴
1	10	·7854	·1869	·613	·4119	·0982	·0491
2	12	1·1310	·2689	·882	·5927	·1696	·1018
3	13	1·3273	·3155	1·035	·6955	·2157	·1402
4	15	1·7672	·4203	1·378	·9261	·3313	·2485
5	16	2·0106	·4787	1·568	1·055	·4021	·3217
6	18	2·5447	·6052	1·985	1·3340	·5720	·5193
7	20	3·1416	·7470	2·450	1·6465	·7854	·7854
8	22	3·8013	·9042	2·965	1·9926	1·045	1·1499
9	24	4·5239	1·076	3·529	2·3717	1·357	1·6286
10	25	4·9087	1·166	3·824	2·5700	1·534	1·9175
11	26	5·3093	1·262	4·141	2·7830	1·726	2·2432
12	28	6·1575	1·464	4·803	3·2277	2·155	3·0172
13	30	7·0686	1·682	5·518	3·7080	2·651	3·9761
14	32	8·0425	1·913	6·273	4·2155	3·217	5·1472
15	35	9·6211	2·292	7·520	5·053	4·209	7·3662
16	38	11·3411	2·697	8·846	5·944	5·387	10·2354
17	40	12·5664	2·988	9·802	6·587	6·283	12·5664
18	42	13·8544	3·295	10·806	7·262	7·274	15·2745
19	45	15·9043	3·784	12·410	8·340	8·946	20·1289
20	48	18·0956	4·304	14·115	9·486	10·857	26·0576
21	50	19·6350	4·670	15·315	10·293	12·272	30·6796
22	52	21·2372	5·052	16·565	11·133	13·804	35·8908
23	55	23·7583	5·672	18·600	12·500	16·334	44·9180
24	58	26·4208	6·282	20·608	13·848	19·155	55·5497
25	60	28·274	6·728	22·054	14·829	21·205	63·6172
26	62	30·191	7·180	23·549	15·825	23·398	72·5332
27	65	33·183	7·882	25·850	17·371	26·961	87·6240
28	68	36·317	8·636	28·327	19·035	30·869	104·0556
29	70	38·485	9·154	30·018	20·172	33·674	117·8588

丸　　鋼 2.　Wt. $\frac{I}{Y}$, & I.



斷面積 $= \frac{\pi}{4} D^2$

物量力率 $= \frac{\pi}{64} D^4 = I$

抵抗力率 $= \frac{\pi}{32} D^3 = R = \frac{I}{Y}$

丸鋼一呎ノ重量＝直徑ノ自乘 × 2·67

番號	直徑 D 吋	面積 吋²	重量 長一呎二听	重量 長一呎二瓩	重量 長一米二瓩	抵抗力率 R 吋³	物量力率 I 吋⁴
1	$\frac{2}{16}$	·0276	·094	·0426	·1394	·00054	·000060
2	$\frac{1}{4}$	·0490	·167	·0757	·2481	·00153	·00019
3	$\frac{5}{16}$	·0767	·261	·1184	·388	·00299	·000468
4	$\frac{3}{8}$	·1104	·376	·1705	·559	·00517	·000971
5	$\frac{7}{16}$	·1503	·511	·2318	·761	·00822	·001799
6	$\frac{1}{2}$	·1963	·668	·3030	·995	·01227	·003068
7	$\frac{9}{16}$	·2485	·845	·3833	1·257	·01748	·004915
8	$\frac{5}{8}$	·3068	1·043	·4732	1·55	·02397	·007490
9	$\frac{11}{16}$	·3712	1·262	·5722	1·88	·03192	·010969
10	$\frac{3}{4}$	·4417	1·502	·6814	2·24	·04142	·015536
11	$\frac{13}{16}$	·5184	1·763	·7998	2·61	·05268	·021400
12	$\frac{7}{8}$	·6013	2·044	·9272	3·21	·06577	·028772
13	$\frac{15}{16}$	·6903	2·347	1·064	3·49	·08090	·037925
14	1	·7854	2·670	1·211	3·97	·09817	·04909
15	$1\frac{1}{16}$	·8864	3·021	1·370	4·49	·11775	·06442
16	$1\frac{1}{8}$	·9940	3·380	1·533	5·03	·1398	·07863
17	$1\frac{3}{16}$	1·1075	3·854	1·748	5·73	·1645	·09767
18	$1\frac{1}{4}$	1·2272	4·172	1·892	6·20	·1917	·11985
19	$1\frac{5}{16}$	1·3530	4·610	2·091	6·86	·2217	·14572
20	$1\frac{3}{8}$	1·4849	5·049	2·290	7·52	·2552	·17555
21	$1\frac{7}{16}$	1·6230	5·531	2·509	8·23	·2917	·2066
22	$1\frac{1}{2}$	1·7671	6·008	2·725	8·94	·3313	·2485
23	$1\frac{9}{16}$	1·9175	6·851	3·108	10·19	·3747	·2927
24	$1\frac{5}{8}$	2·0739	7·051	3·199	10·49	·4213	·3431
25	$1\frac{11}{16}$	2·2365	7·734	3·508	11·51	·4719	·3981
26	$1\frac{3}{4}$	2·4053	8·178	3·709	12·15	·5261	·4607
27	$1\frac{13}{16}$	2·5802	8·791	3·988	13·08	·5847	·5298
28	$1\frac{7}{8}$	2·7612	9·388	4·259	13·97	·6471	·6067
29	$1\frac{15}{16}$	2·9483	10·04	4·554	14·95	·7142	·6919

丸　　鋼 3.　Wt. $\frac{I}{Y}$, & I.

抵抗力率(吋³)×16·4＝抵抗力率(糎³)

物量力率(吋⁴)×41·6＝物量力率(糎⁴)

重量 听/呎) × 1·488＝重量(瓩/米)

番號	直徑 D 吋	面積 吋²	重量 長一呎二听	重量 長一呎二瓩	重量 長一米二瓩	抵抗力率 R 吋³	物量力率 I 吋⁴
30	2	3·1416	10·68	4·845	15·79	·7854	·7854
31	$2\frac{1}{8}$	3·5466	12·06	5·470	17·95	·9421	1·0012
32	$2\frac{1}{4}$	3·9761	13·52	6·133	20·12	1·1187	1·2658
33	$2\frac{3}{8}$	4·4301	15·06	6·832	22·41	1·3155	1·5618
34	$2\frac{1}{2}$	4·9087	16·69	7·572	24·84	1·5345	1·917
35	$2\frac{5}{8}$	5·4119	18·40	8·346	27·38	1·7162	2·331
36	$2\frac{3}{4}$	5·9396	20·19	9·160	30·04	2·0420	2·807
37	$2\frac{7}{8}$	6·4918	22·07	10·01	32·84	2·3330	3·354
38	3	7·0686	24·03	10·90	35·76	2·6515	3·976
39	$3\frac{1}{8}$	7·6699	26·11	11·84	38·85	2·996	4·681
40	$3\frac{1}{4}$	8·2958	28·21	12·79	41·98	3·370	5·476
41	$3\frac{3}{8}$	8·9462	30·46	13·81	45·36	3·777	6·369
42	$3\frac{1}{2}$	9·6211	32·71	14·83	48·68	4·211	7·366
43	$3\frac{5}{8}$	10·321	35·16	15·95	51·84	4·677	8·476
44	$3\frac{3}{4}$	11·045	37·55	17·03	55·37	5·177	9·707
45	$3\frac{7}{8}$	11·793	40·17	18·22	59·78	5·713	11·07
46	4	12·566	42·73	19·38	63·59	6·282	12·569
47	$4\frac{1}{8}$	13·364	45·52	20·65	67·74	6·891	14·21
48	$4\frac{1}{4}$	14·186	48·23	21·88	71·78	7·536	16·088
49	$4\frac{3}{8}$	15·033	51·21	23·23	76·22	8·221	17·98
50	$4\frac{1}{2}$	15·904	54·04	24·53	80·50	8·946	20·135
51	$4\frac{5}{8}$	16·800	57·24	25·96	85·18	9·713	22·435
52	$4\frac{3}{4}$	17·721	60·25	27·33	89·68	10·525	24·99
53	$4\frac{7}{8}$	18·665	63·59	28·89	94·62	11·375	27·72
54	5	19·635	66·76	30·28	99·34	12·276	30·685
55	$5\frac{1}{8}$	20·629	70·28	31·88	101·56	13·217	33·86
56	$5\frac{1}{4}$	21·648	73·60	33·38	109·50	14·211	37·29
57	$5\frac{3}{8}$	22·691	77·32	35·07	115·65	15·250	40·97
58	$5\frac{1}{2}$	23·758	80·78	36·68	121·30	16·340	44·93

丸　　鋼 4. Wt. $\frac{I}{Y}$, & I.

抵抗力率(糎³) × 0·0612 = 抵抗力率(吋³)
物量力率(糎⁴) × 0·0241 = 物量力率(吋⁴)
重量(瓩/米) × 0·672 = 重量(听/呎)

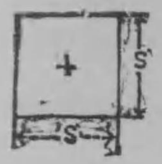
番號	直徑 粍	面積 糎²	重量 長一呎ニ付 瓲	重量 長一米ニ付 瓲	重量 長一呎ニ付 听	抵抗力率 R 糎³	物量力率 I 糎⁴
30	75	44·179	10·52	34·500	23·185	41·417	155·3156
31	80	50·266	11·95	39·207	26·350	50·265	201·0619
32	85	56·749	13·49	44·261	29·746	60·292	256·2392
33	90	63·617	15·13	49·621	33·350	71·569	322·0623
34	95	70·882	16·86	55·288	37·151	84·173	399·8198
35	100	78·540	18·68	61·261	41·169	98·175	490·8738
36	110	95·033	22 61	74·126	49·82	130·7	718·7000
37	120	113·097	26·89	88·216	59·28	169·6	1018·0000
38	130	132·732	31·12	103·53	69·58	215·7	1402·0000
39	140	153·938	36·62	120· 7	80·71	269·4	1886·0000
40	150	176·715	42·03	137·84	92·64	331·3	2485·0000

角　　鋼 1.

抵抗力率(糎³)×0·0612=抵抗力率(吋³)
物量力率(糎⁴)×0·0241=物量力率(吋⁴)

番號	邊 S 粍	面積 糎²	重量 一呎ニ付 瓲	重量 一米ニ付 瓲	重量 一呎ニ付 听	抵抗力率 R 糎³	物量力率 I 糎⁴
29	70	49·00	11·65	38·220	25·685	57·17	200·080
30	75	56·25	13·45	44·100	29·640	70·31	263·650
31	80	64·00	15·22	49·920	33·549	85·33	341·330
32	85	72·25	17·18	56·36	37·875	102·35	435·000
33	90	81·00	19·26	63·18	42·455	121·50	546·750
34	95	90·25	21·46	70·395	47·300	142·90	678·750
35	100	100·00	23·79	78·00	52·450	166·67	833·330
36	110	121·00	28·77	94·38	63·43	221·83	1220·100
37	120	144·00	34·25	112·32	75·50	288·00	1728·000
38	130	169·00	40·19	131·82	88·60	366·20	2380·100
39	140	196·00	46·60	152·88	102·73	457·30	3201·300
40	150	255·00	53·51	175·00	117·93	562·50	4218·800

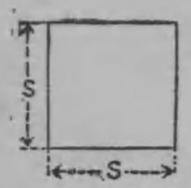
角　　鋼 2. Wt. $\frac{I}{Y}$, & I.



斷面積 = S²
抵抗力率 = $\frac{S^3}{6}$ = R = $\frac{I}{Y}$
物量力率 = $\frac{S^4}{12}$ = I
角鋼一米ノ重量 = 斷面積 × 0·785
重量(瓩/米) × 0·672 = 重量(听/呎)

番號	邊 S 粍	面積 糎²	重量 一呎ニ付 瓲	重量 一米ニ付 瓲	重量 一呎ニ付 听	抵抗力率 R 糎³	物量力率 I 糎⁴
1	10	1·00	·2377	·785	·5241	·166	·0833
2	12	1·44	·3423	1·123	·7547	·288	·1728
3	13	1·69	·4017	1·318	·8857	·366	·2380
4	15	2·25	·5350	1·755	1·1793	·563	·4219
5	16	2·56	·6088	1·997	1·3420	·683	·5461
6	18	3·24	·7704	2·527	1·698	·972	·8748
7	20	4·00	·9508	3·120	2·096	1·333	1·333
8	22	4·84	1·151	3·775	2·537	1·755	1·952
9	24	5·76	1·369	4·493	3·019	2·304	2·765
10	25	6·25	1·486	4·875	3·276	2·604	3·255
11	26	6·76	1·607	5·273	3·543	2·927	3·808
12	28	7·84	1·863	6·115	4·108	3·659	5·122
13	30	9·00	2·140	7·020	4·717	4·500	6·750
14	32	10·24	2·434	7·987	5·366	5·461	8·738
15	35	12.25	2·911	9·550	6·417	7·146	12·505
16	38	14·44	3·432	11·263	7·565	9·145	17·376
17	40	16·00	3·801	12·480	8 387	10·667	21·333
18	42	17·64	4·194	13·759	9·246	12·348	25·931
19	45	20·25	4·807	15·770	10·597	15·188	34·172
20	48	23·04	5·478	17·970	12·077	18·432	44·237
21	50	25·00	5·946	19·500	13·105	20·833	52·083
22	52	27·04	6·432	21·090	14·173	23·435	60·930
23	55	30·25	7·196	23·600	15·860	27·728	76·255
24	58	33·64	8·004	26·239	17·643	32·519	94·304
25	60	36·00	8·564	28·080	18·880	36·000	108·000
26	62	38·44	9·142	29·983	20·150	39·72	123·130
27	65	42·25	10·06	33·000	22·177	45·77	148·750
28	68	46·24	19·90	36·067	24·040	52·41	178·180

角　　鋼 3. Wt. $\frac{I}{Y}$, & I.



断面積 $=S^2$

物量力率 $=\frac{S^4}{12}=I$

抵抗力率 $=\frac{S^3}{6}=R=\frac{I}{Y}$

角鋼一呎ノ重量面積×3·4(听)

番號	邊 S 吋	面積 吋²	重量 長一呎二听	重量 長一呎二旺	重量 長一米二旺	物量力率 I 吋⁴	抵抗力率 R 吋³
1	3/16	·03516	·120	·0544	·1592	·000103	·000109
2	1/4	·06250	·213	·0966	·3170	·000325	·001563
3	5/16	·09766	·332	·1506	·4941	·000794	·005086
4	3/8	·14060	·478	·2168	·7114	·001648	·008789
5	7/16	·19140	·651	·2953	·9688	·004397	·013956
6	1/2	·25000	·894	·4055	1·3202	·005208	·020833
7	9/16	·31640	1·076	·4881	1·6012	·008416	·029667
8	5/8	·39060	1·328	·6024	1·9765	·010465	·040681
9	11/16	·47270	1·607	·7290	2·3915	·018615	·054165
10	3/4	·56250	1·912	·8678	2·8755	·026360	·070320
11	13/16	·66020	2·245	1·0180	3·3400	·036310	·089400
12	7/8	·76560	2·603	1·1810	3·8750	·048840	·111650
13	15/16	·87890	2·988	1·3550	4·4470	·064360	·137320
14	1	1·00000	3·400	1·5420	5·0600	·083320	·166660
15	1 1/16	1·12900	3·839	1·7410	5·7110	·103900	·199850
16	1 1/8	1·26600	4·300	1·9510	6·4040	·133490	·237350
17	1 3/16	1·41000	4·794	2·1740	7·1340	·165710	·279000
18	1 1/4	1·56300	5·321	2·4140	7·9200	·203390	·325500
19	1 5/16	1·72300	5·858	2·6570	8·7180	·247280	·376650
20	1 3/8	1·89100	6·428	2·9160	9·5660	·297728	·433320
21	1 7/16	2·06600	7·650	3·1860	10·4500	·355790	·495000
22	1 1/2	2·25000	7·654	3·4700	11·3800	·421850	·562500
23	1 9/16	2·44100	8·300	3·7650	12·3500	·496700	·635800
24	1 5/8	2·64100	8·978	4·0720	13·3600	·581000	·715200
25	1 11/16	2·84800	9·684	4·3920	14·4100	·675610	·800800
26	1 3/4	3·06300	10·412	4·7230	15·4900	·721500	·893200
27	1 13/16	3·28500	11·169	5·0660	16·6200	·899100	·992400
28	1 7/8	3·51600	11·953	5·4220	17·7900	1·029900	1·088000
29	1 15/16	3·75400	12·761	5·9890	18·9900	1·174000	1·212100

角　　鋼 4. Wt. $\frac{I}{Y}$, & I.

抵抗力率 吋³)×16·4=抵抗力率 糎³)

物量力率 吋⁴)×41·6=物量力率 糎⁴)

重量 听/呎)×1·488=重量 瓩/米)

番號	邊 吋	面積 吋²	重量 長一呎二听	重量 長一呎二旺	重量 長一米二旺	物量力率 I 吋	抵抗力率 R 吋³
30	2	4·00000	13·600	6·1700	20·2400	1·3330 0	1·333200
31	2 1/8	4·51500	15·350	6·9640	22·8400	1·699000	1·599000
32	2 1/4	5·06300	17·210	7·8060	25·6100	2·13650	1·898500
33	2 3/8	5·64100	19·180	8·70.0	28·5400	2·650500	2·232500
34	2 1/2	6·250c 0	21·250	9·1400	31·6200	3·255000	2·604200
35	2 5/8	6·89000	23·430	10·62.0	34·8700	3·956000	3·014500
36	2 3/4	7·56200	25·710	11·6000	38·2600	4·765000	3·466000
37	2 7/8	8·26500	28·100	12·7400	41·8100	5·692000	3·623500
38	3	9·00000	30·600	13·8800	45·5400	6·750000	4·500000
39	3 1/8	9·76500	33·200	15·0600	49·4000	7·945000	5·086000
40	3 1/4	10·56500	35·910	16·2900	53·4400	9·29 ,000	5·721600
41	3 3/8	11·39500	38·730	17·5600	57·6400	10·800000	6·407000
42	3 1/2	12·25000	41·650	18·8900	61·9800	12·557000	7·146100
43	3 5/8	13·14000	44·630	20·2600	66·4600	14·387000	7·939000
44	3 3/4	14·062 0	47·810	21·6800	71·140	16·475000	8·78[illegible]00
45	3 7/8	15·01500	51·030	23·1400	74·8500	18·720000	9·6990 0
46	4	16·00000	54·410	24·6700	80·9500	21·330000	10·666000
47	4 1/8	17·01500	57·820	26·2300	86·0400	24·120000	11·695000
48	4 1/4	18·06200	61·410	27·8600	91·3900	27·180000	12·795000
49	4 3/8	19·64000	65·080	29·5200	96·8500	30·525000	13·985000
50	4 1/2	20·25000	68·850	31·2300	102·4500	34·180000	15·185000
51	4 5/8	21·39000	72·710	32·980	108·2000	38·120000	16·485000
52	4 3/4	22·56200	76·710	34·790	114·1500	41·740000	17·857000
53	4 7/8	23·76500	80·800	36·6500	120·2500	47·020000	19·325000
54	5	25·00000	85·000	33·5600	126·4900	52·080000	20·832000

平鋼重量表

听トアルハ長サ一呎ニ付(ポンド)ヲ示ス

瓩トアルハ長サ一呎ニ付(キログラム)ヲ示ス

瓩ノ數 = 听ノ數 × ·4536

幅(吋) / 厚(吋)	1		1¼		1½		1¾		2	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	·638	·289	·797	·361	·857	·434	1·11	·503	1·28	·585
1/4	·850	·385	1·06	·480	1·28	·580	1·49	·675	1·70	·771
5/16	1·060	·480	1·33	·603	1·59	·721	1·86	·843	2·12	·961
3/8	1·280	·580	1·59	·721	1·92	·870	2·23	1·011	2·55	1·156
7/16	1·490	·675	1·86	·843	2·23	1·011	2·60	1·179	2·98	1·351
1/2	1·700	·771	2·12	·961	2·55	1·156	2·98	1·351	3·40	1·542
9/16	1·920	·870	2·39	1·084	2·87	1·301	3·35	1·519	3·83	1·737
5/8	2·120	·961	2·65	1·202	3·19	1·446	3·72	1·687	4·25	1·927
11/16	2·340	1·061	2·92	1·324	3·51	1·592	4·09	1·855	4·67	2·118
3/4	2·550	1·156	3·19	1·446	3·83	1·737	4·47	2·038	5·10	2·313
13/16	2·760	1·251	3·45	1·564	4·14	1·877	4·84	2·195	5·53	2·508
7/8	2·980	1·351	3·72	1·687	4·47	2·027	5·20	2·358	5·95	2·698
15/16	3·190	1·446	3·99	1·809	4·78	2·168	5·58	2·531	6·38	2·893
1	3·400	1·542	4·25	1·927	5·10	2·313	5·95	2·692	6·80	3·084
1 1/16	3·610	1·637	4·52	2·050	5·42	2·458	6·32	2·866	7·22	3·274
1 1/8	3·830	1·737	4·78	2·168	5·74	2·603	6·70	3·039	7·65	3·469
1 3/16	4·040	1·832	5·05	2·290	6·06	2·748	7·07	3·206	8·08	3·665
1 1/4	4·250	1·927	5·31	2·408	6·38	2·893	7·44	3·374	8·50	3·855
1 5/16	4·460	2·023	5·58	2·531	6·69	3·034	7·81	3·542	8·93	4·050
1 3/8	4·670	2·118	5·84	2·648	7·02	3·184	8·18	3·710	9·35	4·241
1 7/16	4·890	2·218	6·11	2·771	7·34	3·329	8·56	3·882	9·78	4·436
1 1/2	5·100	2·313	6·38	2·893	7·65	3·469	8·93	4·050	10·20	4·627
1 9/16	5·320	2·413	6·64	3·011	7·97	3·615	9·30	4·218	10·63	4·823
1 5/8	5·520	2·503	6·90	3·129	8·29	3·760	9·67	4·386	11·05	5·010
1 11/16	5·740	2·603	7·17	3·252	8·61	3·905	10·04	4·554	11·47	5·204
1 3/4	5·950	2·698	7·44	3·374	8·93	4·050	10·42	4·727	11·90	5·400
1 13/16	6·160	2·794	7·70	3·492	9·24	4·191	10·79	4·895	12·33	5·598
1 7/8	6·380	2·893	7·97	3·615	9·57	4·340	11·15	5·058	12·75	5·785
1 15/16	6·590	2·989	8·24	3·737	9·88	4·481	11·53	5·230	13·18	5·980
2	6·800	3·084	8·50	3·855	10·20	4·626	11·90	5·400	13·60	6·170

平鋼重量表

听トアルハ長サ一呎ニ付(ポンド)ヲ示ス

瓩トアルハ長サ一呎ニ付(キログラム)ヲ示ス

瓩ノ數 = 听ノ數 × ·4536

幅(吋) / 厚(吋)	2¼		2½		2¾		3		3¼	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	1·44	·653	1·59	·721	1·75	·793	1·91	·866	2·07	·938
1/4	1·91	·866	2·12	·961	2·34	1·061	2·55	1·156	2·76	1·251
5/16	2·39	1·084	2·65	1·202	2·92	1·324	3·19	1·446	3·45	1·564
3/8	2·87	1·301	3·19	1·446	3·51	1·592	3·83	1·737	4·15	1·882
7/16	3·35	1·519	3·72	1·687	4·09	1·855	4·46	2·023	4·83	2·190
1/2	3·83	1·737	4·25	1·927	4·67	2·118	5·10	2·313	5·53	2·508
9/16	4·30	1·950	4·78	2·168	5·26	2·385	5·74	2·603	6·22	2·821
5/8	4·78	2·168	5·31	2·408	5·84	2·648	6·38	2·893	6·91	3·134
11/16	5·26	2·385	5·84	2·646	6·43	2·916	7·02	3·184	7·60	3·447
3/4	5·75	2·608	6·38	2·893	7·02	3·184	7·65	3·469	8·29	3·760
13/16	6·21	2·816	6·90	3·129	7·60	3·447	8·29	3·760	8·98	4·073
7/8	6·69	3·034	7·44	3·374	8·18	3·710	8·93	4·050	9·67	4·386
15/16	7·18	3·256	7·97	3·665	8·77	3·978	9·57	4·340	10·36	4·699
1	7·65	3·469	8·50	3·855	9·35	4·241	10·20	4·627	11·05	5·012
1 1/16	8·13	3·687	9·03	4·095	9·93	4·504	10·84	4·917	11·74	5·326
1 1/8	8·61	3·905	9·57	4·340	10·52	4·772	11·48	5·208	12·43	5·639
1 3/16	9·09	4·123	10·10	4·581	11·11	5·040	12·12	5·498	13·12	5·952
1 1/4	9·57	4·340	10·63	4·822	11·69	5·304	12·75	5·784	13·81	6·264
1 5/16	10·04	4·554	11·16	5·062	12·27	5·566	13·39	6·074	14·50	6·578
1 3/8	10·52	4·773	11·69	5·303	12·85	5·830	14·03	6·364	15·20	6·896
1 7/16	11·00	4·990	12·22	5·543	13·44	6·097	14·66	6·650	15·88	7·204
1 1/2	11·48	5·208	12·75	5·784	14·03	6·366	15·30	6·940	16·58	7·522
1 9/16	11·95	5·420	13·28	6·024	14·61	6·628	15·94	7·232	17·27	7·834
1 5/8	12·43	5·640	13·81	6·264	15·19	6·892	16·58	7·520	17·96	8·162
1 11/16	12·91	5·856	14·34	6·505	15·78	7·159	17·22	7·812	18··	8·460
1 3/4	13·40	6·080	14·88	6·750	16·37	7·426	17·85	8·098	19·3	8·774
1 13/16	13·86	6·288	15·40	6·986	16·95	7·690	18·49	8·390	20·03	9·086
1 7/8	14·34	6·506	15·94	7·232	17·53	7·953	19·13	8·683	20·72	9·400
1 15/16	14·83	6·728	16·47	7·471	18·12	8·220	19·77	8·969	21·41	9·712
2	15·30	6·942	17·00	7·712	18·70	8·484	20·40	9·254	22·10	10·02

平鋼重量表

听トアルハ長サ一呎ニ付(ポンド)ヲ示ス
瓩トアルハ長サ一呎ニ付(キログラム)ヲ示ス
瓩ノ數 = 听ノ數 × ·4536 (續キ)

幅(吋) / 厚(吋)	3½		3¾		4		4¼		4½	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	2·23	1·011	2·39	1·084	2·55	1·156	2·71	1·229	2·87	1·301
1/4	2·98	1·351	3·19	1·446	3·40	1·542	3·61	1·637	3·83	1·737
5/16	3·72	1·687	3·99	1·809	4·25	1·927	4·52	2·050	4·78	2·168
3/8	4·47	2·027	4·78	2·168	5·10	2·313	5·42	2·458	5·74	2·603
7/16	5·20	2·358	5·58	2·531	5·95	2·698	6·32	2·866	6·70	3·039
1/2	5·95	2·698	6·38	2·893	6·80	3·084	7·22	3·274	7·65	3·469
9/16	6·70	3·039	7·17	3·252	7·65	3·469	8·13	3·687	8·61	3·905
5/8	7·44	3·374	7·97	3·615	8·50	3·855	9·03	4·095	9·57	4·340
11/16	8·18	3·710	8·76	3·973	9·35	4·241	9·93	4·504	10·52	4·772
3/4	8·93	4·050	9·57	4·340	10·20	4·627	10·84	4·917	11·48	5·208
13/16	9·67	4·386	10·36	4·700	11·05	5·012	11·74	5·326	12·43	5·640
7/8	10·41	4·722	11·16	5·062	11·90	5·398	12·65	5·738	13·39	6·074
15/16	11·16	5·063	11·95	5·421	12·75	5·784	13·55	6·147	14·34	6·505
1	11·90	5·398	12·75	5·784	13·60	6·170	14·45	6·555	15·30	6·940
1 1/16	12·65	5·740	13·55	6·147	14·45	6·555	15·35	6·964	16·26	7·376
1 1/8	13·39	6·074	14·34	6·505	15·30	6·941	16·26	7·376	17·22	7·812
1 3/16	14·13	6·410	15·14	6·869	16·15	7·326	17·16	7·784	18·17	8·241
1 1/4	14·87	6·746	15·94	7·232	17·00	7·712	18·06	8·192	19·13	8·678
1 5/16	15·62	7·086	16·74	7·594	17·85	8·098	18·96	8·574	20·08	9·110
1 3/8	16·36	7·422	17·53	7·952	18·7	8·483	19·87	9·014	21·04	9·545
1 7/16	17·10	7·758	18·33	8·316	19·55	8·870	20·77	9·422	21·99	9·976
1 1/2	17·85	8·098	19·13	8·678	20·4	9·254	21·68	9·834	22·95	10·41
1 9/16	18·60	8·438	19·92	9·038	21·25	9·640	22·58	10·24	23·91	10·84
1 5/8	19·34	8·774	20·72	9·400	22·10	10·02	23·48	10·65	24·87	11·28
1 11/16	20·08	9·110	21·51	9·758	22·95	10·41	24·38	11·06	25·82	11·71
1 3/4	20·83	9·450	22·32	10·12	23·80	10·78	25·29	11·47	26·78	12·15
1 13/16	21·57	9·784	23·11	10·48	24·65	11·13	26·19	11·88	27·73	12·58
1 7/8	22·31	10·12	23·91	10·84	25·50	11·56	27·10	12·29	28·69	13·01
1 15/16	23·06	10·46	24·70	11·20	26·35	11·95	28·00	12·70	29·64	13·44
2	23·80	10·79	25·50	11·56	27·20	12·34	28·90	13·11	30·60	13·88

平鋼重量表 4

听トアルハ長一呎ニ付(ポンド)ヲ示ス
瓩トアルハ長一呎ニ付(キログラム)ヲ示ス
瓩ノ數=听ノ數×·4536

幅(吋) / 厚(吋)	4¾		5		5¼		5½		5¾	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	3·03	1·374	3·19	1·446	3·35	1·519	3·51	1·592	3·67	1·664
1/4	4·04	1·832	4·25	1·927	4·46	2·023	4·67	2·118	4·89	2·218
5/16	5·05	2·290	5·31	2·408	5·58	2·531	5·84	2·648	6·11	2·771
3/8	6·06	2·748	6·38	2·893	6·69	3·034	7·02	3·184	7·34	3·329
7/16	7·07	3·206	7·44	3·374	7·81	3·542	8·18	3·710	8·56	3·882
1/2	8·08	3·665	8·50	3·855	8·93	4·050	9·35	4·241	9·77	4·431
9/16	9·09	4·123	9·57	4·322	10·04	4·554	10·52	4·772	11·00	4·990
5/8	10·10	4·581	10·63	4·821	11·16	5·062	11·69	5·303	12·22	5·543
11/16	11·11	5·040	11·69	5·303	12·27	5·563	12·85	5·830	13·44	6·096
3/4	12·12	5·498	12·75	5·784	13·39	6·074	14·03	6·364	14·67	6·654
13/16	13·12	5·951	13·81	6·220	14·50	6·578	15·19	6·890	15·88	7·204
7/8	14·13	6·410	14·87	6·746	15·62	7·086	16·36	7·420	17·10	7·758
15/16	15·14	6·869	15·94	7·232	16·74	7·594	17·53	7·952	18·33	8·314
1	16·15	7·326	17·00	7·712	17·85	8·098	18·70	8·483	19·55	8·870
1 1/16	17·16	7·784	18·06	8·190	18·96	8·600	19·87	9·014	20·77	9·424
1 1/8	18·17	8·242	19·13	8·678	20·08	9·110	21·04	9·544	21·99	9·978
1 3/16	19·18	8·700	20·19	9·160	21·20	9·618	22·21	10·07	23·32	10·53
1 1/4	20·19	9·160	21·25	9·640	22·32	10·12	23·38	10·60	24·44	11·08
1 5/16	21·20	9·618	22·32	10·12	23·43	10·63	24·54	11·13	25·66	11·64
1 3/8	22·21	10·07	23·38	10·60	24·54	11·13	25·71	11·66	26·88	12·19
1 7/16	23·22	10·53	24·44	11·08	25·66	11·64	26·88	12·19	28·10	12·74
1 1/2	24·23	10·99	25·50	11·57	26·75	12·13	28·05	12·72	29·33	13·30
1 9/16	25·24	11·45	26·57	12·05	27·89	12·65	29·22	13·21	30·55	13·85
1 5/8	26·25	11·91	27·63	12·53	29·01	13·16	30·39	13·79	31·77	14·41
1 11/16	27·26	12·36	28·69	13·01	30·12	13·66	31·55	14·31	32·99	14·96
1 3/4	28·27	12·82	29·75	13·49	31·24	14·17	32·73	14·84	34·22	15·52
1 13/16	29·27	13·28	30·81	13·98	32·35	14·67	33·89	15·37	35·43	16·07
1 7/8	30·28	13·73	31·87	14·45	33·47	15·18	35·06	15·91	36·65	16·62
1 15/16	31·29	14·19	32·94	14·94	34·59	15·69	36·23	16·43	37·88	17·18
2	32·30	14·65	34·00	15·42	35·70	16·19	37·40	16·96	39·10	17·74

平鋼重量表 5.

厚(吋) \ 闊(吋)	6		6¼		6½		6¾		7	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	3·83	1·737	3·99	1·811	4·14	1·878	4·30	1·951	4·46	2·026
1/4	5·10	2·313	5·31	2·409	5·53	2·508	5·74	2·604	5·95	2·698
5/16	6·38	2·894	6·64	3·012	6·90	3·130	7·17	3·252	7·44	3·375
3/8	7·65	3·447	7·97	3·615	8·29	3·760	8·61	3·905	8·93	4·051
7/16	8·93	4·051	9·29	4·214	9·67	4·386	10·04	4·554	10·41	4·722
1/2	10·20	4·626	10·63	4·822	11·05	5·011	11·48	5·203	11·90	5·398
9/16	11·48	5·208	11·95	5·420	12·43	5·638	12·91	5·856	13·39	6·074
5/8	12·75	5·784	13·28	6·024	13·81	6·264	14·34	6·050	14·87	6·746
11/16	14·03	6·364	14·61	6·628	15·20	6·896	15·78	7·159	16·36	7·421
3/4	15·30	6·940	15·94	7·230	16·58	7·522	17·22	7·812	17·85	8·098
13/16	16·58	7·522	17·27	7·834	17·95	8·143	18·65	8·460	19·34	8·773
7/8	17·85	8·097	18·60	8·437	19·34	8·773	20·08	9·109	20·83	9·449
15/16	19·13	8·678	19·92	9·036	20·72	9·399	21·51	9·752	22·32	10·13
1	20·40	9·254	21·25	9·640	22·10	10·03	22·95	10·41	23·80	10·80
1 1/16	21·68	9·834	22·58	10·24	23·48	10·65	24·39	11·06	25·29	11·47
1 1/8	22·95	10·41	23·91	10·85	24·87	11·28	25·82	11·71	26·78	11·15
1 3/16	24·23	10·99	25·23	11·45	26·24	11·91	27·25	12·36	28·26	12·82
1 1/4	25·50	11·57	26·56	12·05	27·62	12·53	28·69	13·01	29·75	13·50
1 5/16	26·78	12·14	27·90	12·66	29·01	13·16	30·12	13·66	31·23	14·17
1 3/8	28·05	12·72	29·22	13·25	30·39	13·79	31·56	14·32	32·72	14·84
1 7/16	29·33	13·32	30·55	13·86	31·77	14·41	32·99	14·97	34·21	15·52
1 1/2	30·60	13·88	31·88	14·46	33·15	15·04	34·43	15·62	35·70	16·19
1 9/16	31·88	14·46	33·20	15·06	34·53	15·66	35·86	16·27	37·19	16·87
1 5/8	33·15	15·03	34·53	15·66	35·91	16·28	37·29	16·92	38·67	17·55
1 11/16	34·43	15·62	35·86	16·27	37·30	16·92	38·73	17·57	40·16	18·23
1 3/4	35·70	16·19	37·19	16·87	38·68	17·55	40·17	18·22	41·65	18·90
1 13/16	36·98	16·77	38·52	17·47	40·05	18·17	41·60	18·87	43·14	19·57
1 7/8	38·25	17·35	39·85	18·08	41·44	18·80	43·03	19·52	41·63	20·25
1 15/16	39·53	17·93	41·17	18·68	42·82	19·43	44·46	20·17	46·12	20·92
2	40·80	18·51	42·50	19·28	44·20	20·05	45·90	20·82	47·60	21·59

平鋼重量表 6.

厚(吋) \ 闊(吋)	7¼		7½		7¾		8		8¼	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	4·60	2·096	4·78	2·168	4·94	2·241	5·10	2·313	5·26	2·386
1/4	6·16	2·794	6·36	2·885	6·58	2·985	6·80	3·084	7·01	3·180
5/16	7·70	3·493	7·97	3·615	8·23	3·733	8·50	3·855	8·76	3·973
3/8	9·25	4·196	9·57	4·341	9·88	4·482	10·20	4·629	10·50	4·772
7/16	10·78	4·890	11·16	5·062	11·53	5·230	11·90	5·398	12·27	5·566
1/2	12·32	5·589	12·75	5·784	13·18	5·979	13·60	6·170	14·03	6·364
9/16	13·86	6·288	14·34	6·505	14·82	6·721	15·30	6·940	15·78	7·159
5/8	15·40	6·986	15·94	7·232	16·47	7·472	17·00	7·712	17·53	7·952
11/16	16·94	7·685	17·53	7·952	18·12	8·220	18·70	8·482	19·28	8·746
3/4	18·49	8·387	19·13	8·755	19·77	8·968	20·40	9·254	21·04	9·545
13/16	20·03	9·086	20·72	9·400	21·41	9·712	22·10	10·02	22·79	10·34
7/8	21·57	9·784	22·32	10·12	23·05	10·45	23·80	10·79	24·55	11·13
15/16	23·11	10·48	23·91	10·84	24·70	11·20	25·50	11·56	26·30	11·93
1	24·65	11·18	25·50	11·56	26·35	11·95	27·20	12·38	28·05	12·72
1 1/16	26·19	11·88	27·10	12·29	28·00	12·70	28·90	13·11	29·80	13·52
1 1/8	27·73	12·57	28·68	13·01	29·64	13·44	30·60	13·88	31·56	14·31
1 3/16	29·27	13·28	30·28	13·73	31·29	14·19	32·30	14·65	33·31	15·11
1 1/4	30·81	13·97	31·88	14·46	32·94	14·94	34·00	15·42	35·06	15·90
1 5/16	32·35	14·67	33·48	15·18	34·59	15·69	35·70	16·19	36·81	16·69
1 3/8	33·89	15·37	35·06	15·90	36·23	16·43	37·40	16·96	38·57	17·49
1 7/16	35·44	16·08	36·66	16·63	37·88	17·18	39·10	17·74	40·32	18·29
1 1/2	36·98	16·77	38·26	17·35	39·53	17·93	40·80	18·51	42·08	19·09
1 9/16	38·51	17·47	39·84	18·07	41·17	18·67	42·50	19·28	43·83	19·88
1 5/8	40·05	18·17	41·44	18·80	42·82	19·42	44·20	20·05	45·58	20·63
1 11/16	41·59	18·86	43·03	19·52	44·47	20·17	45·90	20·82	47·33	21·47
1 3/4	43·14	19·57	44·63	20·24	46·12	20·92	47·60	21·59	49·09	22·27
1 13/16	44·68	20·27	46·22	20·97	47·76	21·66	49·30	22·36	50·84	23·06
1 7/8	46·22	20·97	47·82	21·69	49·40	22·41	51·00	23·13	52·60	23·86
1 15/16	47·76	21·66	49·41	22·41	51·05	23·15	52·70	23·90	54·35	24·65
2	49·30	22·36	51·00	23·13	52·70	23·90	54·40	24·68	56·10	25·45

平鋼重量表 7.

幅(吋) / 厚(吋)	8½		8¾		9		9¼		9½	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	5·42	2·458	5·58	2·531	5·74	2·604	5·90	2·676	6·06	2·749
1/4	7·22	3·275	7·43	3·370	7·65	3·470	7·86	3·565	8·08	3·665
5/16	9·03	4·096	9·29	4·214	9·56	4·337	9·83	4·459	10·10	4·581
3/8	10·84	4·917	11·16	5·062	11·48	5·204	11·80	5·353	12·12	5·498
7/16	12·64	5·734	13·02	5·906	13·40	6·078	13·76	6·242	14·14	6·415
1/2	14·44	6·550	14·87	6·746	15·30	6·941	15·73	7·136	16·16	7·331
9/16	16·26	7·376	16·74	7·594	17·22	7·812	17·69	8·026	18·18	8·247
5/8	18·06	8·192	18·59	8·433	19·13	8·678	19·65	8·914	20·19	9·159
11/16	19·86	9·010	20·45	9·272	21·04	9·544	21·62	9·808	22·21	10·07
3/4	21·68	9·834	22·32	10·12	22·96	11·41	23·59	10·70	24·23	10·99
13/16	23·48	10·65	24·17	10·96	24·86	11·27	25·55	11·59	26·24	11·90
7/8	25·30	11·48	26·04	11·81	26·78	12·15	27·52	12·48	28·26	12·82
15/16	27·10	12·29	27·89	12·65	28·69	13·01	29·49	13·38	30·28	13·73
1	28·90	13·11	29·75	13·49	30·60	13·88	31·45	14·27	32·30	14·65
1 1/16	30·70	13·93	31·61	14·34	32·52	14·75	33·41	15·15	34·32	15·57
1 1/8	32·52	14·75	33·47	15·18	34·43	15·62	35·38	16·05	36·34	16·48
1 3/16	34·32	15·57	35·33	16·03	36·34	16·45	37·35	16·94	38·36	17·40
1 1/4	36·12	16·38	37·20	16·87	38·26	17·35	39·41	17·83	40·37	18·31
1 5/16	37·93	17·20	39·05	17·71	40·16	18·22	41·28	18·73	42·40	19·23
1 3/8	39·74	18·03	40·91	18·56	42·08	19·09	43·25	19·62	44·41	20·15
1 7/16	41·54	18·84	42·77	19·40	44·00	19·96	45·22	20·51	46·44	21·07
1 1/2	43·35	19·67	44·63	20·24	45·90	20·82	47·18	21·40	48·45	21·99
1 9/16	45·16	20·48	46·49	21·09	47·82	21·69	49·14	22·29	50·48	22·90
1 5/8	46·96	21·30	48·34	21·93	49·73	22·56	51·10	23·18	52·49	23·81
1 11/16	48·76	22·12	50·20	22·77	51·64	23·42	53·07	24·03	54·51	24·73
1 3/4	50·58	22·94	52·07	23·62	53·56	24·30	55·04	24·97	56·53	25·65
1 13/16	52·38	23·76	53·92	24·46	55·46	25·16	57·00	25·85	58·54	26·51
1 7/8	54·20	24·58	55·79	25·31	57·38	26·03	58·97	26·75	60·56	27·47
1 15/16	56·00	25·40	57·64	26·15	59·29	26·89	60·94	27·65	62·58	28·39
2	57·80	26·22	59·50	26·99	61·20	27·76	62·90	28·53	64·60	29·30

平鋼重量表 8.

幅(吋) / 厚(吋)	9¾		10		10¼		10½		10¾	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	6·22	2·821	6·38	2·894	6·54	2·967	6·70	3·039	6·86	3·112
1/4	8·29	3·760	8·50	3·856	8·71	3·951	8·92	4·046	9·14	4·146
5/16	10·36	4·700	10·62	4·818	10·89	4·940	11·16	5·063	11·42	5·180
3/8	12·44	5·644	12·75	5·784	13·07	5·930	13·39	6·075	13·71	6·220
7/16	14·51	6·582	14·88	6·750	15·25	6·918	15·62	7·086	15·99	7·254
1/2	16·58	7·522	17·00	7·712	17·42	7·903	17·85	8·098	18·28	8·292
9/16	18·65	8·460	19·14	8·682	19·61	8·896	20·08	9·110	20·56	9·328
5/8	20·72	9·400	21·25	9·640	21·78	9·880	22·32	10·12	22·85	10·37
11/16	22·79	10·34	23·38	10·60	23·96	10·87	24·54	11·13	25·13	11·40
3/4	24·86	11·28	25·50	11·57	26·14	11·86	26·78	12·15	27·42	12·44
13/16	26·94	12·23	27·62	12·53	28·32	12·85	29·00	13·15	23·69	13·47
7/8	29·01	13·16	29·75	13·49	30·50	13·83	31·24	14·17	31·98	14·50
15/16	31·08	14·10	31·88	14·46	32·67	14·82	33·48	15·18	34·28	15·55
1	33·15	15·04	34·00	15·42	34·85	15·81	35·70	16·19	36·55	16·63
1 1/16	35·22	15·98	36·12	16·38	37·03	16·80	37·92	17·20	38·83	17·61
1 1/8	37·29	16·92	38·25	17·35	39·21	17·79	40·17	18·22	41·12	18·65
1 3/16	39·37	17·86	40·38	18·32	41·39	18·78	42·40	19·23	43·40	19·69
1 1/4	41·44	18·80	42·50	19·28	43·56	19·76	44·63	20·25	45·69	20·73
1 5/16	43·52	19·74	44·64	20·25	45·75	20·75	46·86	21·26	47·97	21·76
1 3/8	45·58	20·68	46·75	21·21	47·92	21·74	49·08	22·26	50·25	22·79
1 7/16	47·66	21·62	48·88	22·17	50·10	22·73	51·32	23·28	52·54	23·83
1 1/2	49·73	22·56	51·00	23·13	52·28	23·72	53·55	24·33	54·83	24·87
1 9/16	51·80	23·50	53·14	24·10	54·46	24·70	55·78	25·30	57·11	25·90
1 5/8	53·87	24·43	55·25	25·06	56·63	25·69	58·02	26·32	59·40	26·95
1 11/16	55·94	25·38	57·30	26·03	58·81	26·68	60·24	27·33	61·68	27·98
1 3/4	58·01	26·31	59·50	26·99	60·99	27·65	62·48	28·34	63·97	29·01
1 13/16	60·09	27·26	61·62	27·95	63·17	28·65	64·70	29·35	66·24	30·05
1 7/8	62·16	28·20	63·75	28·92	65·35	29·64	66·94	30·37	68·53	31·08
1 15/16	64·23	29·13	65·88	29·88	67·52	30·63	69·18	31·38	70·83	32·13
2	66·30	30·07	68·00	30·85	69·70	31·62	71·40	32·39	73·10	33·15

平鋼重量表 9.

幅(吋) / 厚(吋)	11		11¼		11½		11¾		12	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	7·02	3·084	7·17	3·252	7·32	3·320	7·49	3·398	7·65	3·470
1/4	9·34	4·237	9·57	4·341	9·78	4·436	10·00	4·536	10·20	4·627
5/16	11·68	5·298	11·95	5·421	12·22	5·544	12·49	5·656	12·75	5·784
3/8	14·03	6·364	14·35	6·510	14 68	6 660	14·99	6 800	15·30	6·941
7/16	16·36	7·421	16·74	7·594	17·12	7·766	17·49	7 934	17·85	8·052
1/2	18·70	8·482	19·13	8·678	19·55	8·868	19·97	9·060	20·40	9·254
9/16	21·02	9·535	21·51	9·757	22·00	9·980	22·48	10·19	22·95	10·41
5/8	23·38	10·60	23·91	10·84	24·44	11·08	24·97	11·33	25·50	11·57
11/16	25·70	11·66	26·30	11·93	26·88	12·19	27·47	12·46	28·05	12·72
3/4	28·05	12·72	28·68	13·01	29·33	13·30	29·97	13·59	30·60	13·88
13/16	30·40	13·79	31·08	14·10	31·76	14·40	32·46	14·72	33·15	15·04
7/8	32·72	14·84	33·47	15·18	34·21	15·52	34·95	15·85	35·70	16·19
15/16	35·06	15·90	35·86	16·26	36·66	16·63	37·46	16·99	38·25	17·35
1	37·40	16·96	38·25	17·35	39 09	17·74	39·95	18·12	40·80	18·51
1 1/16	39·74	18·03	40·64	18·43	41·54	18·84	42·45	19·26	43·35	19·66
1 1/8	42·08	19·09	43·04	19·52	44 00	19·96	44·94	20·38	45·90	20·82
1 3/16	44·42	20·15	45·42	20·60	46·44	21·07	47·45	21·52	48·45	21·98
1 1/4	46·76	21·21	47·82	21·69	48·88	22·17	49·94	22·65	51·00	23·13
1 5/16	49·08	22·26	50·20	22·77	51·32	23·28	52·44	23·79	53·55	24·29
1 3/8	51·42	23·32	52·59	23·85	53·76	24·39	54·93	24·92	56·10	25·45
1 7/16	53·76	24·38	54·99	24·94	56·21	25·50	57·43	26·05	58·65	26·60
1 1/2	56·10	25·40	57·37	26·02	58·65	26·60	59·93	27·18	61·20	27·76
1 9/16	58·42	26·50	59·76	27.11	61·10	27·72	62·43	28·32	63·75	28·92
1 5/8	60·78	27·57	62·16	28·20	63·54	28·82	64·92	29·45	66·30	30·07
1 11/16	63·10	28·62	64·55	29·28	65·98	29·93	67·42	30·58	68·85	31·23
1 3/4	65·45	29 69	66·93	30·36	68·43	31·01	69·92	31·72	71·40	32·39
1 13/16	67·80	30·75	69·33	31·45	70·68	32·06	72·41	32 85	73·95	33·54
1 7/8	70·12	31·81	71·72	32·54	73·31	33·25	74·90	33·98	76·50	34·70
1 15/16	72·46	32·87	74·11	33·61	75·76	34·26	77·41	35·11	79·05	35·86
2	74·80	33·93	76·50	34·70	78·20	35·47	79·90	36·24	81 60	37 01

平鋼重量表 10.

幅(吋) / 厚(吋)	12¼		12½		12¾		13		14	
	听	瓩	听	瓩	听	瓩	听	瓩	听	瓩
3/16	7·82	3·547	7·98	3·620	8·13	3·687	8·28	3·756	8·92	4·046
1/4	10·42	4·726	10·63	4·822	10·84	4·917	11·06	5·017	11·90	5·398
5/16	13·01	5·901	13·28	6·240	13·55	6·147	13·81	6 264	14·88	6·750
3/8	15·62	7·086	15·94	7·231	16·26	7·376	16·58	7·522	17·86	8·102
7/16	18·23	8·269	18·60	8·437	18·97	8·605	19·34	8·772	20·82	9·444
1/2	20·82	9·444	21·25	9·640	21·67	9·830	22·10	10·02	23·80	10·79
9/16	23·43	10·63	23·90	10·84	24·39	11 06	24·86	11·28	26·78	12·15
5/8	26·03	11·80	26·56	12·05	27·09	12·29	26·62	12·07	29·74	13·49
11/16	28·64	12·99	29·22	13·25	29·80	13·52	30·39	13·78	32·72	14·84
3/4	31·25	14·17	31·88	14·46	32·52	14·75	33·16	15·04	35·71	16·20
13/16	33·83	15·34	34·53	15·66	35·22	15·97	35·91	16·29	38·67	17·54
7/8	36·44	16·53	37·19	16·87	37·93	17·20	38·68	17·55	41·65	18·89
15/16	39·05	17·71	39·84	18·07	40·64	18·43	41·44	18·80	44·63	20·24
1	41·65	18·89	42·50	19·28	43·35	19·66	44·20	20·05	47·60	21·59
1 1/16	44·25	20 07	45·16	20·48	46·06	20·89	46·96	21·30	50·57	22·94
1 1/8	46·86	21·26	47·82	21·69	48·77	22·12	49·72	22·55	53·55	24·29
1 3/16	49·46	22·44	50·46	22·89	51·48	23·35	52·48	23·81	56·52	25·64
1 1/4	52·05	23·61	53·12	24·10	54·19	24·58	55·25	25·06	59·50	26·99
1 5/16	54·67	24·80	55·78	25·30	56·90	25·81	58·02	26·32	62·47	28·34
1 3/8	57·27	25·98	58·44	26·51	59·60	27·03	60·77	27·57	65·45	29·69
1 7/16	59·87	27·16	61·10	27·71	62·32	28·27	63·54	28·82	68·42	31·03
1 1/2	62·48	28·34	63·75	28·83	65·03	29·50	66·30	30·07	71·40	32·38
1 9/16	65·08	29·52	66·40	30·12	67·74	30·73	69·06	31·33	74·38	33·74
1 5/8	67·68	30·70	69·06	31·33	70·44	31·95	71·83	32·58	77·35	35·09
1 11/16	70·29	31·88	71·72	32·53	73·15	33·18	74·59	33·83	80·33	36·43
1 3/4	72·90	33·06	74·38	33·78	75·87	34·41	77·35	35·08	83·30	37·78
1 13/16	75·48	34·24	77·03	34·94	78·57	35·64	80·11	36·33	86·28	39·13
1 7/8	78·09	35·42	79·69	36·15	81·28	36·87	82·88	37·59	89·25	40·48
1 15/16	80·70	36·60	82·34	37·35	83·99	38·10	85·64	38·84	92·23	41·83
2	83·30	37·78	85·00	38·55	86·70	39·33	88·40	40·10	95·20	43 18

平 鋼 重 量 表 11.

厚(吋) \ 幅(吋)	15		16		17		18		19	
	听	疋	听	疋	听	疋	听	疋	听	疋
3/16	9·56	4·336	10·20	4·271	10·84	4·917	11·48	5·207	12·10	5·489
1/4	12·75	5·784	13·60	6·170	14·44	5··90	15·30	6·940	16·16	7·330
5/16	15·94	7·231	17·00	7·712	18·05	8·190	19·12	8·673	20·20	9·164
3/8	19·14	8·682	20·40	9·254	21·68	9·834	22·96	10·41	24·24	10·99
7/16	22·32	10·12	23·80	10·79	25·28	11·47	26·79	12·15	28·28	12·83
1/2	25·50	11·57	27·20	12·34	28·89	13·10	30·60	13·88	32·31	14·65
9/16	28·70	13·02	30·60	13·88	32·52	14·75	34·44	15·62	36·34	16·48
5/8	31·88	14·46	34·00	15·42	36·12	16·38	38·25	17·35	40·37	18·31
11/16	35·06	15·90	37·40	16·96	39·72	18·02	42·08	19·13	44·42	20·15
3/4	38·26	17·35	40·80	18·51	43·36	19·67	45·95	20·84	48·46	21·98
13/16	41·43	18·79	44·20	20·05	46·96	21·30	49·72	22·55	52·48	23·80
7/8	44·62	20·24	47·60	21·59	50·60	22·95	53·56	24·29	56·52	25·64
15/16	47·82	21·69	51·00	23·13	54·20	24·59	57·38	26·03	60·57	27·47
1	51·00	23·13	54·40	24·68	57·80	26·22	61·20	27·76	64·60	29·30
1 1/16	54·20	24·58	57·80	26·22	61·40	27·85	65·02	29·49	68·64	31·13
1 1/8	57·37	26·02	61·20	27·76	65·04	29·50	68·85	31·23	72·68	32·97
1 3/16	60·56	27·47	64·60	29·30	68·64	31·13	72·68	32·97	76·72	34·80
1 1/4	63·76	28·92	68·00	30·85	72·26	32·78	76·50	34·70	80·74	36·62
1 5/16	66·95	30·37	71·40	32·39	75·86	34·41	80·33	36·44	84·80	38·47
1 3/8	70·12	31·81	74·80	33·93	79·48	36·05	84·15	38·17	88·83	40·29
1 7/16	73·32	33·26	78·20	35·47	83·08	37·69	88·00	39·92	92·88	42·13
1 1/2	76·51	34·70	81·60	37·01	86·70	39·33	91·80	41·64	96·90	43·95
1 9/16	79·69	36·15	85·00	38·55	90·31	40·96	95·63	43·38	100·94	45·79
1 5/8	82·83	37·60	88·40	40·10	93·93	42·60	99·45	45·11	104·98	47·62
1 11/16	86·06	39·04	91·80	41·64	97·54	44·24	103·28	46·85	109·01	49·46
1 3/4	89·25	40·48	95·20	43·18	101·15	45·88	107·10	48·59	113·05	51·28
1 13/16	92·44	41·96	98·60	44·72	104·76	47·58	110·93	50·31	117·09	53·11
1 7/8	95·63	43·37	102·00	46·27	108·38	49·16	114·75	52·06	121·13	54·92
1 15/16	98·81	44·82	105·40	47·81	111·99	50·80	118·58	53·80	125·16	56·78
2	102·00	46·27	108·80	49·36	115·60	52·44	122·40	55·52	129·20	58·61

平 鋼 重 量 表 12.

厚(吋) \ 幅(吋)	20		21		22		23		24	
	听	疋	听	疋	听	疋	听	疋	听	疋
3/16	12·76	5·788	13·40	6·079	14·04	6·370	14·64	6·641	15·32	6·950
1/4	17·00	7·712	17·84	8·093	18·69	8·478	19·56	8·872	20·40	9·254
5/16	21·24	9·635	22·32	10·12	23·36	10··9	24·44	11·08	25·52	11·57
3/8	25·50	11·57	26·78	12·15	28·06	12·73	29·33	13·30	30·60	13·88
7/16	29·75	13·49	31·24	14·17	32·72	14·84	34··4	15·53	35·72	16·20
1/2	34·00	15·42	35·70	16·19	37·40	16·96	39·10	17·74	40·80	18·50
9/16	38·27	17·36	40·16	18·22	42·04	19·07	44·00	15·96	45·92	20·83
5/8	42·50	19·28	44·64	20·25	46·72	21·21	48·88	22·17	51·00	23·13
11/16	46·74	21·20	49·08	22·26	51·40	23·31	53·76	24·39	56·12	25·46
3/4	51·00	23·13	53·56	24·29	56·10	25·45	58·66	26·61	61·29	27·76
13/16	55·25	25·06	58·01	26·31	60·79	27·57	63·53	28·82	66·24	30·· 7
7/8	59·50	26·99	62·46	28·33	65·44	29·68	68·43	31·04	71·40	32·39
15/16	63·76	28·92	66·96	30·37	70·13	31·83	73·32	33·· 6	76·50	34·70
1	68·00	30·84	71·40	32·39	74·80	33·93	78·20	35·47	81·60	37·01
1 1/16	72·25	32·77	73·85	33·50	79·48	36·05	83·08	37·69	86·70	39·33
1 1/8	76·50	34·29	80·33	36·44	84·16	38·18	88·00	39·92	91·80	41·64
1 3/16	80·75	36·63	84·79	38·46	88·83	40·29	92·88	42·13	96·62	43·90
1 1/4	85·00	38·56	89·26	40·49	93·52	42·42	97·76	44·34	102·00	46·27
1 5/16	89·28	40·50	93·72	42·51	98·16	44·53	102·64	46·56	107·12	48·60
1 3/8	93·50	42·41	98·17	44·53	102·84	46·66	107·52	48·78	112·20	50·90
1 7/16	97·75	44·34	102·65	46·57	107·52	48·78	112·42	51·00	117·30	53·21
1 1/2	102·00	46·27	107·10	48·59	112·22	50·91	117·30	53·21	122·40	55·52
1 9/16	106·25	48·20	111·56	50·60	116·88	53·01	122·19	55·40	127·50	57·84
1 5/8	110·50	50·13	116·03	52·63	121·55	55·12	127·08	57·65	132·60	60·16
1 11/16	114·75	52·06	120·49	54·65	126·23	57·27	131·96	59·87	137·70	62·47
1 3/4	119·00	53·98	124·95	56·68	130·90	59·38	136·85	62·08	142·84	64·80
1 13/16	123·25	55·91	129·41	58·72	135·58	61·50	141·74	64·30	147·90	67·10
1 7/8	127·50	57·84	133·88	60·73	140·25	63·62	146·63	66·52	153·00	69·40
1 15/16	131·75	59·77	138·34	62·76	144·93	65·74	151·51	68·74	158·10	71·72
2	136·00	61·70	142·80	64·78	149·60	67·86	156·40	70·95	163·20	74·03

薄鋼板重量表

厚サ(吋ノ百分數)×·40＝听/平方呎

B. G. 番號	厚サ 吋	厚サ 粍	重量 平方呎ニ付听	重量 平方米ニ付瓲
0000	—	—	—	—
000	·50000	12·700	20·000	97·680
00	·44520	11·308	17·808	86·980
0	·39640	10·058	15·856	77·400
1	·35320	8·971	14· 23	69·000
2	·31470	7·993	12·588	61·440
3	·28040	7·122	11·216	54·780
4	·25000	6·350	10 000	48·830
5	·22250	5·651	8 900	43·460
6	·19810	5·032	7·924	38·700
7	·17640	4·480	7·056	34·450
8	·15700	3·988	6·280	30·660
9	·13980	3·551	5·592	27·310
10	·12500	3·175	5·000	24·420
11	·11130	2·827	4·452	21·740
12	·09910	2.517	3·964	19·360
13	·08820	2·240	3·528	17·230
14	·07850	1·994	3·140	15·330
15	·06990	1·775	2·796	13·650
16	·06250	1 587	2·500	12 210
17	·05560	1·412	2·224	10·860
18	·04950	1·257	1·980	9·670
19	·04400	1·118	1·760	8·596
20	·03920	·996	1·568	7·658
21	·03490	·886	1·396	6·818
22	·03125	·794	1·250	6·105
23	·02782	·707	1·1128	5·430
24	·02476	·629	·9904	4·836
25	·02204	·560	·8816	4·305
26	·01981	·498	·7844	3·830
27	·01745	·4432	·698	3·408
28	·01562	·39 9	·625	3 052
29	·01390	·3531	·556	2·715
30	·01230	·3124	·492	2·402

鋼板重量表 1.

厚サ一吋鋼板一平方呎ノ重量＝40·89 听トス

板ノ厚サ 吋	板ノ厚サ 粍	平ニ方付呎听	平ニ方付呎瓲	平ニ方付米瓲	平ニ方付呎貫	3′×6′ 瓲 听	4′×8′ 瓲 听	5′×10′ 瓲 听
·039	1	1·594	·723	7·78	·192	12·9	23·1	36·5
						28·6	51·0	79·7
1/16	1·6	2·560	1·16	12·5	·309	20·8	27·1	580·6
						46·0	81·9	128·0
1/8	3·2	5·110	2·31	24·9	·616	41·6	74·1	115·9
						92·9	163·5	255·5
3/16	4·8	7·670	3·47	37·4	·925	62·6	111·4	174·0
						138·0	245·4	383·5
1/4	6·4	10·22	4·63	49·9	1·233	83·4	148·4	231·8
						184·0	327·1	511·0
5/16	8·0	12·78	5·79	62·4	1·543	104·0	185·5	289·8
						230·0	409·0	639·0
3/8	9·5	15·34	6·95	74·9	1·852	125·2	222 7	347·9
						276·1	491·0	767·0
7/16	11·1	17·90	8·12	87·4	2·161	146·1	259·8	406·0
						322·2	572·8	895·0
1/2	12·7	20·45	9·27	99·8	2·468	166·9	296·8	463·7
						368·1	654·4	1022·0
9/16	14·3	23·00	10·43	112·3	2·776	187·8	333·8	521·7
						414·0	736·0	1150·0
5/8	15·9	25·56	11·59	124·8	3·085	208·7	367·7	579·8
						460·1	818 0	1278·0
11/16	17·7	27·81	12·61	140·7	3·478	235·2	418·2	653·4
						518·6	922·0	1440·5
3/4	19·1	30·67	13·91	149·8	3·702	250·4	445·4	695 4
						552·1	981·5	1533·5
13/16	20·6	33·22	15·07	162·2	4·010	271·2	482·2	753·4
						598·0	1063·0	1661·0
7/8	22·9	35·78	16·23	174·7	4·319	292·1	519·4	811·8
						644·1	1145·0	1789·0
15/16	23·8	38·34	17·39	187·2	4·628	313·1	556·8	869·6
						690·2	1227·0	1917·0
1	25·4	40·89	18·55	199·7	4·936	333·8	593·4	927·2
						735·0	1308·0	2044·0

鋼板重量表 2

(厚サ八分ノ一吋鋼板ノ重量)　　鋼板一平方呎ノ重量＝吋ノ百分數×·4089 听

長(呎) ＼ 幅(呎)		2′	2′−6″	3′	3′−6″	4′	4′−6″	5′	5′−6″	6′	6′−6″	7′
6′	面積	12·0	15·0	18·0	21·0	24·0	27·0	30·0	33·0	36·4	39·0	42·0
	瓩	27·8	34·7	41·7	48·6	55·3	62·5	69·5	76·5	83·0	90·4	97·3
	听	61·3	76·66	92·9	107·3	122·6	137·9	153·3	168·6	18·39	199·3	214·6
6′−6″	面積	13·0	16·25	19·5	22·75	26·0	29·25	32·5	35·75	39·0	42·25	45·5
	瓩	30·1	37·1	45·2	52·7	60·2	67·7	75·3	82·8	90·4	97·9	105·4
	听	66·42	81·9	99·65	116·2	132·8	149·4	166·1	182·7	199·3	215·9	232·5
7′	面積	14·0	17·5	21·0	24·5	28·0	31·4	35·0	38·5	42·0	45·5	49·0
	瓩	32·4	40·5	48·6	56·7	64·9	73·0	81·1	89·2	97·3	105·4	113·6
	听	71·52	89·43	107·3	125·2	143·1	160·9	178·8	196·7	214·6	232·5	250·4
7′−6″	面積	15·0	18·75	22·5	26·25	30·0	337·5	37·5	41·25	45·0	48·75	52·5
	瓩	34·7	43·4	52·1	60·8	69·5	78·2	86·9	95·6	104·3	113·0	121·7
	听	76·56	95·82	114·9	134·3	153·3	172·4	191·6	210·8	229·9	249·1	268·3
8′	面積	16·0	20·0	24·0	28·0	32·0	36·0	40·0	44·0	48·0	52·0	56·0
	瓩	37·0	46·3	55·6	64·9	74·1	83·4	92·7	101·9	111·2	120·5	129·8
	听	81·76	102·2	122·6	143·1	163·5	183·9	204·4	224·8	245·2	265·7	286·2
8′−6″	面積	17·0	21·25	25·5	29·75	34·0	38·25	42·5	46·75	51·0	55·25	59·5
	瓩	39·3	49·2	59·1	68·9	78·8	88·6	98·5	108·3	118·2	128·0	137·9
	听	86·88	108·6	130·3	152·0	173·7	195 4	217·2	238·9	260·6	282·3	304·0

9′	面積	18·0	22·5	27·0	31·5	36·0	40·5	45·0	49·5	54·0	58·5	63·0
	瓩	41·7	51·7	62·5	73·0	83·4	93·8	104·3	114·7	125·1	135·6	146·0
	听	92·0	114·9	137·9	160·9	183·9	206·9	229·9	252·9	275·9	298·9	321·9
9′−9″	面積	19·0	23·75	28·5	33·25	38·0	42·75	47·5	52·25	57·0	61·75	66·5
	瓩	44·0	55·0	66·0	77·0	88·1	99·0	110·2	121·1	132·2	143·1	154·1
	听	97·1	121·4	145·6	169·9	194·2	218·4	242·7	267·0	291·3	315·5	339·8
10′	面積	20·0	25·0	30·0	35·0	40·0	45·0	50·0	55·0	60·0	65·0	70·0
	瓩	46·3	57·9	69·5	81·1	92·7	104·3	115·9	127·5	139·1	150·6	162·2
	听	102·2	127·8	153·3	178·8	204·4	229·9	255·5	281·0	306·6	332·1	357·7
10′−6″	面積	21·0	26·25	31·5	36·75	42·0	47·25	52·5	57·75	63·0	68·25	73·5
	瓩	48·6	60·8	73·0	85·2	97·3	109·5	121·7	133·9	146·0	158·2	170·4
	听	107·3	134·1	160·9	187·8	214·6	241·4	268·3	295·1	321·9	348·7	375·6
11′	面積	22·0	27·5	33·0	38·5	44·0	49·5	55·0	60·5	66·0	71·5	77·0
	瓩	50·9	63·7	76·5	89·2	101·9	114·7	127·4	140·2	153·0	165·7	178·9
	听	112·4	140·5	168·6	196·7	224·0	252·9	281·0	309·1	337·3	365·3	393·4
11′−6″	面積	23·0	28·75	34·5	40·25	46·0	51·75	57·5	63·25	69·0	74·75	80·5
	瓩	53·3	66·6	79·9	93·3	106·6	119·9	133·3	146·6	159·9	173·2	186·5
	听	117·5	146·9	176·3	205·7	235·0	264·4	293·8	323·2	352·5	381·9	411·3
12′	面積	24·0	30·0	36·0	42·0	48·0	54·0	60·0	66·0	72·0	78·0	84·0
	瓩	55·3	69·5	83·4	97·3	111·2	125·1	139·1	153·0	166·8	180·8	194·7
	听	122·6	153·3	183·9	214·6	245·2	275·9	306·6	337·3	367·8	398·6	429·3

鋼板重量表 3.

(厚サ八分ノ一吋鋼板ノ重量)　鋼板一平方呎ノ重量＝吋ノ百分數×·4089斤

長(呎) ＼ 幅(呎)		2′	2′－6″	3′	3′－6″	4′	4′－6″	5′	5′－6″	6′	6′－6″	7′
12′－6″	面積	25·0	31·25	37·5	43·75	50·0	56·25	62·5	68·75	75·0	81·25	87·5
	瓩	57·9	72·4	86·9	101·4	115·9	130·4	144·9	159·4	173·8	188·3	202·8
	斤	127·8	159·7	191·6	223·5	255·5	287·5	319·4	351·4	383·2	415·2	447·1
13′	面積	26·0	32·5	39·0	45·5	52·0	58·5	65·0	71·5	78·0	84·5	91·0
	瓩	60·2	75·3	90·2	105·4	120·5	135·6	146·1	165·7	180·8	195·9	210·9
	斤	132·8	166·1	199·3	232·5	265·7	298·9	332·1	365·3	398·6	431·8	465·0
13′－6″	面積	27·0	33·75	40·5	47·25	54·0	60·75	67·5	74·25	81·0	87·75	94·5
	瓩	62·5	78·2	93·8	109·5	125·1	140·8	156·4	172·1	187·7	203·4	219·0
	斤	137·9	172·4	206·9	241·4	275·9	310·4	344·9	379·4	413·9	448·4	482·9
14′	面積	28·0	35·0	42·0	49·0	56·0	63·0	70·0	77·0	84·0	91·0	98·0
	瓩	64·9	81·1	97·3	113·6	129·8	146·0	162·3	178·4	194·7	210·9	227·1
	斤	143·1	178·8	214·6	250·4	286·2	321·9	357·7	393·4	429·3	465·0	500·7
14′－6″	面積	29·0	36·25	43·5	50·75	58·0	65·7	72·5	79·75	87·0	94·25	101·5
	瓩	67·2	84·0	100·8	117·8	134·4	152·3	168·0	184·8	201·6	218·5	235·2
	斤	148·2	185·2	222·3	259·7	296·4	335·7	370·4	407·5	444·5	481·6	518·6
15′	面積	30·0	37·5	45·0	52·5	60·0	67·5	75·0	82·5	90·0	97·5	105·0
	瓩	69·5	86·9	104·3	121·7	139·1	156·3	173·8	191·2	208·5	226·0	243·4
	斤	153·3	191·6	229·9	268·3	306·6	344·9	383·2	421·5	459·8	498·2	536·6
15′－6″	面積	31·0	38·75	46·5	54·25	62·0	69·75	77·5	85·25	93·0	100·75	108·5
	瓩	71·8	89·8	107·8	125·7	143·7	161·7	179·6	197·6	215·5	233·5	251·5
	斤	158·4	198·0	237·6	277·2	316·8	356·5	396·0	435·6	475·2	514·8	554·5
16′	面積	32·0	40·0	48·0	56·0	64·0	72·0	80·0	88·0	96·0	104·0	112·0
	瓩	74·1	92·7	111·2	129·8	148·3	166·8	185·4	204·0	222·5	241·1	259·6
	斤	103·5	204·4	245·2	286·2	327·0	367·8	408·9	449·7	490·5	531·5	572·3
16′－6″	面積	33·0	41·25	49·5	57·75	66·0	74·25	82·5	90·75	99·0	107·25	115·5
	瓩	76·5	95·6	114·5	123·8	153·0	172·1	191·2	210·4	229·4	248·6	267·7
	斤	168·6	210·8	252·9	295·0	337·3	379·4	421·5	469·8	505·8	548·0	590·2
17′	面積	34·0	42·5	51·0	59·5	68·0	76·5	85·0	93·5	102·0	110·5	119·0
	瓩	78·8	98·5	118·2	137·9	157·7	177·3	197·0	216·7	236·4	256·1	275·8
	斤	173·7	217·2	260·6	304·0	347·5	390·9	434·3	477·8	521·0	564·6	608·1
18′	面積	36·0	45·0	54·0	63·0	72·0	81·0	90·0	99·0	105·0	117·0	126·0
	瓩	83·4	104·3	125·1	146·0	166·8	187·8	208·5	229·4	243·4	271·2	292·1
	斤	183·9	229·9	275·9	321·9	367·8	413·9	459·8	505·8	536·6	597·9	643·9
19′	面積	38·0	47·5	57·0	66·5	76·0	85·5	95·0	104·5	114·0	123·5	133·0
	瓩	88·1	110·1	132·1	154·1	176·2	198·4	220·2	242·2	264·2	286·3	308·3
	斤	194·2	242·7	291·2	339·8	388·3	437·4	485·4	534·0	582·5	631·1	679·7
20′	面積	40·0	50·0	60·0	70·0	80·0	90·0	100·0	110·0	120·0	130·0	140·0
	瓩	92·7	115·9	139·1	162·3	185·6	208·6	231·8	255·0	278·1	301·3	327·5
	斤	204·4	255·5	306·6	357·7	408·9	459·9	511·0	562·1	613·2	664·3	715·4

4. 鋼板重量表

鋼板一平方呎ノ重量＝吋ノ百分數×·4089 听

鋼板ノ厚サ				一平方呎ノ重量	
二十分數	十分數	八分數	十六分數	听	瓩
	·0500			2·04	0·92
$\frac{1}{20}$	·0625		$\frac{1}{16}$	2·56	1·16
	·1000			4·08	1·85
$\frac{2}{20}$	·1250	$\frac{1}{8}$		5·11	2·31
	·1500			6·13	2·78
$\frac{3}{20}$	·1875		$\frac{3}{16}$	7·67	3·47
	·2000			8·17	3·70
$\frac{4}{20}$	·2500	$\frac{1}{4}$		10·22	4·63
$\frac{5}{20}$	·3000			12·26	5·56
$\frac{6}{20}$	·3125		$\frac{5}{16}$	12·78	5·79
	·3500			14·31	6·49
$\frac{7}{20}$	·3750	$\frac{3}{8}$		15·34	6·95
	·4000			16·35	7·41
$\frac{8}{20}$	·4375		$\frac{7}{16}$	17·90	8·12
	·4500			18·40	8·34
$\frac{9}{20}$	·5000	$\frac{1}{2}$		20·45	9·27
$\frac{10}{20}$	·5500			22·48	10·20
$\frac{11}{20}$	·5625		$\frac{9}{16}$	23·00	10·43
	·6000			24·53	11·12
$\frac{12}{20}$	·6250	$\frac{5}{8}$		25·56	11·59
	·6500			26·57	12·05
$\frac{13}{20}$	·6875		$\frac{11}{16}$	27·81	12·61
	·7000			28·62	12·98
$\frac{14}{20}$	·7500	$\frac{3}{4}$		30·67	13·91
$\frac{15}{20}$	·8000			32·71	14·83
$\frac{16}{20}$	·8125		$\frac{13}{16}$	33·22	15·07
	·8500			34·75	15·76
$\frac{17}{20}$	·8750	$\frac{7}{8}$		35·78	16·23
	·9000			36·80	16·69
$\frac{18}{20}$	·9375		$\frac{15}{16}$	38·34	17·09
	·9500			38·84	17·62
$\frac{19}{20}$	1·0000			40·89	18·55

鋼線及薄鋼板重量表

听/呎×4·883＝瓩/米　板ノ厚(吋ノ百分數)×·4089＝听/平方呎

BWG番號	徑若クハ厚サ		鋼線重量		鋼板重量	
	吋	粍	百呎ニ付听	百米ニ付瓩	平方呎ニ付听	平方米ニ付瓩
0000	·454	11·530	55·1000	82·0000	18·560	90·640
000	·425	10·800	48·2800	71·8200	17·380	84·870
00	·380	9·650	38·6000	57 4400	15·540	75·890
0	·340	8·636	30·9200	46·0100	13·900	67·880
1	·300	7·640	26·0400	38·7500	12·270	60·920
2	·284	7·213	21·5700	32·1000	11·610	56·690
3	·259	6·579	18·2200	27·1100	10·590	51·710
4	·238	6·046	15·0800	22·4400	9·734	47·550
5	·220	5·588	12·5900	18·7300	8·996	43·940
6	·203	5·154	11·5700	17·2100	8·302	40·570
7	·180	4·572	9·3500	13·9100	7·362	35·950
8	·165	4·191	7·3700	10·9600	6·748	32·990
9	·148	3·759	6·6800	9·9400	6·052	29·550
10	·134	3·404	5·0200	7·4700	5·480	26·750
11	·120	3·048	4·1800	6·2200	4·907	23·960
12	·109	2·769	3·1800	4·7320	4·458	21·770
13	·095	2·413	2·3600	3·5120	3·888	18·990
14	·083	2·108	1·7100	2·5440	3·394	16 570
15	·072	1·829	1·3900	2·0680	2·944	14·380
16	·065	1·651	1·0600	1·5770	2·658	12·980
17	·058	1·473	·8100	1·2050	2·372	11·580
18	·049	1·245	·6200	·9226	2·003	9 782
19	·042	1·067	·4700	·6994	1·717	8·384
20	·035	·889	·3300	·4911	1·431	6·989
21	·032	·813	·2737	·4075	1·308	6·388
22	·028	·711	·2095	·3120	1·145	5·592
23	·025	·635	·1671	·2488	1·022	4·991
24	·022	·559	·1294	·1927	·899	4·390
25	·020	·508	·1069	·1592	·818	3·995
26	·018	·457	·0866	·1289	·736	3·594
27	·016	·406	·0684	·1018	·654	3·194
28	·014	·356	·0524	·0780	·572	2·793
29	·013	·330	·0452	·0673	·531	2·593
30	·012	·305	·0385	·0573	·490	2·393
31	·010	·254	·0267	·0398	·408	1·993
32	·009	·229	·0216	·0322	·368	1·797
33	·008	·203	·0171	·0255	·327	1·597
34	·007	·178	·0131	·0195	·286	1·397
35	·005	·127	·0067	·0099	·204	·996
36	·004	·102	·0043	·0064	·163	·796

六角頭「ボールト」及「ナット」重量表
一箇ノ重量(听)

頭下ノ長サ(吋)	「ボールト」ノ直徑(吋)											
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
1	·031	·056	·092	·139	·200	·276	·369	·613	—	—	—	—
1 1/4	·035	·061	·100	·150	·214	·295	·391	·644	·989	—	—	—
1 2/4	·038	·068	·108	·161	·228	·312	·414	·677	1·033	1·489	—	—
1 3/4	·042	·073	·116	·172	·234	·330	·436	·709	1·077	1·546	2·118	—
2	·046	·078	·124	·183	·257	·349	·458	742	1·121	1·604	2·214	2·951
2 1/4	·049	·085	·132	·194	·271	·364	·481	·773	1·165	1·661	2·286	3·041
2 2/4	·053	·090	·140	·205	·286	·385	·504	·806	1·209	1·718	2·359	3·131
2 3/4	·056	·095	·149	·216	·300	·404	·526	·838	1·252	1·776	2·432	3·220
3	·060	·101	·156	·227	·315	·422	·549	·871	1·296	1·833	2·468	3·309
3 1/4	·064	·107	·164	·238	·329	·437	·571	·903	1·340	1·891	2·577	3·398
3 2/4	·067	·112	·173	·248	·343	·458	·592	·935	1·381	1·928	2·650	3·489
3 3/4	·071	·118	·180	·260	·358	·476	·616	·968	1·429	2·005	2·722	3·578
4	·074	·123	·189	·270	·372	·494	·638	1·000	1·473	2·062	2·795	3·667
4 1/4	·078	·129	·197	·282	·386	·513	·660	1·032	1·510	2·119	2·867	3·756
4 2/4	·081	·135	·205	·292	·401	·531	·683	1·064	1·561	2·177	2·941	3·846
4 3/4	·085	·140	·213	·304	·415	·549	·705	1·097	1·605	2·234	3·013	3·936
5	·089	·145	·221	·315	·429	·567	·727	1·129	1·649	2·292	3·085	4·025
5 1/2	·096	·157	·237	·337	·458	·603	·772	1·193	1·736	2·406	3 230	4·.04
一吋ニ付キ頭長サ一吋加ヘル加算量	·014	·022	·031	·042	·055	·069	·0854	·1230	·1676	·2183	·2766	·3408

上表「ボールト」ノ各部寸法ハ英國ノ「スタンダード」ニ依ル

「リベット」重量表
百箇ノ重量(听)

頭下ノ長サ(吋)	直徑(吋)											
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
1	1·7	3·08	5·0	7·65	11·0	15·2	20·0	26·2	39·6	61·0	86·3	118·0
1 1/4	1·9	3·35	5·5	8·25	12·8	16·2	22·0	29·3	43·9	66·6	93·3	127·0
1 2/4	2·1	3·74	6·3	8·85	14·2	17·2	24·1	32·4	48·2	72·1	100·0	136·0
1 3/4	2·3	4·02	7·0	9·45	15·5	18·2	26·3	35·5	52·5	77·7	107·0	145·0
2	2·5	4·30	7·9	10·80	16·9	19·2	28·5	38·7	56·7	83·3	114·0	153·0
2 1/4	2·7	4·67	8·7	10·65	18·3	20·2	30·7	41·8	61·0	88·8	121·0	162·0
2 2/4	2·9	4·95	9·4	11·30	19·7	21·2	32·8	44·9	65·2	94·4	128·0	171·0
2 3/4	3·1	5·22	10·2	11·80	21·1	22·2	35·0	48·0	69·5	100·0	136·0	179·0
3	3·3	5·55	11·0	12·50	22·5	23·2	37·2	51·1	73·7	105·0	143·0	188·0
3 1/4	3·5	5·89	11·7	13·10	23·9	24·2	39·3	54·3	78·0	111·0	150·0	197·0
3 2/4	3·7	6·15	12·6	13·65	25·3	25·2	41·5	57·4	82·3	116·0	157·0	205·0
3 3/4	3·9	6·50	13·4	14·30	26·7	26·2	43·7	60·5	86·5	122·0	164·0	214·0
4	4·1	6·76	14·1	14·90	28·1	27·2	45·9	63·6	90·8	128·0	170·0	223·0
4 1/4	4·3	7·10	14·9	15·60	29·4	28·2	48·0	66·7	95·0	134·0	177·0	231·0
4 2/4	4·5	7·43	15·7	16·20	30·8	29·2	50·2	69·9	99·3	139·0	185·0	240·0
4 3/4	4·7	7·70	16·5	16·90	32·2	30·2	52·4	73·0	104·0	145·0	192·0	249·0
5	4·9	8·00	17·2	17·30	33·6	31·2	54·5	76·1	108·0	150·0	199·0	258·0
5 1/2	5·3	8·65	18·1	18·50	35·0	33·2	56·7	79·2	112·0	156·0	206·0	266·0
一箇ニ付キ一吋ノ頭長サ加ヘル加算量	·014	·022	·031	·042	·055	·069	·0854	·1230	·1676	·2183	·2766	·3408

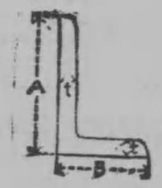
上表「リベット」其頭部普通ノ大サノ凸形頭ノモノナリ

吋ノ分數ニ於ケル山形鋼ノ重量表 1.

（長サ一呎ニ付斤）

厚 (t) 吋	合セタル「フランヂ」ノ高サ (吋)										
	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7
5/20	1·49	2·02	2·34	2·76	3·19	3·61	4·04	4·46	4·89	5·31	5·74
5·5/20	1·74	2·21	2·67	3·02	3·48	3·95	4·42	4·89	5·35	5·82	6·29
6/20	1·88	2·39	2·90	3·26	3·77	4·28	4·79	5·31	5·81	6·32	6·83
6·5/20	2·03	2·58	3·13	3·51	4·06	4·61	5·17	5·72	6·27	6·82	7·38
7/20	2·17	2·76	3·36	3·95	4·34	4·94	5·53	6·13	6·72	7·32	7·91
7·5/20	—	—	—	—	4·62	5·26	5·90	6·53	7·17	7·81	8·45
8/20	—	—	—	—	—	5·58	6·26	6·94	7·62	8·30	8·98
8·5/20	—	—	—	—	—	5·89	6·61	7·33	8·06	8·78	9·50
9/20	—	—	—	—	—	—	6·96	7·73	8·49	9·26	10·02
9·5/20	—	—	—	—	—	—	7·31	8·12	8·92	9·73	10·54
10/20	—	—	—	—	—	—	—	8·50	9·35	10·20	11·05
10·5/20	—	—	—	—	—	—	—	—	9·77	10·67	11·56
11/20	—	—	—	—	—	—	—	—	10·19	11·13	12·06
11·5/20	—	—	—	—	—	—	—	—	10·61	11·58	12·56
12/20	—	—	—	—	—	—	—	—	11·02	12·04	13·06
12·5/20	—	—	—	—	—	—	—	—	11·42	12·48	13·55
13/20	—	—	—	—	—	—	—	—	11·82	12·93	14·00

備考　(A+B)＝合セタル「フランヂ」ノ高サ



吋ノ分數ニ於ケル山形鋼ノ重量表 2.

（長サ一呎ニ付斤）

厚 (t) 吋	合セタル「フランヂ」ノ高サ (吋)									
	$7\frac{1}{2}$	8	$8\frac{1}{2}$	9	$9\frac{1}{2}$	10	$10\frac{1}{2}$	11	$11\frac{1}{2}$	12
5/20	6·16	6·59	7·01	7·44	7·86	—	—	—	—	—
5·5/20	6·76	7·22	7·69	8·16	8·63	9·09	—	—	—	—
6/20	7·34	7·85	8·36	8·87	9·38	9·89	—	—	—	—
6·5/20	7·93	8·48	9·03	9·59	10·14	10·69	11·24	—	—	—
7/20	8·51	9·10	9·70	10·29	10·89	11·48	12·08	—	—	—
7·5/20	9·08	9·72	10·36	11·00	11·63	12·27	12·91	13·55	—	—
8/20	9·66	10·34	11·02	11·70	12·38	13·06	13·74	14·42	15·10	—
8·5/20	10·22	10·95	11·67	12·39	13·11	13·84	14·56	15·28	16·00	16·73
9/20	10·79	11·55	12·32	13·08	13·85	14·61	15·38	16·14	16·91	17·67
9·5/20	11·35	12·15	12·96	13·77	14·58	15·38	16·19	17·00	17·81	18·61
10/20	11·90	12·75	13·60	14·45	15·30	16·15	17·00	17·85	18·70	19·55
10·5/20	12·45	13·34	14·24	15·13	16·02	16·91	17·81	18·70	19·59	20·48
11/20	13·00	13·93	14·87	15·80	16·74	17·67	18·61	19·54	20·48	21·41
11·5/20	13·54	14·52	15·49	16·47	17·45	18·43	19·40	20·38	21·36	22·34
12/20	14·08	15·10	16·12	17·14	18·16	19·18	20·20	21·22	22·24	23·26
12·5/20	14·61	15·67	16·73	17·80	18·86	19·92	20·98	22·05	23·11	24·17
13/20	15·14	16·24	17·35	18·45	19·56	20·66	21·77	22·88	23·98	25·08

軌條及附屬品 1.
軌道一哩ニ要スル數量

番號	軌條一碼ノ重量	軌條一本ノ長サ	軌道一哩ニ要スル數量		
	斤	呎	軌條(本)	繼目板(組)	「ボールトナット」(本)
No. 9G	9	15	704	704	2,816
		18	586	586	2,348
No. 12G	12	15	704	704	2,816
		18	586	586	2,348
No. 18G	18	15	704	704	2,816
		18	586	586	2,348
		24	440	440	1,770
No. 20G	20	15	704	704	2,816
		18	586	586	2,348
		24	440	440	1,770
No. 45A	45	28	377	377	1,508
		30	352	352	1,408
No. 60A	60	18	586	586	2,348
		21	500	500	2,000
		24	440	440	1,760
		26	406	406	1,625
		28	377	377	1,508
		30	352	352	1,408
		33	320	320	1,280
No. 60B	60	30	352	352	1,408
		33	320	320	1,280
No. 75A	75	30	352	352	2,112
		33	320	320	1,920

此他軌道一哩ニ要スル「スパイキ」數量ハ一定セズト雖モ大略下ノ通リトス

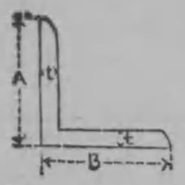
No. 9 G ヨリ	No. 20G迄	10,560本
No. 45 A ヨリ	No. 60B迄	8,448本
No. 75 A		8,960本

軌條及附屬品 2.
軌道一哩ニ要スル重量

番號	軌條		繼目板		「ボールト」「ナット」		全重量	
	噸	瓲	噸	瓲	噸	瓲	噸	瓲
No. 9G	14·253	14·481	·33793	·34213	·1356	·1379	14·725	14·960
	—	—	·28100	·28528	·1131	·1150	14·650	14·881
No. 12G	19·241	19·317	·43513	·44212	·1356	·1379	19·560	19·896
	—	—	·36480	·36863	·1131	·1150	19·500	19·854
No. 18G	28·500	28·963	1·0471	1·06400	·3048	·3097	29·660	30·337
	—	—	·8725	·88637	·2504	·2582	29·600	30·107
	—	—	·6541	·66440	·1915	·1947	29·300	29·821
No. 20G	31·450	31·933	1·2950	1·31648	·3048	·3097	33·000	35·558
	—	—	1·0800	1·09769	·2504	·2582	32·700	33·288
	—	—	·8150	·82280	·1947	·1947	32·400	32·349
No. 45A	70·710	71·841	2·540	2·5636	·5880	·5971	73·800	75.001
	—	—	2·300	2·3368	·5486	·5575	73·600	74·491
No. 60A	94·286	95 799	8·477	8·6140	9800	·9957	103·34	107·409
	—	—	7·233	7·3500	·8360	·8500	101·37	103·999
	—	—	6·365	6·4680	·7360	·7480	101·00	103·015
	—	—	5·838	5·9829	·6800	·6906	100·30	101·905
	—	—	5·454	5·5419	·6310	·6409	100·00	101·600
	—	—	5·080	5·1740	·5886	·5984	100·00	101·600
	—	—	4·620	4·7040	·5350	·5440	99·40	101·047
No. 60B	94·286	95 799	5·540	5·6320	·5888	·5988	100·30	101·905
	—	—	5·040	5·1200	·5854	·5940	100·00	101·600
No. 75A	11·786	11·974	8·620	8·7500	·9415	9567	126·69	129·446
	—	—	7·880	8·0000	·8548	·8697	125·97	128·600

此他軌道一哩ニ要スル「スパイキ」重量ハ大略下ノ通リトス

No. 9G No. 12G用 644瓲　No. 18G用 748瓲
No. 20G 1,047瓲　No. 45A用 1,499瓲　No. 60A用 2,129瓲
No. 60B用 2,624瓲　No. 75A用 2,258瓲



等邊山形鋼

一呎ノ重量(听)＝斷面積×3·4
一米ノ重量(瓩)＝一呎ノ重量(听)×1·488
瓩＝听×·4536

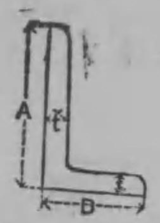
番號	寸法 A×B 吋	寸法 A×B 粍	寸法 t 吋	寸法 t 粍	斷面積(平方吋)	長一呎ノ重量 听	長一呎ノ重量 瓩
BSEA 1	1×1	25·4×25·4	·125	3·2	·234	·80	·362
			·250	6·4	·357	1·49	·676
BSEA 2	1¼×1¼	32·0×32·0	·125	3·2	·299	1·02	·462
			·250	6·4	·564	1·92	·871
BSFA 3	1½×1½	38×38	·125	3·2	·361	1·23	·558
			·250	6·4	·689	2·34	1.061
BSEA 4	1¾×1¾	44×44	·175	4·4	·583	1·98	.898
			·300	7·6	·961	3·27	1.483
BSEA 5	2×2	51×51	·175	4·4	·670	2·28	1.034
			·300	7·6	1·110	3·77	1.710
BSEA 6	¼×2¼	57×57	·175	4·4	·757	2·57	1.165
			·300	7·6	1·260	4·28	1.941
BSFA 7	2½×2½	64×64	·250	6·4	1·187	4·09	1.855
			·375	9·5	1·733	5·89	2.672
			·500	12·7	2·249	7·65	3.470
BSEA 8	2¾×2¾	70×70	·250	6·4	1·312	4·46	2·023
			·375	9·5	1·921	6·53	2·962
			·500	12·7	2·499	8·50	3·855
B EA 9	3×3	76×76	·250	6·4	1·440	4·90	2·223
			·375	9·5	2·111	7·18	3·257
			·500	12·7	2·752	9·36	4·246
BSEA 10	3½×3½	89×89	·300	7·6	2·011	6·84	3·102
			·425	10·8	2·795	9·50	4·309
			·500	12·7	3·251	11·05	5·011
BSEA 11	4×4	102×102	·300	7·6	2·310	7·85	3·560
			·425	10·8	3·219	10·94	4·962
			·500	12·7	3·749	12·75	5·782
BSEA 12	4½×4½	114×114	·375	9·5	3·236	11·00	4·990
			·500	12·7	4·252	14·40	6·560
BSEA 13	5×5	127×127	·375	9·5	3·610	12·27	5·564
			·500	12·7	4·750	16·15	7·323
BSEA 14	6×6	152×152	·450	11·4	5·201	17·68	8·020
			·625	15·9	7·112	24·18	10·970

等邊山形鋼 2

Cx, Cy＝重心距離 (吋)
I＝物量力率 (吋⁴)
R＝抵抗力率 (吋³)

(續)

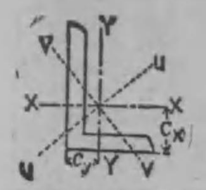
重心距離(吋) Cx＝Cy	物量力率(吋⁴) Ix	Iy	Max. Iu	Min. Iv	抵抗力率(吋³) Rx	Ry	番號
·285	·020	·020	·032	·008	·028	·028	BSEA 1
—	—	—	—	—	—	—	
·346	·041	·041	·065	·017	·045	·045	BSEA 2
—	—	—	—	—	—	—	
·409	·074	·074	·117	·031	·068	·068	BSEA 3
—	—	—	—	—	—	—	
·490	·062	·062	·257	·067	·129	·129	BSEA 4
—	—	—	—	—	—	—	
·549	·244	·244	·387	·101	·168	·168	BSEA 5
—	—	—	—	—	—	—	
·611	·354	·354	·562	·146	·216	·216	BSEA 6
—	—	—	—	—	—	—	
·703	·677	·677	1·076	·278	·377	·377	BSEA 7
—	—	—	—	—	—	—	
—	—	—	—	—	—	—	
·765	·917	·917	1·457	·377	·462	·462	BSEA 8
—	—	—	—	—	—	—	
—	—	—	—	—	—	—	
·827	1·027	1·027	1·919	·495	·555	·555	BSEA 9
—	—	—	—	—	—	—	
—	—	—	—	—	—	—	
·969	2·299	2·299	3·656	·942	·908	·908	BSEA 10
—	—	—	—	—	—	—	
—	—	—	—	—	—	—	
1·091	3·477	3·477	5·531	1·423	1·195	1·195	BSEA 11
—	—	—	—	—	—	—	
—	—	—	—	—	—	—	
1·244	6·141	6·141	9·768	2·514	1·886	1·886	BSEA 12
—	—	—	—	—	—	—	
1·365	8·510	8·510	13·540	3·480	2·341	2·341	BSEA 13
—	—	—	—	—	—	—	
1·643	17·741	17·741	28·236	7·246	4·072	4·072	BSEA 14
—	—	—	—	—	—	—	



不等邊山形鋼 1.

一呎ノ重量(听)＝斷面積×3·4
一米ノ重量(瓩)＝一呎ノ重量(听)×1·488
瓩＝听×·4536

番號	寸法 A×B 吋	寸法 A×B 粍	寸法 t 吋	寸法 t 粍	斷面積(平方吋)	長一呎ノ重量 听	長一呎ノ重量 瓩
BSUA 4	2×1½	51×38	·175	4·4	·583	1·98	·898
			·300	7·6	·961	3·27	1·483
BSUA 5	2½×2	64×51	·175	4·4	·757	2·57	1·165
			·300	7·6	1·260	4·28	1·941
BSUA 6	3×2	76×51	·250	6·4	1 187	4·04	1·832
			·375	9·5	1·733	5·89	2·672
			·500	12·7	2·249	7 65	3·470
BSUA 7	3×2½	76×64	·250	6·4	1·312	4·46	2·023
			·375	9·5	1·921	6·53	2·962
			·500	12·7	2·499	8·50	3·855
BSUA 8	3½×2½	89×64	·250	6·4	1·440	4·90	2·223
			·375	9·5	2·112	7·18	3·257
			·500	12·7	2·752	9·36	4·245
BSUA 9	3½×3	89×76	·250	6·4	1·563	5·31	2·409
			·375	9·5	2 298	7·81	3·542
			·500	12·7	3·001	10·20	4·627
BSUA 10	4×2½	102×64	·250	6·4	1·563	5·31	3·409
			·375	9·5	2·298	7·81	3·542
			·500	12·7	3·001	10·20	4·627
BSUA 11	4×3	102×76	·300	7·6	2·011	6·84	3·104
			·425	10·8	2·795	9·50	4·309
			500	12·7	3·251	11·05	4·763
BSUA 12	4×3½	102×89	·300	7·6	2·195	7 34	3·329
			·425	10·8	3·006	10·22	4·635
			·500	12·7	3·499	11·90	5·398
BSUA 13	4½×3	114×76	·300	7·6	2·159	7·34	3·329
			·425	10·8	3·006	9·50	4·635
			500	12·7	3·499	11·90	5·398
BSUA 14	4½×3½	114×89	·300	7·6	2·309	7·85	3·561
			·425	10·8	3·219	10·94	4 963
			500	12·7	3·749	12·75	5·784
BSUA 15	5×3	127×76	·300	7·6	2·309	7·85	3·561
			·425	10·8	3·219	10 94	4 963



不等邊山形鋼 2.

Cx, Cy＝重心距離
I＝物量力率
R＝抵抗力率

(續)

重心距離(吋) Cx	重心距離(吋) Cy	物量力率(吋⁴) Ix	物量力率(吋⁴) Iy	物量力率(吋⁴) Max. Iu	物量力率(吋⁴) Min. Iv	抵抗力率(吋³) Rx	抵抗力率(吋³) Ry	番號
·622	·376	·225	·108	·275	·058	·163	·096	BSUA 4
—	—	—	—	—	—	—	—	
·741	·495	·460	·260	·586	·134	·262	·173	BSUA 5
—	—	—	—	—	—	—	—	
·976	·482	1·056	·373	1·213	·216	·522	·245	BSUA 6
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
·895	·648	1·138	·716	1·498	·356	·541	·387	BSUA 7
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·095	·602	1·758	·748	2·091	·415	·743	·391	BSUA 8
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·014	·767	1·853	1·254	2·499	·608	·745	·562	BSUA 9
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·300	·561	2·535	·767	2·847	·455	·939	·366	BSUA 10
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·235	·741	3·188	1·537	3·899	·826	1·153	·680	BSUA 11
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·157	·910	3·334	2·378	4·583	1·129	1·173	·918	BSUA 12
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·438	·697	4·407	1·574	5·076	·905	1·439	·683	BSUA 13
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
1·355	·860	4·641	2·460	5·815	1·286	1·476	·932	BSUA 14
—	—	—	-	—	—	—	—	
—	—	—	—	—	—	—	—	
1·651	·662	5·908	1·617	6·552	·973	1·764	·692	BSUA 15
—	—	—	—	—	—	—	—	

3. 不等邊山形鋼

(續)

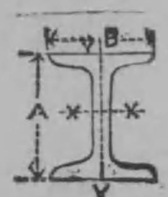
番號	寸法 A×B 吋	寸法 A×B 粍	寸法 t 吋	寸法 t 粍	斷面積 平方吋	長一呎ノ重量 听	長一呎ノ重量 瓩	重心距離 (吋) Cx	重心距離 (吋) Cy	物量力率 (吋⁴) Ix	物量力率 (吋⁴) Iy	物量力率 (吋⁴) Iu Max.	物量力率 (吋⁴) Iy Min.	抵抗力率 (吋³) Rx	抵抗力率 (吋³) Ry
BSUA 15	5×3	127× 76	·500	12·7	3·794	12·75	5·78	1·651	·662	5·908	1·617	6·552	·973	1·764	·692
BSUA 16	5×3½	127× 89	·375	9·5	3·050	10·37	4·70	1·590	·848	7·644	3·095	9·005	1·734	2·242	1·167
			·500	12·7	4·003	13·61	6·17	—	—	—	—	—	—	—	—
BSUA 17	5×4	127×102	·375	9·5	3·230	11·00	4·99	1·506	1·011	7·961	4·527	10·168	2·320	2·278	1·515
			·500	12·7	4·252	14·46	6·56	—	—	—	—	—	—	—	—
BSUA 19	5½×3½	140× 89	·375	9·5	3·236	11·00	4·99	1·797	·807	9·932	3·155	11·233	1·854	2·682	1·172
			·500	12·7	4·252	14·46	6·56	—	—	—	—	—	—	—	—
BSUA 20	6×3½	152× 89	·375	9·5	3·424	11·64	5·28	2·011	·773	12·646	3·225	13·908	1·963	3·170	1·183
			·500	12·7	4·502	15·31	6·94	—	—	—	—	—	—	—	—
BSUA 21	6×4	152×102	·375	9·5	3·610	12·27	5·56	1·912	·923	13·191	4·731	15·209	2·713	3·227	1·538
			·500	12·7	4·750	16·15	7·32	—	—	—	—	—	—	—	—
BSUA 22	6½×3½	165× 89	·375	9·5	3·610	12·27	5·56	2·225	·741	15·728	3·266	16·949	2·045	3·679	1·184
			·500	12·7	4·750	16·15	7·32	—	—	—	—	—	—	—	—
BSUA 23	6½×4	165×102	·525	13·3	5·237	17·81	8·08	2·188	·948	22·359	6·498	24·698	3·889	5·185	2·129
BSUA 24	6½×4½	165×114	·550	14·0	5·746	19·54	8·86	2·104	1·111	24·213	9·508	28·351	5·370	5·508	2·806
BSUA 25	7×3½	178× 89	·525	13·3	5·237	17·81	8·08	2·512	·775	26·213	4·456	27·789	2·880	5·841	1·635
BSUA 26	7×4	178×102	·550	14·0	5·746	19·54	8·86	2·412	·923	28·580	6·858	31·207	4·231	6·229	2·229

工形鋼 1.

一呎ノ重量(听)＝斷面積×3·4

一米ノ重量(瓩)＝一呎ノ重量(听)×1·488

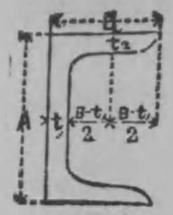
番號	寸法 A×B 吋	寸法 A×B 粍	寸法 t_1 吋	寸法 t_1 粍	寸法 t_2 吋	寸法 t_2 粍	斷面積 平方吋	長一呎ノ重量 听	長一呎ノ重量 瓩
BSB 2	3×3	76×76	·2000	5·07	·332	8·41	2·501	8·50	3·855
BSB 3	4×1¾	102×44	·1700	4·32	·240	6·10	1·472	5·00	2·268
BSB 4	4×3	102×76	·2200	5·59	·336	8·52	2·795	9·50	4·309
BSB 5	4¾×1¾	121×44	·1800	4·58	·325	8·25	1·912	6·50	2·950
BSB 6	5×3	127×76	·2200	5·59	·376	9·55	3·238	11·01	4·994
BSB 7	5×4½	127×114	·2900	7·37	·448	11·14	5·290	17·99	8·172
BSB 8	6×3	152×76	·2600	6·60	·348	8·87	3·527	11·99	5·442
BSB 9	6×4½	152×114	·3700	9·40	·431	10·95	5·882	20·00	9·072
BSB10	6×5	152×127	·4100	10·40	·520	13·21	7·354	5·00	11·34
BSB11	7×4	178×102	·2500	6·35	·387	9·84	4·709	16·01	7·26
BSB12	8×4	203×102	·2800	7·11	·402	10·20	5·297	18·01	8·17
BSB13	8×5	203×127	·3500	8·89	·575	14·60	8·241	28·02	12·72
BSB14	8×6	203×152	·4400	11·17	·597	15·15	10·293	35·00	15·87
BSB15	9×4	229×102	·3000	7·62	·460	11·68	6·178	21·00	9·52
BSB16	9×7	229×178	·5500	13·97	·924	23·49	17·064	58·02	26·32
BSB17	10×5	254×127	·3600	9·14	·552	14·00	8·820	29·99	13·60
BSB18	10×6	254×152	·4000	10·16	·736	18·70	12·358	42·02	19·06
BSB19	10×8	254×203	·6000	15·24	·970	24·64	20·582	69·98	31·74
BSB20	12×5	305×127	·3500	8·89	·550	13·97	9·408	31·99	14·51
BSB21	12×6	305×152	·4000	11·17	·717	18·20	12·946	44·02	19·97
NP 10	3 15/16×2	100×50	·1875	4·50	·267	6·80	1·657	5·57	2·57
NP 12	3¾×2 5/16	120×58	·2500	5·10	·303	7·70	2·212	7·46	3·38
NP 15	5 1/16×2 13/16	150×70	·2500	6·00	·354	9·00	3·178	10·75	4·87
NP 18	7 1/16×3½	180×82	·3125	6·90	·409	10·40	4·341	14·71	6·67
NP 20	7 7/8×3 9/16	200×90	·3125	7·50	·441	11·30	5·222	17·65	7·98
NP 22	8 11/16×3 7/8	220×980	·3750	8·10	·480	12·20	6·170	20·83	9·45
NP 24	9½×4 9/16	240×106	·3750	8·70	·515	13·10	7·193	24·32	11·04
NP 26	10¼×4½	260×113	·3750	9·40	·555	14·10	8·344	28·16	12·77
NP 28	11 1/16×4 11/16	280×119	·4375	10·10	·598	15·20	9·517	32·19	14·60
NP 30	11 13/16×3 15/16	300×125	·4375	10·80	·637	16·20	10·744	36·31	16·49



工 形 鋼 2.

Cx,Cy＝重心距離
I＝物量力率(吋⁴)
R＝抵抗力率(吋³)
I×41·6＝物量力率(糎⁴)
R×16·4＝抵抗力率(糎³)　　(續)

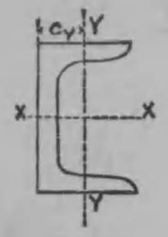
重心距離(吋)	物量力率(吋⁴)		抵抗力率(吋³)		番號
Cx, Cy	Ix	Iy	Rx	Ry	
0	3·789	1·261	2·526	·841	BSB 2
0	3·671	·194	1·835	·222	BSB 3
0	7·526	1·280	3·763	·854	BSB 4
0	6·767	·263	2·849	·300	BSB 5
0	13·620	1·461	5·448	·974	BSB 6
0	22·699	5·656	9·080	2·514	BSB 7
0	20·228	1·338	6·743	·892	BSB 8
0	34·660	5·409	11·553	2·404	BSB 9
0	43·641	9·105	14·547	3·642	BSB 10
0	39·222	3·410	11·206	1·705	BSB 11
0	55·716	3·574	13·929	1·787	BSB 12
0	89·357	10·250	22·339	4·100	BSB 13
0	110·597	17·929	27·649	5·976	BSB 14
0	81·115	4·198	18·026	2·099	BSB 15
0	229·740	46·265	51·053	13·219	BSB 16
0	145·684	9·780	29·137	3·912	BSB 17
0	211·614	22·930	42·323	7·643	BSB 18
0	345·039	71·609	69·008	17·902	BSB 19
0	220·115	9·743	36·686	3·897	BSB 20
0	315·439	22·357	52·573	7·419	BSB 21
0	4·085	·2932	2·005	·297	NP 10
0	7·856	·5142	3·341	·452	NP 12
0	17·635	1·0500	6·001	·766	NP 15
0	34·700	1·9530	9·870	1·213	NP 18
0	51·400	2·8120	13·118	1·587	NP 20
0	73·400	3·9170	17·040	2·041	NP 22
0	101·800	5·283	21·640	2·550	NP 24
0	137·800	6·896	27·030	3·102	NP 26
0	182·000	8·722	33·160	3·727	NP 28
0	235·200	10·789	30·970	4·407	NP 30



溝 形 鋼 1.

…呎ノ重量(听)＝斷面積×3·4
一米ノ重量(瓩)＝一呎ノ重量(听)×1·483

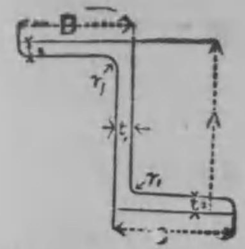
番號	寸法 A×B 吋	寸法 A×B 糎	寸法 t_1 吋	寸法 t_1 糎	寸法 t_2 吋	寸法 t_2 糎	平方吋斷面積	一呎量ノ長ノ重量 听	一呎量ノ長ノ重量 瓩
BSC 1	3×1½	76× 38	·250	6·4	·312	7·94	1·549	5·27	2·39
BSC 2	3½×2	89× 51	·250	6·4	·312	7·90	1·968	6·75	3·06
BSC 3	4×2	102× 51	·250	6·4	·375	9·50	2·341	7·96	3·61
BSC 4	5×2½	127× 64	·312	7·9	·375	9·50	3·230	10·98	4·99
BSC 5	6×2½	152× 64	·312	7·9	·375	9·50	3·542	12·04	5·48
BSC 6	6×3	152× 76	·312	7·9	·437	11·10	4·261	14·49	6·58
BSC 7	6×3	152× 76	·375	9·5	·475	12·10	4·791	16·29	7·39
BSC 9	7×3	179× 76	·375	9·5	·475	12·10	5·166	17·56	7·98
BSC 10	7×3½	178× 89	·400	10·2	·500	12·70	5·950	20·23	9·16
BSC 11	8×2½	203× 64	·312	7·9	·437	11·10	4·448	15·12	6·85
BSC 12	8×3	203× 76	·375	9·5	·500	12·70	5·675	19·30	8·75
BSC 13	8×3½	203× 89	·425	10·8	·525	13·30	6·682	22·72	10·29
BSC 14	8×4	203×102	·450	11·4	·550	13·97	7·569	25·73	11·66
BSC 15	9×3	229× 76	·375	9·5	·437	11·10	5·696	19·37	8·79
BSC 16	9×3½	229× 89	·375	9·5	·500	12·70	6·550	22·27	10·11
BSC 18	9×4	229×102	·475	12·1	·575	14·60	8·396	28·55	12·93
BSC 19	10×3½	254× 89	·375	9·5	·500	12·70	6·925	23·55	10·70
BSC 20	10×3½	254× 89	·475	12·1	·575	14·60	8·296	28·21	12·79
BSC 21	10×4	254×102	·475	12·1	·575	14·60	8·871	30·16	13·69
BSC 22	11×3½	279× 89	·475	12·1	·575	14·60	8·771	29·82	13·52
BSC 23	11×4	279×102	·500	12·7	·600	15·20	9·771	33·22	15·06
BSC 24	12×3½	305× 89	·375	9·5	·500	12·70	7·675	26·10	11·84
AP 10½	4 3/16×2 9/16	105× 65	·315	8	·315	8	2·713	9·20	4·17
AP 11¾	4 11/16×2 9/16	117× 65	·393	10	·393	10	3·535	11·96	5·42
AP 14½	5¾ ×2⅜	145× 60	·315	8	·315	8	3·085	10·41	4·72
NP 18	7⅛ ×2 13/16	180× 70	·315	8	·315	8	3·566	14·71	6·67
AP 23½	9 5/16×3 9/16	235× 90	·393	10	·393	10	6·620	22·38	15·10



溝　形　鋼　2.

Cx,Cy＝重心距離
I＝物量力率(吋⁴)
R＝抵抗力率(吋³)
I×41·6＝物量力率(糎⁴)
R×16·4＝抵抗力率(糎³)　　(續)

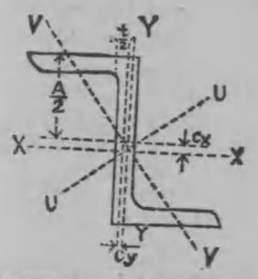
重心距離(吋)		物量力率(吋⁴)		抵抗力率(吋³)		番號
Cx	Cy	Ix	Iy	Rx	Ry	
o	·484	1·994	·296	1·329	·291	BSC 1
o	·645	3·701	·713	2·115	·526	BSC 2
o	·656	5·709	·843	2·855	·627	BSC 3
o	·757	12·134	1·774	4·854	1·018	BSC 4
o	·704	18·763	1·830	6·254	1·047	BSC 5
o	·938	24·010	3·503	8·003	1·699	BSC 6
o	·928	26·034	3·822	8·678	1·845	BSC 7
o	·874	37·627	4·017	10·751	1·889	BSC 9
o	1·061	44·549	6·498	12·728	2·664	BSC 10
o	·666	41·094	2·283	10·273	1·245	BSC 11
o	·844	53·432	4·329	13·358	2·008	BSC 12
o	1·011	63·763	7·067	15·941	2·839	BSC 13
o	1·201	74·018	10·790	18·504	3·855	BSC 14
o	·754	65·177	4·021	14·484	1·790	BSC 15
o	·976	79·902	6·963	17·756	2·759	BSC 16
o	1·151	101·654	11·635	22·590	4·084	BSC 18
o	·933	102·622	7·187	20·524	2·800	BSC 19
o	·933	117·959	8·194	23·592	3·192	BSC 20
o	1·102	130·715	12·018	26·143	4·147	BSC 21
o	·896	148·606	8·421	27·019	3·234	BSC 22
o	1·063	170·454	12·812	30·992	4·162	BSC 23
o	·860	158·639	7·572	26·440	2·868	BSC 24
o	·740	6·896	1·471	3·353	·809	AP 10½
o	·751	10·740	1·852	4·665	1·024	AP 11¾
o	·590	14·050	1·288	4·947	·729	AP 14¼
o	·755	32·540	2·740	8·196	·373	NP 18
o	·897	82·400	6·536	17·900	2·483	AP 23½



Z　形　鋼

一呎ノ重量(听)＝斷面積×3·4
一米ノ量重(瓩)＝一呎ノ重量(听)×1·488
瓩＝听×·4536

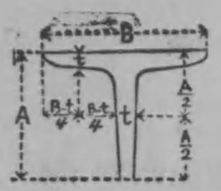
番號	寸法(吋) A×B×C	t_1	t_2	斷面積(平方吋)	長一呎ノ重量 听	瓩
BSZ 1	3×2½×3	·360	·400	2·884	9·81	4·450
BSZ 2	4×2½×3	·325	·425	3·392	11·53	5·230
BSZ 3	5×3×3	·350	·450	4·169	14·17	6·428
BSZ 4	6×3½×3½	·375	·475	5·258	17·88	8·110
BSZ 5	7×3½×3½	·400	·500	5·948	20·22	9·112
BSZ 6	8×3½×3½	·425	·525	6·670	22·68	10·286
BSZ 7	9×3½×3½	·450	·500	7·419	25·33	11·490
BSZ 8	10×3½×3½	·475	·575	8·283	28·16	12·770



Z　形　鋼

I＝物量力率(吋⁴)
R＝抵抗力率(吋³)
I×41·6＝物量力率(糎⁴)
R×16·4＝抵抗力率(糎³)

重心距離(吋)		物量力率(吋⁴)				抵抗力率(吋³)		番號
Cx	Cy	Ix	Iy	I_u^{Max}	I_v^{Min}	Rx	Ry	
·090	·178	4·009	4·591	7·749	·851	2·521	1·718	BSZ 1
·112	·160	8·368	4·831	11·886	1·313	3·962	1·805	BSZ 2
o	o	16·145	6·578	20·694	2·029	6·458	2·328	BSZ 3
o	o	29·660	11·134	37·251	3·543	9·887	3·361	BSZ 4
o	o	44·609	11·618	52·035	4·192	12·745	3·521	BSZ 5
o	o	63·729	12·024	70·991	4·762	15·932	3·657	BSZ 6
o	o	87·889	12·418	95·011	5·296	19·531	3·792	BSZ 7
o	o	117·865	12·876	124·912	5·829	23·573	3·947	BSZ 8

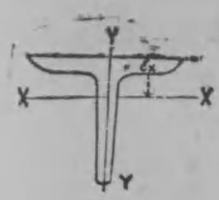


丁　形　鋼　1.

一呎ノ重量(听)＝斷面積×3·4

一米ノ重量(瓩)＝一呎ノ重量×1·488

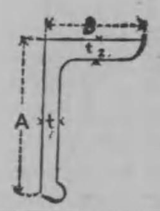
番號	寸法(吋) B×A	t	斷面積(平方吋)	一呎ノ重量 听	瓩
BST 1	1×1	·125	·240	·82	·372
		·187	·344	1·17	·531
BST 3	$1\frac{1}{2}\times1\frac{1}{2}$	·187	·531	1·81	·821
		·250	·691	2·35	1·066
BST 6	2×2	·250	·947	3·22	1·460
		·312	1·159	3·94	1·787
		·375	1·366	4·64	2·105
BST 8	$2\frac{1}{2}\times2\frac{1}{2}$	·250	1·197	4·07	1·846
		·312	1·471	5·00	2·268
		·375	1·741	5·92	2·685
BST 9	3×2	·312	1·472	5·01	2·273
		·375	1·743	5·93	2·690
BST 11	3×3	·312	1·788	6·08	2·758
		·375	2·121	7·21	3·270
		·437	2·441	8·30	3·765
BST 14	4×3	·375	2·498	8·49	3·851
		·500	3·260	11·08	5·026
BST 15	4×4	·375	2·872	9·77	4·431
		·500	3·758	12·78	5·799
BST 16	4×5	·375	3·253	11·06	5·017
		·500	4·264	14·50	6·578
BST 17	5×3	·375	2·875	9·78	4·436
		·500	3·762	12·79	5·802
BST 18	$5\times3\frac{1}{2}$	·500	4·018	13·66	6·196
BST 19	5×4	·500	4·268	14·51	6·582
BST 20	6×3	·375	3·260	11·08	5·026
		·500	4·272	14·53	6·591
BST 21	6×4	·500	4·771	16·22	7·358



丁　形　鋼　2.

I＝物量力率(吋⁴)
R＝抵抗力率(吋³)
I×4·16＝物量力率(糎⁴)
R×16·4＝抵抗力率(糎³)　(續)

重心距離(吋) Cx	Cy	物量力率(吋⁴) Ix	Iy	抵抗力率(吋³) Rx	Ry	番號
·289	0	·021	·009	·030	·018	BST 1
·435	0	·106	·048	·138	·088	BST 3
·579	0	·337	·157	·237	·157	BST 6
·697	0	·677	·302	·375	·242	BST 8
·509	0	·457	·665	·307	·444	BST 9
·842	0	1·456	·659	·657	·446	BST 11
·767	0	1·860	1·914	·833	·959	BST 14
1·106	0	4·189	1·901	1·447	·950	BST 15
1·469	0	7·771	1·887	2·101	·943	BST 16
·691	0	1·976	3·716	·854	1·486	BST 17
·892	0	3·936	5·043	1·509	2·017	BST 18
1·052	0	5·772	5·017	1·958	2·007	BST 19
·633	0	2·062	6·389	·871	2·130	BST 20
·968	0	6·070	8·621	2·002	2·874	BST 21



球　山　形　鋼　1.

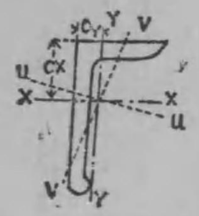
一呎ノ重量(听)＝斷面積×3·4

一米ノ重量(瓩)＝一呎ノ重量(听)×1·488

番號	寸法(吋) A×B	$t_1=t_2$	斷面積(平方吋)	長一呎ノ重量 听	瓩
BSBA 1	$4\times2\frac{1}{2}$	·300	2·170	7·38	3·347
BSBA 2	$5\times2\frac{1}{2}$	·325	2·743	9·33	4·232
BSBA 3	$5\frac{1}{2}\times3$	·350	3·332	11·33	5·140
BSBA 4	6×3	·375	3·763	12·79	5·802
BSBA 5	$6\frac{1}{2}\times3$	·375	4·002	13·61	6·174
BSBA 6	$6\frac{1}{2}\times3\frac{1}{2}$	·400	4·420	15·03	6·818
BSBA 7	7×3	·400	4·198	15·9	6·936
BSBA 8	$7\times3\frac{1}{2}$	·425	4·940	16·80	7·621

球山形鋼 1. (續)

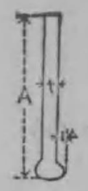
番號	寸法(吋) A×B	寸法(吋) $t_1=t_2$	斷面積(平方吋)	長一呎ノ重量 听	長一呎ノ重量 瓩
BSBA 9	$7\frac{1}{2}\times3$	·425	5·023	17·08	7·748
BSBA 10	$7\frac{1}{2}\times3\frac{1}{2}$	·425	5·236	17·80	8·065
BSBA 11	8×3	·425	5·301	18·02	8·175
BSBA 12	$8\times3\frac{1}{2}$	·450	5·779	19·65	8·914
BSBA 13	$8\frac{1}{2}\times3$	·450	5·837	19·85	9·004
BSBA 14	$8\frac{1}{2}\times3\frac{1}{2}$	·475	6·339	21·55	9·774
BSBA 15	9×3	·475	6·439	21·89	9·930
BSBA 16	$9\times3\frac{1}{2}$	·475	6·677	22·70	10·295



球山形鋼 2.

CxCy=重心距離
I=物量力率(吋⁴)
R=抵抗力率(吋³)
I×41·6=物量力率(糎⁴)
R×16·4=抵抗力率(糎³) (續)

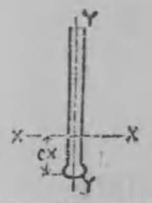
番號	重心距離 Cx	重心距離 Cy	物量力率(吋⁴) Ix	Iy	Max. Iu	Min. Iv	抵抗力率(吋³) Rx	Ry
BSBA 1	1·661	·577	4·461	·915	4·724	·652	1·907	·476
BSBA 2	2·103	·538	8·802	1·021	9·024	·799	3·136	·520
BSBA 3	2·346	·649	13·032	1·909	13·520	1·421	4·132	·812
BSBA 4	2·597	·638	17·350	2·057	17·826	1·581	5·098	·871
BSBA 5	2·865	·619	21·677	2·098	22·117	1·658	5·963	·881
BSBA 6	2·723	·747	23·943	3·494	24·857	2·580	6·339	1·269
BSBA 7	3·141	·614	28·063	2·250	28·484	1·829	7·272	·943
BSBA 8	2·993	·737	30·914	3·730	31·809	2·835	7·725	1·350
BSBA 9	3·419	·612	35·725	2·405	36·123	2·007	8·754	1·007
BSBA 10	3·290	·717	37·844	3·772	38·648	2·918	8·984	1·358
BSBA 11	3·698	·600	42·863	2·449	43·231	2·081	9·964	1·020
BSBA 12	3·543	·712	47·072	4·031	47·887	3·216	10·561	1·446
BSBA 13	3·956	·598	52·685	2·603	53·038	2·250	11·594	1·084
BSBA 14	3·798	·706	57·725	4·265	58·521	3·469	12·277	1·526
BSBA 15	4·238	·603	64·712	2·792	65·042	2·462	13·589	1·165
BSBA 16	4·095	·695	68·383	4·336	69·116	3·603	13·941	1·546



球鋼板 1.

一呎ノ重量(听)=斷面積×3·4
一米突ノ重量(瓩)=一呎ノ重量(听)×1·483

番號	寸法(吋) A	t	d	斷面積(平方吋)	長一呎ノ重量 瓩	听
BSBP 1	6	·300	·400	2·230	7·58	3·438
BSBP 2	7	·350	·450	3·011	10·24	4·645
BSBP 3	8	·400	·500	3·887	13·22	5·996
BSBP 4	9	·450	·575	4·958	16·68	7·566
BSBP 5	10	·500	·625	6·059	20·60	9·344
BSBP 6	11	·550	·675	7·315	24·87	11·280
BSBP 7	12	·600	·725	8·652	29·42	13·340



球鋼枚 2.

I=物量力率(吋⁴)
R=抵抗力率(吋³)
I=41·6=物量力率(糎⁴)
R×16·4=抵抗力率(糎³) (續)

番號	重心距離(吋) Cx	重心距離(吋) Cy	物量力率(吋⁴) Ix	Iy	抵抗力率(吋³) Rx	Ry
BSBP 1	2·487	0	7·899	·060	2·248	·109
BSBP 2	2·920	0	14·400	·104	3·539	·167
BSBP 3	3·370	0	24·314	·165	5·251	·235
BSBP 4	3·767	0	39·295	·277	7·509	·346
BSBP 5	4·219	0	59·193	·399	10·239	·456
BSBP 6	4·650	0	86·411	·571	13·608	·601
BSBP 7	5·100	0	121·398	·775	17·594	·756

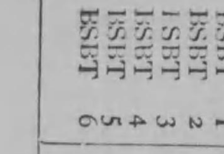
球丁形鋼 1.

一呎ノ重量(听)＝斷面積×3·4

一米ノ重量(瓩)＝一呎ノ重量(听)×1·488

番號		寸 A×B	法(吋) t₁	t₂	d	斷面積(平方吋)	長一呎ノ重量 听	瓩
BSBT	1	7×5	·425	·425	·450	5·592	19·01	8·623
BSBT	2	8×5½	·450	·450	·500	6·701	22·78	10·330
BSBT	3	9×5½	·475	·500	·575	7·870	26 76	12·140
BSBT	4	10×6	·500	·500	·625	9·295	31·60	14·340
BSBT	5	11×6½	·550	·600	·675	11.136	37·86	17·170
BSBT	6	12×6½	·575	·650	·725	12·498	42·49	19·280

球丁形鋼 2.

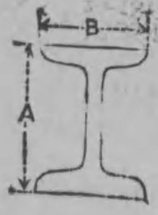


Cx, Cy＝重心距離(吋)
I＝物量力率(吋⁴)
R＝抵抗力率(吋³)
I×41·6＝物量力率(糎⁴)
R×16·4＝抵抗力率(糎³)

(續)

番號		重心距離(吋) Cx	Cy	物量力率(吋⁴) Ix	Iy	抵抗力率(吋³) Rx	Ry
ISBT	1	2·611	0	35·087	4·021	7·994	1·608
ISBT	2	3·018	0	55·377	5·628	11·115	2·046
ISBT	3	3·524	0	83·730	6·410	15·290	2·331
ISBT	4	3·881	0	122·278	9·124	19·984	3·041
ISBT	5	4·290	0	177·041	12·690	26·324	3·905
ISBT	6	4·759	0	236·808	13·965	32·704	4·297

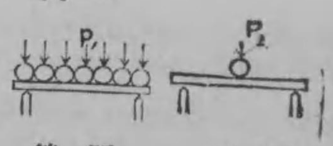
工形鋼ノ強度表



此ヘ表ハ兩端ヲ支ヘ全長ニ等布荷物ヲ載セタルトキノ計算ナリ(第一圖ノ場合)
兩端ヲ支ヘ中央ニ荷物ヲ載スル場合ハ本表ノ二分ノ一ナリトス(第二圖ノ場合)

R＝抵抗力率
W＝長サ一呎ノ目方(听)
P＝荷重(听)
l＝徑間(吋)
F＝最大應力
(一平方吋15,000听トス)
L＝徑間(呎)

(1) A.



第一圖　第二圖

$P_1=\frac{SF}{l}P-WL$　$P_2=\frac{1}{2}P_1$

番號	寸法 (A×B)	面積 平方吋	每一呎重量(听)	抵抗力率(吋³)	各徑間(呎)ニ應ズル安全荷重(听) 2′	3′	4′	5′	6′	7′	8′	9′	10′	12′	14′
BSB 2	3×3	2·50	8·50	2·526	12,583	8,144	6,266	4,957	4,116	3,552	3,089	2,723	2,435	1,980	1,801
BSB 3	4×1¾	1·47	5·00	1·837	9,140	6,084	4,555	3,635	3,020	2,581	2,247	1,988	1,780	1,458	1,248
BSB 4	4×3	2·79	9·50	3·763	18,781	12,503	9,373	7,472	6,210	5,307	4,624	4,091	3,665	3,006	2,555
BSB 5	4¾×1¾	1·91	6·50	2·849	14,187	9,446	7,074	5,647	4,695	4,015	3,498	3,096	2,775	2,259	1,939
BSB 6	5×3	3·23	11·01	5·448	27,178	18,098	13,556	10,825	8,999	7,702	6,712	5,944	5,330	4,383	3,735
BSB 7	5×4½	5·29	17·99	9·080	45,464	30,276	22,676	18,110	15,061	12,887	11,231	9,238	8,820	7,337	6.254

(1) B. (續)

番號	寸法 (A×B)	面積 平方吋	每呎重量 (听)	抵抗率 (吋³)	各徑間(呎)ニ應ズル安全荷量(听)										
					2′	3′	4′	5′	6′	7′	8′	9′	10′	12′	14′
BSB 8	6×3	3·52	11·99	6·743	33,676	22,428	16,390	12,900	11,180	9,568	8,029	7,133	6,380	5,448	4,658
BSB 9	6×4½	5·88	20·00	11·553	57,460	38,269	28,670	22,000	19,050	16,305	14,215	12,596	11,300	9,308	8,042
BSB 10	6×5	7·35	25·00	14·547	72,450	48,253	36,150	27,750	24,021	18,980	16,120	15,884	1,4250	11,735	10,017
BSB 11	7×4	4·70	16·00	11·206	55,968	37,281	27,936	22,320	18,574	15,904	13,872	12,299	1,1040	9,104	7,784
BSB 12	8×4	5·29	18·01	13·929	—	46,274	34,688	27,710	23,063	19,751	17,231	15,180	13,720	11,321	9,686
BSB 13	8×5	8·24	28·02	22·339	—	—	55,638	44,460	37,006	31,693	27,651	24,523	22,020	18,173	15,552
BSB 14	8×6	10·29	35·00	27·649	—	—	68,860	55,025	45,799	39,223	34,220	30,348	27,250	22,488	19,244
BSB 15	9×4	6·17	21·00	18·026	—	—	—	35,895	29,880	25,593	22,332	19,809	17,790	14,808	12,576
BSB 16	9×7	17·064	58·02	51·053	—	—	—	—	84,669	72,521	63,286	56,139	50,420	41,574	37,693
BSB 17	10×5	8·82	29·99	29·137	—	—	—	—	—	41,403	36,135	31,960	28,800	23,793	20,386
BSB 18	10×6	12·35	42·02	42·323	—	—	—	—	—	—	52,164	46,284	41,580	34,356	29,442
BSB 19	10×8	20·58	69·98	69·008	—	—	—	—	—	—	—	76,029	68,300	56,430	48,355
BSB 20	12×5	9·40	31·99	36·686	—	—	—	—	—	—	—	—	36,380	30,066	25,772
BSB 21	12×6	12·946	44·02	52·573	—	—	—	—	—	—	—	—	—	43,047	36,921

(1) C. (續)

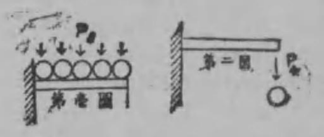
番號	各徑間(呎)ニ應ズル安全荷重(听)														
	16′	18′	20′	22′	24′	26′	28′	30′	32′	34′	36′	38′	40′	42′	44′
BSB 2	1,327	1,221	1,080	950	828	741	654	580	507	446	386	330	285	238	193
BSB 3	1,045	900	800	709	630	563	502	449	417	359	318	283	250	218	188
BSB 4	2,208	1,887	1,690	1,501	1,339	1,200	1,076	967	869	782	699	627	560	495	435
BSB 5	1,671	1,450	1,295	1,153	1,032	926	835	754	681	616	555	502	452	405	360
BSB 6	3,224	2,772	2,505	2,237	2,008	1,812	1,667	1,484	1,348	1,228	1,113	1,015	922	835	753
BSB 7	5,404	4,681	4,180	3,735	3,354	3,027	2,716	2,483	2,256	2,057	1,867	1,754	1,550	1,375	1,269
BSB 8	4,026	3,495	3,135	2,804	2,522	2,282	2,070	1,891	1,718	1,573	1,432	1,316	1,205	1,100	1,001
BSB 9	6,867	5,965	5,350	4,792	4,336	3,926	3,563	3,246	2,963	2,715	2,439	2,277	2,087	1,908	1,741
BSB 10	8,662	7,495	6,750	6,047	5,446	4,951	4,494	4,295	3,739	3,427	3,130	2,826	2,637	2,412	2,202
BSB 11	6,744	5,872	5,080	4,777	4,296	3,896	3,550	3,249	2,982	2,748	2,526	2,337	2,160	1,993	1,838
BSB 12	8,399	7,321	6,590	5,918	5,364	4,883	4,458	4,083	3,760	3,474	3,182	2,971	2,755	2,552	2,363
BSB 13	13,489	11,761	10,590	9,530	8,627	7,857	7,177	6,585	6,074	5,597	5,240	4,811	4,465	4,140	3,839
BSB 14	16,690	14,480	13,100	11,788	10,669	9,716	8,873	8,140	7,491	6,921	6,399	5,701	5,512	5,110	4,736
BSB 15	10,914	9,522	8,580	7,728	7,002	6,389	5,838	5,364	4,944	4,578	4,230	3,936	3,660	3,402	3,162
BSB 16	30,947	27,006	24,340	21,929	19,875	18,127	16,583	15,243	14,056	13,022	12,039	11,209	10,430	9,702	9,025
BSB 17	17,707	15,465	13,950	12,580	11,414	10,483	9,548	8,790	8,119	7,535	6,980	6,513	6,050	5,642	5,263
BSB 18	25,578	22,344	20,160	18,186	16,506	14,250	13,818	12,720	11,340	10,920	10,122	9,450	8,820	8,303	7,754
BSB 19	42,005	36,690	33,100	29,855	27,293	24,745	22,673	20,877	19,288	17,906	16,593	15,487	14,450	13,782	12,583
BSB 20	22,408	19,604	17,700	15,995	14,531	13,293	12,194	11,260	10,426	9,702	9,148	8,824	7,890	7,386	6,912
BSB 21	32,108	28,083	25,377	22,919	20,838	19,068	17,518	16,179	14,962	13,949	12,916	12,138	11,360	10,652	9,974

工形鋼ノ強度表　(2) A.

本表ハ梁ノ一端ヲ固定シ他端支持セラレザルトキ等布荷重ノ場合(第一圖ノ場合)

第二圖ノ場合ニハ本表ノ$\frac{1}{2}$倍トス

R＝抵抗力率(吋³)
W＝長サ一呎ノ重量
l＝徑間(吋)
F＝最大應力(15,000听トシテ計算ス)
P＝荷重(听)
L＝徑間(呎)



$$P_3=\frac{2F}{l}R-WL,\quad P_4=\frac{1}{2}P_3.$$

番號	寸法 (A×B)	面積平方吋	毎一呎ノ重量(听)	抵抗力率(吋³)	徑間(呎)ニ應ズル安全荷重(听) 3′	4′	5′	6′	7′	8′	9′	10′	12′
BSB 2	3×3	2·50	8·50	2·526	2,057	1,527	1,208	1,000	840	720	626	546	423
BSB 3	4×1¾	1·47	5·00	1·837	1,515	1,128	893	734	617	533	465	409	322
BSB 4	4×3	2·79	9·50	3·763	3,106	2,314	1,833	1,508	1,273	1,098	960	846	669
BSB 5	4¾×1¾	1·91	6·50	2·849	2,353	1,755	1,391	1,146	969	837	744	647	514
BSB 6	5×3	3·23	11·01	5·448	4,505	3,361	2,669	2,200	1,863	1,612	1,415	1,252	1,001
BSB 7	5×4½	5·29	17·99	9·080	7,510	5,602	4,450	3,669	3,107	2,689	2,362	2,090	1,673

(2) B. (續)

番號	寸法 (A×B)	面積平方吋	毎一呎ノ重量(听)	抵抗力率(吋³)	徑間(呎)ニ應ズル安全荷重(听) 3′	4′	5′	6′	7′	8′	9′	10′	12′
BSB 8	6×3	3·52	11·99	6·743	5,580	4,166	3,311	2,733	2,317	2,008	1,766	1,566	1,258
BSB 9	6×4½	5·88	20·00	11·553	9,584	7,142	5,677	4,687	3,973	3,445	3,032	2,688	2,163
BSB 10	6×5	7·35	25·00	14·547	12,045	8,990	7,149	5,902	5,003	4,338	3,819	3,387	2,726
BSB 11	7×4	4·70	16·00	11·206	9,287	6,940	5,523	4,568	3,879	3,369	2,971	2,642	2,239
BSB 12	8×4	5·29	18·00	13·929	11,552	8,634	6,572	5,687	4,833	4,202	3,710	3,302	2,689
BSB 13	8×5	8·24	28·02	22·339	18,526	13.848	11,030	9,124	7,754	6,646	5,958	5,304	4,310
BSB 14	8×6	10·29	35·00	27·649	22,925	17,140	13,645	11,290	9,599	8,348	7,369	6,561	5,331
BSB 15	9×4	6·17	21·00	18·026	14,967	11,184	8,909	7,374	6,270	5,456	4,822	4,296	3,498
BSB 16	9×7	17·06	58·02	51·053	42,346	31,673	25,235	20,887	17,769	15,564	13,668	12,180	9,924
BSB 17	10×5	8·82	29·99	29·137	24,180	18,090	14,420	11,940	10,160	8,851	7,830	6,984	5,700
BSB 18	10×6	12·35	42·02	42·323	35,124	26,282	20,940	17,358	14,766	13,864	11,382	10,160	8,300
BSB 19	10×8	20·58	69·98	69·008	57,225	42,840	34,150	28,280	24,070	20,968	18,550	16,550	13,510
BSB 20	12×5	9·40	31·99	36·686	30,464	22,800	18,182	15,068	12,836	11,189	9,910	8,850	7,346
BSB 21	12×6	12·94	44·02	52·573	43,658	32,680	26,065	21,605	18.406	16,049	14,218	12,702	10,406

工形鋼ノ強度表 (2) C. (續)

番號	徑間(呎)ニ應ズル安全荷重(听) 14′	16′	18′	20′	22′	24′	26′	28′	30′	32′	34′	36′	38′	40′	42′	44′	46′
BSB 2	330	258	198	145	98	58	21	14	—	—	—	—	—	—	—	—	—
BSB 3	257	206	165	129	97	71	46	23	12	7	—	—	—	—	—	—	—
BSB 4	537	435	352	280	216	153	114	68	27	11	—	—	—	—	—	—	—
BSB 5	416	340	279	226	179	140	104	71	41	14	13	—	—	—	—	—	—
BSB 6	816	674	559	461	373	302	237	177	122	73	23	21	—	—	—	—	—
BSB 7	1,356	1,128	1,032	775	630	512	403	304	213	132	50	22	—	—	—	—	—
BSB 8	1,032	960	721	590	500	413	335	264	199	141	84	33	8	—	—	—	—
BSB 9	1,777	1,482	1,246	1,044	865	721	589	488	359	261	163	77	19	—	—	—	—
BSB 10	2,239	1,869	1,572	1,318	1,093	913	746	594	457	334	212	104	25	—	—	—	—
BSB 11	1,771	1,492	1,270	1,081	914	781	659	549	450	362	274	197	120	54	11	—	—
BSB 12	2,228	1,885	1,612	1,381	1,178	1,016	869	734	616	510	405	313	221	143	65	12	—
BSB 13	3,584	3,037	2,601	2,232	1,908	1,651	1,416	1,204	1,014	846	678	533	388	265	142	19	82
BSB 14	4,431	3,853	3,213	2,756	2,354	2,035	1,744	1,481	1,285	1,036	928	647	467	314	161	128	112
BSB 15	2,915	2,476	2,128	1,833	1,575	1,370	1,184	1,016	866	734	602	488	373	277	181	85	7
BSB 16	8,275	7,347	3,052	5,222	4,493	3,918	3,393	2,919	2,497	2,126	1,754	1,434	1,114	845	546	307	88
BSB 17	4,766	4,065	5,510	3,042	2,632	2,310	2,017	1,754	1,518	1,315	1,107	930	754	606	459	311	193
BSB 18	6,946	5,930	5,127	4,450	3,859	3,393	2,971	2,590	2,253	1,957	1,661	1,408	1,155	944	733	522	353
BSB 19	11,352	9,640	8,332	7,225	6,257	5,496	4,803	4,181	3,626	3,088	2,656	2,240	1,825	1,478	1,131	784	506
BSB 20	6,082	5,210	4,522	3,945	3,441	3,047	2,689	2,368	2,184	1,837	1,589	1,379	1,168	1,094	820	646	508
BSB 21	8,741	7,496	3,516	5,691	4,972	4,411	3,902	3,440	3,043	2,873	2,341	2,043	1,745	1,499	1,253	1,007	814

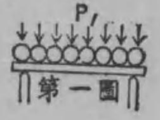
工形鋼ノ強度表 (3) A.

(撓度ヲ六百分一トシテ算出セルルモノ)

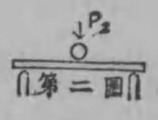
本表ハ兩端ヲ支ヘ等布荷重ノ場合(第一圖)

第二圖ノ場合ニハ本表ノ$\frac{5}{8}$倍トス

P=荷重(彎曲セントスル)(听)
I=物量力率(吋⁴)
E=彈性係數 28,800,000
W=重量(听/呎)
l=徑間(吋)
d=撓度=$\frac{1}{600}$ $P_1=\frac{25600\,I}{2L}-WL$, $P^2=\frac{5}{8}P_1$, $d=\frac{5Pl^3}{384\,EI}$
L=徑間(呎)



第一圖



第二圖

番號	寸法 (A×B)	面積平方吋	每一呎ノ重量(听)	物量力率(吋⁴)	徑間(呎)ニ應ズル安全荷重(听) 3′	4′	5′	6′	7′	8′	9′	10′
BSB 2	3×3	2·50	8·50	3·789	10,752	6,028	3,837	2,643	1,920	1,447	1,120	885
BSB 3	4×1¾	1·47	5·00	3·671	10,427	5,854	3,734	2,580	1,883	1,428	1,115	889
BSB 4	4×3	2·79	9·50	7·526	21,383	12,002	7,660	5,294	3,867	2,933	2,292	1,832
BSB 5	3¾×⅜	1·91	6·50	6·767	19,225	10,794	6,896	4,772	3,490	2,654	2,077	1,667
BSB 6	5×3	3·23	11·01	13·620	38,711	21,776	15,332	9,620	7,039	5,360	4,206	2,377
BSB 7	5×4½	5·29	17·99	22·699	64,501	36,238	23,150	16,030	11,729	8,934	7,012	5,630

(3) B (續)

番號	寸法 (A×B)	面積平方吋	毎一ノ呎重量(听)	物力率(吋⁴)	徑間(呎)ニ應ズル安全荷重(听) 3′		5′	6′	7′	8′	9′	10′
BSB 8	6×3	3·52	11·99	20·228	57,497	32,312	20,650	14,308	10,484	7,995	6,265	5,058
BSB 9	6×4½	5·88	20·00	34·660	98,528	55,370	35,390	24,525	17,965	13,700	10,770	8,673
BSB 10	6×5	7·35	25·00	43·641	104,925	69,720	44,555	30,875	22,620	17,250	13,565	10,920
BSB 11	7×4	4·70	16·01	39·222	111,532	62,776	40,080	27,794	20,378	15,560	12,253	9,882
BSB 12	8×4	5·29	18·01	55·716	158,446	89,088	56,970	29,522	28,984	22,144	17,448	14,085
BSB 13	8×5	8·24	28·02	89·357	254,116	142,832	91,370	63,352	46,494	35,516	27,988	22,598
BSB 14	8×6	10·29	35 00	110·597	314,545	176,840	113,095	78,450	57,555	43,970	34,645	27,970
BSB 15	9×4	6·17	21·00	81·115	230,579	129,666	82,935	57,537	42,223	32,280	25,441	20,550
BSB 16	9×7	17·06	58·02	229·740	653,326	367,368	235,180	154,652	110,594	91,426	72,098	53,010
BSB 17	10×5	8·82	29·99	145·684	414,360	232,980	194,030	103,422	75,905	58,040	45,780	37,000
BSB 18	10×6	12·35	42·02	211·614	602,874	338,432	216,490	150,248	110,286	84,314	66,522	53,760
BSB 19	10×8	20·58	69·98	345·039	981,190	551,720	353,070	244,880	177,710	137,440	108,470	87,620
BSB 20	12×5	9·40	31·99	220·115	626,004	352,022	22,5230	156,308	114,776	87,784	69,282	56,030
BSB 21	12×6	12·94	44·02	315·439	897,068	504,424	32,2732	223,816	164,772	25,798	99,254	80,310

(3) C. (續)

番號	徑間(呎)ニ應ズル安全荷重(听) 12′	14′	16′	18′	20′	22′	24′	26′	28′	30′	32′	34′	36′	38′	40′	42′
BSB 2	571	375	242	146	72	13	—	—	—	—	—	—	—	—	—	—
BSB 3	592	409	281	200	134	84	43	9	—	—	—	—	—	—	—	—
BSB 4	1,224	849	600	423	291	189	106	38	—	—	—	—	—	—	—	—
BSB 5	1,124	792	572	417	303	214	144	87	38	—	—	—	—	—	—	—
BSB 6	2,289	1,625	1,186	878	651	480	341	259	136	57	—	—	—	—	—	—
BSB 7	3,819	2,712	1,981	1,469	1,092	804	576	391	237	105	—	—	—	—	—	—
BSB 8	3,452	2,474	1,831	1,382	1,054	805	609	453	324	215	121	39	—	—	—	—
BSB 9	5,922	4,247	3,146	2,378	1,818	1,393	1,060	792	571	386	226	87	—	—	—	—
BSB 10	7,457	5,350	3,963	2,998	2,296	1,758	1,339	1,002	725	481	291	116	—	—	—	—
BSB 11	6,781	4,899	3,666	2,811	2,190	1,722	1,359	1,069	833	635	468	324	198	—	—	—
BSB 12	9,690	7,022	2,584	4,082	3,207	2,551	2,045	1,642	1,315	1,034	817	622	461	304	171	54
BSB 13	15,549	11,278	8,488	6,557	4,959	4,110	3,302	2,656	2,134	1,702	1,338	1,028	757	520	309	123
BSB 14	19,240	13,960	10,500	8,108	6,380	5,082	4,075	3,279	2,632	2,096	1,644	1,259	925	630	370	139
BSB 15	14,163	10,296	7,774	6,029	4,770	3,827	3,100	2,525	2,060	1,565	1,355	1,081	845	640	457	299
BSB 16	40,145	29,188	22,047	17,106	13,540	10,874	8,819	7,192	5,877	4,795	3,888	3,115	2,448	1,869	1,355	905
BSB 17	25,540	18,610	14.090	10,970	8,725	7,048	5,756	4,738	3,917	3,245	2,685	2,206	1,798	1,443	1,131	859
BSB 18	37,116	26,912	20,488	15,964	12,705	10,271	8,398	6.925	5,734	4,760	3,947	3,258	2,668	2,156	1,706	1,308
BSB 19	60,490	44,080	33,380	26,000	20,680	16,710	13,651	11,242	9,301	7,834	6,385	5,260	4,294	3,456	2,720	2,078
BSB 20	38,746	28,302	21,498	16,814	13,447	10,937	9,015	7,456	6,292	5,301	4,479	3,786	3,195	2,686	2,243	1,858
BSB 21	55,542	40,561	30,836	24,125	19,305	15,713	12,962	10,798	9,068	7,652	6,478	5,438	4,646	3,989	3,286	2,739

工形鋼强度表 (1) A

(撓度ヲ六百分ノ一トシテ算出セルモノ)

本表ハ梁ノ一端ヲ固定シ他端支持セラレザルトキ等布荷重ノ場合(第一圖)

第二圖ノ場合ハ本表ノ $\frac{5}{8}$ 倍トス

番號	寸法 (A×B)	面積 (平方吋)	毎呎一ノ重量 (听)	物力率 (吋⁴)	徑間 (呎) 3′	4′	5′	6′	7′
BSB 2	3×3	2·50	8·50	3·789	1,097	597	362	230	147
BSB 3	4×1¾	1·47	5·00	3·671	1,072	592	366	242	165
BSB 4	4×3	2·79	9·50	7·526	2,202	1,216	756	501	344
BSB 5	4¾×1¾	1·91	6·50	6·767	1,985	1,101	680	563	323
BSB 6	5×3	3·23	11·01	13·620	4,001	2,225	1,397	943	664
BSB 7	5×4½	5·29	17·99	22·699	6,668	3,710	2,330	1,573	1,109
BSB 8	6×3	3·52	11·99	20·228	5,953	3,321	2,096	1,425	1,016
BSB 9	6×4½	5·88	20·00	34·660	10,205	5,695	3,596	2,447	1,746
BSB10	6×5	7·35	25·00	43·641	12,850	7,173	4,429	3,082	2,200
BSB11	7×4	4·70	16·01	39·222	11,567	6,572	4,103	2,809	2,022
BSB12	8×4	5·29	18·00	55·716	16,451	9,213	5,852	4,019	2,906
BSB13	8×5	8·24	28·02	81·357	26,381	14,773	9,378	6,448	4,665
BSB14	8×6	10·29	35·00	110·597	32,650	18,290	11,620	7,982	5,773
BSB15	9×4	6·17	21·00	81·115	23,957	13,426	8,543	5,879	4,265
BSB16	9×7	17·06	58·02	229·740	67,876	38,048	24,209	16,654	12,093
BSB17	10×5	8·82	29·99	145·684	43,055	24,147	15,380	10,618	7,714
BSB18	10×6	12·35	42·02	211·614	62,564	35,087	22,352	15,517	11,216
BSB19	10×8	20·58	69·98	345·039	101,990	57,209	36,440	25,130	18,280
BSB20	12×5	9·40	56·99	220·115	65,104	36,547	23,310	16,108	11,771
BSB21	12×6	12·94	44·02	315·439	93,298	52,484	33,460	23,694	16,852

工形鋼强度表 (4) B. (續)

P=荷重(听)

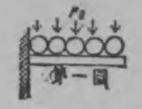
d=撓度=$\frac{l}{6}$

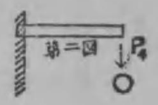
I=物量力率(吋⁴)

E=彈性系數 28,800,000

W=重量(呎/听)

l=徑間(吋)



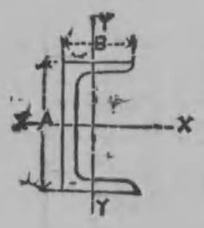


$P_3=\frac{2666\,I}{\left(\frac{l}{12}\right)^2}-\frac{Wl}{12}$, $P_4=\frac{3}{8}P_3$,

$d=\frac{pl^3}{8EI}$.

番號	二應ズル荷重 (听) 8′	9′	10′	12′	14′	16′	18′	20′	22′	24′	26′
BSB 2	90	49	16	—	—	—	—	—	—	—	—
,, 3	113	76	48	8	—	—	—	—	—	—	—
,, 4	228	163	106	25	—	—	—	—	—	—	—
,, 5	130	165	115	47	1	—	—	—	—	—	—
,, 6	479	349	253	120	31	—	—	—	—	—	—
,, 7	801	585	425	204	47	—	—	—	—	—	—
,, 8	746	557	419	230	107	19	—	—	—	—	—
,, 9	1,284	961	724	402	191	41	—	—	—	—	—
,, 10	1,618	1,212	914	508	244	55	—	—	—	—	—
,, 11	1,506	1,147	886	534	310	153	35	—	—	—	—
,, 12	2,177	1,672	1,306	816	506	292	135	10	—	—	—
,, 13	3,497	2,688	1,102	1,318	823	482	231	35	—	—	—
,, 14	4,328	3,325	2,519	1,628	1,014	592	280	37	—	—	—
,, 15	3,210	2,480	1,952	1,249	809	508	289	120	—	—	—
,, 16	9,106	7,040	5,545	3,557	2,313	1,464	846	371	—	—	—
,, 17	5,827	4,524	3,583	2,336	1,561	1,037	658	371	142	—	—
,, 18	7,480	6,586	5,221	3,413	2,290	2,531	985	570	241	—	—
,, 19	13,969	10,725	8,499	5,548	3,713	2,473	1,579	900	360	—	—
,, 20	8,913	6,962	5,548	3,691	2,546	1,780	1,335	827	508	251	36
,, 21	12,878	11,219	7,969	5,311	3,674	2,581	2,112	1,222	869	404	96

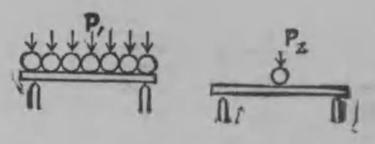
溝形鋼ノ強度表



此表ハ兩端ヲ支ヘ全長ニ等布荷重ヲ載セタルトキノ計算ナリ(第一圖)

第二圖ノ塲合ニハ本表ノ½倍トス

R＝抵抗力率(吋³)
W＝長サ一呎ノ目方(听)
P＝荷重(听)
l＝徑間(吋)
F＝最大應力(一平方吋15000听トス)



$$P_1=\frac{8F}{l}R-WL \qquad P_2=\frac{1}{2}P_1$$

番號	寸法 (A×B)	面積 平方吋	一ノ量 毎呎重(听)	力率 抵抗(吋³)	各徑間(呎)ニ應スル安全荷重(听)									
					2′	3′	4′	5′	6′	7′	8′	9′	10′	12′
BSC 1	3×1½	1·549	5·27	1·329	6,635	4,415	3,302	2,632	2,183	2,863	1,619	1,429	1,276	1,040
BSC 2	3½×2	1·968	6·75	2·115	10,561	7,030	7,029	4,196	3,485	2,978	2,590	2,289	2,047	1,674
BSC 3	4×2	2·341	7·96	2·855	14,259	9,492	7,106	5,670	4,702	14,027	3,505	3,100	2,775	2,310
BSC 4	5×2½	3·230	10·98	4·854	24,248	16,145	12,090	9,653	8,026	6,865	5,980	5,292	4,744	3,897
BSC 5	6×2½	3·542	12·04	6·254	31,196	20,809	15,587	12,448	10,353	8,860	7,722	6,841	6,134	5,047
BSC 6	6×3	4·261	14·49	8·003	39,989	26,631	19,948	15,933	13,271	11,343	9,888	8,762	7,858	6,469
BSC 7	6×3	4·791	16·29	8·678	43,357	28,871	21,630	17,275	14,368	12,296	10,718	9.495	8.515	7,007

溝形鋼ノ強度表(續)

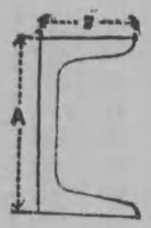
番號	寸法 (A×B)	面積 平方吋	一ノ量 毎呎重(听)	力率 抵抗(吋³)	各徑間(呎)ニ應ズル安全荷重(听)									
					2′	3′	4′	5′	6′	7′	8′	9′	10′	12′
BSC 9	7×3	5·166	17·56	10·751	53,725	35,787	22,615	22,422	17,816	15,256	13,301	11,788	10,575	8,713
BSC 10	7×3½	5·950	20·23	12·728	63,600	42,368	31,739	25,359	21,099	18,059	15,748	13,959	12,526	10,322
BSC 11	8×2½	4·448	15·12	10·273	51,335	34,209	25,629	20,474	17,037	14,585	12,721	11,279	10,122	8,347
BSC 12	8×3	5·675	19·30	13·358	66,851	44,463	33,323	26,623	22,154	18,970	16,546	14,667	13,161	10,846
BSC 13	8×3½	6·682	22·72	15·941	79,660	53,072	39,770	31,776	26,444	22,642	19,748	17,507	15,714	10,958
BSC 14	8×4	7·569	25·73	18·504	92,468	61,592	46,163	36,886	30,696	26,288	22,928	20,329	18,247	15,051
BSC 15	9×3	5·696	19·37	14·484	72,381	48,217	36,138	28,874	24,033	20,579	17,954	15,910	14,090	11,721
BSC 16	9×3½	6·550	22·27	17·756	88,735	59,193	44,306	35,409	29,471	25,239	22,021	19,531	17,533	14,470
BSC 18	9×4	8·396	28·55	22·590	112,893	75,214	56,366	45,042	37,489	32,110	28,013	24,843	22,304	18,407
BSC 19	10×3½	6·925	23·55	20·524	102,573	68,330	51,214	40,917	34,244	29,189	15,472	22,592	20,288	16,752
BSC 20	10×3½	8·296	28·21	23·592	117,904	78,545	58,869	47,049	39,166	33,547	19,269	25,963	23,310	19,243
BSC 21	10×4	8·871	30·16	26·143	130,655	87,040	65,241	52,148	43,401	37,179	32,442	28,229	25,841	21,339
BSC 22	11×3½	8·771	29·82	27·019	135,035	89,936	67,431	53,891	44,861	38,420	33,540	29,753	26,711	22,071
BSC 23	11×4	9·771	33·22	30·992	154,884	103,190	77,359	61,824	51,463	44,092	38,484	34,141	30,660	25,326
BSC 24	12×3½	7·675	26·10	26·440	132,148	88,042	65,996	52,750	43,923	37,632	34,847	29,145	26,179	21,636

溝鋼形ノ強度表 (續)

各徑間(呎)ニ應スル安全荷重(听)

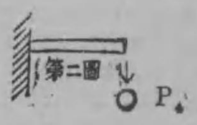
番號	14′	16′	18′	20′	22′	24′	26′	28′	30′	32′	34′	36′	38′	40′	42′	44′
BSC 1	876	747	636	560	189	428	375	327	285	246	212	178	150	121	95	36
BSC 2	1,417	1,214	1,041	922	813	718	638	567	501	443	392	343	299	259	219	173
BSC 3	1,930	1,657	1,427	1,268	1,124	999	892	796	712	636	568	503	448	396	346	324
BSC 4	3,317	2,758	1,472	2,207	1,967	1,760	1,583	1,426	1,287	1,164	1,053	949	860	775	694	595
BSC 5	4,303	3,716	3,223	2,881	2,581	2,319	2,095	1,896	1,722	1,566	1,430	1,299	1,187	1,082	982	858
BSC 6	5,519	4,768	4,141	3,712	3,323	2,990	2,704	2,451	2,230	2,033	1,860	1,595	1,554	1,421	1,296	1,136
BSC 7	5,977	5,181	4,480	4,013	3,591	3,228	2,917	2,742	2,401	2,187	1,997	1,818	1,663	1,518	1,382	1,210
BSC 9	7,442	6,440	5,598	5,025	4,501	4,063	3,683	3,357	3,054	2,793	2,564	2,347	2,161	1,986	1,821	1,614
BSC10	8,818	7,632	6,637	5,959	5,346	4,822	6,374	3,978	3,632	3,325	3,054	2,778	2,579	2,373	2,179	1,936
BSC11	7,134	6,180	5,378	4,834	4,342	3,921	3,581	4,245	2,968	2,722	2,507	2,302	2,127	1,963	2,810	1,615
BSC12	9,282	3,540	7,001	6,283	5,653	5,108	4,644	4,249	3,870	3,550	3,071	3,005	2,780	2,567	2,368	2,116
BSC13	11,081	9,000	8,361	7,517	6,754	6,104	5,547	4,056	4,627	4,247	3,914	3,598	3,330	3,077	2,840	2,539
BSC14	12,870	11,152	9,714	8,737	7,894	7,099	6,455	5,886	5,390	4,950	4,565	4,199	3,889	3,597	3,324	2,975
BSC15	10,084	8,743	7,618	6,848	6,164	5,576	5,012	4,623	4,243	3,900	3,570	3,315	3,072	2,846	3,633	2,363
BSC16	12,384	10,741	9,366	8,433	7,590	6,870	6,258	5,717	5,245	4,827	4,464	4,117	3,824	3,548	3,291	2,962
BSC18	15,751	13,662	11,911	10,724	9,651	8,732	7,936	7,266	6,666	6,134	4,670	5,257	4,857	4,506	4,577	3,754
BSC19	14,345	12,451	10,874	9,711	8,820	7,992	7,290	6,668	6,128	5,650	5,233	4,837	4,503	4,189	4,896	3,520
BSC20	16,475	14,194	12,468	11,232	10,114	9,162	8,350	7,633	7,011	6,458	5,977	5,519	5,133	4,770	4,430	3,996
BSC21	18,271	15,857	13,837	12,469	11,231	10,177	9,282	8,488	7,802	7,192	6,661	6,155	5,730	5,330	4,955	4,477
BSC22	18,901	16,410	14,327	12,849	11,637	10,549	9,626	8,811	8,102	7,476	6,929	6,410	5,973	5.562	5,178	4,686
BSC23	21,697	18,839	16,448	14,832	13,370	12,127	11,067	10,135	9,394	8,608	7,981	7,388	6,890	6,419	5,981	5,418
BSC24	18,540	16,107	14,071	12,698	11,456	10,399	9,501	8,709	8,022	7,415	6,886	6,384	5,962	5,466	5,197	4,722

溝形鋼ノ強度表 (二)



本表ハ梁ノ一端ヲ固定シ他端支持セラレザルトキ等布荷重ノ場合(第一圖)第二圖ノ場合ハ本表ノ½倍トス

R=抵抗力率(吋³)
W=長サ一呎ノ重量
l=徑間(吋)
F=最大應力 (平方吋15000听トス)
P=荷重(听)



$$P_3=\frac{2F}{l}R-WL \qquad P_4=\frac{1}{2}P_3$$

番號	寸法 (A×B)	面積 平方吋	每一呎ノ重量(听)	抵抗力率(吋³)	徑間(呎)ニ應ズル安全荷重(听) 3′	4	5′	6′	7′	8′	9′	10′	12′
BSC 1	3×1½	1·549	5·27	1·329	1,092	809	638	521	437	372	322	280	213
BSC 2	3⅓×2	1·968	6·75	2·115	1,562	1,295	1,024	839	706	605	529	461	358
BSC 3	4×2	2·341	7·96	2·855	2,355	1,753	1,388	1,113	961	827	722	634	498
BSC 4	5×2½	3·230	10·98	4·854	4,011	2,991	2,373	1,954	1,652	1,427	1,251	1,104	828
BSC 5	6×2½	3·542	12·04	6·254	5,174	3,860	3,067	2,531	2,142	1,855	1,650	1,443	1,156
BSC 6	6×3	4·261	14·49	8·003	6,623	4,944	3,929	3,242	2,748	2,381	2,094	1,856	1,492
BSC 7	6×3	4·791	16·29	8·678	7,180	5,359	4,258	3,513	2,975	2,670	2,266	2,007	1,610

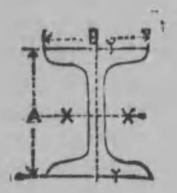
溝形鋼ノ強度表 (續)

番號	寸法 (A×B)	面積 平方吋	一呎ノ重量 (听)	抵抗力率 (吋³)	徑間(呎)ニ應ズル安全荷重(听) 3′	4′	5′	6′	7′	8′	9′	10′	12′
BSC 9	7×3	5·166	17·56	10·751	8,909	6,650	5,289	4,367	3,706	3,210	2,830	2,512	2,026
BSC 10	7×3½	5·950	20·23	12·728	10,5.0	7,876	6,263	5.173	4,391	3,810	3,356	2,980	2,405
BSC 11	8×2½	4·448	15·12	10·273	8,511	6,360	5,061	4,183	3,502	3,085	2,719	2,417	1,956
BSC 12	8×3	5·675	19·30	13·358	11,068	8,273	6,584	5,441	4,621	4,013	3,540	3,146	2,547
BSC 13	8×3½	6·682	22·72	15·941	13,212	9,874	7,859	6,495	5,517	4,792	4,227	3,758	3,044
BSC 14	8×4	7·569	25·73	18·504	15,333	11,463	9,124	7,544	6,408	5,568	4,913	4,369	3,501
BSC 15	9×3	5·696	19·37	14·484	12,002	8,975	7,146	5,908	5,018	4,365	3,852	3,428	2,781
BSC 16	9×3½	6·550	22·27	17·756	14,724	11,006	8,767	7,253	6,167	5,361	4,736	4,217	2,426
BSC 18	9×4	8·396	28·55	22·590	18,735	14,006	11,152	9,225	7,844	6,820	4,624	5,352	4,356
BSC 19	10×3½	6·925	23·55	20·504	13,020	12,731	10,143	8,397	7,145	6,215	5,494	4,896	3,987
BSC 20	10×3½	8·296	28·21	23·592	19,566	14,628	11,654	9,644	8,201	7,135	6,305	5,616	4,569
BSC 21	10×4	8·871	30·16	26·143	21,690	16,220	12,920	10,690	9,097	7,915	6,996	6,204	5,076
BSC 22	11×3½	8·771	29·82	27·019	22,411	16,761	13,361	11.057	9,412	8,191	7,243	6,456	5,262
BSC 23	11×4	9·771	33·22	30·992	25,721	19,238	15,309	12,691	10,798	9,404	8,316	7,416	6,048
BSC 24	12×3½	7·675	26·10	26·440	21,942	16,421	13,090	10,843	9,030	8,041	7,126	6,349	5,186

溝形鋼ノ強度表 (續)

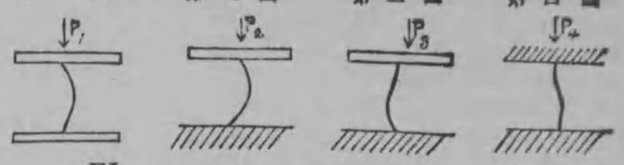
番號	徑間(呎)ニ應ズル安全荷重(听) 14′	16′	18′	20′	22′	24′	26′	28′	30′	32′	34′	36′	38′	40′	42′	44′	46′
BSC 1	163	123	90	61	35	12	—	—	—	—	—	—	—	—	—	—	—
BSC 2	282	222	173	129	91	58	37	—	—	—	—	—	—	—	—	—	—
BSC 3	497	318	353	197	147	105	79	—	—	—	—	—	—	—	—	—	—
BSC 4	711	583	477	387	307	241	195	125	73	27	—	—	—	—	—	—	—
BSC 5	945	783	653	541	442	361	304	219	158	102	47	—	—	—	—	—	—
BSC 6	1,222	1,017	852	711	586	485	412	306	229	160	91	30	—	—	—	—	—
BSC 7	1,316	1,396	913	759	612	511	433	316	231	155	79	11	—	—	—	—	—
BSC 9	1,669	1,399	1,178	993	829	697	601	465	365	276	188	109	31	—	—	—	—
BSC 10	1,982	1,662	1,405	1,187	993	838	727	566	449	345	241	149	58	—	—	—	—
BSC 11	1,613	1,361	1,156	982	828	806	615	491	398	317	235	163	92	31	—	—	—
BSC 12	2,108	1,776	1,510	1,283	1,085	926	808	648	529	423	319	227	135	56	—	—	—
BSC 13	2,520	2,424	1,807	1,539	1,302	1,113	975	783	641	516	390	281	173	93	—	—	—
BSC 14	2,934	2,476	1,109	1,799	1,525	1,307	1,144	927	763	620	475	349	225	118	70	—	—
BSC 15	2,307	1,950	1,665	1,473	1,211	1,042	1,915	747	621	509	398	301	205	123	40	—	—
BSC 16	2,850	2,414	2,068	1,754	1,517	1,312	1,157	956	805	671	539	423	308	209	112	14	—
BSC 18	3,622	3,068	2,627	2,253	1,925	1,664	1,467	1,211	1,018	848	678	530	383	258	132	9	—
BSC 19	3,324	2,826	2,430	2,095	1,801	1,569	1,392	1,167	996	847	697	568	439	330	221	113	25
BSC 20	3,806	3,230	2,772	2,385	2,046	1,777	1,572	1,309	1,112	937	766	611	461	334	207	80	—
BSC 21	4,231	3,596	3,092	2,665	2,291	1,996	1,769	1,482	1,265	1,074	883	616	553	144	275	137	24
BSC 22	4,410	3,738	3,219	2,781	2,397	2,095	1,861	1,569	1,347	1,153	958	690	623	182	342	201	86
BSC 23	5,152	4,304	3,710	3,210	2,772	2,426	2,160	1,828	1,575	1,354	1,133	1,042	752	592	433	273	145
BSC 24	4,342	3,708	3,206	2,783	2,414	2,124	1,897	1,622	1,411	1,227	1,043	888	726	595	464	332	227

工形鋼支柱ノ強度表



E＝彈性係數29,000,000
I＝物量力率(吋⁴)
l＝長サ(吋)
C＝安全係數＝5

第一圖　第二圖　第三圖　第四圖



$P_1=\pi^2\frac{EI}{Cl^2}$　$P_2=\frac{1}{4}P_1$　$P_3=2P_1$　$P_4=4P_1$

第一圖　柱ノ兩端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合
第二圖　柱ノ一端ヲ固定シ他端ヲ固定セズシテ之ニ荷重ヲ加ヘタル場合
第三圖　ハ柱ノ一端ヲ固定シ他端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合
第四圖　ハ柱ノ兩端固ヲ定シ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合

備考　本表ハ兩端固定セズシテ荷重ヲ柱軸ノ方向ニ加ヘタル場合(第一圖)
最大荷重ハ材料ノ强サ(實用抗壓力)ヲ斷面一平方吋ニ付15,000听トシテ計算シタルモノナリ
最大荷重＝斷面積×15,000
最大荷重ニ於ケル長サトハ此最大荷重ヲ加ヘ得ベキトキノ柱ノ最大長サヲ云フ
最大荷重ニ於ケル長サハ第二圖ノ場合ニハ上表ノ½倍
第三圖ノ場合ニハ上表ノ$\sqrt{2}$倍.　第四圖ノ場合ニハ上表ノ2倍トス

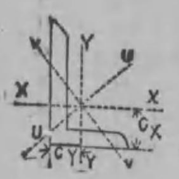
工形鋼支柱ノ強度表(續キ)

番號	寸法 (A×B)	面積 平方吋	物量力率 (吋⁴)	最大荷重 (听)	荷大ニ於最ケ長ル重サ (呎)	支柱ニ於ケル安全荷重(听) 3′	4′	5′	6′	7′	8′	9′
BSB 2	3×3	2·501	1·261	37,510	3·59	8,622	30,395	19,455	13,510	9,926	7,600	6,002
BSB 3	4×1¾	1·472	194	22,080	5·94	—	4,849	3,104	2,155	1,583	1,212	958
BSB 4	4×3	2·795	1·280	40,190	3·57	11,690	32,000	20,480	14,235	10,450	8,000	6,320
BSB 5	4¾×1¾	1·912	263	28,680	6·06	—	6,576	4,208	2,922	2,147	1,644	1,299
BSB 6	5×3	3·238	1·461	48,570	3·46	—	36,510	23,365	16,230	11,920	9,129	7,212
BSB 7	5×4½	5·290	5·656	79,360	5·33	—	—	—	—	46,170	33,350	27,930
BSB 8	6×3	3·527	1·338	52,905	3·17	—	33,450	21,420	14,865	10,920	8,362	6,607
BSB 9	6×4½	5·882	5·409	88,230	4·94	—	—	86,580	60,130	44,170	33,820	26,720
BSB 10	6×5	7·354	9·105	110,300	5·74	—	—	—	121,250	74,360	56,940	44,980
BSB 11	7×4	4·709	3·410	70,640	4·39	—	—	54,560	37,890	27,940	21,315	16,840
BSB 12	8×4	5·297	3·574	79,460	4·23	—	—	57,180	39,710	29,170	22,340	17,645
BSB 13	8×5	8·241	10·250	123,650	5·75	—	—	—	113,900	83,670	64,070	50,610
BSB 14	8×6	10·293	17·927	154,400	6·81	—	—	—	—	146,330	112,050	88,540
BSB 15	9×4	6·178	4·198	100,780	4·08	—	—	—	46,650	34,270	26,240	20,730
BSB 16	9×7	17·064	46·265	255,970	8·48	—	—	—	—	—	—	228,500
BSB 17	10×5	8·820	9·780	132,300	5·41	—	—	—	108,680	79,840	61,120	48,280
BSB 18	10×6	12·358	22·930	185,350	7·02	—	—	—	—	—	143,300	113,210
BSB 19	10×8	20·282	71·609	307,900	9·64	—	—	—	—	—	—	—
BSB 20	12×5	9·408	9·743	141,100	5·25	—	—	—	108,250	79,530	60,881	48,110
BSB 21	12×6	12·946	22·257	179,200	7·41	—	—	—	—	—	139,080	109,890

工形鋼支柱ノ強度表(續キ)

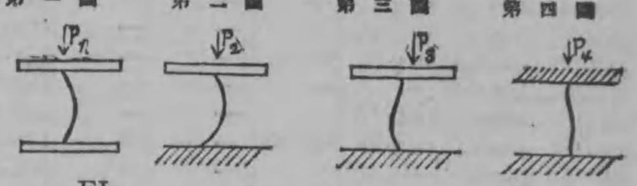
番號	支柱ニケル安全荷重(听)											
	10′	11′	12′	14′	16′	18′	20′	24′	26′	28′	30′	32′
BSB 2	4,864	4,019	3,377	2,482	1,900	1,501	1,216	844	719	620	541	475
BSB 3	776	641	538	396	303	240	194	134	114	98	86	75
BSB 4	5,120	4,231	3,555	2,612	2,000	1,580	1,280	889	757	653	569	500
BSB 5	1,052	869	730	536	411	324	263	182	155	134	117	102
BSB 6	5,842	4,828	4,057	2,982	2,282	1,803	1,461	1,014	864	745	650	570
BSB 7	22,625	18,690	15,710	11,541	8,838	6,983	5,656	3,927	3,347	2,885	2,516	2,209
BSB 8	5,352	4,423	3,716	2,731	2,091	1,652	1,338	929	791	682	593	522
BSB 9	21,647	17,890	15,030	11,042	8,456	6,682	5,412	3,758	3,202	2,761	2,407	2,114
BSB 10	36,440	30,110	25,300	18,590	14,230	11,247	9,110	6,326	5,390	4,648	4,053	3,558
BSB 11	13,640	11,270	9,470	6,960	5,328	4,210	3,410	2,368	2,018	1,740	1,517	1,332
BSB 12	14,295	11,810	9,927	7,294	5,584	4,412	3,574	2,482	2,114	1,823	1,589	1,396
BSB 13	41,000	33,880	28,470	20,915	16,015	12,652	10,250	7,118	6,065	5,230	4,560	4,003
BSB 14	71,720	59,270	49,800	36,590	28,030	22,135	17,930	12,450	10,609	9,148	7,978	7,004
BSB 15	16,795	13,880	11,660	8,569	6,561	5,184	4,199	2,916	2,484	2,142	1,868	1,640
BSB 16	185,070	152,950	128,500	94,430	72,300	57,130	46,270	32,130	27,375	23,605	20,585	18,070
BSB 17	39,120	32,320	27,160	19,955	15,275	12,072	9,780	6,791	5,784	4,989	4,350	3,819
BSB 18	91,720	75,800	63,690	46,790	35,860	28,310	22,930	15,921	13,568	11,698	10,211	8,957
BSB 19	286,400	236,650	198,850	146,100	111,850	88,400	71,600	49,720	42,360	36,525	31,850	27,960
BSB 20	38,970	32,200	27,060	19,880	15,220	12,026	9,742	6,765	5,764	4,970	4,334	3,805
BSB 21	89,020	73,570	61,810	45,415	34,771	27,475	22,252	15,451	13,168	11,352	9,902	8,693

山形鋼支柱ノ強度表



E=彈性係數29,000,000
I=物量力率(吋⁴)
l=長サ(吋)
C=安全係數=5

第一圖　第二圖　第三圖　第四圖



$P_1=\pi^2\frac{EI}{Cl^2}$　$P_2=\frac{1}{4}P_1$　$P_3=2P_1$　$P_4=4P_1$

本表ハ柱ノ兩端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合(第一圖)

第一圖　ハ柱ノ兩端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合
第二圖　ハ柱ノ一端ヲ固定シ他端ヲ固定セズシテ荷重ヲ加ヘタル場合
第三圖　ハ柱ノ一端ヲ固定シ他端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合
第四圖　ハ柱ノ兩端ヲ固定シ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合

備考　最大荷重ハ材料ノ強サ(實用抗壓力)ヲ斷面一平方吋ニ付15000听トシテ計算シタルモノナリ
最大荷重ニ於ケル長サトハ此最大荷重ヲ加ヘ得ベキトキノ柱ノ最大長サヲ云フ
最大荷重ニ於ケル長サハ第二圖ノ場合ニハ上表ノ $\frac{1}{2}$ 倍第三圖ノ場合ニハ上表ノ $\sqrt{2}$ 倍第四圖ノ場合ニハ上表ノ2倍ナリトス

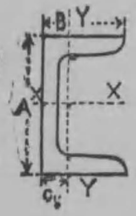
溝形鋼支柱ノ強度表（續キ）

番號	寸法 (A×B)	面積 (平方吋)	最大重荷 (听)	最大荷重ヲ受クル長サ (呎)	物力率 (吋⁴)	支柱ニ於ケル安全荷重 (听) 3′	4′	5′	6′	7′	8′
BSC 1	3×1½	1·549	23,250	2·25	·286	13,150	7,400	4,736	3,289	2,416	1,850
„ 2	3½×2	1·986	29,800	3·08	·713	—	17,830	11,410	7,927	5,824	4,459
„ 3	4×2	2·341	35,100	3·09	·843	—	21,070	13,490	9,366	6,881	5,268
„ 3	5×2½	3·230	48,400	3·80	1·774	—	44,350	28,380	19,714	14,480	11,087
„ 4	6×2½	3·542	53,100	3·70	1·880	—	47,000	30,080	20,889	15,345	11,749
„ 5	6×3	4·261	63,900	4·67	3·503	—	—	56,040	38,920	28,590	21,890
„ 6	6×3	4·791	71,800	4·60	3·822	—	—	61,020	42,390	31,140	23,840
„ 7	7×3	5·166	77,500	4·55	4·017	—	—	64,290	44,640	32,795	25,110
„ 9	7×3½	5·950	89,300	5·30	6·498	—	—	—	72,170	53,020	40,590
„ 10	8×2½	4·448	66,700	3·70	2·283	—	57,060	36,530	25,365	18,635	14,268
„ 11	8×3	5·675	85,000	4·50	4·329	—	—	69,280	48,110	35,340	27,055
„ 12	8×3½	6·682	100,000	5·30	7·067	—	—	—	78,520	57,690	44,165
„ 13	8×4	7·569	113,500	6·10	10·790	—	—	—	—	88,080	67,430
„ 14	9×3	5·696	85,400	4·30	4·021	—	—	64,320	44,670	32,815	25,120
„ 15	9×3½	6·550	98,500	5·30	6·963	—	—	—	77,360	56,830	43,510
„ 16	9×4	8·396	126,000	6·07	11·635	—	—	—	—	94,980	72,720
„ 18	10×3½	6·925	103,800	5·20	7·187	—	—	—	79,830	58,640	44,900
„ 19	10×3½	8·296	124,500	5·10	8·194	—	—	—	91,020	66,870	51,200
„ 20	10×4	8·871	133,000	6·00	12·018	—	—	—	133,530	98,120	75,120
„ 21	11×3½	8·771	131,500	5·00	8·421	—	—	—	93,580	68,750	52,630
„ 23	11×4	9·771	146,500	5·90	12·812	—	—	—	142,380	104,600	80,090
„ 24	12×3½	7·675	115,000	5·10	7·527	—	—	—	83,640	61,440	47,040

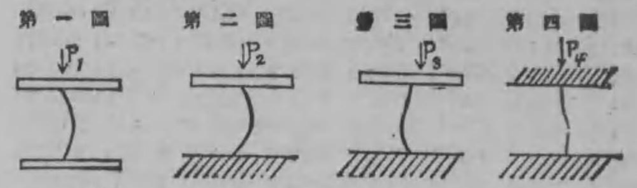
溝形鋼支柱ノ強度表（續キ）

番號	支柱ニ於ケル安全荷重 (听) 9′	10′	11′	12′	14′	16′	18′	20′	24′	26′	28′	30′
BSC 1	1,462	1,184	978	822	604	462	365	296	205	185	150	131
„ 2	3,523	2,854	2,358	1,981	1,456	1,114	881	713	495	447	364	317
„ 3	4,162	3,372	2,786	2,341	1,720	1,317	1,040	843	585	528	430	374
„ 3	8,762	7,097	5,865	4,928	3,621	2,772	2,190	1,774	1,231	1,112	905	455
„ 4	9,280	7,520	6,214	5,222	3,837	3,328	2,320	1,880	1,305	1,178	959	835
„ 5	17,296	14,010	11,578	9,730	7,149	5,473	4,325	3,503	2,432	2,195	1,787	1,556
„ 6	18,840	15,260	12,610	10,595	7,786	5,961	4,710	3,815	2,649	2,391	1,946	1,695
„ 7	19,840	16,070	13,280	11,160	8,200	6,278	4,960	4,018	2,790	2,518	2,050	1,785
„ 9	32,070	25,980	21,470	18,040	13,254	10,150	8,019	6,495	4,510	4,071	3,314	2,886
„ 10	11,272	9,132	7,546	6,341	4,659	3,567	2,817	2,283	1,585	1,431	1,165	1,015
„ 11	21,378	17,318	14,310	12,024	8,836	6,704	5,342	4,329	3,006	2,714	2,209	1,924
„ 12	34,300	28,240	23,360	19,630	14,420	11,040	8,725	7,067	4,907	4,429	3,605	3,140
„ 13	53,280	43,160	35,660	29,970	22,020	16,860	13,320	10,790	7,492	6,763	5,492	4,795
„ 14	19,850	16,080	13,288	11,165	8,204	6,282	4,963	4,020	2,792	2,520	2,051	1,786
„ 15	34,380	27,850	23,010	19,335	14,208	10,878	8,596	6,962	4,834	4,364	3,552	3,094
„ 16	57,460	46,540	38,460	32,315	23,745	18,180	14,364	11,634	8,080	7,293	5,936	5,170
„ 18	35,475	28,740	23,745	19,952	14,660	11,225	8,870	7,185	4,989	4,506	3,665	3,193
„ 19	40,450	32,770	27,080	22,750	16,718	12,800	10,115	8,192	5,689	5,135	4,179	3,640
„ 20	59,360	48,080	39,730	33,380	24,330	18,780	14,840	12,020	8,347	7,534	6,132	5,341
„ 21	41,590	33,690	27,840	23,390	17,185	13,159	10,398	8,422	5,648	5,279	4,297	3,743
„ 23	63,280	51,260	42,360	25,590	26,150	20,020	15,820	12,814	8,899	8,032	6,538	5,695
„ 24	37,170	30,110	24,880	20,905	15,360	11,760	9,293	7,520	5,227	4,718	3,840	3,345

溝形鋼支柱ノ強度表



E＝彈性係數29,000,000
I＝F物量力率(吋⁴)
l＝長サ(吋)
C＝安全係數＝5



$P_1=\pi^2\frac{EI}{Cl^2}$　$P_2=\frac{1}{4}P_1$　$P_3=2P_1$　$P_4=4P_1$

本表ハ柱ノ兩端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合各第(一圖)

第一圖　ハ柱ノ兩端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合

第二圖　ハ柱ノ一端ヲ固定シ他端ヲ固定セズシテ之ニ荷重ヲ加ヘタル場合

第三圖　ハ柱ノ一端ヲ定固シ他端ヲ固定セズシテ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合

第四圖　ハ柱ノ兩端ヲ固定シ荷重ノ方向ヲ柱軸ノ方向ニ制限シタル場合

備考　最大荷重ハ材料ノ强サ(實用抗壓力)ヲ斷面一平方吋ニ付15,000听トシテ計算シタルモノナリ

最大重荷＝斷面積×15,000

最大荷重ノトキノ長サトハ此最大荷重ヲ加ヘ得ベキトキノ柱ノ最大長サヲ云フ

最大荷重ニ於ケル長サハ第二圖ノ場合ニハ上表ノ½倍　第三圖ノ場合ニハ上表ノ$\sqrt{2}$倍　第四圖ノ場合ニハ上表ノ2倍トス

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山形鋼支柱ノ强度表

番號	寸法(A×B)	面積平方吋	物量率力(吋⁴)	最大重荷(听)	最大荷重キノ長サ(呎)	支柱ニ於ケル安全荷重(听) 3′	4′	5′	6′	7′	8′
BSEA 1	1×1	·234	·008	3,510	1	356	200	128	89	66	50
BSEA 2	1¼×1¼	·299	·014	4,486	1·2	756	425	272	189	131	105
BSEA 3	1½×1½	·361	·031	5,416	1·4	1,378	778	496	344	239	194
BSEA 4	1¾×1¾	·583	·067	8,745	1·7	3,111	1,675	1,072	744	516	419
BSEA 5	2×2	·670	·101	10,005	2.0	4,488	2,525	1,616	1,122	778	631
BSEA 6	2¼×2¼	·757	·146	11,355	2·2	6,489	3,650	2'336	1,622	1,125	913
BSEA 7	2½×2½	1.187	·278	17,810	2·4	12,355	6,950	4,448	3,089	2,143	1,737
BSEA 8	2¾×2¾	1.312	·377	19,680	2·7	16,755	9,425	6,032	4,189	2,905	2,356
BSEA 9	3×3	1.440	·495	21,600	3·0	—	12,372	7,920	5,500	3,815	3,093
BSEA 10	3½×3½	2.011	·542	30,170	3·5	—	23,550	15,070	10,465	7,260	5,886
BSEA 11	4×4	2.310	1.423	34,660	3·9	—	34,570	22,720	15,810	10,965	8,894
BSEA 12	4½×4½	3.236	2·514	48,550	2·9	—	37,850	24,225	16,825	11,669	9,464
BSEA 13	5×5	3.610	3·480	54,140	5·1	—	—	—	38,670	26,820	21,750
BSEA 14	6×6	5.201	7·246	78 020	5·9	—	—	—	—	55,850	45,290

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山形鋼支柱ノ強度表（續キ）

支柱ニ於ケル安全荷重（噸）

番號		9′	10′	12′	14′	16′	18′	20′	22′	24′	26′	28′	30′
BSEA	1	39	32	22	16	11	9	8	6	5	4	4	3
BSEA	2	84	68	47	34	24	21	17	14	11	10	8	7
BSEA	3	153	124	87	64	45	38	31	25	21	18	15	13
BSEA	4	331	268	186	137	96	87	67	54	46	39	35	30
BSEA	5	499	404	281	209	144	125	101	85	70	59	51	45
BSEA	6	721	584	406	298	208	180	146	121	101	89	74	65
BSEA	7	1,373	1,112	772	567	396	343	278	230	193	165	142	124
BSEA	8	1,863	1,508	1,047	769	537	466	377	312	262	223	192	168
BSEA	9	2,444	1,980	1,375	1,010	705	611	495	409	344	293	253	220
BSEA	10	4,651	3,768	2,616	1,922	1,342	1,164	942	779	654	557	481	419
BSEA	11	7,027	5,692	3,952	2,904	2,028	1,757	1,243	1,176	988	842	726	632
BSEA	12	7,477	6,056	4,206	3,090	2,158	1,869	1,514	1,251	1,051	846	773	673
BSEA	13	17,185	13,920	9,667	7,103	4,960	4,297	3,480	2,876	2,417	2,059	1,775	1,546
BSEA	14	35,780	28,990	20,130	14,790	10,329	8,948	7,249	5,990	5,032	14,288	3,697	3,220

STRENGTH AND STIFFNESS OF BEAMS.

Let M = the greatest bending moment.

I = the geometrical moment of inertia of a section of the beam about a horizontal axis in the plane of the section, through the centre of figure,

y_0 = the distance of the centre of figure of the section to the tension or compression skin,

f = the intensity of stress induced in the tension or compression skin,

ρ = the radius of curvature of the gravity-axis (or neutral axis for ordiary beams) of the beam originally straight,

E = the coefficient of direct elasticity,

W = the total load on the beam; in the case of uniformly distributed load $W = wl$, w units of weight being the intensity of load per unit length of the span.

l = the length of the beam,

x, y = the coordinates of any point in the elastic curve which the gravity axis assumes after bending, the axis of x being the originally straight axis of the beam,

F = the greatest shearing force,

δ = the maximum deflection (except in the cases marked (1) and (2) in the Table I.) of the beam when uniform in section,

$m, n, p,$ = constants for greatest bending moment, maximum deflection and greatest shearing force; Table I gives the values of these constants.

Then the general formula for strength is

$$M = f\frac{I}{y_0} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (A)$$

and that for stiffness is

$$\frac{1}{\rho} = \frac{M}{EI}$$
$$\text{or } \frac{d^2y}{dx^2} = \frac{M}{EI} \text{ very nearly.} \quad \Big\} \ldots\ldots\ldots (B)$$

We have so

$$M = mWl \quad \ldots\ldots (1)$$

$$\delta = n\frac{Wl^3}{EI} \quad \ldots\ldots (2)$$

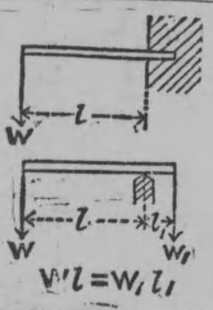
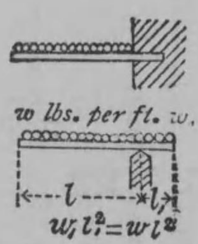
$$F = pW \quad \ldots\ldots\ldots (3)$$

(1) Here the maximum deflection occurs at $\frac{1}{\sqrt{5}}l = 0.4472\,l$ from the supported end & is $\frac{Wl^3}{48\sqrt{5}EI} = 1.022 \times \left(\frac{7}{16} \times \frac{Wl^3}{48\,IE}\right)$.

(2) Here the maximum deflection occurs at $\frac{1}{16}(1+\sqrt{33})l = 0.4216\,l$ from the supported end & is $1.040 \times \left(\frac{1}{4} \times \frac{Wl^3}{48\,EI}\right)$.

TABLE 1.

Giving the values of m, n and p in the Formulæ (1), (2), and (3).

Max. B.M.	Max. Def.	Manner of Loading.	m	n	p	Remarks.
Wl	$\frac{Wl^3}{3EI}$	 $W'l = W_1 l_1$	1	$16 \times \frac{1}{48}$	1	Greatest bending moment occurs at the fixed end and at the support in the first and second figures respectively; shearing force is constant.
$\frac{Wl}{2}$	$\frac{Wl^3}{8EI}$	*w lbs. per ft.*  *w lbs. per ft.* w, $w_1 l_1^2 = w l^2$	$\frac{1}{2}$	$6 \times \frac{1}{48}$	1	Greatest bending moment at fixed end or at support; greatest shearing force at fixed end or at support.

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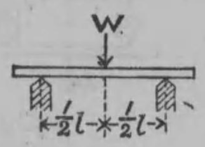
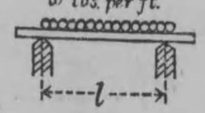
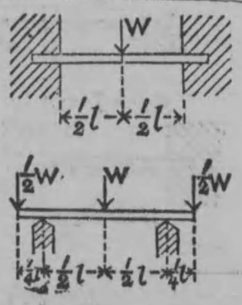
Max. B.M.	Max. Def.	Manner of Loading.	m	n	p	Remarks.
$\frac{Wl}{4}$	$\frac{Wl^3}{48EI}$		$\frac{1}{4}$	$\frac{1}{48}$	$\frac{1}{2}$	Greatest B. M. at the centre; shearing force constant for each half of the span.
$\frac{Wl}{8}$	$\frac{5Wl^3}{384EI}$	*W lbs per ft.* 	$\frac{1}{8}$	$\frac{5}{5} \times \frac{1}{48}$	$\frac{1}{2}$	Greatest B M. at the centre; greatest shearing force at the ends.
$\frac{Wl}{8}$	$\frac{Wl}{192EI}$		$\frac{1}{8}$	$\frac{1}{4} \times \frac{1}{48}$	$\frac{1}{2}$	Greatest bending moment at centre and ends, or at centre and supports; shearing force constant for each half of the span. Points of contrary flexure at $\frac{1}{4}l$ from centre.

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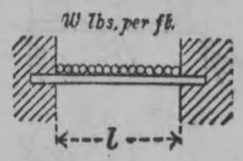
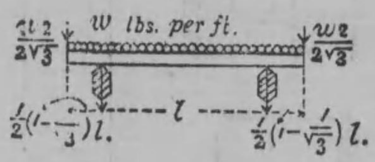
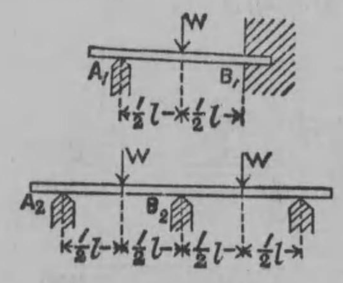
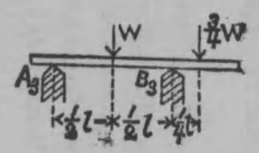
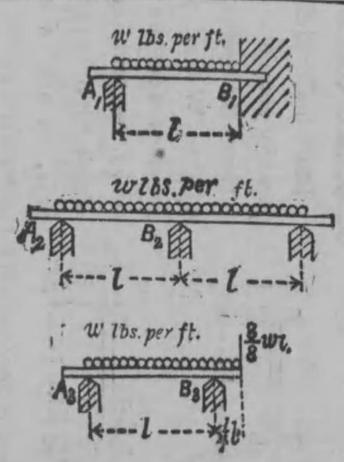
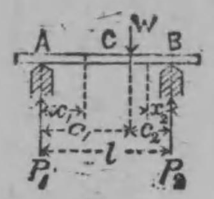
Manner of Loading.	m	n	p	Remarks.
Max. B.M. Max. Def. $\frac{Wl}{12}$ $\frac{Wl^3}{384EI}$  	$\frac{1}{12}$	$\frac{1}{8}\times\frac{1}{48}$	$\frac{1}{2}$	Greatest bending moment at fixed ends or at support; greatest shearing force at fixed ends or at supports. Points of contrary flexure at $\frac{l}{2\sqrt{3}}=0.2887l$ from centre. $\frac{1}{2}\left(1-\frac{1}{\sqrt{3}}\right)l=0.211l$
	$\frac{3}{16}$	$\frac{7}{16}\times\frac{1}{48}$	$\frac{11}{16}$	Greatest bending moment at fixed end or at middle support or at right hand support. Greatest shearing force between W and fixed end, or between W and middle support, or between W and right hand support. Pressure at A_1, A_2, and A_3 $\frac{5}{16}$ W.

Manner of Loading.	m	n	p	Remarks.
				The deflection given is that at the centre. Pressure at B_2 $\frac{11}{8}$W; pressure at B_3 $\frac{23}{16}$ W.
	$\frac{1}{8}$	$\frac{1}{4}\times\frac{1}{48}$	$\frac{5}{8}$	Greatest bending moment at fixed end or at middle support or at right hand support; greatest shearing force at fixed end, or at middle support or at right hand support. Pressures at supports A_1A_2 and A_3 $\frac{3}{8}$ W. The deflection given is that at centre. Pressures at B_2 and B_3 $1\frac{1}{4}wl$.

SPECIAL CASE 1.



Beam supported at the ends and loaded with a concentrated weight at an intermediate point.

Hence $P_1=\frac{c_2}{l}W$ and $P_2=\frac{c_1}{l}W$;

the greatest bending moment occurs at the loaded section and its value is

$$M=\frac{c_1c_2}{l}W.$$

The equation to the elastic curve between A and C is

$$y_1=\frac{W}{EI}\frac{c_1^2c_2^2}{6l}\left\{\frac{2x_1}{c_1}+\frac{x_2}{c_2}-\frac{x_1^3}{c_1^2c_2}\right\}$$

and that between C and B is

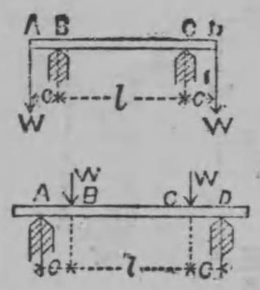
$$y_2=\frac{W}{EI}\frac{c_1^2c_2^2}{6l}\left\{\frac{2x_2}{c_2}+\frac{x_2}{c_1}-\frac{x_2^3}{c_1^2c_1}\right\}.$$

The deflection at the scetion C is

$$y_e=\frac{c_1^2c_2^2}{3l^4}\times\frac{Wl^3}{EI}.$$

The maximum deflection occurs at a point distant $x=c_1\sqrt{\frac{1}{3}+\frac{2c_2}{3c_1}}$ from the left hand end, c_1 being supposed greater than c_2, and $Y_{max.}=\frac{c_1}{c_2}\left(\frac{1}{3}+\frac{2c_2}{3c_1}\right)^{\frac{3}{2}}\times\frac{c_1^2c_2^2}{3l^4}.\frac{Wl^3}{EI}$.

SPECIAL CASE 2.

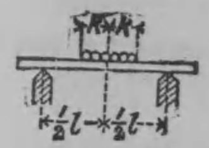


Beam under the action of two equal and opposite couples.

Here the supporting forces are each equal to W and the bending moment is constant between the points B and C at which the two inner equal forces act. The elastic curve between these points is, therefore, an arc of a circle. The shearing force is zero between these points and is equal to W between each W and nearest support. The maximum deflection occuring at the centre is, above or below BC.

$$Y_{max.}=\frac{c}{8l}.\frac{Wl^3}{EI}.$$

SPECIAL CASE 3.



Beam supported at the ends and loaded uniformly over a central portion of the span with w units of weight per units of weight per unit of length.

Here the supporting forces are each equal to wk and the greatest bending moment occuring at the centre is

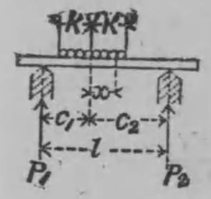
$$M_{max.}=\frac{1}{4}lW.\left(1-\frac{k}{l}\right).$$

The greatest deflection occuring at the centre is

$$Y_{max.}=\left(1-\frac{k}{l}\right)\left(1+\frac{k}{l}-\frac{k^2}{l^2}\right).\frac{1}{48}\frac{Wl^3}{EI}.$$

where W the total load is $2wk$.

SPECIAL CASE 4.



Beam supported at the ends and loaded uniformly over a portion of the span with w units of weight per unit of length.

Here the supporting forces are $P_1=\frac{c_2}{l}W$ and $P_2=\frac{c_1}{l}W$, where W the total load, is $2wk$.

The bending moment at any section situated within the loaded portion is

$$M_x=2wk\frac{c_1}{l}(c_2-x)-\tfrac{1}{2}w(k-x)^2.$$

The greatest bending moment occurs at a point distant $x=k\left(1-\frac{2c_1}{l}\right)=k\left(\frac{2c_2}{l}-1\right)$ from the centre of the load toward the larger segment of the span, and

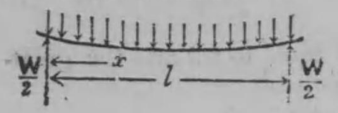
$$M_{max.}=\frac{c_1c_2}{l}W\left(1-\frac{k_1}{l}\right).$$

BEAM TABLE NO. 1.

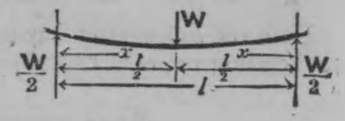
Reactions True for Constant or Variable Cross Section.

Case 1.—Supported at Both Ends, Uniform Load.

Total Load W.



Case 2.—Supported at Both Ends, Load at Center.



Stress at Any Point.

For Constant or Variable Cross Section.

$$= -\frac{W}{2Zl}x(l-x) \qquad = -\frac{Wx}{2Z}$$

Stress at Critical Points.

For Constant or Variable Cross Section.

Those given are Maximum for Constant Cross Section.

At Center. $-\frac{Wl}{8Z}$ At W. $-\frac{Wl}{4Z}$

Deflection at Any Point.

For Constant Cross Section Only.

$$= \frac{Wx(l-x)}{24EIl}[l^2+x(l-x)] \qquad = \frac{Wx}{48EI}(3l^2-4x^2)$$

Deflections at Critical Points.

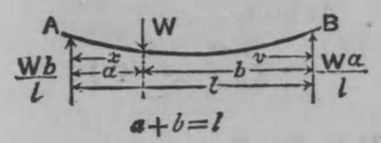
For Constant Cross Section Only.

Maximum, at Center. $\frac{5}{384}\frac{Wl^3}{EI}$ Maximum, at W. $\frac{Wl^3}{48EI}$

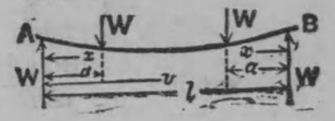
BEAM TABLE No. 2.

Reactions True for Const. and Variable Cross Sect.

Case 3.—Supported at Both Ends-Load at Any Point.



Case 4.—Supported at Both Ends - Two Symmetrical Loads.



Stress at Any Point.

For Const. or Variable Cross Section.

Bet. A and W, $S = -\frac{Wbx}{Zl}$ Beyond loads, $S = -\frac{Wx}{Z}$

Bet. B and W, $S = -\frac{Wav}{Zl}$ Bet. loads, $S = -\frac{Wa}{Z}$

Stress at Critical Points.

For Constant or Variable Cross Sections.

Those given are Max. for Const. Cross Section.

S at $W = -\frac{Wab}{Zl}$ S, at each load and all points bet. $= -\frac{Wa}{Z}$

Deflection at Any Point.

For Constant Cross Sections Only.

Bet. A and W $= \frac{Wbx}{6EIl}(l^2-x^2-b^2)$ Beyond loads $= \frac{Wx}{6EI}[3a(l-a)-x^2]$

Bet. W and B $= \frac{Wav}{6EIl}(l^2-v^2-a^2)$ Bet. loads $= \frac{Wa}{6EI}[3v(l-v)-a^2]$

Deflection of Critical Point.

For Constant Cross Section Only.

At $W=\frac{Wa^2b^2}{3EIl}$

Maximum in b,

At $v=b\sqrt{\frac{1}{3}+\frac{2a}{3b}}=v_1$

and is $\frac{Wav_1^3}{3EIl}$

Max. at center

$=\frac{Wa}{24EI}(3l^2-4a^2)$

At loads

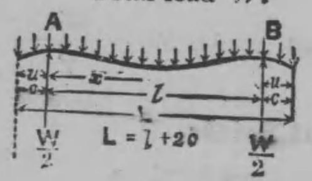
$=\frac{Wa^2}{6EI}(3l-4a)$

BEAM TABLE No. 3.

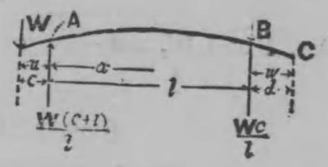
Reactions True for Constant or Variable Cross Section.

Case 5.—Both Ends Overhanging Supports Symmetrically, Uniform Load.

Total load W.



Case 6.—Both Ends Overhanging Supports, Single Overhanging Load.



Stress at Any Point.

For Constant or Variable Cross Section.

$=\frac{W}{2ZL}(c-u)^2$. beyond supports.

$=\frac{W}{2ZL}[c^2-x(l-x)]$. between supports.

$=\frac{W}{Z}(c-u)$. Bet. A and W

$=\frac{Wc}{Zl}(l-x)$. Bet. A and B

$=0$. Bet. B and C.

Stress at Critical Points.

For Constant or Variable Cross Section.

Those given are Maximum for Constant Cross Section.

$=\frac{Wc^2}{2ZL}$. At A and B.

$=\frac{W}{2ZL}(c^2-\frac{1}{4}l^2)$. At center.

$l>2c$, $S=0$ At $\sqrt{\frac{1}{4}l^2-c^2}$. on both sides of center.

$=\frac{Wc}{Z}$. At A.

$=0$. At B.

$l=2{\cdot}828c$, const. cross-sec.,

$S=\frac{WL}{46{\cdot}62Z}$

At A, B and center.

Deflection at Any Point.

For Constant Cross Section Only.

$=\frac{Wu}{24EIL}[6c^2(l+u)-u^2(4c-u)-l^3]$. Beyond supports.

$=\frac{Wx(l-x)}{24EIL}[x(l-x)+l^2-6c^2]$. Between supports.

$=\frac{Wu}{6EI}(3cu-u^2+2cl)$. Between A and W.

$=\frac{Wcx}{6EIl}(l-x)(2l-x)$. Between A and B

$=\frac{Wclw}{6EI}$. Between B and C.

Deflection at Critical Points.

For Constant Cross Section Only.

$=\frac{Wc}{24EIL}[3c^2(c+2l)-l^3]$. At ends.

$=\frac{Wl^2}{384EIL}(5l^2-24c^2)$. At center.

$2{\cdot}449c>l>2c$, maximum upward deflections at $\sqrt{3(\frac{1}{4}l^2-c^2)}$ on both sides of center, and

$=\frac{W}{96EIL}(6c^2-l^2)^2$.

$=\frac{Wc^2}{3EI}(c+l)$. At W.

$=\frac{Wcld}{6EI}$ At C.

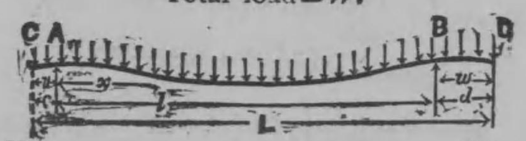
$=\frac{Wcl^2}{15{\cdot}55EI}$ Maximum upward deflection, at $x=0{\cdot}4226l$.

BEAM TABLE No. 4.

Reactions True for Const. and Variable Cross Section.

Case 7.—Both ends overhanging supports unsymmetrically, uniform load.

Total load $=W$.



$\frac{W}{2l}(l-d+c)$ $L=l+c+d$ $\frac{W}{2l}(l+d-c)$

Stress at Any Point.

For Constant or Variable Cross Section.

Bet. A and $C=\frac{W}{2ZL}(c-u)^2$. Bet. B and $D=\frac{W}{2ZL}(d-w)^2$

Bet. A and $B=\frac{W}{2ZL}\left\{c^2\left(\frac{l-x}{l}\right)+d^2\frac{x}{l}-x(l-x)\right\}$

Stress at Critical Points.

For Constant or Variable Cross Section.

Those given are Max. for Const. Cross Section.

At $A=\frac{Wc^2}{2ZL}$, At $B=\frac{Wd^2}{2ZL}$. If $x_1>c$, stress=0, at $\sqrt{x_1^2-c^2}$ on both sides of $x=x_1$ Critical bet. A and B for $x=\frac{l^2+c^2-d^2}{2l}=x_1$ and is $\frac{W}{2ZL}(c^2-x_1^2)$

Deflection of Any Point.

For Const. Cross Section Only.

Bet. A and $C=\frac{Wu}{24EIL}[2l(d^2+2c^2)+6c^2u-u^2(4c-u)-l^3]$

Bet. A and $B=\frac{Wx(l-x)}{24EIL}\{x(l-x)+l^2-2(d^2+c^2)-\frac{2}{l}[d^2x+c^2(l-x)]\}$

Bet. B and $D=\frac{Ww}{24EIL}[2l(c^2+2d^2)+6d^2w-w^2(4d-w)-l^3]$

Deflection of Critical Point.

For Constant Cross Section Only.

At $C=\frac{Wc}{24EIL}[2l(d^2+2c^2)-l^3]$

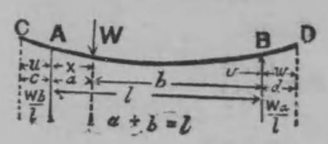
At $D=\frac{Wd}{24EIL}[2l(c^2+2d^2)+3d^3-l^3]$

Bet. A and B it is too complicated to obtain formula.

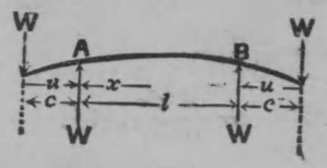
BEAM TABLE NO. 5.

Reactions True for Constant or Variable Cross Section.

Case 8.—Both Ends Overhanging Supports, Load at any Point between.



Case 9.—Both Ends Overhanging Supports, Symmetrical Overhanging Loads.



Stress at any Point.

For Constant Cross Section only.

Between A and W, $s=\frac{Wbx}{Zl}$ Beyond Supports. $s=\frac{W}{Z}(c-u)$

Between B and W, $s=\frac{Wav}{Zl}$ Between Supports. $s=\frac{Wc}{Z}$

Beyond Supports, $s=O$

Stress at critical Points.

For Var. or Constant Cross Section.

Those given are Maximum for Constant Cross Section.

Stress at $W=\frac{Wab}{Zl}$ Stress at A and B and at all Points between. $s=\frac{Wc}{Z}$

Deflection at any Point.

For Constant Cross Section only.

In a, $y=\frac{Wbx}{6EIl}(l^2-x^2-b^2)$

In b, $y=\frac{Wav}{6EIl}(l^2-v^2-a^2)$

In c, $y=\frac{Wabu}{6EIl}(l+b)$

In d, $y=\frac{Wabw}{6EIl}(l+a)$

Beyond Supports.

$y=\frac{Wu}{6EI}[3C(l+u)-u^2]$

Between Supports.

$y=\frac{Wcx}{2EI}(l-x)$

Deflection at Critical Point.

For Constant Cross Section only.

Max. in b at $v = b\sqrt{\frac{1}{3}+\frac{2a}{3b}}$ $= v_1$

Def. $= \frac{Wav_1^3}{3EIl}$

Def. at $c = \frac{Wabc}{6EIl}(l+b)$

Def. at $d = \frac{Wabd}{6EIl}(l+a)$

At Loads

$d = \frac{Wc^3}{6EI}(2c+3l)$

At Center

$d = \frac{Wcl^2}{8EI}$

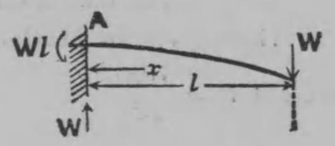
BEAM TABLE NO. 6.

Reaction True for Constant or Variable Cross Section.

Case 10.—Fixed at one end Uniform Load.

Total Load W.

Case 11.—Fixed at one end Load at Other.



Stress at any Point.

For Constant or Variable Cross Section.

$= \frac{W}{2Zl}(l-x)^2$ $= \frac{W}{Z}(l-x)$

Stress at Critical Points.

For Constant or Variable Cross Section.

Those given are Maximum for Constant Cross Section.

$= \frac{Wl}{2Z}$ at A. $= \frac{Wl}{Z}$ at A.

Deflection at Any Point.

For Constant Cross Section only.

$= \frac{Wx^2}{24EIl}\cdot[2l^3+(2l-x)^3]$. $= \frac{Wx^2}{6EI}(3l-x)$.

Deflection at Critical Points.

For Constant Cross Section only.

$= \frac{Wl^3}{8EI}$ Max. at B. $= \frac{Wl^3}{3EI}$ Max. at W.

BEAM TABLE NO. 7.

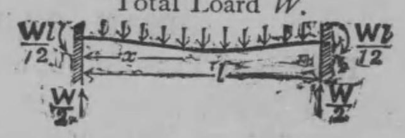
Reactions True for Constant or Variable Cross Section.

Case 12.—Fixed at one End, Intermediate Load.

Reactions True for Constant Cross Section Only.

Case 13.—Fixed at both ends, Uniform Load.

Total Loard W.



Stress at any Point.

For Constant or Variable Cross Section.

$= \frac{W}{Z}(l-x)$. Between A & W.

$= O$. Between B & W.

For Constant Cross Section Only.

$= \frac{Wl}{2Z}\left\{\frac{1}{6}-\frac{x}{l}+\left(\frac{x}{l}\right)^2\right\}$.

Stress at Critical Point.

For Constant (Maximum given) or Variable Cross Section.

$= \frac{Wl}{Z}$. at A.

For Constant Cross Section only.

$= \frac{Wl}{12Z}$. at ends, Maximum.

$= O$. for $x = 0.7887l$ and $x = 0.2113l$.

$= \frac{Wl}{24Z}$. at Center.

Deflection at any Point.

For Constant Cross Section Only.

$= \frac{Wx^2}{6EI}(3l-x)$. Between A & W.

$= \frac{Wv^2}{6EI}(3v-l)$. Between B & W.

Deflection at Critical Points.

For Constant Cross Section Only.

$= \frac{Wl^3}{3EI}$. at W.

$= \frac{Wl^2}{6EI}(2l+3b)$. at B.

Maximum Deflection.

$= \frac{Wl^3}{384EI}$. at Center.

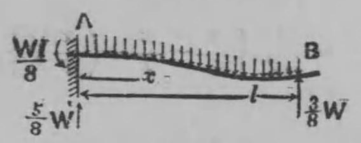
Maximum Deflection.

BEAM TABLE NO. 8.

Reactions True for Constant Cross Section Only.

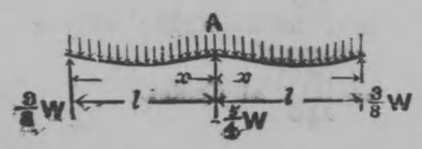
Case 14.—Fixed at one End, supported at the other. Uniform Load.

Total load W

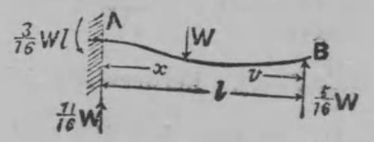


Case 15.—Continuous Beam with Two Equal Spans. Uniform Load.

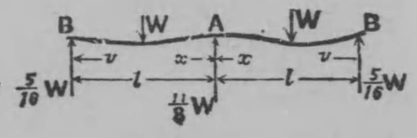
Total load in each Span W.



Case 16.—Fixed at one End, supported at the other. Load at Center.



Case 17.—Continuous Beam with Two Equal Spans. Equel Loads at Center of Each.



Stress at any Point.

For Constant Cross Section Only.

$= \frac{W(l-x)}{2Zl}\left(\frac{1}{4}l-x\right)$.

$= \frac{W}{16Z}(3l-11x)$. Between A & W.

$= \frac{5Wv}{16Z}$ Between B & W.

Stress at Critical Points.

For Constant Cross Section Only.

$= \frac{Wl}{8Z}$. Max. at A.

$= 0$. at $x = \frac{1}{4}l$.

$= \frac{9Wl}{128Z}$. at $x = \frac{5}{8}l$.

$= \frac{3Wl}{16Z}$ Max. at A.

$= 0$. at $x = \frac{3}{11}l$.

$= \frac{5Wl}{32Z}$. at W.

Deflection at any Point.

For Constant Cross Section Only.

$= \frac{Wx^2(l-x)}{48EIl}(3l-2x)$.

$= \frac{Wx^2}{96EI}(9l-11x)$. Between A & W.

$= \frac{Wv}{96EI}(3l^2-5v^2)$. Between B & W.

Deflection at Critical Points.

For Constant Cross Section Only.

$= \frac{Wl^3}{185EI}$. Max. at $x = 0.5785l$.

$= \frac{Wl^3}{192EI}$. at Center.

$= \frac{Wl^3}{187EI}$. at $x = \frac{5}{8}l$.

$= \frac{Wl^3}{107.33EI}$. Max. at $v = 0.4472l$.

$= \frac{7Wl^3}{768EI}$.

BEAM TABLE NO. 9.

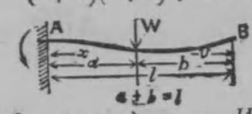
Reactions True for Constant Cross Section Only.

Case 18.—Fixed at One End, Supported at the Other.
Load at any Point.

$(l+a)(l+b)+al=m$

$al(l+b)=n$

$\frac{Wab(l+b)}{2l^2}$



$W\left\{1-\frac{a^2}{2l^3}(3l-a)\right\}$ $\qquad \frac{Wa^2(3l-a)}{2l^3}$

Stress at Any Point.
For Constant Cross Section Only.

$=\frac{Wb}{2Zl^3}(n-mx)$ Between A and W.,

$=\frac{Wa^2v}{2Zl^3}(3l-a)$ Between B and W.

Stress at Critical Points.
For Constant Cross Section Only.

$=\frac{Wab}{2Zl^2}(l+b)$, at A., $\qquad =\frac{Wa^2b}{2Zl^3}(3l-a)$, at W.

If $a<0.5858l$, Max. At A. If $a>0.5858l$, Max. At W.

If $a=0.5858l$, Each $=\frac{Wl}{5.83Z}$ $\qquad =0$, For $x=\frac{n}{m}$

Deflection at Any Point.
For Constant Cross Section Only.

$=\frac{Wx^2b}{12EIl^3}(3n-mx)$ $\qquad =\frac{Wa^2v}{12EIl^3}[3l^2b-v^2(3l-a$

Between A and W $\qquad$ Between B and W

Deflections at Critical Points.
For Constant Cross Section Only.

$=\frac{Wa^2b^2}{12EIl^3}(3l+b)$, At W.

If $a>0.5858l$, Max. Between W and A at $x=\frac{2n}{m}$ and is, $\frac{Wbn^3}{3EIm^2l^3}$

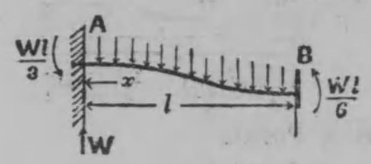
If $a<0.5858l$, Max. Between W and B, at $v=\sqrt{\frac{b}{2l+b}}$ and is $\frac{Wa^2b}{6EI}\sqrt{\frac{b}{2l+b}}$

If $a=0.5858l$, Max. At W, and is, $\frac{Wl^3}{101.9EI}$

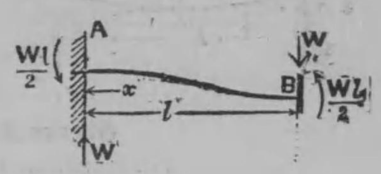
BEAM TABLE NO. 10.

Reactions True for Constant Cross Section Only.

Case 19.—Fixed at One End, Free But Guided at Other, Uniform Load.
Total Load W



Case 20.—Fixed at One End Free, But Guided at Other, With Load.



Stress at Any Point.
For Constant Cross Section Only.

$=\frac{Wl}{Z}\left\{\frac{1}{3}-\frac{x}{l}+\frac{1}{2}\left(\frac{x}{l}\right)^2\right\}$ $\qquad =\frac{W}{Z}\left(\frac{l}{2}-x\right)$

Stresses at Critical Points.
For Constant Cross Section Only.

$=\frac{Wl}{3Z}$, At A Maximum.

$=0$, For $x=0.4227l$.

$=\frac{Wl}{6Z}$, At B

$=\frac{Wl}{2Z}$, At A } Maximum.
$=\frac{Wl}{2Z}$, At B }

$=0$, At center

Deflection at any Point.
For Constant Cross Section Only.

$=\frac{Wx^2}{24\ EIl}(2l-x)^2$ $\qquad =\frac{Wx^2}{12EI}(3l-2x)$

Deflections at Critical Points.
For Constant Cross Section Only.

Maximum, At B

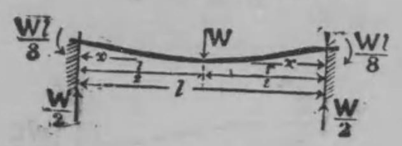
$=\frac{Wl^3}{24EI}$

Maximum, At B

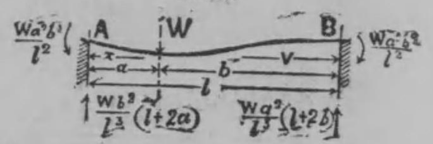
$=\frac{Wl^3}{12EI}$

BEAM TABLE NO. 11.
Reactions True For Constant Cross Section only

Case 21. Fixed At Both Ends, Loads At Centre.



Case 22. Fixed At Both Ends, Loads At Any Point



Stress At Any Point.
For Constant Cross Section Only.

$$=\frac{W}{2Z}\left(\tfrac{1}{4}l-x\right)$$

$$=\frac{Wb^2}{Zl^3}[al-x(l+2a)] \text{ For } a$$

$$=\frac{Wa^2}{Zl^3}[bl-v(l+2b)] \text{ For } b$$

Stress At Critical Point.
For Constant Cross Section Only.

$$=\frac{Wl}{8Z} \text{ At Ends}$$

$$=-\frac{Wl}{8Z} \text{ At Load}$$

$$=\text{Zero For } x=\tfrac{1}{4}l$$

$$=\frac{Wab^2}{Zl^2} \text{ At } A \text{ Max.}$$

$$=\frac{Wa^2b}{Zl^2} \text{ At } B$$

$$=\text{Zero For } x=\frac{al}{l+2a} \text{ And}$$

$$v=\frac{bl}{l+2b}-\frac{2Wa^2b^2}{Zl^3} \text{ At } W.$$

Deflection At Any Point.
For Constant Cross Section Only.

$$=\frac{Wx^2}{48EI}(3l-4x)$$

$$=\frac{Wx^2b^2}{6EIl^3}[2a(l-x)+l(a-x)]$$
Between A and W

$$=\frac{Wv^2a^2}{6EIl^3}[2b(l-v)+l(b-v)]$$
Between B and W

Deflection At Critical Point.
For Constant Cross Section Only.

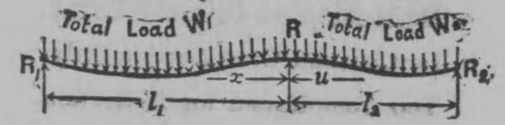
$$=\frac{Wl^3}{19ZEI} \text{ At } W$$
Maximum.

$$=\frac{Wa^3b^3}{3EIl^3} \text{ At}$$
Maximum in b at $v=\frac{2bl}{l+2b}$

And is $\frac{2Wa^3b^3}{3EI(l+2b)^2}$

BEAM TABLE NO. 12.
Reactions True For Constant Cross Section Only.

Case 23.—Continuous Beam; With two Unequal Spans, Unequal Uniform Loads.



$$\frac{l_1W_1(3l_1+4l_2)-W_2l_2^2}{8l_1(l_1+l_2)}=r_1 \qquad r_2=\frac{l_2W_2(3l_2+4l_1)-W_1l_1^2}{8l_2(l_1+l_2)}$$

$$\frac{W_1+W_2}{2}+\frac{1}{8}\left(\frac{W_1l_1}{l_2}+\frac{W_2l_2}{l_1}\right)=r$$

Stress at any Point.
For Constant Cross Section Only.

$$=\frac{l_1-x}{Z}\left\{\frac{(l_1-x)W_1}{2l_1}-r_1\right\} \text{ Between } R_1 \text{ and } R$$

$$=\frac{l_2-u}{Z}\left\{\frac{(l_2-u)W_2}{2l_2}-r_2\right\} \text{ Between } R_2 \text{ And } R$$

Stress at Critical Point.
For Constant Cross Section Only.

$$=\frac{W_1l_1^2+W_2l_2^2}{8Z(l_1+l_2)} \text{ At } R$$

Maximum Between R_1 and R For $x=\frac{l_1}{W_1}(W_1-r_1)$ and is,

$$=-\frac{r_1^2l_1}{2ZW_1}$$

Maximum Between R_2 and R For $u=\frac{l_2}{W_2}(W_2-r_2)$ and is $=-\frac{r_2^2 l_2}{2ZW_2}$.

Deflection at any Point.

For Constant Cross Section Only.

$=\frac{x(l_1-x)}{24EI}\left\{(2l_1-x)(4r_1-W_1)-\frac{W_1(l_1-x)^2}{l_1}\right\}$
Between R_1 and R

$=\frac{u(l_2-u)}{24EI}\left\{(2l_2-u)(4r_2-W_2)-\frac{W_2(l_2-u)^2}{l_2}\right\}$
Between R_2 and R

Deflection at Critical Point.

For Constant Cross Section Only.

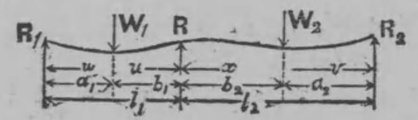
Too Complicated for Derivation.

BEAM TABLE NO. 13.

Reactions True for Constant Cross Section Only.

Case 24.—Continuous Beam with two Unequal Spans, Unequal Loads at any Point of Each.

$$m=\frac{1}{2(l_1+l_2)}\left\{\frac{W_1a_1b_1}{l_1}(l_1+a_1)+\frac{W_2a_2b_2}{l_2}(l_2+a_2)\right\}$$



$\frac{W_1b_1-m}{l_1}=r_1$. $\frac{W_1a_1+m}{l_1}+\frac{W_2a_2+m}{l_2}=r$. $\frac{W_2b_2-m}{l_2}=r_2$.

Stress at any Point.

For Constant Cross Section Only.

$=\frac{Wr_1}{Z}$ Between R_1 and W_1. $=\frac{vr_2}{Z}$ Between R_2 and W_2

$=\frac{1}{l_1Z}[m(l_1-u)-W_1a_1u]$ Between R and W_1

$=\frac{1}{l_2Z}[m(l_2-x)-W_2a_2x]$ Between R and W_2

Stresses at Critical Points.

For Constant Cross Section Only.

Greatest is Max. For Constant Cross Section.

$=\frac{a_1r_1}{Z}$ At W_1 $=\frac{m}{Z}$ At R $=\frac{a_2r_2}{Z}$ At W_2

Deflection at any Point.

For Constant Cross Section Only.

$=\frac{W}{6EI}\left[(l_1-w)(l_1+w)r_1-\frac{W_1b_1^3}{l_1}\right]$ Between R_1 and W_1

$=\frac{u}{6EII_1}[W_1a_1b_1(l_1+a_1)-W_1a_1u^2-m(2l_1-u)(l_1-u)]$
Between R and W_1

$=\frac{x}{6EII_2}[W_2a_2b_2(l_2+a_2)-W_2a_2x^2-m(2l_2-x)(l_2-x)$
Between R and W_2

$=\frac{v}{6EI}\left[(l_2-v)(l_2+v)r_2-\frac{W_2b_2^3}{l_2}\right]$ Between R_2 and W_2

Deflections at Critical Points.

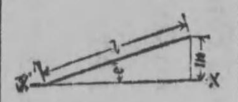
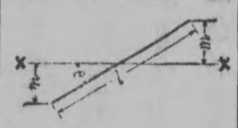
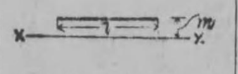
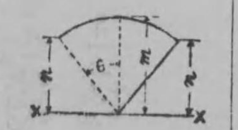
For Constant Cross Section Only.

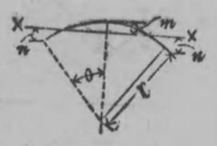
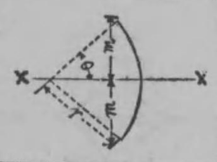
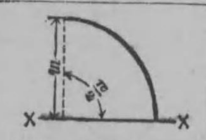
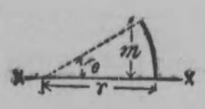
$=\frac{a_1b_1}{6EII_1}[2a_1b_1W_1-m(l_1+a_1)]$ At W_1 Maximum too Complex

$=\frac{a_2b_2}{6EII_2}[2a_2b_2W_2-m(l_2+a_2)]$ At W_2 For Derivation.

MOMENTS OF INERTIA.

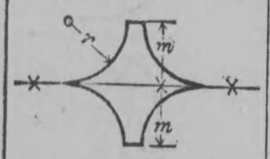
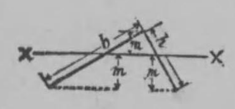
Thin Sections. t = Thickness.

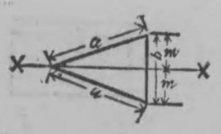
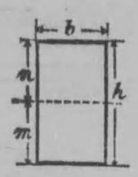
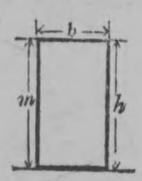
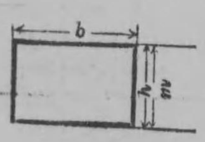
Section and Neut. Axis.	Moment of Inertia.	Values of m & n.	Section Modulus.	Area.
	$\frac{1}{3}Am^2$	$m = l\sin\theta$	$\frac{1}{3}Am$	lt
	$\frac{1}{3}Am^2$	$m = \frac{l}{2}\sin\theta$	$\frac{1}{3}Am$	lt
	Am^2	m = variable	Am	
	$tr^3(\theta + \sin\theta\cos\theta)$ $\frac{Ar^2}{2}\left\{1 + \frac{\sin\theta\cos\theta}{\theta}\right\}$	$m = r$ $n = r\cos\theta$	$tr^2(\theta + \sin\theta\cos\theta)$ $\frac{Ar}{2}\left\{1 + \frac{\sin\theta\cos\theta}{\theta}\right\}$	$2r\theta t$

	$tr^3\left\{\theta + \sin\theta\cos\theta - \frac{2\sin^2\theta}{\theta}\right\}$ $\frac{Ar^2}{2}\left\{1 + \frac{\sin\theta\cos\theta}{\theta} - \frac{2\sin^2\theta}{\theta^2}\right\}$	$m = r\left\{1 - \frac{\sin\theta}{\theta}\right\}$ $n = r\left\{\frac{\sin\theta}{\theta} - \cos\theta\right\}$	$\frac{tr^2}{\theta - \sin\theta}(\theta^2 + \theta\sin\theta\cos\theta - 2\sin^2\theta)$ $\frac{Ar}{2t\theta - \sin\theta}\left\{1 + \frac{\sin\theta\cos\theta}{\theta} - \frac{2\sin^2\theta}{\theta^2}\right\}$	$2r\theta t$
	$tr^3(\theta - \sin\theta\cos\theta)$ $\frac{Ar^2}{2}\left\{1 - \frac{\sin\theta\cos\theta}{\theta}\right\}$	$m = r\sin\theta$	$tr^2\left\{\frac{\theta}{\sin\theta} - \cos\theta\right\}$ $\frac{Ar}{2}\left\{\frac{1}{\sin\theta} - \frac{\cos\theta}{\theta}\right\}$	$2r\theta t$
	$\frac{Ar^2}{2}$	$m = r$	$\frac{Ar}{2}$	$\frac{\pi rt}{2}$
	$\frac{tr^3}{2}(\theta - \sin\theta\cos\theta)$ $\frac{Ar^2}{2}\left\{1 - \frac{\sin\theta\cos\theta}{\theta}\right\}$	$r\sin\theta$	$\frac{tr^2}{2}\left\{\frac{\theta}{\sin\theta} - \cos\theta\right\}$	$r\theta t$

MOMENTS OF INERTIA.—*Continued.*

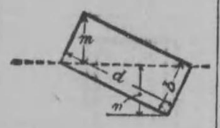
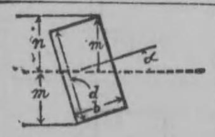
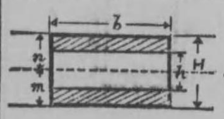
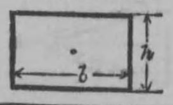
Thin Sections. t = Thickness.

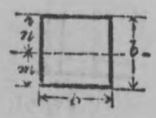
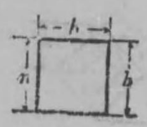
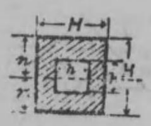
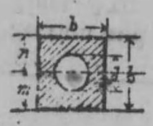
Section and Neutral Axis.	Moment of Inertia.	Values of m.	Section Modulus.	Area.
	$\frac{2}{11}Ar^2 \quad \left\{\pi=\frac{22}{7}\right\}$	$\frac{r}{2}$	$\frac{4}{11}Ar$	Area of arcs $=A$ " " web $=\frac{3}{11}A$ Total area $=A'=\frac{14}{11}A$
	$Ar^2 \quad \left\{\pi=\frac{22}{7}\right\}$	r	Ar	Area of arcs $=2A$ " " webs $=\frac{6}{11}A$ Total area $=A'=\frac{14}{11}A$
	$\frac{b^2h^2t(b+h)}{12(b^2+h^2)}$ $\frac{Ab^2h^2}{12(b^2+h^2)}$	$\frac{bh}{2\sqrt{b^2+h^2}}$	$\frac{bht(b+h)}{6\sqrt{b^2+h^2}}$ $\frac{Abh}{6\sqrt{b^2+h^2}}$	$t(b+h)$
	$\frac{b^3t}{12}$ $\frac{Ab^2}{24}$	$\frac{1}{2}b\sqrt{2}$	$\frac{b^2t}{6\sqrt{2}}$ $\frac{Ab}{12\sqrt{2}}$	$2bt$

	$\frac{b^2t}{12}(2a+b)$ $\frac{Ab^2}{12}$	$\frac{b}{2}$	$\frac{bt}{6}(2a+b)$ $\frac{Ab}{6}$	$t(2a+b)$
	$\frac{bh^3}{12}$	$m=n.$ $\frac{h}{2}$	$\frac{bh^2}{6}$	bh
	$\frac{bh^3}{3}$	h	$\frac{bh^2}{3}$	bh
	$\frac{bh^3}{3}$	h	$\frac{bh^2}{3}$	bh

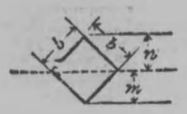
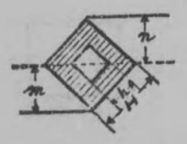
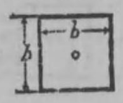
MOMENTS OF INERTIA.—*Continued.*

Plane Sections.

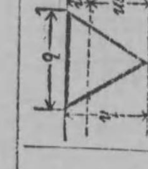
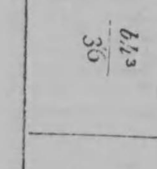
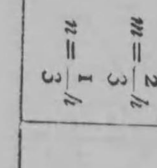
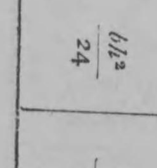
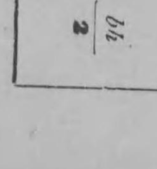
Section and Neut. Axis.	Moment of Inertia.	Values of m and n.	Section Modulus.	Area of Section.
	$\frac{b^3d^3}{6(b^2+d^2)}$	$\frac{bd}{\sqrt{b^2+d^2}}$	$\frac{b^2d^2}{6\sqrt{b^2+d^2}}$	bd
	$\frac{bd}{12}(d^2\cos^2\alpha+b^2\sin^2\alpha)$	$\frac{d\cos\alpha+b\sin\alpha}{2}$	$\frac{db}{6}\left(\frac{d^2\cos^2\alpha+b^2\sin^2\alpha}{d\cos\alpha+b\sin\alpha}\right)$	bd
	$\frac{b}{12}(H^3-h^3)$	$\frac{H}{2}$	$\frac{b}{6H}(H^3-h^3)$	$b(H-h)$
Polar Axis. 	$\frac{1}{12}bh(b^2+h^2)$			

	$\frac{b^4}{12}$	$m=n$ $\frac{b}{2}$	$\frac{b^3}{6}$	b^2
	$\frac{b^4}{3}$	b	$\frac{b^3}{3}$	b^2
	$\frac{H^4-h^4}{12}$	$\frac{H}{2}$	$\frac{H^4-h^4}{6H}$	H^2-h^2
	$\frac{1}{12}\left(b^4-\frac{3\pi}{16}d^4\right)$	$\frac{b}{2}$	$\frac{1}{6b}\left(b^4-\frac{3\pi}{16}d^4\right)$	$b^2-\frac{\pi d^2}{4}$

MOMENTS OF INERTIA.—*Continued.*
Plane Sections.

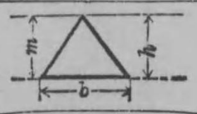
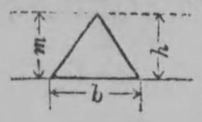
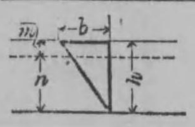
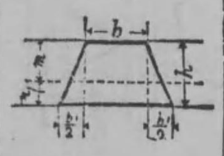
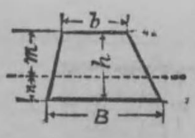
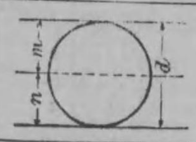
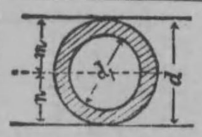
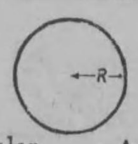
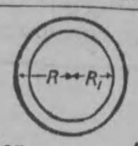
Section and Neut. Axis.	Moment of Inertia.	Values of m and n.	Section Modulus.	Area of Section.
	$\frac{b^4}{12}$	$\frac{b}{\sqrt{2}}$	$0{\cdot}118b^3$	b^2
	$\frac{H^4-h^4}{12}$	$\frac{H}{\sqrt{2}}$	$0{\cdot}1179\left(\frac{H^4-h^4}{H}\right)$	H^2-h^2
Polar Axis. 	$\frac{b^4}{6}$	—	—	—

MOMENTS OF INERTIA.—*Continued.*
Plane Sections.

Section and Neut. Axis.	Moment of Inertia.	Values of m and n.	Section Modulus.	Area of Section.
	$\frac{bh^3}{48}$	$m=n$ $\frac{h}{2}$	$\frac{bh^2}{24}$	$\frac{bh}{2}$
	$0{\cdot}5413b^4$	$0{\cdot}866\ b$	$\frac{5}{8}b^3$	$2{\cdot}598b^2$
	$0{\cdot}5413b^4$	b	$\frac{51\sqrt{3}}{16}b^3$	$2{\cdot}598b^2$
	$0{\cdot}8758d^4$	$\frac{d}{2}$	$1{\cdot}7516d^3$	$0{\cdot}8284d^2$
	$0{\cdot}638\ b^4$	$0{\cdot}924b$	$0{\cdot}677b^3$	$2{\cdot}828b^2$
	$\frac{bh^3}{36}$	$m=\frac{2}{3}h$ $n=\frac{1}{3}h$	$\frac{bh^2}{24}$	$\frac{bh}{2}$

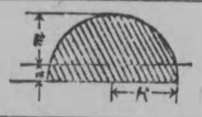
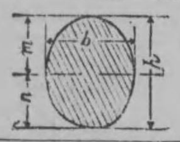
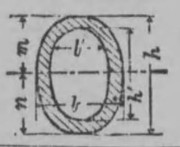
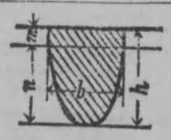
MOMENTS OF INERTIA.—*Continued.*

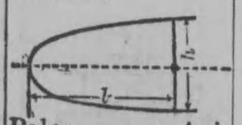
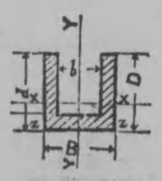
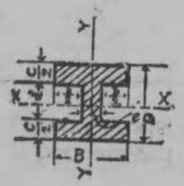
Plane Sections.

Section and Neut. Axis.	Moment of Inertia.	Values of m and n.	Section Modulus.	Area of Section.
	$\frac{1}{12}bh^3$	$m=h$	$\frac{1}{12}bh^2$	$\frac{bh}{2}$
	$\frac{bh^3}{4}$	$m=h$	$\frac{bh^2}{4}$	$\frac{bh}{2}$
	$\frac{bh^3}{36}$	$m=\frac{h}{3}$ $n=\frac{2h}{3}$	$Zm=\frac{bh^2}{12}$ $Zn=\frac{bh^2}{24}$	$\frac{bh}{2}$
	$\frac{(6b^2+6bb_1+b_1^2)h^3}{36(2b+b_1)}$	$m=\frac{1}{3}\left(\frac{3b+2b_1}{2b+b_1}\right)h$ $n=\frac{1}{3}\left(\frac{3b+b_1}{2b+b_1}\right)h$	$Zm=\frac{(6b^2+6bb_1+b_1^2)h^2}{12(3b+2b_1)}$ $Zn=\frac{(6b^2+6bb_1+b_1^2)h^2}{12(3b+b_1)}$	$bh+\frac{b_1h}{2}$
	$\frac{(B^2+4Bb+b^2)h^3}{36(B+b)}$	$m=\frac{h(2B+b)}{3(B+b)}$ $n=\frac{h(B+2b)}{3(B+b)}$	$Zm=\frac{(B^2+4Bb+b^2)h^2}{12(2B+b)}$ $Zn=\frac{(B+4Bb+b^2)h^2}{12(B+2b)}$	$\frac{h}{2}(B+b)$
	$\frac{\pi}{64}d^4$ $\frac{\pi}{64}=.0491$	$m=n$ $\frac{d}{2}$	$\frac{\pi d^3}{32}$ $\frac{\pi}{32}=.0982$	$\frac{\pi d^2}{4}$ $\frac{\pi}{4}=.7854$
	$\frac{\pi}{64}(d^4-d_1^4)$ $\frac{\pi}{64}=.0491$	$m=n$ $\frac{d}{2}$	$\frac{\pi}{32}(d^4-d_1^4)$ $\frac{\pi}{32}=.0981$	$\frac{\pi}{4}(d^2-d_1^2)$ $\frac{\pi}{4}=.7854$
 Polar Axis	$\frac{\pi R^4}{2}$	—	—	—
 Polar Axis	$\frac{\pi(R^4-R_1^4)}{2}$	—	—	—

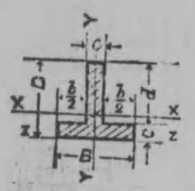
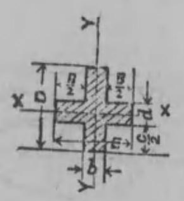
MOMENTS OF INERTIA.—*Continued.*

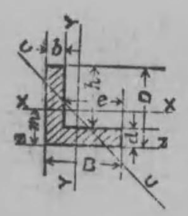
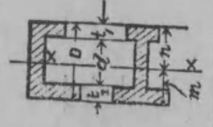
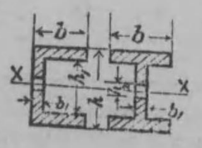
Plane Section.

Section and Neutral Axis.	Moment of Inertia.	Values of m and n.	Section Modulus.	Area of Section.
	$\left(\frac{\pi}{8}-\frac{8}{9\pi}\right)R^4$ $0{\cdot}1098R^4$	$m=0{\cdot}5756\ R$ $n=0{\cdot}4244\ R$	$Z_m=0{\cdot}1907\ R^3$ $Z_n=0{\cdot}2586\ R^3$	$\frac{\pi R^2}{2}$ $1{\cdot}5708\ R^2$
	$\frac{\pi bh^3}{64}$ $0{\cdot}0491bh^3$	$n=m$ $\frac{h}{2}$	$\frac{\pi bh^2}{32}$ $0{\cdot}0982bh^2$	$\frac{\pi bh}{4}$ $0{\cdot}7854bh$
	$\frac{\pi(bh^3-b'd'^3)}{64}$ $\frac{\pi}{64}=0{\cdot}0491$	$n=m$ $\frac{h}{2}$	$\frac{\pi(bh^3-b'h'^3)}{32}$ $\frac{\pi}{32}=0{\cdot}0982$	$\frac{\pi}{4}(bh-b'h')$ $\frac{\pi}{4}=0{\cdot}7854$
	$\frac{8}{175}bh^3$ $0{\cdot}0457bh^3$	$m=\frac{2h}{5}$ $n=\frac{3h}{5}$	$Zm=0{\cdot}114\ bh^2$ $Zn=0{\cdot}076\ bh^2$	$\frac{2bh}{3}$

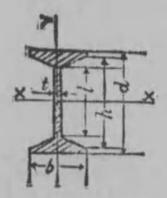
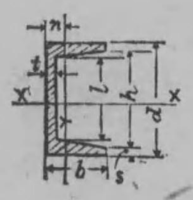
Parabola  Polar Axis	$\frac{A}{5}\left(\frac{h^2}{4}+\frac{8b^2}{7}\right)$ $0{\cdot}0333bh^3+$ $0{\cdot}1524b^3h$	—	—	$\frac{2bh}{3}$
	$I_X=\frac{(BD^2-bd^2)^2-4BDbd(D-d)^2}{12(BD-bd)}$ $I_Y=\frac{1}{12}(DB^3-db^3)$ $I_Z=\frac{1}{3}\{(B-b)D^3+b(D-d)^3\}$	$X-X$ $m=\frac{BD^2-2bdD+bd^2}{2(BD-bd)}$ $n=\frac{BD^2-bd^2}{2(BD-bd)}$	$Sm=\frac{(BD^2-bd^2)^2-4BDbd(D-a)^2}{6(BD^2-2bdD+bd^2)}$ $Sn=\frac{(BD^2-bd^2)^2-4BDbd(D-d)^2}{6(BD^2-bd^2)}$ $S_T=\frac{I}{m}\qquad Sc=\frac{I}{n}$	$A=BD-bd$
	$I_X=\frac{1}{12}(BD^3-bd^3)$ $I_Y=\frac{1}{12}(CB^3+de^3)$	$X-X$ $m=n=\frac{D}{2}$ $Y-Y$ $m=n=\frac{B}{2}$	$S_X=\frac{BD^3-bd^3}{6D}$ $S_Y=\frac{CB^3+de^3}{6B}$ $Sm=Sn$	$A=BD-bd$

MOMENTS OF INERTIA OF PLANE SECTIONS.—*Continued.*

Section and Neut. Axis.	Moment of Intertia.	Dist. m & n from Neut. Axis. to T & C Fibres.	Section Modulus.	Area of Section.
	$I_X=\frac{(BD^2-bd^2)^2-4BDbd(D-d)^2}{12(BD-bd)}$ $I_Y=\frac{1}{12}(CB^3+de^3)$ $I_Z=\frac{1}{3}\{(B-b)D^3+b(D-d)^3\}$	$X-X$ $m=\frac{BD^2-2bdD+bd^2}{2(BD-bd)}$ $n=\frac{BD^2-bd^2}{2(BD-bd)}$	$X-X$ $Sm=\frac{(BD^2-bd^2)^2-4BDbd(D-d)^2}{6(BD^2-2bdD+bd^2)}$ $Sn=\frac{(BD^2-bd^2)-4BDbd(D-d)^2}{6(BD^2-bd^2)}$	$A=BD-bd$
	$I_X=\frac{1}{12}(bD^3+Bd^3)$ $I_Y=\frac{1}{12}(dE^3+Cb^3)$	$X-X$ $m=n=\frac{D}{2}$ $Y-Y$ $m=n=\frac{E}{2}$	$S_X=\frac{bD^3-Bd^3}{6D}$ $S_Y=\frac{dE^3-Cb^3}{6E}$	$A=BD+bd$

	$IX=\frac{1}{3}Bm^3+b(D-m)^3-(B-b)(m-b)^3$ for uneven and even |s $I_Y=\frac{1}{3}Dm^3+b(B-m)^3-(D-b)(m-b)^3$ for uneven |s $I_U=\frac{1}{3}\{m^4-2(m-b)^4+bB-(2m-\frac{b}{2})\}^3$ or even |s $I_Z=\frac{1}{3}\{(B-e)D^3+e(D-h)^3\}$	$m=\frac{b(2h+B)+h^2}{2(h+B)}$ for uneven and even |s	$X-X$ $Sm=\frac{(BD^2-eh^2)^2-4BDeh(D-h)^2}{6(BD^2-2ehD+eh^2)}$ $Sn=\frac{(BD^2-eh^2)^2-4BDeh(D-h)^2}{6(BD^2-eh^2)}$	$A=BD-eh$
	$I=\frac{a_1t_1^2+a_2t_2^2+ad^2}{12}+\frac{a_1a_2(D-d)^2+a_1a(t_1-d)^2+a_2a(t_2+d)^2}{4(a_1+a_2+a)}$ a_1 = area of top flange a_2 = „ „ bottom flange a = „ „ web	$m=\frac{a_1(2D-t_1)+a_2t_2+a(d+2t_2)}{2(a_1+a_2+a)}$ $n=\frac{a_2(2D-t_2)+a_1t_1+a(d-2t_1)}{2(a_1+a_2+a)}$	$Sm=\frac{I}{m}$ $Sn=\frac{I}{n}$	$A=a_1+a_2+a$
	$I_X=\frac{b(h^3-h_1^3)+b_1(h_1^3-h_2^3)}{12}$	$m=\frac{h}{2}$ $n=\frac{h}{2}$	$S=\frac{b(h^3-h_1^3)}{6h}+\frac{b_1(h_1^3-h_2^3)}{6h}$	$A=bh-(b-b_1)h_1-b_1h_2$

MOMENTS OF INERTIA OF PLANE SECTIONS.—*Continued.*

Section and Neut. Axis.	Moment of Inertia.	Dist. m & n from Neut. Axis to T & C Fibres.	Section Modulus.	Area of Section.
	$I_X = \frac{bd^3 - \frac{1}{4r}(h^4 - l^4)}{12}$ $I_Y = \frac{b^3(d-h) + lt^3 + \frac{r}{4}(b^4 - t^4)}{12}$ Batter $= r = \frac{h-l}{b-t}$	$X-X$ $m = n = \frac{d}{2}$ $Y-Y$ $m = n = \frac{b}{2}$	$X-X$ $S = \frac{bd^3 - \frac{1}{4r}(h^4 - l^4)}{6d}$ $Y-Y$ $S = \frac{b^3(d-h) + lt^3 + \frac{r}{4}(b^4 - t^4)}{6b}$	$A = bd - (b-t)l - \frac{(b-t)(h-l)}{2}$
	$I_X = \frac{bd^3 - \frac{1}{8r}(h^4 - l^4)}{12}$ $I_Y = \frac{2sb^3 + lt^3 + \frac{r}{2}(b^4 - t^4)}{3} - An^2.$ Batter $= r = \frac{h-l}{2(b-t)}$	$X-X$ $m = n = \frac{d}{2}$ $Y-Y$ $n = [b^2 s + \frac{ht^2}{2} + \frac{r}{3}(b-t)^2(b + 2t)] \div A.$	$X-X$ $S = \frac{\frac{bd^2}{6} - \frac{1}{8r}(h^4 - l^4)}{6d}$ $Y-Y$ $S_T = \frac{I}{m}$ $S_b = \frac{I}{n}$	$A = 2bs + ht + \frac{h-l}{2}(b-t)$

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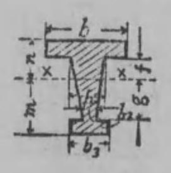
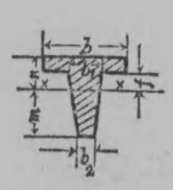
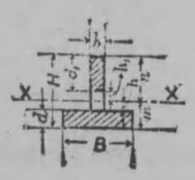
	$I_X = \frac{1}{3}\left[\frac{b_1 - b_2}{4(f+g)}(g^4 - f^4) + b(n^3 - f^3) + b_2(f^3 + g^3) + b_3(m^3 - g^3)\right]$	Determined graphically or by experiment.	$Sm = \frac{I}{m}$ $Sn = \frac{I}{n}$	$A = b(n-f) + \frac{b_1 + b_2}{2}(f+g) + b_3(m-g).$
	$I_X = \frac{1}{3}\left[\frac{b_1 - b_2}{4(f+m)}\right](m^4 - f_4) + b(n^3 - f^2) + b_2(f + n^3)\Big]$	Determined graphically or by experiment.	$Sm = \frac{I}{m}$ $Sn = \frac{I}{n}$	$A = b(n-f) + \frac{b_1 + b}{2}(f+m)$
	$I_X = \frac{1}{3}[B(m^3 - h^3) + b(n^3 - h_1^3)].$	$m = \frac{1}{2}\left[\frac{Bd^2}{Bd - bd_1} + \frac{bd_1(2H - d_1)}{Bd + bd_1}\right]$ $n = H - m$	$Sm = \frac{I}{m}$ $Sn = \frac{I}{n}$	$A = Bd + bd_1$

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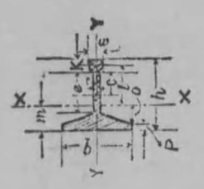
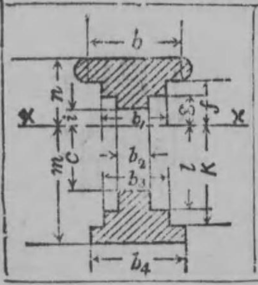
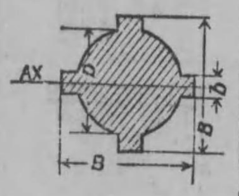
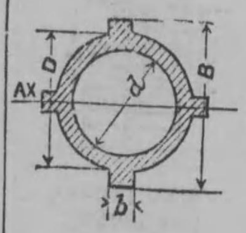
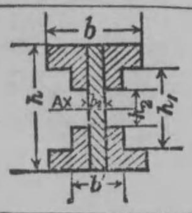
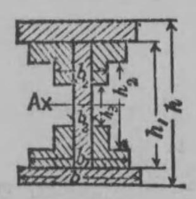
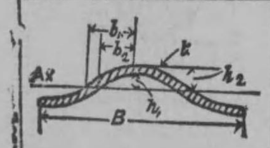
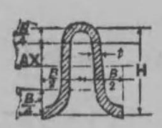
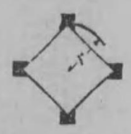
MOMENTS OF INERTIA OF PLANE SECTIONS.—*Continued.*

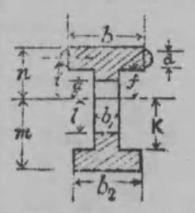
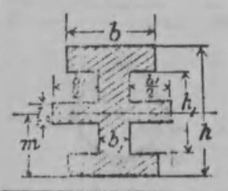
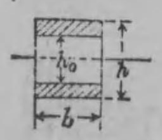
Section and Neut. Axis.	Moment of Inertia.	Dist. m & n from Neut. Axis to T & C Fibres.	Section Modulus.	Area of Section.
	$I_X=\frac{\pi k^4}{16}+\frac{(w-k)k^3}{12}+al^2+\frac{tc^3}{3}+\frac{bm^3}{3}-\frac{r^3(b-t)}{3}+\frac{(b-t)s^3}{36}+\frac{s(b-t)o^2}{2}$ $I_Y=\frac{ak^2}{12.4}+\frac{ei^2}{12}+\frac{(p+\frac{s}{4})b^3}{12}$ s = taper of flange. a = area of bulb. $o=r-\frac{s}{3}$	$X-X$ $m=\frac{a(2h-k)+t(h-k)^2+(b-t)p^2+s(b-t)}{(p+\frac{s}{3})2A}$	$Sm=\frac{I}{m}$ $Sn=\frac{I}{h-m}$	
	$I_X=\frac{1}{3}[b(n^3-f^3)+b_1(f^3-g^3)+b_2(g^3-i^3+l^3-c^3)+b_3(k^3-l^3)+b_4(m^3-k^3)]+\frac{\pi}{64}[(n-f)^4+B(n+f)(n-f)^2]$	Determined graphically or by experiment.	$Sm=\frac{I}{m}$ $Sn=\frac{I}{n}$	$A=b(n-f)+b_1(f-g)+b_2(g-i+l-c)+b_3(k-l)+b_4(m-k)+\frac{\pi}{4}(n-f)^2$

	I	M	N	Z	A
	$\frac{1}{12}\left\{\frac{3\pi}{16}D^4+b(B^3-D^3)+b^3(B-D)\right\}$	$\frac{B}{2}$	$\frac{B}{2}$	$\frac{1}{6B}\left\{\frac{3\pi}{16}D^4+b(B^3-D^3)+b^3(B-D)\right\}$	$\frac{\pi}{4}D^2+2b(B-D)$
	$\frac{1}{12}\left\{\frac{3\pi}{16}(D^4-d^4)+b(B^3-D^3)+b^3(B-D)\right\}$	$\frac{B}{2}$	$\frac{B}{2}$	$\frac{1}{6B}\left\{\frac{3\pi}{16}(D^4-d^4)+b(B^3-D^3)+b^3(B-D)\right\}$	$\frac{\pi}{4}(D^2-d^2)+2b(B-D)$

MOMENTS OF INERTIA OF PLAEN SECTIONS.—*Continued.*

Section and Neutral Axis.	Moment of Inertia.	Values M—N From outer Fibres.		Section Modulus.	Area of Section.
	I	M	N	Z	A
	$\frac{bh^3-(b-b^1)h^3-(b^1-b_2)h_2^2}{12}$	$\frac{h}{2}$	$\frac{h}{2}$	—	—
	$\frac{bh^3-(b-b_1)h_1^3-(b_1-b_2)h_2^3}{12}$ $-\frac{(b_2-b_3)h_3^3}{12}$	$\frac{h}{2}$	$\frac{h}{2}$	—	—
	$\frac{64}{105}(b_1h_1^3-b_2h_2^3)$	h_2	h_3	$\frac{2I}{H+t}$	—
	$\frac{t}{4}\left(\frac{\pi B^3}{16}+B^2h+\frac{\pi Bh^2}{2}+\frac{2}{3}h^3\right)$	$M=\frac{H}{2}+\frac{t}{2}$ $N=\frac{H}{2}+\frac{t}{2}$		$\frac{2I}{H+t}$	—
 a = area	$\pi r^3t+2a\left(r+\frac{l}{2}\right)^2$	$M=r+\frac{i}{2}$ $N=r+\frac{l}{2}$		—	$2\pi rt+4a$
	$\frac{4r^3t\sqrt{2}}{3}+2a\left(r+\frac{l}{2}\right)^2$	—		—	$4rt\sqrt{2}+4a$
	$\pi r^3t+3a\left(r+\frac{l}{2}\right)^2$	$M=r+\frac{l}{2}$ $N=r+\frac{l}{2}$		—	$2\pi rt+6a$

MOMENTS OF INERTIA OF PLANE SECTIONS.—*Continued.*

Section and Neutral Axis.	Moment of Inertia.	Dist. m & n From Neut. Axis To T&C Fibres.	Section Modulus.	Area of Section.
	$I_X=\frac{1}{3}[b(n^3-f^3)+b_1(f^3-g^3+K^3-l^3)+b_2(m^3-K^3)]+\frac{\pi}{64}(d^4+16d^2i^2)$	Determined graphically or by experiment.	$S_m=\frac{I}{m}$ $S_n=\frac{I}{n}$	$b(n-f)+b_1(f-g+K-l)+b_2(m-K)+\frac{\pi d^2}{4}$
	$I_X=\frac{bh^3-(b-b_2)h_1^3+b_1h_2^3}{12}$	$m=n=\frac{h}{2}$	$S_m=S_n=\frac{2I}{h}$	$bh-(b-b_2)h_1+b_1h_2$
	$\frac{1}{12}b(h^3-h_0^3)$	$\frac{1}{2}h$	—	$b(h-h_0)$

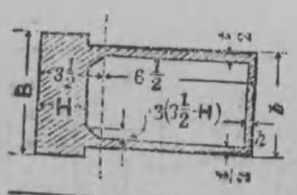
ELEMENTS OF STANDARD PIPE SECTIONS.

Common.						Extra.					Double Extra.					
Normal Size.	Area of Metal Sq. In.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Square of Radius of Gyration.	Area of Metal Sq. In.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Square of Radius of Gyration.	Area of Metal Sq. In.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Square of Radius of Gyration.	Normal Size.
⅛	·072	·001	·005	·122	·015	·086	·001	·006	·114	·013						
¼	·125	·003	·012	·163	·027	·161	·004	·014	·154	·024						
⅜	·166	·007	·022	·209	·044	·219	·009	·025	·200	·040						
½	·249	·017	·041	·262	·068	·323	·020	·048	·250	·062	·507	·024	·058	·213	·048	
¾	·333	·037	·071	·334	·111	·414	·045	·086	·321	·103	·727	·058	·111	·283	·080	
1	·495	·107	·132	·343	·118	·648	·107	·162	·408	·165	1·09	·141	·214	·360	·130	1
1¼	·668	·195	·235	·540	·291	·893	·244	·270	·523	·273	1·55	·343	·413	·470	·221	1¼
1½	·797	·309	·326	·681	·463	1·08	·395	·416	·605	·365	1·91	·571	·601	·547	·300	1½
2	1·07	·666	·561	·787	·620	1·50	·877	·738	·766	·586	2·69	1·32	1·11	·701	·491	2
2½	1·71	1·53	1·07	·947	·898	2·28	1·94	1·35	·923	·852	4·07	2·89	2·01	·842	·709	2½
3	2·24	3·02	1·73	1·16	1·35	3·05	3·93	2·28	1·14	1·29	5·52	6·03	3·45	1·05	1·09	3
3½	2·68	4·79	2·39	1·34	1·79	3·71	6·33	3·16	1·31	1·70	6·77	9·90	4·95	1·21	1·46	3½

ELEMENTS OF STANDARD PIPE SECTIONS.—*Continued.*

Normal Size.	Common. Area of Metal Sq. In.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Square of Radius of Gyration.	Extra. Area of Metal Sq. In.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Square of Radius of Gyration.	Double Extra. Area of Metal Sq. In.	Moment of Inertia.	Section Modulus.	Radius of Gyration.	Square of Radius of Gyration.	Normal Size.
4	3·17	7·23	3·21	1·51	2·28	4·45	9·72	4·32	1·48	2·18	8·18	15·4	6·84	1·37	1·88	4
4½	3·67	10·41	4·16	1·68	2·83											4½
5	4·32	15·2	5·47	1·88	3·52	6·12	20·7	7·43	1·84	3·38	11·34	33·6	12·1	1·72	2·96	5
6	5·58	28·2	8·50	2·25	5·04	8·51	40·9	12·4	2·19	4·81	15·90	66·9	20·2	2·06	4·23	6
7	6·93	46·5	12·2	2·59	6·72											7
8	8·39	72·4	16·8	2·94	8·63											8
9	10·03	108	22·4	3·28	10·8											9
10	11·92	161	29·9	3·67	13·5											10
11	13·70	232	37·1	4·12	16·9											11
12	14·58	279	43·8	4·38	19·2											12
14	16·05	373	52·7	4·82	23·2											14
15	17·23	461	62·0	5·15	26·5											15

MOMENT OF INERTIA.



Punch and Shear Frame Sections.

S_c = Modulus Comp. S_t = Modulus Ten.
A = Area of Section.
I = Moment of Inertia about Gravity Axis.

B	b	$h=\frac{t}{2}$	H	A	I	S_c	S_t
10	10	¼	0·57	15·36	228·51	35·2	65·4
,,	,,	⅜	1·10	23·43	311·78	47·95	89·1
,,	,,	½	1·80	31·82	397·83	61·2	113·7
,,	9	¼	0·51	14·66	200·77	30·89	57·36
,,	,,	⅜	0·99	21·64	290·32	44·66	82·95
,,	,,	½	1·61	29·56	371·95	57·22	106·27
,,	,,	⅝	2·41	38·69	438·24	67·44	125·21
,,	8	¼	0·44	13·87	180·98	27·8	51·5
,,	,,	⅜	0·88	20·41	272·07	41·9	77·7
,,	,,	½	1·38	27·27	345·47	53·2	98·5
,,	,,	⅝	2·04	35·2	410·37	63·1	117·0
,,	,,	¾	3·5*	49·63	462·98	71·2	132·0
,,	7	¼	0·38	13·15	172·76	26·5	49·3
,,	,,	⅜	0·77	19·21	261·46	40·3	74·6
,,	,,	½	1·24	25·69	320·52	49·3	91·5
,,	,,	⅝	1·74	32·24	378·80	58·3	108·0
,,	,,	¾	2·34	39·42	428·57	65·9	122·6
9	9	¼	0·59	14·66	204·06	31·4	58·3
9	9	⅜	1·20	21·57	291·47	44·4	83·4
,,	,,	½	2·00	30·68	363·50	55·8	103·6
,,	8	¼	0·5	13·83	185·91	28·6	53·65
,,	,,	⅜	1·0	20·34	268·15	41·28	76·65
,,	,,	½	1·7	28·07	338·66	52·15	96·81
,,	,,	⅝	2·6	37·12	403·27	62·1	115·12
,,	7	¼	0·42	13·00	173·33	26·6	49·8
,,	,,	⅜	0·89	19·25	250·41	38·4	71·6
,,	,,	½	1·42	25·65	317·24	48·8	90·5
,,	,,	⅝	2·11	33·03	375·00	57·7	107·1
,,	,,	¾	3·06	42·13	420·36	64·6	120·1
,,	6	¼	0·36	12·40	161·7	24·9	46·2
,,	,,	⅜	0·75	17·92	226·2	34·8	64·7
,,	,,	½	1·23	23·89	290·5	44·7	83·0
,,	,,	⅝	1·79	30·22	345·7	53·1	100·6
,,	,,	¾	2·62	38·26	392·0	60·3	112·0
8	8	¼	0·62	14·09	187·46	28·9	53·55
,,	,,	⅜	1·20	20·50	268·38	41·3	76·70

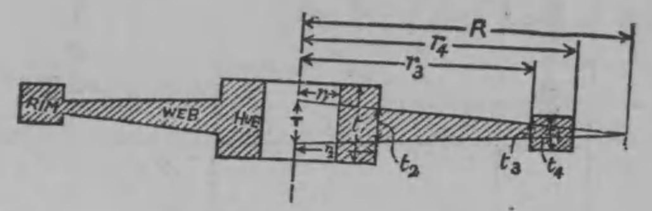
* Low.

Continued

B	b	h = t/2	H	A	I	S_e	S_t
8	8	1/2	1·65	23·03	258·64	40·0	73·8
"	7	5/16	2·55	30·36	302·6	46·5	86·5
"	"	1/2	0·31	10·96	124·2	19·12	35·5
"	"	3/8	0·76	15·71	183·0	28·15	52·3
"	"	1/2	1·31	20·80	232·2	35·7	66·4
"	6	5/16	1·98	26·30	275·0	42·3	78·6
"	"	1/2	0·68	12·56	156·25	24·0	44·6
"	"	3/8	1·56	18·79	222·1	32·6	60·5
"	"	1/2	3·5	30·00	275·0	42·3	78·6
"	5	5/16	0·53	11·68	180·83	29·0	51·6
"	"	3/8	1·27	17·25	214·79	33·0	61·4
"	"	1/2	2·35	24·15	253·85	39·0	73·4
"	4	5/16	0·38	10·88	125·59	19·3	35·8
"	"	3/8	1·00	15·84	181·36	27·9	51·8
"	"	1/2	1·80	20·87	228·96	35·2	65·4
"	5	1/4	0·73	11·76	139·73	21·5	40·0
"	"	5/16	1·70	17·28	196·98	30·2	56·2
"	4	1/4	0·55	10·97	125·4	19·3	35·9
"	"	5/16	1·45	16·13	181·52	28·0	52·0
"	3	1/4	0·84	10·16	110·14	17·25	32·0
"	"	5/16	1·12	14·90	167·70	25·70	47·6
"	"	3/8	2·10	19·99	198·57	30·50	56·8
7	5	1/2	1·65	28·79	336·75	51·8	96·2
"	"	5/16	0·55	13·69	172·25	26·5	49·2
"	"	3/8	1·10	19·50	248·56	38·3	71·1
"	"	1/2	1·90	27·07	315·01	48·5	90·0
"	6	5/16	3·0	36·41	377·05	58·0	108·0
"	"	3/8	0·43	12·43	155·80	23·9	44·5
"	"	1/2	0·91	18·07	221·14	34·0	63·1
"	"	5/8	1·50	24·20	283·77	43·5	80·8
"	"	3/8	2·35	31·79	339·75	52·3	96·9
"	5	5/16	0·33	11·61	139·76	21·42	39·9
"	"	3/8	0·75	16·81	204·37	31·41	58·4
"	"	1/2	1·25	22·27	261·65	40·25	75·2
"	"	5/8	2·0	29·00	310·74	49·7	88·8
"	"	3/8	2·75	35·66	350·65	54·0	100·0
"	7	1/2	0·70	13·52	169·40	26·04	48·4
"	"	5/8	1·40	19·99	243·80	37·5	69·6
"	"	3/8	2·44	27·28	310·80	47·8	88·8
"	6	1/2	0·55	12·55	147·20	22·6	42·1
"	"	5/8	1·14	18·27	220·03	33·8	62·8
"	"	3/4	2·00	25·17	282·60	43·4	80·8
"	5	1/2	0·41	12·28	136·92	20·0	39·1
"	"	5/8	0·95	16·98	203·40	31·0	58·0

MOMENT OF INERTIA.

Fly Wheels.



Webbed Wheels.

$I = I_{Hub} + I_{Web} + I_{Rim}$

$$I_{Hub} = \frac{w\pi t_1}{2g}(r_2^4 - r_1^4) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

$$I_{Web} = \frac{2\pi w t}{g}\left\{\frac{r_3^4 - r_2^4}{4} - \frac{r_3^5 - r_2^5}{5R}\right\} \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

$$I_{Rim} = \frac{w\pi t_4}{2g}(r_4^4 - r_3^4) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

g = Acceleration of Gravity = 32·2 Ft. Per Sec^2.

w = Weight of Material, Lbs. Per Cu. Ft.

Wheels with Arms.

Approximate Method of reducing arms to an Equivalent web.

A_2 = Total sheared area of inner ends of arms.

A_3 = " " " " outer " " "

t_2 = Thickness of inner edge of an equivalent web having the same area as the sheared area of all the inner ends of the arms.

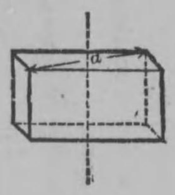
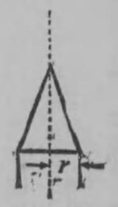
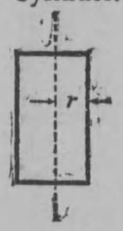
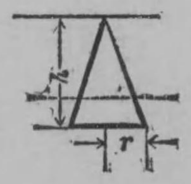
t_3 = Thickness of outer edge of equivalent web.

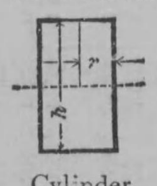
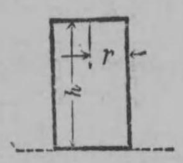
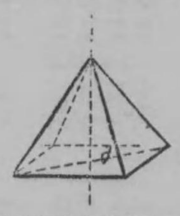
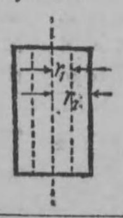
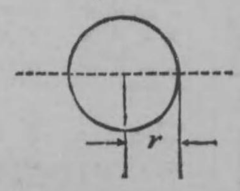
$t_2 = \frac{A_2}{2\pi r_2}$ $\qquad$ $t_3 = \frac{A_3}{2\pi r_3}$ $\qquad$ Find R and **7**.

Apply Formulae 1, 2, & 3.

MOMENTS OF INERTIA.

Solids.

Solid.	Moment of Inertia.	Solid.	Moment of Inertia.
Rectangular Parallelopiped. 	$\frac{1}{12}Md^2$	Rt. Circular Cone. 	$\frac{3}{10}Mr^2$
Rt. Circular Cylinder. 	$\frac{1}{2}Mr^2$	Rt. Circular Cone. 	$\frac{3}{20}M(r^2+\frac{1}{4}h^2)$

Rt. Circular Cylinder. 	$M(\frac{1}{4}r^2+\frac{1}{2}h^2)$	Rt. Circular Cone. 	$\frac{3}{20}M(r^2+4h^2)$
Rt. Circular Cylinder. 	$M(\frac{1}{4}r^2+\frac{1}{3}h^2)$	Sq. Pyramid. 	$\frac{1}{20}Md^2$
Hollow Rt. Circular Cylinder. 	$\frac{1}{2}M(r_2^2+r_1^2)$	Sphere. 	$\frac{2}{5}Mr^2$

MOMENTS OF INERTIA OF BUILT UP SECTIONS.

One Plate  Two Angles

One Plate, Size in Inches.	Two Angles. Size in Inches.	Two Angles. Lbs. per Foot.	Total Area, Square Inches.	Axis AB. I	Axis AB. r^2	Eccentricity.	Axis CD. r^2
6×¼	2 ×2½	3·5	3·60	10·5	2·93	1·44	0·85
„	2 ×3	4·0	3·90	11·1	2·84	1·55	1·33
„	2½×3	4·4	4·14	11·2	2·71	1·49	1·25
„	3 ×3	5·9	5·04	12·3	2·45	1·50	1·28
6×⅜	2 ×2½	3·5	4·35	14·1	3·23	1·19	0·77
„	2 ×3	4·0	4·65	14·9	3·19	1·30	1·19
„	2½×3	4·4	4·89	14·9	3·04	1·26	1·14
„	3 ×3	5·9	5·79	16·1	2·77	1·31	1·20
7×¼	2 ×2½	3·5	3·85	16·2	4·22	1·62	0·80
„	2 ×3	4·0	4·15	17·1	4·12	1·74	1·25
„	2½×3	4·4	4·39	17·1	3·90	1·71	1·18
„	3 ×3	5·9	5·29	18·3	3·46	1·77	1·22
7×⅜	2 ×2½	3·5	4·73	21·7	4·59	1·32	0·71
„	2 ×3	4·0	5·03	22·9	4·55	1·44	1·10
„	2½×3	4·4	5·27	22·8	4·33	1·42	1·06
„	3 ×3	5·9	6·17	24·2	3·98	1·52	1·13
8×¼	2 ×3	4·0	4·40	24·9	5·66	1·92	1·18
„	2½×3	4·4	4·64	24·9	5·36	1·90	1·12
„	3 ×3	5·9	5·54	26·3	4·75	2·01	1·17
„	3 ×4	8·3	6·98	29·3	4·20	2·30	2·55
8×⅜	2 ×3	4·0	5·40	33·2	6·15	1·56	1·03
„	2½×3	4·4	5·64	33·2	5·88	1·56	0·99
„	3 ×3	5·9	6·54	35·0	5·35	1·70	1·06
„	3 ×4	8·3	7·98	39·2	4·92	2·01	2·34

MOMENTS OF INERTIA OF BUILT UP SECTIONS.—*Continued.*

One Plate, Size in Inches.	Two Angles. Size in Inches.	Two Angles. Lbs. per Foot.	Total Area, Square Inches.	Axis AB. I	Axis AB. r^2	Eccentricity.	Axis CD. r^2
9×¼	2½×3	4·4	4·89	34·6	7·07	2·07	1·06
„	3 ×3	5·9	5·79	36·4	6·29	2·23	1·12
„	3 ×4	8·3	7·23	40·5	5·60	2·56	2·46
„	3 ×4½	8·9	7·59	41·5	5·47	2·65	3·29
9×⅜	2½×3	4·4	6·02	46·1	7·67	1·69	0·93
„	3 ×3	5·9	6·92	48·7	7·04	1·86	1·01
„	3 ×4	8·3	8·36	54·5	6·52	2·22	2·24
„	3 ×4½	8·9	8·72	56·0	6·42	2·30	2·99
10×¼	2½×3	4·4	5·14	46·5	9·05	2·23	1·01
„	3 ×3	5·9	6·04	49·0	8·11	2·43	1·07
„	3 ×4	8·3	7·48	54·3	7·26	2·81	2·38
„	3 ×4½	8·9	7·84	55·7	7·10	2·90	3·18
10×⅜	2½×3	4·4	6·39	61·9	9·69	1·79	0·87
„	3 ×3	5·9	7·29	65·5	8·98	2·01	0·96
„	3 ×4	8·3	8·73	73·2	8·38	2·41	2·14
„	3 ×4½	8·9	9·09	75·2	8·27	2·50	2·87
12×¼	3 ×3	5·9	6·54	81·9	12·53	2·78	0·99
„	3 ×4	8·3	7·98	90·8	11·38	3·26	2·23
„	3 ×5	9·5	8·70	95·3	10·96	3·47	3·88
„	3½×5	10·2	9·12	95·6	10·48	3·45	3·73
12×⅜	3 ×3	5·9	8·04	109·4	13·60	2·26	0·87
„	3 ×4	8·3	9·48	122·3	12·90	2·74	1·97
„	3 ×5	9·5	10·20	128·7	12·62	2·96	3·44
„	3½×5	10·2	10·62	128·9	12·14	2·96	3·33
14×⅝	3 ×3	5·9	7·92	148·3	18·73	2·75	0·85
„	3 ×4	8·3	9·36	165·4	17·68	3·31	1·95
„	3 ×5	9·5	10·08	173·8	17·25	3·56	3·42
„	3½×5	10·2	10·50	174·0	16·58	3·58	3·31