DORMAN, LONG & Co. Ld.

IRON & STEEL MANUFACTURERS

MIDDLESBROUGH

ENGLAND

HANDBOOK

FOR

CONSTRUCTIONAL ENGINEERS

CONTAINING

TABLES RELATING TO

STEEL

AND

INFORMATION REGARDING THE PRODUCTS AND MANUFACTURES

OF

DORMAN, LONG & CO., LTD.

MIDDLESBROUGH, ENGLAND

IRON & STEEL MANUFACTURERS
CONSTRUCTIONAL ENGINEERS
BRIDGE BUILDERS
COLLIERY AND MINE OWNERS
BRICK AND ARTIFICIAL STONE MANUFACTURERS

CONTRACTORS TO H.M. GOVERNMENT, THE INDIA, DOMINION AND COLONIAL OFFICES AND TO THE CROWN AGENTS FOR THE COLONIES.

1924

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DORMAN, LONG & CO. LIMITED.

Registered Office :

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ENGLAND.

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TELEPHONE:—MIDDLESBROUGH 2241.

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Telephone - MIDDLESBROUGH 2061.

CLEVELAND STEELWORKS, South Bank.
Telegrams - "DORMAN, MIDDLESBROUGH."
Telephone - 58471 SOUTH BANK.

BRIDGE AND CONSTRUCTIONAL WORKS, Middlesbrough.
Telegrams - "DORSTRUC, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 3821.

REDCAR IRON AND STEELWORKS, Redcar.
Telegrams - "REDCOAT, MIDDLESBROUGH."
Telephone - REDCAR 171.

DORMAN, LONG & CO. LIMITED.

WORKS AND DEPARTMENTS—Continued.

CLARENCE IRON AND STEELWORKS, Middlesbrough.

Telegrams - "DORMAN, PORT CLARENCE."
Telephone - MIDDLESBROUGH 3878.

ACKLAM IRON AND STEELWORKS, Middlesbrough.

Telegrams - "DORMACK, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 2054.

NEWPORT IRONWORKS, Middlesbrough.

Telegrams - "DORNEW, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 2035.

AYRTON SHEET MILLS, Middlesbrough.

Telegrams - "NAMROD, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 3803.

CLEVELAND WIRE MILLS, Middlesbrough.

Telegrams - "RODS, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 3837.

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Telegrams - "BY-PRODUCTS, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 2402.

MINERALS DEPARTMENT, Middlesbrough.

Telegrams - "DORCOAL, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 3402.

PIG IRON DEPARTMENT, Middlesbrough.

Telegrams - "DORIRON, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 3402.

BRICK WORKS AND CONCRETE WORKS.

Telegrams - "DORDOCK, MIDDLESBROUGH."
Telephone - MIDDLESBROUGH 3001.

DORMAN, LONG & CO. LIMITED.

LONDON OFFICES :

55 BROADWAY, WESTMINSTER, S.W.1.

Telegrams - "Pugilism, Sowest, London."
Telephone - Victoria 9600.

London Constructional Yard, Stockyard and Wharf.

NINE ELMS, BATTERSEA, S.W.8.

Telephone - Brixton 1595.

London Office for Sheet and Wire Departments.

110 CANNON STREET, E.C.4.

Telegrams - "Trefileur, Cannon, London."
Telephone - City 2213.

MANCHESTER OFFICE :

9 ALBERT SQUARE.

Telegrams - "Dorlong, Manchester."
Telephone - Blackfriars 2231/2.

NOTTINGHAM :

LLOYDS BANK CHAMBERS, MARKET PLACE.

Telegrams - "Dormanlong, Nottingham."
Telephone - 41123 Nottingham.

INDIA :

DORMAN, LONG & CO., LD., 8 CLIVE STREET, CALCUTTA.

Telegrams - "Dormlong, Calcutta."
Telephone - Calcutta 2659.
Stockyard - Kidderpore, Calcutta.

ASSOCIATED COMPANIES.

SOUTH AFRICA :

WADE & DORMAN, LD.

DURBAN—SOUTH AFRICAN IRONWORKS, ORDNANCE ROAD.

CAPETOWN—WOODSTOCK.

UNION CONSTRUCTION COMPANY, LD.

JOHANNESBURG—BARSDORF BUILDING, MARSHALL STREET.

WORKS :—GERMISTON.

SOUTH AMERICA :

CIA. BRITÁNICA DE CONSTRUCCIONES DE ACERO LTDA.,

CALLE BALCARCE 278,

BUENOS AIRES, ARGENTINE REPUBLIC.

WORKS :—CALLE FERRÉ 1900, NUERA POMPEYA,

BUENOS AIRES.

Telegraphic Address - "Britanica, Buenos Aires."

AGENTS IN THE UNITED KINGDOM.

NEWCASTLE-ON-TYNE.

Alexander Leith & Co., Sun Insurance Buildings, Collingwood Street.

Telegrams - "Echalaz, Newcastle."
Telephone - 24095 Newcastle.

BIRMINGHAM AND SOUTH WALES.

Hesketh Wright & Co., Newton Chambers, Cannon Street Birmingham.

Telegrams - "Steelyard, Birmingham."
Telephone - Central 5425, Birmingham.

SCOTLAND.

Reid & Rennie, 156 St. Vincent Street, Glasgow.

Telegrams - "Renato, Glasgow."
Telephone - Central 145, Glasgow.

SOUTH WALES : (Ferro-Manganese and Spiegeleisen only).

Arthur O'Bree & Son, Commereial Buildings, Port Talbot.

Telegrams - "Probe, Port Talbot."
Telephone - Port Talbot 319.

AGENTS FOR THE SALE OF TRAMRAILS :

ALEX. MCBEAN & SON, LICHFIELD STREET, WOLVERHAMPTON.

Telegrams - "McBean, Wolverhampton."
Telephone - Wolverhampton 609.

AGENTS ABROAD.

AUSTRALIA.

Australian Iron & Steel, Ld., Kembla Building, G.P.O. Box, 794 G.; 58 Margaret Street, Sydney.
Telegrams - "Ironsteel, Sydney."

Australian Iron & Steel, Ld., Constructional Department, 203 Grant Street, South Melbourne.
Telegrams - "Ironsteel, Melbourne."

NEW ZEALAND.

John Duthie & Co., Ld., Wellington, New Zealand.
LONDON OFFICE—23 Lime Street, E.C.3.

N. W. INDIA.

B. R. Herman & Mohatta, Ld., McLeod Road, Karachi.
Stockyard - Karachi.

UGANDA AND KENYA COLONY.

Isherwoods, Ltd., Nairobi, Kenya Colony, British East Africa.
Telegrams - "Barimar, Nairobi."

CHINA.

For Constructional Work :

A. Cameron & Co. (China), Ld.
21 JINKEE ROAD, SHANGHAI.
Telegrams - "Ingots, Shanghai."

For Plain Materials :—

Samuel Osborn & Co., Ld.,
NATIONAL CITY BANK BUILDING, 2A KIUKIANG ROAD, SHANGHAI.
Telegrams - "Handheart, Shanghai."

EGYPT.

Associated British Manufacturers (Egypt), Ld.
CAIRO—Khedivial Buildings, Sharia Emad el Din.
SUDAN—Khartoum.
ALEXANDRIA—13 bis, Rue Fouad Ier.

FRANCE.

La Grande Union des Industries et des Transports de L'Entente.
36 RUE DE LIÈGE, PARIS.
Telegrams - "Guite, Paris."
Telephone - Central 93-96.

AGENTS FOR THE SALE OF FERRO-MANGANESE AND SPIEGELEISEN :

CANADA.

A. C. LESLIE & CO., LD., MONTREAL.

SOUTH AFRICA.

WADE & DORMAN, LD., DURBAN.

AGENT FOR SALE OF SPIEGELEISEN :

U.S.A.

C. W. LEAVITT & CO., 30 CHURCH STREET, NEW YORK CITY.

PRODUCTS.

STEEL BY THE BASIC OPEN HEARTH PROCESS.

BRITANNIA STEELWORKS.

Rolled beams, channels, angles, bulb angles, tees, troughing, bridge and flat bottom rails and other sections for Engineering, Shipbuilding and Constructional Work.

BRIDGE AND CONSTRUCTIONAL WORKS.

Steel Frame Buildings, Workshops, Bridges, Storage Tanks, Pipe Lines and Structural Steelwork of all descriptions.

REDCAR AND CLEVELAND IRON AND STEELWORKS.

Steel Plates for Shipbuilding, Engineering and Constructional Work, including Universal Plates with rolled edges, passing the British Standard Tests, Board of Trade, Admiralty and Lloyds.

CLARENCE IRON AND STEELWORKS.

Blooms, Slabs and Billets of steel, in carbon content ranging from dead soft to 1·25% carbon, for the manufacture of wire, springs, files, saws, forgings, stampings, agricultural implements and motor vehicle parts.

Conductivity steel to stand General Post Office, India Office and British Railway Tests.

Railway rails to British Standard Sections, or to buyers own section and specification.

Speciality—High carbon rails, high silicon rails, and electric conductor rails.

ACKLAM IRON AND STEELWORKS.

Railway rails—both flange and bull head—fishplates, soleplates and sleeper plates to any section.

Grooved girder tram rails and accessories, to British Standard Sections or to buyers own section and specification.

NEWPORT IRONWORKS.

In addition to manufacturing pig iron, details of which will be found under "Pig Iron Department," these works have an extensive slag crushing plant, and the following grades can be supplied :—

Dry and tarred slag	..	for roadmaking.
Dry slag to any gauge	..	for concreting.
Rolled pea slag	..	for drives and footpaths.
Special fine slag	..	for concreting.

AYRTON SHEET MILLS.

Black sheets, close annealed and patent flattened. Galvanized steel sheets, flat or corrugated, curved or plain. Galvanized Scandinavian tiles ; also ridging, rainwater goods and galvanized fittings.

CLEVELAND WIRE MILLS.

Wire rods and bars for ferro-concrete ; galvanized telegraph wire ; fencing wire (galvanized, varnished, barbed and strand) ; signal strand ; submarine cable wire ; galvanized steel hawser wire ; and bright patent and plough steel wire for Colliery and Lift ropes.

COKE AND BY-PRODUCTS.

Coke, tar, creosote, benzol, sulphate of ammonia, and all the chemical by-products of coal.

Note.—There is a large tank installation for the storage of creosote in close proximity to the Company's wharf, with facilities for shipment in bulk.

MINES AND COLLIERIES.

Coal for steam raising, bunkers, coke making, gas producing and household purposes, from :—

Mainsforth Colliery	Ferryhill.
Sherburn Collieries	Nr. Durham.
Browney Colliery	Nr. Durham.
Tursdale Colliery	Ferryhill.
Bowburn Colliery	Nr. Durham.
South Brancepeth Colliery ..	Spennymoor.
Dean and Chapter Colliery ..	Ferryhill.
Auckland Park Colliery ..	Bishop Auckland.
Newfield Colliery	Newfield, Willington, Co. Durham.
Leasingthorne Colliery ..	Bishop Auckland.
Westerton Colliery	Bishop Auckland.

Cleveland Ironstone Mines are as follows :-

Park Pit	Skelton.
Lumpsey and Carlin How ..	Brotton.
Kilton	Brotton.
Spawood	Guisborough.
North Skelton	Skelton-in-Cleveland.
South Skelton	Boosbeck, Skelton-in-Cleveland.
Eston	Eston.

Northampton Ironstone :—

Burley Quarry	Nr. Oakham.

Limestone :—

Parson Byers Quarry ..	Nr. Stanhope.
Newlandside Quarry	Stanhope, Co. Durham.

DORMAN, LONG & CO. LIMITED.

SILICA BRICKS—

For Coke Ovens and Gas Retorts.

GANISTER BRICKS—

For Open Hearth Checkers, Flue Uptakes, etc.

FIREBRICKS—

Lumps, Quarls, Ladle Bricks, and to customers own designs.

Brick Works, Hunwick, near Willington, and South Brancepeth Colliery, near Spennymoor.

PRESSED PLATE BRICKS—

Engineering and Building.
Works, Leasingthorne, Bishop Auckland.

CONCRETE GOODS OF EVERY DESCRIPTION—

Including Flags, Kerbs, Fence and Gate Posts, Steps, Sills, Heads, Mullions, Coping, Cornice, Corbels, Gate Pillars and Caps, Sundials, Bird Baths, Vases.

ARCHITECTURAL DRESSINGS.

CRUSHED ANNEALED SLAG.

ARTIFICIAL STONE—

For Public Buildings, Churches, Hospitals, Schools, Picture Halls, etc.

CONCRETE WORKS : SOUTH BANK.

PREFACE.

THIS reprint of the Handbook is necessary on account of the recent incorporation of the properties of Bolckow, Vaughan & Co., Ld., with those of Dorman, Long & Co., Ld.

The whole of the products and manufactures of the Company are dealt with. The rolled sections conform to the requirements of the New British Standard Sections determined by the British Engineering Standards Association in 1924.

The computations of the data have been carried out by our own staff and will be found to be in accordance with the best modern practice.

The accuracy attained in the calculations enables us confidently to recommend the use of the book to Architects, Engineers, and all those engaged in Bridge Building, Constructional Engineering, Shipbuilding and Allied Industries, for which our products are suitable.

DORMAN, LONG & CO. LIMITED.

Our Bridge and Constructional Works—Middlesbrough, having installed a powerful hydraulic press can now supply a large variety of pressed flooring. Full particulars of the present range of standard sections are given on pages 209A to 209D and particulars of other sections of flooring and kerbs on pages 209E and 209F. Arrangements can, however, be made to supply other sections when the tonnage required warrants the purchase of the necessary tools.

We take the opportunity of acknowledging the kind permission of the British Engineering Standards Association to include in the Handbook a copy of the "British Standard Specification of Structural Steel for Bridges, &c., and General Building Construction, No. 15—revised May, 1930," and their sanction to make use of the tables of properties of British Standard Sections published by the Association.

DORMAN, LONG & COMPANY, LIMITED.

GENERAL NOTES.

STEEL.

All Dorman, Long & Co.'s steel is manufactured by the BASIC OPEN HEARTH Process, which ensures a reliable and uniform product.

TESTS.

The Company's standard product will give the following results under test :—

28/33 tons tensile stress per square inch.
20% elongation in eight inches.
40% reduction of area at point of fracture.

The Steel meets the requirements of His Majesty's Government, British Standard Specifications, The London County Council, Lloyd's and other surveys, and Railways at home and abroad.

STRESS.

There has been in recent times a tendency towards a somewhat increased tensile strength of steel ; the British Engineering Standards Association has already raised its upper limit to 33 tons per square inch.

Under these circumstances, the tables given in this Handbook are based on a safe extreme fibre stress of 8 tons per square inch, this being, in the Company's experience, a perfectly safe limit.

SPECIAL STEEL.

Such as Copper Bearing Steel, Admiralty " D " and " D. 1," and other High Tensile Steels, can be supplied to meet Customers' requirements.

ROLLING MARGINS.

The usual Trade margin is claimed in rolling sectional material, namely $2\frac{1}{2}\%$ above or below the dimensions and weights listed.

Sections, whether from rolls or stock, are cut to a margin of 1in. over or under specified lengths. An extra is charged for cutting to within $\frac{1}{8}$in. of exact length, and for machining square.

BRITISH STANDARD SECTIONS.

Full information as to the dimensions and properties of the New British Standard Sections is given, and a wider range of tables will be found in this Handbook than in the Company's previous publications.

Some time will, of course, elapse before the New British Standard Sections are adopted generally, and some of the Old British Standard Sections will be on the market until the rolls for these sections are out of use. It is, therefore, necessary in the present issue to give particulars of the old as well as the new sections. Particulars of the old sections are printed on PINK PAPER to enable them readily to be found and distinguished from those of the New British Standards. Other sections, which have on occasions been rolled by the Company to meet a special demand, will also be found on the pink paper.

PLATES.

The Plate Mills manufacture ordinary plates up to 108in. wide, and, in addition, plates from a Universal Mill, with Rolled Edges, up to 45in. wide. Universal Plates are suitable for all classes of constructional steelwork and structures or plant of any kind in which Plates are used. The rolled edges being parallel eliminate shearing and edge planing, thereby affording to the user a great reduction in labour and waste.

Full particulars are given as to sizes of ordinary and Universal Plates.

BRIDGE & CONSTRUCTIONAL WORKS.

The Bridge and General Constructional Works at Middlesbrough are well equipped with thoroughly modern plant for the rapid fabrication of all classes of structural work, including Bridges, Steel Frame Buildings, Workshops, Storage Tanks and Steel Pipes of all sizes. The Company also maintains Constructional Shops with up-to-date equipment at Nine Elms, London, and at Calcutta, India.

The Company is associated for structural work with Wade & Dorman, Ld., who have shops at Durban and Johannesburg, and with The British Structural Steel Co., Ld., who have shops at Buenos Aires.

All these establishments are well equipped for the execution of orders for all classes of structural work, and maintain extensive stocks of material.

Whilst every Steel Frame Building or Structure demands individual treatment in design, it has been found possible to standardize the details of Constructional Work in order to secure economy to the Customer. It will enable the Company to ensure quicker delivery of material if standard details and workmanship are specified whenever possible.

Large technical Staffs are employed, and the Company is prepared to submit designs and estimates.

PIG IRON.

In addition to the Company's output of basic pig iron for their own steel furnaces, they manufacture for the market the following well-known brands of pig iron :—

Brand.	Iron.
" Clarence "	Special, Cleveland and Basic.
" Redcar "	Cleveland and Basic.
" Acklam "	Do. do.
" B.S. Newport "	Do. do.
" B.S. Hematite "	
" Cleveland "	Cleveland.
" B. V."	Sandless and Sand Cast Basic.

COAL SHIPPING PLANT.

In order to save the necessity of vessels that bring cargoes of raw materials to Middlesbrough having to proceed to other ports to load return cargoes of Coal or Coke, the Company has just completed a modern Coaling Plant capable of bunkering and loading steamers up to 6,000 tons capacity with four holds, without movement.

This Plant is situated at the Company's Port Clarence Wharf on the North Bank of the River Tees.

The Plant is of latest design and efficiency, and is capable of shipping at the rate of 500 tons of Coal or 300 tons of Coke per hour ; thus immensely improving upon the facilities which have hitherto existed in the river, and offering vessels the quickest possible despatch.

SHIPPING FACILITIES.

The Company's wharves on the River Tees are as follows :—

	Length of Wharf	Length of Dredged Berth	Depth of Water High Water Spring Tides	Depth of Water High Water Neap Tides	No. of Cranes	Steam or Electric	Size of Vessels Berthed		
							Max. Length	Max. Beam	Max. Draft
	FT.	FT.	FT.	FT.			FT.	FT.	FT. IN.
CLARENCE									
Upper Wharf	1037	900	27	22	6	4 Electric 2 Steam	420	56	26 0
Lower Wharf	800	800	31	26	4	Electric	420	56	30 0
REDCAR	500	410	32	30	3	Electric	400	50	24 8
NEWPORT									
Upper Wharf	490	490	25	21	4	Steam	300	38	21 0
Lower Wharf	400	400	27	23	4	Electric	400	53	23 0
BRITANNIA	415	450	23	20	3	Electric	360	55	23 0
SOUTH BANK WHARF—									
Deep Water Berth	958	947	31	26	9	Electric	380	52	31 0
Shallow Water Berth	619	608	24	19			380	52	24 0

There are also adequate railway connections with Middlesbrough Docks, from which regular and frequent sailings take place to all parts of the World.

The wharf at the Company's Nine Elms Constructional Works on the Thames at Battersea, is 350 feet long and provided with ample facilities for discharging the steel which comes by sea from Middlesbrough, and for barging fabricated steelwork to customers' wharves on the Thames.

REDCAR & CLEVELAND IRON & STEEL WORKS

IRON & STEEL WORKS

ROLLING MILLS

STEEL PLATES

REDCAR & CLEVELAND IRON AND STEEL WORKS

BASIC OPEN HEARTH STEEL

STEEL PLATES

for Shipbuilding, Engineering and Constructional Work, Pipe Lines, etc.

UNIVERSAL PLATES

with PARALLEL ROLLED Edges suitable for Constructional Steelwork and Structures or Plant of any kind in which plates are used.

BRANDS: "DORMAN'S REDCAR STEEL"
"DORMAN'S CLEVELAND STEEL"

STAMPED ON ALL STEEL PLATES.

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF STEEL PLATES ROLLED.

SHIPBUILDING THICKNESSES.

Thickness Inches		Length Feet	Max. Width Inches	Max. Area Square Feet	Diameter Inches
Twentieths	Decimals				
$\frac{3}{16}$ ...	·1875	30	72	120	72
... $\frac{5}{20}$	·25	35	90	260	90
$\frac{6}{20}$ ...	·30	40	96	280	96
... $\frac{7}{20}$	·35	50	96	320	96
$\frac{8}{20}$ ...	·40	65	100	335	100
... $\frac{9}{20}$	·45	65	105	360	105
$\frac{10}{20}$ ...	·50				
... $\frac{11}{20}$	·55				
$\frac{12}{20}$ ...	·60	65	108	360	108
... $\frac{13}{20}$	·65				
$\frac{14}{20}$ ...	·70				
... $\frac{15}{20}$	·75				
$\frac{16}{20}$ ...	·80				
... $\frac{17}{20}$	·85	65	108	360	108
$\frac{18}{20}$ ...	·90				
... $\frac{19}{20}$	·95				
1 ...	1·00	65	108	360	108
... $1\frac{2}{20}$	1·10	65	108	300	108
$1\frac{5}{20}$ ...	1·25	65	108	280	108
... $1\frac{8}{20}$	1·40	65	108	250	108
$1\frac{10}{20}$ ...	1·50	60	108	230	108
... $1\frac{15}{20}$	1·75	60	108	200	108
2 ...	2·00	50	108	180	108
... $2\frac{5}{20}$	2·25	40	106	160	106
$2\frac{10}{20}$ ...	2·50	40	106	140	106
... $2\frac{15}{20}$	2·75	40	106	130	106
3 ...	3·00	40	106	120	106

The widths are the maxima, but the lengths and areas may be increased for Plates below the maximum width, subject to approved Specification.

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF STEEL PLATES ROLLED.

CONSTRUCTIONAL THICKNESSES.

Thickness Inches			Length Feet	Max. Width Inches	Max. Area Square Feet	Diameter Inches
Sixteenths		Decimals				
...	$\frac{3}{16}$	·1875	30	72	120	72
$\frac{1}{4}$	...	·25	35	90	260	90
...	$\frac{5}{16}$	·3125	40	96	280	96
$\frac{3}{8}$	...	·375	65	100	335	100
...	$\frac{7}{16}$	·4375	65	105	360	105
$\frac{1}{2}$	...	·50	65	108	360	108
...	$\frac{9}{16}$	·5625				
$\frac{5}{8}$	...	·625				
...	$\frac{11}{16}$	·6875				
$\frac{3}{4}$	...	·75	65	108	360	108
...	$\frac{13}{16}$	·8125				
$\frac{7}{8}$	...	·875				
...	$\frac{15}{16}$	·9375				
1	...	1·00	65	108	360	108
...	$1\frac{1}{8}$	1·125	65	108	300	108
$1\frac{1}{4}$	...	1·25	65	108	280	108
...	$1\frac{3}{8}$	1·375	65	108	250	108
$1\frac{1}{2}$	...	1·50	60	108	230	108
...	$1\frac{5}{8}$	1·625	60	108	210	108
$1\frac{3}{4}$	...	1·75	60	108	200	108
...	$1\frac{7}{8}$	1·875	50	108	180	108
2	...	2·00	50	108	180	108
...	$2\frac{1}{4}$	2·25	40	106	160	106
$2\frac{1}{2}$	...	2·50	40	106	140	106
...	$2\frac{3}{4}$	2·75	40	106	130	106
3	...	3·00	40	106	120	106

The widths are the maxima, but the lengths and areas may be increased for Plates below the maximum width, subject to approved Specification.

DORMAN, LONG & CO. LIMITED.

UNIVERSAL MILL PLATES—MAXIMUM SIZES.

Width in Inches	THICKNESS IN INCHES												
	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 3/8
	EXTREME LENGTH IN FEET												
12	..	..	90	90	90	90	90	90	90	90	80	72	65
13	..	..	90	90	90	90	90	90	90	90	80	72	65
14	..	90	90	90	90	90	90	90	90	90	80	72	65
15	85	90	90	90	90	90	90	90	90	90	80	72	65
16	85	90	90	90	90	90	90	90	90	90	80	72	65
17	85	90	90	90	90	90	90	90	90	90	80	72	65
18	85	90	90	90	90	90	90	90	90	90	80	72	65
19	85	90	90	90	90	90	90	90	90	90	80	72	65
20	85	90	95	95	95	95	95	95	95	90	80	72	65
21	85	90	95	95	95	95	95	95	95	90	80	72	65
22	85	90	95	95	95	95	95	95	95	90	80	72	65
23	85	90	95	95	95	95	95	95	95	90	80	72	65
24	85	90	95	95	95	95	95	95	95	90	80	72	65
25	85	90	95	95	95	95	95	95	95	90	80	72	65
26	..	90	95	95	95	95	95	95	95	90	80	72	65
27	..	90	95	95	95	95	95	95	95	90	80	72	65
28	..	80	95	95	95	95	95	95	95	90	80	72	65
29	..	80	95	95	95	95	95	95	95	90	80	72	65
30	..	80	95	95	95	95	95	95	95	90	80	72	65
31	..	80	95	95	95	95	95	95	95	90	80	72	65
32	..	80	80	85	95	95	95	95	95	90	80	72	65
33	..	80	80	85	95	95	95	95	95	90	80	72	65
34	..	80	80	85	95	95	95	95	95	90	80	72	65
35	..	80	80	85	95	95	95	95	95	90	80	72	65
36	..	80	80	85	95	95	95	95	90	90	80	72	65
37	..	..	80	85	95	95	95	95	90	80	75	65	60
38	..	..	80	85	95	95	95	95	90	80	75	60	60
39	..	..	80	85	95	95	95	95	90	80	75	60	60
40	..	..	80	85	95	95	95	95	80	75	70	60	55
41	..	..	80	85	95	95	95	95	80	75	70	60	55
42	..	..	80	85	95	95	95	95	80	70	70	60	55
43	..	..	80	85	95	95	95	95	80	70	65	55	50
44	..	..	80	85	95	95	95	95	80	70	65	55	50
45	..	..	80	85	95	95	95	95	80	70	65	55	50

Intermediate widths can be supplied.

For any intermediate size, use length given for next larger size.

DORMAN, LONG & CO. LIMITED.

UNIVERSAL MILL PLATES—MAXIMUM SIZES.

THICKNESS IN INCHES												Width in Inches
1½	1⅝	1¾	1⅞	2	2¼	2⅜	2½	2⅝	2¾	2⅞	3	
EXTREME LENGTH IN FEET												
60	55	50	48	45	40	38	32	28	26	25	24	12
60	55	50	48	45	40	38	32	28	26	25	24	13
60	55	50	48	45	40	38	32	28	26	25	24	14
60	55	50	48	45	40	38	32	28	26	25	24	15
60	55	50	48	45	40	38	32	28	26	25	24	16
60	55	50	48	45	40	38	32	28	26	25	24	17
60	55	50	48	45	40	38	32	28	26	25	24	18
60	55	50	48	45	40	38	32	28	26	25	24	19
60	55	50	48	45	40	38	32	28	26	25	24	20
60	55	50	48	45	40	38	32	28	26	25	24	21
60	55	50	48	45	40	38	32	28	26	25	24	22
60	55	50	48	45	40	38	32	28	26	25	24	23
60	55	50	48	45	40	38	32	28	26	25	24	24
60	55	50	48	45	40	38	32	28	26	25	24	25
60	55	50	48	45	40	38	32	28	26	25	24	26
60	55	50	48	45	40	38	32	28	26	25	24	27
60	55	50	48	45	40	38	32	28	26	25	24	28
60	55	50	48	45	40	38	32	28	26	25	24	29
60	55	48	45	42	35	34	32	28	26	25	24	30
60	55	48	45	42	35	34	32	28	26	25	24	31
60	55	48	45	42	35	34	32	28	26	25	24	32
60	55	48	45	42	35	34	32	28	26	25	24	33
60	55	48	45	40	35	34	32	28	26	25	24	34
60	55	48	45	40	35	34	32	28	26	24	23	35
60	55	48	45	40	35	34	32	28	26	24	23	36
55	50	48	45	40	30	30	30	26	24	24	23	37
55	50	46	43	40	30	30	30	26	24	24	23	38
55	45	40	38	35	30	30	30	26	24	24	23	39
50	45	40	38	35	30	30	30	26	24	24	23	40
50	45	40	38	35	30	30	30	26	24	24	23	41
50	45	40	38	35	30	30	30	26	24	24	23	42
45	40	40	38	35	30	30	30	26	24	24	23	43
45	40	40	35	35	30	30	30	26	24	24	23	44
45	40	38	35	30	30	30	30	26	24	24	23	45

Rolling allowances on width specified $\frac{1}{8}$" over and $\frac{1}{8}$" under.

SLABS FOR STANCHION BASES.

Slabs suitable for Stanchion Bases can be supplied up to 12 inches thick. An illustration of such a Base is shewn on Page 161.

Slabs up to about 8 inches thick can be supplied with two rolled edges from the Universal Mill, provided a sufficient number of the same width and thickness are ordered at one time.

NOTES ON SECTIONS.

REFERENCE MARKS.—The reference marks determined by the British Engineering Standards Association for the new British Standard Sections have been generally adopted throughout this work as a ready means of identification, but other sections for which rolls are still available and those to meet special demand, which are tabulated on the pink pages, retain the reference marks given in our previous issues of the "Pocket Companion."

WEIGHT OF STEEL.—All calculations for weights are based on a piece of steel one square inch sectional area and one foot long, weighing 3·4 lbs., or one cubic foot of steel weighing 489·6 lbs.

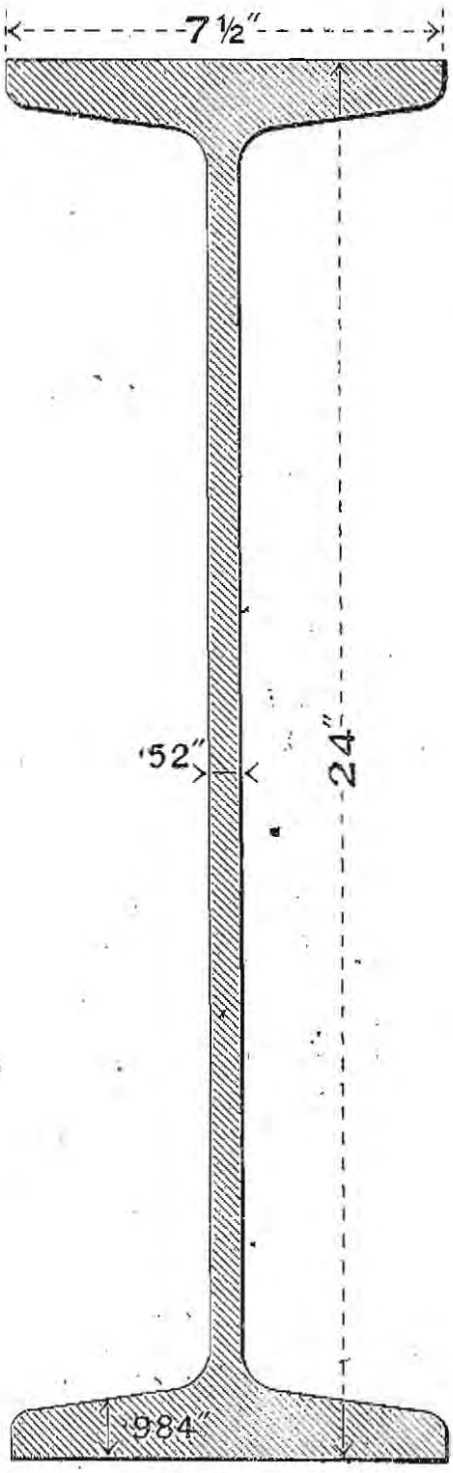
MODE OF ORDERING MATERIAL.—Beams, Channels and Bulb Angles should be specified according to the weights per foot given in the diagrams and tables, Rails to the published weights per yard, but Angles, Tees, Flats, etc., to the thicknesses required.

VARIATIONS FROM PUBLISHED WEIGHTS OR THICKNESSES.—The minimum weights or thicknesses given on the diagrams and tables cannot be decreased, but may be exceeded if the tonnage ordered is sufficient to warrant a change being made; the effect upon the profile being as indicated on page 55.

It should be observed, however, that such change is only of limited extent.

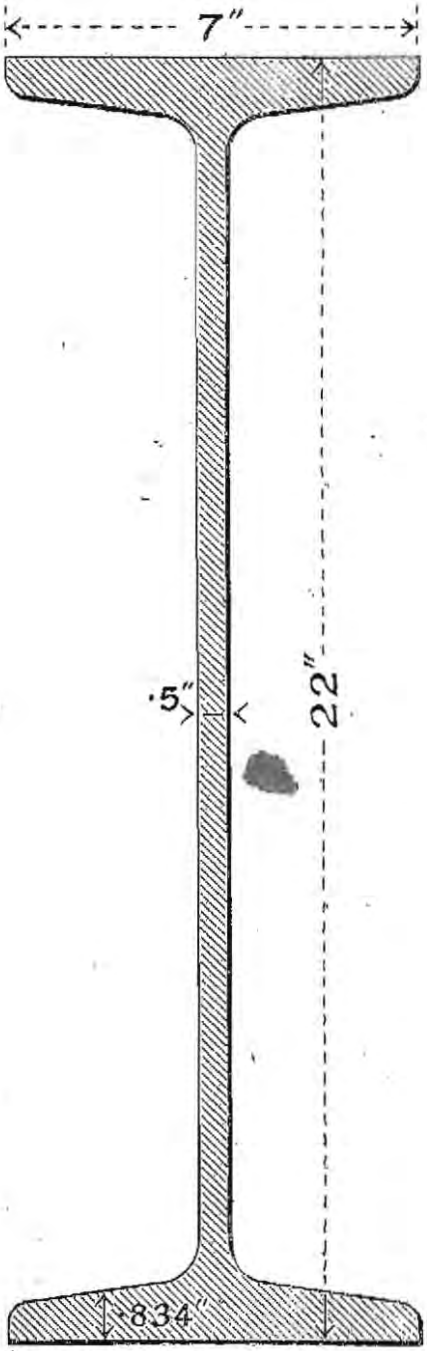
BEAMS

(GIRDER SECTIONS)



N.B.S.B. 18.

24" × 7½" × 90 lbs per foot.



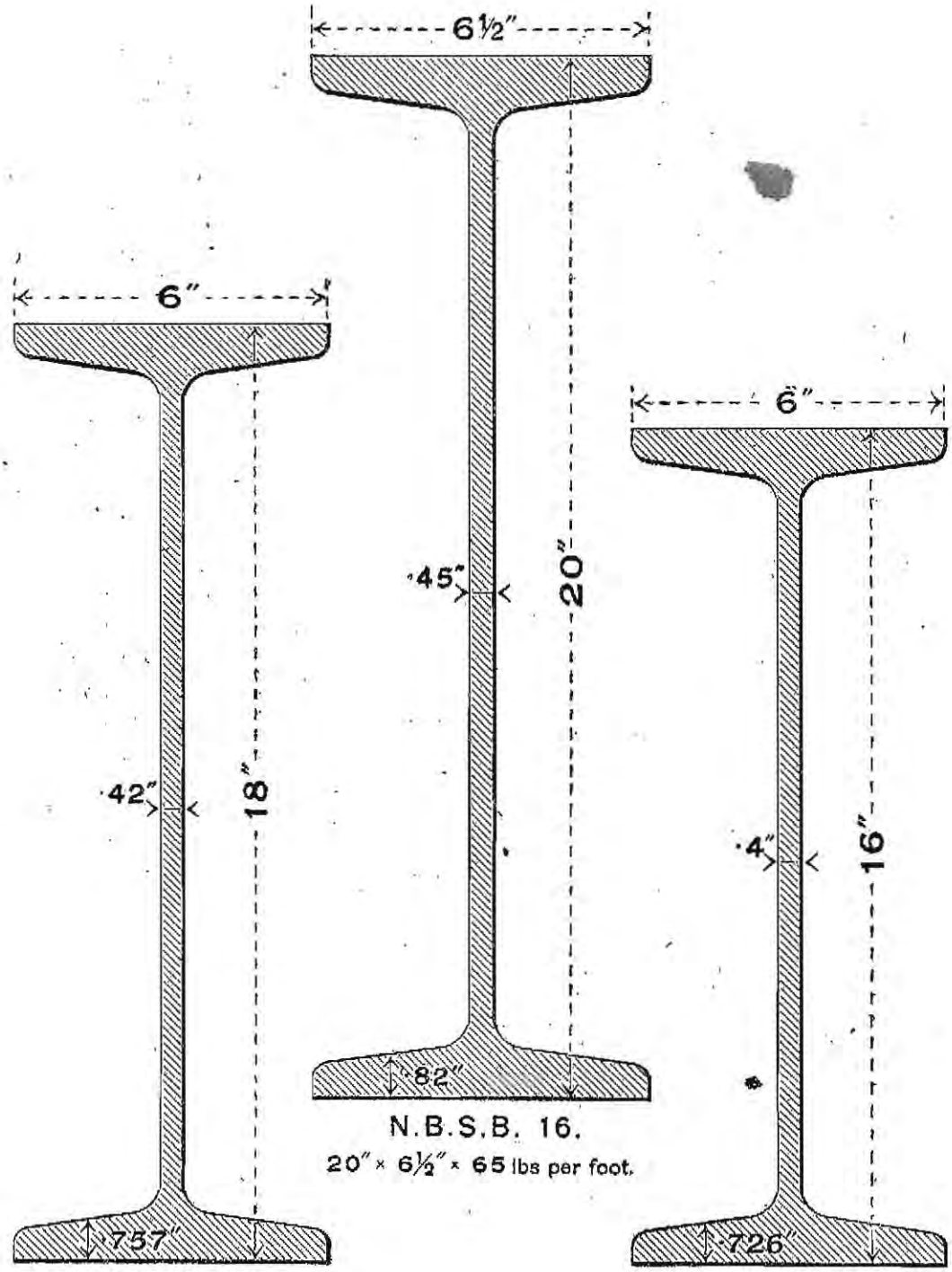
N.B.S.B. 17.

22" × 7" × 75 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

BEAMS

(GIRDER SECTIONS)



N.B.S.B. 16.
20" × 6½" × 65 lbs per foot.

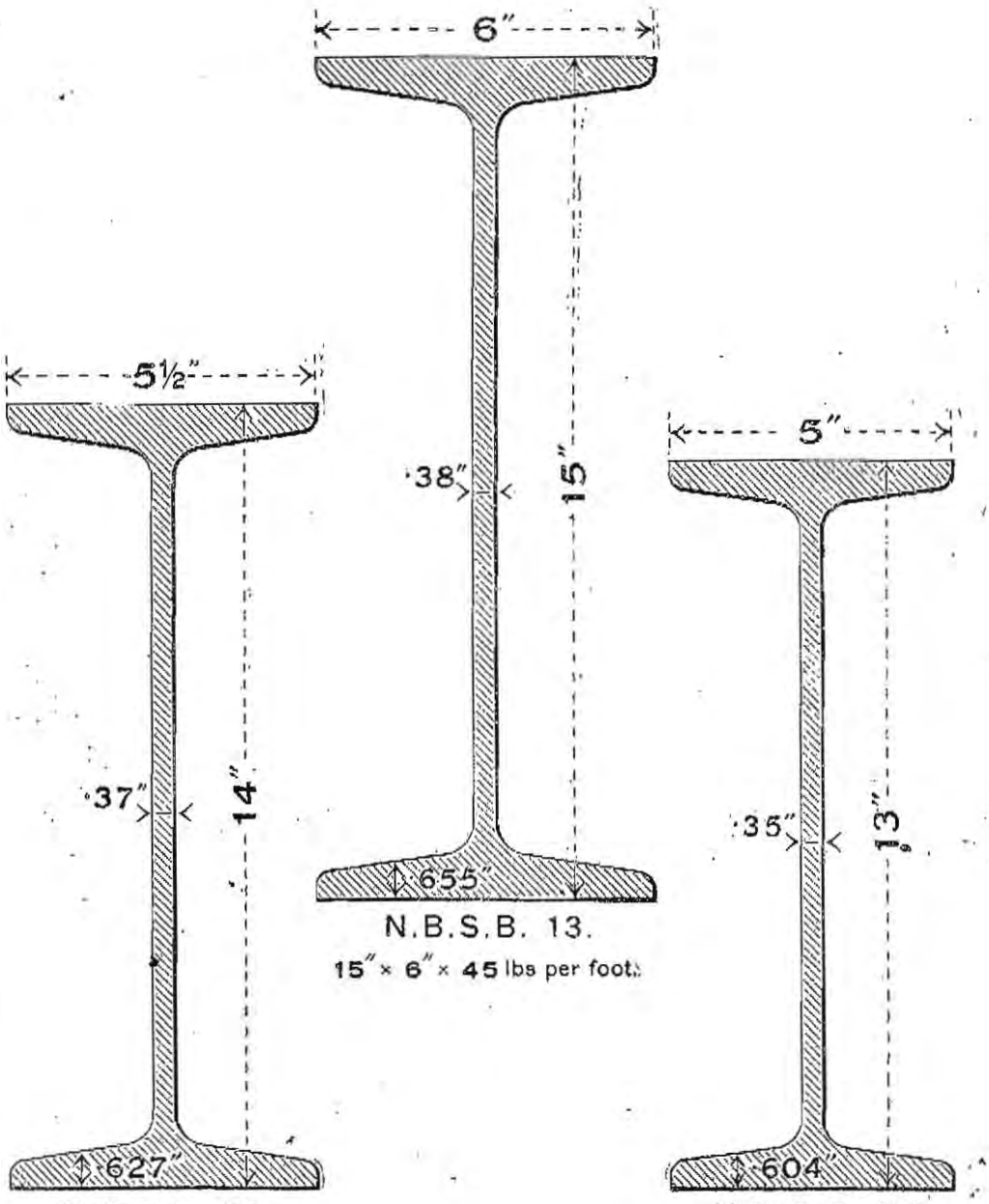
N.B.S.B. 15.
18" × 6" × 55 lbs per foot.

N.B.S.B. 14.
16" × 6" × 50 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

BEAMS

(GIRDER SECTIONS)



N.B.S.B. 13.
15" × 6" × 45 lbs per foot.

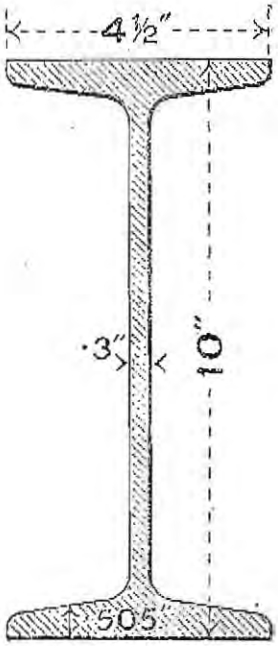
N.B.S.B. 12.
14" × 5½" × 40 lbs per foot.

N.B.S.B. 11.
13" × 5" × 35 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

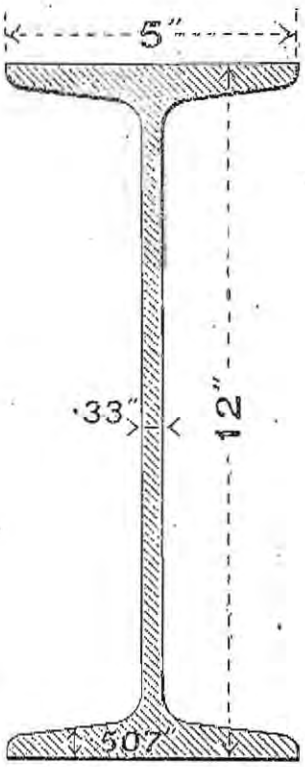
BEAMS

(GIRDER SECTIONS)



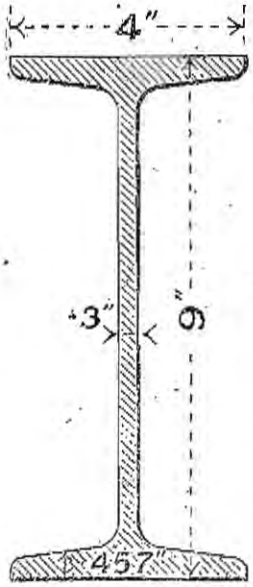
N.B.S.B 9.

10" × 4½" × 25 lbs per foot.



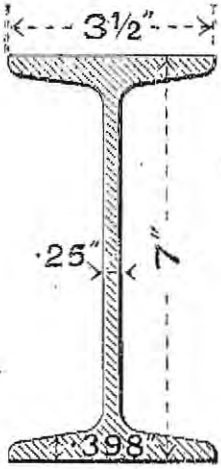
N.B.S.B. 10.

12" × 5" × 30 lbs per foot.



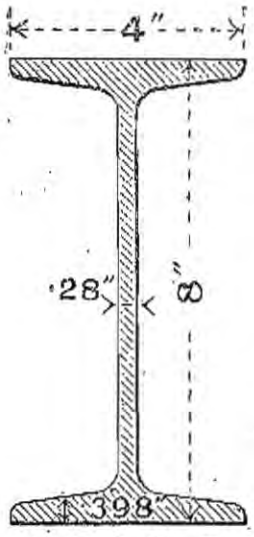
N.B.S.B. 8.

9" × 4" × 21 lbs per foot.



N.B.S.B. 6.

7" × 3½" × 15 lbs per foot.



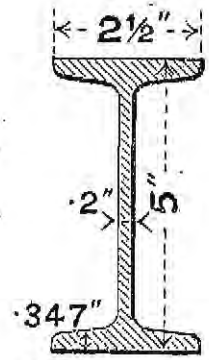
N.B.S.B. 7.

8" × 4" × 18 lbs per foot

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

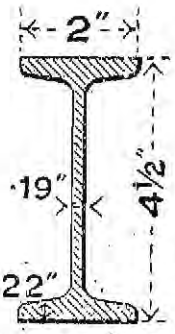
BEAMS

(GIRDER SECTIONS)



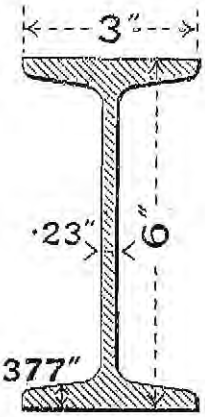
N.B.S.B. 4.

5" × 2½" × 9 lbs per foot.



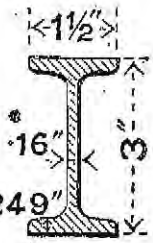
N.B.S.B. 3.

4½" × 2" × 7 lbs per foot.



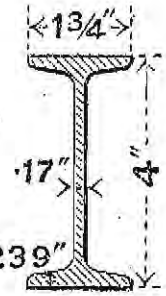
N.B.S.B. 5.

6" × 3" × 12 lbs per foot.



N.B.S.B. 1.

3" × 1½" × 4 lbs per foot.



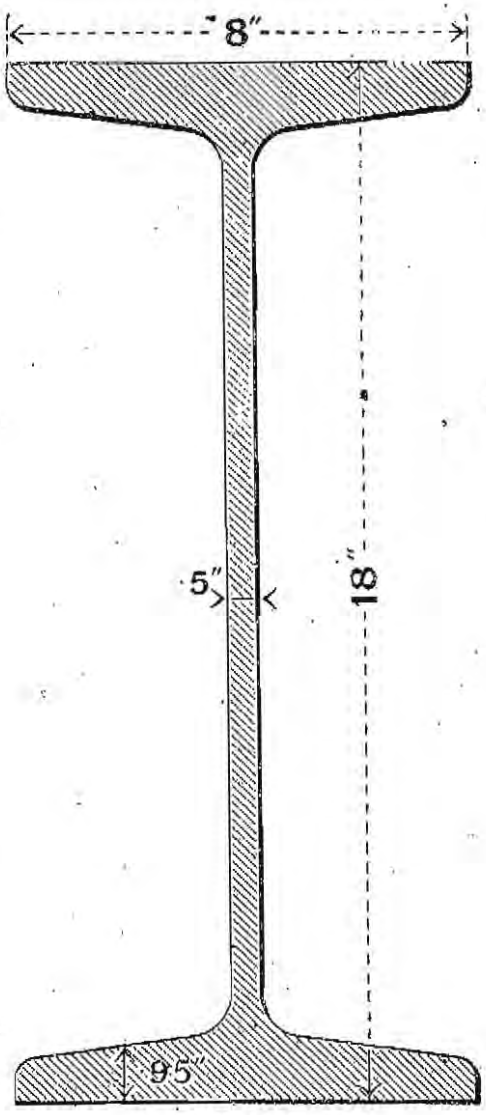
N.B.S.B. 2.

4" × 1¾" × 5 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

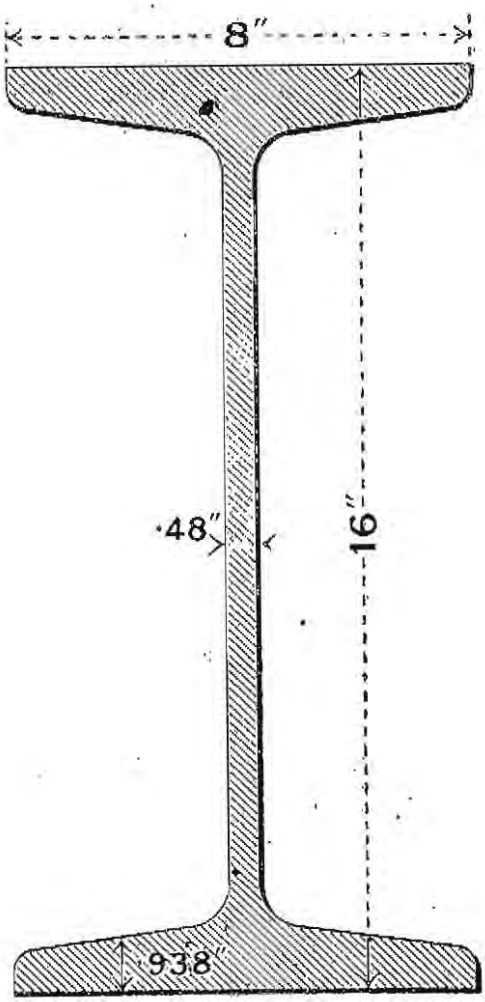
BEAMS

(HEAVY BEAMS AND PILLARS)



N.B.S.H.B. 11.

18″ × 8″ × 80 lbs per foot.



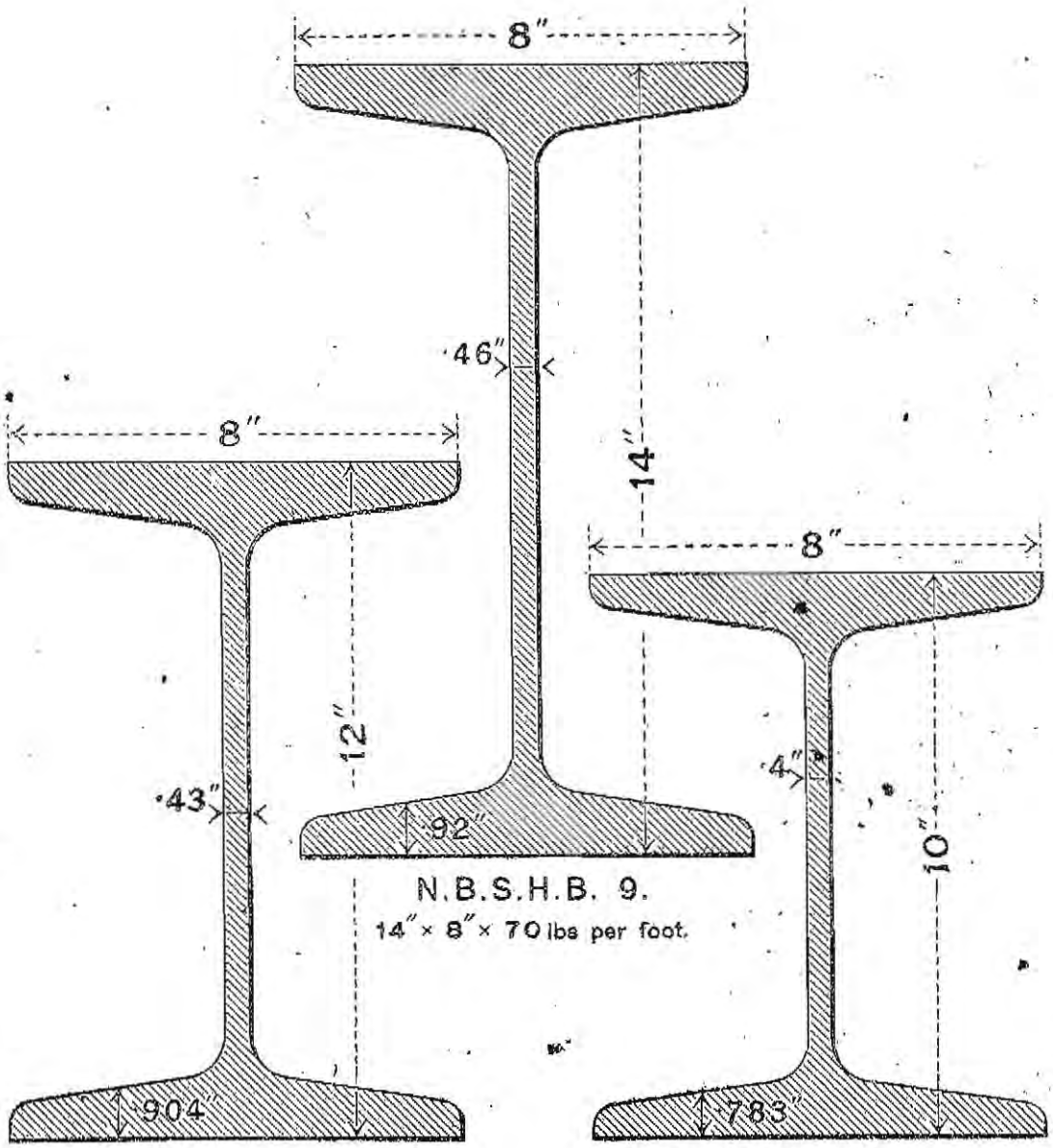
N.B.S.H.B. 10.

16″ × 8″ × 75 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

BEAMS

(HEAVY BEAMS AND PILLARS)



N.B.S.H.B. 9.
14" × 8" × 70 lbs per foot.

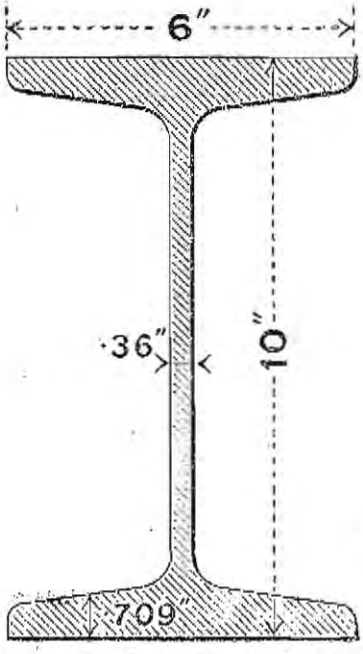
N.B.S.H.B. 8.
12" × 8" × 65 lbs per foot.

N.B.S.H.B. 7.
10" × 8" × 55 lbs per foot.

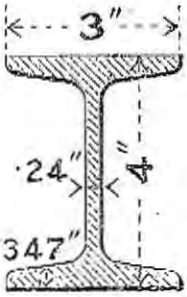
FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

BEAMS

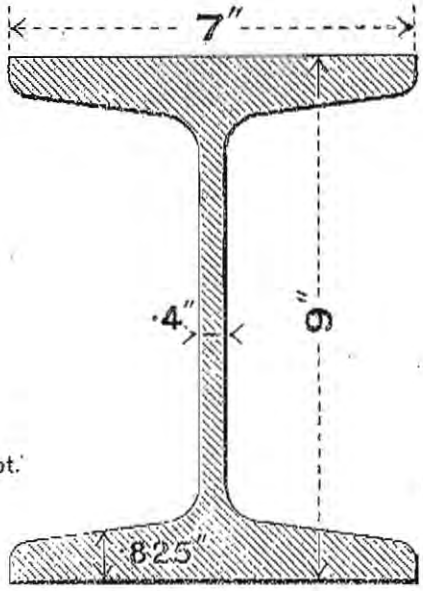
(HEAVY BEAMS AND PILLARS)



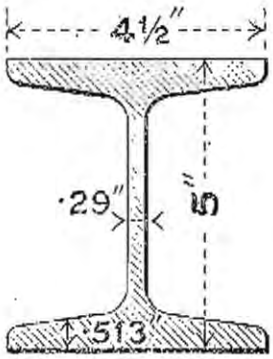
N.B.S.H.B. 6.
10" × 6" × 40 lbs per foot.



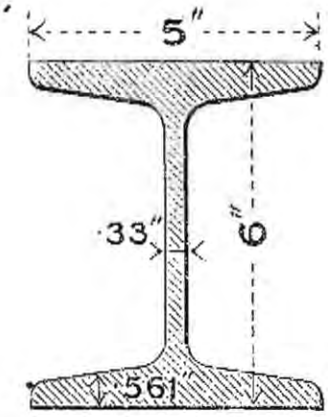
N.B.S.H.B. 1
4" × 3" × 10 lbs per foot.



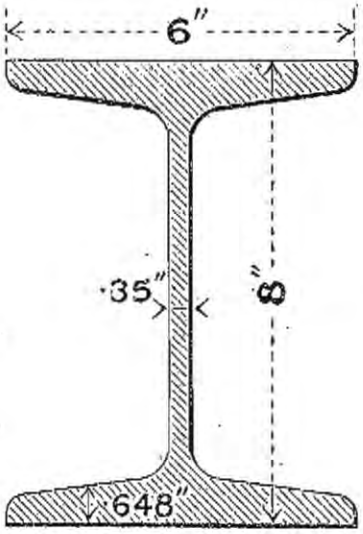
N.B.S.H.B. 5.
9" × 7" × 50 lbs per foot.



N.B.S.H.B. 2.
5" × 4½" × 20 lbs per foot.



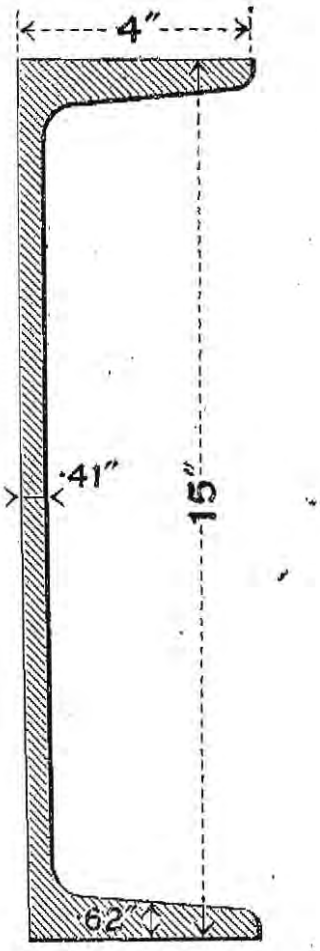
N.B.S.H.B. 3.
6" × 5" × 25 lbs per foot.



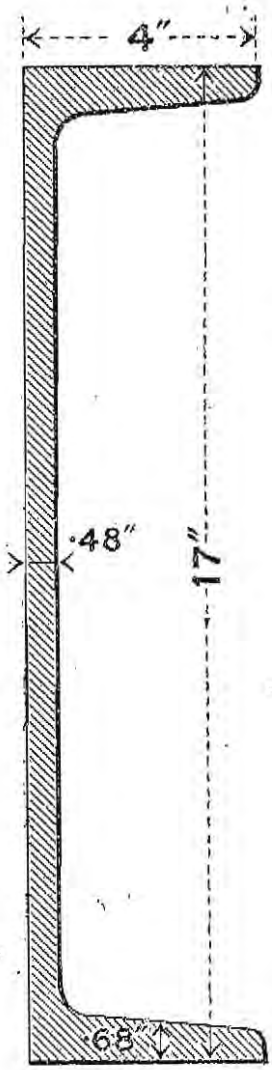
N.B.S.H.B. 4.
8" × 6" × 35 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 58, 59, 72 AND 73.

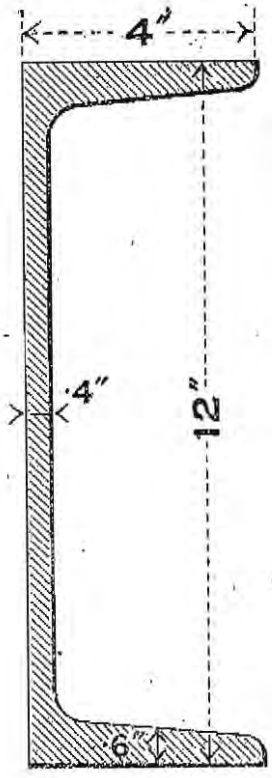
CHANNELS



N.B.S.C. 17.
15″ × 4″ × 36·37 lbs per ft.



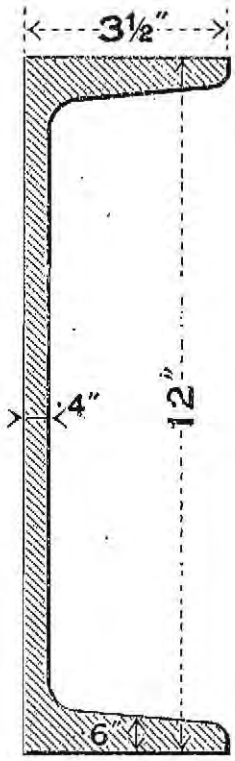
N.B.S.C. 18.
7″ × 4″ × 44·34 lbs per ft.



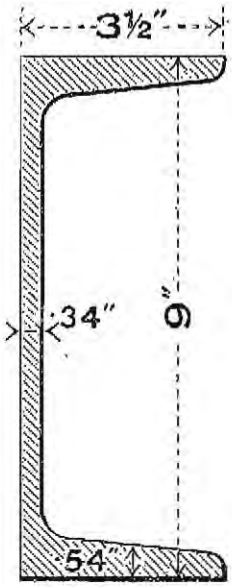
N.B.S.C. 16.
12″ × 4″ × 31·33 lbs per ft.

FOR TABLE OF PROPERTIES SEE PAGES 60 AND 61.

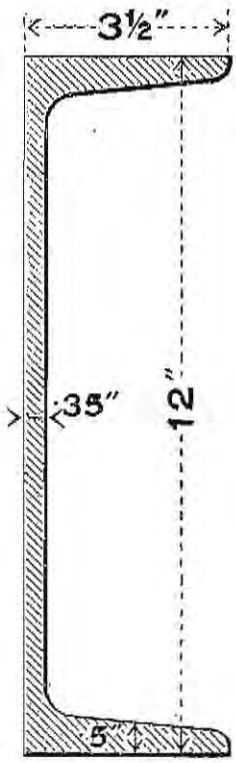
CHANNELS



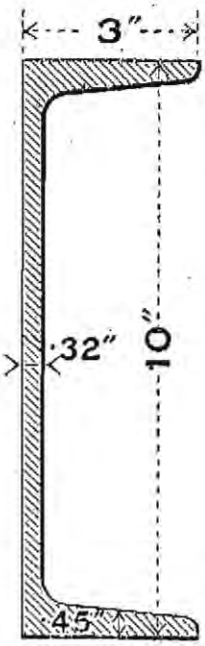
N.B.S.C. 15.
12" × 3½" × 29·23 lbs per ft.



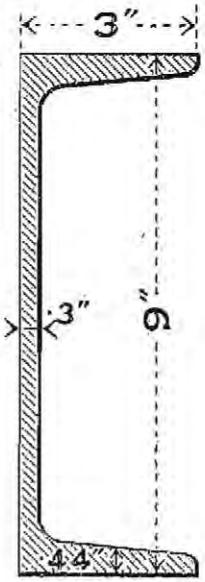
N.B.S.C. 11.
9" × 3½" × 22·27 lbs per ft.



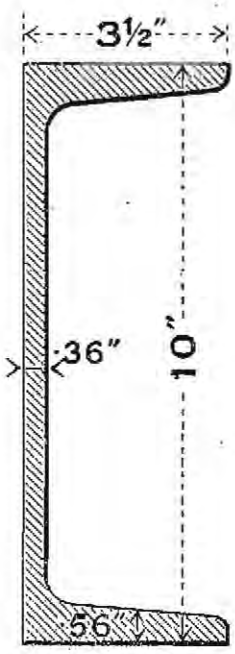
N.B.S.C. 14.
12" × 3½" × 25·25 lbs per ft.



N.B.S.C. 12.
10" × 3" × 19·28 lbs per ft.



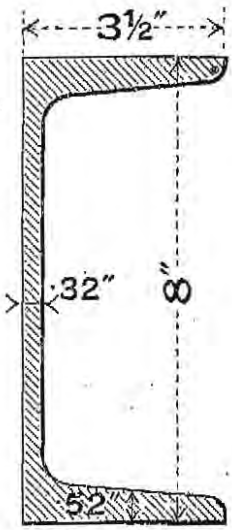
N.B.S.C. 10.
9" × 3" × 17·46 lbs per ft.



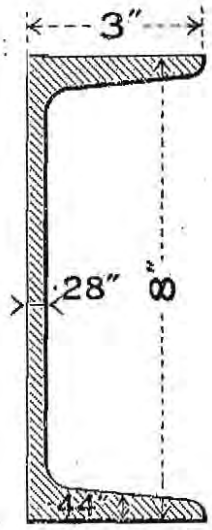
N.B.S.C. 13.
10" × 3½" × 24·46 lbs per ft.

FOR TABLE OF PROPERTIES SEE PAGES 60 AND 61.

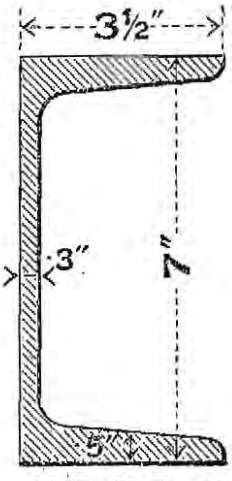
CHANNELS



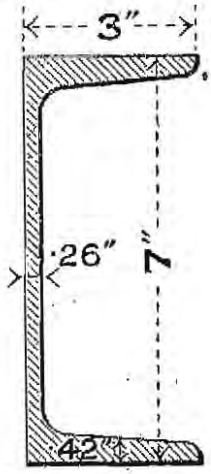
N.B.S.C. 9.
8"× 3½"× 20·21 lbs per ft.



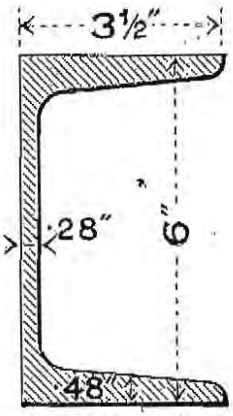
N.B.S.C. 8.
8"× 3"× 15·96 lbs per ft.



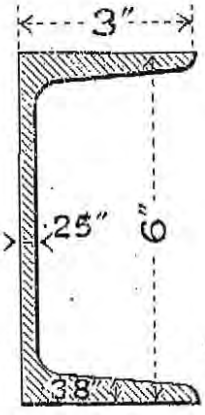
N.B.S.C. 7.
7"× 3½"× 18·28 lbs per ft.



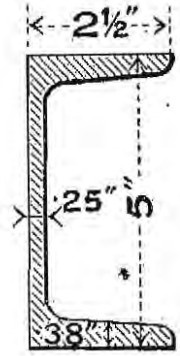
N.B.S.C. 6.
7"× 3"× 14·22 lbs per ft.



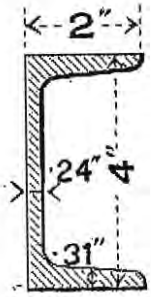
N.B.S.C. 5.
6"× 3½"× 16·48 lbs per ft.



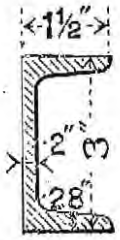
N.B.S.C. 4.
6"× 3"× 12·41 lbs per ft.



N.B.S.C. 3.
5"× 2½"× 10·22 lbs per ft.



N.B.S.C. 2.
4"× 2"× 7·09 lbs per ft.



N.B.S.C. 1.
3"× 1½"× 4·6 lbs per ft

FOR TABLE OF PROPERTIES SEE PAGES 60 AND 61.

UNEQUAL ANGLES

N.B.S.U.A. 20.
Thicknesses
7/16", 9/16", 11/16".

N.B.S.U.A. 19.
Thicknesses
7/16", 5/8", 13/16".

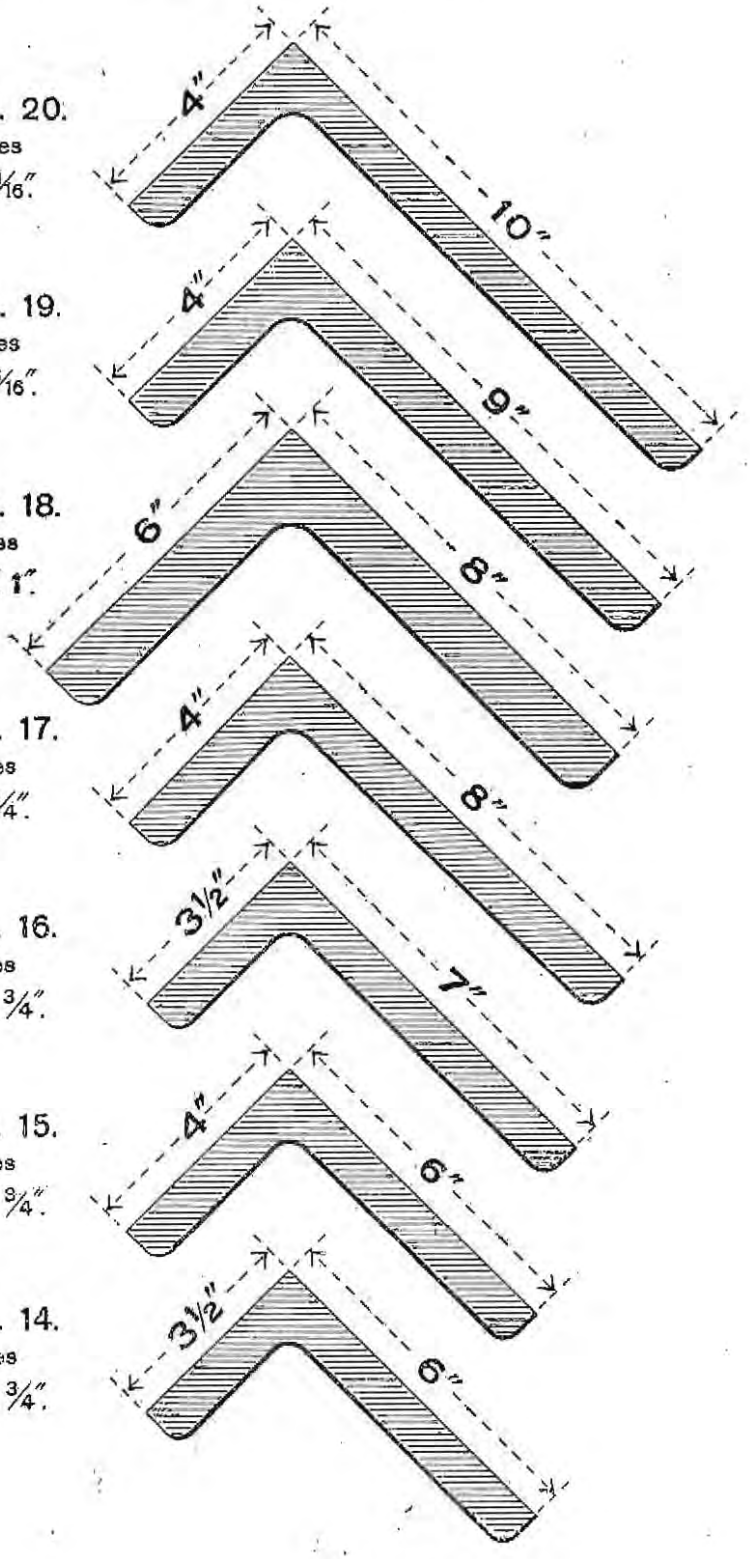
N.B.S.U.A. 18.
Thicknesses
1/2", 5/8", 3/4", 1".

N.B.S.U.A. 17.
Thicknesses
7/16", 5/8", 3/4".

N.B.S.U.A. 16.
Thicknesses
3/8", 1/2", 5/8", 3/4".

N.B.S.U.A. 15.
Thicknesses
3/8", 1/2", 5/8", 3/4".

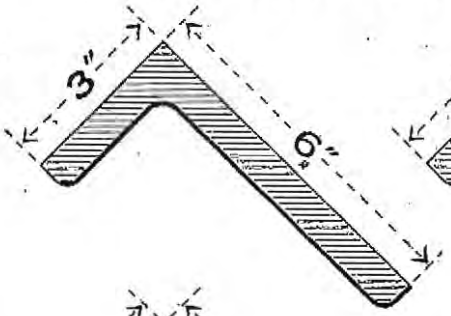
N.B.S.U.A. 14.
Thicknesses
3/8", 1/2", 5/8", 3/4".



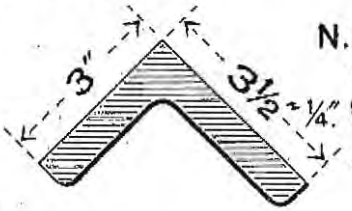
FOR TABLE OF PROPERTIES SEE PAGES 62 AND 63.

UNEQUAL ANGLES

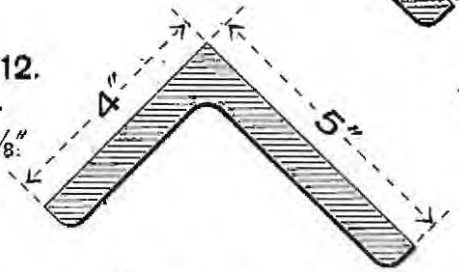
N.B.S.U.A. 13.
Thicknesses
5/16", 3/8", 1/2", 5/8".



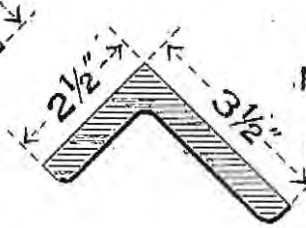
N.B.S.U.A. 7.
Thicknesses
1/4", 5/16", 3/8", 1/2", 5/8".



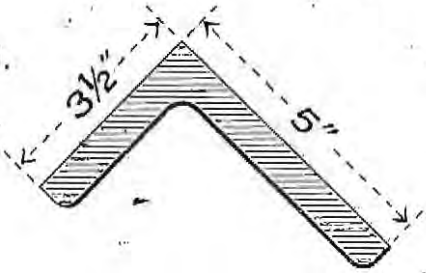
N.B.S.U.A. 12.
Thicknesses
5/16", 3/8", 1/2", 5/8".



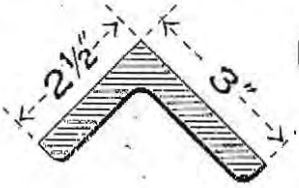
N.B.S.U.A. 6.
Thicknesses
1/4", 5/16", 3/8", 1/2".



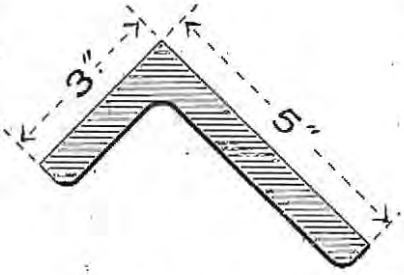
N.B.S.U.A. 11.
Thicknesses
5/16", 3/8", 1/2", 5/8".



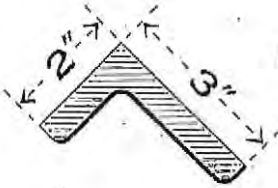
N.B.S.U.A. 5.
Thicknesses
1/4", 5/16", 3/8", 1/2".



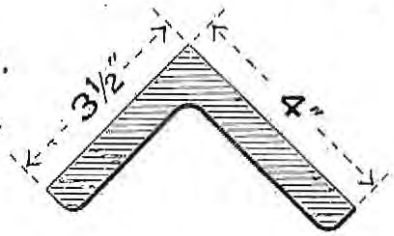
N.B.S.U.A. 10.
Thicknesses
5/16", 3/8", 1/2", 5/8".



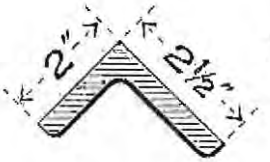
N.B.S.U.A. 4.
Thicknesses
3/16", 1/4", 5/16", 3/8", 1/2".



N.B.S.U.A. 9.
Thicknesses
5/16", 3/8", 1/2", 5/8".

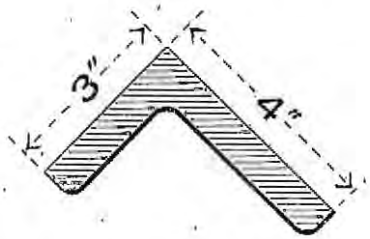


N.B.S.U.A. 3.
Thicknesses
3/16", 1/4", 5/16", 3/8".



N.B.S.U.A. 2.
Thicknesses
3/16", 5/16", 3/8".

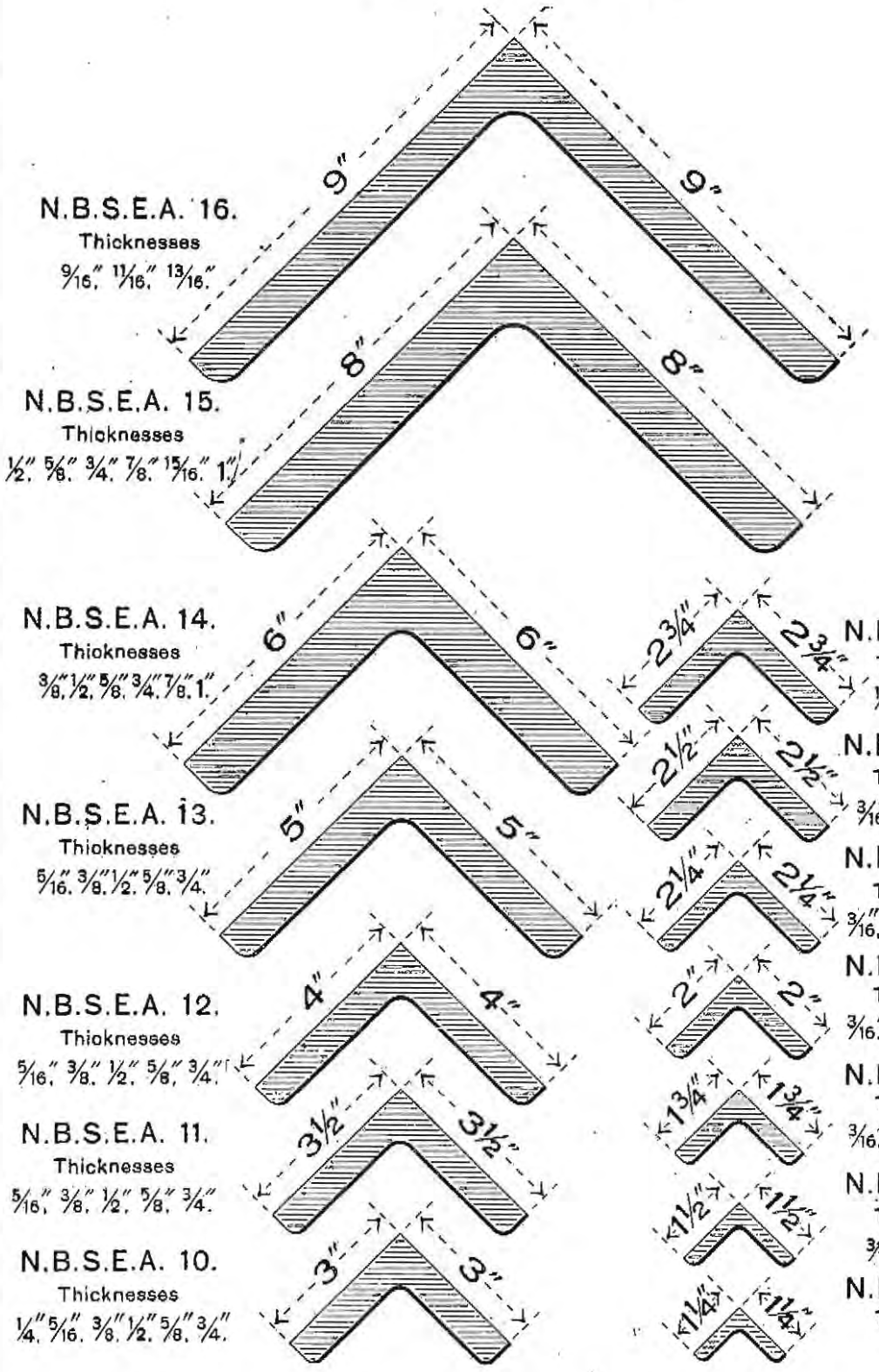
N.B.S.U.A. 8.
Thicknesses
5/16", 3/8", 1/2", 5/8", 3/4".



N.B.S.U.A. 1.
Thicknesses
3/16", 1/4", 5/16", 3/8".

FOR TABLE OF PROPERTIES SEE PAGES 62 AND 63.

EQUAL ANGLES



N.B.S.E.A. 16.
Thicknesses
9/16", 11/16", 13/16".

N.B.S.E.A. 15.
Thicknesses
1/2", 5/8", 3/4", 7/8", 15/16", 1".

N.B.S.E.A. 14.
Thicknesses
3/8", 1/2", 5/8", 3/4", 7/8", 1".

N.B.S.E.A. 13.
Thicknesses
5/16", 3/8", 1/2", 5/8", 3/4".

N.B.S.E.A. 12.
Thicknesses
5/16", 3/8", 1/2", 5/8", 3/4".

N.B.S.E.A. 11.
Thicknesses
5/16", 3/8", 1/2", 5/8", 3/4".

N.B.S.E.A. 10.
Thicknesses
1/4", 5/16", 3/8", 1/2", 5/8", 3/4".

N.B.S.E.A. 9.
Thicknesses
1/4", 3/8", 1/2".

N.B.S.E.A. 8.
Thicknesses
3/16", 1/4", 5/16", 3/8", 1/2".

N.B.S.E.A. 7.
Thicknesses
3/16", 1/4", 5/16", 3/8", 7/16".

N.B.S.E.A. 6.
Thicknesses
3/16", 1/4", 5/16", 3/8".

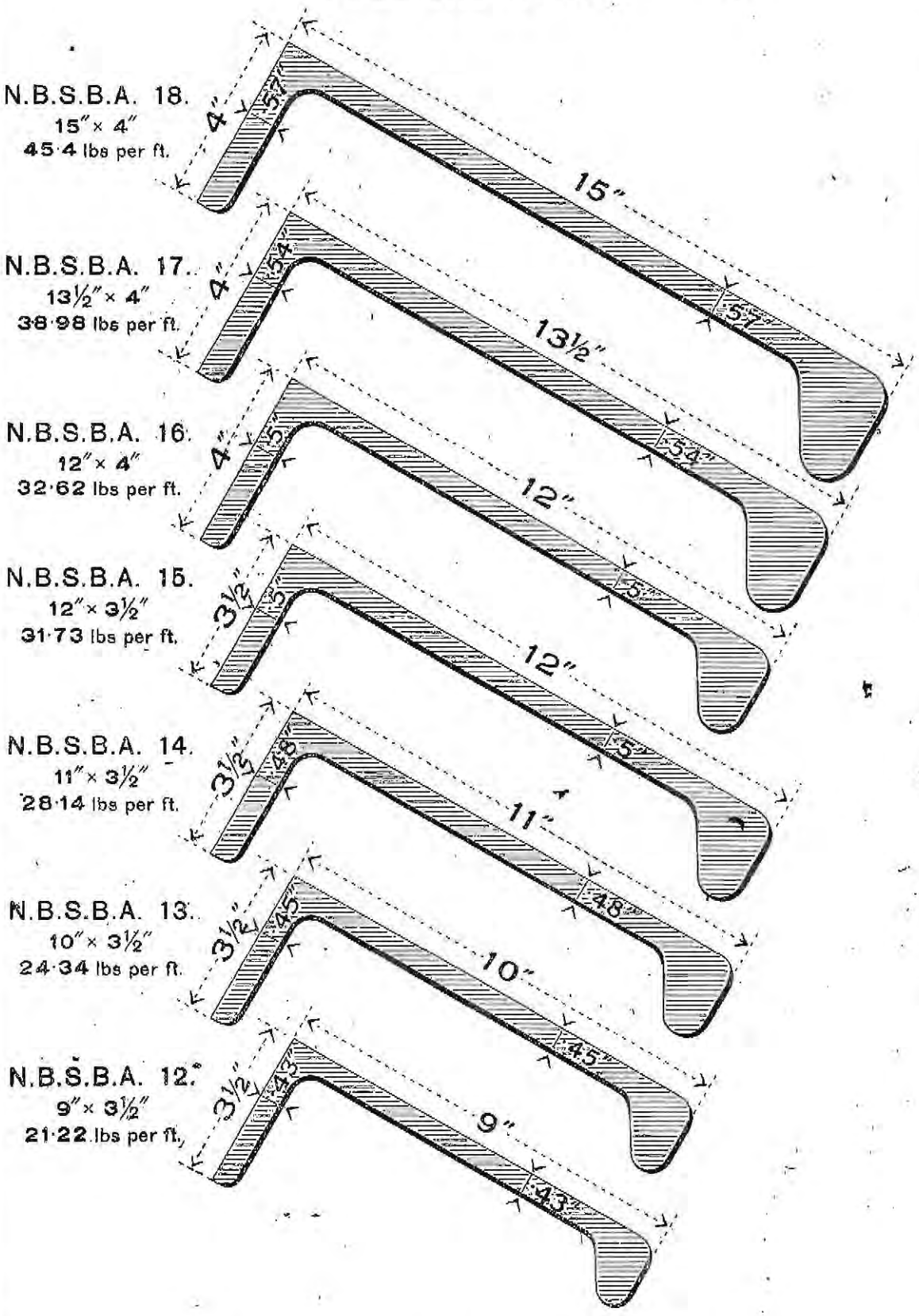
N.B.S.E.A. 5.
Thicknesses
3/16", 1/4", 5/16", 3/8".

N.B.S.E.A. 4.
Thicknesses
3/16", 1/4", 5/16".

N.B.S.E.A. 3.
Thicknesses
3/16", 1/4".

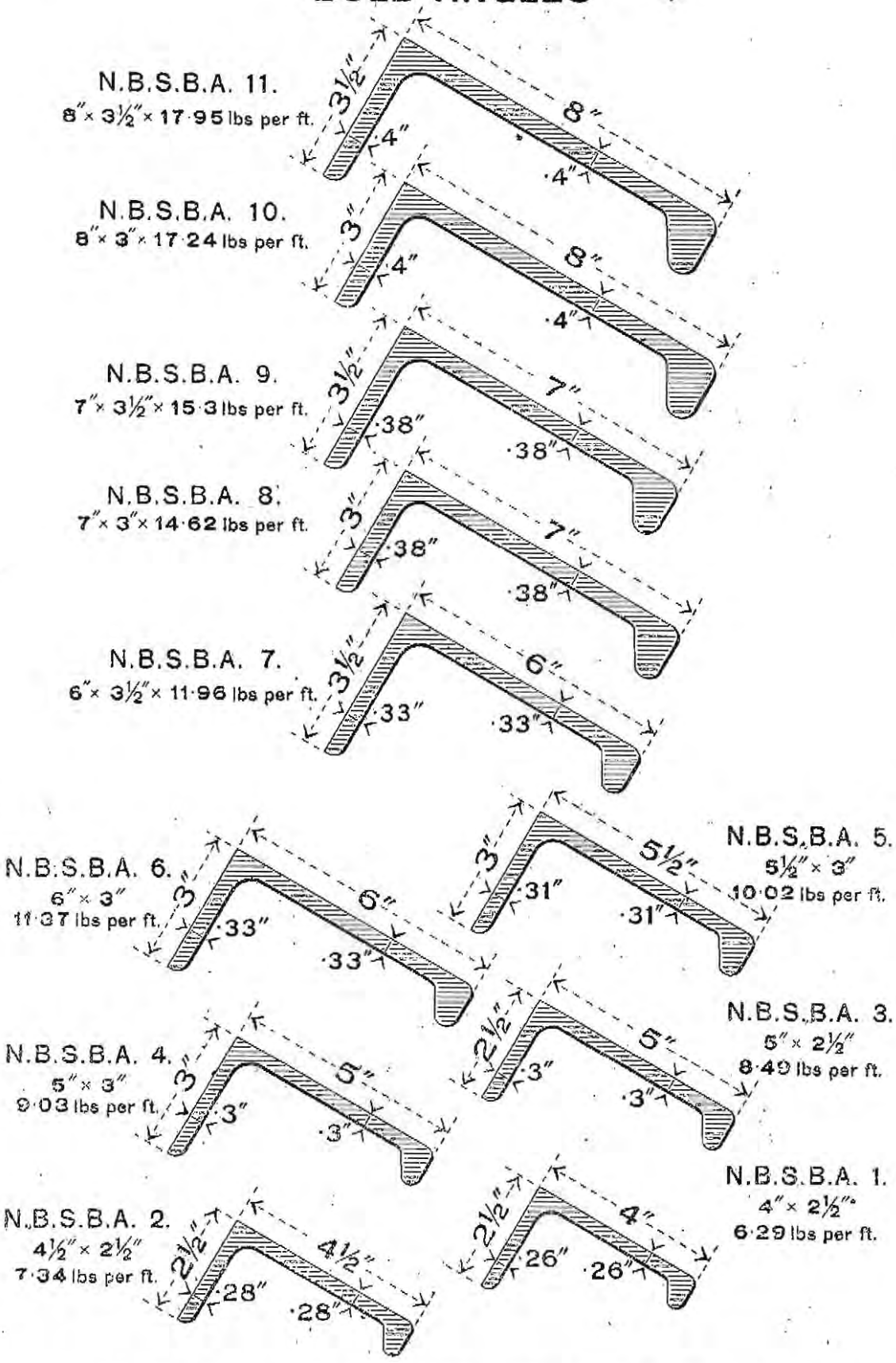
FOR TABLE OF PROPERTIES SEE PAGES 64 AND 65.

BULB ANGLES



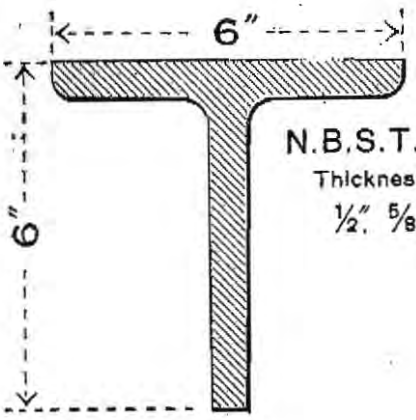
FOR TABLE OF PROPERTIES SEE PAGES 66 AND 67.

BULB ANGLES

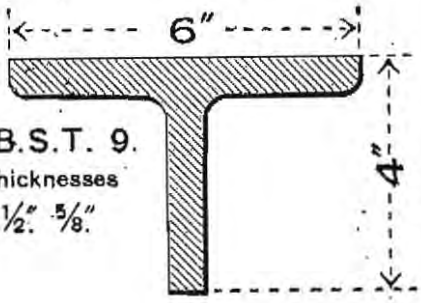


FOR TABLE OF PROPERTIES SEE PAGES 66 AND 67.

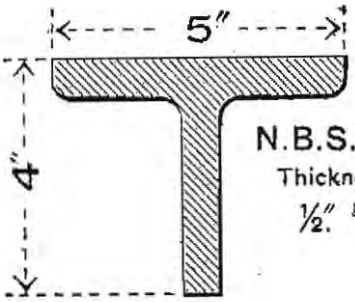
TEES



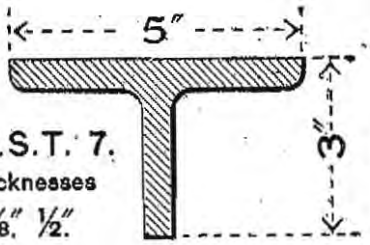
N.B.S.T. 10.
Thicknesses
½". ⅝".



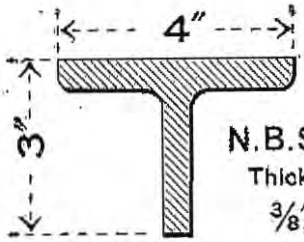
N.B.S.T. 9.
Thicknesses
½". ⅝".



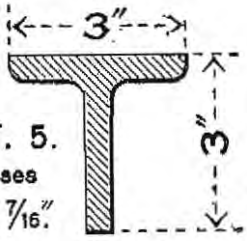
N.B.S.T. 8.
Thicknesses
½". ⅝".



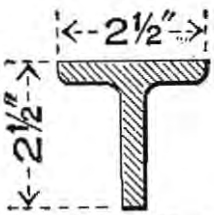
N.B.S.T. 7.
Thicknesses
⅜". ½".



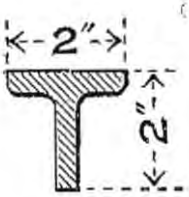
N.B.S.T. 6.
Thicknesses
⅜". ½".



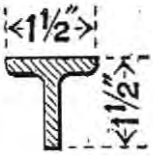
N.B.S.T. 5.
Thicknesses
5/16". ⅜". 7/16".



N.B.S.T. 4.
Thicknesses
¼". 5/16". ⅜".



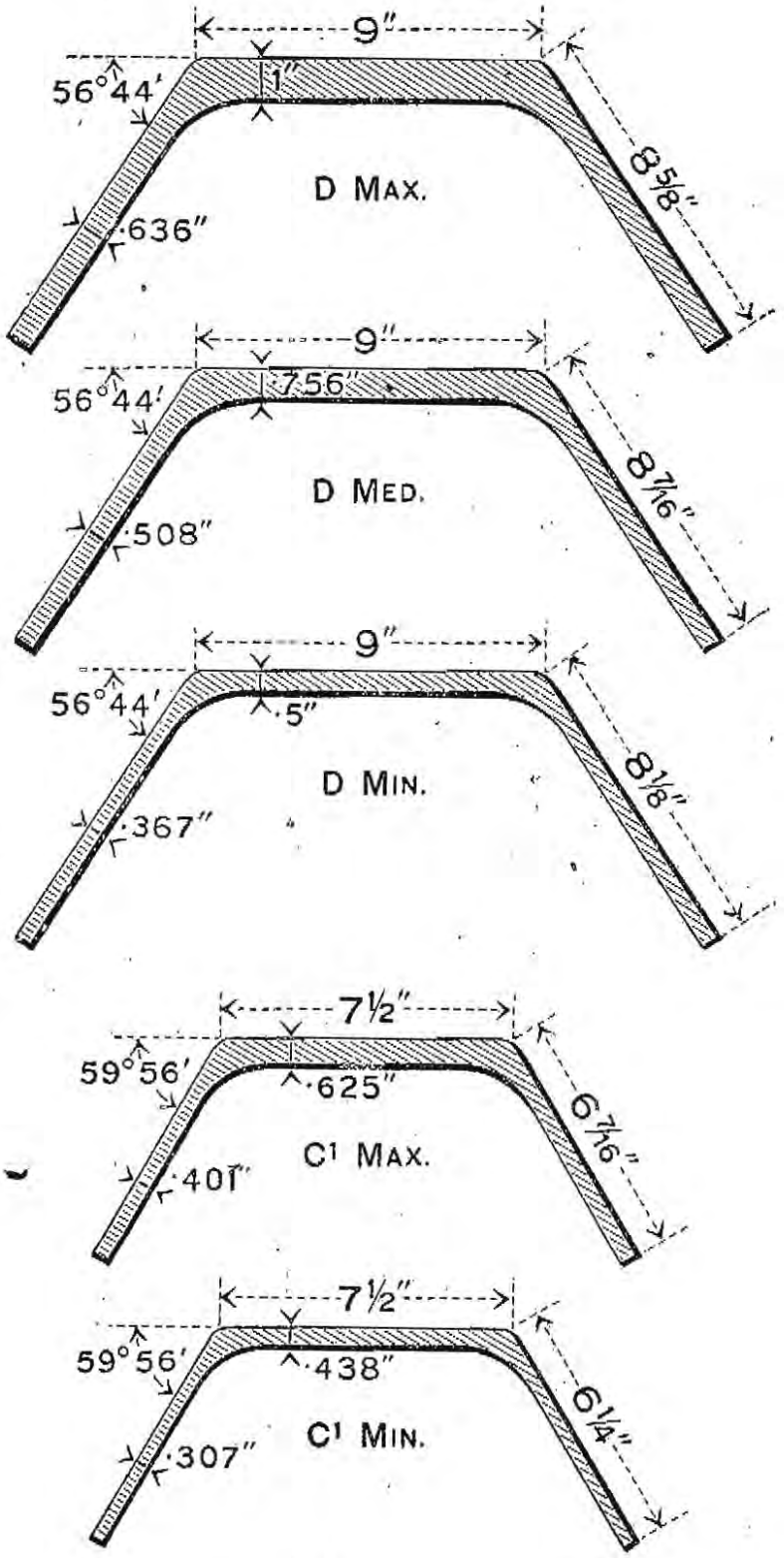
N.B.S.T. 3.
Thicknesses
¼". 5/16". ⅜".



N.B.S.T. 2.
Thicknesses
3/16". ¼".

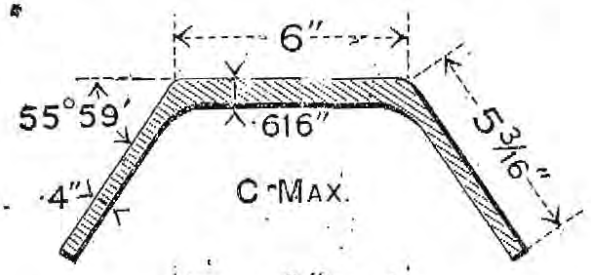
FOR TABLE OF PROPERTIES SEE PAGE 68.

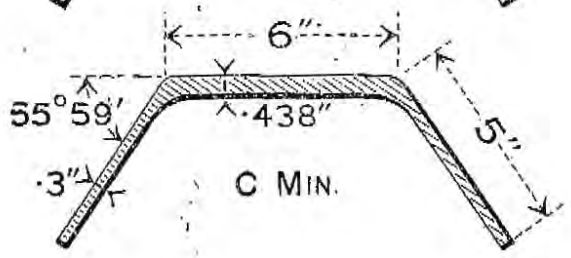
STEEL TROUGHING

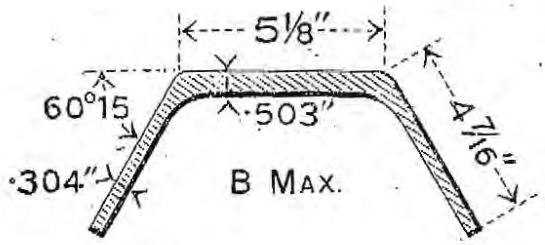


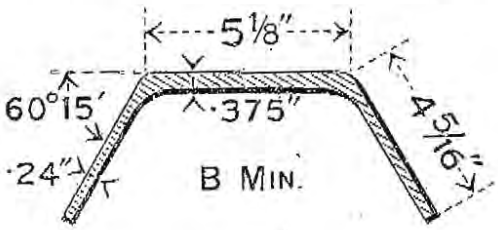
FOR FLOORING COMPOSED OF THE ABOVE SECTIONS SEE PAGES 189 TO 208.

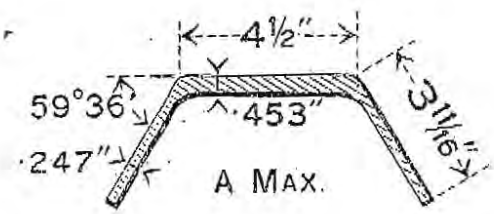
STEEL TROUGHING

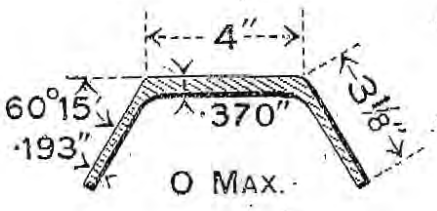


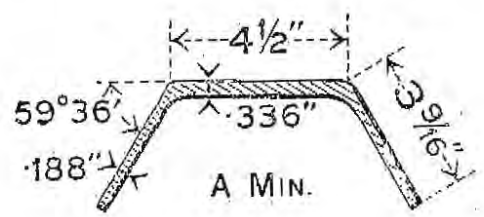


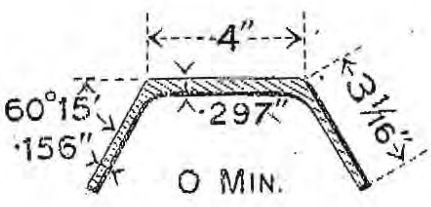






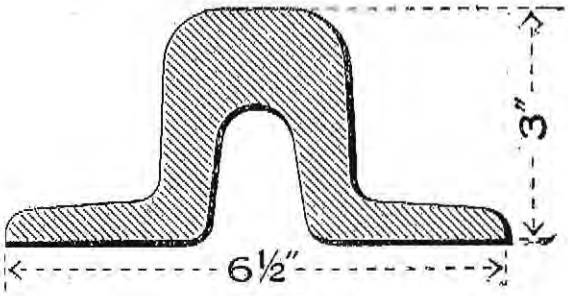




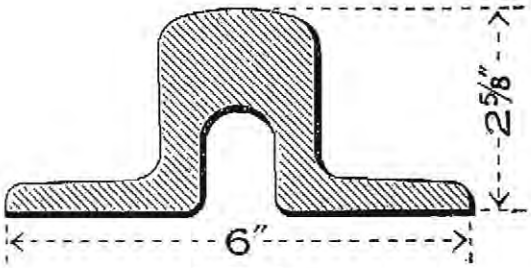


FOR FLOORING COMPOSED OF THE ABOVE SECTIONS SEE PAGES 189 TO 208.

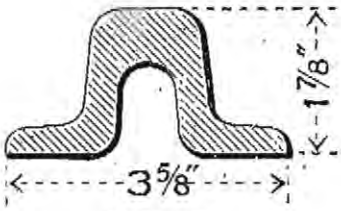
BRIDGE RAILS



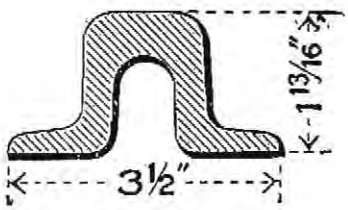
B.R. 5.
70 lbs per yard.



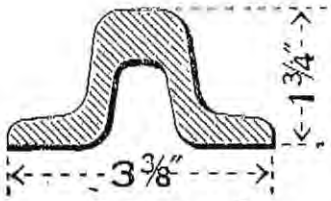
B.R. 1.
56 lbs per yard.



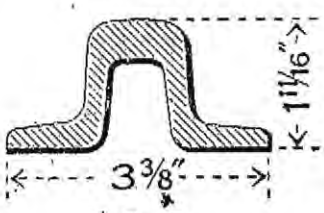
B.R. 6.
26 lbs per yard.



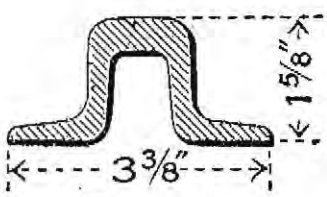
B.R. 2.
24 lbs per yard.



B.R. 7.
20 lbs per yard.

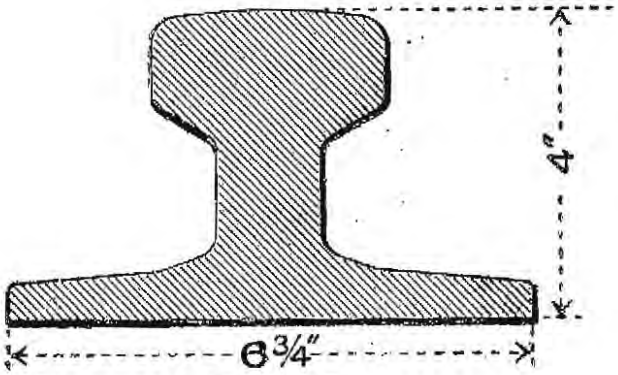


B.R. 3.
18 lbs per yard

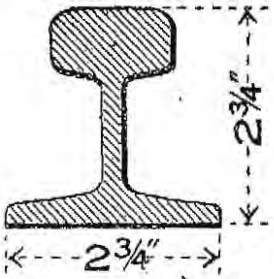


B.R. 4.
16 lbs per yard.

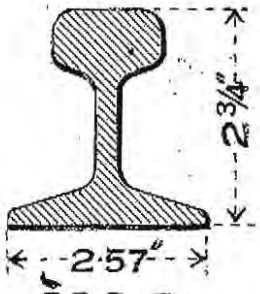
FLAT BOTTOM RAILS



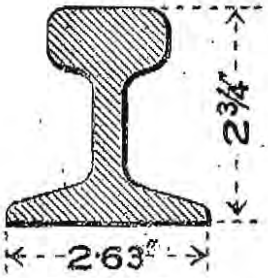
F.B.R. 9.
112 lbs per yard.



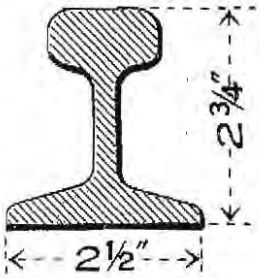
F.B.R. 25.
25 lbs per yard.



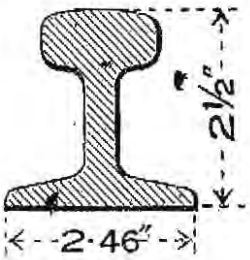
F.B.R. 7.
26 lbs per yard.



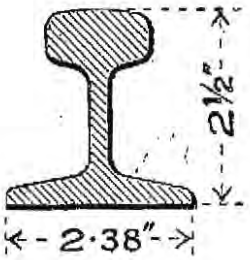
F.B.R. 8.
27¾ lbs per yard.



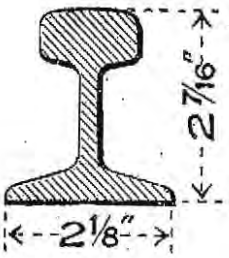
F.B.R. 1.
24 lbs per yard



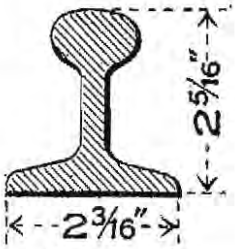
F.B.R. 6.
22 lbs per yard.



F.B.R. 2.
20 lbs per yard.



F.B.R. 3.
18 lbs per yard.



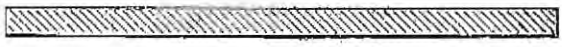
F.B.R. 5.
18 lbs per yard.

SQUARES.

SIDES.

½″	9/16″	⅝″	11/16″	¾″	13/16″	⅞″	15/16″
1″	1 1/16″	1⅛″	1 3/16″	1¼″	1 5/16″	1⅜″	1 7/16″
1½″	1 9/16″	1⅝″	1¾″	1⅞″	2″	2⅛″	2¼″

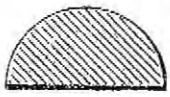
FLATS.



Width Inches	Thicknesses in inches		Width Inches	Thicknesses in inches	
	Minimum	Maximum		Minimum	Maximum
11	⅜	1	3¾	¼	1
10	5/16	1	3½	¼	1⅛
9	¼	1	3¼	¼	1⅛
8	¼	1	3	¼	1⅛
7½	¼	1	2¾	¼	1
7	¼	1	2½	¼	1
6½	¼	1	2¼	¼	1
6	¼	1⅛	2	¼	1
5½	¼	1	1¾	¼	1
5	¼	1	1½	¼	¾
4½	¼	1	1¼	¼	½
4	¼	1½			

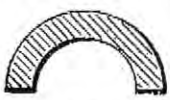
NOTE.—Flats of greater thicknesses than those above will have slightly rounded edges.

SOLID HALF ROUNDS.



3″ × 1½″ × 12·02 lbs. per foot.

HOLLOW HALF ROUNDS.



2½″ × 1¼″ × ½″
3″ × 1½″ × ½″

CONVEX BARS.

3″ × 1″ × 8·06 lbs. per foot.

DORMAN, LONG & CO. LIMITED.

ROUNDS AND MISCELLANEOUS SECTIONS.

ROUNDS.

DIAMETERS.

$\frac{1}{2}''$ $\frac{9}{16}''$ $\frac{5}{8}''$ $\frac{11}{16}''$ $\frac{3}{4}''$ $\frac{13}{16}''$ $\frac{7}{8}''$ $\frac{15}{16}''$

$1''$ $1\frac{1}{16}''$ $1\frac{1}{8}''$ $1\frac{3}{16}''$ $1\frac{1}{4}''$ $1\frac{5}{16}''$ $1\frac{3}{8}''$ $1\frac{7}{16}''$

$1\frac{1}{2}''$ $1\frac{9}{16}''$ $1\frac{5}{8}''$ $1\frac{11}{16}''$ $1\frac{3}{4}''$ $1\frac{13}{16}''$ $1\frac{7}{8}''$

$2''$ $2\frac{1}{8}''$ $2\frac{1}{4}''$

RIVET BARS.

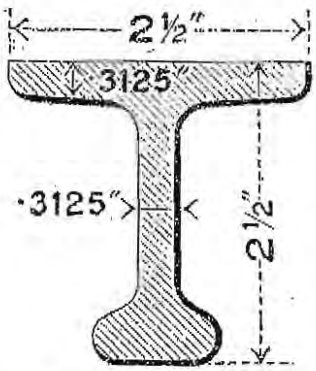
DIAMETERS.

$\frac{19}{32}''$ $\frac{21}{32}''$ $\frac{23}{32}''$

$\frac{25}{32}''$ $\frac{27}{32}''$ $\frac{29}{32}''$ $\frac{31}{32}''$

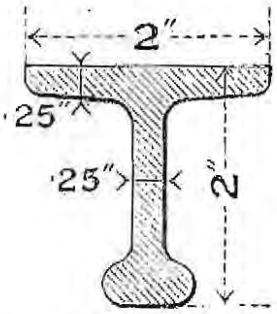
$\frac{33}{64}''$ $\frac{35}{64}''$ $\frac{39}{64}''$ $\frac{47}{64}''$ $\frac{55}{64}''$

BULB TEES.



D.L.B.T. 1A.

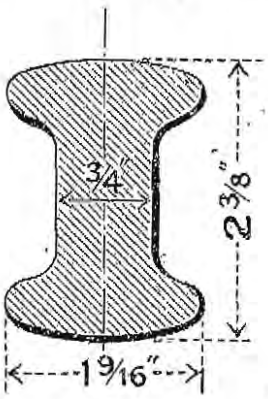
2½"×2½"×5·98 lbs per ft.



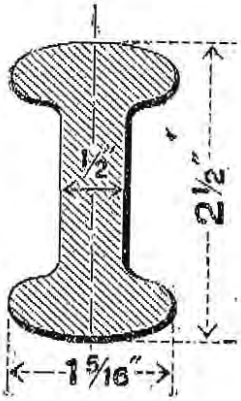
D.L.B.T. 1B.

2"×2"×3·75 lbs per ft.

BOBBIN SECTIONS.



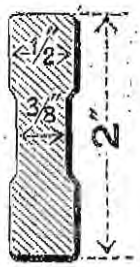
8 lbs per ft.



6·66 lbs per ft.

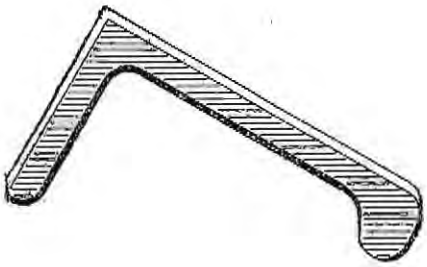
FENCING STANDARD.

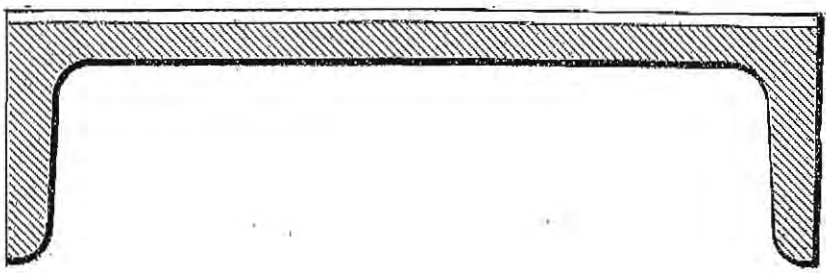
2"×⅛"×⅜"

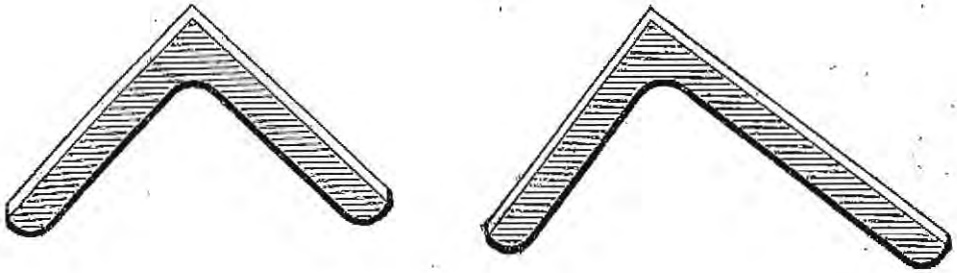


DIAGRAMS SHEWING PROFILES OBTAINED WHEN SECTIONS ARE ROLLED TO THICKNESSES OTHER THAN THOSE GIVEN ON THE PRECEDING PAGES.

The hatched portions indicate correct profiles, the blank portions the added material.







DIMENSIONS, PROPERTIES, &c.,

OF

BEAMS, CHANNELS, UNEQUAL AND EQUAL ANGLES, BULB ANGLES AND TEES.

DIMENSIONS AND PROPERTIES.—Complete tables are given of dimensions and properties of the various sections illustrated, dimensions being in inches and properties in inch units.

The areas and properties have been carefully calculated on correct profiles, and full sections without holing ; all fillets, rounded corners, taper of flanges, &c., being taken into consideration.

LEAST RADII OF GYRATION.—The least radii of gyration have been determined for all sections, and will be found in the tables, the values being given in inches.

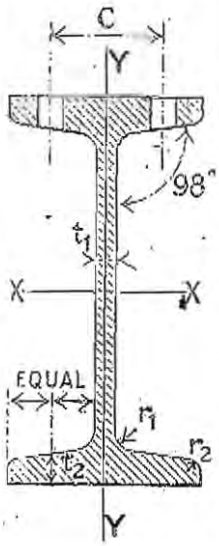
In sections such as beams, channels, tees and equal angles, which have an axis of symmetry, this radius is either about that axis or one at right angles to it. In the case of unequal angles and bulb angles, having no axis of symmetry, the position of the axis, about which the radius is least, has been calculated and is given in the tables ; this axis being marked in the diagram "minor axis."

DORMAN, LONG & CO. LIMITED.

BEAMS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

For safe distributed loads see pages 72 and 73.



Reference Mark	Size Inches	Weight per foot lbs.	Standard Thicknesses		Radii		Centres of Holes C Inches
			Web t_1	Flange t_2	Root r_1	Toe r_2	
"A" GIRDER SECTIONS.							
NBSB 18	24×7½	90	·52	·984	·73	·36	4·5
" 17	22×7	75	·50	·834	·69	·34	4·0
" 16	20×6½	65	·45	·820	·65	·32	3·75
" 15	18×6	55	·42	·757	·61	·30	3·5
" 14	16×6	50	·40	·726	·61	·30	3·5
" 13	15×6	45	·38	·655	·61	·30	3·5
" 12	14×5½	40	·37	·627	·57	·28	3·25
" 11	13×5	35	·35	·604	·53	·26	2·75
" 10	12×5	30	·33	·507	·53	·26	2·75
" 9	10×4½	25	·30	·505	·49	·24	2·5
" 8	9×4	21	·30	·457	·45	·22	2·25
" 7	8×4	18	·28	·398	·45	·22	2·25
" 6	7×3½	15	·25	·398	·41	·20	2·0
" 5	6×3	12	·23	·377	·37	·18	1·5
" 4	5×2½	9	·20	·347	·33	·16	..
" 3	4½×2	7	·19	·322	·29	·14	..
" 2	4×1¾	5	·17	·239	·27	·13	..
" 1	3×1⅓	4	·16	·249	·25	·12	..
"B" HEAVY BEAMS AND PILLARS.							
NBSHB 11	18×8	80	·50	·950	·77	·38	4·75
" 10	16×8	75	·48	·938	·77	·38	4·75
" 9	14×8	70	·46	·920	·77	·38	4·75
" 8	12×8	65	·48	·904	·77	·38	4·75
" 7	10×8	55	·40	·783	·77	·38	4·75
" 6	10×6	40	·36	·709	·61	·30	3·5
" 5	9×7	50	·40	·825	·69	·34	4·0
" 4	8×6	35	·35	·648	·61	·30	3·5
" 3	6×5	25	·33	·561	·53	·26	2·75
" 2	5×4½	20	·29	·513	·49	·24	2·5
" 1	4×3	10	·24	·347	·37	·18	1·5

DORMAN, LONG & CO. LIMITED.

BEAMS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

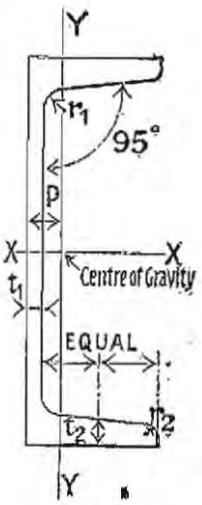
For safe distributed loads see pages 72 and 73.

Area Square Inches	Moments of Inertia		Radii of Gyration Inches		Section Moduli		Size Inches
	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	
"A" GIRDER SECTIONS.							
26·47	2443	60·44	9·61	1·51	203·6	16·12	24 ×7½
22·06	1677	41·07	8·72	1·36	152·4	11·73	22 ×7
19·12	1226	32·56	8·01	1·31	122·6	10·02	20 ×6½
16·18	841·8	23·64	7·21	1·21	93·53	7·878	18 ×6
14·71	618·1	22·47	6·48	1·24	77·26	7·489	16 ×6
13·24	491·9	19·87	6·10	1·23	65·59	6·624	15 ×6
11·77	377·1	14·79	5·66	1·12	53·87	5·377	14 ×5½
10·30	283·5	10·82	5·25	1·03	43·62	4·326	13 ×5
8·827	206·9	8·770	4·84	·997	34·49	3·508	12 ×5
7·354	122·3	6·486	4·08	·939	24·47	2·883	10 ×4½
6·177	81·13	4·148	3·62	·820	18·03	2·074	9 ×4
5·296	55·63	3·506	3·24	·814	13·91	1·753	8 ×4
4·416	35·90	2·408	2·85	·738	10·26	1·376	7 ×3½
3·533	20·99	1·461	2·44	·643	6·996	·974	6 ×3
2·647	10·91	·789	2·03	·546	4·364	·631	5 ×2½
2·060	6·652	·383	1·80	·431	2·957	·383	4½×2
1·470	3·664	·186	1·58	·356	1·832	·213	4 ×1¾
1·177	1·660	·125	1·19	·326	1·107	·167	3 ×1½
"B" HEAVY BEAMS AND PILLARS.							
23·53	1292	69·43	7·41	1·72	143·6	17·36	18 ×8
22·06	973·9	68·30	6·64	1·76	121·7	17·08	16 ×8
20·59	705·6	66·67	5·85	1·80	100·8	16·67	14 ×8
19·12	487·8	65·18	5·05	1·85	81·30	16·30	12 ×8
16·18	288·7	54·74	4·22	1·84	57·74	13·69	10 ×8
11·77	204·8	21·76	4·17	1·36	40·96	7·253	10 ×6
14·71	208·1	40·17	3·76	1·65	46·25	11·48	9 ×7
10·30	115·1	19·54	3·34	1·38	28·76	6·513	8 ×6
7·351	45·16	9·876	2·48	1·16	15·05	3·951	6 ×5
5·882	25·03	6·590	2·06	1·06	10·01	2·929	5 ×4½
2·940	7·786	1·326	1·63	·672	3·893	·884	4 ×3

DORMAN, LONG & CO. LIMITED.

CHANNELS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches	Weight per foot lbs.	Standard Thicknesses		Radii		Dimension
			Web t_1	Flange t_2	Root r_1	Toe r_2	P
NBSC 18	17×4	44·34	·48	·68	·60	·30	·920
" 17	15×4	36·37	·41	·62	·60	·30	·967
" 16	12×4	31·33	·40	·60	·60	·30	1·055
" 15	12×3½H	29·23	·40	·60	·54	·27	·901
" 14	12×3½L	25·25	·35	·50	·54	·27	·849
" 13	10×3½	24·46	·36	·56	·54	·27	·965
" 12	10×3	19·28	·32	·45	·48	·24	·742
" 11	9×3½	22·27	·34	·54	·54	·27	1·003
" 10	9×3	17·46	·30	·44	·48	·24	·781
" 9	8×3½	20·21	·32	·52	·54	·27	1·045
" 8	8×3	15·96	·28	·44	·48	·24	·834
" 7	7×3½	18·28	·30	·50	·54	·27	1·092
" 6	7×3	14·22	·26	·42	·48	·24	·875
" 5	6×3½	16·48	·28	·48	·54	·27	1·143
" 4	6×3	12·41	·25	·38	·48	·24	·890
" 3	5×2½	10·22	·25	·38	·42	·21	·773
" 2	4×2	7·09	·24	·31	·36	·18	·599
" 1	3×1½	4·60	·20	·28	·30	·15	·476

DORMAN, LONG & CO. LIMITED.

CHANNELS.

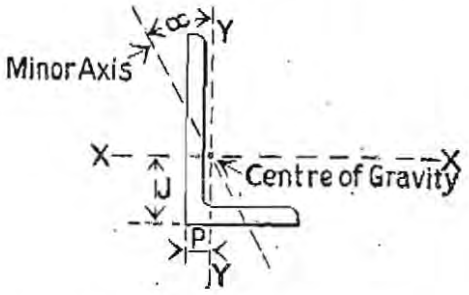
DIMENSIONS AND PROPERTIES IN INCH UNITS.

Area square inches	Moments of Inertia		Radii of Gyration Inches		Section Moduli		Size Inches
	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	
13·04	520·2	15·26	6·32	1·08	61·20	4·955	17×4
10·70	349·1	13·34	5·71	1·12	46·55	4·398	15×4
9·214	200·1	12·12	4·66	1·15	33·35	4·116	12×4
8·596	180·3	8·436	4·58	·991	30·05	3·245	12×3½H
7·426	156·4	7·066	4·59	·975	26·07	2·665	12×3½L
7·193	109·5	7·420	3·90	1·02	21·90	2·927	10×3½
5·672	82·66	3·983	3·82	·838	16·53	1·764	10×3
6·549	82·62	6·899	3·55	1·03	18·36	2·763	9×3½
5·136	62·52	3·752	3·49	·855	13·89	1·691	9×3
5·944	60·57	6·370	3·19	1·04	15·14	2·595	8×3½
4·694	46·72	3·578	3·16	·873	11·68	1·652	8×3
5·376	42·83	5·834	2·82	1·04	12·24	2·423	7×3½
4·182	32·75	3·255	2·80	·882	9·357	1·531	7×3
4·848	28·88	5·293	2·44	1·05	9·627	2·246	6×3½
3·650	21·27	2·825	2·41	·880	7·090	1·339	6×3
3·006	11·87	1·641	1·99	·739	4·749	·950	5×2½
2·085	5·063	·703	1·56	·581	2·532	·502	4×2
1·352	1·823	·261	1·16	·439	1·215	·255	3×1½

DORMAN, LONG & CO. LIMITED.

UNEQUAL ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size and Thickness	Area Square Inches	Weight per foot lbs.	Radii		Dimensions		Moments of Inertia		Minimum Section Moduli		Angles ∝ Degrees	Least Radius of Gyration
				Root	Toe	J	P	About X-X	About Y-Y	About X-X	About Y-Y		
NBSUA 20	10 × 4 × 7/16	5·934	20·18	·54	·38	3·70	·73	61·84	6·00	9·81	1·83	10½	·83
" 20	" " 1/2	7·559	25·70	·54	·38	3·76	·78	78·06	7·50	12·50	2·33	10	·82
" 20	" " 9/16	9·153	31·12	·54	·38	3·81	·83	93·57	8·90	15·12	2·81	10	·82
" 19	9 × 4 × 7/16	5·496	18·69	·51	·36	3·24	·77	46·36	5·90	8·05	1·83	12	·84
" 19	" " 5/8	7·735	26·30	·51	·36	3·33	·85	64·23	8·06	11·33	2·56	12	·83
" 19	" " 13/16	9·903	33·67	·51	·36	3·41	·92	80·86	9·99	14·46	3·25	11½	·83
" 18	8 × 6 × ½	6·751	22·95	·54	·38	2·44	1·45	43·47	21·08	7·82	4·63	29	1·29
" 18	" " 5/8	8·360	28·42	·54	·38	2·49	1·50	53·27	25·74	9·67	5·72	29	1·28
" 18	" " ¾	9·938	33·79	·54	·38	2·54	1·55	62·60	30·14	11·47	6·77	28½	1·28
" 18	" " 1	13·001	44·20	·54	·38	2·64	1·64	79·97	38·21	14·91	8·77	28½	1·27
" 17	8 × 4 × 7/16	5·058	17·20	·48	·34	2·80	·82	33·57	5·78	6·46	1·82	15	·86
" 17	" " 5/8	7·109	24·17	·48	·34	2·88	·90	46·37	7·87	9·06	2·54	14½	·85
" 17	" " ¾	8·437	28·69	·48	·34	2·93	·94	54·36	9·14	10·73	2·99	14½	·84
" 16	7 × 3½ × 3/8	3·797	12·91	·44	·31	2·44	·71	19·28	3·31	4·23	1·19	15	·75
" 16	" " ½	5·000	17·00	·44	·31	2·50	·76	25·07	4·27	5·57	1·56	14½	·74
" 16	" " 5/8	6·172	20·98	·44	·31	2·55	·81	30·53	5·14	6·86	1·91	14½	·74
" 16	" " ¾	7·313	24·86	·44	·31	2·60	·86	35·66	5·94	8·11	2·25	14	·73
" 15	6 × 4 × 3/8	3·611	12·28	[illegible]	·29	1·91	·92	13·21	4·74	3·23	1·54	23½	·87
" 15	" " ½	4·752	16·16	·42	·29	1·97	·97	17·14	6·11	4·25	2·02	23½	·86
" 15	" " 5/8	5·861	19·93	·42	·29	2·02	1·02	20·82	7·37	5·23	2·48	23½	·86
" 15	" " ¾	6·939	23·59	·42	·29	2·06	1·07	24·26	8·53	6·16	2·91	23	·85
" 14	6 × 3½ × 3/8	3·422	11·63	·41	·29	2·01	·77	12·62	3·21	3·16	1·18	19	·76
" 14	" " ½	4·500	15·30	·41	·29	2·06	·82	16·36	4·13	4·15	1·54	19	·75
" 14	" " 5/8	5·547	18·86	·41	·29	2·11	·87	19·85	4·96	5·11	1·89	18½	·75
" 14	" " ¾	6·562	22·31	·41	·29	2·16	·92	23·11	5·73	6·02	2·22	18½	·74
" 13	6 × 3 × 5/16	2·716	9·23	·39	·27	2·09	·61	10·13	1·74	2·59	·73	15	·64
" 13	" " 3/8	3·236	11·00	·39	·27	2·12	·63	11·99	2·05	3·09	·87	14½	·64
" 13	" " ½	4·251	14·45	·39	·27	2·17	·68	15·51	2·62	4·05	1·13	14½	·63
" 13	" " 5/8	5·236	17·80	·39	·27	2·22	·73	18·80	3·14	4·98	1·38	14	·63
" 12	5 × 4 × 5/16	2·716	9·23	·39	·27	1·48	·99	6·74	3·84	1·91	1·27	32	·85
" 12	" " 3/8	3·236	11·00	·39	·27	1·51	1·01	7·97	4·53	2·28	1·52	32	·85
" 12	" " ½	4·251	14·45	·39	·27	1·56	1·06	10·29	5·83	2·99	1·98	32	·84
" 12	" " 5/8	5·236	17·80	·39	·27	1·61	1·11	12·44	7·02	3·67	2·43	31½	·84

DORMAN, LONG & CO. LIMITED.

UNEQUAL ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS

CONTINUED.

Reference Mark	Size and Thickness	Area Square Inches	Weight per foot lbs.	Radii		Dimensions		Moments of Inertia		Minimum Section Moduli		Angles ∝ Degrees	Least Radius of Gyration
				Root	Toe	J	P	About X-X	About Y-Y	About X-X	About Y-Y		
NBSUA 11	5 × 3½ × 5/16	2·561	8·71	·38	·26	1·56	·82	6·46	2·62	1·88	·98	26	·76
" 11	" " 3/8	3·049	10·37	·38	·26	1·59	·85	7·63	3·09	2·24	1·16	25½	·75
" 11	" " ½	4·002	13·61	·38	·26	1·64	·90	9·84	3·95	2·93	1·52	25½	·75
" 11	" " 5/8	4·924	16·74	·38	·26	1·69	·94	11·89	4·74	3·59	1·86	25	·74
" 10	5 × 3 × 5/16	2·403	8·17	·36	·25	1·66	·67	6·14	1·68	1·83	·72	20	·65
" 10	" " 3/8	2·860	9·72	·36	·25	1·68	·69	7·25	1·97	2·18	·85	19½	·65
" 10	" " ½	3·751	12·75	·36	·25	1·73	·74	9·33	2·51	2·86	1·11	19½	·64
" 10	" " 5/8	4·610	15·67	·36	·25	1·78	·79	11·25	3·00	3·50	1·36	19	·64
" 9	4 × 3½ × 5/16	2·248	7·64	·35	·24	1·16	·92	3·47	2·47	1·22	·96	37	·72
" 9	" " 3/8	2·673	9·09	·35	·24	1·19	·94	4·09	2·91	1·45	1·14	37	·72
" 9	" " ½	3·502	11·91	·35	·24	1·24	·99	5·24	3·72	1·90	1·48	37	·71
" 9	" " 5/8	4·298	14·61	·35	·24	1·29	1·04	6·28	4·45	2·31	1·81	36½	·71
" 8	4 × 3 × 5/16	2·091	7·11	·33	·23	1·24	·75	3·30	1·59	1·20	·71	28½	·64
" 8	" " 3/8	2·485	8·45	·33	·23	1·27	·77	3·89	1·87	1·42	·84	28½	·64
" 8	" " ½	3·251	11·05	·33	·23	1·32	·82	4·97	2·37	1·85	1·09	28½	·63
" 8	" " 5/8	3·985	13·55	·33	·23	1·36	·87	5·96	2·83	2·26	1·32	28	·63
" 8	" " ¾	4·688	15·94	·33	·23	1·41	·91	6·86	3·24	2·65	1·55	27½	·63
" 7	3½ × 3 × ¼	1·564	5·32	·32	·22	1·01	·77	1·86	1·26	·75	·56	36	·62
" 7	" " 5/16	1·935	6·58	·32	·22	1·04	·79	2·27	1·54	·92	·70	35½	·62
" 7	" " 3/8	2·298	7·81	·32	·22	1·07	·82	2·67	1·80	1·10	·83	35½	·62
" 7	" " ½	3·001	10·20	·32	·22	1·12	·87	3·40	2·28	1·43	1·07	35½	·61
" 7	" " 5/8	3·673	12·49	·32	·22	1·16	·91	4·06	2·72	1·73	1·30	35	·61
" 6	3½ × 2½ × ¼	1·438	4·89	·30	·21	1·09	·60	1·75	·745	·73	·39	26½	·54
" 6	" " 5/16	1·778	6·05	·30	·21	1·12	·63	2·14	·907	·90	·48	26½	·53
" 6	" " 3/8	2·110	7·17	·30	·21	1·15	·65	2·51	1·06	1·07	·57	26	·53
" 6	" " ½	2·750	9·35	·30	·21	1·19	·70	3·19	1·33	1·39	·74	26	·53
" 5	3 × 2½ × ¼	1·313	4·46	·29	·20	·89	·65	1·14	·716	·54	·39	34	·52
" 5	" " 5/16	1·622	5·51	·29	·20	·92	·67	1·39	·871	·67	·48	34	·52
" 5	" " 3/8	1·923	6·54	·29	·20	·94	·70	1·62	1·02	·79	·56	34	·52
" 5	" " ½	2·501	8·50	·29	·20	·99	·74	2·05	1·28	1·02	·73	33½	·52
" 4	3 × 2 × 3/16	·903	3·07	·27	·19	·95	·46	·815	·289	·40	·19	23½	·43
" 4	" " ¼	1·188	4·04	·27	·19	·98	·48	1·06	·375	·52	·25	23½	·43
" 4	" " 5/16	1·465	4·98	·27	·19	1·00	·51	1·29	·454	·65	·30	23	·43
" 4	" " 3/8	1·735	5·90	·27	·19	1·03	·53	1·50	·527	·76	·36	23	·42
" 4	" " ½	2·250	7·65	·27	·19	1·08	·58	1·90	·657	·98	·46	22½	·42
" 3	2½ × 2 × 3/16	·809	2·75	·26	·18	·75	·50	·490	·277	·28	·18	32	·42
" 3	" " ¼	1·063	3·61	·26	·18	·77	·53	·635	·358	·37	·24	32	·42
" 3	" " 5/16	1·309	4·45	·26	·18	·80	·55	·770	·433	·45	·30	31½	·42
" 3	" " 3/8	1·547	5·26	·26	·18	·82	·57	·894	·501	·53	·35	31½	·41
" 2	2½ × 1½ × 3/16	·715	2·43	·24	·17	·83	·34	·446	·120	·27	·10	19½	·32
" 2	" " 5/16	1·152	3·92	·24	·17	·89	·39	·697	·184	·43	·17	19	·32
" 2	" " 3/8	1·359	4·62	·24	·17	·91	·42	·808	·212	·51	·20	19	·31
" 1	2 × 1½ × 3/16	·621	2·11	·23	·16	·63	·38	·239	·114	·17	·10	28½	·32
" 1	" " ¼	·813	2·76	·23	·16	·65	·41	·307	·145	·23	·13	28	·31
" 1	" " 5/16	·996	3·39	·23	·16	·68	·43	·368	·174	·28	·16	28	·31
" 1	" " 3/8	1·172	3·98	·23	·16	·70	·45	·425	·200	·33	·19	28	·31

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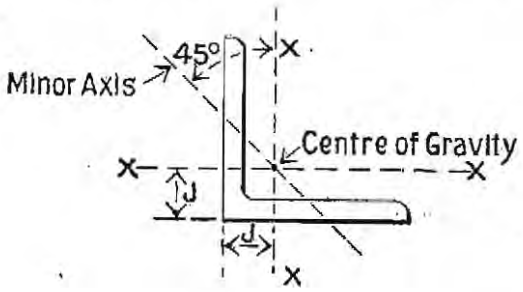
DORMAN, LONG & CO. LIMITED.

EQUAL ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size and Thickness			Area Square Inches	Weight per Foot lbs.	Radii		Dimension J	Moment of Inertia About X-X	Minimum Section Modulus About X-X	Least Radius of Gyration
						Root	Toe				
NBSEA 16	9	×9	× 9/16	9·811	33·36	·66	·46	2·42	76·10	11·57	1·78
" 16	"	"	11/16	11·905	40·48	·66	·46	2·47	91·54	14·08	1·77
" 16	"	"	13/16	13·968	47·49	·66	·46	2·52	106·35	16·42	1·76
" 15	8	×8	× ½	7·752	26·36	·60	·42	2·15	47·45	8·11	1·58
" 15	"	"	⅝	9·611	32·68	·60	·42	2·20	58·26	10·05	1·57
" 15	"	"	¾	11·439	38·89	·60	·42	2·25	68·58	11·94	1·57
" 15	"	"	× ⅞	13·236	45·00	·60	·42	2·30	78·44	13·77	1·56
" 15	"	"	15/16	14·123	48·02	·60	·42	2·33	83·20	14·66	1·56
" 15	"	"	1	15·002	51·01	·60	·42	2·35	87·85	15·55	1·56
" 14	6	×6	× ⅜	4·359	14·82	·48	·34	1·61	14·95	3·40	1·18
" 14	"	"	½	5·750	19·55	·48	·34	1·66	19·48	4·49	1·18
" 14	"	"	⅝	7·109	24·17	·48	·34	1·71	23·73	5·54	1·17
" 14	"	"	× ¾	8·437	28·69	·48	·34	1·76	27·74	6·54	1·17
" 14	"	"	⅞	9·734	33·10	·48	·34	1·81	31·51	7·51	1·16
" 14	"	"	1	11·000	37·40	·48	·34	1·85	35·06	8·45	1·16
" 13	5	×5	× 5/16	3·029	10·30	·42	·29	1·34	7·20	1·97	·99
" 13	"	"	⅜	3·611	12·28	·42	·29	1·37	8·53	2·35	·98
" 13	"	"	½	4·752	16·16	·42	·29	1·42	11·04	3·08	·98
" 13	"	"	⅝	5·861	19·93	·42	·29	1·47	13·37	3·78	·97
" 13	"	"	¾	6·939	23·59	·42	·29	1·51	15·54	4·46	·97
" 12	4	×4	× 5/16	2·403	8·17	·36	·25	1·10	8·61	1·24	·78
" 12	"	"	⅜	2·860	9·72	·36	·25	1·12	4·26	1·48	·78
" 12	"	"	½	3·751	12·75	·36	·25	1·17	5·46	1·93	·78
" 12	"	"	⅝	4·610	15·67	·36	·25	1·22	6·56	2·36	·77
" 12	"	"	¾	5·438	18·49	·36	·25	1·26	7·57	2·77	·77

DORMAN, LONG & CO. LIMITED.

EQUAL ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS

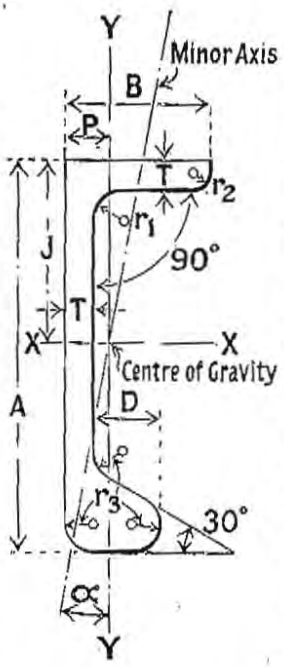
CONTINUED.

Reference Mark	Size and Thickness	Area Square Inches	Weight per Foot lbs.	Radii		Dimension J	Moment of Inertia About X-X	Minimum Section Modulus About X-X	Least Radius of Gyration
				Root	Toe				
NBSEA 11	3½ × 3½ × 5/16	2·091	7·11	·33	·23	·97	2·38	·94	·68
" 11	" " 3/8	2·485	8·45	·33	·23	1·00	2·80	1·12	·68
" 11	" " ½	3·251	11·05	·33	·23	1·05	3·57	1·46	·68
" 11	" " 5/8	3·985	13·55	·33	·23	1·09	4·27	1·77	·68
" 11	" " ¾	4·688	15·94	·33	·23	1·14	4·90	2·08	·68
" 10	3 × 3 × ¼	1·438	4·89	·30	·21	·83	1·20	·55	·59
" 10	" " 5/16	1·778	6·05	·30	·21	·85	1·47	·68	·58
" 10	" " 3/8	2·110	7·17	·30	·21	·88	1·72	·81	·58
" 10	" " ½	2·750	9·35	·30	·21	·92	2·18	1·05	·58
" 10	" " 5/8	3·360	11·42	·30	·21	·97	2·59	1·27	·58
" 10	" " ¾	3·938	13·39	·30	·21	1·01	2·95	1·49	·58
" 9	2¾ × 2¾ × ¼	1·813	4·46	·29	·20	·76	·917	·46	·54
" 9	" " 3/8	1·923	6·54	·29	·20	·81	1·30	·67	·53
" 9	" " ½	2·501	8·50	·29	·20	·86	1·64	·87	·53
" 8	2½ × 2½ × 3/16	·902	3·07	·27	·19	·68	·523	·29	·49
" 8	" " ¼	1·188	4·04	·27	·19	·70	·680	·38	·49
" 8	" " 5/16	1·465	4·98	·27	·19	·73	·826	·47	·48
" 8	" " 3/8	1·735	5·90	·27	·19	·75	·962	·55	·48
" 8	" " ½	2·250	7·65	·27	·19	·80	1·21	·71	·48
" 7	2¼ × 2¼ × 3/16	·809	2·75	·26	·18	·62	·377	·23	·44
" 7	" " ¼	1·063	3·61	·26	·18	·64	·488	·30	·44
" 7	" " 5/16	1·309	4·45	·26	·18	·67	·591	·37	·43
" 7	" " 3/8	1·547	5·26	·26	·18	·69	·685	·44	·43
" 7	" " 7/16	1·778	6·05	·26	·18	·71	·773	·50	·43
" 6	2 × 2 × 3/16	·715	2·43	·24	·17	·56	·260	·18	·39
" 6	" " ¼	·937	3·19	·24	·17	·58	·336	·24	·39
" 6	" " 5/16	1·152	3·92	·24	·17	·61	·405	·29	·38
" 6	" " 3/8	1·359	4·62	·24	·17	·63	·468	·34	·38
" 5	1¾ × 1¾ × 3/16	·621	2·11	·23	·16	·49	·171	·14	·34
" 5	" " ¼	·813	2·76	·23	·16	·52	·219	·18	·34
" 5	" " 5/16	·996	3·39	·23	·16	·54	·268	·22	·34
" 5	" " 3/8	1·172	3·98	·23	·16	·57	·308	·26	·34
" 4	1½ × 1½ × 3/16	·527	1·79	·21	·15	·43	·105	·10	·29
" 4	" " ¼	·687	2·34	·21	·15	·46	·134	·13	·29
" 4	" " 5/16	·840	2·85	·21	·15	·48	·159	·16	·29
" 3	1¼ × 1¼ × 3/16	·434	1·48	·20	·14	·37	·059	·07	·24
" 3	" " ¼	·568	1·91	·20	·14	·40	·074	·09	·24

DORMAN, LONG & CO. LIMITED.

BULB ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches A × B	Standard Thickness T	Area Square Inches	Weight per foot lbs.	Radii r_1	Radii r_2	Radii r_3
NBSBA 18	15 × 4	·57	13·352	45·40	·60	·30	·60
" 17	13½ × 4	·54	11·466	38·98	·60	·30	·54
" 16	12 × 4	·50	9·593	32·62	·60	·30	·48
" 15	12 × 3½	·50	9·332	31·73	·54	·27	·48
" 14	11 × 3½	·48	8·276	28·14	·54	·27	·44
" 13	10 × 3½	·45	7·159	24·34	·54	·27	·40
" 12	9 × 3½	·43	6·241	21·22	·54	·27	·36
" 11	8 × 3½	·40	5·280	17·95	·54	·27	·32
" 10	8 × 3	·40	5·070	17·24	·48	·24	·32
" 9	7 × 3½	·38	4·500	15·30	·54	·27	·28
" 8	7 × 3	·38	4·300	14·62	·48	·24	·28
" 7	6 × 3½	·33	3·519	11·96	·54	·27	·24
" 6	6 × 3	·33	3·344	11·37	·48	·24	·24
" 5	5½ × 3	·31	2·947	10·02	·48	[illegible]	·22
" 4	5 × 3	·30	2·657	9·03	·48	·24	·20
" 3	5 × 2½	·30	2·498	8·49	·42	·21	·20
" 2	4½ × 2½	·28	2·158	7·34	·42	·21	·18
" 1	4 × 2½	·26	1·849	6·29	·42	·21	·16

Di	
D	
1·95	·7
1·75	·6
1·56	·5
1·56	·6
1·43	·5
1·30	·4
1·17	·4
1·04	·3
1·04	·3
·91	·3
·91	·3
·78	·2
·78	·2
·71	·2
·65	·2
·65	·2
·58	·1
·52	·1

Radii	
r_2	r_3
30	·60
30	·54
30	·48
27	·48
27	·44
27	·40
27	·36
27	·32
24	·32
27	·28
24	·28
27	·24
24	·24
24	·22
24	·20
21	·20
21	·18
21	·16

DORMAN, LONG & CO. LIMITED.

BULB ANGLES.

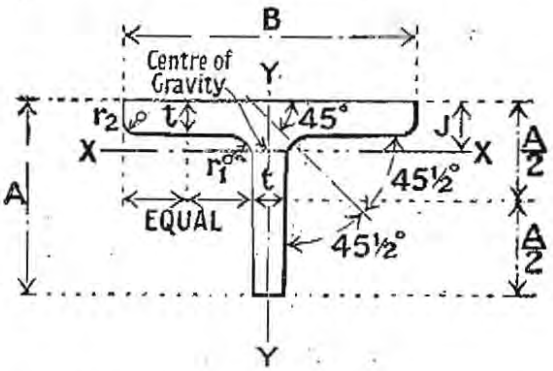
DIMENSIONS AND PROPERTIES IN INCH UNITS.

Dimensions			Moments of Inertia		Section Modull		Angle ∝ degrees	Least Radius of Gyration Inches	Reference Mark
D	J	P	About X - X	About Y - Y	About X - X	About Y - Y			
1·95	7·807	·812	388·085	10·289	53·949	3·228	1½	·869	NBSBA 18
1·75	6·841	·795	272·631	8·947	40·941	2·792	2	·863	" 17
1·56	5·911	·784	182·473	7·750	29·968	2·410	3½	·862	" 16
1·56	6·069	·707	173·935	5·570	29·326	1·994	2	·756	" 15
1·43	5·437	·700	130·469	5·054	23·453	1·805	3	·755	" 14
1·30	4·825	·694	94·102	4·526	18·185	1·613	4	·755	" 13
1·17	4·208	·697	66·703	4·147	13·919	1·480	5½	·758	" 12
1·04	3·611	·704	44·819	3·729	10·212	1·334	7	·763	" 11
1·04	3·752	·607	42·303	2·435	9·957	1·018	5	·649	" 10
·91	3·017	·724	29·130	3·425	7·314	1·234	9½	·770	" 9
·91	3·147	·616	27·480	2·213	7·133	·928	7	·654	" 8
·78	2·462	·740	16·819	2·903	4·754	1·052	13	·776	" 7
·78	2·581	·622	15·865	1·866	4·640	·785	9½	·659	" 6
·71	2·295	·631	11·733	1·724	3·661	·728	11½	·662	" 5
·65	2·014	·650	8·669	1·635	2·904	·696	14	·665	" 4
·65	2·131	·529	8·094	·968	2·821	·491	9½	·549	" 3
·58	1·848	·540	5·641	·886	2·127	·452	12	·552	" 2
·52	1·577	·555	3·798	·805	1·568	·414	15	·554	" 1

DORMAN, LONG & CO. LIMITED.

TEES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size and Thickness Inches B × A × t	Area Square Inches	Weight per foot lbs.	Radii		Dimension	Moments of Inertia		Section Moduli		Radii of Gyration	
				Root r_1	Toe r_2	J	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y
NBST 10	6 × 6 × ½	5·772	19·62	·48	·34	1·630	19·043	8·556	4·357	2·852	1·816	1·218
" 10	" " ⅝	7·126	24·23	·48	·34	1·687	23·309	10·866	5·404	3·622	1·809	1·235
" 9	6 × 4 × ½	4·772	16·22	·42	·29	·968	6·070	8·642	2·002	2·881	1·128	1·346
" 9	" " ⅝	5·878	19·99	·42	·29	1·018	7·331	10·932	2·459	3·644	1·117	1·364
" 8	5 × 4 × ½	4·266	14·50	·39	·27	1·052	5·773	5·024	1·958	2·009	1·163	1·085
" 8	" " ⅝	5·248	17·84	·39	·27	1·102	6·963	6·363	2·403	2·545	1·152	1·101
" 7	5 × 3 × ⅜	2·878	9·79	·36	·25	·691	1·973	3·716	·855	1·487	·828	1·136
" 7	" " ½	3·766	12·80	·36	·25	·741	2·515	5·037	1·113	2·015	·817	1·157
" 6	4 × 3 × ⅜	2·498	8·49	·33	·23	·767	1·860	1·911	·833	·956	·863	·875
" 6	" " ½	3·262	11·09	·33	·23	·816	2·366	2·595	1·083	1·298	·852	·892
" 5	3 × 3 × 5/16	1·786	6·07	·30	·21	·842	1·455	·666	·674	·444	·903	·611
" 5	" " ⅜	2·119	7·20	·30	·21	·869	1·708	·813	·801	·542	·898	·619
" 5	" " 7/16	2·440	8·30	·30	·21	·894	1·942	·959	·922	·640	·892	·627
" 4	2½ × 2½ × ¼	1·197	4·07	·27	·19	·697	·678	·305	·376	·244	·752	·504
" 4	" " 5/16	1·471	5·00	·27	·19	·724	·822	·388	·463	·311	·748	·514
" 4	" " ⅜	1·742	5·92	·27	·19	·749	·959	·475	·548	·380	·742	·522
" 3	2 × 2 × ¼	·945	3·21	·24	·17	·579	·337	·157	·237	·157	·597	·408
" 3	" " 5/16	1·158	3·94	·24	·17	·604	·406	·201	·291	·201	·592	·417
" 3	" " ⅜	1·366	4·64	·24	·17	·628	·469	·246	·342	·246	·586	·425
" 2	1½ × 1½ × 3/16	·533	1·81	·21	·15	·434	·106	·048	·100	·065	·447	·302
" 2	" " ¼	·693	2·36	·21	·15	·459	·135	·067	·130	·090	·442	·312

DORMAN, LONG & CO. LIMITED.

INFORMATION

RELATING TO THE

CARRYING CAPACITY, &c.

OF

BEAMS

COMPOUND GIRDERS

STANCHIONS AND STRUTS

PLATE GIRDERS

ROOF TRUSSES

AND

TROUGHING

TOGETHER WITH

STANDARD DETAILS

Etc.

NOTES ON BEAMS AND COMPOUNDS.

DIMENSIONS AND PROPERTIES.—The dimensions and properties of beams will be found on pages 58 and 59.

The dimensions and properties of compounds are given on the pages immediately preceding those containing the tabular loads. The moment of inertia and section modulus have been calculated in inch units on the net section, that is both flanges holed for rivets, the size allowed in any particular case being shewn in the several tables.

WEIGHTS OF COMPOUNDS.—The published weights per foot of compounds are inclusive of rivets. The pitch of rivets for spans in general demand has been taken as the basis of calculation in all cases.

TABULAR LOADS.—The loads given in the tables include the weights of the girders themselves, and are based on an extreme fibre stress of 8 tons per square inch. They are also calculated on the assumption that the girders receive the usual side support as in building work. For other cases, such as concentrated, eccentric, or live loads, special calculations are necessary.

The resistance of the web to shear or buckle has been taken as the limiting factor in deciding the maximum load for each section. These loads should not be exceeded when sections are used at less spans than those for which such values are given.

It will be noted that, in many cases, several compounds of different depths and widths will meet the requirements as to loading. It should, however, be borne in mind that, where the depth is not restricted, a deeper and frequently a lighter section, carrying even a greater load than that required, may often be found more economical.

DEFLECTION.—Care should be taken in selecting beams and compounds that the deflection is not too great for the purpose for which they are to be employed. The zig-zag lines in the tables indicate the generally accepted limit of span to depth (20 to 1) for girders supporting plastered ceilings at full tabular loads.

For beams and compounds of uniform section throughout their lengths, a table giving the deflections in inches for tabular loads will be found on page 110. If the actual load is less than the tabular load, the deflection will be less in exactly the same proportion.

RIVETING OF COMPOUNDS.—In the tables of compounds, particulars are given of the diameter of rivets for each section, together with the minimum spans, at, and above, which the various pitches may be used for uniformly distributed dead loads. In cases of spans shorter than those for which loads are given, as also for concentrated, eccentric, or live loads, special calculations are necessary.

DORMAN, LONG & CO. LIMITED.

BEAMS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see pages 58 and 59.

Reference Mark	Size Inches	Weight per foot lbs.	SPANS IN FEET 2	4	6	8	10	12	14	16	18
"A" GIRDER SECTIONS.											
NBSB 18	24×7½	90	..	..	..	..	..	..	75·4	67·9	60·3
" 17	22×7	75	..	..	..	..	70·1	67·7	58·1	50·8	45·2
" 16	20×6½	65	..	..	..	..	57·3	54·5	46·7	40·9	36·3
" 15	18×6	55	..	..	..	50·2	49·9	41·6	35·6	31·2	27·7
" 14	16×6	50	..	..	..	46·3	41·2	34·3	29·4	25·8	22·9
" 13	15×6	45	..	..	..	41·9	35·0	29·2	25·0	21·9	19·4
" 12	14×5½	40	..	..	39·8	35·9	28·7	23·9	20·5	18·0	16·0
" 11	13×5	35	..	..	35·5	29·1	23·3	19·4	16·6	14·5	12·9
" 10	12×5	30	..	31·4	30·7	23·0	18·4	15·3	13·1	11·5	10·2
" 9	10×4½	25	..	26·0	21·7	16·3	13·0	10·9	9·32	8·16	7·25
" 8	9×4	21	24·3	24·0	16·0	12·0	9·61	8·01	6·87	6·01	5·34
" 7	8×4	18	20·2	18·5	12·4	9·27	7·42	6·18	5·30	4·64	4·12
" 6	7×3½	15	15·8	13·7	9·12	6·84	5·47	4·56	3·91	3·42	3·04
" 5	6×3	12	12·4	9·33	6·22	4·66	3·73	3·11	2·67	2·33	2·07
" 4	5×2½	9	9·90	5·82	3·88	2·91	2·33	1·94	1·66	1·45	..
" 3	4½×2	7	7·70	3·94	2·63	1·97	1·58	1·31	1·13	..	..
" 2	4×1¾	5	4·89	2·44	1·63	1·22	·98	·81	..	..	..
" 1	3×1½	4	2·95	1·48	·98	·74	·59	..	..	..	..
"B" HEAVY BEAMS.											
NBSHB 11	18×8	80	..	..	..	..	73·8	63·8	54·7	47·9	42·5
" 10	16×8	75	..	..	..	67·9	64·9	54·1	46·4	40·6	36·1
" 9	14×8	70	..	..	..	58·0	53·8	44·8	38·4	33·6	29·9
" 8	12×8	65	..	..	..	46·4	43·4	36·1	31·0	27·1	24·1
" 7	10×8	55	..	..	..	36·0	30·8	25·7	22·0	19·2	17·1
" 6	10×6	40	..	..	32·4	27·3	21·8	18·2	15·6	13·7	12·1
" 5	9×7	50	..	..	32·4	30·8	24·7	20·6	17·6	15·4	13·7
" 4	8×6	35	..	..	25·2	19·2	15·3	12·8	11·0	9·59	8·52
" 3	6×5	25	..	17·8	13·4	10·0	8·03	6·69	5·73	5·02	4·46
" 2	5×4½	20	..	13·1	8·90	6·67	5·34	4·45	3·81	3·34	..
" 1	4×3	10	8·64	5·19	3·46	2·60	2·08	1·73	1·48	..	..

DORMAN, LONG & CO. LIMITED.

BEAMS.

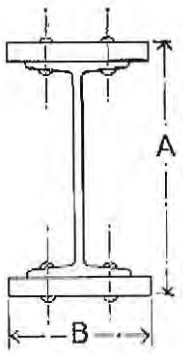
SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

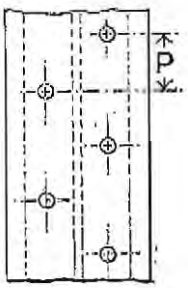
For dimensions and properties of sections see pages 58 and 59.

SPANS IN FEET										Section Modulus	Size Inches
20	22	24	26	28	30	32	36	40	44		
"A" GIRDER SECTIONS.											
54·3	49·4	45·2	41·8	38·8	36·2	33·9	30·2	27·1	24·7	203·6	24×7½
40·6	37·0	33·9	31·3	29·0	27·1	25·4	22·6	20·3	18·5	152·4	22×7
32·7	29·7	27·2	25·2	23·4	21·8	20·4	18·2	16·3	14·9	122·6	20×6½
24·9	22·7	20·8	19·2	17·8	16·6	15·6	13·9	12·5	11·3	93·53	18×6
20·6	18·7	17·2	15·8	14·7	13·7	12·9	11·4	..	..	77·26	16×6
17·5	15·9	14·6	13·5	12·5	11·7	10·9	..	..	..	65·59	15×6
14·4	13·1	12·0	11·0	10·3	9·58	..	..	..	..	53·87	14×5½
11·6	10·6	9·69	8·95	8·31	..	..	..	..	..	43·62	13×5
9·20	8·36	7·66	7·07	6·57	..	..	..	..	..	34·49	12×5
6·52	5·93	5·44	5·02	..	..	..	..	..	..	24·47	10×4½
4·81	4·37	4·01	..	..	..	..	..	..	..	18·03	9×4
3·71	3·37	..	..	..	..	..	..	..	..	13·91	8×4
2·74	..	..	..	..	..	..	..	..	..	10·26	7×3½
..	..	..	..	..	..	..	..	..	..	6·996	6×3
..	..	..	..	..	..	..	..	..	..	4·364	5×2½
..	..	..	..	..	..	..	..	..	..	2·957	4½×2
..	..	..	..	..	..	..	..	..	..	1·832	4×1¾
..	..	..	..	..	..	..	..	..	..	1·107	3×1½
"B" HEAVY BEAMS.											
38·3	34·8	31·9	29·4	27·3	25·5	23·9	21·3	19·1	17·4	143·6	18×8
32·5	29·5	27·1	25·0	23·2	21·6	20·3	18·0	..	..	121·7	16×8
26·9	24·4	22·4	20·7	19·2	17·9	..	..	..	..	100·8	14×8
21·7	19·7	18·1	16·7	15·5	..	..	..	..	..	81·30	12×8
15·4	14·0	12·8	11·8	..	..	..	..	..	..	57·74	10×8
10·9	9·93	9·10	8·40	..	..	..	..	..	..	40·96	10×6
12·3	11·2	10·3	..	..	..	..	..	..	..	46·25	9×7
7·67	6·97	..	..	..	..	..	..	..	..	28·76	8×6
..	..	..	..	..	..	..	..	..	..	15·05	6×5
..	..	..	..	..	..	..	..	..	..	10·01	5×4½
..	..	..	..	..	..	..	..	..	..	3·893	4×3

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.





Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches	
			Beam	Each Flange
CD 1	27½×12	235·5	24×7½	12×1¾
" 2	27 ×12	215	"	12×1½
" 3	26½×12	194·5	"	12×1¼
" 4	26 ×12	174·5	"	12×1
" 5	25¾×12	164	"	12×⅞
" 6	25½×12	153	"	12×¾
" 7	25¼×12	143	"	12×⅝
" 8	25 ×12	132·5	"	12×½
" 9	25 × 9	122·5	"	9×½
" 10	24¾× 9	115	"	9×⅝
CD 11	25½×12	220·5	22×7	12×1¾
" 12	25 ×12	200	"	12×1½
" 13	24½×12	179·5	"	12×1¼
" 14	24 ×12	159·5	"	12×1
" 15	23¾×12	149	"	12×⅞
" 16	23½×12	138	"	12×¾
" 17	23¼×12	128	"	12×⅝
" 18	23 ×12	117·5	"	12×½
" 19	23 × 9	107·5	"	9×½
" 20	22¾× 9	100	"	9×⅜
CD 21	23½×10	186·5	20×6½	10×1¾
" 22	23 ×10	169·5	"	10×1½
" 23	22½×10	152·5	"	10×1¼
" 24	22 ×10	135·5	"	10×1
" 25	21¾×10	127	"	10×⅞
" 26	21½×10	118	"	10×¾
" 27	21¼×10	109·5	"	10×⅝
" 28	21 ×10	101	"	10×½
" 29	21 × 8	94	"	8×½
" 30	20¾× 8	87	"	8×⅜

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
68·47	8635	628·0	⅞	..	44	..	CD 1
62·47	7608	563·5	"	..	38	..	" 2
56·47	6618	499·5	"	..	34	..	" 3
50·47	5665	435·8	"	..	30	..	" 4
47·47	5203	404·1	"	..	28	..	" 5
44·47	4749	372·4	"	..	26	28	" 6
41·47	4303	340·9	"	..	..	24	" 7
38·47	3867	309·3	"	..	..	20	" 8
35·47	3417	273·3	"	..	..	18	" 9
33·22	3105	250·9	"	..	..	16	" 10
64·06	6975	547·0	⅞	40	42	..	CD 11
58·06	6093	487·5	"	..	36	..	" 12
52·06	5246	428·2	"	..	32	..	" 13
46·06	4433	369·4	"	..	28	..	" 14
43·06	4039	340·1	"	..	24	..	" 15
40·06	3653	310·9	"	..	22	28	" 16
37·06	3275	281·7	"	..	20	24	" 17
34·06	2905	252·6	"	..	18	20	" 18
31·06	2526	219·6	"	..	..	16	" 19
28·81	2262	198·8	"	..	..	14	" 20
54·12	4847	412·5	⅞	..	38	..	CD 21
49·12	4235	368·2	"	..	34	..	" 22
44·12	3648	324·3	"	..	30	..	" 23
39·12	3088	280·7	"	..	26	..	" 24
36·62	2816	259·0	"	..	24	..	" 25
34·12	2552	237·4	"	..	22	24	" 26
31·62	2293	215·8	"	..	..	20	" 27
29·12	2040	194·3	"	..	..	18	" 28
27·12	1830	174·3	"	..	..	16	" 29
25·12	1638	157·8	"	..	..	14	" 30

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET									
	14	16	18	20	22	24	26	28	30	32
CD 1	..	..	..	..	..	..	..	..	..	..
" 2	..	..	..	..	..	..	..	..	..	..
" 3	..	..	..	..	..	..	..	..	..	..
" 4	..	..	..	..	..	..	..	..	75·4	72·6
" 5	..	..	..	..	..	..	..	75·4	71·8	67·4
" 6	..	..	..	..	..	..	75·4	70·9	66·2	62·1
" 7	..	..	..	..	..	75·4	69·9	64·9	60·6	56·8
" 8	..	..	..	75·4	75·0	68·7	63·4	58·9	55·0	51·6
" 9	..	..	75·4	72·9	66·3	60·7	56·1	52·1	48·6	45·6
" 10	..	75·4	74·3	66·9	60·8	55·8	51·5	47·8	44·6	41·8
CD 11	..	..	..	..	..	..	..	..	..	..
" 12	..	..	..	..	..	..	..	..	..	..
" 13	..	..	..	..	..	..	..	..	..	70·1
" 14	..	..	..	..	..	..	..	70·1	65·7	61·6
" 15	..	..	..	..	..	70·1	69·8	64·8	60·5	56·7
" 16	..	..	..	..	70·1	69·1	63·8	59·2	55·3	51·8
" 17	..	..	..	70·1	68·3	62·6	57·8	53·7	50·1	47·0
" 18	..	..	70·1	67·4	61·2	56·1	51·8	48·1	44·9	42·1
" 19	..	70·1	65·1	58·6	53·2	48·8	45·0	41·8	39·0	36·6
" 20	70·1	66·3	58·9	53·0	48·2	44·2	40·8	37·9	35·3	33·1
CD 21	..	..	..	..	..	..	..	..	..	..
" 22	..	..	..	..	..	..	..	..	..	..
" 23	..	..	..	..	..	..	..	..	57·3	54·1
" 24	..	..	..	..	..	..	57·3	53·5	49·9	46·8
" 25	..	..	..	..	..	57·3	53·1	49·8	46·0	43·2
" 26	..	..	..	..	57·3	52·8	48·7	45·2	42·2	39·6
" 27	..	..	..	57·3	52·3	48·0	44·3	41·1	38·4	36·0
" 28	..	..	57·3	51·8	47·1	43·2	39·9	37·0	34·5	32·4
" 29	..	57·3	51·6	46·5	42·3	38·7	35·8	33·2	31·0	29·1
" 30	57·3	52·6	46·8	42·1	38·3	35·1	32·4	30·1	28·1	26·3

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

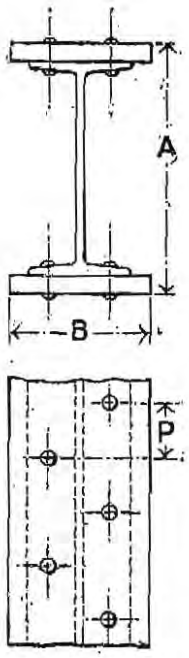
For dimensions and properties of sections see preceding pages.

SPANS IN FEET									Reference Mark
34	36	38	40	42	44	46	48	50	
..	..	..	..	..	75·4	72·8	69·8	67·0	CD 1
..	..	75·4	75·1	71·6	68·3	65·3	62·6	60·1	" 2
75·4	74·0	70·1	66·6	63·4	60·5	57·9	55·5	53·3	" 3
68·4	64·6	61·2	58·1	55·3	52·8	50·5	48·4	46·5	" 4
63·4	59·9	56·7	53·9	51·3	49·0	46·9	44·9	43·1	" 5
58·4	55·2	52·3	49·7	47·3	45·1	43·2	41·4	39·7	" 6
53·5	50·5	47·8	45·5	43·3	41·3	39·5	37·9	36·4	" 7
48·5	45·8	43·4	41·2	39·3	37·5	35·9	34·4	33·0	" 8
42·9	40·5	38·4	36·4	34·7	33·1	31·7	30·4	29·2	" 9
39·4	37·2	35·2	33·5	31·9	30·4	29·1	27·9	..	" 10
..	..	..	70·1	69·5	66·3	63·4	60·8	58·3	CD 11
..	70·1	68·4	65·0	61·9	59·1	56·5	54·2	52·0	" 12
67·2	63·4	60·1	57·1	54·4	51·9	49·6	47·6	..	" 13
57·9	54·7	51·8	49·3	46·9	44·8	42·8	41·0	..	" 14
53·4	50·4	47·7	45·3	43·2	41·2	39·4	..	..	" 15
48·8	46·1	43·6	41·5	39·5	37·7	36·0	..	..	" 16
44·2	41·7	39·5	37·6	35·8	34·1	32·7	..	..	" 17
39·6	37·4	35·5	33·7	32·1	30·6	29·3	..	..	" 18
34·4	32·5	30·8	29·3	27·9	26·6	25·5	..	..	" 19
31·2	29·5	27·9	26·5	25·2	24·1	..	..	..	" 20
..	..	57·3	55·0	52·4	50·0	47·8	..	..	CD 21
57·3	54·5	51·7	49·1	46·8	44·6	42·7	..	..	" 22
50·9	48·0	45·5	43·2	41·2	39·3	..	..	..	" 23
44·0	41·6	39·4	37·4	35·6	34·0	..	..	..	" 24
40·6	38·4	36·4	34·5	32·9	..	..	..	..	" 25
37·2	35·2	33·3	31·7	30·1	..	..	..	..	" 26
33·9	32·0	30·3	28·8	27·4	..	..	..	..	" 27
30·5	28·8	27·3	25·9	24·7	..	..	..	..	" 28
27·3	25·8	24·5	23·2	22·1	..	..	..	..	" 29
24·8	23·4	22·1	21·0	..	..	..	..	..	" 30

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches	
			Beam	Each Flange
CD 31	21 ×12	205	18×8	12×1½
" 32	20½×12	184·5	"	12×1¼
" 33	20 ×12	164·5	"	12×1
" 34	19½×12	143	"	12×¾
CD 35	21 ×10	159·5	18×6	10×1½
" 36	20½×10	142·5	"	10×1¼
" 37	20 ×10	125·5	"	10×1
" 38	19¾×10	117	"	10×⅞
" 39	19½×10	108	"	10×¾
" 40	19¼×10	99·5	"	10×⅝
" 41	19 ×10	91	"	10×½
" 42	19 × 8	84	"	8×½
" 43	18¾× 8	77	"	8×⅜
CD 44	19 ×12	201	16×8	12×1½
" 45	18½×12	179·5	"	12×1¼
" 46	18 ×12	159·5	"	12×1
" 47	17½×12	139	"	12×¾
" 48	17 ×12	117·5	"	12×½
CD 49	18½×10	137·5	16×6	10×1¼
" 50	18 ×10	120·5	"	10×1
" 51	17¾×10	112	"	10×⅞
" 52	17½×10	103	"	10×¾
" 53	17¼×10	94·5	"	10×⅝
" 54	17 ×10	86	"	10×½
" 55	17 × 8	79	"	8×½
" 56	16¾× 8	72	"	8×⅜

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
59·53	4328	412·2	⅞	28	36	..	C D 31
53·53	3732	364·1	"	26	30	..	" 32
47·53	3165	316·5	"	22	24	..	" 33
41·53	2626	269·3	"	18	20	28	" 34
46·18	3328	317·0	⅞	..	32	..	C D 35
41·18	2841	277·1	"	..	28	..	" 36
36·18	2376	237·6	"	..	24	..	" 37
33·68	2152	218·0	"	..	22	..	" 38
31·18	1984	198·4	"	..	20	24	" 39
28·68	1722	178·9	"	..	18	20	" 40
25·18	1514	159·4	"	..	..	16	" 41
24·18	1343	141·4	"	..	..	14	" 42
22·18	1186	126·5	"	..	..	12	" 43
58·06	3425	360·5	⅞	28	36	..	C D 44
52·06	2938	317·7	"	24	30	..	" 45
46·06	2478	275·3	"	20	24	..	" 46
40·06	2042	233·4	"	18	20	28	" 47
34·06	1631	191·8	"	..	14	20	" 48
39·71	2229	241·0	⅞	..	26	..	C D 49
34·71	1852	205·8	"	..	22	..	" 50
32·21	1671	188·3	"	..	20	..	" 51
29·71	1495	170·8	"	..	18	24	" 52
27·21	1324	153·5	"	..	16	20	" 53
24·71	1158	136·2	"	..	14	16	" 54
22·71	1022	120·2	"	..	..	12	" 55
20·71	896	107·0	"	..	..	12	" 56

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET							
	12	14	16	18	20	22	24	26
CD 31	..	..	..	..	..	..	..	..
" 32	..	..	..	..	..	..	..	73·8
" 33	..	..	..	..	..	73·8	70·3	64·9
" 34	..	..	..	73·8	71·8	65·3	59·8	55·2
CD 35	..	..	..	..	..	..	..	..
" 36	..	..	..	..	..	..	..	..
" 37	..	..	..	..	..	..	50·2	48·7
" 38	..	..	..	..	..	50·2	48·4	44·7
" 39	..	..	..	..	50·2	48·1	44·1	40·7
" 40	..	..	..	50·2	47·7	43·4	39·8	36·7
" 41	..	..	50·2	47·2	42·5	38·6	35·4	32·7
" 42	..	50·2	47·1	41·9	37·7	34·3	31·4	29·0
" 43	50·2	48·2	42·2	37·5	33·7	30·7	28·1	26·0
CD 44	..	..	..	..	..	..	..	..
" 45	..	..	..	..	..	..	67·9	65·2
" 46	..	..	..	..	67·9	66·7	61·2	56·5
" 47	..	..	..	67·9	62·2	56·6	51·9	47·9
" 48	..	67·9	63·9	56·8	51·1	46·5	42·6	39·3
CD 49	..	..	..	..	..	..	..	46·3
" 50	..	..	..	..	..	46·3	45·7	42·2
" 51	..	..	..	..	46·3	45·7	41·8	38·6
" 52	..	..	..	46·3	45·5	41·4	38·0	35·0
" 53	..	..	46·3	45·5	40·9	37·2	34·1	31·5
" 54	..	46·3	45·4	40·4	36·3	33·0	30·3	27·9
" 55	46·3	45·8	40·1	35·6	32·1	29·1	26·7	24·7
" 56	46·3	40·8	35·7	31·7	28·5	25·9	23·8	22·0

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

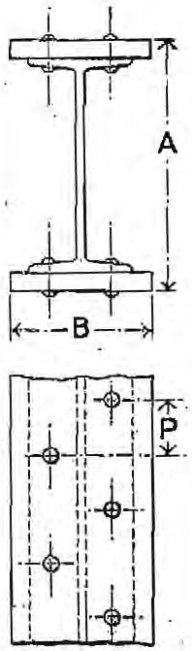
For dimensions and properties of sections see preceding pages.

SPANS IN FEET								Reference Mark
28	30	32	34	36	38	40	42	
73·8	73·3	68·7	64·7	61·1	57·9	55·0	52·3	CD 31
69·4	64·7	60·7	57·1	53·9	51·1	48·5	..	" 32
60·3	56·3	52·8	49·6	46·9	44·4	42·2	..	" 33
51·3	47·9	44·9	42·2	39·9	37·8	..	..	" 34
	..	50·2	49·7	47·0	44·5	42·3	40·3	CD 35
50·2	49·3	46·2	43·5	41·1	38·9	36·9	..	" 36
45·3	42·2	39·6	37·3	35·2	33·3	31·7	..	" 37
41·5	38·8	36·3	34·2	32·3	30·6	..	..	" 38
37·8	35·3	33·1	31·1	29·4	27·8	..	..	" 39
34·1	31·8	29·8	28·1	26·5	25·1	..	..	" 40
30·4	28·3	26·6	25·0	23·6	22·4	..	..	" 41
26·9	25·1	23·6	22·2	20·9	19·8	..	..	" 42
24·1	22·5	21·1	19·8	18·7	..	..	..	" 43
67·9	64·1	60·1	56·6	53·4	50·6	..	..	CD 44
60·5	56·5	53·0	49·8	47·1	..	..	..	" 45
52·4	48·9	45·9	43·2	40·8	..	..	..	" 46
44·5	41·5	38·9	36·6	..	..	..	..	" 47
36·5	34·1	32·0	30·1	..	..	..	..	" 48
45·9	42·8	40·2	37·8	35·7	..	..	..	CD 49
39·2	36·6	34·3	32·3	30·5	..	..	..	" 50
35·9	33·5	31·4	29·5	..	..	..	..	" 51
32·5	30·4	28·5	26·8	..	..	..	..	" 52
29·2	27·3	25·6	24·1	..	..	..	..	" 53
25·9	24·2	22·7	21·4	..	..	..	..	" 54
22·9	21·4	20·0	18·9	..	..	..	..	" 55
20·4	19·0	17·8	..	..	..	..	..	" 56

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches	
			Beam	Each Flange
C D 57	17½×10	132·5	15×6	10×1¼
" 58	17 ×10	115·5	"	10×1
" 59	16¾×10	107	"	10×⅞
" 60	16½×10	98	"	10×¾
" 61	16¼×10	89·5	"	10×⅝
" 62	16 ×10	81	"	10×½
" 63	16 × 8	74	"	8×½
" 64	15¾× 8	67	"	8×⅜
C D 65	17 ×10	174·5	14×8	10×1½
" 66	16½×10	157·5	"	10×1¼
" 67	16 ×10	140·5	"	10×1
" 68	15½×10	123·5	"	10×¾
" 69	15 ×10	106	"	10×½
C D 70	16½× 9	119	14×5½	9×1¼
" 71	16 × 9	103	"	9×1
" 72	15¾× 9	95	"	9×⅞
" 73	15½× 9	87·5	"	9×¾
" 74	15¼× 9	80	"	9×⅝
" 75	15 × 9	71·5	"	9×½
" 76	14¾× 9	64	"	9×⅜
" 77	14¾× 7	59	"	7×⅜
C D 78	15 × 9	98	13×5	9×1
" 79	14¾× 9	90	"	9×⅞
" 80	14½× 9	82·5	"	9×¾
" 81	14¼× 9	75	"	9×⅝
" 82	14 × 9	66·5	"	9×½
" 83	13¾× 9	59	"	9×⅜
" 84	13¾× 7	54	"	7×⅜

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
38·24	1929	220·5	⅞	..	28	..	C D 57
33·24	1592	187·3	"	..	22	..	" 58
30·74	1431	170·8	"	..	20	..	" 59
28·24	1274	154·5	"	..	18	24	" 60
25·74	1122	138·1	"	..	16	20	" 61
23·24	975	121·9	"	..	14	16	" 62
21·24	855	106·9	"	..	..	12	" 63
19·24	744	94·4	"	..	..	12	" 64
50·59	2272	267·3	⅞	24	30	..	C D 65
45·59	1954	236·9	"	20	24	..	" 66
40·59	1655	206·9	"	18	20	..	" 67
35·59	1374	177·3	"	..	16	24	" 68
30·59	1111	148·1	"	..	12	16	" 69
34·27	1526	185·0	¾	24	30	..	C D 70
29·77	1256	157·0	"	20	24	..	" 71
27·52	1126	143·1	"	18	22	..	" 72
25·27	1002	129·2	"	16	20	28	" 73
23·02	881	115·5	"	14	16	24	" 74
20·77	763	101·8	"	12	14	20	" 75
18·52	650	88·2	"	..	10	14	" 76
17·02	573	77·7	"	..	10	12	" 77
28·30	1050	140·0	¾	20	24	..	C D 78
26·05	937	127·0	"	18	22	..	" 79
23·80	827	114·1	"	16	18	28	" 80
21·55	721	101·2	"	14	16	24	" 81
19·30	619	88·5	"	12	14	20	" 82
17·05	521	75·7	"	..	10	14	" 83
15·55	454	66·0	"	..	8	12	" 84

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET						
	8	10	12	14	16	18	20
CD 57	..	..	..	..	..	..	..
" 58	..	..	..	..	..	..	..
" 59	..	..	..	..	..	..	41·9
" 60	..	..	..	..	..	41·9	41·2
" 61	..	..	..	..	41·9	40·9	36·8
" 62	..	..	..	41·9	40·6	36·1	32·5
" 63	..	..	41·9	40·7	35·6	31·7	28·5
" 64	..	..	41·9	36·0	31·5	28·0	25·2
CD 65	..	..	..	..	..	..	..
" 66	..	..	..	..	..	..	58·0
" 67	..	..	..	..	..	58·0	55·2
" 68	..	..	..	..	58·0	52·5	47·3
" 69	..	..	58·0	56·4	49·4	43·9	39·5
CD 70	..	..	..	..	..	..	..
" 71	..	..	..	..	..	..	39·8
" 72	..	..	..	..	..	39·8	38·2
" 73	..	..	..	..	39·8	38·3	34·5
" 74	..	..	..	39·8	38·5	34·2	30·8
" 75	..	..	39·8	38·8	33·9	30·2	27·1
" 76	..	39·8	39·2	33·6	29·4	26·1	23·5
" 77	..	39·8	34·5	29·6	25·9	23·0	20·7
CD 78	..	..	..	..	..	..	35·5
" 79	..	..	..	..	..	35·5	33·9
" 80	..	..	..	..	35·5	33·8	30·4
" 81	..	..	..	35·5	33·7	30·0	27·0
" 82	..	..	35·5	33·7	29·5	26·2	23·6
" 83	..	35·5	33·6	28·8	25·2	22·4	20·2
" 84	35·5	35·2	29·3	25·1	22·0	19·6	17·6

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

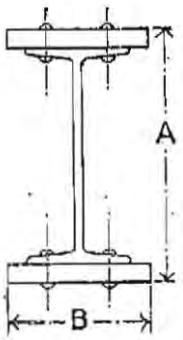
SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

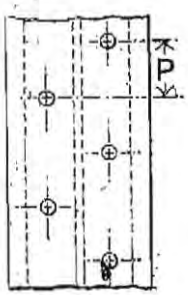
For dimensions and properties of sections see preceding pages.

SPANS IN FEET							Reference Mark	
22	24	26	28	30	32	34		
..	..	..	41·9	39·2	36·8	34·6	C D	57
41·9	41·6	38·4	35·7	33·3	31·2	29·4	"	58
41·4	38·0	35·0	32·5	30·4	28·5	..	"	59
37·5	34·3	31·7	29·4	27·5	25·8	..	"	60
33·5	30·7	28·3	26·3	24·6	23·0	..	"	61
29·6	27·1	25·0	23·2	21·7	20·3	..	"	62
25·9	23·8	21·9	20·4	19·0	17·8	..	"	63
22·9	21·0	19·4	18·0	16·8	..	..	"	64
..	58·0	54·8	50·9	47·5	44·6	41·9	C D	65
57·4	52·6	48·6	45·1	42·1	39·5	..	"	66
50·2	46·0	42·4	39·4	36·8	34·5	..	"	67
43·0	39·4	36·4	33·8	31·5	..	..	"	68
35·9	32·9	30·4	28·2	26·3	..	..	"	69
..	39·8	38·0	35·2	32·9	30·8	..	C D	70
38·1	34·9	32·2	29·9	27·9	26·2	..	"	71
34·7	31·8	29·4	27·3	25·4	..	..	"	72
31·3	28·7	26·5	24·6	23·0	..	..	"	73
28·0	25·7	23·7	22·0	20·5	..	..	"	74
24·7	22·6	20·9	19·4	18·1	..	..	"	75
21·4	19·6	18·1	16·8	..	..	..	"	76
18·8	17·3	15·9	14·8	..	..	..	"	77
33·9	31·1	28·7	26·7	24·9	..	..	C D	78
30·8	28·2	26·1	24·2	..	..	..	"	79
27·7	25·4	23·4	21·7	..	..	..	"	80
24·5	22·5	20·8	19·3	..	..	..	"	81
21·5	19·7	18·2	16·9	..	..	..	"	82
18·4	16·8	15·5	..	..	..	..	"	83
16·0	14·7	13·5	..	..	..	..	"	84

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.





Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches	
			Beam	Each Flange
C D 85	14½×10	152·5	12×8	10×1¼
" 86	14 ×10	135·5	"	10×1
" 87	13½×10	118·5	"	10×¾
" 88	13 ×10	101	"	10×½
" 89	12¾×10	92·5	"	10×⅜
C D 90	14 × 9	93	12×5	9×1
" 91	13¾× 9	85	"	9×⅞
" 92	13½× 9	77·5	"	9×¾
" 93	13¼× 9	70	"	9×⅝
" 94	13 × 9	61·5	"	9×½
" 95	12¾× 9	54	"	9×⅜
" 96	12¾× 7	49	"	7×⅜
C D 97	12 ×10	125·5	10×8	10×1
" 98	11½×10	108·5	"	10×¾
" 99	11 ×10	91	"	10×½
C D 100	12 × 9	103·5	10×6	9×1
" 101	11½× 9	87·5	"	9×¾
" 102	11 × 9	72·5	"	9×½
C D 103	12 × 7	74·5	10×4½	7×1
" 104	11½× 7	62·5	"	7×¾
" 105	11 × 7	50	"	7×½

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
44·12	1435	198·0	⅞	22	24	..	CD 85
39·12	1205	172·1	"	18	20	..	" 86
34·12	990	146·7	"	..	16	22	" 87
29·12	792	121·8	"	..	14	16	" 88
26·62	698	109·4	"	..	..	12	" 89
26·83	873	124·7	¾	20	24	..	CD 90
24·58	775	112·7	"	18	22	..	" 91
22·33	680	100·7	"	16	18	..	" 92
20·08	588	88·8	"	14	16	24	" 93
17·83	500	76·9	"	12	14	20	" 94
15·58	415	65·1	"	..	10	14	" 95
14·08	358	56·1	"	..	8	12	" 96
36·18	809	134·8	⅞	18	20	..	CD 97
31·18	652	113·4	"	..	16	22	" 98
26·18	509	92·5	"	..	12	16	" 99
29·77	677	112·9	¾	18	24	..	CD 100
25·27	536	93·2	"	14	18	..	" 101
20·77	406	73·9	"	12	14	20	" 102
21·35	479	79·9	¾	16	18	..	CD 103
17·85	373	64·8	"	12	14	20	" 104
14·35	275	50·0	"	..	10	14	" 105

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark		SPANS IN FEET					
		8	10	12	14	16	18
CD	85	..	..	..	..	..	..
"	86	..	..	..	..	..	46·4
"	87	..	..	..	..	46·4	43·5
"	88	..	..	..	46·4	40·6	36·1
"	89	..	..	46·4	41·7	36·5	32·4
CD	90	..	..	..	..	..	..
"	91	..	..	..	..	..	31·4
"	92	..	..	..	..	31·4	29·8
"	93	..	..	..	31·4	29·6	28·3
"	94	..	..	31·4	29·3	25·6	22·8
"	95	..	31·4	28·9	24·8	21·7	19·3
"	96	31·4	29·9	24·9	21·4	18·7	16·6
CD	97	..	..	..	..	..	36·0
"	98	..	..	..	..	36·0	33·6
"	99	..	..	36·0	35·2	30·8	27·4
CD	100	..	..	..	..	..	32·4
"	101	..	..	..	32·4	31·1	27·6
"	102	..	..	32·4	28·2	24·6	21·9
CD	103	..	..	..	..	26·0	23·7
"	104	..	..	26·0	24·7	21·6	19·2
"	105	..	26·0	22·2	19·1	16·7	14·8

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

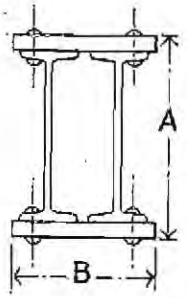
SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

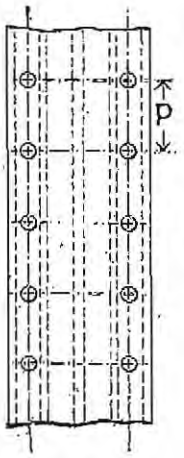
For dimensions and properties of sections see preceding pages.

SPANS IN FEET					Reference Mark	
20	22	24	26	28		
..	46·4	44·0	40·6	37·7	C D	85
45·9	41·7	38·2	35·3	32·8	"	86
39·1	35·6	32·6	30·1	..	"	87
32·5	29·5	27·1	25·0	..	"	88
29·2	26·5	24·3	..	..	"	89
31·4	30·2	27·7	25·6	23·8	C D	90
30·1	27·3	25·0	23·1	..	"	91
26·9	24·4	22·4	20·7	..	"	92
28·7	21·5	19·7	18·2	..	"	93
20·5	18·6	17·1	15·8	..	"	94
17·4	15·8	14·5	..	..	"	95
15·0	13·6	12·5	..	..	"	96
35·9	32·7	30·0	..	..	C D	97
30·2	27·5	..	..	..	"	98
24·7	22·4	..	..	..	"	99
30·1	27·4	25·1	..	..	C D	100
24·9	22·6	..	..	..	"	101
19·7	17·9	..	..	..	"	102
21·3	19·4	17·8	..	..	C D	103
17·3	15·7	..	..	..	"	104
13·3	12·1	..	..	..	"	105

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages





Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Centres of Beams Inches
			Beams	Each Flange	
CD 106	28½×18	461	24×7½	18×2¼	9½
" 107	28 ×18	430	"	18×2	"
" 108	27½×18	399·5	"	18×1¾	"
" 109	27 ×18	369	"	18×1½	"
" 110	26½×18	336·5	"	18×1¼	"
" 111	26 ×18	306	"	18×1	"
" 112	25½×18	275·5	"	18×¾	"
" 113	25 ×18	245	"	18×½	"
" 114	24¾×18	229·5	"	18×⅜	"
CD 115	26½×16	400	22×7	16×2¼	8
" 116	26 ×16	373	"	16×2	"
" 117	25½×16	346	"	16×1¾	"
" 118	25 ×16	317	"	16×1½	"
" 119	24½×16	289·5	"	16×1¼	"
" 120	24 ×16	262·5	"	16×1	"
" 121	23½×16	235	"	16×¾	"
" 122	23 ×16	208	"	16×½	"
" 123	22¾×16	194·5	"	16×⅜	"
CD 124	24 ×16	353	20×6½	16×2	8½
" 125	23½×16	326	"	16×1¾	"
" 126	23 ×16	297	"	16×1½	"
" 127	22½×16	269·5	"	16×1¼	"
" 128	22 ×16	242·5	"	16×1	"
" 129	21½×16	215	"	16×¾	"
" 130	21 ×16	188	"	16×½	"
" 131	20¾×16	174·5	"	16×⅜	"

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
133·93	16944	1189·0	⅞	..	42	..	CD 106
124·93	15335	1095·4	"	..	38	..	" 107
115·93	13783	1002·4	"	..	34	..	" 108
106·93	12286	910·1	"	..	32	40	" 109
97·93	10844	818·4	"	..	28	34	" 110
88·93	9455	727·3	"	..	24	28	" 111
79·93	8118	636·7	"	..	..	22	" 112
70·93	6834	546·7	"	..	..	18	" 113
66·43	6210	501·8	"	..	..	16	" 114
116·13	12381	934·4	⅞	..	34	..	CD 115
108·13	11165	858·8	"	..	32	..	" 116
100·13	9994	783·8	"	..	28	..	" 117
92·13	8868	709·5	"	..	26	36	" 118
84·13	7787	635·6	"	..	24	30	" 119
76·13	6748	562·4	"	..	20	24	" 120
68·13	5752	489·6	"	..	..	18	" 121
60·13	4798	417·2	"	..	..	14	" 122
56·13	4336	381·2	"	..	..	14	" 123
102·24	9031	752·6	⅞	..	34	..	CD 124
94·24	8035	683·8	"	..	30	..	" 125
86·24	7080	615·7	"	..	28	34	" 126
78·24	6167	548·1	"	..	24	30	" 127
70·24	5292	481·1	"	..	22	24	" 128
62·24	4457	414·6	"	..	..	18	" 129
54·24	3660	348·6	"	..	..	16	" 130
50·24	3275	315·7	"	..	..	14	" 131

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET									
	14	16	18	20	22	24	26	28	30	32
CD 106	..	..	..	..	..	..	..	..	..	..
" 107	..	..	..	..	..	..	..	..	..	..
" 108	..	..	..	..	..	..	..	..	..	..
" 109	..	..	..	..	..	..	..	..	..	151
" 110	..	..	..	..	..	..	..	151	145	136
" 111	..	..	..	..	..	151	149	139	129	121
" 112	..	..	..	..	151	141	131	121	113	106
" 113	..	..	151	146	133	121	112	104	97·2	91·1
" 114	..	151	149	134	122	112	103	95·6	89·2	83·6
CD 115	..	..	..	..	..	..	..	..	..	..
" 116	..	..	..	..	..	..	..	..	..	140
" 117	..	..	..	..	..	..	..	140	139	131
" 118	..	..	..	..	..	..	140	135	126	118
" 119	..	..	..	..	..	140	130	121	113	106
" 120	..	..	..	140	136	125	115	107	100	93·7
" 121	..	..	140	131	119	109	100	93·3	87·0	81·6
" 122	140	139	124	111	101	92·7	85·6	79·5	74·2	69·5
" 123	140	127	113	102	92·4	84·7	78·2	72·6	67·8	63·5
CD 124	..	..	..	..	..	..	..	..	..	..
" 125	..	..	..	..	..	..	..	..	115	114
" 126	..	..	..	..	..	..	..	115	109	103
" 127	..	..	..	..	..	115	112	104	97·4	91·4
" 128	..	..	..	..	115	107	98·7	91·6	85·5	80·2
" 129	..	..	115	111	101	92·1	85·0	79·0	73·7	69·1
" 130	..	115	103	93·0	84·5	77·5	71·5	66·4	62·0	58·1
" 131	115	105	93·5	84·2	76·5	70·2	64·8	60·1	56·1	52·6

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

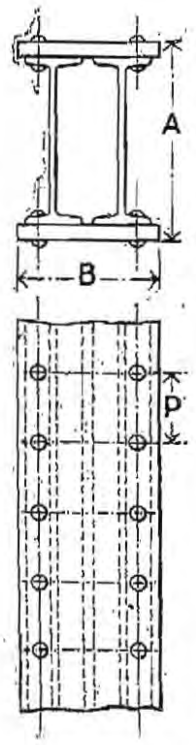
For dimensions and properties of sections see preceding pages.

SPANS IN FEET									Reference Mark
34	36	38	40	42	44	46	48	50	
..	..	..	..	151	144	138	132	127	CD 106
..	..	151	146	139	133	127	122	117	" 107
151	149	141	134	127	122	116	111	107	" 108
143	135	128	121	116	110	106	101	97·1	" 109
128	121	115	109	104	99·2	94·9	90·9	87·3	" 110
114	108	102	97·0	92·4	88·2	84·3	80·8	77·6	" 111
99·9	94·3	89·4	84·9	80·9	77·2	73·8	70·7	67·9	" 112
85·8	81·0	76·7	72·9	69·4	66·3	63·4	60·7	58·3	" 113
78·7	74·3	70·4	66·9	63·7	60·8	58·2	55·8	..	" 114
140	138	131	125	119	113	108	104	99·7	CD 115
135	127	121	115	109	104	99·6	95·4	91·6	" 116
123	116	110	105	99·5	95·0	90·9	87·1	83·6	" 117
111	105	99·6	94·6	90·1	86·0	82·3	78·8	75·7	" 118
99·7	94·2	89·2	84·7	80·7	77·0	73·7	70·6	..	" 119
88·2	83·3	78·9	75·0	71·4	68·2	65·2	62·5	..	" 120
76·8	72·5	68·7	65·3	62·2	59·3	56·8	..	..	" 121
65·4	61·8	58·6	55·6	53·0	50·6	48·4	..	..	" 122
59·8	56·5	53·5	50·8	48·4	46·2	..	..	..	" 123
115	111	106	100	95·6	91·2	87·3	83·6	..	CD 124
107	101	96·0	91·2	86·8	82·9	79·3	..	..	" 125
96·6	91·2	86·4	82·1	78·2	74·6	71·4	..	..	" 126
86·0	81·2	76·9	73·1	69·6	66·4	..	..	..	" 127
75·5	71·3	67·5	64·1	61·1	58·3	..	..	..	" 128
65·0	61·4	58·2	55·3	52·6	..	..	..	..	" 129
54·7	51·6	48·9	46·5	44·3	..	..	..	..	" 130
49·5	46·8	44·3	42·1	..	..	..	..	..	" 131

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Centres of Beams Inches
			Beams	Each Flange	
CD 132	21½×20	403·5	18×8	20×1¾	10½
" 133	21 ×20	369·5	"	20×1½	"
" 134	20½×20	335·5	"	20×1¼	"
" 135	20 ×20	299·5	"	20×1	"
CD 136	21½×16	306	18×6	16×1¾	8½
" 137	21 ×16	278·5	"	16×1½	"
" 138	20½×16	249·5	"	16×1¼	"
" 139	20 ×16	222·5	"	16×1	"
" 140	19½×16	195	"	16×¾	"
" 141	19 ×16	168	"	16×½	"
" 142	18¾×16	154·5	"	16×⅜	"
CD 143	19½×20	393·5	16×8	20×1¾	10½
" 144	19 ×20	359·5	"	20×1½	"
" 145	18½×20	325·5	"	20×1¼	"
" 146	18 ×20	291·5	"	20×1	"
CD 147	19 ×16	268·5	16×6	16×1½	8½
" 148	18½×16	241·5	"	16×1¼	"
" 149	18 ×16	212·5	"	16×1	"
" 150	17½×16	185	"	16×¾	"
" 151	17 ×16	158	"	16×½	"
" 152	16¾×16	144·5	"	16×⅜	"
CD 153	18 ×16	258·5	15×6	16×1½	8½
" 154	17½×16	231·5	"	16×1¼	"
" 155	17 ×16	202·5	"	16×1	"
" 156	16½×16	175	"	16×¾	"
" 157	16 ×16	148	"	16×½	"
" 158	15¾×16	134·5	"	16×⅜	"

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	8″	4″	6″	
117·05	8536	794·0	⅞	28	34	..	CD 132
107·05	7513	715·5	"	24	30	..	" 133
97·05	6537	637·8	"	22	26	38	" 134
87·05	5608	560·8	"	..	20	30	" 135
88·36	6311	587·1	⅞	..	30	..	CD 136
80·36	5514	525·1	"	..	28	34	" 137
72·36	4754	463·8	"	..	24	30	" 138
64·36	4029	402·9	"	..	20	24	" 139
56·36	3341	342·6	"	..	..	18	" 140
48·36	2686	282·8	"	..	..	14	" 141
44·36	2372	253·0	"	..	..	12	" 142
114·13	6768	694·1	⅞	26	34	..	CD 143
104·13	5928	624·0	"	24	30	..	" 144
94·13	5131	554·8	"	20	26	..	" 145
84·13	4377	486·3	"	18	20	30	" 146
77·41	4334	456·2	⅞	..	26	34	CD 147
69·41	3713	401·4	"	..	22	30	" 148
61·41	3125	347·2	"	..	20	24	" 149
53·41	2569	293·5	"	..	16	18	" 150
45·41	2043	240·4	"	..	..	12	" 151
41·41	1792	213·9	"	..	..	12	" 152
74·47	3753	417·0	⅞	..	26	34	CD 153
66·47	3197	365·4	"	..	22	30	" 154
58·47	2672	314·3	"	..	20	24	" 155
50·47	2176	263·8	"	..	16	18	" 156
42·47	1710	213·7	"	..	..	12	" 157
38·47	1488	188·9	"	..	..	12	" 158

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark		SPANS IN FEET							
		12	14	16	18	20	22	24	26
C D	132	..	..	..	..	..	..	..	..
,,	133	..	..	..	..	..	..	148	147
,,	134	..	..	..	..	..	148	142	131
,,	135	..	..	..	..	148	136	125	115
C D	136	..	..	..	..	..	..	..	..
,,	137	..	..	..	..	..	..	..	..
,,	138	..	..	..	..	..	..	100	95·1
,,	139	..	..	..	..	100	97·7	89·5	82·6
,,	140	..	..	..	100	91·4	83·1	76·1	70·3
,,	141	..	100	94·3	83·8	75·4	68·6	62·8	58·0
,,	142	100	96·4	84·3	75·0	67·5	61·3	56·2	51·9
C D	143	..	..	..	..	..	..	..	136
,,	144	..	..	..	..	..	..	136	128
,,	145	..	..	..	..	136	134	123	114
,,	146	..	..	..	136	130	118	108	99·8
C D	147	..	..	..	..	..	..	..	92·6
,,	148	..	..	..	..	..	92·6	89·2	82·3
,,	149	..	..	..	..	92·6	84·2	77·2	71·2
,,	150	..	..	92·6	87·0	78·3	71·2	65·2	60·2
,,	151	92·6	91·6	80·1	71·2	64·1	58·3	53·4	49·3
,,	152	92·6	81·5	71·3	63·4	57·0	51·9	47·5	43·9
C D	153	..	..	..	..	..	..	..	83·8
,,	154	..	..	..	..	..	83·8	81·2	75·0
,,	155	..	..	..	..	83·8	76·2	69·8	64·5
,,	156	..	..	83·8	78·2	70·3	64·0	58·6	54·1
,,	157	83·8	81·4	71·2	63·3	57·0	51·8	47·5	43·8
,,	158	83·8	72·0	63·0	56·0	50·4	45·8	42·0	38·7

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

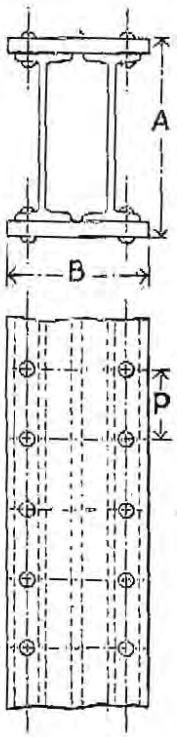
For dimensions and properties of sections see preceding pages.

SPANS IN FEET								Reference Mark	
28	30	32	34	36	38	40	42		
148	141	132	125	118	111	106	101	CD	132
136	127	119	112	106	100	95·4	90·9	"	133
121	113	106	100	94·5	89·5	85·0	..	"	134
107	99·7	93·5	88·0	83·1	78·7	74·8	..	"	135
..	100	97·9	92·1	87·0	82·4	78·3	74·6	CD	136
100	93·4	87·5	82·4	77·8	73·7	70·0	66·7	"	137
88·3	82·5	77·3	72·8	68·7	65·1	61·8	..	"	138
76·7	71·6	67·2	63·2	59·7	56·5	53·7	..	"	139
65·3	60·9	57·1	53·7	50·8	48·1	..	..	"	140
53·9	50·3	47·1	44·4	41·9	39·7	..	..	"	141
48·2	45·0	42·2	39·7	37·5	..	..	..	"	142
132	123	116	109	103	97·4	..	..	CD	143
119	111	104	97·9	92·4	87·6	..	..	"	144
106	98·6	92·5	87·0	82·2	..	..	..	"	145
92·6	86·5	81·1	76·3	72·0	..	..	..	"	146
86·9	81·1	76·0	71·6	67·6	64·0	..	..	CD	147
76·5	71·4	66·9	63·0	59·5	..	..	..	"	148
66·1	61·7	57·9	54·5	51·4	..	..	..	"	149
55·9	52·2	48·9	46·0	..	..	..	..	"	150
45·8	42·7	40·1	37·7	..	..	..	..	"	151
40·7	38·0	35·7	..	..	..	..	..	"	152
79·4	74·1	69·5	65·4	61·8	..	..	..	CD	153
69·6	65·0	60·9	57·3	..	..	..	..	"	154
59·9	55·9	52·4	49·3	..	..	..	..	"	155
50·2	46·9	44·0	..	..	..	..	..	"	156
40·7	38·0	35·6	..	..	..	..	..	"	157
36·0	33·6	..	..	..	..	..	..	"	158

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Centres of Beams Inches
			Beams	Each Flange	
CD 159	17 ×20	349·5	14×8	20×1½	10½
" 160	16½×20	315·5	"	20×1¼	"
" 161	16 ×20	281·5	"	20×1	"
" 162	15½×20	247·5	"	20×¾	"
CD 163	17 ×14	226	14×5½	14×1½	7
" 164	16½×14	202·5	"	14×1¼	"
" 165	16 ×14	178·5	"	14×1	"
" 166	15½×14	153·5	"	14×¾	"
" 167	15 ×14	130	"	14×½	"
" 168	14¾×14	118	"	14×⅜	"
CD 169	15½×14	192·5	13×5	14×1¼	7½
" 170	15 ×14	168·5	"	14×1	"
" 171	14½×14	145	"	14×¾	"
" 172	14 ×14	120	"	14×½	"
" 173	13¾×14	108	"	14×⅜	"
CD 174	14 ×18	258	12×8	18×1	9
" 175	13½×18	225·5	"	18×¾	"
" 176	13 ×18	195	"	18×½	"
" 177	12¾×18	179·5	"	18×⅜	"
CD 178	14 ×12	145	12×5	12×1	6
" 179	13½×12	123·5	"	12×¾	"
" 180	13 ×12	103	"	12×½	"
" 181	12¾×12	93	"	12×⅜	"

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
101·18	4545	534·6	⅞	24	30	..	C D 159
91·18	3909	473·8	"	20	24	..	" 160
81·18	3311	413·8	"	18	20	30	" 161
71·18	2748	354·6	"	..	16	24	" 162
65·53	2902	341·4	¾	22	28	..	C D 163
58·53	2469	299·3	"	20	24	..	" 164
51·53	2061	257·6	"	16	18	28	" 165
44·53	1676	216·3	"	..	14	22	" 166
37·53	1317	175·5	"	..	10	14	" 167
34·03	1145	155·3	"	..	10	12	" 168
55·60	2067	266·7	¾	20	22	..	C D 169
48·60	1707	227·6	"	16	18	28	" 170
41·60	1370	189·0	"	..	14	22	" 171
34·60	1056	150·9	"	..	10	14	" 172
31·10	907	132·0	"	..	8	12	" 173
74·24	2240	320·0	⅞	..	18	26	C D 174
65·24	1859	275·4	"	..	14	20	" 175
56·24	1505	231·5	"	..	12	14	" 176
51·74	1338	209·9	"	..	..	12	" 177
41·65	1238	176·9	¾	14	16	24	C D 178
35·65	993	147·1	"	..	12	18	" 179
29·65	765	117·8	"	..	8	12	" 180
26·65	658	103·2	"	..	8	10	" 181

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark		SPANS IN FEET						
		8	10	12	14	16	18	20
CD	159	..	..	..	..	..	..	..
"	160	..	..	..	..	..	..	116
"	161	..	..	..	..	..	116	110
"	162	..	..	..	..	116	105	94·6
CD	163	..	..	..	..	..	..	..
"	164	..	..	..	..	..	..	79·6
"	165	..	..	..	..	79·6	76·3	68·7
"	166	..	..	..	79·6	72·1	64·1	57·7
"	167	..	79·6	78·0	66·9	58·5	52·0	46·8
"	168	..	79·6	69·0	59·2	51·8	46·0	41·4
CD	169	..	..	..	..	..	..	71·1
"	170	..	..	..	..	71·1	67·4	60·7
"	171	..	..	..	71·1	63·0	56·0	50·4
"	172	..	71·1	67·1	57·5	50·3	44·7	40·2
"	173	71·1	70·4	58·7	50·3	44·0	39·1	35·2
CD	174	..	..	..	..	..	92·9	85·3
"	175	..	..	..	92·9	91·8	81·6	73·4
"	176	..	..	92·9	88·2	77·2	68·6	61·7
"	177	..	..	92·9	80·0	70·0	62·2	56·0
CD	178	..	..	..	62·9	59·0	52·4	47·2
"	179	..	..	62·9	56·0	49·0	43·6	39·2
"	180	62·9	62·8	52·4	44·9	39·3	34·9	31·4
"	181	62·9	55·0	45·9	39·3	34·4	30·6	27·5

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

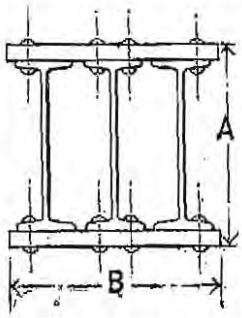
For dimensions and properties of sections see preceding pages.

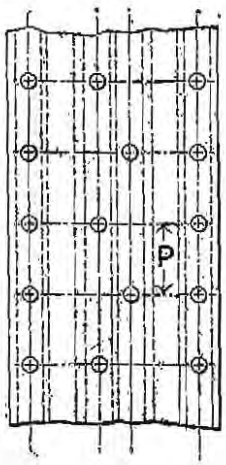
SPANS IN FEET							Reference Mark	
22	24	26	28	30	32	34		
..	116	110	102	95·0	89·1	83·9	CD	159
115	105	97·2	90·2	84·2	79·0	..	"	160
100	92·0	84·9	78·8	73·6	69·0	..	"	161
86·0	78·8	72·7	67·5	63·0	..	..	"	162
79·6	75·9	70·0	65·0	60·7	56·9	53·6	CD	163
72·6	66·5	61·4	57·0	53·2	49·9	..	"	164
62·4	57·2	52·8	49·1	45·8	42·9	..	"	165
52·4	48·1	44·4	41·2	38·5	..	..	"	166
42·5	39·0	36·0	33·4	31·2	..	..	"	167
37·6	34·5	31·9	29·6	..	..	..	"	168
64·7	59·3	54·7	50·8	47·4	..	..	CD	169
55·2	50·6	46·7	43·4	40·5	..	..	"	170
45·8	42·0	38·8	36·0	..	..	..	"	171
36·6	33·5	31·0	28·7	..	..	..	"	172
32·0	29·3	27·1	..	..	..	..	"	173
77·6	71·1	65·6	61·0	..	..	..	CD	174
66·8	61·2	56·5	..	..	..	..	"	175
56·1	51·4	47·5	..	..	..	..	"	176
50·9	46·6	..	..	..	..	..	"	177
42·9	39·3	36·3	33·7	..	..	..	CD	178
35·7	32·7	30·2	..	..	..	..	"	179
28·6	26·2	24·2	..	..	..	..	"	180
25·0	22·9	..	..	..	..	..	"	181

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.





Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Centres of Beams Inches
			Beams	Each Flange	
CD 182	28 × 24	604·5	24×7½	24×2	7⅞
" 183	27 × 24	520	"	24×1½	"
" 184	26 × 24	438·5	"	24×1	"
" 185	25 × 24	357	"	24×½	"
CD 186	26 × 24	559·5	22×7	24×2	7⅞
" 187	25 × 24	475	"	24×1½	"
" 188	24 × 24	393·5	"	24×1	"
" 189	23 × 24	312	"	24×½	"
CD 190	24 × 22	502·5	20×6½	22×2	7¼
" 191	23 × 22	425	"	22×1½	"
" 192	22 × 22	350	"	22×1	"
" 193	21 × 22	275	"	22×½	"
CD 194	22 × 26	601·5	18×8	26×2	8½
" 195	21 × 26	513·5	"	26×1½	"
" 196	20 × 26	422	"	26×1	"
CD 197	21 × 20	374·5	18×6	20×1½	6½
" 198	20 × 20	306·5	"	20×1	"
" 199	19 × 20	238·5	"	20×½	"
CD 200	20 × 26	586·5	16×8	26×2	8½
" 201	19 × 26	498·5	"	26×1½	"
" 202	18 × 26	407	"	26×1	"
CD 203	19 × 20	359·5	16×6	20×1½	6½
" 204	18 × 20	291·5	"	20×1	"
" 205	17 × 20	223·5	"	20×½	"
CD 206	18 × 20	344·5	15×6	20×1½	6½
" 207	17 × 20	276·5	"	20×1	"
" 208	16 × 20	208·5	"	20×½	"
CD 209	17 × 26	483·5	14×8	26×1½	8½
" 210	16 × 26	395	"	26×1	"
CD 211	17 × 18	308·5	14×5½	18×1½	5⅞
" 212	16 × 18	246	"	18×1	"
" 213	15 × 18	184·5	"	18×½	"

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
175·40	20971	1497·9	⅞	..	34	..	CD 182
151·40	16964	1256·6	"	..	28	36	" 183
127·40	13244	1018·8	"	..	..	24	" 184
103·40	9800	784·0	"	..	..	18	" 185
162·19	16747	1288·2	⅞	..	32	..	CD 186
138·19	13302	1064·2	"	..	26	36	" 187
114·19	10123	843·5	"	..	20	24	" 188
90·19	7197	625·8	"	..	..	14	" 189
145·36	12576	1048·0	⅞	..	32	..	CD 190
123·36	9926	863·1	"	..	26	32	" 191
101·36	7497	681·6	"	..	20	22	" 192
79·36	5280	502·8	"	..	..	14	" 193
174·58	12806	1164·2	⅞	28	32	..	CD 194
148·58	10126	964·4	"	22	26	38	" 195
122·58	7689	768·9	"	..	18	26	" 196
108·55	7128	678·8	⅞	..	24	28	CD 197
88·55	5322	532·2	"	..	18	20	" 198
68·55	3687	388·1	"	..	..	12	" 199
170·19	10176	1017·6	⅞	26	32	..	CD 200
144·19	7971	839·1	"	20	26	38	" 201
118·19	5987	665·2	"	16	18	26	" 202
104·12	5580	587·3	⅞	..	22	28	CD 203
84·12	4109	456·5	"	..	16	20	" 204
64·12	2792	328·5	"	..	..	12	" 205
99·71	4811	534·5	⅞	..	22	28	CD 206
79·71	3495	411·1	"	..	16	20	" 207
59·71	2325	290·6	"	..	..	12	" 208
139·77	6094	716·9	⅞	22	26	..	CD 209
113·77	4515	564·4	"	16	18	26	" 210
89·30	3811	448·4	¾	20	22	34	CD 211
71·30	2753	344·1	"	14	16	24	" 212
53·30	1817	242·3	"	..	10	12	" 213

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET										
	10	12	14	16	18	20	22	24	26	28	30
CD 182	..	..	..	..	..	..	..	..	..	..	..
" 183	..	..	..	..	..	..	..	..	..	226	223
" 184	..	..	..	..	..	..	..	226	209	194	181
" 185	..	..	..	..	226	209	190	174	161	149	139
CD 186	..	..	..	..	..	..	..	..	..	..	..
" 187	..	..	..	..	..	..	..	..	210	203	189
" 188	..	..	..	..	..	210	204	187	173	161	150
" 189	..	..	210	209	185	167	152	139	128	119	111
CD 190	..	..	..	..	..	..	..	..	..	..	..
" 191	..	..	..	..	..	..	..	..	172	164	153
" 192	..	..	..	..	..	172	165	151	140	130	121
" 193	..	..	172	168	149	134	122	112	103	95·8	89·4
CD 194	..	..	..	..	..	..	..	..	..	221	207
" 195	..	..	..	..	..	..	221	214	198	184	171
" 196	..	..	..	..	221	205	186	171	158	146	137
CD 197	..	..	..	..	..	..	..	151	139	129	121
" 198	..	..	..	..	151	142	129	118	109	101	94·6
" 199	..	151	148	129	115	103	94·1	86·2	79·6	73·9	69·0
CD 200	..	..	..	..	..	..	..	..	204	194	181
" 201	..	..	..	..	..	204	203	186	172	160	149
" 202	..	..	..	204	197	177	161	148	136	127	118
CD 203	..	..	..	..	..	..	139	131	120	112	104
" 204	..	..	..	139	135	122	111	101	93·6	87·0	81·2
" 205	..	139	125	110	97·3	87·6	79·6	73·0	67·4	62·6	58·4
CD 206	..	..	..	..	..	..	126	119	110	102	95·0
" 207	..	..	..	126	122	110	99·7	91·4	84·3	78·3	73·1
" 208	..	126	111	96·9	86·1	77·5	70·5	64·6	59·6	55·4	51·7
CD 209	..	..	..	..	..	..	174	159	147	137	127
" 210	..	..	..	174	167	151	137	125	116	108	100
CD 211	..	..	..	..	..	119	109	99·6	92·0	85·4	79·7
" 212	..	..	119	115	102	91·8	83·4	76·5	70·6	65·5	61·2
" 213	119	108	92·3	80·8	71·8	64·6	58·7	53·8	49·7	46·2	43·1

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

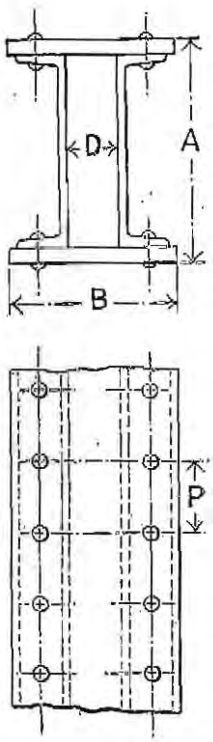
For dimensions and properties of sections see preceding pages.

SPANS IN FEET										Reference Mark
32	34	36	38	40	42	44	46	48	50	
..	226	222	210	200	190	182	174	166	160	CD 182
209	197	186	176	168	160	152	146	140	134	" 183
170	160	151	143	136	129	123	118	113	109	" 184
131	123	116	110	105	99·6	95·0	90·9	87·1	83·6	" 185
210	202	191	181	172	164	156	149	143	137	CD 186
177	167	158	149	142	135	129	123	118	114	" 187
141	132	125	118	112	107	102	97·8	93·7	..	" 188
104	98·2	92·7	87·8	83·4	79·5	75·9	72·6	..	..	" 189
172	164	155	147	140	133	127	122	116	..	CD 190
144	135	128	121	115	110	105	100	..	..	" 191
114	107	101	95·7	90·9	86·6	82·6	..	..	..	" 192
83·8	78·9	74·5	70·6	67·0	63·8	..	..	..	..	" 193
194	183	172	163	155	148	141	..	..	..	CD 194
161	151	143	135	129	122	..	..	..	..	" 195
128	121	114	108	103	..	..	..	..	..	" 196
113	106	101	95·3	90·5	86·2	..	..	..	..	CD 197
88·7	83·5	78·8	74·7	71·0	..	..	..	..	..	" 198
64·7	60·9	57·5	54·5	..	..	..	..	..	..	" 199
170	160	151	143	136	..	..	..	..	..	CD 200
140	132	124	118	..	..	..	..	..	..	" 201
111	104	98·5	..	..	..	..	..	..	..	" 202
97·9	92·1	87·0	82·4	..	..	..	..	..	..	CD 203
76·1	71·6	67·6	..	..	..	..	..	..	..	" 204
54·8	51·5	..	..	..	..	..	..	..	..	" 205
89·1	83·8	79·2	..	..	..	..	..	..	..	CD 206
68·5	64·5	..	..	..	..	..	..	..	..	" 207
48·4	..	..	..	..	..	..	..	..	..	" 208
119	112	..	..	..	..	..	..	..	..	CD 209
94·1	..	..	..	..	..	..	..	..	..	" 210
74·7	70·3	..	..	..	..	..	..	..	..	CD 211
57·4	..	..	..	..	..	..	..	..	..	" 212
..	..	..	..	..	..	..	..	..	..	" 213

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Distance D Inches
			Channels	Each Flange	
CD 214	19 ×14	187·5	17×4	14×1	5½
" 215	18½×14	163·5	"	14×¾	"
" 216	18 ×14	140	"	14×½	"
" 217	17¾×14	128	"	14×⅜	"
CD 218	17 ×14	171·5	15×4	14×1	5½
" 219	16½×14	147·5	"	14×¾	"
" 220	16 ×14	124	"	14×½	"
" 221	15¾×14	112	"	14×⅜	"
CD 222	14 ×12	143·5	12×3½H	12×1	4½
" 223	13½×12	122	"	12×¾	"
" 224	13 ×12	93·5	12×3½L	12×½	"
" 225	12¾×12	83·5	"	12×⅜	"
CD 226	12 ×10	109	10×3	10×1	3½
" 227	11½×10	92	"	10×¾	"
" 228	11 ×10	75	"	10×½	"
" 229	10¾×10	66·5	"	10×⅜	"
CD 230	10½×10	88	9×3	10×¾	3½
" 231	10 ×10	71	"	10×½	"
" 232	9¾×10	62·5	"	10×⅜	"
CD 233	9½×10	85	8×3	10×¾	3½
" 234	9 ×10	68	"	10×½	"
" 235	8¾×10	59·5	"	10×⅜	"
CD 236	8¼×10	73	7×3	10×⅝	3½
" 237	8 ×10	64·5	"	10×½	"
" 238	7¾×10	56	"	10×⅜	"

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS

IN INCH UNITS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION			Diameter of Rivets	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Moment of Inertia	Section Modulus	Inches	3″	4″	6″	
54·08	2837	298·6	⅞	12	14	20	CD 214
47·08	2304	249·1	"	..	10	16	" 215
40·08	1799	199·9	"	..	8	12	" 216
36·58	1557	175·5	"	..	6	8	" 217
49·39	2133	251·0	⅞	12	14	20	CD 218
42·39	1707	207·0	"	..	10	16	" 219
35·39	1307	163·4	"	..	8	12	" 220
31·89	1116	141·7	"	..	6	8	" 221
41·19	1176	168·0	¾	10	16	24	CD 222
35·19	931	137·9	"	8	12	18	" 223
26·85	665	102·3	"	6	8	12	" 224
23·85	558	87·5	"	..	6	10	" 225
31·34	641	106·8	¾	8	12	18	CD 226
26·34	496	86·3	"	8	10	14	" 227
21·34	363	66·1	"	6	8	10	" 228
18·84	302	56·1	"	4	6	8	" 229
25·27	398	75·9	¾	8	10	14	CD 230
20·27	288	57·7	"	6	8	10	" 231
17·77	237	48·7	"	4	6	8	" 232
24·39	314	66·2	¾	8	10	14	CD 233
19·39	225	50·0	"	6	8	10	" 234
16·89	184	42·0	"	4	6	8	" 235
20·86	204	49·3	¾	..	8	12	CD 236
18·36	169	42·2	"	6	8	10	" 237
15·86	137	35·2	"	4	6	8	" 238

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark		SPANS IN FEET								
		4	6	8	10	12	14	16	18	20
C D	214	..	..	..	..	131	114	99·5	88·5	79·6
"	215	..	..	..	131	111	94·9	83·0	73·8	66·4
"	216	..	..	131	107	88·8	76·2	66·6	59·2	53·3
"	217	..	131	117	93·6	78·0	66·9	58·5	52·0	46·8
C D	218	..	..	..	..	96·1	95·6	83·7	74·4	66·9
"	219	..	..	..	96·1	92·0	78·9	69·0	61·3	55·2
"	220	..	..	96·1	87·1	72·6	62·2	54·5	48·4	43·6
"	221	..	96·1	94·5	75·6	63·0	54·0	47·2	42·0	37·8
C D	222	..	..	..	86·4	74·7	64·0	56·0	49·8	44·8
"	223	..	..	86·4	73·5	61·3	52·5	46·0	40·9	36·8
"	224	..	70·0	68·2	54·6	45·5	39·0	34·1	30·3	27·3
"	225	..	70·0	58·3	46·7	38·9	33·3	29·2	25·9	23·3
C D	226	..	..	57·3	57·6	47·5	40·7	35·6	31·6	28·5
"	227	..	..	57·3	46·0	38·4	32·9	28·8	25·6	23·0
"	228	..	57·3	44·1	35·3	29·4	25·2	22·0	19·6	17·6
"	229	57·3	49·9	37·4	29·9	24·9	21·4	18·7	16·6	15·0
C D	230	..	..	48·6	40·5	33·7	28·9	25·3	22·5	20·2
"	231	..	48·6	38·5	30·8	25·6	22·0	19·2	17·1	15·4
"	232	48·6	43·3	32·5	26·0	21·6	18·6	16·2	14·4	..
C D	233	..	..	40·3	35·3	29·4	25·2	22·1	19·6	..
"	234	..	40·3	33·3	26·7	22·2	19·0	16·7	14·8	..
"	235	40·3	37·3	28·0	22·4	18·7	16·0	14·0	..	..
C D	236	..	..	32·8	26·3	21·9	18·8	16·4	..	..
"	237	..	32·8	28·1	22·5	18·8	16·1	14·1	..	..
"	238	32·8	31·3	23·5	18·8	15·6	13·4	..	..	..

DORMAN, LONG & CO. LIMITED.

COMPOUND GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

SPANS IN FEET									Reference Mark	
22	24	26	28	30	32	34	36	38		
72·4	66·4	61·3	56·9	53·1	49·8	46·8	44·2	41·9	C D	214
60·4	55·4	51·1	47·4	44·3	41·5	39·1	36·9	..	"	215
48·5	44·4	41·0	38·1	35·5	33·3	31·4	29·6	..	"	216
42·5	39·0	36·0	33·4	31·2	29·3	27·5	..	..	"	217
60·8	55·8	51·5	47·8	44·6	41·8	39·4	..	..	C D	218
50·2	46·0	42·5	39·4	36·8	34·5	..	..	..	"	219
39·6	36·3	33·5	31·1	29·0	27·2	..	..	..	"	220
34·4	31·5	29·1	27·0	25·2	..	..	..	..	"	221
40·7	37·3	34·5	32·0	..	..	..	..	..	C D	222
33·4	30·6	28·3	..	..	..	..	..	..	"	223
24·8	22·7	21·0	..	..	..	..	..	..	"	224
21·2	19·4	..	..	..	..	..	..	..	"	225
25·9	23·7	..	..	..	..	..	..	..	C D	226
20·9	..	..	..	..	..	..	..	..	"	227
16·0	..	..	..	..	..	..	..	..	"	228
..	..	..	..	..	..	..	..	..	"	229
..	..	..	..	..	..	..	..	..	C D	230
..	..	..	..	..	..	..	..	..	"	231
..	..	..	..	..	..	..	..	..	"	232
..	..	..	..	..	..	..	..	..	C D	233
..	..	..	..	..	..	..	..	..	"	234
..	..	..	..	..	..	..	..	..	"	235
..	..	..	..	..	..	..	..	..	C D	236
..	..	..	..	..	..	..	..	..	"	237
..	..	..	..	..	..	..	..	..	"	238

DORMAN, LONG & CO. LIMITED.

DEFLECTION.

SYMMETRICAL GIRDERS OF UNIFORM CROSS SECTION UNDER THE TABULAR LOADS IN THE PRECEDING PAGES.

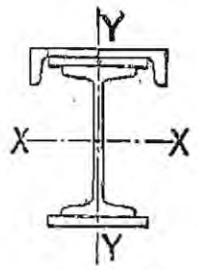
Depth Inches	DEFLECTIONS IN INCHES FOR SPANS IN FEET													
	8	10	12	14	16	18	20	24	28	32	36	40	44	48
30	·04	·07	·10	·13	·17	·22	·27	·38	·52	·68	·86	1·07	1·29	1·54
29	·04	·07	·10	·14	·18	·22	·28	·40	·54	·71	·89	1·10	1·34	1·59
28	·05	·07	·10	·14	·18	·23	·29	·41	·56	·73	·93	1·14	1·38	1·65
27	·05	·07	·11	·15	·19	·24	·30	·43	·58	·76	·96	1·19	1·43	1·71
26	·05	·08	·11	·15	·20	·25	·31	·44	·60	·79	1·00	1·23	1·49	1·77
25	·05	·08	·12	·16	·20	·26	·32	·46	·63	·82	1·04	1·28	1·55	1·84
24	·05	·08	·12	·16	·21	·27	·33	·48	·65	·85	1·08	1·33	1·61	1·92
23	·06	·09	·13	·17	·22	·28	·35	·50	·68	·89	1·13	1·39	1·68	2·00
22	·06	·09	·13	·18	·23	·29	·36	·52	·71	·93	1·18	1·45	1·76	2·09
21	·06	·10	·14	·19	·24	·31	·38	·55	·75	·98	1·23	1·52	1·84	2·19
20	·06	·10	·14	·20	·26	·32	·40	·58	·78	1·02	1·30	1·60	1·94	2·30
19	·07	·11	·15	·21	·27	·34	·42	·61	·83	1·08	1·36	1·68	2·04	2·43
18	·07	·11	·16	·22	·28	·36	·44	·64	·87	1·14	1·44	1·78	2·15	2·56
17	·08	·12	·17	·23	·30	·38	·47	·68	·92	1·20	1·52	1·88	2·28	2·71
16	·08	·13	·18	·25	·32	·41	·50	·72	·98	1·28	1·62	2·00	2·42	2·88
15	·09	·13	·19	·26	·34	·43	·53	·77	1·05	1·37	1·73	2·13	2·58	..
14	·09	·14	·21	·28	·37	·46	·57	·82	1·12	1·46	1·85	2·29	2·77	..
13	·10	·15	·22	·30	·39	·50	·62	·89	1·21	1·58	1·99	2·46	2·98	..
12	·11	·17	·24	·33	·43	·54	·67	·96	1·31	1·71	2·16	2·67	3·23	..
11	·12	·18	·26	·36	·47	·59	·73	1·05	1·43	1·86	2·36	2·91	3·52	..
10	·13	·20	·29	·39	·51	·65	·80	1·15	1·57	2·05	..	..	..	..
9½	·13	·21	·30	·41	·54	·68	·84	1·21	1·65	2·16	..	..	..	..
9	·14	·22	·32	·44	·57	·72	·89	1·28	1·74	2·28	..	..	..	..
8½	·15	·24	·34	·46	·60	·76	·94	1·36	1·84	2·41	..	..	..	..
8	·16	·25	·36	·49	·64	·81	1·00	1·44	1·96	2·56	..	..	..	..
7½	·17	·27	·38	·52	·68	·86	1·07	..	..	..	..	..	..	..
7	·18	·29	·41	·56	·73	·93	1·14	..	..	..	..	..	..	..
6½	·20	·31	·44	·60	·79	1·00	1·23	..	..	..	..	..	..	..
6	·21	·33	·48	·65	·85	1·08	1·33	..	..	..	..	..	..	..
5½	·23	·36	·52	·71	·93	1·18	1·45	..	..	..	..	..	..	..
5	·26	·40	·58	·78	..	..	..	..	..	..	..	..	..	..
4½	·28	·44	·64	·87	..	..	..	..	..	..	..	..	..	..
4	·32	·50	·72	·98	..	..	..	..	..	..	..	..	..	..
3½	·37	·57	·82	1·12	..	..	..	..	..	..	..	..	..	..
3	·43	·67	·96	1·31	..	..	..	..	..	..	..	..	..	..

See notes on page 71.

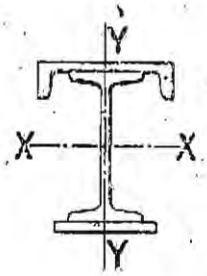
DORMAN, LONG & CO. LIMITED.

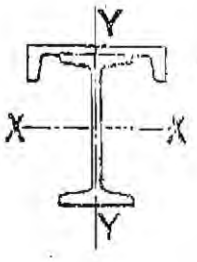
COMPOUND CRANE GIRDERS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Weight per foot lbs.	Dimensions in Inches				Section Moduli	
		Beam	Top Flange		Bottom Flange	About X-X	About Y-Y
			Channel	Flat			
CG 1	254·5	24×7½	17×4	12×⅞	12×2	679·4	111·1
" 2	223·5	24×7½	17×4	12×½	12×1⅝	582·3	99·2
" 3	251·5	24×7½	15×4	12×1	12×2	676·1	105·4
" 4	210·5	24×7½	15×4	12×½	12×1½	542·8	87·5
" 5	195·5	22×7	15×4	12×½	12×1½	466·4	86·3
" 6	142·5	20×6½	12×3½L	9×⅜	9×1¼	291·9	43·9
" 7	165·5	18×8	12×3½L	9×½	9×1⅜	306·1	49·4
" 8	140·5	18×6	12×3½L	9×½	9×1⅜	264·9	45·4
CG 9	183	24×7½	17×4	..	12×1⅛	454·2	83·4
" 10	170	24×7½	15×4	..	12×1	410·9	69·6
" 11	154·5	24×7½	15×4	..	12×⅝	342·2	62·8
" 12	143·5	24×7½	12×3½L	..	12×⅝	334·8	46·5
" 13	150	22×7	15×4	..	12×⅞	331·0	65·9
" 14	128·5	22×7	12×3½L	..	12×⅝	275·7	44·6
" 15	119·5	20×6½	12×3½L	..	9×⅞	234·1	37·2
" 16	134·5	18×8	12×3½L	..	9×⅞	238·3	41·0
" 17	109·5	18×6	12×3½L	..	9×⅞	195·0	36·2
" 18	129·5	16×8	12×3½L	..	9×⅞	205·1	40·9
" 19	104·5	16×6	12×3½L	..	9×⅞	167·2	36·1
" 20	99·5	15×6	12×3½L	..	9×⅞	150·8	35·8
" 21	93·5	14×5½	12×3½L	..	9×⅞	135·5	35·6
CG 22	135	24×7½	17×4	..	..	227·7	66·7
" 23	127·5	24×7½	15×4	..	..	224·1	52·9
" 24	116	24×7½	12×3½L	..	..	219·4	34·1
" 25	112·5	22×7	15×4	..	..	170·5	50·8
" 26	101	22×7	12×3½L	..	..	166·6	31·4
" 27	91	20×6½	12×3½L	..	..	134·3	30·2
" 28	106	18×8	12×3½L	..	..	153·3	35·4
" 29	81,	18×6	12×3½L	..	..	103·2	28·9
" 30	101	16×8	12×3½L	..	..	129·8	35·2
" 31	76	16×6	12×3½L	..	..	85·1	28·8
" 32	71	15×6	12×3½L	..	..	72·5	28·4
" 33	66	14×5½	12×3½L	..	..	60·1	27·8





STANCHIONS AND STRUTS.

CRIPPLING LOADS.—A table shewing the crippling loads, in tons per square inch, on stanchions and struts with fixed ends, for various values of $\frac{l}{r}$ up to 200, is given on page 117.

TABULAR LOADS.—The safe loads given in the tables are based on the crippling values above referred to, for the least radius of gyration for each section ; the factor of safety adopted being 4. They are for stanchions or struts the ends of which may be considered fixed, and only apply to static and concentric loading.

In preparing the table of safe loads on latticed stanchions, it has been assumed that the component beams or channels are efficiently connected together by lattice bars, or batten plates, so that they act as a unit, thus eliminating all possibility of failure by local flexure of either beam or channel.

EFFECTIVE LENGTH.—In stanchions or struts having intermediate steelwork connections, so arranged as to prevent side flexure where these connections occur, the effect is such that the load transmitted may be considered as acting on the shortened length, and the section determined accordingly.

LIMITING LENGTHS FOR TABULAR LOADS.—The maximum lengths for which loads are given are based on the lesser of the two values :—

I.—160 times the least radius of gyration.

II.— 40 times the least width of the section.

TABULAR WEIGHTS OF STANCHIONS.—The weight given in the tables, for each section, is for the shaft, inclusive of rivets; the pitch of rivets for lengths in general demand, being taken as the basis of calculation in all cases.

The weights of base, cap and fittings are not included, as they depend on the loads and type of structure.

PROPERTIES OF SECTIONS.—The section moduli, radii of gyration and area are given for each section. The section moduli will be of service when calculating additional stresses due to wind-pressure, eccentric loading, or other forces producing bending.

CONDITION OF ENDS.—Under some conditions it is necessary to consider either one or both ends rounded. The following method will be found sufficiently accurate for ascertaining the approximate safe loads. In the case of one end fixed and the other rounded, the approximate load may be found by referring in the table of safe loads to a length of $1\frac{1}{3}$ times the actual length; whilst with both ends rounded the reference length should be $1\frac{2}{3}$ times the actual length.

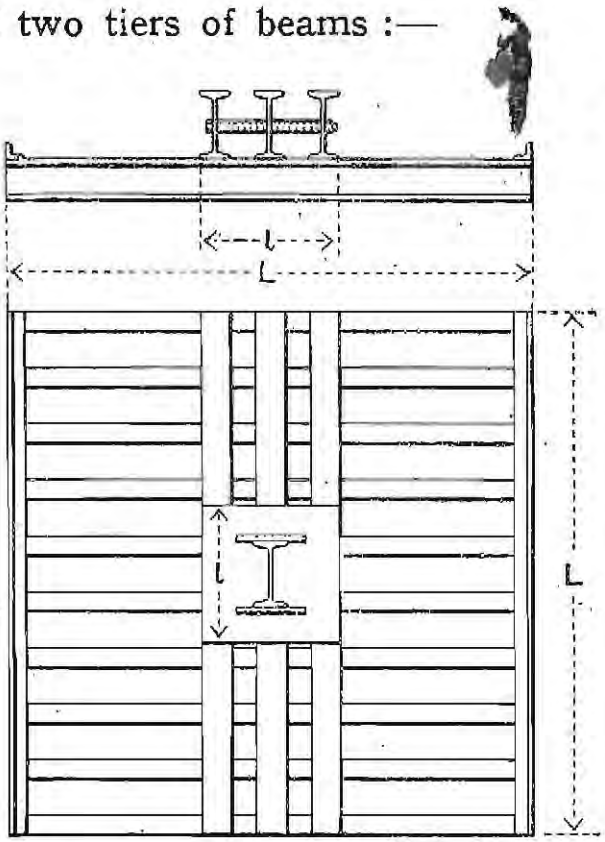
EXAMPLE.—For a stanchion or strut 12 feet long with one end fixed and one end rounded, reference should be made in the table of safe loads to a length of 16 feet, or, if both ends are rounded, to a length of 20 feet, when the respective safe loads will be found.

TYPES OF BASES, CAPS, JOINTS, AND GIRDER CONNECTIONS TO STANCHIONS.—Various types of bases, caps, joints, and girder connections to stanchions are illustrated. In all of these, due consideration has been given to ensure efficiency and simplicity of design.

BEAM GRILLAGES FOR STANCHIONS.—For stanchions supporting heavy loads, the necessity for deep excavations and large masses of masonry in foundations, may be considerably reduced by the adoption of suitable grillages, combined with stanchion bases, carefully designed to transmit the load.

These are generally obtained by placing on a layer of concrete, one, two, or three tiers of beams, according to the load to be distributed, and the bearing capacity of the ground. The beams in each tier should be kept sufficiently far apart to allow of the intervening spaces being thoroughly filled with concrete. In cases where two or three tiers are found necessary, they should be efficiently secured to each other, and the stanchion base to the whole.

The following diagram illustrates a grillage, consisting of two tiers of beams :—



The overall dimensions of the lower tier are determined by the bearing capacity of the ground, and to find the section of beams required in any tier :—

Let W = total load in tons supported by the stanchion.

n = number of beams forming the tier.

w = load in tons supported by one beam = $\frac{W}{n}$.

L = length in feet of each beam.

l = length in feet, at central portion of beam, over which the load above it is distributed.

M = maximum bending moment in foot tons, in one beam (this occurs at the centre of length L).

Then $M = \left(\frac{w}{2} \times \frac{L}{4}\right) - \left(\frac{w}{2} \times \frac{l}{4}\right) \quad \frac{w}{8} (L - l)$.

The above bending moment is equivalent to that produced in a beam supported at both ends, and carrying a distributed load w over a span = L — l. Therefore, on reference to this span in the tables of safe loads, given on pages 72 and 73, the size of beam to carry the load w may be obtained direct.

It should be observed, however, that for reasons given on page 70, under the heading "Tabular Loads," the load w should not exceed the maximum load, given in the table, for the section decided upon.

EXAMPLE.—A grillage has to be provided for a stanchion, on ground having a bearing capacity of 2 tons per square foot, the total load to be supported being 120 tons ; assumed size of stanchion base, 2 feet square.

For above load and bearing capacity of ground, two tiers will suffice, and as the area required for the foundation is 60 square feet, the lower tier will require

to be about 8 feet square ; therefore, in this tier, ten beams can be placed side by side at 10 inches centres, the load w on each being about $\frac{120}{10}$ or 12 tons.

The bending moment in each beam is equivalent to that produced by this load uniformly distributed over a span of $L - l = 8 - 2 = 6$ feet, and referring to table of safe loads on page 72, it is found that N.B.S.B. 7 (8" × 4" × 18 lbs. per foot) is a suitable section for the lower tier.

The upper tier will be 2 feet wide, i.e., the width of the stanchion base. In this width three beams can be placed side by side at 9 inches centres, the load w on each being about $\frac{120}{3} = 40$ tons, which is to be taken as uniformly distributed over a span of $L - l = 6$ feet, and on reference to the table of safe loads as before, it will be found that N.B.S.B. 12 (14" × 5½" × 40 lbs. per foot), is a suitable section for this tier.

The above analysis involves the usual fundamental assumptions pertaining to flexure.

The exact conditions involved in these assumptions are not usually obtained in grillage practice, so that results obtained by the above analysis should be carefully interpreted.

Our own practice in designing grillages is on the lines of the above analysis.

Where the loads transmitted are very large, the grillage requires special designing, and in such cases, particular attention should be given to the sections of the beams with reference to their ability to carry the loads involved without crippling of the webs.

DORMAN, LONG & CO. LIMITED.

TABLE OF CRIPPLING LOADS

IN TONS PER SQUARE INCH,

For Stanchions or Struts with fixed ends,* and various values of $\frac{l}{r}$, in which l=length in inches, and r=radius of gyration in inches.

$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load
5	23·97	45	22·45	85	18·92	125	13·99	165	9·93
6	23·96	46	22·39	86	18·81	126	13·87	166	9·85
7	23·95	47	22·33	87	18·70	127	13·75	167	9·77
8	23·94	48	22·26	88	18·59	128	13·63	168	9·69
9	23·92	49	22·19	89	18·48	129	13·51	169	9·61
10	23·90	50	22·12	90	18·37	130	13·40	170	9·53
11	23·88	51	22·05	91	18·26	131	13·29	171	9·45
12	23·86	52	21·98	92	18·15	132	13·18	172	9·37
13	23·84	53	21·91	93	18·03	133	13·07	173	9·29
14	23·82	54	21·83	94	17·91	134	12·96	174	9·21
15	23·80	55	21·75	95	17·79	135	12·85	175	9·13
16	23·77	56	21·67	96	17·67	136	12·74	176	9·05
17	23·74	57	21·59	97	17·55	137	12·63	177	8·98
18	23·71	58	21·51	98	17·43	138	12·52	178	8·91
19	23·68	59	21·43	99	17·31	139	12·41	179	8·84
20	23·65	60	21·35	100	17·19	140	12·30	180	8·77
21	23·62	61	21·26	101	17·06	141	12·19	181	8·70
22	23·59	62	21·17	102	16·93	142	12·09	182	8·63
23	23·56	63	21·08	103	16·80	143	11·99	183	8·56
24	23·52	64	20·99	104	16·67	144	11·89	184	8·49
25	23·48	65	20·90	105	16·53	145	11·79	185	8·42
26	23·44	66	20·81	106	16·40	146	11·69	186	8·35
27	23·40	67	20·72	107	16·27	147	11·59	187	8·28
28	23·36	68	20·63	108	16·14	148	11·49	188	8·21
29	23·32	69	20·54	109	16·01	149	11·39	189	8·14
30	23·28	70	20·44	110	15·88	150	11·29	190	8·07
31	23·23	71	20·34	111	15·75	151	11·19	191	8·00
32	23·18	72	20·24	112	15·62	152	11·09	192	7·93
33	23·13	73	20·14	113	15·49	153	11·00	193	7·87
34	23·08	74	20·04	114	15·36	154	10·91	194	7·81
35	23·03	75	19·94	115	15·23	155	10·82	195	7·75
36	22·98	76	19·84	116	15·10	156	10·73	196	7·69
37	22·93	77	19·74	117	14·97	157	10·64	197	7·63
38	22·87	78	19·64	118	14·84	158	10·55	198	7·57
39	22·81	79	19·54	119	14·71	159	10·46	199	7·51
40	22·75	80	19·44	120	14·59	160	10·37	200	7·45
41	22·69	81	19·34	121	14·47	161	10·28	..	..
42	22·63	82	19·24	122	14·35	162	10·19	..	..
43	22·57	83	19·14	123	14·23	163	10·10	..	..
44	22·51	84	19·03	124	14·11	164	10·01	..	..

*The Crippling Loads for other conditions of ends will be sufficiently accurate if found as follows:—

For one end fixed and the other rounded.—Multiply the actual $\frac{l}{r}$ by 1⅓, and the required Crippling Load will be that given in the table for this value.

For both ends rounded.—Multiply the actual $\frac{l}{r}$ by 1⅔, and the required Crippling Load will be that given in the table for this value.

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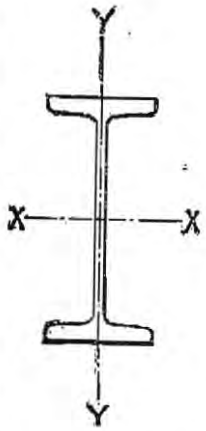
BEAMS AS STANCHIONS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches	Weight per foot lbs.	Area Square Inches	Radii of Gyration Inches		Section Moduli	
				About X - X	About Y - Y	About X - X	About Y - Y
"A" LIGHT SECTIONS.							
NBSB 18	24×7½	90	26·47	9·61	1·51	203·6	16·13
" 17	22×7	75	22·06	8·72	1·36	152·4	11·13
" 16	20×6½	65	19·12	8·01	1·31	122·6	10·02
" 15	18×6	55	16·18	7·21	1·21	93·53	7·878
" 14	16×6	50	14·71	6·48	1·24	77·26	7·489
" 13	15×6	45	13·24	6·10	1·23	65·59	6·624
" 12	14×5½	40	11·77	5·66	1·12	53·87	5·377
" 11	13×5	35	10·30	5·25	1·03	43·62	4·326
" 10	12×5	30	8·827	4·84	·997	34·49	3·508
" 9	10×4½	25	7·354	4·08	·939	24·47	2·883
" 8	9×4	21	6·177	3·62	·820	18·03	2·074
" 7	8×4	18	5·296	3·24	·814	13·91	1·753
" 6	7×3½	15	4·416	2·85	·738	10·26	1·376
"B" HEAVY SECTIONS.							
NBSHB 11	18×8	80	23·53	7·41	1·72	148·6	17·36
" 10	16×8	75	22·06	6·64	1·76	121·7	17·08
" 9	14×8	70	20·59	5·85	1·80	100·8	16·67
" 8	12×8	65	19·12	5·05	1·85	81·30	16·30
" 7	10×8	55	16·18	4·22	1·84	57·74	13·69
" 6	10×6	40	11·77	4·17	1·36	40·96	7·253
" 5	9×7	50	14·71	3·76	1·65	46·25	11·48
" 4	8×6	35	10·30	3·34	1·38	28·76	6·513
" 3	6×5	25	7·351	2·48	1·16	15·05	3·951
" 2	5×4½	20	5·882	2·06	1·06	10·01	2·929

DORMAN, LONG & CO. LIMITED.

BEAMS AS STANCHIONS.

SAFE LOADS IN TONS.

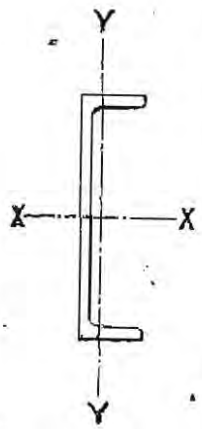
ENDS FIXED.

For other conditions of ends see page 118.

SAFE LOADS IN TONS FOR LENGTHS IN FEET										Size Inches
6	8	10	12	14	16	18	20	22	24	
"A" LIGHT SECTIONS.										
147	139	129	118	104	91	79	69	..	..	24×7½
121	113	103	90	78	67	58	..	..	..	22×7
104	96	87	76	65	55	..	..	..	..	20×6½
86	79	70	60	50	42	..	..	..	..	18×6
79	72	65	55	47	40	..	..	..	..	16×6
71	65	58	49	42	35	..	..	..	..	15×6
62	55	48	40	33	..	..	..	..	..	14×5½
53	46	39	32	..	..	..	..	..	..	13×5
45	39	32	26	..	..	..	..	..	..	12×5
36	31	25	20	..	..	..	..	..	..	10×4½
29	23	18	..	..	..	..	..	..	..	9×4
25	20	15	..	..	..	..	..	..	..	8×4
19	15	..	..	..	..	..	..	..	..	7×3½
"B" HEAVY SECTIONS.										
133	128	120	112	103	92	82	72	64	..	18×8
125	120	114	106	97	88	79	70	62	..	16×8
117	113	107	100	93	84	75	67	60	53	14×8
109	105	100	94	87	80	72	64	57	51	12×8
92	89	85	79	74	67	61	54	48	43	10×8
64	60	55	48	42	36	31	..	..	..	10×6
83	79	74	69	62	56	49	43	38	..	9×7
57	53	48	43	37	32	27	..	..	..	8×6
39	35	31	26	22	..	..	..	..	..	6×5
30	27	23	19	15	..	..	..	..	..	5×4½

CHANNELS AS STANCHIONS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches	Weight per foot lbs.	Area Square Inches	Radii of Gyration Inches		Section Modull	
				About X - X	About Y - Y	About X - X	About Y - Y
NBSC 18	17×4	44·34	13·04	6·32	1·08	61·20	4·955
" 17	15×4	36·37	10·70	5·71	1·12	46·55	4·398
" 16	12×4	31·33	9·214	4·66	1·15	33·35	4·116
" 15	12×3½ H	29·23	8·596	4·58	·991	30·05	3·245
" 14	12×3½ L	25·25	7·426	4·59	·975	26·07	2·665
" 13	10×3½	24·46	7·193	3·90	1·02	21·90	2·927
" 12	10×3	19·28	5·672	3·82	·838	16·53	1·764
" 11	9×3½	22·27	6·549	3·55	1·03	18·36	2·763
" 10	9×3	17·46	5·136	3·49	·855	13·89	1·691
" 9	8×3½	20·21	5·944	3·19	1·04	15·14	2·595
" 8	8×3	15·96	4·694	3·16	·873	11·68	1·652
" 7	7×3½	18·28	5·376	2·82	1·04	12·24	2·423
" 6	7×3	14·22	4·182	2·80	·882	9·357	1·531
" 5	6×3½	16·48	4·848	2·44	1·05	9·627	2·246
" 4	6×3	12·41	3·650	2·41	·880	7·090	1·339
" 3	5×2½	10·22	3·006	1·99	·739	4·749	·950

DORMAN, LONG & CO. LIMITED.

CHANNELS AS STANCHIONS.

SAFE LOADS IN TONS.

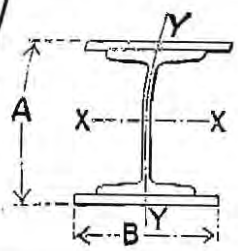
ENDS FIXED.

For other conditions of ends see page 113.

SAFE LOADS IN TONS FOR LENGTHS IN FEET										Size Inches
3	4	5	6	7	8	9	10	11	12	
75	73	71	68	64	60	56	51	47	43	17×4
62	60	58	56	53	50	47	44	40	36	15×4
54	52	51	49	46	44	41	38	35	32	12×4
49	48	46	43	41	38	34	31	28	25	12×3½H
43	41	39	37	35	32	29	26	24	21	12×3½L
41	40	39	37	34	32	29	27	24	22	10×3½
32	31	29	27	24	22	19	17	..	..	10×3
38	37	35	33	32	29	27	25	22	20	9×3½
29	28	26	24	22	20	18	16	..	..	9×3
34	33	32	30	29	27	25	22	20	18	8×3½
27	26	24	23	21	19	17	15	..	..	8×3
31	30	29	28	26	24	22	20	18	17	7×3½
24	23	22	20	19	17	15	13	..	..	7×3
28	27	26	25	24	22	20	18	17	15	6×3½
21	20	19	18	16	15	13	12	..	..	6×3
17	16	15	13	12	10	..	..	..	..	5×2½

Addition of these Size of plates gives variety of loads which can be carried

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

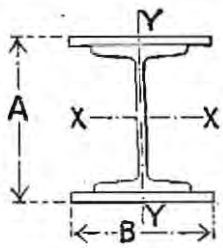
Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches Beam	DIMENSIONS Inches Each Flange	Area Square Inches	Radii of Gyration Inches About X - X	Radii of Gyration Inches About Y - Y	Section Moduli About X - X	Section Moduli About Y - Y
S 1	28 ×14	286	24×7½	14×2	82·47	12·03	3·44	851·8	139·3
" 2	27 ×14	238	"	14×1½	68·47	11·64	3·30	687·3	106·6
" 3	26 ×14	190·5	"	14×1	54·47	11·19	3·08	524·7	74·0
" 4	25½×14	165	"	14× ¾	47·47	10·92	2·92	443·9	57·6
" 5	25¼×14	153	"	14× ⅝	43·97	10·77	2·81	403·7	49·5
" 6	25 × 9	124	"	9× ½	35·47	10·34	1·85	303·5	26·9
S 7	26 ×14	271	22×7	14×2	78·06	11·18	3·50	750·7	136·5
" 8	25 ×14	223	"	14×1½	64·06	10·81	3·37	598·7	103·9
" 9	24 ×14	175·5	"	14×1	50·06	10·37	3·16	448·5	71·2
" 10	23½×14	150	"	14× ¾	43·06	10·10	2·99	374·0	54·9
" 11	23¼×14	138	"	14× ⅝	39·56	9·95	2·87	336·9	46·7
" 12	23 × 9	109	"	9× ½	31·06	9·52	1·81	244·9	22·6
S 13	24 ×12	233·5	20×6½	12×2	67·12	10·25	3·01	587·5	101·4
" 14	23 ×12	193	"	12×1½	55·12	9·89	2·90	469·0	77·4
" 15	22 ×12	152	"	12×1	43·12	9·48	2·73	352·2	53·4
" 16	21½×12	130	"	12× ¾	37·12	9·23	2·59	294·4	41·4
" 17	21 ×12	109·5	"	12× ½	31·12	8·94	2·38	236·9	29·4
" 18	20¾× 9	91·5	"	9× ⅜	25·87	8·63	1·74	185·7	17·4
S 19	22 ×14	276	18×8	14×2	79·53	9·32	3·52	628·2	140·6
" 20	21 ×14	228	"	14×1½	65·53	8·99	3·40	504·1	107·9
" 21	20½×14	204·5	"	14×1¼	58·53	8·81	3·31	442·8	91·6
" 22	20 ×14	180·5	"	14×1	51·53	8·61	3·20	382·2	75·3
" 23	19½×14	155	"	14× ¾	44·53	8·40	3·04	321·9	58·9
" 24	19¼×14	143	"	14× ⅝	41·03	8·28	2·94	291·9	50·8
" 25	22 ×12	247	"	12×2	71·53	9·24	3·00	555·3	107·6
" 26	21 ×12	206	"	12×1½	59·53	8·91	2·90	449·6	83·6
" 27	20½×12	185·5	"	12×1¼	53·53	8·73	2·83	397·6	71·6
" 28	20 ×12	165	"	12×1	47·53	8·53	2·74	346·0	59·6
" 29	19½×12	145	"	12× ¾	41·53	8·32	2·62	294·9	47·6
" 30	19 ×12	124·5	"	12× ½	35·53	8·08	2·45	244·1	35·6
" 31	18¾× 9	106·5	"	9× ⅜	30·28	7·84	1·95	198·6	25·6

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

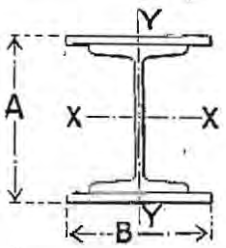
ENDS FIXED.

For other conditions of ends see page 118.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
8	10	12	14	16	18	20	22	24	26	28	32	36	40	
482	475	467	457	447	435	421	407	392	376	359	322	286	254	S 1
399	393	385	377	368	358	345	333	320	307	290	258	227	202	" 2
316	311	304	297	288	278	267	256	246	232	218	190	167	146	" 3
274	269	263	255	247	238	228	217	205	193	181	156	136	..	" 4
254	248	242	235	227	217	207	197	185	173	160	139	120	..	" 5
195	185	174	162	148	133	119	106	95	..	..	..	..	..	" 6
457	450	443	434	424	413	401	389	375	361	345	310	278	246	S 7
374	368	361	354	346	336	326	315	303	289	275	246	218	194	" 8
291	286	280	274	266	258	248	238	229	217	205	180	158	139	" 9
250	245	240	233	226	218	209	200	190	179	167	145	127	..	" 10
229	224	219	213	205	197	189	180	170	158	148	128	112	..	" 11
170	162	151	140	127	114	102	91	81	..	..	..	..	..	" 12
389	382	374	364	352	340	326	312	296	280	262	229	201	176	S 13
319	313	305	296	287	276	264	252	239	224	208	182	157	..	" 14
248	243	236	228	220	211	200	189	177	166	153	131	114	..	" 15
213	208	201	194	186	178	167	157	146	134	124	107	..	..	" 16
177	172	166	158	150	142	133	123	113	103	95	..	..	..	" 17
141	133	124	114	103	91	81	72	..	..	..	..	..	..	" 18
465	459	451	443	432	423	410	396	383	367	351	318	283	253	S 19
383	377	371	364	354	344	333	322	310	297	284	254	225	200	" 20
341	336	329	323	315	306	295	284	274	262	248	221	194	173	" 21
300	295	289	282	275	266	257	247	237	225	213	188	166	145	" 22
258	254	249	242	235	226	218	208	198	187	177	154	135	117	" 23
237	233	228	221	214	207	197	188	179	168	158	137	119	..	" 24
414	407	398	387	375	362	348	332	316	298	279	244	213	185	" 25
344	338	329	320	310	298	285	272	258	240	225	196	170	..	" 26
309	303	295	287	276	265	253	241	227	212	197	170	147	..	" 27
274	267	260	253	243	232	221	210	196	182	169	146	125	..	" 28
238	232	226	218	209	200	188	177	165	153	141	121	..	..	" 29
203	197	190	182	174	165	155	143	132	122	112	94	..	..	" 30
168	160	152	142	131	119	108	97	87	78	..	..	..	..	" 31

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

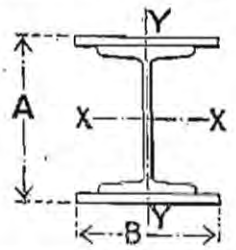
Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Area Square Inches	Radii of Gyration Inches		Section Moduli	
			Beam	Each Flange		About X - X	About Y - Y	About X - X	About Y - Y
S 32	21 ×12	183	18×6	12×1½	52·18	9·05	2·95	406·7	75·9
" 33	20 ×12	142	"	12×1	40·18	8·65	2·78	301·0	51·9
" 34	19 ×12	99·5	"	12× ½	28·18	8·14	2·44	196·7	27·9
" 35	21 ×10	160·5	"	10×1½	46·18	8·95	2·43	352·3	54·7
" 36	20 ×10	126·5	"	10×1	36·18	8·56	2·29	264·8	38·1
" 37	19 ×10	92·5	"	10× ½	26·18	8·05	2·02	178·7	21·4
" 38	18¾× 9	81·5	"	9× ⅜	22·93	7·85	1·74	150·6	15·4
" 39	18¾× 7	76·5	"	7× ⅜	21·43	7·74	1·45	137·1	12·9
S 40	20 ×14	271	16×8	14×2	78·06	8·42	3·55	552·9	140·4
" 41	19 ×14	223	"	14×1½	64·06	8·09	3·43	441·8	107·8
" 42	18½×14	199·5	"	14×1¼	57·06	7·92	3·35	387·3	91·4
" 43	18 ×14	175·5	"	14×1	50·06	7·74	3·24	333·3	75·1
" 44	17½×14	150	"	14× ¾	43·06	7·54	3·09	279·8	58·8
" 45	17¼×14	138	"	14× ⅝	39·56	7·43	2·99	253·2	50·6
" 46	20 ×12	242	"	12×2	70·06	8·34	3·93	487·8	107·4
" 47	19 ×12	201	"	12×1½	58·06	8·02	2·94	393·4	83·4
" 48	18½×12	180·5	"	12×1¼	52·06	7·85	2·87	347·0	71·4
" 49	18 ×12	160	"	12×1	46·06	7·67	2·78	301·1	59·4
" 50	17½×12	140	"	12× ¾	40·06	7·47	2·66	255·7	47·4
" 51	17 ×12	119·5	"	12× ½	34·06	7·25	2·50	210·7	35·4
" 52	16¾× 9	101·5	"	9× ⅜	28·81	7·04	1·99	170·3	25·3
S 53	19 ×12	178	16×6	12×1½	50·71	8·17	2·99	355·9	75·7
" 54	18 ×12	137	"	12×1	38·71	7·80	2·83	261·6	51·7
" 55	17 ×12	94·5	"	12× ½	26·71	7·33	2·50	168·8	27·7
" 56	19 ×10	155·5	"	10×1½	44·71	8·08	2·47	307·4	54·5
" 57	18 ×10	121·5	"	10×1	34·71	7·71	2·33	229·4	37·8
" 58	17 ×10	87·5	"	10× ½	24·71	7·25	2·07	152·8	21·2
" 59	16¾× 9	76·5	"	9× ⅜	21·46	7·06	1·78	127·8	15·1
" 60	16¾× 7	71·5	"	7× ⅜	19·96	6·97	1·48	115·8	12·5

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

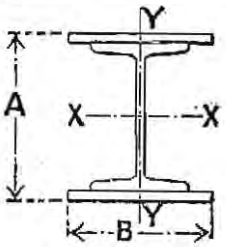
ENDS FIXED.

For other conditions of ends see page 113.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
8	10	12	14	16	18	20	22	24	26	28	32	36	40	
302	296	289	282	273	263	252	241	229	214	200	175	153	..	S 32
232	227	221	214	206	197	189	179	169	157	145	126	109	..	" 33
161	156	151	145	138	130	123	114	105	96	88	75	..	..	" 34
263	256	247	237	226	213	200	186	171	157	145	122	..	..	" 35
205	199	191	182	172	162	150	138	125	115	105	..	..	..	" 36
146	140	133	125	116	106	96	87	78	71	..	..	..	..	" 37
125	118	110	101	90	81	72	64	..	..	..	..	..	..	" 38
111	103	93	81	71	61	..	..	..	..	..	..	..	..	" 39
457	450	443	436	426	415	403	391	377	363	347	315	280	251	S 40
374	369	362	355	347	338	327	316	305	292	279	250	222	197	" 41
333	328	322	316	308	299	289	279	268	257	245	217	193	171	" 42
291	287	282	275	268	259	251	242	231	221	209	184	164	144	" 43
250	246	240	235	228	220	211	204	194	184	172	152	132	116	" 44
229	225	220	214	208	200	192	184	175	165	154	135	118	103	" 45
406	398	391	381	369	356	342	328	312	294	276	241	212	185	" 46
336	329	322	313	303	291	279	267	253	238	223	193	168	..	" 47
301	295	288	279	270	260	248	236	224	208	195	169	146	..	" 48
265	260	253	246	237	226	217	205	192	180	167	144	125	..	" 49
230	225	219	211	203	194	184	173	162	150	139	119	..	..	" 50
195	190	183	176	168	159	150	140	130	119	109	93	..	..	" 51
160	154	146	136	126	115	104	94	85	77	..	..	..	..	" 52
294	288	282	275	266	257	246	236	224	211	198	173	151	131	S 53
223	219	213	207	200	192	183	174	164	154	142	123	106	..	" 54
153	149	144	138	132	125	118	109	102	93	86	73	..	..	" 55
255	248	240	231	220	209	196	182	167	155	142	120	..	..	" 56
197	191	184	176	167	156	146	134	123	112	103	..	..	..	" 57
138	133	126	119	111	103	93	84	77	69	..	..	..	..	" 58
117	111	104	96	87	78	69	62	..	..	..	..	..	..	" 59
104	96	88	77	67	58	..	..	..	..	..	..	..	..	" 60

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

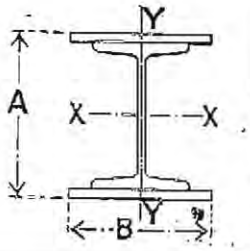
Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Area Square Inches	Radii of Gyration Inches		Section Moduli	
			Beam	Each Flange		About X - X	About Y - Y	About X - X	About Y - Y
S 61	18 ×12	173	15×6	12×1½	49·24	7·74	3·02	327·7	75·3
" 62	17 ×12	132	"	12×1	37·24	7·38	2·88	238·8	51·3
" 63	16 ×12	89·5	"	12× ½	25·24	6·93	2·55	151·6	27·3
" 64	18 ×10	150·5	"	10×1½	43·24	7·66	2·50	282·2	54·0
" 65	17 ×10	116·5	"	10×1	33·24	7·31	2·37	208·7	37·3
" 66	16 ×10	82·5	"	10× ½	23·24	6·86	2·11	136·6	20·6
" 67	15¾× 9	71·5	"	9× ⅜	19·99	6·68	1·81	113·1	14·5
" 68	15¾× 7	66·5	"	7× ⅜	18·49	6·59	1·49	101·9	11·8
S 69	18 ×14	266	14×8	14×2	76·59	7·50	3·58	478·7	140·2
" 70	17 ×14	218	"	14×1½	62·59	7·19	3·47	380·7	107·5
" 71	16½×14	194·5	"	14×1¼	55·59	7·03	3·39	332·7	91·2
" 72	16 ×14	170·5	"	14×1	48·59	6·85	3·28	285·4	74·9
" 73	15½×14	145	"	14× ¾	41·59	6·67	3·14	238·6	58·5
" 74	15¼×14	133	"	14× ⅝	38·09	6·57	3·04	215·3	50·4
" 75	18 ×12	237	"	12×2	68·59	7·44	3·06	421·5	107·1
" 76	17 ×12	196	"	12×1½	56·59	7·13	2·97	338·2	83·1
" 77	16½×12	175·5	"	12×1¼	50·59	6·96	2·90	297·4	71·1
" 78	16 ×12	155	"	12×1	44·59	6·79	2·82	257·2	59·1
" 79	15½×12	135	"	12× ¾	38·59	6·61	2·71	217·5	47·1
" 80	15 ×12	114·5	"	12× ½	32·59	6·40	2·54	178·2	35·1
" 81	14¾× 9	96·5	"	9× ⅜	27·34	6·21	2·03	143·0	24·9
S 82	17 ×12	166	14×5½	12×1½	47·77	7·30	3·06	299·5	74·5
" 83	16 ×12	125	"	12×1	35·77	6·95	2·91	216·1	50·5
" 84	15 ×12	83	"	12× ½	23·77	6·51	2·58	134·4	26·5
" 85	17 × 9	134	"	9×1½	38·77	7·19	2·25	235·7	43·8
" 86	16 × 9	103·5	"	9×1	29·77	6·84	2·14	173·9	30·3
" 87	15 × 9	73	"	9× ½	20·77	6·40	1·91	113·4	16·8
" 88	14¾× 9	65	"	9× ⅜	18·52	6·26	1·81	98·4	13·4
" 89	14¾× 7	60	"	7× ⅜	17·02	6·17	1·46	87·9	10·4

COMPOUND STANCHIONS.

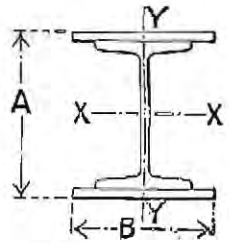
SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 113



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
8	10	12	14	16	18	20	22	24	26	28	32	36	40	
285	280	274	268	259	250	241	230	219	207	194	169	148	130	S 61
215	211	206	200	193	186	178	169	160	149	139	121	105	..	" 62
144	141	136	131	126	119	113	105	98	91	83	71	..	..	" 63
247	241	233	224	213	203	191	177	165	151	139	118	..	..	" 64
189	183	177	169	161	152	142	131	119	110	100	..	..	..	" 65
130	125	120	113	106	98	89	81	73	67	61	..	..	..	" 66
109	104	97	90	82	73	65	58	52	..	..	..	..	..	" 67
97	90	82	72	63	55	..	..	..	..	..	..	..	..	" 68
447	441	435	427	417	408	396	383	371	357	342	311	276	248	S 69
366	360	354	348	340	331	321	310	299	287	275	246	219	196	" 70
325	320	314	307	300	292	283	273	263	252	241	215	191	168	" 71
283	279	273	268	261	253	245	236	226	216	206	182	160	142	" 72
242	238	233	227	221	214	206	198	189	180	169	149	130	114	" 73
221	217	213	207	201	194	186	178	169	160	151	132	115	100	" 74
398	391	383	373	361	349	337	323	307	290	272	240	209	182	" 75
328	322	314	305	296	285	274	261	248	234	219	191	165	..	" 76
293	287	280	272	263	253	242	231	219	206	191	167	144	..	" 77
257	252	246	238	230	220	211	200	189	176	164	142	123	..	" 78
222	217	211	204	196	188	178	168	158	147	136	117	100	..	" 79
186	182	176	170	162	154	146	136	126	116	107	91	..	..	" 80
153	146	139	131	122	111	101	92	83	75	..	..	..	..	" 81
277	272	267	260	252	243	235	225	214	202	190	166	146	127	S 82
207	203	198	192	186	179	172	163	155	145	136	118	103	..	" 83
136	133	129	124	119	113	107	101	94	86	80	68	..	..	" 84
219	212	203	193	183	171	159	145	132	121	110	..	..	..	" 85
167	161	154	145	137	127	116	106	96	87	79	..	..	..	" 86
115	109	103	97	89	80	72	65	58	..	..	..	..	..	" 87
101	96	90	83	76	68	60	54	48	..	..	..	..	..	" 88
89	82	74	65	56	49	..	..	..	..	..	..	..	..	" 89



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches Beam	DIMENSIONS Inches Each Flange	Area Square Inches	Radii of Gyration Inches About X - X	Radii of Gyration Inches About Y - Y	Section Moduli About X - X	Section Moduli About Y - Y
S 90	16 ×10	140·5	13×5	10×1½	40·30	6·80	2·54	233·3	52·2
" 91	15 ×10	106·5	"	10×1	30·30	6·46	2·42	168·7	35·5
" 92	14 ×10	71·5	"	10× ½	20·30	6·04	2·15	105·6	18·8
" 93	16 × 9	129	"	9×1½	37·30	6·77	2·28	213·6	42·4
" 94	15 × 9	98·5	"	9×1	28·30	6·42	2·16	155·6	29·4
" 95	14 × 9	68	"	9× ½	19·30	6·00	1·93	99·1	15·9
" 96	13¾× 9	60	"	9× ⅜	17·05	5·86	1·82	85·2	12·5
" 97	13¾× 7	55	"	7× ⅜	15·55	5·77	1·44	75·4	9·2
S 98	16 ×14	261	12×8	14×2	75·12	6·58	3·61	406·3	140·0
" 99	15 ×14	213	"	14×1½	61·12	6·28	3·51	321·2	107·3
" 100	14½×14	189·5	"	14×1¼	54·12	6·12	3·43	279·8	91·0
" 101	14 ×14	165·5	"	14×1	47·12	5·96	3·33	239·0	74·7
" 102	13½×14	140	"	14× ¾	40·12	5·78	3·19	198·8	58·3
" 103	13¼×14	128	"	14× ⅝	36·62	5·69	3·10	179·0	50·1
" 104	16 ×12	232	"	12×2	67·12	6·52	3·09	357·0	106·9
" 105	15 ×12	191	"	12×1½	55·12	6·22	3·00	284·6	82·9
" 106	14½×12	170·5	"	12×1¼	49·12	6·07	2·94	249·4	70·9
" 107	14 ×12	150	"	12×1	43·12	5·91	2·86	214·8	58·9
" 108	13½×12	130	"	12× ¾	37·12	5·73	2·75	180·8	46·9
" 109	13 ×12	109·5	"	12× ½	31·12	5·54	2·59	147·2	34·9
" 110	12¾× 9	91·5	"	9× ⅜	25·87	5·37	2·07	117·1	24·6
S 111	14½×10	118·5	12×5	10×1¼	33·83	6·22	2·53	180·3	43·4
" 112	14 ×10	101·5	"	10×1	28·83	6·05	2·47	150·5	35·1
" 113	13½×10	83·5	"	10× ¾	23·83	5·86	2·37	121·1	26·8
" 114	13 ×10	66·5	"	10× ½	18·83	5·63	2·21	92·0	18·4
" 115	14½× 9	109	"	9×1¼	31·33	6·18	2·26	165·2	35·7
" 116	14 × 9	93·5	"	9×1	26·83	6·01	2·20	138·4	29·0
" 117	13½× 9	78	"	9× ¾	22·33	5·82	2·12	112·0	22·2
" 118	13 × 9	63	"	9× ½	17·83	5·60	1·97	86·0	15·5
" 119	12¾× 9	55	"	9× ⅜	15·58	5·47	1·87	73·0	12·1
" 120	12¾× 7	50	"	7× ⅜	14·08	5·38	1·47	64·0	8·6

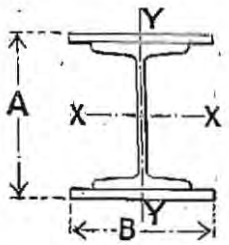
DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

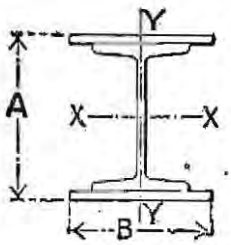
ENDS FIXED.

For other conditions of ends see page 118.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
8	10	12	14	16	18	20	22	24	26	28	32	36	40	
230	225	218	210	201	191	180	168	156	143	133	113	..	..	S 90
172	168	162	156	148	140	131	121	111	102	94	79	..	..	" 91
114	110	105	100	94	87	80	72	66	60	54	..	..	..	" 92
211	204	197	187	177	166	154	141	128	118	107	..	..	..	" 93
159	153	147	139	131	122	111	102	92	84	77	..	..	..	" 94
107	102	96	90	83	75	67	61	54	..	..	..	..	..	" 95
93	89	83	77	70	63	56	50	45	..	..	..	..	..	" 96
81	74	67	58	51	44	..	..	..	..	..	..	..	..	" 97
439	434	427	419	411	401	391	378	365	353	339	308	274	245	S 98
358	353	347	340	332	323	315	305	294	282	270	243	217	193	" 99
316	312	306	300	293	285	277	267	257	247	236	211	188	166	" 100
275	271	266	261	253	246	238	230	222	211	201	179	158	140	" 101
234	229	225	220	214	207	200	192	184	175	166	146	129	113	" 102
213	209	204	200	194	187	180	173	165	156	147	129	113	99	" 103
390	383	375	366	355	343	330	317	303	286	269	237	206	182	" 104
319	314	307	299	289	279	268	256	244	230	215	188	164	143	" 105
284	279	273	265	257	247	236	226	214	201	189	163	142	..	" 106
249	244	238	231	223	215	205	196	184	173	161	140	121	..	" 107
214	209	204	197	190	182	174	164	153	144	133	114	99	..	" 108
178	174	169	163	156	149	140	132	123	114	104	89	..	..	" 109
145	139	132	125	117	108	98	88	80	72	..	..	..	..	" 110
193	189	183	176	168	160	150	141	130	120	111	94	..	..	S 111
164	160	155	149	142	134	126	117	108	100	92	77	..	..	" 112
135	131	127	121	115	109	102	94	85	79	72	..	..	..	" 113
106	103	98	93	88	82	76	69	63	57	52	..	..	..	" 114
177	172	164	157	148	139	128	117	108	98	90	..	..	..	" 115
151	146	140	133	125	117	107	98	89	81	74	..	..	..	" 116
125	121	115	109	102	94	86	78	71	64	58	..	..	..	" 117
99	95	90	84	78	71	64	58	52	47	..	..	..	..	" 118
86	82	77	72	65	59	53	47	42	..	..	..	..	..	" 119
73	68	61	54	47	41	..	..	..	..	..	..	..	..	" 120

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches Beam	DIMENSIONS Inches Each Flange	Area Square Inches	Radii of Gyration Inches About X - X	Radii of Gyration Inches About Y - Y	Section Modull About X - X	Section Modull About Y - Y
S 121	14 ×12	222	10×8	12×2	64·18	5·63	3·13	290·4	105·1
" 122	13 ×12	181	"	12×1½	52·18	5·34	3·05	228·6	81·1
" 123	12½×12	160·5	"	12×1¼	46·18	5·19	3·00	198·7	69·1
" 124	12 ×12	140	"	12×1	40·18	5·03	2·92	169·5	57·1
" 125	11½×12	120	"	12× ¾	34·18	4·87	2·82	140·8	45·1
" 126	11 ×12	99·5	"	12× ½	28·18	4·69	2·66	112·7	33·1
" 127	13 ×10	160·5	"	10×1½	46·18	5·28	2·57	197·9	60·9
" 128	12½×10	143·5	"	10×1¼	41·18	5·13	2·53	173·3	52·6
" 129	12 ×10	126·5	"	10×1	36·18	4·97	2·47	149·2	44·3
" 130	11½×10	109·5	"	10× ¾	31·18	4·81	2·40	125·7	35·9
" 131	11 ×10	92·5	"	10× ½	26·18	4·64	2·30	102·6	27·6
" 132	10¾× 9	81·5	"	9× ⅜	22·93	4·53	2·09	87·5	22·3
S 133	13 ×12	166	10×6	12×1½	47·77	5·42	3·08	215·7	75·6
" 134	12 ×12	125	"	12×1	35·77	5·11	2·94	155·5	51·6
" 135	11 ×12	83	"	12× ½	23·77	4·75	2·64	97·4	27·6
" 136	13 ×10	144·5	"	10×1½	41·77	5·37	2·55	185·0	54·4
" 137	12 ×10	110·5	"	10×1	31·77	5·05	2·44	135·3	37·7
" 138	11 ×10	76·5	"	10× ½	21·77	4·70	2·20	87·4	21·0
" 139	10¾× 9	65	"	9× ⅜	18·52	4·57	1·91	71·9	15·0
S 140	12 ×10	154·5	9×7	10×1½	44·71	4·82	2·55	173·4	58·0
" 141	11½×10	137·5	"	10×1¼	39·71	4·68	2·50	151·0	49·7
" 142	11 ×10	120·5	"	10×1	34·71	4·52	2·44	129·1	41·4
" 143	10½×10	103·5	"	10× ¾	29·71	4·36	2·36	107·7	33·0
" 144	10 ×10	86·5	"	10× ½	24·71	4·19	2·24	86·8	24·7
" 145	9¾× 9	75	"	9× ⅜	21·46	4·08	2·00	73·1	19·1
S 146	11 × 9	129	8×6	9×1½	37·80	4·42	2·33	132·6	44·8
" 147	10½× 9	114	"	9×1¼	32·80	4·28	2·29	114·1	38·1
" 148	10 × 9	98·5	"	9×1	28·30	4·12	2·23	96·2	31·3
" 149	9½× 9	83	"	9× ¾	23·80	3·97	2·16	78·8	24·6
" 150	9 × 9	68	"	9× ½	19·30	3·79	2·04	61·7	17·8
" 151	8¾× 7	55	"	7× ⅜	15·55	3·65	1·62	47·4	11·7

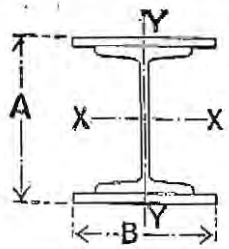
DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

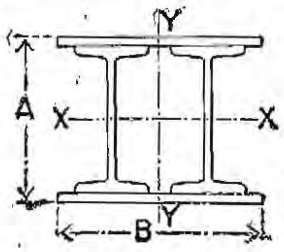
ENDS FIXED.

For other conditions of ends see page 113.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
8	10	12	14	16	18	20	22	24	26	28	32	36	40	
373	367	359	350	341	330	317	305	291	276	261	230	201	176	S 121
303	298	291	284	275	265	255	245	234	221	207	181	159	139	" 122
268	263	257	250	242	234	224	215	204	192	180	157	137	120	" 123
232	228	223	216	209	201	193	185	174	163	153	133	115	..	" 124
197	193	188	182	176	169	162	153	145	135	126	109	94	..	" 125
162	158	154	148	143	136	129	122	114	105	97	83	..	..	" 126
265	258	250	241	230	220	208	194	180	167	153	131	..	..	" 127
235	230	222	214	204	195	183	172	158	146	135	114	..	..	" 128
206	201	195	187	178	169	159	147	137	125	115	98	..	..	" 129
177	172	166	159	152	143	134	124	114	104	96	81	..	..	" 130
148	144	138	132	125	117	108	100	92	83	77	..	..	..	" 131
128	124	118	111	104	96	87	79	72	65	..	..	..	..	" 132
277	272	267	260	253	244	235	225	215	204	191	167	147	128	S 133
207	203	198	193	187	180	172	164	156	147	137	120	104	..	" 134
137	133	129	125	120	114	109	102	95	88	82	70	..	..	" 135
239	233	226	217	208	198	187	175	162	150	138	[illegible]	..	..	" 136
181	176	170	163	155	147	137	128	118	108	99	[illegible]	..	..	" 137
123	118	113	108	102	95	87	79	72	66	6[illegible]	..	..	..	" 138
102	98	92	86	79	72	64	58	52	..	..	..	..	..	" 139
256	250	241	233	223	211	200	186	173	160	147	125	..	..	S 140
227	221	214	206	196	187	175	163	151	139	129	108	..	..	" 141
198	193	186	178	170	161	151	140	129	118	109	92	..	..	" 142
169	164	158	151	144	135	126	116	107	98	89	..	..	..	" 143
139	135	130	123	116	108	101	92	83	76	70	..	..	..	" 144
119	115	109	102	95	87	78	71	64	58	..	..	..	..	" 145
212	205	197	189	178	168	157	144	132	121	111	..	..	..	S 146
186	180	173	165	156	147	136	125	114	104	95	..	..	..	" 147
160	154	148	141	133	124	115	105	96	87	80	..	..	..	" 148
134	129	123	117	110	102	94	85	77	70	64	..	..	..	" 149
108	103	98	93	86	79	72	65	59	53	..	..	..	..	" 150
83	78	72	65	58	51	45	..	..	..	..	..	..	..	" 151

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

Reference Mark	Size Inches A × B	Weight per ft. lbs.	DIMENSIONS Inches Beams	DIMENSIONS Inches Each Flange	Centres of Beams Ins.	Area Square Inches	Radii of Gyration Inches About X-X	Radii of Gyration Inches About Y-Y	Section Moduli About X-X	Section Moduli About Y-Y
S 152	28×20	455·5	24×7½	20×2	10½	132·93	11·78	5·65	1316·6	424·6
" 153	27×20	387·5	"	20×1½	10½	112·93	11·39	5·63	1085·3	358·0
" 154	26×20	319·5	"	20×1	10½	92·93	10·95	5·60	856·9	291·3
" 155	25×20	251·5	"	20× ½	10½	72·93	10·40	5·55	631·0	224·6
S 156	26×18	398·5	22×7	18×2	9½	116·13	10·88	5·10	1057·4	335·8
" 157	25×18	337	"	18×1½	9½	98·13	10·50	5·08	865·5	281·8
" 158	24×18	276	"	18×1	9½	80·13	10·07	5·06	676·5	227·8
" 159	23×18	215	"	18× ½	9½	62·13	9·52	5·02	489·7	173·8
S 160	24×16	351	20×6½	16×2	8½	102·24	10·00	4·55	851·5	26[illegible]·1
" 161	23×16	297	"	16×1½	8½	86·24	9·64	4·54	696·4	222·5
" 162	22×16	242·5	"	16×1	8½	70·24	9·23	4·53	543·9	179·8
" 163	21×16	188	"	16× ½	8½	54·24	8·73	4·50	393·7	137·1
S 164	22×20	435·5	18×8	20×2	10½	127·05	9·14	5·68	964·6	410·2
" 165	21×20	367·5	"	20×1½	10½	107·05	8·80	5·67	790·4	343·6
" 166	20×20	299·5	"	20×1	10½	87·05	8·44	5·64	619·8	276·9
" 167	19×20	231·5	"	20× ½	10½	67·05	8·00	5·60	452·2	210·2
S 168	22×16	331	18×6	16×2	8½	96·36	9·17	4·55	736·8	249·6
" 169	21×16	277	"	16×1½	8½	80·36	8·82	4·54	595·8	207·0
" 170	20×16	222·5	"	16×1	8½	64·36	8·43	4·52	457·4	164·3
" 171	19×16	168	"	16× ½	8½	48·36	7·94	4·49	321·3	121·6
S 172	20×18	398·5	16×8	18×2	9	116·13	8·20	5·06	780·4	330·5
" 173	19×18	337	"	18×1½	9	98·13	7·88	5·04	641·3	276·5
" 174	18×18	276	"	18×1	9	80·13	7·54	5·00	505·8	222·5
" 175	17×18	215	"	18× ½	9	62·13	7·15	4·94	373·3	168·5
S 176	20×16	321	16×6	16×2	8½	93·41	8·30	4·56	644·2	242·7
" 177	19×16	267	"	16×1½	8½	77·41	7·97	4·55	517·9	200·0
" 178	18×16	212·5	"	16×1	8½	61·41	7·60	4·53	394·5	157·4
" 179	17×16	158	"	16× ½	8½	45·41	7·16	4·49	273·6	114·7

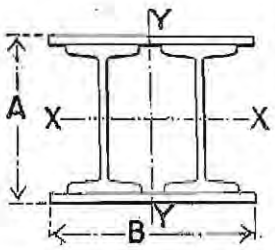
DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

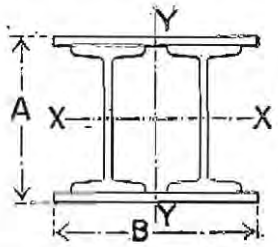
ENDS FIXED.

For other conditions of ends see page 118.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
785	780	774	767	760	752	742	733	723	712	698	686	659	629	S 152
667	662	657	652	646	637	630	623	614	603	593	582	557	534	" 153
549	545	541	536	530	524	519	512	503	496	488	477	459	437	" 154
430	427	424	420	416	412	406	401	395	388	381	374	358	343	" 155
683	678	672	664	657	648	638	629	617	604	591	579	549	520	S 156
577	573	567	561	555	548	539	530	522	511	499	487	464	439	" 157
471	468	463	458	452	447	440	432	424	417	407	397	379	356	" 158
365	362	359	355	351	346	340	335	329	322	314	307	292	274	" 159
599	592	586	578	571	560	550	539	527	512	499	486	455	422	S 160
505	500	494	488	480	472	464	454	443	432	421	408	384	354	" 161
411	407	403	397	391	385	378	369	361	352	341	332	312	288	" 162
317	314	311	306	302	297	291	285	279	270	264	257	240	221	" 163
750	746	739	733	726	719	711	700	691	681	670	655	630	604	S 164
632	628	623	618	612	606	598	590	582	574	562	552	531	506	" 165
514	510	507	502	498	491	486	480	473	465	457	449	430	412	" 166
396	393	390	387	382	378	374	370	363	358	352	344	331	315	" 167
565	558	552	545	538	528	518	508	495	483	471	458	429	398	S 168
471	466	461	455	447	440	432	424	413	403	393	380	357	329	" 169
377	373	369	364	358	353	346	338	331	322	313	304	284	264	" 170
283	280	277	273	269	265	259	254	247	241	235	227	214	197	" 171
683	678	671	664	655	648	638	627	615	604	591	576	549	516	S 172
577	572	567	561	554	546	539	530	519	508	499	487	461	436	" 173
471	467	462	458	452	446	439	431	424	415	405	395	377	354	" 174
365	362	358	354	350	345	340	334	327	320	313	305	290	273	" 175
547	541	535	528	521	512	502	492	482	468	456	444	415	386	S 176
454	449	444	438	431	424	416	408	398	388	378	368	344	317	" 177
359	356	352	347	342	336	330	322	315	308	298	290	273	252	" 178
266	263	260	256	253	249	243	238	233	226	221	215	201	185	" 179

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

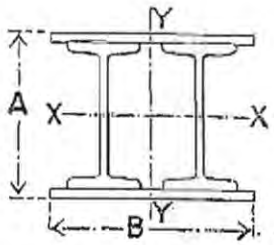
Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Centres of Beams	Area Square Inches	Radii of Gyration Inches		Section Moduli	
			Beams	Each Flange	Ins.		About X - X	About Y - Y	About X - X	About Y - Y
S 180	18×16	257	15×6	16×1½	8½	74·47	7·56	4·55	473·3	192·7
" 181	17×16	202·5	"	16×1	8½	58·47	7·20	4·53	357·0	150·1
" 182	16×16	148	"	16× ½	8½	42·47	6·77	4·50	243·1	107·4
S 183	18×18	388·5	14×8	18×2	9	113·18	7·31	5·07	671·5	323·5
" 184	17×18	327	"	18×1½	9	95·18	7·00	5·05	548·8	269·5
" 185	16×18	266	"	18×1	9	77·18	6·68	5·01	429·9	215·5
" 186	15×18	205	"	18× ½	9	59·18	6·31	4·96	314·3	161·5
S 187	17×14	225	14×6½	14×1½	7	65·53	7·08	3·91	386·4	143·4
" 188	16×14	177·5	"	14×1	7	51·53	6·73	3·88	291·4	110·7
" 189	15×14	130	"	14× ½	7	37·53	6·30	3·82	198·7	78·1
S 190	16×12	194·5	13×5	12×1½	6	56·60	6·60	3·36	308·3	106·5
" 191	15×12	154	"	12×1	6	44·60	6·26	3·33	232·7	82·5
" 192	14×12	113	"	12× ½	6	32·60	5·85	3·28	159·1	58·5
S 193	16×18	378·5	12×8	18×2	9	110·24	6·41	5·08	565·9	316·5
" 194	15×18	317	"	18×1½	9	92·24	6·11	5·06	459·5	262·5
" 195	14×18	256	"	18×1	9	74·24	5·80	5·03	357·1	208·5
" 196	13×18	195	"	18× ½	9	56·24	5·46	4·97	258·3	154·5
S 197	15×12	184·5	12×5	12×1½	6	53·65	6·20	3·37	274·8	101·4
" 198	14×12	144	"	12×1	6	41·65	5·86	3·34	204·3	77·4
" 199	13×12	103	"	12× ½	6	29·65	5·46	3·29	135·8	53·4
S 200	14×18	358·5	10×8	18×2	9	104·35	5·53	5·09	456·2	301·0
" 201	13×18	297	"	18×1½	9	86·35	5·24	5·07	365·1	247·0
" 202	12×18	236	"	18×1	9	68·35	4·94	5·04	278·2	193·0
" 203	11×18	175	"	18× ½	9	50·35	4·62	4·98	195·2	139·0
S 204	13×14	225	10×6	14×1½	7	65·54	5·25	3·94	277·9	145·4
" 205	12×14	177·5	"	14×1	7	51·54	4·94	3·91	209·8	112·7
" 206	11×14	130	"	14× ½	7	37·54	4·60	3·86	144·7	80·1

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

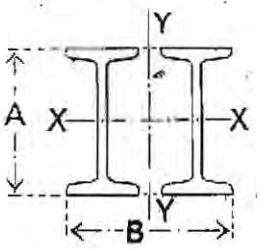
ENDS FIXED.

For other conditions of ends see page 113.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
436	432	427	421	416	408	400	392	382	373	364	354	331	308	S 180
343	339	335	331	325	320	314	307	300	293	286	277	260	240	" 181
248	246	243	240	236	233	228	223	218	212	206	201	188	173	" 182
665	661	654	647	639	632	622	611	599	589	576	561	535	503	S 183
560	555	550	544	537	530	523	514	504	493	484	472	448	423	" 184
454	450	445	441	435	429	423	417	408	400	391	381	363	341	" 185
348	345	341	337	333	329	324	318	312	305	298	292	277	260	" 186
381	376	370	364	356	348	339	328	318	308	297	286	260	233	S 187
299	295	291	286	279	273	266	258	250	241	232	223	203	182	" 188
218	215	211	208	203	198	193	187	181	174	168	160	145	130	" 189
325	319	313	305	297	288	276	266	255	243	230	217	191	170	S 190
256	252	247	240	233	226	218	210	200	190	180	170	149	133	" 191
187	183	180	175	170	164	158	151	145	138	129	122	107	95	" 192
648	644	637	630	624	615	606	595	586	574	561	547	521	494	S 193
542	539	533	527	520	515	507	498	488	480	469	458	436	410	" 194
437	433	429	424	419	413	407	401	393	385	376	368	349	330	" 195
331	328	325	321	317	313	308	302	296	290	285	278	263	247	" 196
308	303	297	290	282	273	263	252	242	231	218	206	183	161	S 197
239	235	230	224	218	211	203	196	188	178	168	159	141	124	" 198
170	167	163	159	154	149	144	138	132	126	119	111	99	87	" 199
614	609	603	597	590	583	573	563	555	543	531	520	494	467	S 200
508	504	499	494	487	482	475	466	457	449	439	428	408	384	" 201
402	399	394	390	385	379	374	368	360	353	344	336	320	300	" 202
295	292	289	285	281	277	272	266	260	254	247	241	225	210	" 203
381	376	370	364	356	348	340	330	320	310	299	288	260	235	S 204
299	295	291	286	280	274	267	258	250	242	234	225	205	183	" 205
218	215	212	208	203	199	194	187	182	176	169	162	147	132	" 206

DORMAN, LONG & CO. LIMITED.



LATTICED BEAM STANCHIONS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

Reference Mark	Size Inches A × B	Beams	Centres of Beams Inches	Area Square Inches	Radii of Gyration Inches		Section Moduli	
					About X-X	About Y-Y	About X-X	About Y-Y
"A" BEAMS SPACED AS FOR PRECEDING COMPOUND STANCHIONS.								
S 207	24×18	24×7½	10½	52·93	9·61	5·46	407·2	175·5
" 208	22×16½	22×7	9½	44·13	8·72	4·94	304·9	130·6
" 209	20×15	20×6½	8½	38·24	8·01	4·45	245·2	100·8
" 210	18×18½	18×8	10½	47·05	7·41	5·52	287·1	155·2
" 211	18×14½	18×6	8½	32·36	7·21	4·42	187·1	87·2
S 212	16×17	16×8	9	44·13	6·64	4·83	243·5	121·2
" 213	16×14½	16×6	8½	29·41	6·48	4·43	154·5	79·5
" 214	15×14½	15×6	8½	26·47	6·10	4·42	131·2	71·4
" 215	14×17	14×8	9	41·18	5·85	4·85	201·6	113·8
" 216	14×12½	14×5½	7	23·53	5·66	3·68	107·7	50·9
S 217	13×11	13×5	6	20·60	5·25	3·17	87·2	37·6
" 218	12×17	12×8	9	38·24	5·05	4·86	162·6	106·4
" 219	12×11	12×5	6	17·65	4·84	3·16	69·0	32·1
" 220	10×17	10×8	9	32·35	4·22	4·86	115·5	90·0
" 221	10×13	10×6	7	23·54	4·17	3·75	81·9	51·1
"B" BEAMS SPACED SO THAT THE LEAST RADIUS OF GYRATION IS ABOUT X-X.								
S 222	24×27½	24×7½	20	52·93	9·61	10·11	407·2	393·7
" 223	22×25	22×7	18	44·13	8·72	9·10	304·9	292·5
" 224	20×22½	20×6½	16	38·24	8·01	8·11	245·2	223·3
" 225	18×24	18×8	16	47·05	7·41	8·18	287·1	262·5
" 226	18×22	18×6	16	32·36	7·21	8·09	187·1	192·6
S 227	16×22	16×8	14	44·13	6·64	7·22	243·5	209·0
" 228	16×20	16×6	14	29·41	6·48	7·11	154·5	148·6
" 229	15×18	15×6	12	26·47	6·10	6·12	131·2	110·3
" 230	14×20	14×8	12	41·18	5·85	6·26	201·6	161·6
" 231	14×17½	14×5½	12	23·53	5·66	6·10	107·7	100·2
S 232	13×17	13×5	12	20·60	5·25	6·09	87·2	89·3
" 233	12×18	12×8	10	38·24	5·05	5·33	162·6	120·7
" 234	12×15	12×5	10	17·65	4·84	5·10	69·0	61·2
" 235	10×18	10×8	10	32·35	4·22	5·33	115·5	102·0
" 236	10×14	10×6	8	23·54	4·17	4·22	81·9	60·0

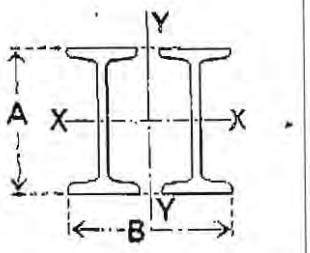
DORMAN, LONG & CO. LIMITED.

LATTICED BEAM STANCHIONS.

SAFE LOADS IN TONS.

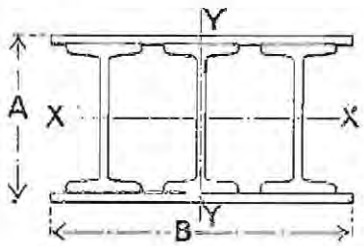
ENDS FIXED.

For other conditions of ends see page 113.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
"A" BEAMS SPACED AS FOR PRECEDING COMPOUND STANCHIONS.														
312	310	307	305	301	298	295	290	286	280	275	270	259	246	S 207
259	257	255	252	248	245	242	237	233	228	222	217	206	194	" 208
224	222	219	216	212	209	205	200	195	190	185	180	168	154	" 209
277	276	274	271	268	265	262	259	255	250	246	240	231	220	" 210
189	187	185	183	180	177	173	169	165	161	156	151	141	130	" 211
259	257	254	251	248	244	240	236	231	225	220	216	204	191	S 212
172	170	168	166	163	161	157	154	150	146	142	137	128	119	" 213
155	153	151	149	147	144	141	138	135	131	128	124	115	106	" 214
242	240	237	234	231	228	225	221	216	211	206	201	190	178	" 215
136	134	132	129	126	123	119	116	111	107	103	98	87	78	" 216
118	116	113	109	106	102	99	94	90	84	79	75	66	..	S 217
224	223	220	218	215	212	209	205	201	196	192	187	177	166	" 218
101	99	97	94	91	88	84	81	76	72	68	64	56	..	" 219
189	187	184	182	178	175	171	167	162	157	153	148	..	..	" 220
136	135	132	130	127	124	120	116	113	109	104	100	..	..	" 221
"B" BEAMS SPACED SO THAT THE LEAST RADIUS OF GYRATION IS ABOUT X-X.														
316	315	314	313	312	311	310	308	307	305	303	301	297	293	S 222
263	262	261	260	259	258	257	255	254	252	250	248	244	240	" 223
228	227	226	225	224	223	221	220	218	216	215	213	209	204	" 224
280	279	277	276	274	273	270	268	266	264	261	259	253	246	" 225
192	191	190	189	188	187	186	184	183	181	179	177	173	168	" 226
262	260	259	257	255	254	251	249	246	243	241	237	231	223	S 227
174	173	172	171	170	169	167	166	164	162	159	158	152	147	" 228
157	156	155	154	152	151	149	148	146	144	142	140	135	129	" 229
243	242	240	238	236	234	231	228	226	222	219	214	206	198	" 230
139	138	137	136	135	133	131	130	128	126	123	121	117	111	" 231
121	120	119	118	117	115	114	112	110	108	106	104	99	94	S 232
225	223	221	219	216	213	210	206	202	198	194	190	180	170	" 233
104	103	102	100	99	98	96	95	93	91	88	86	82	76	" 234
189	187	184	182	178	175	171	167	162	157	153	148	..	..	" 235
137	136	134	132	129	127	124	121	117	114	111	107	..	..	" 236

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS,

DIMENSIONS & PROPERTIES IN INCH UNITS.

Reference Mark	Size Inches A × B	Weight per ft. lbs.	DIMENSIONS Inches Beams	DIMENSIONS Inches Each Flange	Centres of Beams Ins.	Area Square Inches	Radii of Gyration Inches About X-X	Radii of Gyration Inches About Y-Y	Section Moduli About X-X	Section Moduli About Y-Y
S 237	27×24	520	24×7½	24×1½	7⅞	151·40	11·22	6·76	1410·9	576·6
" 238	26×24	438·5	"	24×1	7⅞	127·40	10·79	6·73	1141·1	480·6
" 239	25×24	357	"	24× ½	7⅞	103·40	10·28	6·68	874·5	384·6
S 240	25×24	475	22×7	24×1½	7⅞	138·19	10·41	6·76	1198·8	526·3
" 241	24×24	393·5	"	24×1	7⅞	114·19	9·98	6·72	948·5	430·3
" 242	23×24	312	"	24× ½	7⅞	90·19	9·46	6·67	701·6	334·3
S 243	23×24	445	20×6½	24×1½	7⅞	129·36	9·64	6·77	1044·6	493·8
" 244	22×24	363·5	"	24×1	7⅞	105·36	9·23	6·73	815·9	397·8
" 245	21×24	282	"	24× ½	7⅞	81·36	8·73	6·67	590·5	301·8
S 246	21×26	510·5	18×8	26×1½	8½	148·58	8·72	7·34	1076·7	615·5
" 247	20×26	422	"	26×1	8½	122·58	8·36	7·30	857·4	502·9
" 248	19×26	334	"	26× ½	8½	96·58	7·95	7·25	642·2	390·2
S 249	21×20	374·5	18×6	20×1½	6½	108·55	8·71	5·63	784·8	343·8
" 250	20×20	306·5	"	20×1	6½	88·55	8·33	5·59	613·9	277·2
" 251	19×20	238·5	"	20× ½	6½	68·55	7·86	5·54	446·0	210·5
S 252	19×26	495·5	16×8	26×1½	8½	144·19	7·86	7·35	937·7	599·0
" 253	18×26	407	"	26×1	8½	118·19	7·52	7·31	742·6	486·3
" 254	17×26	319	"	26× ½	8½	92·19	7·13	7·26	552·0	373·7
S 255	19×20	359·5	16×6	20×1½	6½	104·12	7·88	5·64	679·9	331·0
" 256	18×20	291·5	"	20×1	6½	84·12	7·51	5·61	527·5	264·3
" 257	17×20	223·5	"	20× ½	6½	64·12	7·08	5·55	378·3	197·7
S 258	17×26	480·5	14×8	26×1½	8½	139·77	6·98	7·36	801·9	582·2
" 259	16×26	392	"	26×1	8½	113·77	6·66	7·33	630·8	469·6
" 260	15×26	304	"	26× ½	8½	87·77	6·30	7·27	464·5	356·9
S 261	15×26	465·5	12×8	26×1½	8½	135·37	6·10	7·37	670·9	565·6
" 262	14×26	377	"	26×1	8½	109·37	5·79	7·34	523·5	452·9
" 263	13×26	289	"	26× ½	8½	83·37	5·45	7·28	381·4	340·3

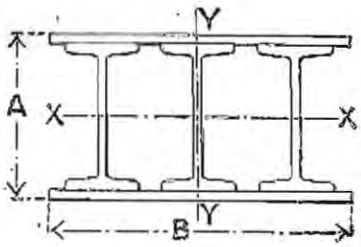
DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

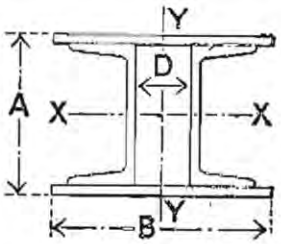
ENDS FIXED.

For other conditions of ends see page 113.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
897	894	889	884	877	872	863	854	847	837	829	817	794	770	S 237
755	752	748	743	738	732	726	719	713	704	698	688	669	648	" 238
613	610	607	603	599	594	588	583	577	572	564	558	540	523	" 239
819	816	811	807	801	794	788	780	774	764	757	746	725	703	S 240
677	674	670	666	662	656	651	644	639	631	623	616	599	581	" 241
535	532	529	526	523	518	513	509	503	499	492	485	471	456	" 242
767	764	759	755	750	745	738	730	724	715	709	698	679	658	S 243
625	622	618	614	611	605	601	594	590	583	577	569	553	536	" 244
482	480	478	474	471	467	463	459	454	450	444	437	425	412	" 245
883	878	875	871	866	859	854	847	838	832	824	816	796	776	S 246
728	725	722	718	713	709	704	699	692	686	680	671	657	638	" 247
573	571	569	566	562	558	555	549	545	541	534	529	515	502	" 248
641	636	632	626	621	612	606	598	590	579	570	560	536	513	S 249
523	519	515	511	505	500	494	488	480	473	465	455	437	416	" 250
404	402	399	395	391	387	381	377	371	364	358	352	337	320	" 251
857	853	849	845	841	834	828	822	816	807	800	792	772	753	S 252
702	699	696	693	688	683	679	674	667	662	656	647	633	615	" 253
547	545	543	540	537	533	530	524	520	516	510	505	492	480	" 254
615	610	606	601	595	587	581	574	566	556	546	537	514	492	S 255
497	493	490	485	480	475	470	464	456	449	441	434	415	396	" 256
378	376	373	369	366	362	357	352	347	341	335	329	315	302	" 257
830	825	822	818	812	806	799	793	784	778	768	760	740	718	S 258
674	671	668	663	659	654	647	642	635	629	621	612	594	576	" 259
520	517	513	511	506	502	497	491	485	481	474	466	451	435	" 260
800	796	791	786	779	772	764	756	746	736	725	713	688	661	S 261
646	642	638	632	627	620	612	605	597	588	579	569	545	523	" 262
492	489	484	480	474	469	464	457	450	441	434	426	407	387	" 263

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

DIMENSIONS & PROPERTIES IN INCH UNITS.

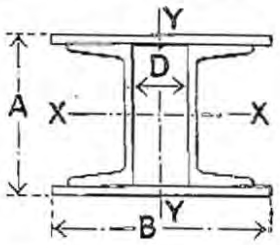
Reference Mark	Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Distance D	Area Square Inches	Radii of Gyration Inches		Section Moduli	
			Channels	Each Flange	Ins.		About X-X	About Y-Y	About X-X	About Y-Y
S 264	20×18	276	17×4	18×1½	9½	80·08	8·42	5·39	567·1	258·6
" 265	19×18	214·5	"	18×1	9½	62·08	7·99	5·45	416·8	204·6
" 266	18×18	153·5	"	18× ½	9½	44·08	7·41	5·54	268·8	150·6
S 267	18×16	239·5	15×4	16×1½	7½	69·39	7·57	4·69	441·6	190·8
" 268	17×16	185	"	16×1	7½	53·39	7·18	4·71	323·4	148·2
" 269	16×16	130·5	"	16× ½	7½	37·39	6·66	4·75	207·4	105·5
S 270	15×14	207·5	12×4	14×1½	5½	60·43	6·20	4·02	309·6	139·6
" 271	14×14	160	"	14×1	5½	46·43	5·84	4·01	226·5	106·9
" 272	13×14	112·5	"	14× ½	5½	32·43	5·40	4·00	145·7	74·2
S 273	15×14	203·5	12×3½H	14×1½	6½	59·19	6·21	4·11	304·3	142·7
" 274	14×14	156	"	14×1	6½	45·19	5·85	4·13	220·8	110·1
" 275	13×14	108·5	"	14× ½	6½	31·19	5·39	4·17	139·7	77·4
S 276	14×14	148	12×3½L	14×1	6½	42·85	5·91	4·10	214·0	108·0
" 277	13×14	100·5	"	14× ½	6½	28·85	5·46	4·13	132·3	70·3
S 278	12×12	133	10×3½	12×1	4½	38·39	4·97	3·43	157·8	75·3
" 279	11×12	92	"	12× ½	4½	26·39	4·57	3·41	100·0	51·3
S 280	12×12	122·5	10×3	12×1	5½	35·34	5·03	3·51	148·9	72·4
" 281	11×12	81·5	"	12× ½	5½	23·34	4·61	3·53	90·2	48·4
S 282	11×12	128·5	9×3½	12×1	4½	37·10	4·55	3·45	139·5	73·4
" 283	10×12	87·5	"	12× ½	4½	25·10	4·17	3·44	87·2	49·4
S 284	11×10	105	9×3	10×1	3½	30·27	4·55	2·82	113·9	48·0
" 285	10×10	71	"	10× ½	3½	20·27	4·16	2·78	70·2	31·3
S 286	10×10	110·5	8×3½	10×1	2½	31·89	4·07	2·75	105·6	48·4
" 287	9×10	76·5	"	10× ½	2½	21·89	3·71	2·69	67·1	31·7
S 288	10×10	102	8×3	10×1	3½	29·39	4·13	2·84	100·0	47·3
" 289	9×10	68	"	10× ½	3½	19·39	3·76	2·81	60·9	30·6
S 290	9×10	107	7×3½	10×1	2½	30·75	3·64	2·78	90·5	47·5
" 291	8×10	73	"	10× ½	2½	20·75	3·30	2·72	56·6	30·8
S 292	9×10	98·5	7×3	10×1	3½	28·36	3·69	2·85	86·0	46·2
" 293	8×10	64·5	"	10× ½	3½	18·36	3·35	2·83	51·6	29·5

COMPOUND STANCHIONS.

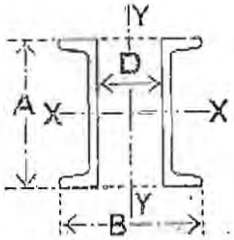
SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 113.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
472	468	465	460	455	449	444	439	431	424	415	407	389	370	S 264
366	364	361	357	353	349	345	340	335	329	323	316	303	289	" 265
260	258	257	254	251	249	245	242	239	234	230	226	216	206	" 266
407	403	399	394	388	383	376	369	359	351	342	334	315	294	S 267
313	310	307	303	299	294	289	284	278	271	265	258	242	226	" 268
219	218	215	213	210	206	203	199	195	190	185	181	171	159	" 269
352	347	342	336	330	323	314	306	297	287	278	269	246	222	S 270
270	267	263	258	253	248	242	235	228	221	213	205	187	169	" 271
189	186	183	180	177	173	169	164	159	154	149	143	131	118	" 272
345	341	336	330	324	318	311	302	294	285	275	267	245	222	S 273
263	260	256	252	248	243	237	231	224	219	211	204	187	171	" 274
182	180	177	175	171	168	164	160	155	151	147	142	130	119	" 275
250	247	243	239	235	230	225	219	213	206	199	192	177	160	S 276
168	166	164	161	159	155	151	147	143	139	135	130	119	109	" 277
221	217	213	208	202	196	189	183	175	167	159	150	133	118	S 278
152	149	146	143	139	135	130	126	120	115	109	103	91	..	" 279
204	200	197	192	187	182	176	170	163	156	148	140	126	112	S 280
135	132	130	127	124	120	116	112	108	104	99	93	83	..	" 281
214	210	206	201	196	190	183	176	169	162	155	146	130	..	S 282
145	142	139	136	132	128	124	119	115	109	104	98	..	..	" 283
171	167	162	156	149	143	136	128	119	111	103	96	..	..	S 284
114	111	108	104	100	95	90	84	79	73	68	63	..	..	" 285
179	175	169	163	157	149	141	132	123	114	106	99	..	..	S 286
123	120	116	111	106	101	95	89	83	77	71	..	..	..	" 287
166	162	157	152	146	139	132	124	117	109	101	94	..	..	S 288
109	107	103	100	96	92	87	82	76	71	66	..	..	..	" 289
174	169	164	158	151	145	137	128	120	111	103	..	..	..	S 290
117	114	110	106	101	96	91	85	79	..	..	..	..	..	" 291
160	157	152	147	141	135	128	121	114	105	98	..	..	..	S 292
104	101	98	95	91	87	83	78	73	..	..	..	..	..	" 293



LATTICED CHANNEL STANCHIONS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

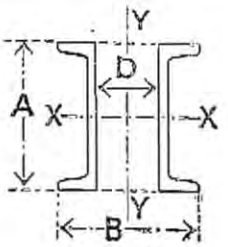
Reference Mark	Size Inches A × B	Channels	Distance D Inches	Area Square Inches	Radii of Gyration Inches		Section Moduli	
					About X-X	About Y-Y	About X-X	About Y-Y
"A" CHANNELS SPACED AS FOR PRECEDING COMPOUND STANCHIONS.								
S 294	17×17½	17×4	9½	26·08	6·32	5·[illegible]	122·4	99·3
" 295	15×15½	15×4	7½	21·39	5·71	4·85	93·1	64·9
S 296	12×13½	12×4	5½	18·43	4·66	3·97	66·7	43·1
" 297	12×13½	12×3½H	6½	17·19	4·58	4·27	60·1	46·4
" 298	12×13½	12×3½L	6½	14·85	4·59	4·21	52·1	39·1
S 299	10×11½	10×3½	4½	14·39	3·90	3·37	43·8	28·4
" 300	10×11½	10×3	5½	11·34	3·82	3·59	33·1	25·4
" 301	9×11½	9×3½	4½	13·10	3·55	3·41	36·7	26·5
" 302	9× 9½	9×3	3½	10·27	3·49	2·67	27·8	15·4
S 303	8× 9½	8×3½	2½	11·89	3·19	2·52	30·3	15·9
" 304	8× 9½	8×3	3½	9·39	3·16	2·78	23·4	14·7
" 305	7× 9½	7×3½	2½	10·75	2·82	2·56	24·5	14·9
" 306	7× 9½	7×3	3½	8·36	2·80	2·77	18·7	13·5
"B" CHANNELS SPACED SO THAT THE LEAST RADIUS OF GYRATION IS ABOUT X-X.								
S 307	17×19	17×4	11	26·08	6·32	6·51	122·4	116·4
" 308	15×18	15×4	10	21·39	5·71	6·07	93·1	87·6
S 309	12×15	12×4	7	18·43	4·66	4·70	66·7	54·2
" 310	12×15	12×3½H	8	17·19	4·58	5·00	60·1	57·3
" 311	12×15	12×3½L	8	14·85	4·59	4·95	52·1	48·4
S 312	10×13	10×3½	6	14·39	3·90	4·09	43·8	37·1
" 313	10×12	10×3	6	11·34	3·82	3·83	33·1	27·8
" 314	9×12	9×3½	5	13·10	3·55	3·65	36·7	29·1
" 315	9×12	9×3	6	10·27	3·49	3·88	27·8	25·7
S 316	8×11	8×3½	4	11·89	3·19	3·22	30·3	22·4
" 317	8×11	8×3	5	9·39	3·16	3·45	23·4	20·3
" 318	7×11	7×3½	4	10·75	2·82	3·26	24·5	20·8
" 319	7×10	7×3	4	8·36	2·80	3·01	18·7	15·1

LATTICED CHANNEL STANCHIONS.

SAFE LOADS IN TONS.

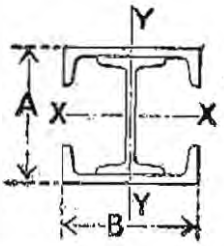
ENDS FIXED.

For other conditions of ends see page 118.



SAFE LOADS IN TONS FOR LENGTHS IN FEET														Reference Mark
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
"A" CHANNELS SPACED AS FOR PRECEDING COMPOUND STANCHIONS.														
154	153	152	151	150	148	146	144	142	140	138	135	130	125	S 294
126	125	123	122	120	118	117	115	112	110	107	104	99	93	" 295
107	106	104	103	101	98	96	93	90	87	84	81	74	67	S 296
100	99	98	96	95	93	91	89	87	84	82	79	73	67	" 297
87	86	84	83	82	80	78	77	74	72	70	68	62	57	" 298
83	81	80	78	75	73	71	68	65	62	59	55	..	..	S 299
66	65	63	62	61	59	57	55	53	51	49	46	..	..	" 300
75	74	73	71	69	67	65	62	60	57	54	..	..	..	" 301
58	56	54	52	50	47	44	41	38	36	33	..	..	..	" 302
66	64	62	59	56	53	49	46	42	..	..	..	..	..	S 303
53	51	50	48	46	44	41	38	36	..	..	..	..	..	" 304
60	58	56	54	51	48	45	..	..	..	..	..	..	..	" 305
47	46	44	43	41	39	37	..	..	..	..	..	..	..	" 306
"B" CHANNELS SPACED SO THAT THE LEAST RADIUS OF GYRATION IS ABOUT X-X.														
155	154	153	152	150	149	148	146	145	143	141	139	135	129	S 307
127	126	125	123	122	121	120	118	116	115	113	111	106	102	" 308
108	107	106	105	103	101	99	98	95	93	91	89	83	77	S 309
101	100	99	97	96	94	92	91	89	87	84	82	77	71	" 310
87	86	85	84	83	82	80	78	77	75	73	71	66	61	" 311
84	82	81	80	78	76	74	72	70	68	65	63	..	..	S 312
66	65	64	63	61	60	58	57	55	53	51	48	..	..	" 313
76	74	73	71	70	68	66	63	61	58	56	..	..	..	" 314
59	58	57	56	54	53	51	49	47	45	43	..	..	..	" 315
68	67	65	63	61	59	57	55	52	..	..	..	..	..	S 316
54	53	51	50	48	47	45	43	41	..	..	..	..	..	" 317
61	59	57	55	53	51	48	..	..	..	..	..	..	..	" 318
47	46	45	43	41	39	37	..	..	..	..	..	..	..	" 319

DORMAN, LONG & CO. LIMITED.



COMPOUND STANCHIONS.

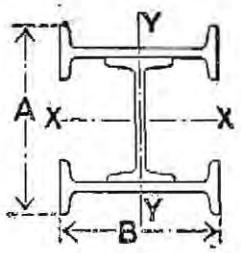
DIMENSIONS AND PROPERTIES IN INCH UNITS.

Reference Mark	Approximate Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches		Area Square Inches	Radii of Gyration Inches		Section Moduli	
			Beam	Channels		About X-X	About Y-Y	About X-X	About Y-Y
S 320	25 ×17	182	24×7½	17×4	52·55	10·65	4·58	477·5	129·5
" 321	24⅞×15	166·5	"	15×4	47·86	10·49	3·98	424·7	101·2
" 322	24⅞×12	156	"	12×4	44·89	10·38	3·20	390·3	76·8
" 323	24¾×12	144	"	12×3½L	41·32	10·35	3·01	358·0	62·2
S 324	23 ×17	167·5	22×7	17×4	48·15	9·79	4·74	402·1	127·2
" 325	22⅞×15	151·5	"	15×4	43·46	9·64	4·12	353·8	98·6
" 326	22⅞×12	141·5	"	12×4	40·49	9·52	3·80	322·2	73·5
" 327	22¾×12	129	"	12×3½L	36·92	9·50	3·10	293·3	59·0
S 328	21 ×17	157·5	20×6½	17×4	45·20	8·97	4·87	347·4	126·2
" 329	20⅞×15	141·5	"	15×4	40·51	8·83	4·25	303·6	97·4
" 330	20⅞×12	131	"	12×4	37·55	8·73	3·39	275·0	72·1
" 331	20¾×12	119	"	12×3½L	33·97	8·72	3·19	249·4	57·6
S 332	19 ×17	172	18×8	17×4	49·61	8·07	4·73	341·1	130·6
" 333	18⅞×15	156·5	"	15×4	44·92	7·96	4·13	302·2	102·3
" 334	18⅞×12	146	"	12×4	41·95	7·87	3·35	276·6	78·3
" 335	18¾×12	134	"	12×3½L	38·38	7·87	3·16	254·5	63·7
S 336	19 ×17	147·5	18×6	17×4	42·26	8·12	5·02	293·6	125·2
" 337	18⅞×15	131·5	"	15×4	37·57	7·98	4·38	254·3	96·2
" 338	18⅞×12	121·5	"	12×4	34·61	7·88	3·50	228·6	70·6
" 339	18¾×12	109	"	12×3½L	31·03	7·88	3·29	206·3	56·1
S 340	17 ×17	167·5	16×8	17×4	48·15	7·20	4·80	294·2	130·4
" 341	16⅞×15	151·5	"	15×4	43·46	7·09	4·20	259·9	102·2
" 342	16⅞×12	141·5	"	12×4	40·49	7·01	3·40	237·2	78·1
" 343	16¾×12	129	"	12×3½L	36·92	7·03	3·21	218·4	63·5
S 344	16⅞×15	126·5	16×6	15×4	36·10	7·12	4·47	217·6	96·1
" 345	16¾×12	104	"	12×3½L	29·56	7·05	3·37	175·8	55·9
" 346	16⅝× 9	88·5	"	9×3	24·98	6·95	2·43	145·3	32·8
S 347	15¾×12	99	15×6	12×3½L	28·09	6·63	3·44	157·2	55·4
" 348	15¾× 9	93	"	9×3½	26·33	6·52	2·65	142·6	41·1
" 349	15⅝× 9	88·5	"	9×3	23·51	6·54	2·48	128·9	32·2

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Approximate Size Inches A × B	Weight per foot lbs.	DIMENSIONS Inches Web Beam	DIMENSIONS Inches Flange Beams	Area Square Inches	Radii of Gyration Inches About X-X	Radii of Gyration Inches About Y-Y	Section Moduli About X-X	Section Moduli About Y-Y
S 350	32 ×24	273·5	24×7½	24×7½	79·40	11·51	7·89	657·1	412·2
" 351	31½×22	243·5	"	22×7	70·59	11·38	6·95	580·8	310·4
" 352	31 ×20	223·5	"	20×6½	64·70	11·27	6·23	531·4	251·3
S 353	30 ×24	258·5	22×7	24×7½	74·99	10·65	8·11	566·9	410·6
" 354	29½×22	228·5	"	22×7	66·19	10·53	7·16	497·9	308·6
" 355	29 ×20	208·5	"	20×6½	60·30	10·43	6·43	453·2	249·3
S 356	27½×22	218·5	20×6½	22×7	63·25	9·69	7·32	432·3	307·8
" 357	27 ×20	198·5	"	20×6½	57·36	9·60	6·58	392·5	248·5
" 358	26⅛×18	178·5	"	18×6	51·48	9·50	5·77	351·8	190·7
S 359	25½×22	233·5	18×8	22×7	67·65	8·72	7·11	403·9	311·2
" 360	25 ×20	213·5	"	20×6½	61·76	8·64	6·39	369·6	252·2
" 361	26½×18	243·5	"	18×8	70·58	8·79	6·13	411·8	294·8
" 362	24½×18	193·5	"	18×6	55·89	8·55	5·60	334·5	194·8
" 363	26½×16	233·5	"	16×8	67·65	8·76	5·46	392·5	252·2
" 364	24½×16	183·5	"	16×6	52·94	8·50	4·97	313·6	163·2
S 365	25 ×20	188·5	18×6	20×6½	54·42	8·74	6·75	333·5	247·6
" 366	24½×18	168·5	"	18×6	48·55	8·65	5·93	297·6	189·7
" 367	24½×16	158·5	"	16×6	45·59	8·61	5·26	276·7	157·5
S 368	23 ×20	208·5	16×8	20×6½	60·30	7·75	6·47	316·0	252·1
" 369	24½×18	238·5	"	18×8	69·12	7·90	6·19	352·3	294·7
" 370	22½×18	188·5	"	18×6	54·43	7·67	5·67	285·7	194·6
" 371	24½×16	228·5	"	16×8	66·19	7·88	5·52	335·5	252·0
" 372	22½×16	178·5	"	16×6	51·47	7·63	5·03	267·5	163·1
" 373	22⅜×15	168·5	"	15×6	48·54	7·58	4·66	249·3	140·3
S 374	23 ×20	183·5	16×6	20×6½	52·94	7·86	6·84	285·0	247·5
" 375	22½×18	163·5	"	18×6	47·07	7·78	6·02	254·0	189·6
" 376	22½×16	153·5	"	16×6	44·12	7·74	5·34	235·8	157·3
S 377	21½×18	158·5	15×6	18×6	45·60	7·35	6·11	230·0	189·3
" 378	21½×16	148·5	"	16×6	42·65	7·31	5·43	213·1	157·0
" 379	21⅜×15	138·5	"	15×6	39·71	7·27	5·03	196·2	133·8

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR SINGLE EQUAL ANGLES. ENDS FIXED.

For other conditions of ends see page 118.

Size and Thickness	LENGTHS IN FEET											
	2	3	4	5	6	7	8	9	10	12	14	16
9 × 9 × 9/16	58·5	58·0	57·4	56·6	55·8	54·8	53·5	52·1	50·8	47·4	43·9	39·6
" " 11/16	70·9	70·4	69·6	68·7	67·5	66·5	65·0	63·8	61·4	57·6	52·9	48·0
" " 13/16	83·2	82·6	81·7	80·6	79·2	77·7	76·2	74·2	72·0	67·2	62·1	55·9
8 × 8 × 5/8	57·2	56·6	55·8	55·0	53·8	52·6	51·1	49·4	47·7	43·6	39·1	34·5
" " 3/4	68·1	67·4	66·4	65·4	64·0	62·4	60·8	58·7	56·5	51·9	46·5	40·7
" " 7/8	78·8	78·0	76·9	75·7	74·1	72·2	70·1	68·0	65·3	60·1	53·4	47·1
6 × 6 × 1/2	34·0	33·4	32·6	31·7	30·6	29·2	27·7	26·1	24·3	20·6	17·2	..
" " 5/8	42·0	41·3	40·3	39·2	37·6	36·0	34·2	32·3	29·9	25·3	21·1	..
" " 3/4	49·8	49·0	47·9	46·5	44·7	42·7	40·6	38·0	35·4	29·8	25·1	..
5 × 5 × 3/8	21·2	20·7	20·0	19·2	18·2	17·1	15·7	14·3	13·0	10·5	..	..
" " 1/2	27·9	27·2	26·4	25·3	23·8	22·3	20·7	18·7	16·9	13·6	..	..
" " 5/8	34·4	33·6	32·5	31·0	29·4	27·6	25·4	23·1	20·7	16·8	..	..
4 × 4 × 3/8	16·6	16·0	15·2	14·1	13·0	11·5	10·2	9·0	7·8	..	..	..
" " 1/2	21·8	21·0	19·9	18·5	16·9	15·1	13·2	11·6	10·1	..	..	..
" " 5/8	26·8	25·7	24·4	22·6	20·8	18·5	16·3	14·2	12·5	..	..	..
3½ × 3½ × 5/16	12·0	11·5	10·7	9·7	8·6	7·4	6·4	5·5	..	..	..	..
" " 3/8	14·3	13·6	12·6	11·5	10·2	8·8	7·6	6·5	..	..	..	..
" " 1/2	18·7	17·8	16·5	15·0	13·3	11·5	9·8	8·4	..	..	..	..
3 × 3 × 1/4	8·2	7·6	6·9	6·1	5·1	4·3	..	..	..	..	..	..
" " 5/16	10·1	9·4	8·6	7·5	6·3	5·3	..	..	..	..	..	..
" " 3/8	12·0	11·2	10·1	8·9	7·4	6·2	..	..	..	..	..	..
" " 1/2	15·6	14·6	13·2	11·5	9·6	8·1	..	..	..	..	..	..
2¾ × 2¾ × 1/4	7·4	6·8	6·0	5·1	4·3	3·5	..	..	..	..	..	..
" " 3/8	10·8	9·9	8·8	7·4	6·1	5·1	..	..	..	..	..	..
2½ × 2½ × 3/16	5·0	4·5	3·9	3·2	2·6	..	..	..	..	..	..	..
" " 1/4	6·6	6·0	5·1	4·2	3·4	..	..	..	..	..	..	..
" " 5/16	8·1	7·3	6·3	5·2	4·2	..	..	..	..	..	..	..
" " 3/8	9·6	8·6	7·5	6·1	4·9	..	..	..	..	..	..	..
2¼ × 2¼ × 3/16	4·4	3·9	3·2	2·6	..	..	..	..	..	..	..	..
" " 1/4	5·8	5·1	4·2	3·3	..	..	..	..	..	..	..	..
" " 5/16	7·1	6·3	5·2	4·1	..	..	..	..	..	..	..	..
" " 3/8	8·4	7·4	6·1	4·8	..	..	..	..	..	..	..	..
2 × 2 × 3/16	3·3	3·2	2·5	1·9	..	..	..	..	..	..	..	..
" " 1/4	5·0	4·2	3·3	2·5	..	..	..	..	..	..	..	..
" " 5/16	6·1	5·2	4·0	3·1	..	..	..	..	..	..	..	..
1¾ × 1¾ × 3/16	3·2	2·5	1·9	..	..	..	..	..	..	..	..	..
" " 1/4	4·1	3·3	2·4	..	..	..	..	..	..	..	..	..
" " 5/16	5·0	4·1	3·0	..	..	..	..	..	..	..	..	..
1½ × 1½ × 3/16	2·5	1·8	..	..	..	..	..	..	..	..	..	..
" " 1/4	3·3	2·4	..	..	..	..	..	..	..	..	..	..
1¼ × 1¼ × 3/16	1·9	1·2	..	..	..	..	..	..	..	..	..	..
" " 1/4	2·4	1·6	..	..	..	..	..	..	..	..	..	..

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR SINGLE UNEQUAL ANGLES.

ENDS FIXED.

For other conditions of ends see page 113.

Size and Thickness	LENGTHS IN FEET									
	2	3	4	5	6	7	8	9	10	12
10 × 4 × 7/16	34·6	33·5	31·9	30·0	27·7	25·3	22·4	19·9	17·5	..
" " 1/2	44·1	42·5	40·6	38·1	35·3	32·0	28·3	25·1	22·1	..
" " 11/16	53·4	51·5	49·0	46·1	42·5	38·4	34·3	30·2	26·5	..
9 × 4 × 7/16	32·1	31·0	29·7	27·9	26·0	23·6	21·1	18·7	16·6	..
" " 5/8	45·1	43·6	41·6	39·1	36·4	33·0	29·4	26·1	23·0	..
" " 13/16	57·7	55·9	53·3	50·1	46·3	42·2	37·4	33·2	29·2	..
8 × 6 × 1/2	40·0	39·4	38·7	37·8	36·6	35·3	33·8	32·1	30·4	26·6
" " 5/8	49·5	48·8	47·9	46·7	45·3	43·7	41·7	39·8	37·7	32·6
" " 3/4	58·8	58·0	56·8	55·5	53·8	51·7	49·5	47·0	44·5	38·5
8 × 4 × 7/16	29·5	28·6	27·4	25·8	24·1	22·0	19·8	17·5	15·6	..
" " 5/8	41·5	40·1	38·4	36·2	33·8	30·8	27·5	24·2	21·5	..
" " 3/4	49·2	47·6	45·5	42·9	39·7	36·3	32·4	28·8	25·3	..
7 × 3½ × 5/8	35·7	34·2	32·2	29·8	26·9	23·7	20·7	17·9	..	..
" " 3/4	42·3	40·6	38·2	35·2	31·9	28·1	24·3	21·2	..	..
6 × 4 × 1/2	27·8	26·9	25·7	24·3	22·6	20·7	18·7	16·6	14·7	..
" " 5/8	34·2	33·2	31·8	30·0	27·9	25·5	22·9	20·3	18·0	..
6 × 3½ × 1/2	26·1	25·0	23·6	21·9	19·9	17·6	15·3	13·4	11·7	..
" " 5/8	32·1	30·9	29·1	26·8	24·3	21·5	18·7	16·3	..	..
6 × 3 × 1/2	24·3	22·9	21·1	18·9	16·3	13·9	11·8	..	..	..
" " 5/8	29·9	28·3	26·0	23·1	19·9	17·0	14·4	..	..	..
5 × 4 × 1/2	24·8	24·0	22·9	21·6	20·0	18·3	16·3	14·5	12·7	..
" " 5/8	30·5	29·5	28·3	26·5	24·6	22·5	19·9	17·7	15·7	..
5 × 3½ × 1/2	23·2	22·3	21·0	19·4	17·7	15·6	13·6	11·9	10·4	..
" " 5/8	28·5	27·4	25·7	23·8	21·6	19·1	16·6	14·5	..	..
5 × 3 × 1/2	21·4	20·3	18·7	16·8	14·5	12·5	10·6	..	..	..
" " 5/8	26·4	24·9	23·0	20·6	17·9	15·2	12·9	..	..	..
4 × 3½ × 1/2	20·2	19·4	18·1	16·7	14·9	13·1	11·3	9·8	..	..
" " 5/8	24·3	23·7	22·2	20·3	18·3	15·9	13·8	11·9	..	..
4 × 3 × 5/16	12·0	11·3	10·4	9·4	8·1	6·9	5·9	..	..	..
" " 3/8	14·2	13·5	12·4	11·1	9·6	8·2	7·0	..	..	..
" " 1/2	18·6	17·5	16·1	14·5	12·5	10·6	9·0	..	..	..
3½ × 3 × 5/16	11·0	10·4	9·5	8·5	7·3	6·2	5·2	..	..	..
" " 3/8	13·1	12·4	11·3	10·1	8·6	7·3	6·2	..	..	..
" " 1/2	17·1	16·1	14·7	13·1	11·2	9·5	8·1	..	..	..
3½ × 2½ × 5/16	10·0	9·2	8·2	6·9	5·7	4·7	..	..	..	..
" " 3/8	11·8	10·9	9·7	8·2	6·7	5·6	..	..	..	..
" " 1/2	15·4	14·2	12·6	10·6	8·8	7·2	..	..	..	..
3 × 2½ × 1/4	7·4	6·7	6·0	5·0	4·1	..	..	..	..	..
" " 5/16	9·1	8·3	7·4	6·1	5·0	..	..	..	..	..
" " 3/8	10·7	9·8	8·7	7·3	5·9	..	..	..	..	..
3 × 2 × 1/4	6·4	5·7	4·6	3·6	..	..	..	..	..	..
" " 5/16	7·9	6·9	5·7	4·5	..	..	..	..	..	..
" " 3/8	9·4	8·2	6·7	5·2	..	..	..	..	..	..
2½ × 2 × 1/4	5·7	5·0	4·0	3·2	..	..	..	..	..	..
" " 5/16	7·0	6·1	5·0	3·9	..	..	..	..	..	..
" " 3/8	8·3	7·2	5·8	4·6	..	..	..	..	..	..
2½ × 1½ × 3/16	3·6	2·8	2·0	..	..	..	..	..	..	..
" " 1/4	5·7	4·4	3·2	..	..	..	..	..	..	..
2 × 1½ × 3/16	3·1	2·4	1·7	..	..	..	..	..	..	..
" " 5/16	4·9	3·8	2·7	..	..	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

TEES AS STRUTS.

SAFE LOADS IN TONS FOR TEES.

ENDS FIXED.

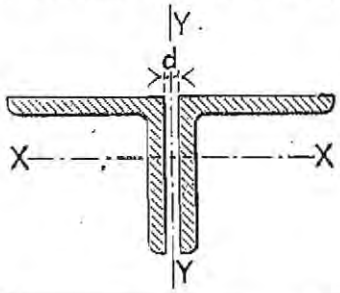
For other conditions of ends see page 113.

Size and Thickness	LENGTHS IN FEET									
	2	3	4	5	6	7	8	9	10	12
6 × 6 × ½	34·1	33·6	32·9	32·0	30·9	29·6	28·2	26·7	25·0	21·4
" " ⅝	42·2	41·5	40·6	39·5	38·3	36·8	35·0	33·3	31·3	26·7
6 × 4 × ½	28·2	27·7	26·9	26·1	25·0	23·9	22·6	21·1	19·6	16·3
" " ⅝	34·7	34·1	33·2	32·1	30·8	29·3	27·6	25·8	23·9	19·9
5 × 4 × ½	25·2	24·7	24·0	23·2	22·2	21·1	19·8	18·3	16·8	13·9
" " ⅝	31·0	30·3	29·5	28·6	27·4	26·0	24·5	22·9	21·0	17·4
5 × 3 × ⅜	16·8	16·2	15·5	14·6	13·5	12·3	10·9	9·6	8·5	..
" " ½	22·0	21·2	20·2	19·0	17·5	15·8	14·0	12·4	10·9	..
4 × 3 × ⅜	14·6	14·1	13·5	12·8	12·0	11·0	9·8	8·7	7·8	..
" " ½	19·1	18·5	17·7	16·7	15·4	14·1	12·6	11·2	9·9	..
3 × 3 × $\frac{5}{16}$	10·2	9·6	8·7	7·8	6·6	5·6	4·8	..	..	..
" " ⅜	12·1	11·4	10·4	9·3	8·0	6·7	5·7	..	..	..
" " $\frac{7}{16}$	14·0	13·2	12·0	10·8	9·3	7·9	6·7	..	..	..
2½ × 2½ × ¼	6·7	6·1	5·3	4·4	3·6	..	..	..	..	..
" " $\frac{5}{16}$	8·2	7·5	6·6	5·5	4·5	..	..	..	..	..
" " ⅜	9·8	8·9	7·9	6·6	5·5	..	..	..	..	..
2 × 2 × ¼	5·1	4·4	3·5	2·7	...	..	..	..	..	..
" " $\frac{5}{16}$	6·2	5·4	4·4	3·4	..	..	..	..	..	..
" " ⅜	7·4	6·5	5·3	4·2	..	..	..	..	..	..
1½ × 1½ × $\frac{3}{16}$	2·6	2·0	1·4	..	..	..	..	..	..	..
" " ¼	3·4	2·6	1·9	..	..	..	..	..	..	..

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO EQUAL ANGLES. CONNECTED TOGETHER AT INTERVALS. ENDS FIXED.

For other conditions of ends see page 113.



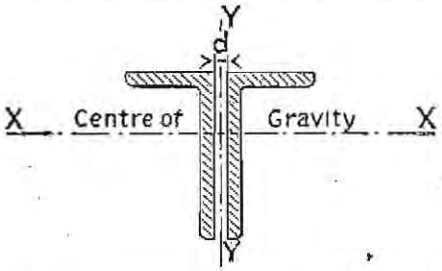
Size and Thickness	d	Radii of Gyration		LENGTHS IN FEET							
		About X-X	About Y-Y	3	4	5	6	8	10	12	16
9 × 9 × 5/8	5/8	2·79	3·90	117·0	116·5	115·7	115·0	113·2	110·7	107·8	100·8
" " 1/2	1/2	2·77	3·93	141·9	141·3	140·4	139·5	137·1	134·3	130·8	122·3
" " 7/16	7/16	2·76	3·96	166·5	165·8	164·7	163·7	160·8	157·6	153·5	142·7
8 × 8 × 5/8	5/8	2·46	3·52	114·4	113·8	113·0	112·1	109·6	106·6	103·4	94·4
" " 3/4	5/8	2·45	3·55	136·1	135·3	134·3	133·4	130·5	126·9	122·6	112·3
" " 7/8	5/8	2·43	3·57	157·5	156·5	155·4	154·1	151·0	146·9	141·8	129·3
6 × 6 × 1/2	5/8	1·84	2·70	68·0	67·4	66·5	65·6	63·2	60·1	56·5	47·9
" " 5/8	5/8	1·83	2·73	84·1	83·3	82·2	81·1	77·9	74·0	69·5	58·8
" " 3/4	5/8	1·81	2·75	99·8	98·9	97·6	96·0	92·4	87·8	82·4	69·2
5 × 5 × 3/8	1/2	1·54	2·23	42·5	41·9	41·2	40·3	38·2	35·5	32·3	25·3
" " 1/2	1/2	1·52	2·26	55·9	55·2	54·2	53·1	50·1	46·4	42·6	33·0
" " 5/8	1/2	1·51	2·29	68·9	67·9	66·7	65·2	61·5	57·3	52·1	40·3
4 × 4 × 3/8	1/2	1·22	1·84	33·3	32·6	31·7	30·6	27·9	24·9	21·2	..
" " 1/2	1/2	1·21	1·86	43·7	42·7	41·5	40·0	36·5	32·5	27·6	..
" " 5/8	1/2	1·19	1·89	53·7	52·4	51·0	49·2	44·8	39·3	33·4	..
3½ × 3½ × 5/8	3/8	1·07	1·58	24·1	23·5	22·7	21·7	19·2	16·3	13·4	..
" " 3/8	3/8	1·06	1·59	28·7	27·9	26·8	25·6	22·8	19·2	15·8	..
" " 1/2	3/8	1·05	1·62	37·5	36·4	35·1	33·4	29·5	24·8	20·5	..
3 × 3 × 1/4	3/8	·91	1·37	16·4	15·8	15·0	14·0	11·9	9·6	..	..
" " 5/16	3/8	·91	1·38	20·2	19·5	18·5	17·4	14·6	11·7	..	..
" " 3/8	3/8	·90	1·40	24·0	23·1	22·0	20·5	17·3	13·8	..	..
" " 1/2	3/8	·89	1·42	31·3	30·0	28·5	26·6	22·2	17·7	..	..
2¾ × 2¾ × 1/4	3/8	·84	1·27	14·8	14·2	13·3	12·4	10·0	..	..	..
" " 3/8	3/8	·82	1·30	21·6	20·7	19·4	18·0	14·4	..	..	..
2½ × 2½ × 1/4	3/8	·76	1·17	13·2	12·5	11·6	10·6	8·2	..	..	..
" " 5/16	3/8	·75	1·18	16·3	15·4	14·2	12·9	10·0	..	..	..
" " 3/8	3/8	·74	1·20	19·3	18·2	16·8	15·2	11·7	..	..	..
2¼ × 2¼ × 1/4	3/8	·68	1·07	11·6	10·8	9·8	8·7	6·4	..	..	..
" " 5/16	3/8	·67	1·09	14·3	13·3	12·1	10·7	7·8	..	..	..
" " 3/8	3/8	·67	1·10	16·9	15·7	14·2	12·5	9·2	..	..	..
2 × 2 × 3/16	3/8	·60	·96	7·6	6·9	6·2	5·3	..	..	..	..
" " 1/4	3/8	·60	·97	10·0	9·1	8·1	6·8	..	..	..	..
" " 5/16	3/8	·59	·99	12·2	11·1	9·8	8·3	..	..	..	..
1¾ × 1¾ × 3/16	3/8	·52	·86	6·4	5·7	4·8	3·9	..	..	..	..
" " 1/4	3/8	·52	·88	8·3	7·4	6·2	5·0	..	..	..	..
" " 5/16	3/8	·51	·89	10·2	9·0	7·5	6·1	..	..	..	..
1½ × 1½ × 3/16	3/8	·45	·76	5·1	4·3	3·4	..	..	..	..	..
" " 1/4	3/8	·44	·78	6·6	5·5	4·4	..	..	..	..	..
1¼ × 1¼ × 3/16	3/8	·37	·67	3·8	2·9	..	..	..	..	..	..
" " 1/4	3/8	·36	·69	4·9	3·7	..	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO UNEQUAL ANGLES, LONG LEGS CONNECTED TOGETHER AT INTERVALS. ENDS FIXED.

For other conditions of ends see page 113.



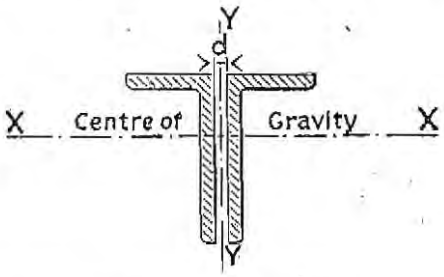
Size and Thickness	d	Radii of Gyration		LENGTHS IN FEET							
		X-X	Y-Y	4	6	8	10	12	14	16	18
10×4 ×7/16	5/8	3·23	1·45	68·6	65·6	61·7	56·8	51·0	44·8	38·8	33·8
" " 1/2	5/8	3·21	1·48	87·6	83·9	79·0	73·1	66·3	58·1	50·6	44·2
" " 9/16	5/8	3·20	1·51	106·1	101·9	96·1	89·4	81·4	72·1	62·9	54·9
9×4 ×7/16	5/8	2·90	1·50	63·7	61·2	57·7	53·4	48·6	42·9	37·5	32·7
" " 1/2	5/8	2·88	1·54	89·8	86·4	81·9	76·0	69·7	61·9	54·6	47·6
" " 9/16	5/8	2·86	1·59	115·3	111·2	105·7	98·7	90·4	81·2	71·6	63·1
8×6 ×1/2	5/8	2·54	2·50	79·9	78·7	77·2	75·1	72·6	69·9	66·6	63·1
" " 5/8	5/8	2·52	2·52	99·0	97·5	95·6	93·0	90·2	86·6	82·9	78·6
" " 3/4	5/8	2·51	2·55	117·7	115·9	113·6	110·6	107·3	103·0	98·6	93·5
8×4 ×7/16	5/8	2·58	1·56	58·7	56·6	53·5	49·9	45·9	40·8	36·0	31·4
" " 5/8	5/8	2·55	1·60	82·7	79·8	75·9	70·9	65·3	58·8	51·9	45·7
" " 3/4	5/8	2·54	1·63	98·4	95·0	90·4	84·5	78·4	70·9	62·6	55·6
7×3½×1/2	5/8	2·24	1·42	57·7	55·1	51·6	47·3	42·3	37·1	32·1	27·7
" " 5/8	5/8	2·22	1·45	71·4	68·3	64·2	59·1	53·4	46·6	40·7	35·1
" " 3/4	5/8	2·21	1·48	84·8	81·1	76·4	70·7	64·2	56·6	49·0	42·7
6×4 ×3/8	1/2	1·91	1·64	42·1	40·6	38·7	36·4	33·6	30·6	27·0	23·8
" " 1/2	1/2	1·90	1·67	55·4	53·6	51·1	48·1	44·7	40·5	36·2	32·1
" " 5/8	1/2	1·88	1·70	68·5	66·3	63·3	59·6	55·4	50·7	45·4	40·3
6×3½×3/8	1/2	1·92	1·41	39·5	37·7	35·3	32·4	29·0	25·2	21·8	18·8
" " 1/2	1/2	1·91	1·44	52·0	49·8	46·6	43·1	38·7	33·7	29·2	25·4
" " 5/8	1/2	1·89	1·47	64·2	61·5	58·0	53·4	48·3	42·2	36·9	32·1
6×3 ×5/16	1/2	1·93	1·17	30·8	28·9	26·1	23·0	19·3	16·3	13·6	..
" " 3/8	1/2	1·92	1·19	36·8	34·4	31·3	27·6	23·4	19·7	16·6	..
" " 1/2	1/2	1·91	1·22	48·5	45·5	41·5	37·0	31·5	26·6	22·4	..
" " 5/8	1/2	1·89	1·25	59·9	56·3	51·7	46·3	39·9	33·9	28·6	..
5×4 ×5/16	1/2	1·57	1·71	31·6	30·4	28·9	26·9	24·8	22·1	19·5	..
" " 3/8	1/2	1·57	1·73	37·6	36·2	34·4	32·1	29·4	26·3	23·2	..
" " 1/2	1/2	1·56	1·76	49·4	47·6	45·0	42·0	38·3	34·3	30·2	..
" " 5/8	1/2	1·54	1·79	60·8	58·5	55·4	51·4	47·2	41·9	36·6	..
5×3½×5/16	1/2	1·59	1·47	29·6	28·4	26·8	24·8	22·3	19·7	17·2	..
" " 3/8	1/2	1·58	1·49	35·3	33·9	32·0	29·5	26·8	23·6	20·6	..
" " 1/2	1/2	1·57	1·52	46·4	44·7	42·2	39·1	35·6	31·5	27·5	..
" " 5/8	1/2	1·55	1·55	57·2	55·0	52·1	48·4	44·4	39·4	34·7	..
5×3 ×5/16	1/2	1·60	1·24	27·4	25·8	23·7	21·1	18·1	15·4	13·0	..
" " 3/8	1/2	1·59	1·26	32·7	30·9	28·4	25·4	21·8	18·5	15·7	..
" " 1/2	1/2	1·58	1·29	43·0	40·6	37·4	33·8	29·3	24·9	21·4	..
" " 5/8	1/2	1·56	1·32	52·9	50·1	46·4	42·1	36·6	31·4	26·9	..

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO UNEQUAL ANGLES, LONG LEGS CONNECTED TOGETHER AT INTERVALS. ENDS FIXED.

For other conditions of ends see page 113.



Size and Thickness	d	Radii of Gyration		LENGTHS IN FEET							
		X-X	Y-Y	2	3	4	5	6	8	10	12
4 × 3½ × 5/16	½	1·24	1·57	26·6	26·2	25·6	25·0	24·2	22·2	19·9	17·0
" " 3/8	½	1·24	1·58	31·6	31·2	30·5	29·7	28·7	26·2	23·5	20·2
" " ½	½	1·22	1·61	41·4	40·8	39·9	38·9	37·5	34·4	30·5	26·0
" " 5/8	½	1·21	1·64	50·8	50·0	48·9	47·5	45·9	42·0	37·2	31·6
4 × 3 × 5/16	½	1·26	1·32	24·8	24·4	23·9	23·3	22·6	20·7	18·6	15·9
" " 3/8	½	1·25	1·34	29·4	29·0	28·4	27·7	26·7	24·5	22·0	18·9
" " ½	½	1·24	1·37	38·5	37·9	37·1	36·1	35·0	31·9	28·5	24·5
" " 5/8	½	1·22	1·40	47·1	46·5	45·4	44·2	42·7	39·1	34·7	29·6
3½ × 3 × ¼	3/8	1·09	1·31	18·4	18·1	17·6	17·0	16·3	14·5	12·4	..
" " 5/16	3/8	1·08	1·33	22·8	22·4	21·8	21·0	20·1	17·9	15·2	..
" " 3/8	3/8	1·08	1·34	27·1	26·6	25·8	24·9	23·8	21·2	18·1	..
" " ½	3/8	1·06	1·37	35·4	34·6	33·7	32·5	31·0	27·6	23·2	..
3½ × 2½ × ¼	3/8	1·10	1·07	17·0	16·6	16·1	15·6	14·9	13·2	11·2	..
" " 5/16	3/8	1·10	1·08	21·0	20·6	20·0	19·3	18·5	16·4	14·0	..
" " 3/8	3/8	1·09	1·10	24·9	24·4	23·7	22·9	22·0	19·6	16·8	..
" " ½	3/8	1·08	1·13	32·4	31·8	30·9	29·8	28·5	25·4	21·7	..
3 × 2½ × ¼	3/8	·93	1·11	15·4	15·0	14·4	13·8	13·0	11·0	8·9	..
" " 5/16	3/8	·93	1·13	19·0	18·5	17·8	16·9	15·9	13·5	10·9	..
" " 3/8	3/8	·92	1·14	22·5	21·9	21·1	20·1	18·9	16·0	12·8	..
" " ½	3/8	·91	1·17	29·3	28·4	27·4	26·0	24·4	20·5	16·5	..
3 × 2 × ¼	3/8	·94	·87	13·9	13·5	12·9	12·2	11·4	9·4	7·5	..
" " 5/16	3/8	·94	·89	17·1	16·7	16·0	15·2	14·2	11·8	9·4	..
" " 3/8	3/8	·93	·91	20·3	19·7	19·0	18·1	17·0	14·2	11·4	..
" " ½	3/8	·92	·94	26·4	25·7	24·7	23·5	22·1	18·6	15·0	..
2½ × 2 × ¼	3/8	·77	·92	12·3	11·9	11·3	10·4	9·6	7·5	..	..
" " 5/16	3/8	·77	·94	15·2	14·6	13·8	12·9	11·7	9·2	..	..
" " 3/8	3/8	·76	·95	17·9	17·3	16·3	15·1	13·8	10·7	..	..
2½ × 1½ × 3/16	3/8	·79	·67	8·2	7·8	7·2	6·6	5·8	4·3	..	..
" " 5/16	3/8	·78	·70	18·8	12·7	11·9	10·9	9·8	7·8	..	..
" " 3/8	3/8	·77	·72	15·7	15·0	14·1	13·0	11·7	8·9	..	..
2 × 1½ × 3/16	3/8	·62	·71	7·1	6·7	6·1	5·4	4·7	..	..	..
" " ¼	3/8	·61	·73	9·3	8·7	8·0	7·1	6·1	..	..	..
" " 5/16	3/8	·61	·75	11·4	10·7	9·7	8·6	7·4	..	..	..

DORMAN, LONG & CO. LIMITED.

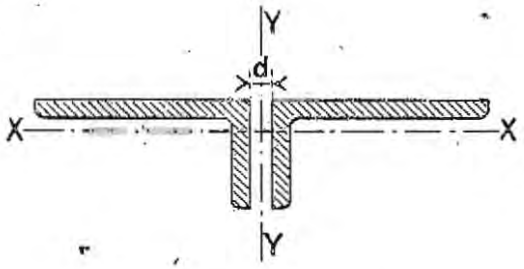
ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO UNEQUAL ANGLES,

SHORT LEGS CONNECTED TOGETHER AT INTERVALS.

ENDS FIXED.

For other conditions of ends see page 113.



Size and Thickness	d	Radius of Gyration X-X	LENGTHS IN FEET								
			3	4	5	6	7	8	9	10	12
8×6 ×½	⅝	1·77	79·8	79·0	77·9	76·6	75·1	73·7	71·8	69·6	65·3
" " ⅝	⅝	1·75	98·7	97·8	96·5	94·8	93·0	90·9	88·5	86·2	80·4
" " ¾	⅝	1·74	117·4	116·1	114·7	112·7	110·6	108·1	105·2	102·1	95·1
8×4 ×⅞	⅝	1·07	58·4	56·8	54·8	52·4	49·4	46·5	43·1	39·5	32·5
" " ⅝	⅝	1·05	82·0	79·6	76·7	73·3	69·1	64·9	59·7	54·6	44·9
" " ¾	⅝	1·04	97·2	94·5	90·7	86·7	81·6	76·6	70·3	64·3	52·8
7×3½×½	⅝	·92	57·0	55·0	52·8	49·1	45·7	41·7	37·4	33·5	..
" " ⅝	⅝	·91	70·4	67·6	64·2	60·3	56·0	51·0	45·8	40·7	..
" " ¾	⅝	·90	83·2	80·1	75·8	71·1	65·9	60·0	53·8	47·8	..
6×4 ×⅜	½	1·15	41·9	40·9	39·7	38·1	36·4	34·4	32·3	29·8	25·0
" " ½	½	1·13	55·1	53·8	52·1	50·1	47·6	45·0	42·3	39·0	32·7
" " ⅝	½	1·12	67·9	66·1	64·0	61·5	58·4	55·1	51·8	47·7	39·9
6×3½×⅜	½	·97	39·2	37·8	36·2	34·3	32·0	29·6	26·9	24·1	..
" " ½	½	·96	51·5	49·8	47·4	44·9	41·8	38·7	34·9	31·5	..
" " ⅝	½	·95	63·4	61·2	58·5	55·0	51·3	47·0	42·6	38·1	..
6×3 ×⅝	½	·80	30·5	29·0	27·1	24·9	22·4	19·8	17·5	15·3	..
" " ⅜	½	·80	36·3	34·5	32·3	29·7	26·5	23·4	20·6	18·1	..
" " ½	½	·78	47·6	45·2	42·2	38·6	34·6	30·5	26·6	23·4	..
" " ⅝	½	·77	58·5	55·4	51·4	47·2	41·9	36·9	32·2	28·3	..
5×4 ×⅝	½	1·19	31·6	30·9	30·0	28·9	27·6	26·3	24·8	23·2	19·7
" " ⅜	½	1·18	37·7	36·7	35·7	34·4	32·9	31·3	29·5	27·6	23·2
" " ½	½	1·17	49·4	48·2	46·9	45·2	43·0	40·9	38·6	36·0	30·2
" " ⅝	½	1·16	60·8	59·4	57·5	55·4	52·7	50·1	47·2	43·6	36·9
5×3½×⅝	½	1·01	29·4	28·6	27·4	26·0	24·5	22·8	20·8	18·8	..
" " ⅜	½	1·01	35·0	33·9	32·5	30·9	29·2	27·1	24·8	22·4	..
" " ½	½	·99	46·0	44·5	42·7	40·5	37·9	35·1	32·0	29·0	..
" " ⅝	½	·98	56·5	54·6	52·3	49·6	46·3	42·9	39·1	35·3	..

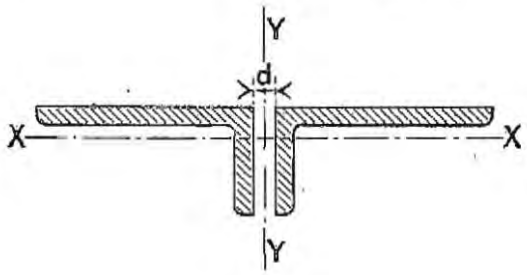
ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO UNEQUAL ANGLES,

SHORT LEGS CONNECTED TOGETHER AT INTERVALS.

ENDS FIXED.

For other conditions of ends see page 118.



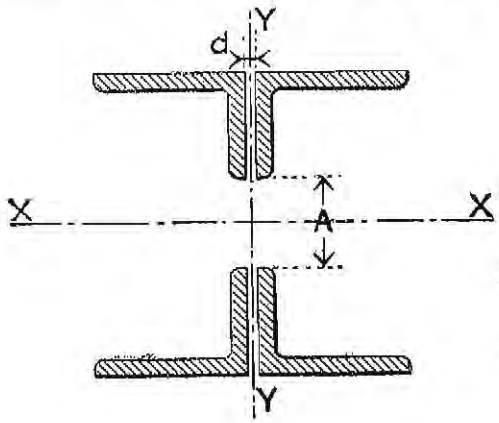
Size and Thicknesss	d	Radius of Gyration X-X	LENGTHS IN FEET							
			3	4	5	6	7	8	9	10
5 ×3 × 5/16	½	·84	27·1	25·9	24·3	22·6	20·5	18·3	16·2	14·3
" " ⅜	½	·83	32·3	30·8	28·9	26·7	24·4	21·6	19·2	16·9
" " ½	½	·82	42·2	40·2	37·8	34·9	31·5	28·1	24·7	21·7
" " ⅝	½	·81	51·8	49·4	46·2	42·6	38·4	33·9	29·9	26·3
4 ×3½ × 5/16	½	1·05	25·9	25·2	24·3	23·1	21·9	20·5	18·9	17·3
" " ⅜	½	1·04	30·8	29·9	28·8	27·5	25·9	24·3	22·3	20·4
" " ½	½	1·03	40·3	39·1	37·7	35·8	33·7	31·6	28·9	26·4
" " ⅝	½	1·02	49·5	48·0	46·1	43·7	41·1	38·5	35·2	31·9
4 ×3 × 5/16	½	·87	28·7	22·7	21·5	20·0	18·5	16·6	14·7	13·1
" " ⅜	½	·87	28·1	27·0	25·5	23·8	21·8	19·6	17·4	15·6
" " ½	½	·85	36·8	35·2	33·2	30·9	28·3	25·4	22·5	20·0
" " ⅝	½	·84	45·0	43·0	40·5	37·5	34·3	30·6	27·2	23·9
3½ ×3 × ¼	⅜	·90	17·8	17·1	16·2	15·2	14·0	12·7	11·3	10·1
" " 5/16	⅜	·89	22·0	21·1	20·0	18·7	17·3	15·6	14·0	12·4
" " ⅜	⅜	·88	26·1	25·1	23·7	22·2	20·4	18·5	16·5	14·6
" " ½	⅜	·87	34·0	32·6	30·8	28·7	26·5	23·8	21·2	18·8
3½ ×2½ × ¼	⅜	·72	15·9	14·9	13·8	12·4	10·8	9·4	..	..
" " 5/16	⅜	·71	19·7	18·4	16·9	15·2	13·2	11·5	..	..
" " ⅜	⅜	·71	23·3	21·8	20·0	17·9	15·5	13·6	..	..
" " ½	⅜	·70	30·2	28·2	25·9	23·1	19·9	17·2	..	..
3 ×2½ × ¼	⅜	·74	14·6	13·7	12·7	11·4	10·1	8·8	..	..
" " 5/16	⅜	·73	18·0	16·9	15·6	14·1	12·4	10·8	..	..
" " ⅜	⅜	·73	21·3	20·0	18·4	16·6	14·5	12·7	..	..
" " ½	⅜	·71	27·7	25·9	23·8	21·3	18·6	16·2	..	..

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR FOUR UNEQUAL ANGLES, SHORT LEGS LACED IN PLANE Y-Y.

ENDS FIXED.

For other conditions of ends see page 118.



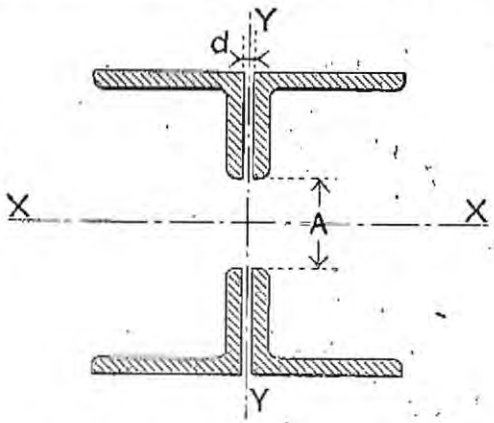
For the Sections given, the least radius of Gyration will be about **Y-Y**, as, for this to be otherwise the distance **A** would have to be less than ½".

Size and Thickness	d	Radius of Gyration Y-Y	LENGTHS IN FEET								
			6	8	10	12	14	16	18	20	24
8×6 ×½	⅝	3·74	159·9	158·2	156·5	154·4	151·6	148·9	145·2	141·7	133·3
" " ⅝	⅝	3·77	198·0	196·3	193·8	191·2	187·7	184·3	180·5	175·5	165·9
" " ¾	⅝	3·80	235·3	233·3	230·4	227·3	223·7	219·1	214·6	209·5	197·2
8×4 ×7/16	⅝	4·04	119·9	119·0	117·8	116·2	114·5	112·6	110·8	108·4	102·9
" " ⅝	⅝	4·09	168·6	167·5	165·8	163·7	161·3	158·7	155·8	152·4	145·3
" " ¾	⅝	4·12	200·3	198·8	196·8	194·3	191·4	188·4	185·5	181·5	172·5
7×3½×½	⅝	3·59	118·3	117·0	115·7	113·8	111·7	109·6	106·8	103·6	97·2
" " ⅝	⅝	3·63	146·0	144·7	142·8	140·4	138·2	135·2	131·8	128·4	120·6
" " ¾	⅝	3·66	172·9	171·4	169·1	166·8	163·7	160·2	156·7	152·2	142·9
6×4 ×⅜	½	2·89	84·8	83·5	81·7	79·9	77·7	75·1	72·0	69·1	62·1
" " ½	½	2·92	111·6	109·9	107·8	105·4	102·2	98·9	95·2	91·4	82·3
" " ⅝	½	2·95	137·9	135·6	133·0	130·1	126·5	122·5	118·0	113·4	102·2
6×3½×⅜	½	2·96	80·5	79·3	77·8	75·9	73·9	71·5	68·9	66·2	60·1
" " ½	½	3·00	105·8	104·3	102·4	100·2	97·5	94·5	91·1	87·5	79·5
" " ⅝	½	3·03	130·5	128·6	126·2	123·5	120·2	116·9	112·8	108·4	98·7
6×3 ×5/16	½	3·03	63·9	63·0	61·8	60·7	59·1	57·3	55·2	53·1	48·3
" " ⅜	½	3·05	76·1	75·2	73·8	72·3	70·4	68·2	65·8	63·2	58·0
" " ½	½	3·08	100·2	98·8	97·0	94·9	92·8	90·0	86·9	83·5	76·7
" " ⅝	½	3·11	123·4	121·6	119·4	117·2	114·3	110·8	107·5	103·4	95·0
5×4 ×5/16	½	2·34	63·1	61·6	59·9	57·5	55·0	52·3	49·3	45·6	38·7
" " ⅜	½	2·36	75·2	73·4	71·3	68·8	65·8	62·3	58·7	54·8	46·4
" " ½	½	2·38	99·0	96·7	94·0	90·8	86·9	82·2	77·6	72·5	61·5
" " ⅝	½	2·41	121·9	119·1	115·8	111·8	107·0	101·8	96·2	90·6	77·0
5×3½×5/16	½	2·41	59·6	58·3	56·6	54·7	52·3	49·8	47·0	44·0	37·4
" " ⅜	½	2·43	71·0	69·4	67·7	65·3	62·6	59·6	56·3	52·8	44·8
" " ½	½	2·46	93·3	91·3	88·8	85·8	82·6	78·6	74·4	69·8	59·9
" " ⅝	½	2·49	114·8	112·3	109·6	105·9	101·6	97·2	92·1	86·4	74·4

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR FOUR UNEQUAL ANGLES, SHORT LEGS LACED IN PLANE Y-Y. ENDS FIXED.

For other conditions of ends see page 113.



For the Sections given, the least radius of Gyration will be about **Y-Y**, as, for this to be otherwise the distance **A** would have to be less than ½".

Size and Thickness	d	Radius of Gyration Y-Y	LENGTHS IN FEET								
			6	8	10	12	14	16	18	20	24
5 × 3 × 5/16	½	2·49	56·0	54·8	53·5	51·7	49·6	47·4	44·9	42·2	36·3
" " 3/8	½	2·50	66·7	65·4	63·7	61·5	59·3	56·5	53·8	50·5	43·6
" " ½	½	2·53	87·6	85·8	83·8	81·0	78·1	74·4	71·0	66·7	57·6
" " 5/8	½	2·56	107·7	105·7	102·9	99·9	95·9	91·9	87·7	82·6	72·0
4 × 3½ × 5/16	½	1·88	51·4	49·6	47·2	44·4	41·5	38·1	34·2	30·6	24·7
" " 3/8	½	1·90	61·1	58·9	56·4	53·0	49·4	45·6	41·1	36·8	29·6
" " ½	½	1·93	80·3	77·5	74·1	69·8	65·5	60·2	54·7	49·0	39·5
" " 5/8	½	1·95	98·6	95·4	91·4	86·1	80·9	74·9	67·7	61·2	49·8
4 × 3 × 5/16	½	1·95	47·9	46·4	44·3	41·9	39·3	36·4	32·9	29·7	24·0
" " 3/8	½	1·97	57·0	55·1	52·8	50·0	47·0	43·3	39·5	35·7	29·1
" " ½	½	2·00	74·7	72·4	69·4	65·8	61·9	57·4	52·5	47·4	38·7
" " 5/8	½	2·02	91·6	89·0	85·4	81·1	76·3	70·9	64·8	58·6	48·2
3½ × 3 × ¼	3/8	1·62	35·2	33·5	31·3	28·9	26·1	23·2	20·4	18·0	..
" " 5/16	3/8	1·64	43·6	41·5	39·0	36·0	32·5	29·0	25·5	22·6	..
" " 3/8	3/8	1·65	51·7	49·4	46·3	43·0	38·9	34·7	30·5	27·1	..
" " ½	3/8	1·68	67·7	64·8	61·0	56·5	51·6	46·1	40·9	36·0	..
3½ × 2½ × ¼	3/8	1·69	32·5	31·0	29·2	27·2	24·9	22·1	19·6	17·4	..
" " 5/16	3/8	1·71	40·2	38·5	36·3	33·8	31·0	27·8	24·7	21·7	..
" " 3/8	3/8	1·72	47·7	45·7	43·1	40·1	37·0	33·2	29·5	26·2	..
" " ½	3/8	1·75	62·4	59·8	56·7	52·9	48·6	43·7	39·1	34·7	..
3 × 2½ × ¼	3/8	1·43	29·1	27·2	25·0	22·4	19·5	16·9	14·7	..	..
" " 5/16	3/8	1·44	35·9	33·6	31·0	27·9	24·5	21·2	18·3	..	..
" " 3/8	3/8	1·46	42·7	40·0	37·0	33·3	29·3	25·3	22·1	..	..
" " ½	3/8	1·49	55·7	52·3	48·4	43·9	38·7	33·8	29·5	..	..

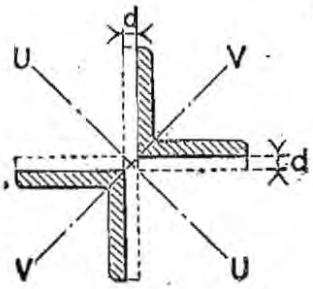
DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO EQUAL ANGLES, CONNECTED TOGETHER AT INTERVALS.

ENDS FIXED.

For other conditions of ends see page 118.

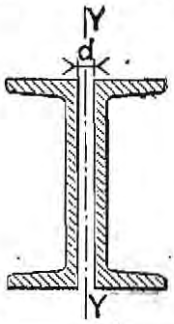


Size and Thickness	d	Radii of Gyration		LENGTHS IN FEET							
		About U-U	About V-V	6	8	10	12	14	16	18	20
9 × 9 × 9/16	5/8	4·26	3·51	116·0	114·8	113·2	111·3	109·2	106·7	104·3	101·2
" " 11/16	5/8	4·32	3·50	140·6	139·3	137·4	135·1	132·5	129·5	126·0	122·3
" " 13/16	5/8	4·38	3·48	165·0	163·1	161·2	158·5	155·5	151·9	147·8	143·4
8 × 8 × 5/8	5/8	3·89	3·11	113·2	111·6	109·6	107·6	104·9	101·7	98·2	94·9
" " 3/4	5/8	3·95	3·09	134·8	132·9	130·5	127·7	124·9	121·1	116·9	112·3
" " 7/8	5/8	4·01	3·07	155·9	153·7	151·0	147·8	148·9	139·5	135·3	130·0
6 × 6 × 1/2	5/8	3·03	2·32	66·8	65·2	63·2	60·9	58·2	55·0	51·8	48·3
" " 5/8	5/8	3·09	2·30	82·6	80·4	78·1	74·9	71·6	68·0	63·7	59·3
" " 3/4	5/8	3·16	2·28	97·8	95·5	92·4	88·9	84·5	80·3	75·1	69·7
5 × 5 × 3/8	1/2	2·49	1·94	41·4	39·9	38·2	36·2	33·8	31·3	28·4	25·5
" " 1/2	1/2	2·55	1·92	54·5	52·6	50·3	47·4	44·4	40·8	37·1	33·2
" " 5/8	1/2	2·61	1·90	67·0	64·8	61·8	58·1	54·5	50·0	45·0	40·6
4 × 4 × 3/8	1/2	2·09	1·54	31·9	30·3	28·1	25·6	22·9	20·0	17·6	..
" " 1/2	1/2	2·16	1·52	41·9	39·5	36·6	33·4	29·5	26·0	22·7	..
" " 5/8	1/2	2·22	1·50	51·8	48·4	44·8	40·7	36·0	31·4	27·4	..
3½ × 3½ × 5/16	3/8	1·78	1·35	22·9	21·3	19·3	17·0	14·6	12·5	..	..
" " 3/8	3/8	1·81	1·34	27·1	25·1	22·8	20·1	17·2	14·8	..	..
" " 1/2	3/8	1·87	1·32	35·4	32·7	29·7	26·0	22·3	19·0	..	..
3 × 3 × 1/4	3/8	1·55	1·15	15·2	13·8	12·0	10·1	8·4	..	..	..
" " 5/16	3/8	1·58	1·15	18·7	16·9	14·7	12·3	10·3	..	..	..
" " 3/8	3/8	1·61	1·14	22·2	20·1	17·3	14·5	12·1	..	..	..
" " 1/2	3/8	1·67	1·12	28·9	25·9	22·4	18·6	15·5	..	..	..
2¾ × 2¾ × 1/4	3/8	1·45	1·05	13·5	12·0	10·1	8·3	..	..	..	..
" " 3/8	3/8	1·51	1·04	19·7	17·3	14·5	11·9	..	..	..	..
2½ × 2½ × 1/4	3/8	1·35	·95	11·8	10·1	8·2	..	..	..	..	..
" " 5/16	3/8	1·38	·95	14·5	12·4	10·1	..	..	..	..	..
" " 3/8	3/8	1·41	·94	17·1	14·6	11·8	..	..	..	..	..

CHANNELS AS STRUTS.

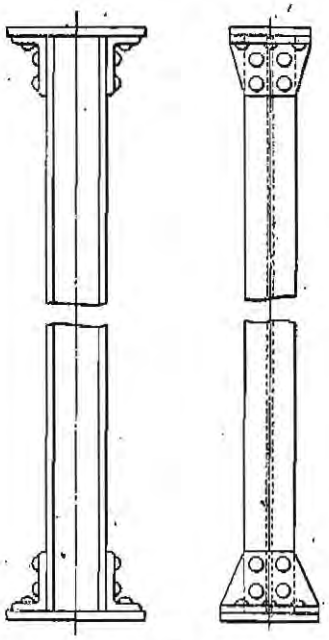
SAFE LOADS IN TONS FOR TWO CHANNELS, CONNECTED TOGETHER AT INTERVALS. ENDS FIXED.

For other conditions of ends see page 118.

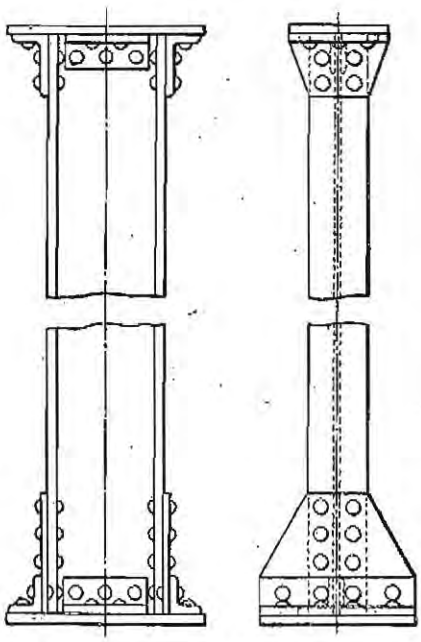


Channels	d	Radius of Gyration About Y-Y	LENGTHS IN FEET							
			4	5	6	8	10	12	16	20
17 × 4	⅝	1·64	152·1	149·5	146·8	139·7	131·3	121·2	97·6	76·2
15 × 4	⅝	1·70	124·9	123·2	121·0	115·5	108·8	101·2	82·8	65·2
12 × 4	⅝	1·78	107·8	106·3	104·8	100·6	95·5	89·1	74·4	59·7
12 × 3½H	⅝	1·57	99·8	98·3	96·2	91·4	84·8	78·0	61·2	47·8
12 × 3½L	⅝	1·52	86·1	84·5	82·9	78·3	72·6	66·1	51·1	39·2
10 × 3½	⅝	1·63	83·9	82·5	81·0	77·1	72·1	66·9	53·4	..
10 × 3	½	1·30	65·0	63·5	61·7	56·8	51·5	44·7	32·6	..
9 × 3½	½	1·62	76·2	75·1	73·7	70·2	65·6	60·5	48·2	..
9 × 3	½	1·34	59·0	57·7	56·1	52·0	47·2	41·4	30·8	..
8 × 3½	½	1·66	69·3	68·3	67·1	63·9	60·2	55·6	44·9	..
8 × 3	½	1·39	54·2	53·0	51·6	48·2	44·1	39·4	29·4	..
7 × 3½	½	1·70	62·8	61·9	60·8	58·0	54·7	50·9	41·6	..
7 × 3	⅜	1·38	48·2	47·2	46·0	42·7	39·1	34·9	25·9	..
6 × 3½	⅜	1·69	56·6	55·8	54·7	52·3	49·3	45·9	37·5	..
6 × 3	⅜	1·39	42·0	41·2	40·1	37·5	34·3	30·4	22·8	..
5 × 2½	⅜	1·21	34·2	33·2	32·2	29·4	26·0	22·1	15·9	..
4 × 2	⅜	·98	23·1	22·2	20·9	18·2	14·8	12·1	..	..
3 × 1½	⅜	·80	14·4	13·5	12·4	9·8	7·6	..	..	..

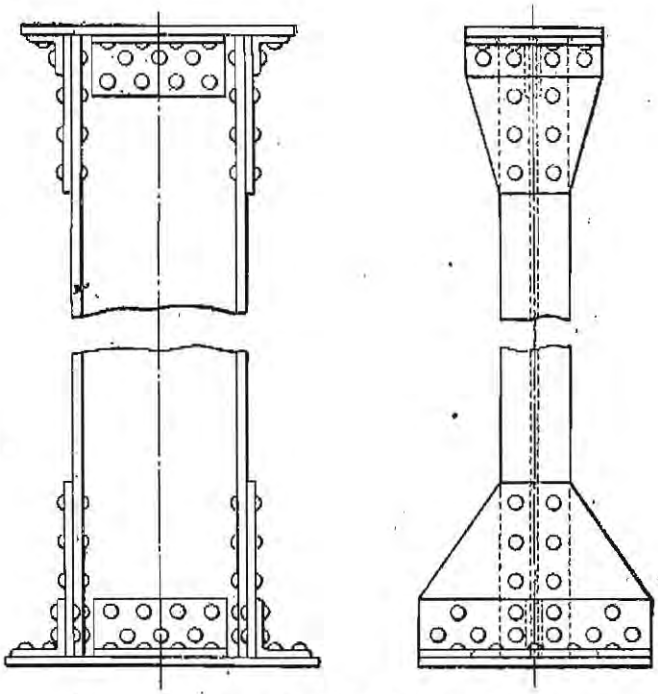
TYPES OF BASES & CAPS FOR STANCHIONS



FOR SMALL BEAMS

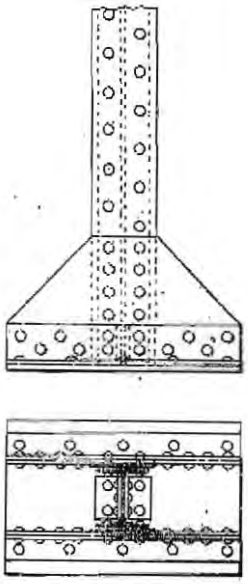


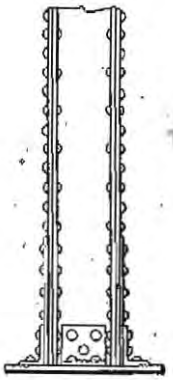
FOR MEDIUM BEAMS



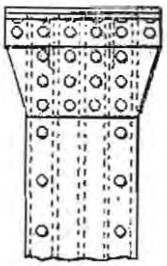
FOR LARGE BEAMS

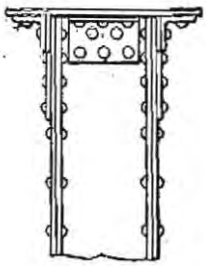
TYPES OF BASES & CAPS FOR STANCHIONS

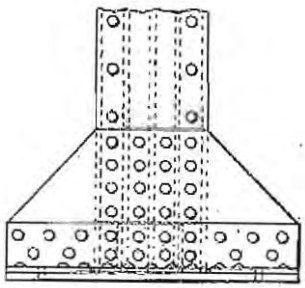


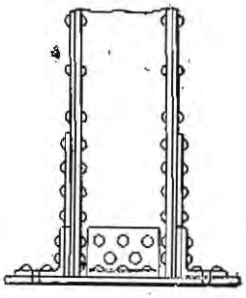


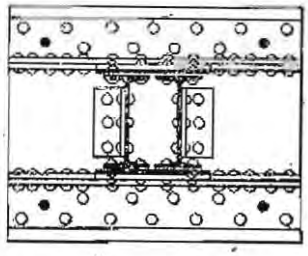
For SINGLE BEAMS
WITH FLATS





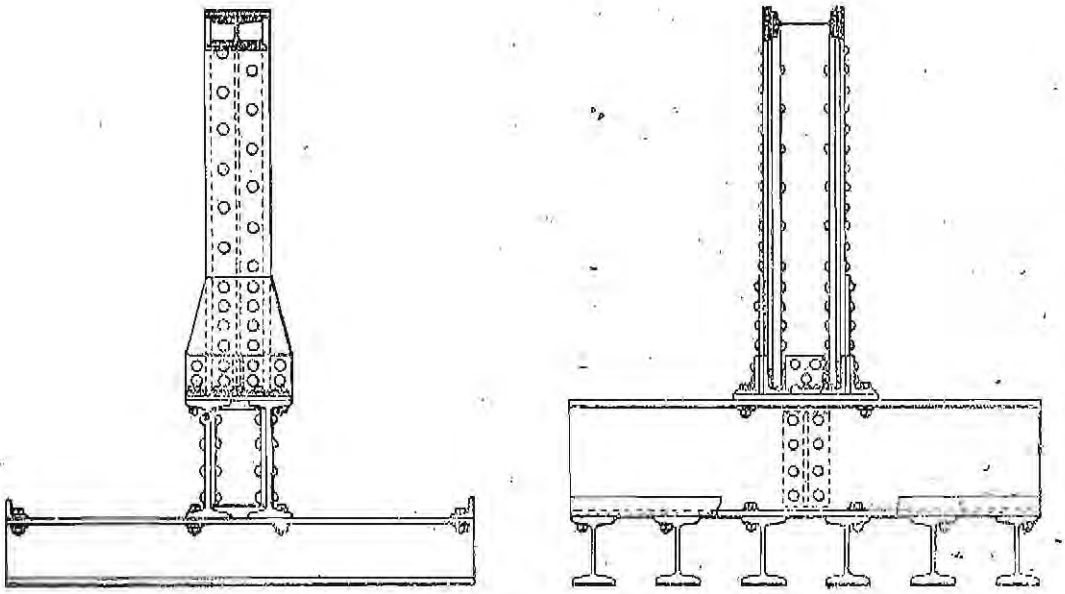




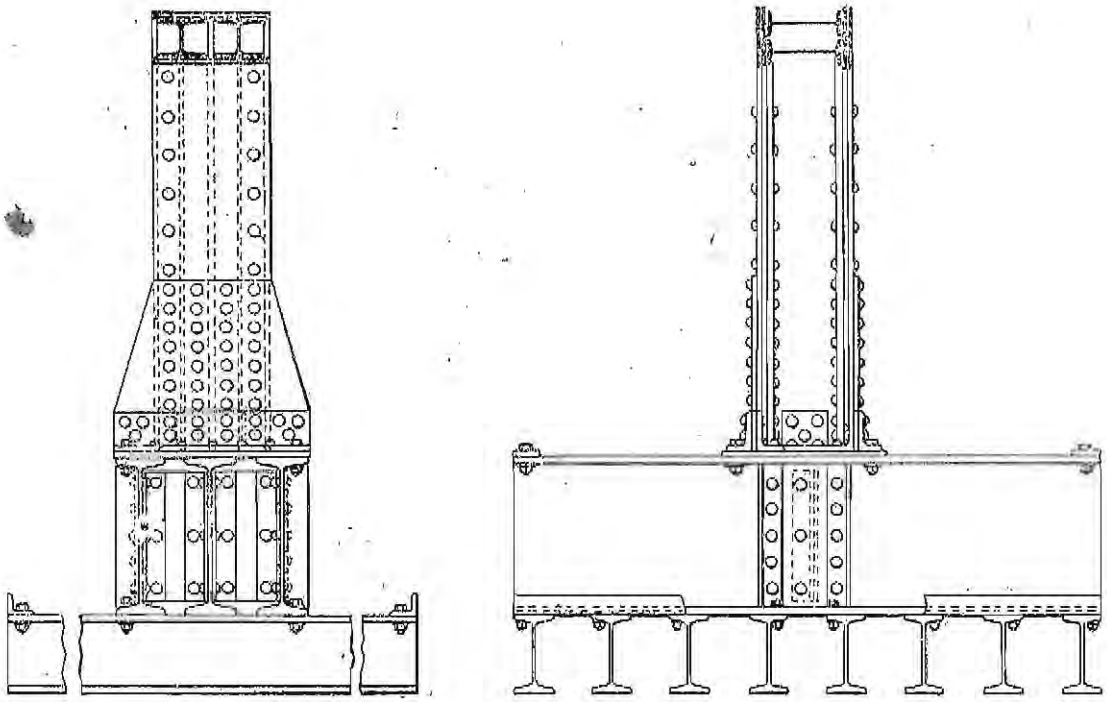


For DOUBLE BEAMS
WITH FLATS

TYPES OF BASES FOR STANCHIONS WITH GRILLAGES

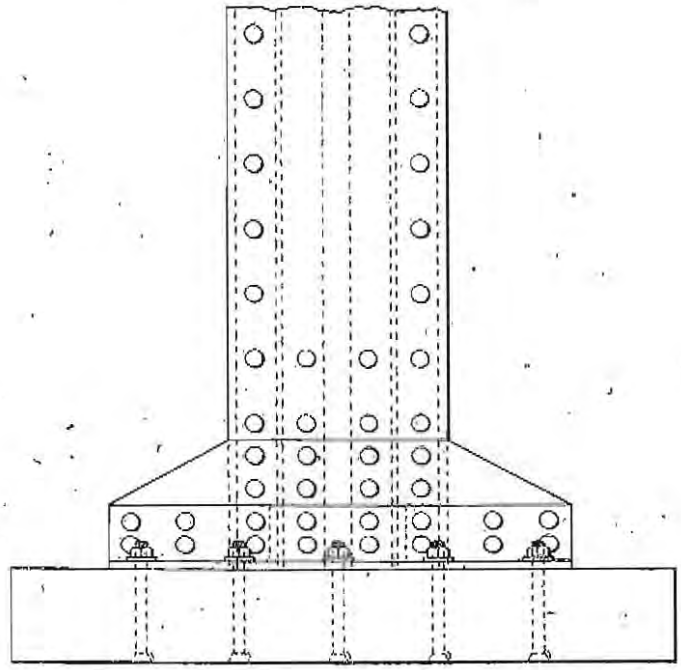


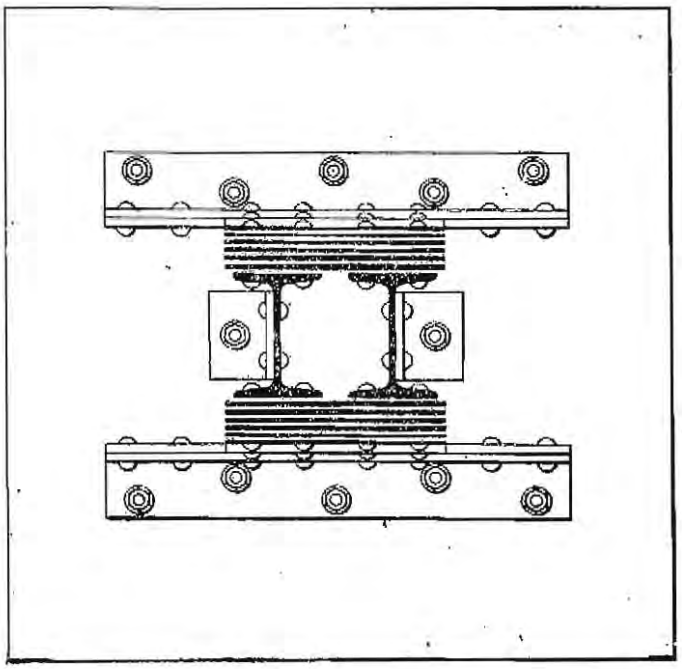
MEDIUM TYPE



LARGE TYPE

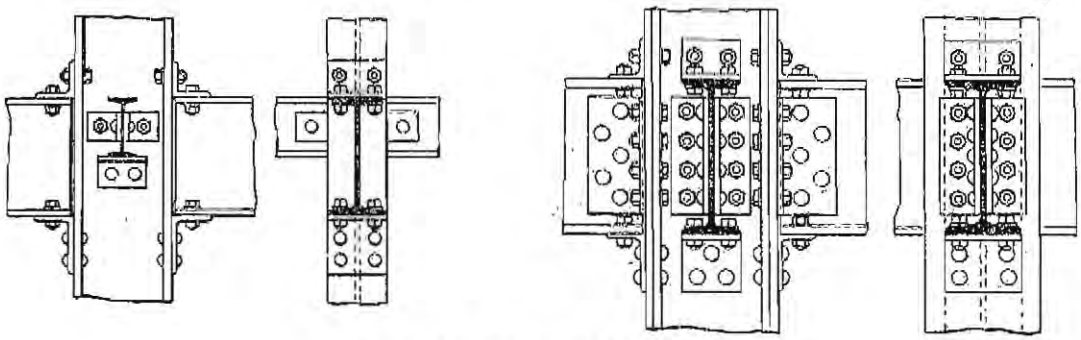
TYPE OF STEEL SLAB BASE FOR STANCHIONS



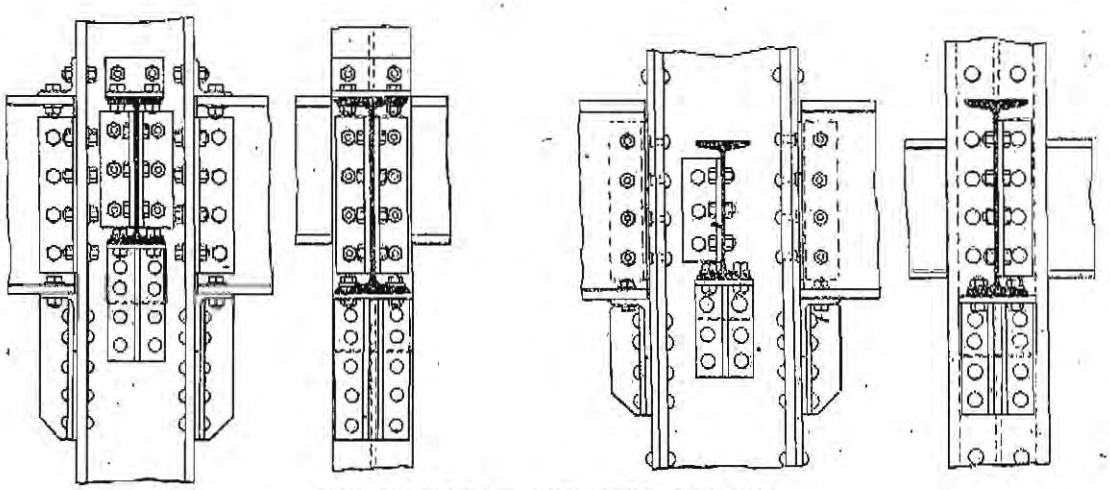


FOR PARTICULARS OF SLABS SEE PAGE 28.

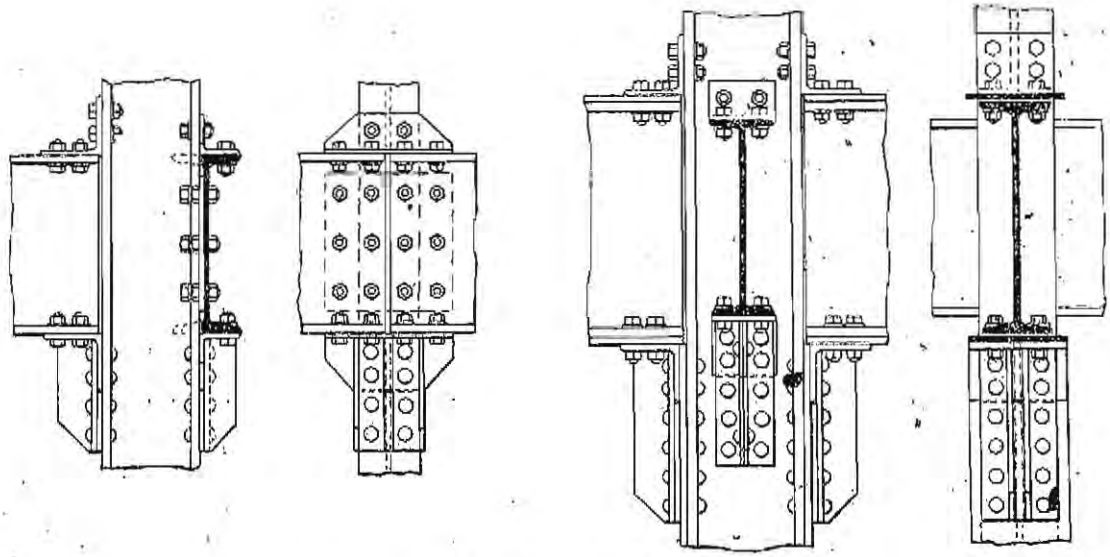
TYPE CONNECTIONS OF BEAMS TO STANCHIONS



SIMPLE ANGLE STOOLS

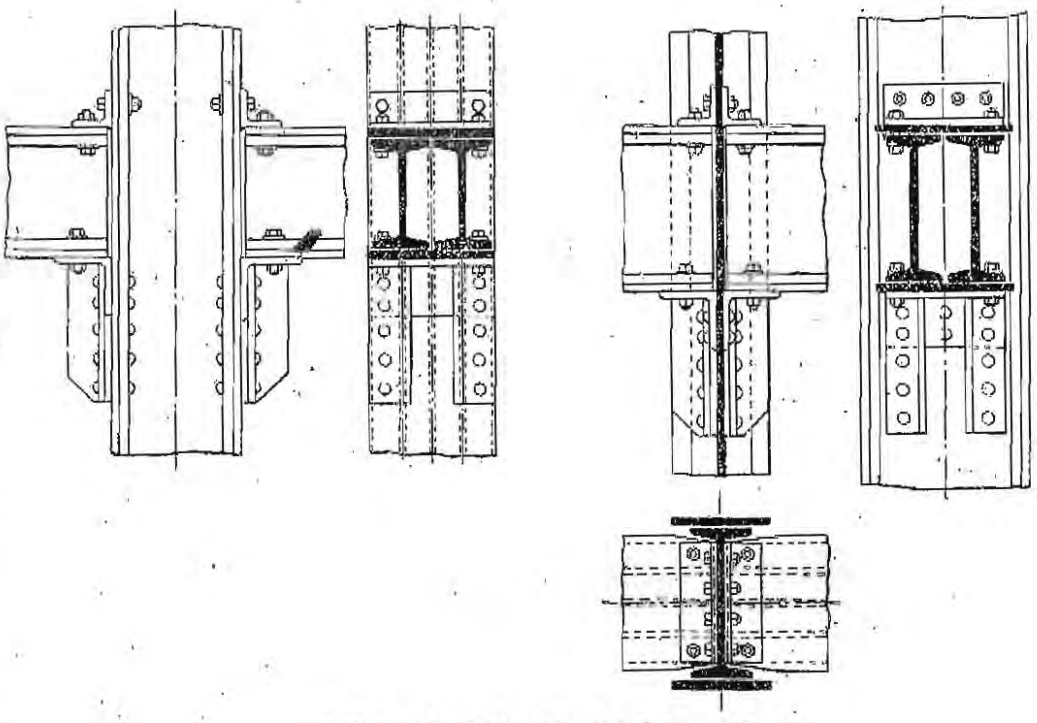


BUILT STOOLS AND SIDE CLEATS

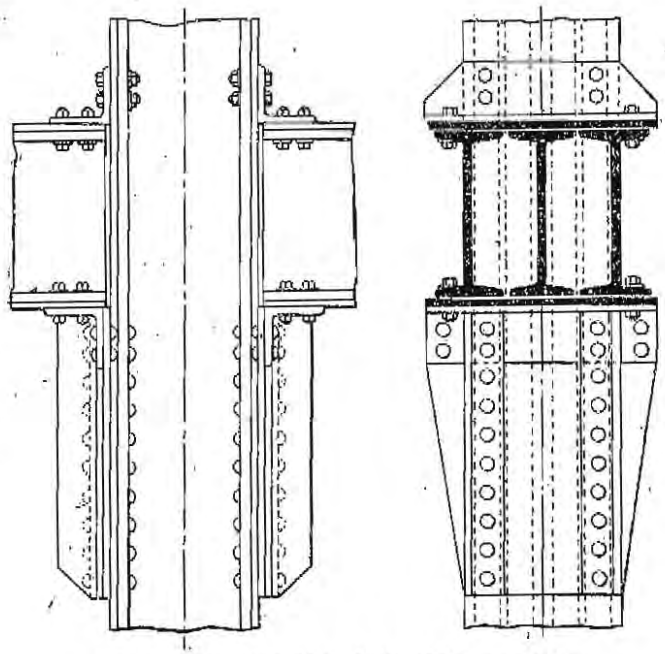


BUILT STOOLS AND TOP CLEATS

TYPE CONNECTIONS OF COMPOUNDS TO STANCHIONS

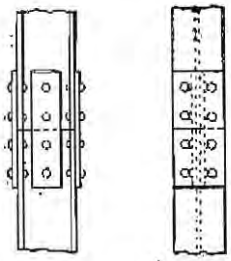


BUILT STOOLS AND TOP CLEATS

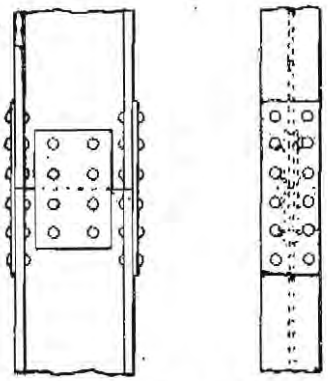


GUSSETED STOOLS AND TOP CLEATS

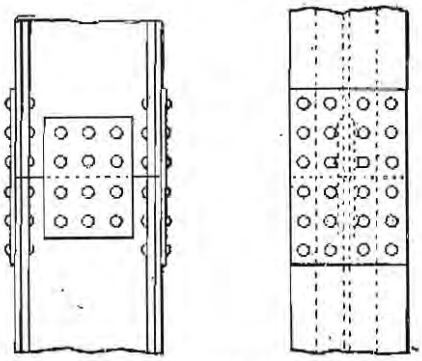
TYPES OF JOINTS FOR STANCHIONS



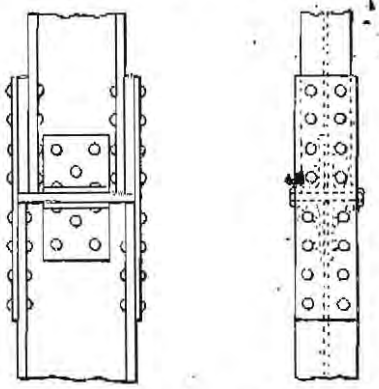
FOR SMALL BEAMS



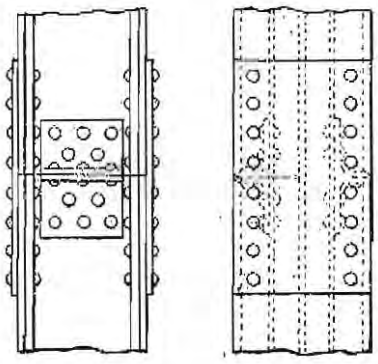
FOR MEDIUM BEAMS



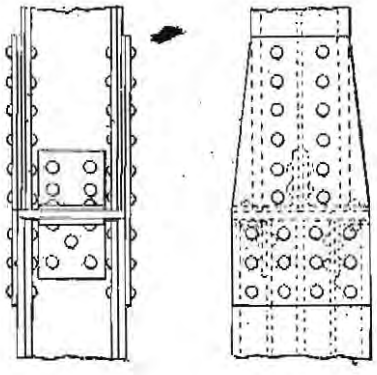
FOR SINGLE BEAMS WITH FLATS



FOR BEAMS OF DIFFERENT SIZES.



FOR DOUBLE BEAMS WITH FLATS



FOR BEAMS AND FLATS OF DIFFERENT SIZES

"Bolted Connections" may be adopted to facilitate erection, if found advisable.

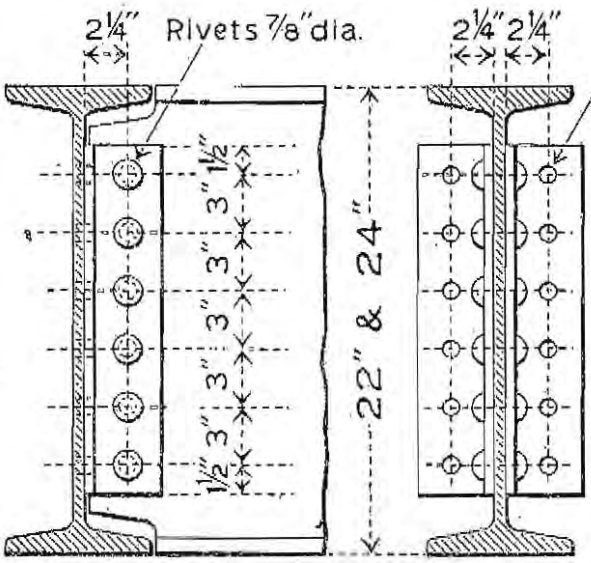
STANDARD CONNECTIONS FOR BEAMS.

STANDARD ANGLE CLEATS.—The standard angle cleats, illustrated on pages 166 to 169, have been designed for bolted site connections. They have also been calculated to withstand reactions equivalent to those produced by the tabular loads on the beams at the minimum spans given with each standard connection.

Where the reactions are greater than the above, additional support, or special connection, will be necessary; on the other hand, modification may be deemed desirable when the spans exceed the minimum, or where the beams rest on brackets capable of transmitting the reactions.

SEPARATORS.—When two or more beams are required to be bolted together, side by side, to form a girder, cast iron or pressed steel separators are frequently used. They should be placed at intervals of about five or six feet, and where concentrated loads occur.

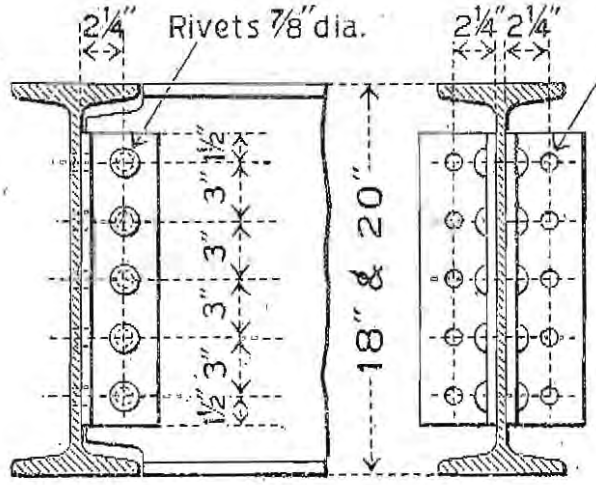
STANDARD CONNECTIONS FOR BEAMS



For
N.B.S.B. 24" × 7½" × 90 lbs
Min. Span 20'-0"

N.B.S.B. 22" × 7" × 75 lbs
Min. Span 16'-0"

ANGLE CLEATS 4" × 4" × ½" × 1'-6" LONG. REF. NO. A1

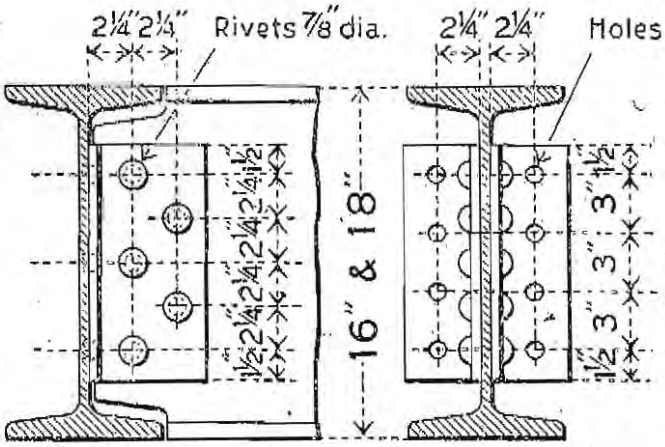


For
N.B.S.B. 20" × 6½" × 65 lbs
Min. Span 17'-0"

N.B.S.B. 18" × 6" × 55 lbs
Min. Span 14'-0"

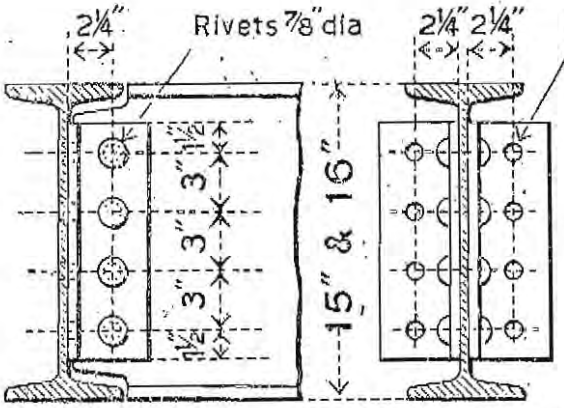
ANGLE CLEATS 4" × 4" × ½" × 1'-3" LONG. REF. NO. A2

STANDARD CONNECTIONS FOR BEAMS



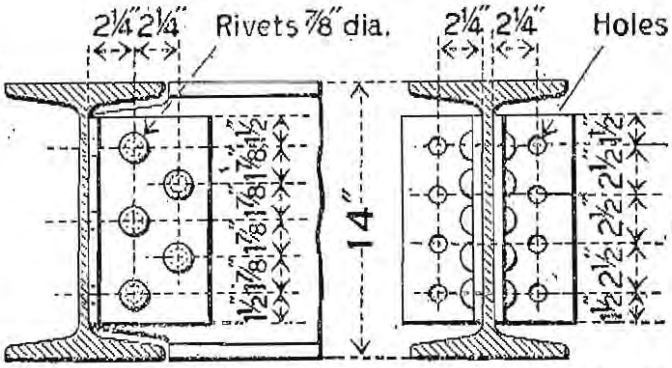
	For	Min. Span
N B S H B	18" × 8" × 80 lbs	20'-0"
N.B.S H.B	16" × 8" × 75 lbs	17'-0"

ANGLE CLEATS 6" × 4" × ½" × 1'-0" LONG REF. NO. A3



	For	Min. Span
N.B.S.B.	16" × 6" × 50 lbs	15'-0"
N.B.S.B.	15" × 6" × 45 lbs	14'-0"

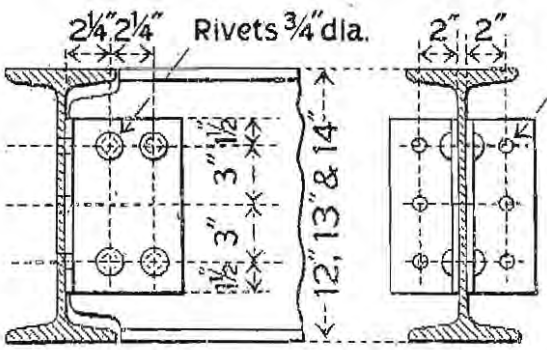
ANGLE CLEATS 4" × 4" × ½" × 1'-0" LONG. REF. NO. A4



	For	Min. Span
N.B.S.H.B.	14" × 8" × 70 lbs	15'-0"

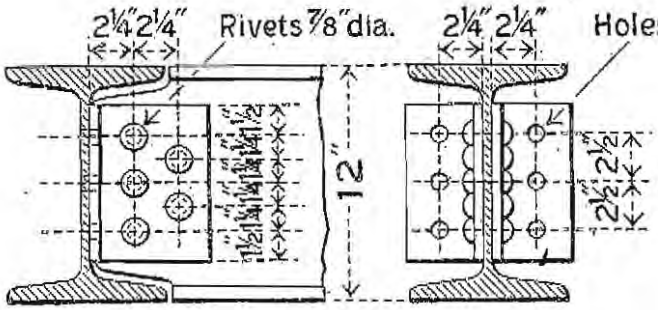
ANGLE CLEATS 6" × 4" × ½" × 10½" LONG. REF. NO. A5

STANDARD CONNECTIONS FOR BEAMS



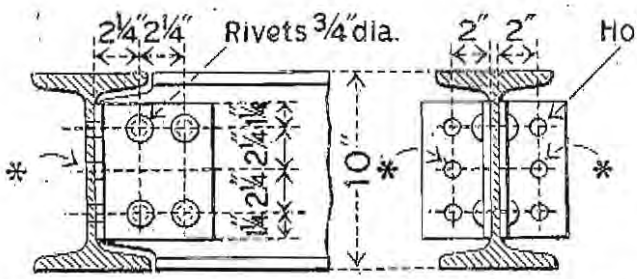
For	Min. Span
N.B.S.B. 14" × 5½" × 40 lbs	14'-0"
N.B.S.B. 13" × 5" × 35 lbs	12'-0"
N.B.S.B. 12" × 5" × 30 lbs	10'-0"

ANGLE CLEATS 6" × 3½" × ⅜" × 9" LONG. REF. NO. A^6



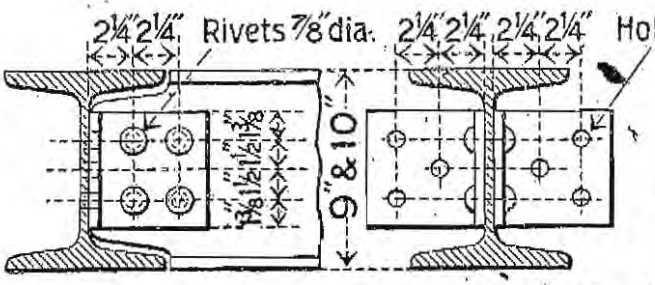
For	Min. Span
N.B.S.H.B. 12" × 8" × 65 lbs	15'-0"

ANGLE CLEATS 6" × 4" × ½" × 8" LONG. REF. NO. A^7



For	Min. Span
N.B.S.H.B. 10" × 6" × 40 lbs	11'-0"
For N.B.S.B. 10" × 4½" × 25 lbs (without holes *)	10'-0"

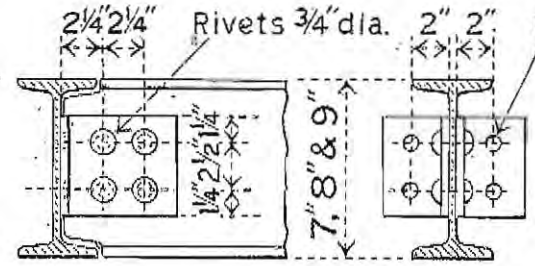
ANGLE CLEATS 6" × 3½" × ⅜" × 7" LONG. REF. NO. { A^8 for 10" × 6" Beam; A^9 for 10" × 4½" Beam }



For	Min. Span
N.B.S.H.B. 10" × 8" × 55 lbs	13'-0"
N.B.S.H.B. 9" × 7" × 50 lbs	11'-0"

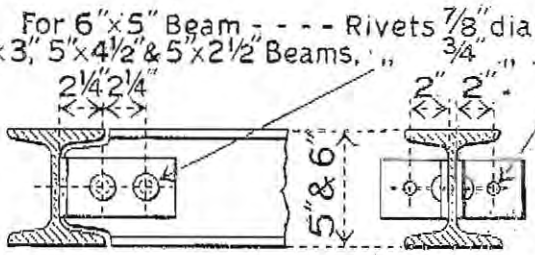
ANGLE CLEATS 6" × 6" × ½" × 5¾" LONG. REF. NO. A^{10}

STANDARD CONNECTIONS FOR BEAMS



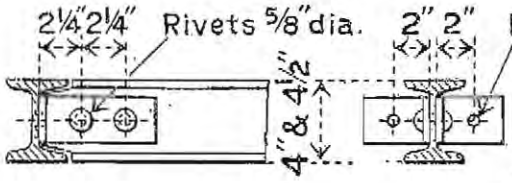
For	Min. Span
N.B.S.B. 9" × 4" × 21 lbs	7'-0"
N.B.S.H.B. 8" × 6" × 35 lbs	11'-0"
N.B.S.B. 8" × 4" × 18 lbs	6'-0"
N.B.S.B. 7" × 3½" × 15 lbs	5'-0"

ANGLE CLEATS 6" × 3½" × ⅜" × 5" LONG. REF NO. A11



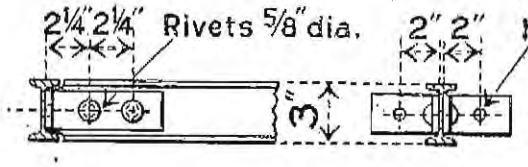
For	Min. Span
N.B.S.H.B. 6" × 5" × 25 lbs	12'-0"
N.B.S.B. 6" × 3" × 12 lbs	7'-0"
N.B.S.H.B. 5" × 4½" × 20 lbs	10'-0"
N.B.S.B. 5" × 2½" × 9 lbs	5'-0"

ANGLE CLEATS 6" × 3½" × ⅜" × 3" LONG. REF NO. A12



For	Min. Span
N.B.S.B. 4½" × 2" × 7 lbs	5'-0"
N.B.S.H.B. 4" × 3" × 10 lbs	6'-0"
N.B.S.B. 4" × 1¾" × 5 lbs	3'-0"

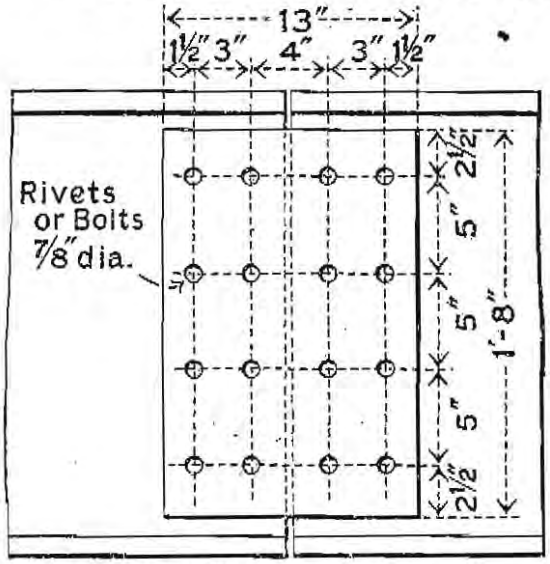
ANGLE CLEATS 6" × 3½" × ⅜" × 2½" LONG. REF. NO. A13



For	Min. Span
N.B.S.B. 3" × 1½" × 4 lbs	2-0"

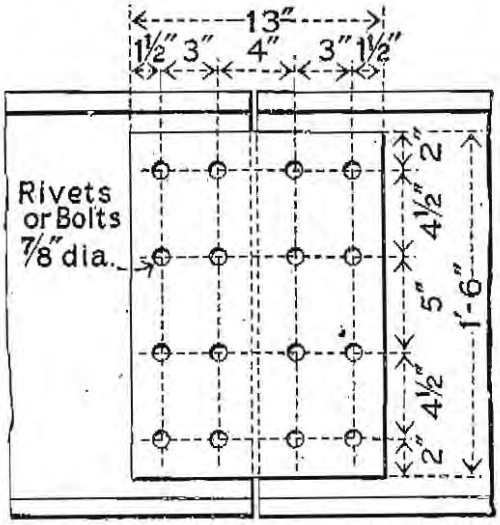
ANGLE CLEATS 6" × 3½" × ⅜" × 2" LONG. REF. NO. A14

STANDARD CONNECTIONS FOR BEAMS



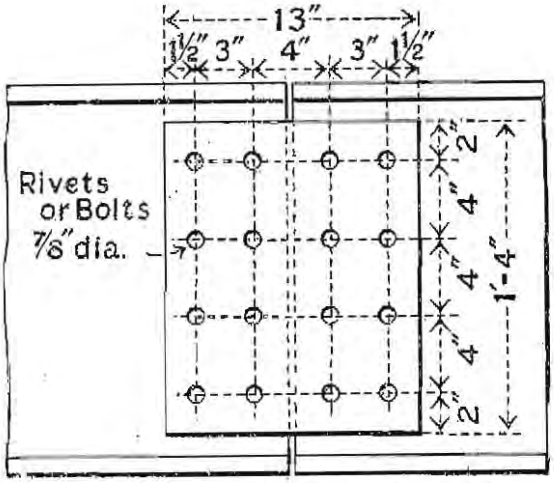
FISHPLATE REF. NO. F1

For N.B.S.B. 24" × 7½" × 90 lbs per ft.



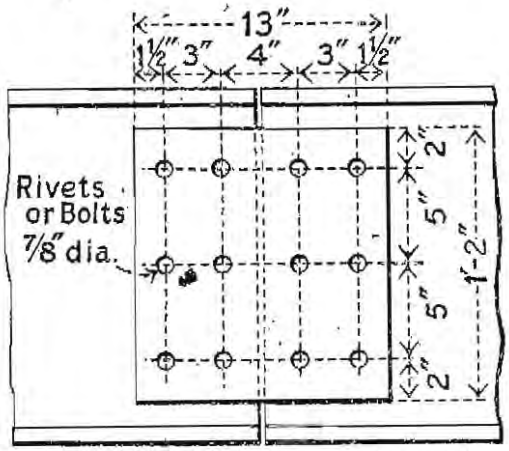
FISHPLATE REF. NO. F2

For N.B.S.B. 22" × 7" × 75 lbs per ft.



FISHPLATE REF. NO. F3

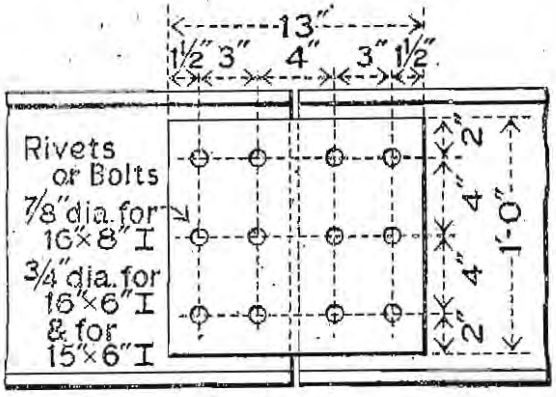
For N.B.S.B. 20" × 6½" × 65 lbs per ft.



FISHPLATE REF. NO. F4

For N.B.S.H.B. 18" × 8" × 80 lbs per ft.

For N.B.S.B. 16" × 6" × 55 lbs per ft.

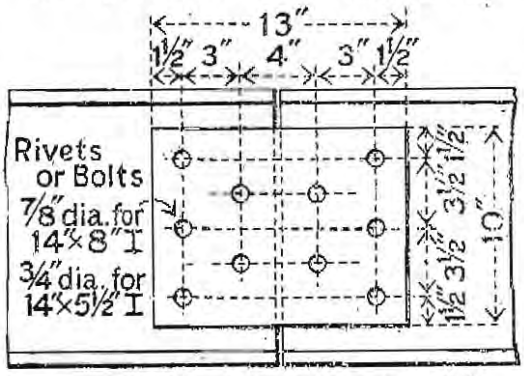


FISHPLATE REF. NO. F5

For N.B.S.H.B. 16" × 8" × 75 lbs per ft.

For N.B.S.B. 16" × 6" × 50 lbs per ft.

For N.B.S.B. 15" × 6" × 45 lbs per ft.

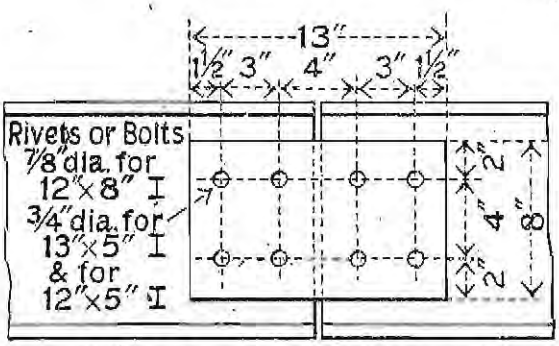


FISHPLATE REF. NO. F6

For N.B.S.H.B. 14" × 8" × 70 lbs per ft.

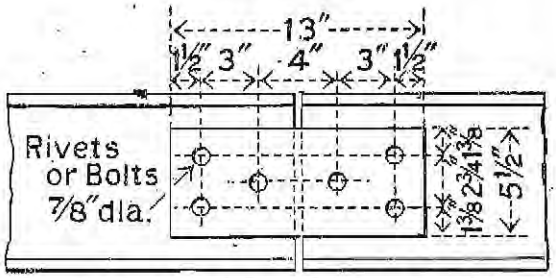
For N.B.S.B. 14" × 5½" × 40 lbs per ft.

STANDARD CONNECTIONS FOR BEAMS



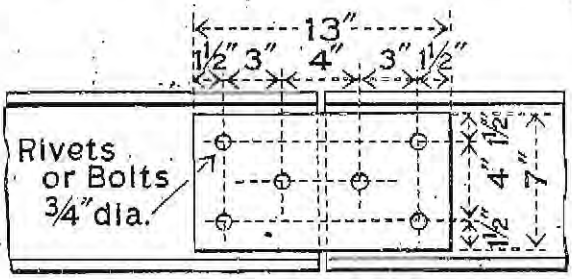
FISHPLATE REF. NO. F7

For N.B.S.B. 13" × 5" × 35 lbs per ft.
For N.B.S.H.B. 12" × 8" × 65 lbs per ft.
For N.B.S.B. 12" × 5" × 30 lbs per ft.



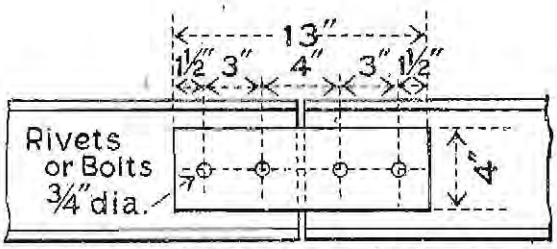
FISHPLATE REF. NO. F8

For N.B.S.H.B. 10" × 8" × 55 lbs per ft.
For N.B.S.H.B. 9" × 7" × 50 lbs per ft.



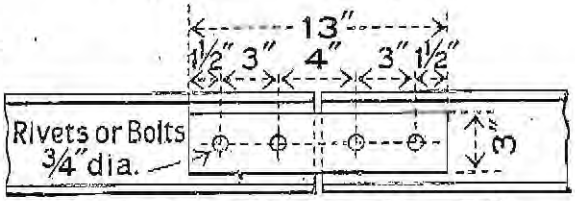
FISHPLATE REF. NO. F9

For N.B.S.H.B. 10" × 6" × 40 lbs per ft.
For N.B.S.B. 10" × 4½" × 25 lbs per ft.
For N.B.S.B. 9" × 4" × 21 lbs per ft.



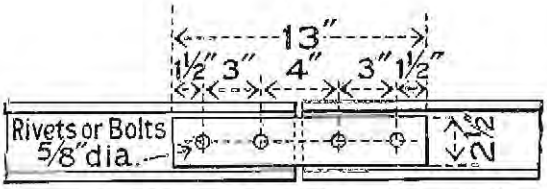
FISHPLATE REF. NO. F10

For N.B.S.H.B. 8" × 6" × 35 lbs per ft.
For N.B.S.B. 8" × 4" × 18 lbs per ft.
For N.B.S.B. 7" × 3½" × 15 lbs per ft.



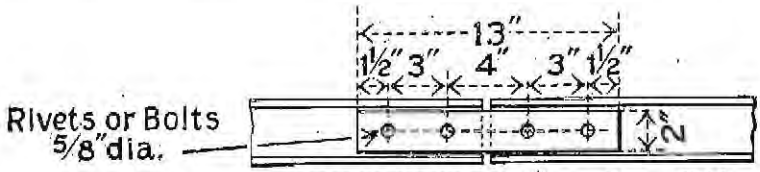
FISHPLATE REF. NO. F11

For N.B.S.H.B. 6" × 5" × 25 lbs per ft.
For N.B.S.B. 6" × 3" × 12 lbs per ft.
For N.B.S.H.B. 5" × 4½" × 20 lbs per ft.
For N.B.S.B. 5" × 2½" × 9 lbs per ft.



FISHPLATE REF. NO. F12

For N.B.S.B. 4½" × 2" × 7 lbs per ft.
For N.B.S.H.B. 4" × 3" × 10 lbs per ft.
For N.B.S.B. 4" × 1¾" × 5 lbs per ft.

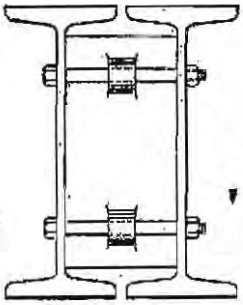


FISHPLATE REF. NO. F13

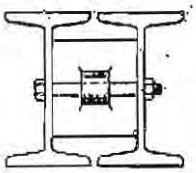
For N.B.S.B. 3" × 1½" × 4 lbs per ft.

DORMAN, LONG & CO. LIMITED.

BEAMS WITH SEPARATORS.



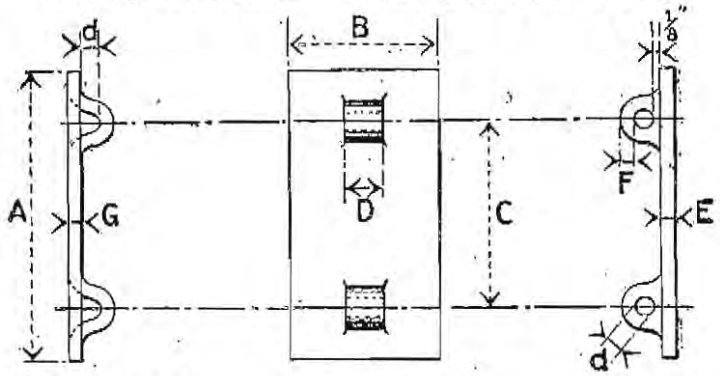
Reference Mark of Beam	Size	Reference Mark of Separator	Centres of Beams Inches	Bolts		
				Diameter Inches	Length Inches	Weight Lbs.
						2 Bolts
NBSB 18	24×7½×90	SP 1	8	⅞	9¾	4·78
NBSB 17	22×7 ×75	" 2	7½	⅞	9¼	4·61
NBSB 16	20×6½×65	" 3	7	⅞	8¾	4·44
NBSHB 11	18×8 ×80	" 4	8½	⅞	10¼	4·95
NBSB 15	18×6 ×55	" 5	6½	⅞	8¼	4·27
NBSHB 10	16×8 ×75	" 6	8½	¾	10	3·48
NBSB 14	16×6 ×50	" 7	6½	¾	8	2·98
NBSB 13	15×6 ×45	" 7	6½	¾	8	2·98
NBSHB 9	14×8 ×70	" 8	8½	¾	10	3·48
NBSB 12	14×5½×40	" 9	6	¾	7½	2·85
NBSB 11	13×5 ×35	" 10	5½	¾	7	2·73
NBSHB 8	12×8 ×65	" 11	8½	¾	10	3·48
NBSB 10	12×5 ×30	" 10	5½	¾	7	2·73
						1 Bolt
NBSHB 7	10×8 ×55	SP 12	8½	¾	10	1·74
NBSHB 6	10×6 ×40	" 13	6½	¾	8	1·49
NBSB 9	10×4½×25	" 14	5	¾	6½	1·30
NBSHB 5	9×7 ×50	" 15	7½	¾	9	1·61
NBSB 8	9×4 ×21	" 16	4½	¾	5¾	1·21
NBSHB 4	8×6 ×35	" 17	6½	¾	8	1·49
NBSB 7	8×4 ×18	" 16	4½	¾	5¾	1·21
NBSB 6	7×3½×15	" 18	4	¾	5¼	1·14



NOTE.—For Beams less than 7 inches deep, gas-tube Distance Pieces are used.

DORMAN, LONG & CO. LIMITED.

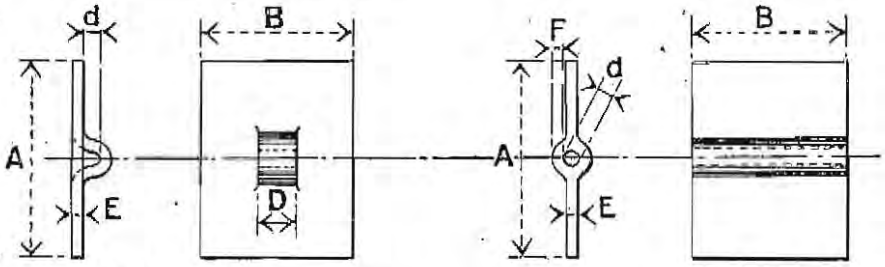
STANDARD SEPARATORS.



PRESSED STEEL — CAST IRON

FOR USE WITH BEAMS FROM 24″×7½″ TO 12″×5″

Reference Mark	DIMENSIONS IN INCHES								Weights in lbs.	
	A	B	C	D	E	F	G	d	Pressed Steel	Cast Iron
SP 1	20	7 7/16	14	1½	5/8	5/8	½	1	21·25	26·75
" 2	18	7	12	1½	5/8	5/8	½	1	18	23
" 3	16	6½	10	1½	5/8	5/8	½	1	15	19·5
" 4	14	8	9	1½	5/8	5/8	½	1	16	20·75
" 5	14	6 1/16	9	1½	5/8	5/8	½	1	12·25	16·25
" 6	12	8	8	1½	½	½	½	⅞	13·75	14·25
" 7	12	6 1/16	8	1½	½	½	½	⅞	10·5	11·25
" 8	10	8	6	1½	½	½	½	⅞	11·5	12·25
" 9	10	5⅝	6	1½	½	½	½	⅞	8·25	9
" 10	9	5⅛	5	1½	½	½	½	⅞	6·75	7·75
" 11	8	8 1/16	4	1½	½	½	½	⅞	9·25	10·25



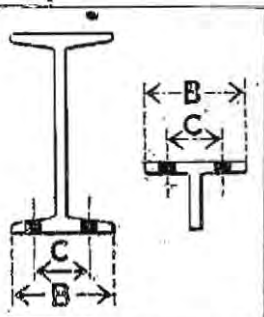
PRESSED STEEL — CAST IRON

FOR USE WITH BEAMS FROM 10″×8″ TO 7″×3½″

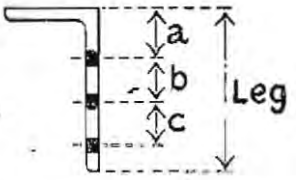
Reference Mark	DIMENSIONS IN INCHES						Weights in lbs.	
	A	B	D	E	F	d	Pressed Steel	Cast Iron
SP 12	6½	8 1/16	1½	½	3/8	⅞	7·5	8·5
" 13	6½	6⅛	1½	½	3/8	⅞	5·75	6·5
" 14	6½	4 1/16	1½	½	3/8	⅞	4·5	5
" 15	5½	7 1/16	1½	½	3/8	⅞	5·75	6·5
" 16	5½	4 3/16	1½	½	3/8	⅞	3·5	4
" 17	5	6⅛	1½	½	3/8	⅞	4·5	5·25
" 18	5	3¾	1½	½	3/8	⅞	2·75	3·25

DORMAN, LONG & CO. LIMITED.

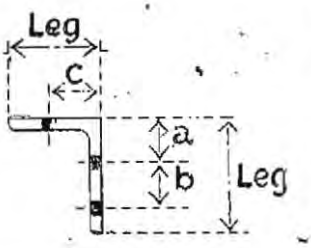
SPACING OF HOLES IN BEAMS, TEES, CHANNELS AND ANGLES.



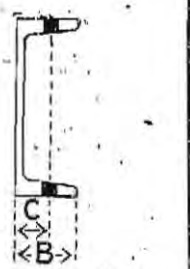
B inches	C inches	Dia. of Rivet or Bolt
8	4¾	⅞″
7½	4½	"
7	4	"
6½	3¾	"
6	3½	⅞″
5½	3¼	¾″
5	2¾	"
4½	2½	"
4	2¼	⅝″
3½	2	½″
3	1½	"
2½	1⅜	⅜″
2¼	1¼	⅜″
2	1⅛	¼″
1¾	⅞	"
1½	¾	"



Dimensions in Inches			
Leg	a	b	c
10 ..	3	2½	2½
.. 9	3	2	2
8 ..	2½	2	2

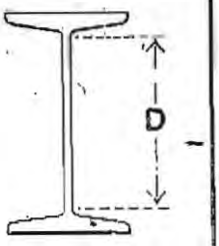


Dimensions in Inches			
Leg	a	b	c
10 ..	3	5	..
.. 9	3	4	..
8 ..	3	3	4½
.. 7	2½	3	4
6½ ..	2½	2½	3¾
.. 6	2¼	2¼	3½
5½ ..	2¼	2	3¼
.. 5	2	1¾	3
4½ ..	..	..	2½
.. 4	..	..	2¼
3½ ..	..	..	2
.. 3	..	..	1¾
2¾ ..	..	..	1⅝
.. 2½	..	..	1⅜
2¼ ..	..	..	1¼
.. 2	..	..	1⅛
1¾ ..	..	..	1
.. 1½	..	..	⅞
1¼ ..	..	..	¾

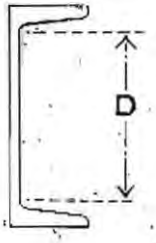


B inches	C inches	Dia. of Rivet or Bolt
4	2¼	⅞″
3½	2	"
3	1¾	"
2½	1⅜	¾″
2	1⅛	⅝″
1½	⅞	½″

DEPTHS OF WEBS CLEAR OF ROOT FILLETS.



BEAMS.



CHANNELS.

SIZE inches	D inches
Girder Sections	
24 ×7½	20·27
22 ×7	18·68
20 ×6½	16·81
18 ×6	15·03
16 ×6	13·09
15 ×6	12·23
14 ×5½	11·39
13 ×5	10·54
12 ×5	9·74
10 ×4½	7·84
9 ×4	7·04
8 ×4	6·16
7 ×3½	5·26
6 ×3	4·41
5 ×2½	3·57
4½ ×2	3·22
4 ×1¾	2·94
3 ×1½	1·97
Heavy Beams	
18×8	14·23
16×8	12·26
14×8	10·29
12×8	8·32
10×8	6·56
10×6	7·13
9×7	5·69
8×6	5·25
6×5	3·63
5×4½	2·83
4×3	2·47

SIZE inches	D inches
17×4	14·23
15×4	12·35
12×4	9·39
12×3½H	9·54
12×3½L	9·74
10×3½	7·62
10×3	7·99
9×3½	6·65
9×3	7·00
8×3½	5·69
8×3	6·00
7×3½	4·73
7×3	5·04
6×3½	3·77
6×3	4·12
5×2½	3·27
4×2	2·57
3×1½	1·78

NOTES ON PLATE GIRDERS.

GENERAL NOTE.—On the preceding pages, tables of beams and compounds are given, shewing the loads carried by each for various spans; but under some conditions, as for instance where the deflection allowed is very small, it will sometimes be found that the plate girders, given in the following pages, may be used with advantage.

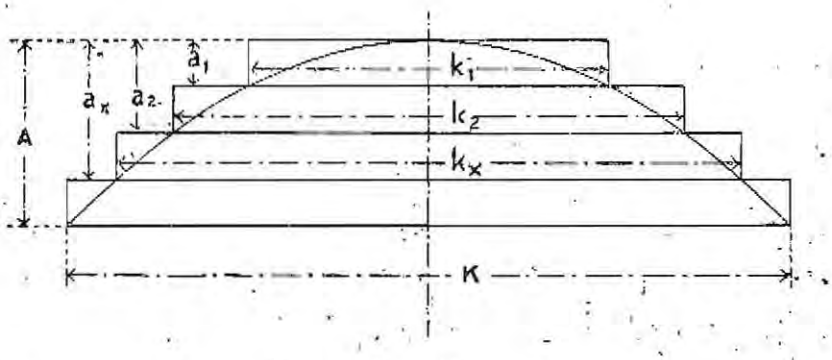
TABULAR LOADS.—The loads given in the tables include the weights of the girders themselves, and are, in each case, calculated from the modulus of the net section, i.e., both flanges holed. They are based on an extreme fibre stress of 8 tons per square inch.

When it is considered advisable to adopt any other extreme fibre stress, say f tons per square inch, the tabular loads should be altered in the ratio $\frac{f}{8}$.

The loads are also based on the assumption that the girders receive efficient lateral support, and the webs are adequately stiffened.

STIFFENERS.—The stiffening of plate girders may be effected by means of vertical angles fitting between the inner surfaces of the flange angles, and properly riveted to the web. In the case of girders having double webs, diaphragms may be adopted, which ensure greater unity than that obtained by using outer stiffeners alone. The spacing of the stiffeners depends on the depth of the girder, the thicknesses of web plates, and the purposes for which the girders are required.

CURTAILMENT OF PLATES.—Where it is not desirable to allow the flange plates to extend the full length of the girder, the limit to which they can be curtailed, for girders supported at both ends and having an uniformly distributed load, may be found as follows :—



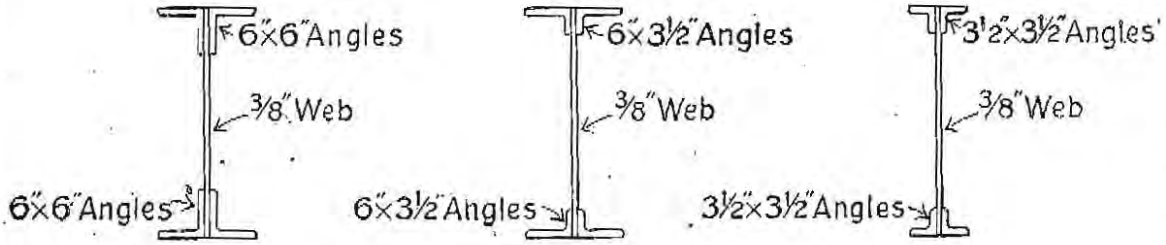
Let A = total area of flange, in square inches.
a_1 = area of top plate, in square inches.
a_2 = area of two top plates in square inches.
a_x = area of number x top plates, in square inches.
K = span of girder, in feet.
k_1 = length of top plate, in feet.
k_2 = length of second plate, in feet.
k_x = length of xth plate, in feet.

Then :—

$$k_1 = \frac{K\sqrt{a_1}}{\sqrt{A}} \qquad k_2 = \frac{K\sqrt{a_2}}{\sqrt{A}} \qquad k_x = \frac{K\sqrt{a_x}}{\sqrt{A}}$$

It is customary to make the plates longer than the lengths found by the above formulæ to the extent of about three pitches of rivets at each end, and the plate next to the flange angles is usually the full length of the girder.

PLATE GIRDERS.



Size Inches	Flange Angles	Area Square Inches	Section Modulus	SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED FOR SPANS IN FEET							
				10	15	20	25	30	40	50	60
60 × 12⅜	6 × 6 × ⅝	50·95	871	..	..	..	186	155	116	92·9	77·4
60 × 12⅜	6 × 6 × ⅜	39·95	608	..	186	161	129	107	80·5	64·4	53·6
60 × 12⅜	6 × 3½ × ⅝	44·70	736	..	..	186	157	131	98·1	78·5	65·4
60 × 12⅜	6 × 3½ × ⅜	36·20	522	..	186	139	111	92·9	69·7	55·7	46·4
60 × 7⅜	3½ × 3½ × ⅝	38·44	552	..	186	147	118	98·2	73·6	58·9	49·1
60 × 7⅜	3½ × 3½ × ⅜	32·44	411	186	146	110	87·7	73·1	54·8	43·8	36·5
48 × 12⅜	6 × 6 × ⅝	46·45	655	..	..	149	140	116	87·3	69·8	58·2
48 × 12⅜	6 × 6 × ⅜	35·45	447	..	149	119	95·4	79·5	59·6	47·7	39·8
48 × 12⅜	6 × 3½ × ⅝	40·20	556	..	149	148	119	98·9	74·2	59·3	49·4
48 × 12⅜	6 × 3½ × ⅜	31·70	388	149	138	103	82·8	69·0	51·7	41·4	34·5
48 × 7⅜	3½ × 3½ × ⅝	33·94	410	149	146	109	87·5	72·9	54·7	43·7	36·4
48 × 7⅜	3½ × 3½ × ⅜	27·94	299	149	106	79·8	63·8	53·2	39·9	31·9	26·6
42 × 12⅜	6 × 6 × ⅝	44·20	552	..	..	130	118	98·1	73·6	58·9	49·1
42 × 12⅜	6 × 6 × ⅜	33·20	374	..	130	99·8	79·9	66·6	49·9	39·9	33·3
42 × 12⅜	6 × 3½ × ⅝	37·95	472	..	130	126	101	83·8	62·9	50·3	41·9
42 × 12⅜	6 × 3½ × ⅜	29·45	326	130	116	86·9	69·5	57·9	43·5	34·8	29·0
42 × 7⅜	3½ × 3½ × ⅝	31·69	344	130	122	91·8	73·4	61·2	45·9	36·7	30·6
42 × 7⅜	3½ × 3½ × ⅜	25·69	248	130	88·3	66·2	53·0	44·2	33·1	26·5	22·1
36 × 12⅜	6 × 6 × ⅝	41·95	453	..	..	111	96·7	80·6	60·4	48·3	40·3
36 × 12⅜	6 × 6 × ⅜	30·95	305	111	108	81·4	65·1	54·2	40·7	32·5	27·1
36 × 12⅜	6 × 3½ × ⅝	35·70	390	..	111	104	83·3	69·4	52·0	41·6	34·7
36 × 12⅜	6 × 3½ × ⅜	27·20	267	111	95·0	71·3	57·0	47·5	35·6	28·5	23·8
36 × 7⅜	3½ × 3½ × ⅝	29·44	282	111	100	75·1	60·1	50·1	37·5	30·0	25·0
36 × 7⅜	3½ × 3½ × ⅜	23·44	201	107	71·5	53·6	42·9	35·7	26·8	21·4	17·9
30 × 12⅜	6 × 6 × ⅝	39·70	358	..	..	92·8	76·4	63·7	47·7	38·2	..
30 × 12⅜	6 × 6 × ⅜	28·70	239	92·8	85·2	63·9	51·1	42·6	31·9	25·5	..
30 × 12⅜	6 × 3½ × ⅝	33·45	312	..	92·8	83·3	66·7	55·5	41·7	33·3	..
30 × 12⅜	6 × 3½ × ⅜	24·95	212	92·8	75·4	56·5	45·2	37·7	28·3	22·6	..
30 × 7⅜	3½ × 3½ × ⅝	27·19	223	92·8	79·1	59·3	47·5	39·6	29·7	23·7	..
30 × 7⅜	3½ × 3½ × ⅜	21·19	157	83·7	55·8	41·9	33·5	27·9	20·9	16·7	..

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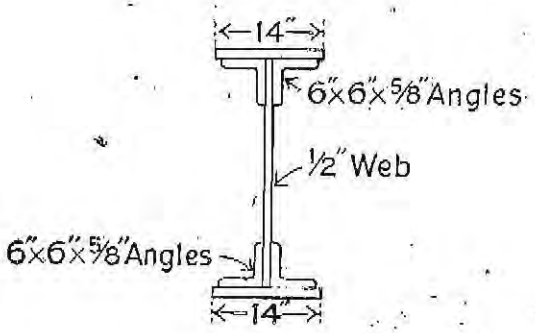
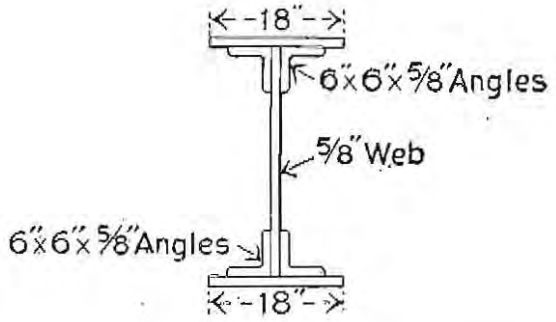
PLATE GIRDERS.



Size Inches	Depth of Web Inches	Flange Thickness Inches	Section Modulus	SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED FOR SPANS IN FEET								
				20	25	30	35	40	45	50	55	60
64 ×14	60	2	2261	..	..	..	..	..	248	241	219	201
63 ×14	60	1½	1909	..	..	..	..	248	226	204	185	170
62 ×14	60	1	1558	..	..	248	237	208	185	166	151	139
61½ ×14	60	¾	1383	..	248	246	211	184	164	148	134	123
61 ×14	60	½	1208	..	248	215	184	161	143	129	117	107
52 ×14	48	2	1753	..	..	..	..	..	198	187	170	156
51 ×14	48	1½	1473	..	..	..	198	196	175	157	143	131
50 ×14	48	1	1193	..	..	198	182	159	141	127	116	106
49½ ×14	48	¾	1053	..	198	187	160	140	125	112	102	93·6
49 ×14	48	½	914	198	195	162	139	122	108	97·5	88·6	81·2
46 ×14	42	2	1507	..	..	..	..	..	173	161	146	134
45 ×14	42	1½	1261	..	..	..	173	168	150	135	122	112
44 ×14	42	1	1017	..	..	173	155	136	121	109	98·6	90·4
43½ ×14	42	¾	896	..	173	159	136	119	106	95·5	86·8	79·6
43 ×14	42	½	774	173	165	138	118	103	91·8	82·6	75·1	68·8
40 ×14	36	2	1266	..	..	..	..	..	149	135	123	112
39 ×14	36	1½	1056	..	..	..	149	141	125	113	102	93·8
38 ×14	36	1	847	..	..	149	129	113	100	90·3	82·1	75·3
37½ ×14	36	¾	743	..	149	132	113	99·1	88·0	79·2	72·0	66·0
37 ×14	36	½	639	149	136	114	97·4	85·2	75·8	68·2	62·0	56·8
34 ×14	30	2	1030	..	..	..	..	124	122	110	99·9	..
33 ×14	30	1½	855	..	..	..	124	114	101	91·2	82·9	..
32 ×14	30	1	682	..	124	121	104	90·9	80·8	72·7	..	..
31½ ×14	30	¾	595	..	124	106	90·7	79·4	70·6	63·5	..	..
31 ×14	30	½	509	124	109	90·6	77·6	67·9	60·4	54·3	..	..

PLATE GIRDERS.



Size Inches	Depth of Web Inches	Flange Thickness Inches	Section Modulus	SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED FOR SPANS IN FEET								
				20	25	30	35	40	45	50	55	60
64 × 18	60	2	2795	..	..	..	..	..	309	298	271	248
63 × 18	60	1½	2323	..	..	..	..	309	275	248	225	207
62 × 18	60	1	1853	..	..	309	282	247	220	198	180	165
61½ × 18	60	¾	1618	..	309	288	247	216	192	173	157	144
61 × 18	60	½	1383	309	295	246	211	184	164	148	134	123
52 × 18	48	2	2172	..	..	..	..	..	248	232	211	193
51 × 18	48	1½	1795	..	..	..	248	239	213	191	174	160
50 × 18	48	1	1419	..	..	248	216	189	168	151	138	126
49½ × 18	48	¾	1232	..	248	219	188	164	146	131	119	110
49 × 18	48	½	1045	248	223	186	159	139	124	111	101	92·9
46 × 18	42	2	1869	..	..	..	..	..	217	199	181	166
45 × 18	42	1½	1540	..	..	..	217	205	182	164	149	137
44 × 18	42	1	1212	..	217	215	185	162	144	129	118	108
43½ × 18	42	¾	1048	..	217	186	160	140	124	112	102	93·2
43 × 18	42	½	885	217	189	157	135	118	105	94·4	85·8	78·7
40 × 18	36	2	1573	..	..	..	..	..	186	168	153	140
39 × 18	36	1½	1291	..	..	..	186	172	153	138	125	115
38 × 18	36	1	1010	..	186	180	154	135	120	108	98·0	89·8
37½ × 18	36	¾	870	..	186	155	133	116	103	92·8	84·4	77·4
37 × 18	36	½	731	186	156	130	111	97·5	86·6	78·0	70·9	65·0
34 × 18	30	2	1284	..	..	..	..	155	152	137	124	..
33 × 18	30	1½	1048	..	..	..	155	140	124	112	102	..
32 × 18	30	1	815	..	155	145	124	109	96·6	86·9	..	..
31½ × 18	30	¾	699	155	149	124	106	93·2	82·8	74·5	..	..
31 × 18	30	½	583	155	124	104	88·9	77·7	69·1	62·2	..	..

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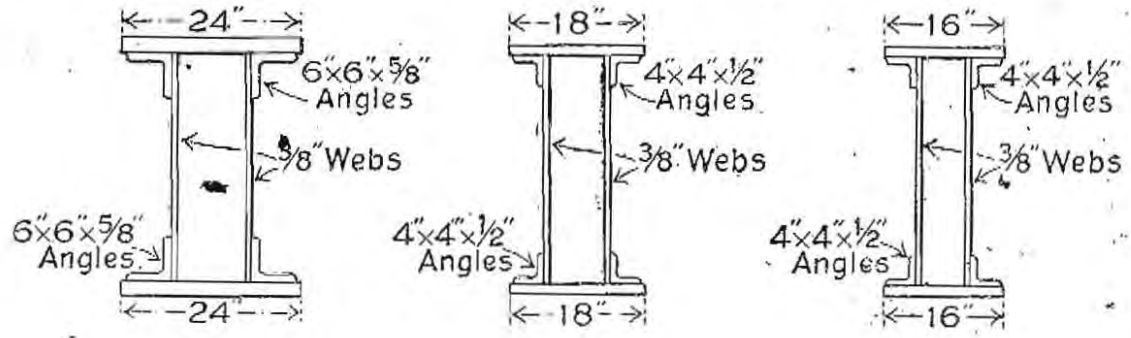
BOX PLATE GIRDERS.



Size Inches	Depth of Web Inches	Flange Thickness Inches	Section Modulus	SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED FOR SPANS IN FEET								
				10	15	20	25	30	35	40	50	60
64×24	60	2	3348	..	..	..	..	..	..	371	357	297
62×24	60	1	2155	..	..	..	..	371	328	287	230	192
61×24	60	½	1562	..	..	371	333	278	238	208	167	139
52×24	48	2	2602	..	..	..	..	..	..	297	278	231
50×24	48	1	1652	..	..	..	297	294	252	220	176	147
49×24	48	½	1180	..	..	297	252	210	180	157	126	105
46×24	42	2	2242	..	..	..	..	..	..	260	239	199
44×24	42	1	1411	..	..	..	260	251	215	188	151	125
43×24	42	½	999	..	..	260	213	178	152	133	107	88·8
40×24	36	2	1889	..	..	..	..	..	..	223	202	168
38×24	36	1	1178	..	..	..	223	209	179	157	126	105
37×24	36	½	825	..	223	220	176	147	126	110	88·0	73·3
34×24	30	2	1545	..	..	..	..	..	..	186	165	..
32×24	30	1	952	..	..	..	186	169	145	127	102	..
31×24	30	½	659	..	186	176	141	117	100	87·8	70·3	..
51×18	48	1½	1682	..	..	..	297	290	249	218	174	145
49×18	48	½	875	..	297	233	187	156	133	117	93·4	77·8
45×18	42	1½	1399	..	..	..	260	249	213	187	149	124
43×18	42	½	738	..	260	197	157	131	112	98·4	78·7	65·6
39×18	36	1½	1178	..	..	..	223	209	179	156	125	104
37×18	36	½	607	223	216	162	130	108	92·6	81·0	64·8	54·0
33×18	30	1½	955	..	..	..	186	170	146	127	102	..
31×18	30	½	484	186	172	129	103	86·0	73·7	64·5	51·6	..
51×16	48	1½	1487	..	..	..	297	264	227	198	159	132
49×16	48	½	827	297	294	221	177	147	126	110	88·3	73·5
45×16	42	1½	1273	..	..	..	260	226	194	170	136	113
43×16	42	½	696	260	247	186	148	124	106	92·8	74·2	61·9
39×16	36	1½	1065	..	..	..	223	189	162	142	114	94·7
37×16	36	½	571	223	203	152	122	102	87·1	76·2	60·9	50·8
33×16	30	1½	865	..	..	186	184	154	132	115	92·2	..
31×16	30	½	454	186	161	121	96·8	80·7	69·1	60·5	48·4	..

NOTES ON ROOFS.

APPROXIMATE WEIGHTS, PER SQUARE FOOT OF GROUND AREA COVERED, FOR STEEL ROOF PRINCIPALS, WITH THE VARIOUS FORMS OF COVERING ENUMERATED BELOW:—

Roof covered with corrugated sheets and steel purlins	7 to 9 lbs.
" " " slates and steel purlins	12 " 16 "
" " " slates, boards and steel purlins	15 " 20 "

For large spans special calculations should be made.

PRESSURE OF WIND ON ROOFS (PER DUCHEMIN'S FORMULA).

a = Angle of surface of roof with horizontal.

F = Force of wind in lbs. per square foot of vertical surface.

N = Corresponding normal pressure per square foot of roof surface $= F \times \frac{2 \sin.a}{1+\sin.^2 a}$.

V = Vertical Component of N = N × cos. a.

H = Horizontal Component of N = N × sin. a.

PRESSURE OF WIND ON ROOFS WHERE THE PROPORTION OF HEIGHT TO HALF SPAN = 1 : 2* (based on the above formulæ).

F. in lbs. per sq. ft.	5	10	15	20	25	30	35	40	45	50	55	60
N	3·73	7·45	11·2	14·9	18·6	22·4	26·1	29·8	33·5	37·3	41·0	44·7
V	3·33	6·67	10·0	13·3	16·7	20·0	23·3	26·7	30·0	33·3	36·7	40·0
H	1·67	3·33	5·00	6·67	8·33	10·0	11·7	13·3	15·0	16·7	18·3	20·0

PRESSURES OF WIND ON ROOFS (based on the above formulæ).

Angle of Roof a	5°	10°	1 in 3	20°	1 in 2½	1 in 2*	30°	1 in 1½	40°	45°	60°	75°	90°
N = F ×	·173	·337	·575	·612	·658	·745	·800	·848	·910	·943	·990	·999	1·00
V = F ×	·172	·332	·545	·575	·606	·667	·693	·706	·697	·667	·495	·259	·00
H = F ×	·015	·059	·182	·209	·242	·333	·400	·471	·585	·667	·857	·965	1·00

PROPORTIONS OF ROOFS.

Proportion of height to half span	Angle		Proportion of Length of Rafter		Proportion of height to half span	Angle		Proportion of Length of Rafter	
	Deg.	Min.	to height	to half span		Deg.	Min.	to height	to half span
1/1	45	0	1·41421	1·41421	*1/2	26	34	2·23607	1·11803
1/1½	33	41	1·80277	1·20185	1/2½	21	48	2·69258	1·07703
$1/\sqrt{3}$	30	0	2·00000	1·15470	1/3	18	26	3·16228	1·05409

*The proportion, 1 : 2 of height to half span, has been adopted as meeting ordinary requirements for sheeted roofs.

ROOF TRUSSES.

Table of Coefficients for the determination of Stresses, and Lengths of Members, in Roof Trusses, for any span, the proportion of height to half the span being 1 : 2.

To find the Stress in any Member :—

Let S = Span between the points of intersection of the Rafter and Tie.

L = Total Dead Load carried by the Truss, including its own weight.

W = Total Wind Pressure resisted by the Truss, acting on one side of roof, and normal to its surface.

f = Total Stress required.

Then f = (L multiplied by Coefficient for Dead Load) + (W multiplied by Coefficient* for Wind Pressure).

* In Trusses of larger spans it is sometimes advisable to provide for expansion, in which case the coefficient for wind pressure corresponding to "one end free" should be used.

To find the length of any Member between points of intersection :—

Multiply S by the length coefficient for that member.

NOTE.—The following Stress Coefficients have been calculated on the assumption that the roof purlins occur over the points of intersection of the various members with the rafter; when such is not the case, bending is produced in the rafter which necessitates further calculation, or allowance being made when deciding its section.

	Member of Truss	STRESS COEFFICIENTS			Length Coefficients
		Dead Load	Normal Wind Pressure		
			Both ends fixed	One end free	
FIG. 1.	a b	·838	·875	..	·27950
	b d	·727	·875	..	·27950
	b c	·223	·500	..	·13975
	a c	·750	·978	..	·31250
	c e	·500	·419	..	·18750
	c d	·250	·559	..	·31250
FIG. 2.	a b	·932	1·042	..	·18634
	b d	·758	·820	..	·18634
	d e	·783	1·042	..	·18634
	b c	·179	·401	..	·16797
	d c	·179	·401	..	·16797
	a c	·833	1·165	..	·31250
	c f	·500	·419	..	·18750
	c e	·333	·746	..	·31250
FIG. 3.	a b	·978	1·125	1·125	·13975
	b d	·922	1·125	1·125	·13975
	d f	·866	1·125	1·125	·13975
	f h	·811	1·125	1·125	·13975
	b c	·112	·250	·250	·06987
	f g	·112	·250	·250	·06987
	d e	·224	·500	·500	·13975
	a c	·875	1·258	1·397	·15625
	c e	·750	·978	1·118	·15625
	e j	·500	·419	·559	·18750
	c d	·125	·279	·279	·15625
	d g	·125	·279	·279	·15625
	g h	·375	·838	·838	·15625
	e g	·250	·559	·559	·15625

FIG 1.

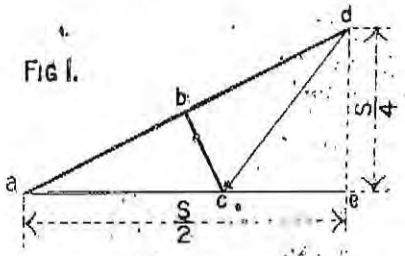


FIG 2.

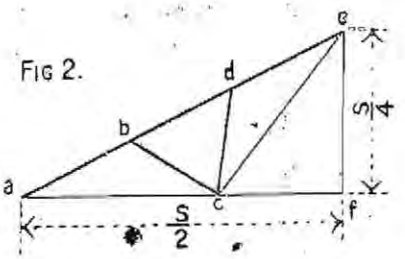
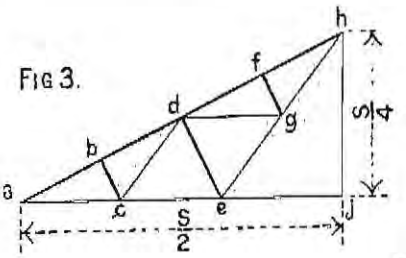


FIG 3.



NOTE.—Heavy lines indicate Compression and light lines Tension Members.

DORMAN, LONG & CO. LIMITED.

ROOF TRUSSES.

Table of Coefficients for the determination of Stresses, &c.

Member of Truss		STRESS COEFFICIENTS			Length Coefficients
		Dead Load	Normal Wind Pressure		
			Both ends fixed	One end free	
FIG. 4.	a b	1·025	1·208	1·208	·09317
	b d	·938	1·097	1·097	·09317
	d e	·950	1·208	1·208	·09317
	e g	·913	1·208	1·208	·09317
	g j	·826	1·097	1·097	·09317
	j k	·838	1·208	1·208	·09317
	b c	·090	·200	·200	·08398
	d c	·090	·200	·200	·08398
	g h	·090	·200	·200	·08398
	j h	·090	·200	·200	·08398
	e f	·224	·500	·500	·13975
	a c	·917	1·351	1·491	·15625
	c f	·750	·978	1·118	·15625
	f l	·500	·419	·559	·18750
	c e	·167	·373	·373	·15625
	e h	·167	·373	·373	·15625
	h k	·417	·932	·932	·15625
	f h	·250	·559	·559	·15625
FIG. 5.	a b	1·048	1·250	1·250	·06987
	b d	1·020	1·250	1·250	·06987
	d f	·992	1·250	1·250	·06987
	f h	·964	1·250	1·250	·06987
	h k	·936	1·250	1·250	·06987
	k m	·908	1·250	1·250	·06987
	m o	·880	1·250	1·250	·06987
	o q	·852	1·250	1·250	·06987
	b c	·056	·125	·125	·03494
	f g	·056	·125	·125	·03494
	k l	·056	·125	·125	·03494
	o p	·056	·125	·125	·03494
	d e	·112	·250	·250	·06987
	m n	·112	·250	·250	·06987
	h j	·224	·500	·500	·13975
	a c	·937	1·397	1·537	·07812
	c e	·875	1·258	1·397	·07812
	e j	·750	·978	1·118	·15625
	j r	·500	·419	·559	·18750
	c d	·062	·140	·140	·07812
	d g	·062	·140	·140	·07812
	l m	·062	·140	·140	·07812
	m p	·062	·140	·140	·07812
	g h	·187	·419	·419	·07812
	h l	·187	·419	·419	·07812
	e g	·125	·279	·279	·07812
	l n	·125	·279	·279	·07812
	p q	·437	·978	·978	·07812
	n p	·375	·838	·838	·07812
	j n	·250	·559	·559	·15625

FIG 4.

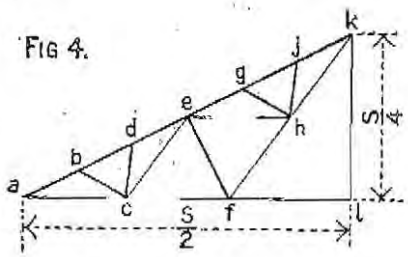
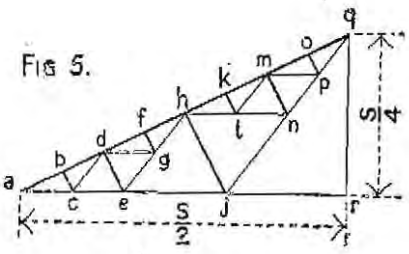
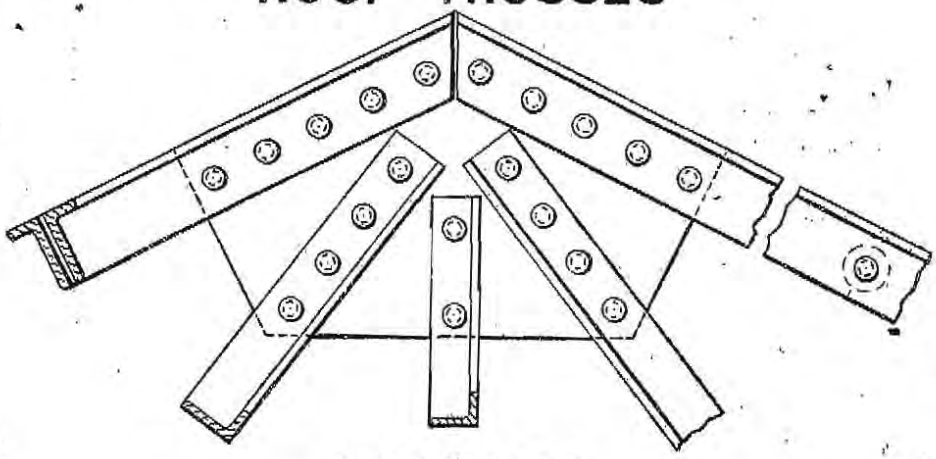


FIG 5.

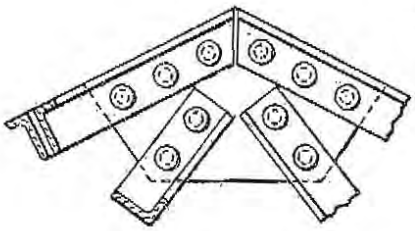


NOTE.—Heavy lines indicate Compression and light lines Tension Members.

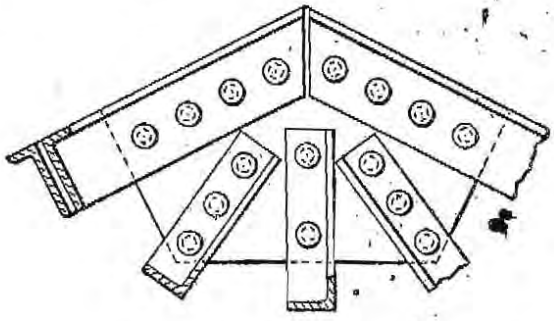
TYPE CONNECTIONS FOR ROOF TRUSSES



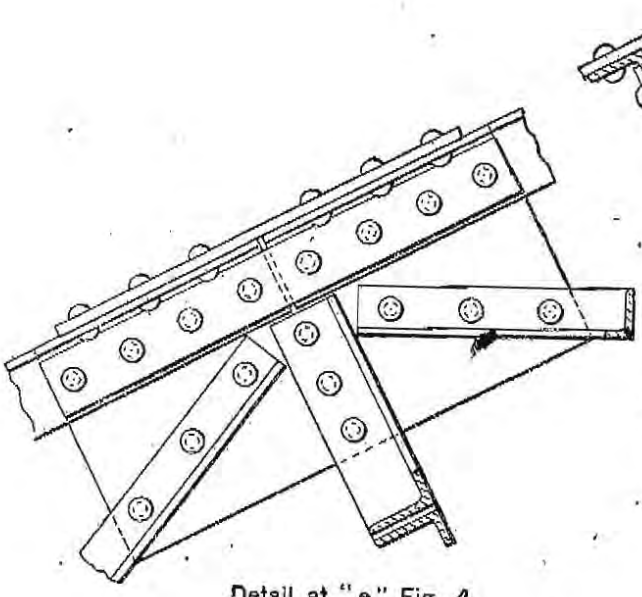
Detail at "k," Fig. 4.



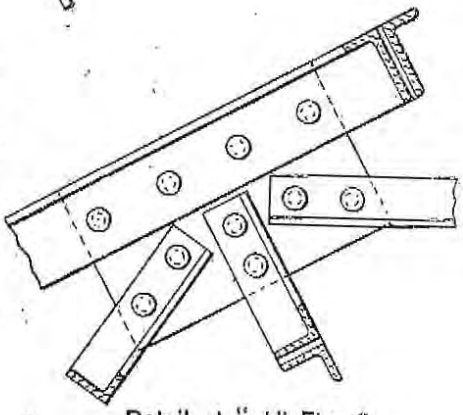
Detail at "d," Fig. 1.



Detail at "h," Fig. 3.

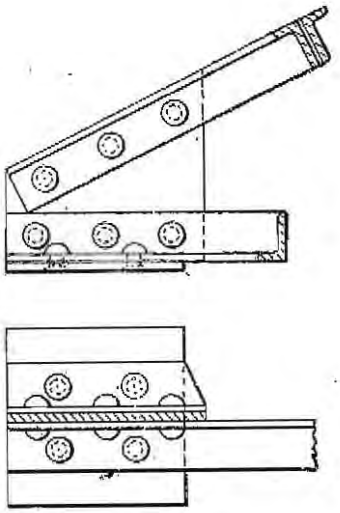


Detail at "e," Fig. 4.

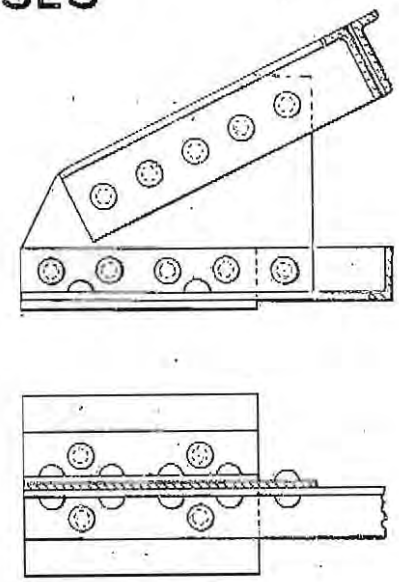


Detail at "d," Fig. 3.

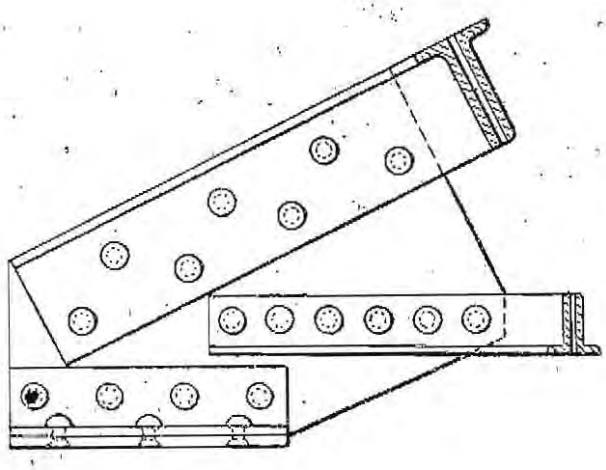
TYPE CONNECTIONS FOR ROOF TRUSSES

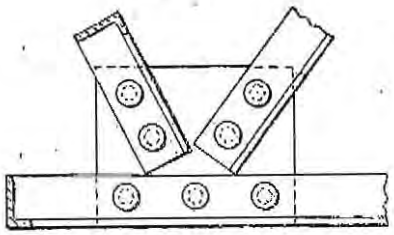


Detail at "a," Fig. 1.

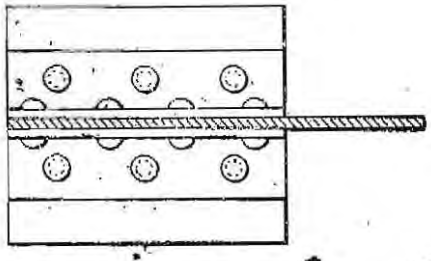


Detail at "a," Fig. 3.

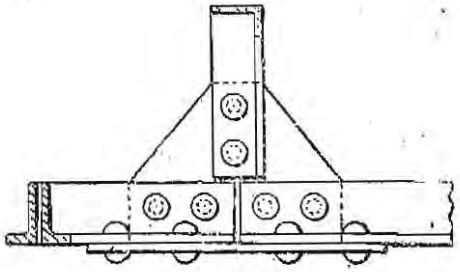




Detail at "c," Figs. 1 & 3.

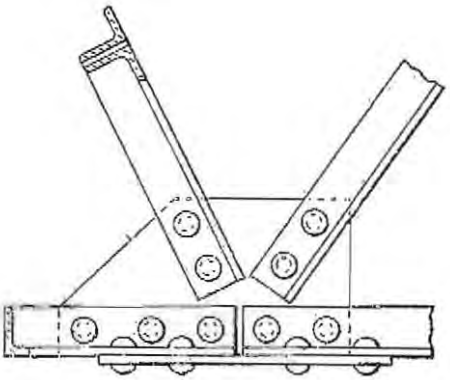


Detail at "a," Fig. 5.

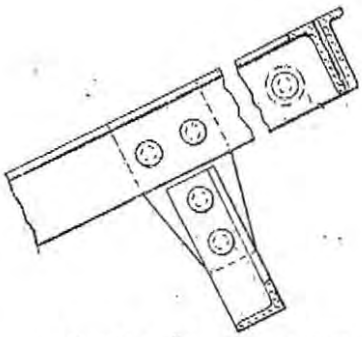


Detail at "l," Fig. 4.

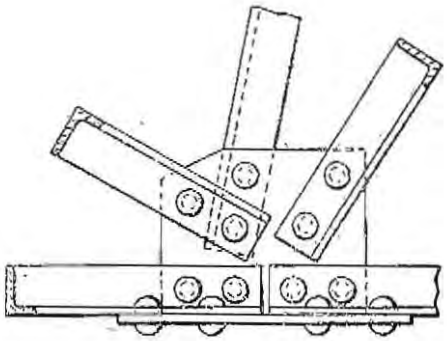
TYPE CONNECTIONS FOR ROOF TRUSSES



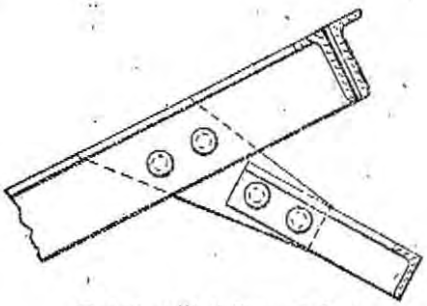
Detail at "e," Fig. 3.



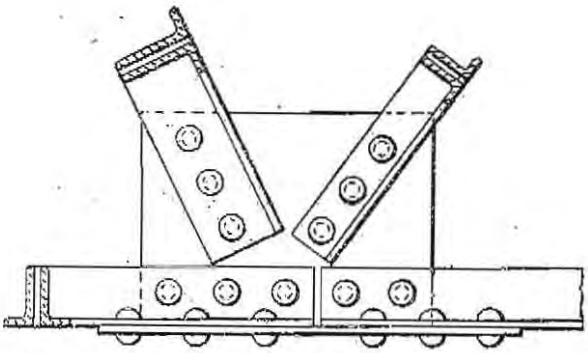
Detail at "b," Figs. 1 & 3.



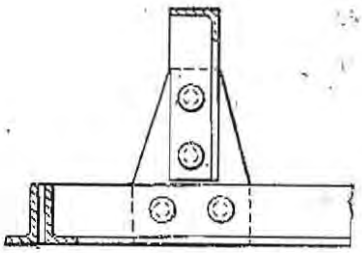
Detail at " c," Fig. 2.



Detail at "b," Figs. 2 & 4.

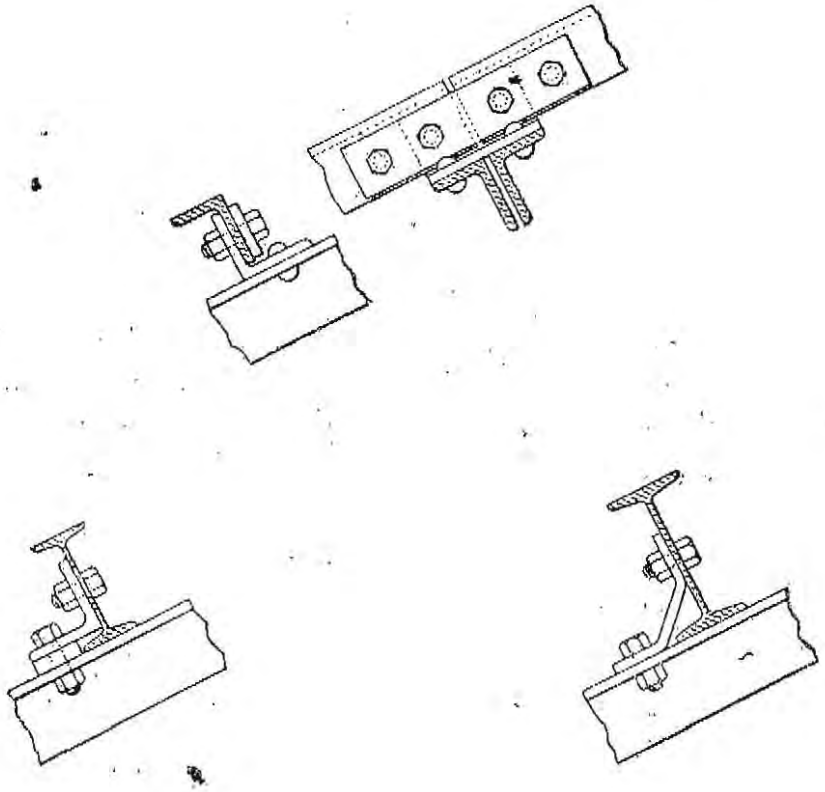


Detail at "j," Fig. 5.

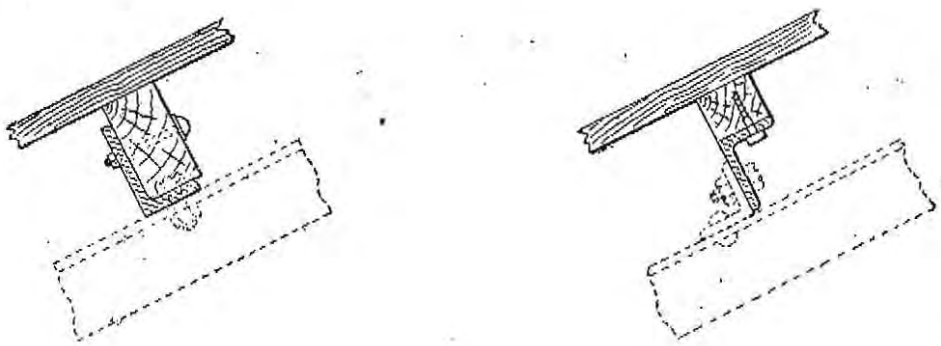


Detail at " r," Fig. 5.

TYPE DETAILS FOR PURLINS

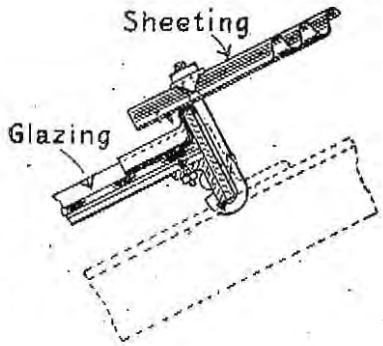


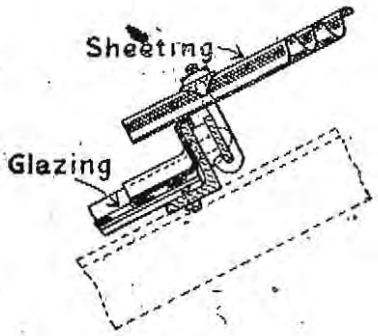
PURLIN GLEAT CONNEOTIONS

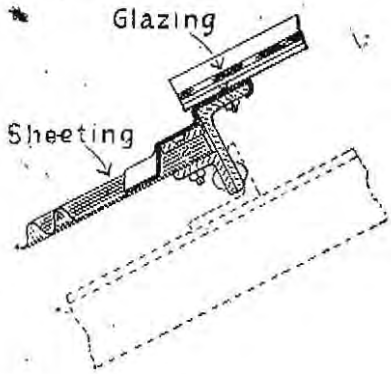


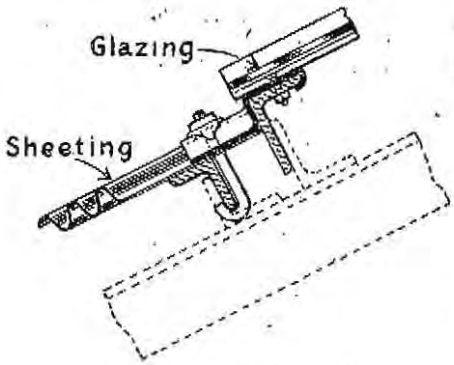
PURLINS FOR TIMBER

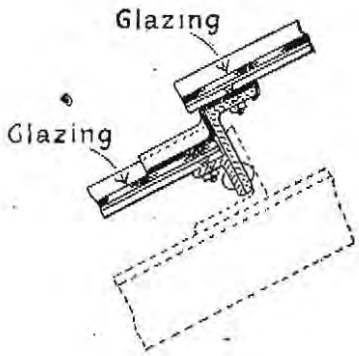
TYPE DETAILS FOR PURLINS

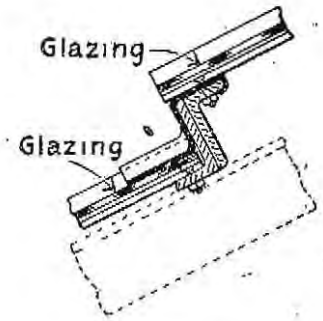










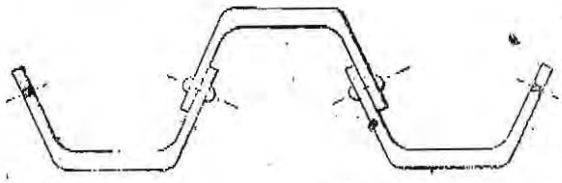


PURLINS FOR CORRUGATED SHEETS AND GLAZING

NOTES ON ROLLED TROUGHING.

TROUGHING, as illustrated on the following pages, can be recommended for a variety of purposes. When used for road bridges, it not only affords a watertight superstructure for carrying the road metalling, but, in most cases, dispenses with the use of cross girders and frequently with the main girders also. In railway bridges it frequently takes the place of cross girders, railbearers and timber planking; at the same time forming a safer floor in case of derailment. A maximum amount of headway under the bridge is attained, and a saving in cost effected. The smaller sections will be found especially useful for the decking of piers, floors of warehouses, ceilings of subways, strong rooms, etc.

The troughing is usually riveted, before dispatch, in sections of three, thus :—



The site connections are generally made with rivets, but bolted connections may be adopted when found advisable; either method affording easy means of erection.

Single troughs, as illustrated on pages 49 and 50, are frequently used as roof gutters, and permit of the supports being placed at long distances apart.

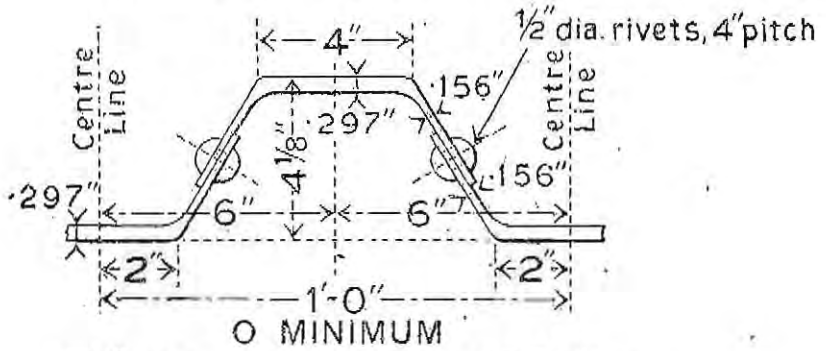
DIMENSIONS, PROPERTIES, SAFE LOADS, &c. Diagrams of the various sections of rolled trough flooring are shown on pages 191 to 199; and tables, giving dimensions and properties in inch units, also safe loads, will be found on pages 200 to 202. The properties have been carefully calculated on correct profiles, fillets and rounded corners being taken into consideration.

The tabular loads include the weight of the troughing itself, and are calculated from the section modulus of the width "C" shewn on diagrams. They are based on an extreme fibre stress of $6\frac{1}{2}$ tons per square inch.

From these particulars the section required to safely support any specified load may be easily determined.

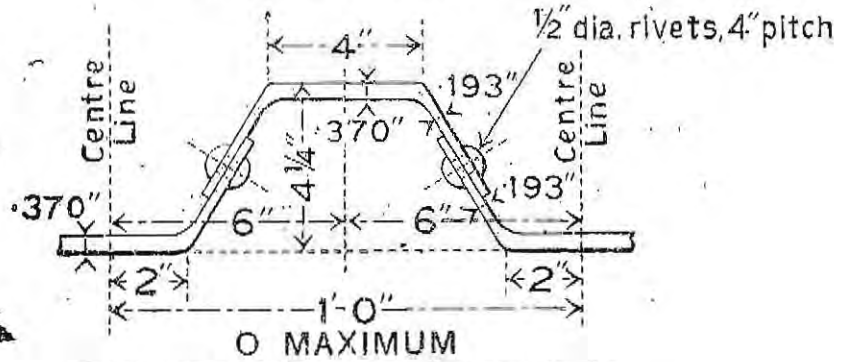
EXAMPLES.—The application of the various sizes of troughing to bridge work, together with the necessary calculations, are given on pages 203 to 208.

STEEL TROUGHING



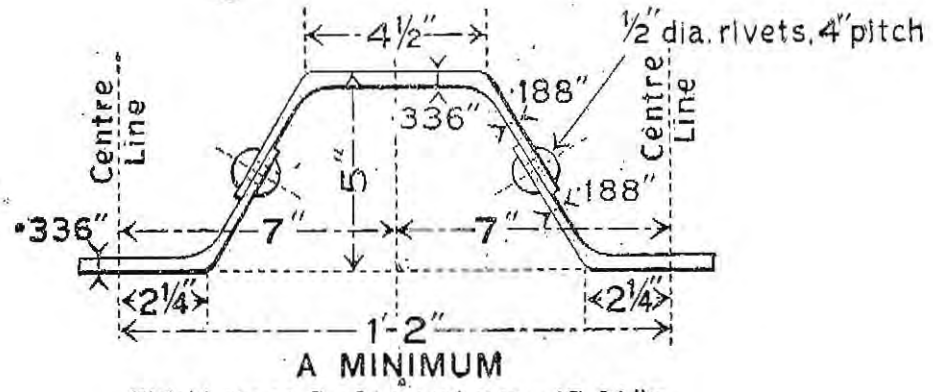
O MINIMUM

Weight per sq. ft. of covered area = 15·32 lbs
Section Modulus = 5·27



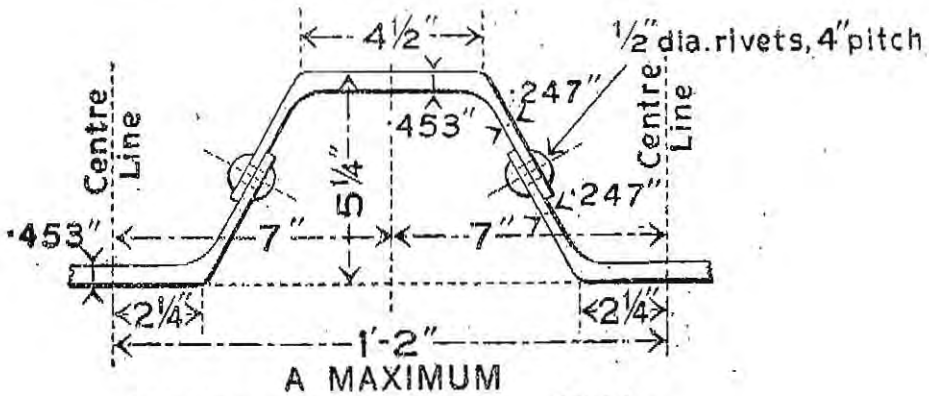
O MAXIMUM

Weight per sq. ft. of covered area = 18·84 lbs
Section Modulus = 6·46



A MINIMUM

Weight per sq. ft. of covered area = 17·61 lbs
Section Modulus = 8·4

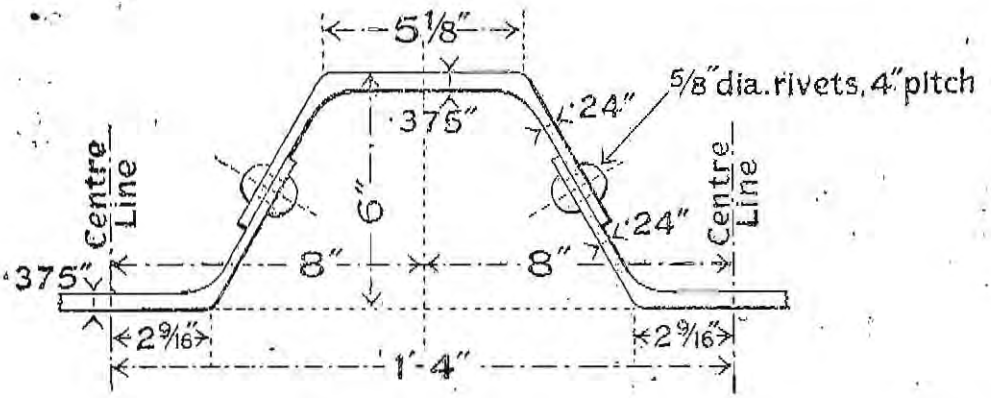


A MAXIMUM

Weight per sq. ft. of covered area = 23·1 lbs
Section Modulus = 11·05

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

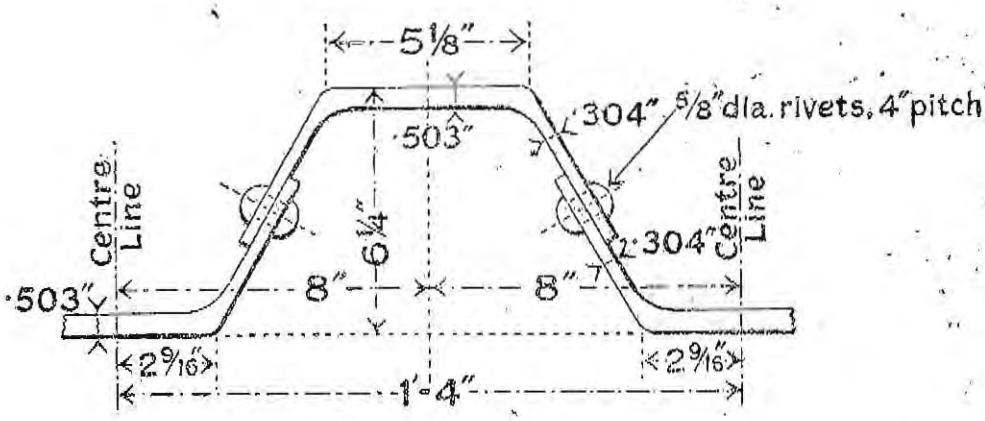
STEEL TROUGHING



B MINIMUM

Weight per sq. ft. of covered area = 21·8 lbs

Section Modulus = 13·5



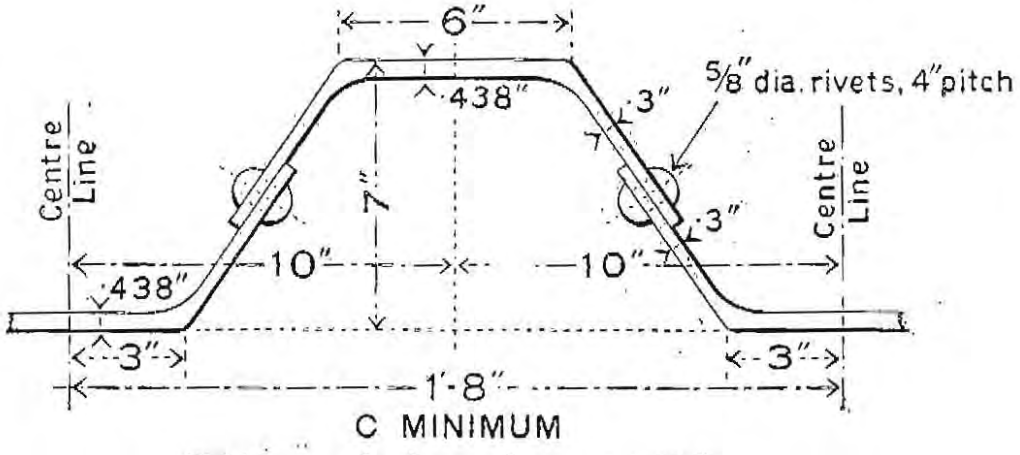
B MAXIMUM

Weight per sq. ft. of covered area = 28 lbs

Section Modulus = 17·5

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

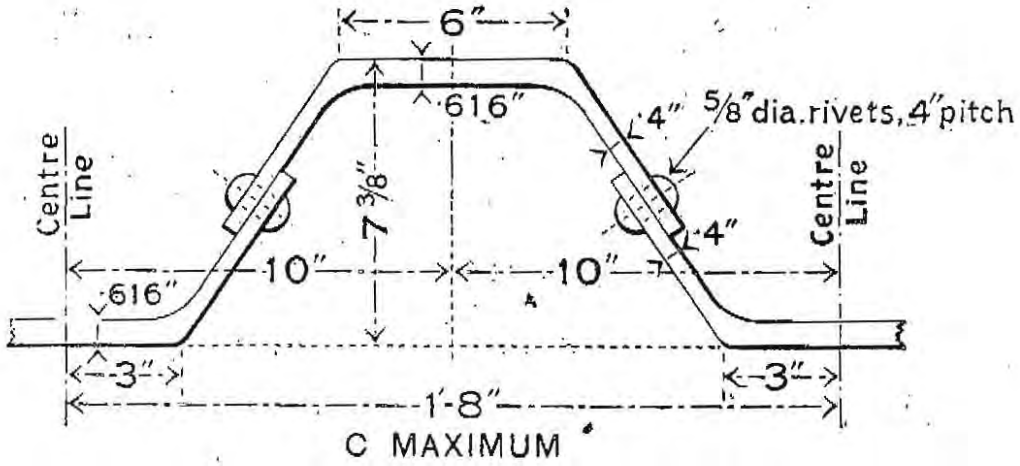
STEEL TROUGHING



C MINIMUM

Weight per sq. ft. of covered area = **24·52** lbs.

Section Modulus = **21·62**



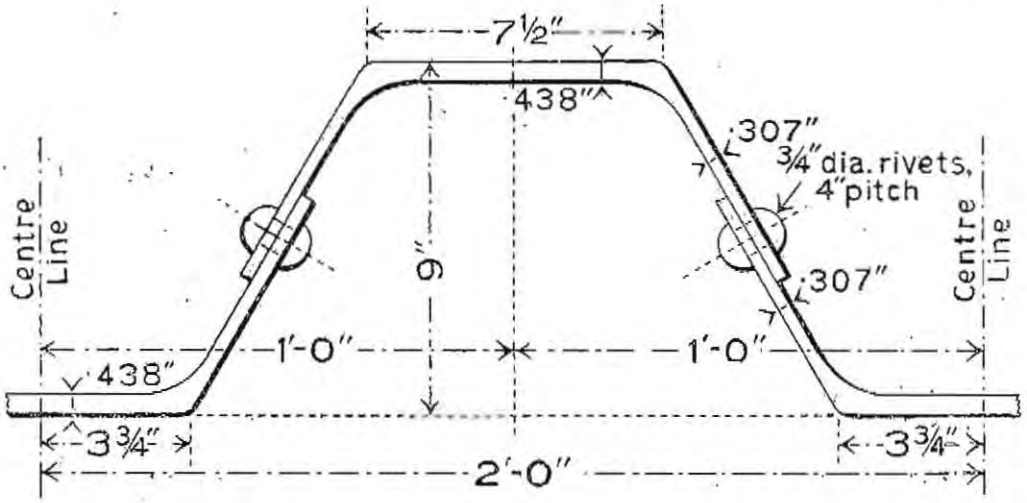
C MAXIMUM

Weight per sq. ft. of covered area = **32·97** lbs.

Section Modulus = **30·6**

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

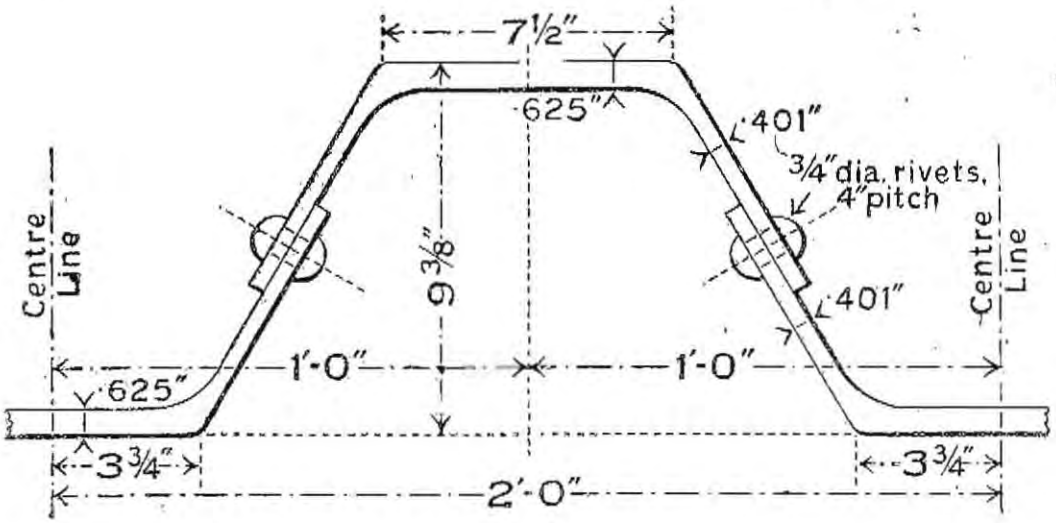
STEEL TROUGHING



C¹ MINIMUM

Weight per sq. ft. of covered area = 26·26 lbs

Section Modulus = 36·57



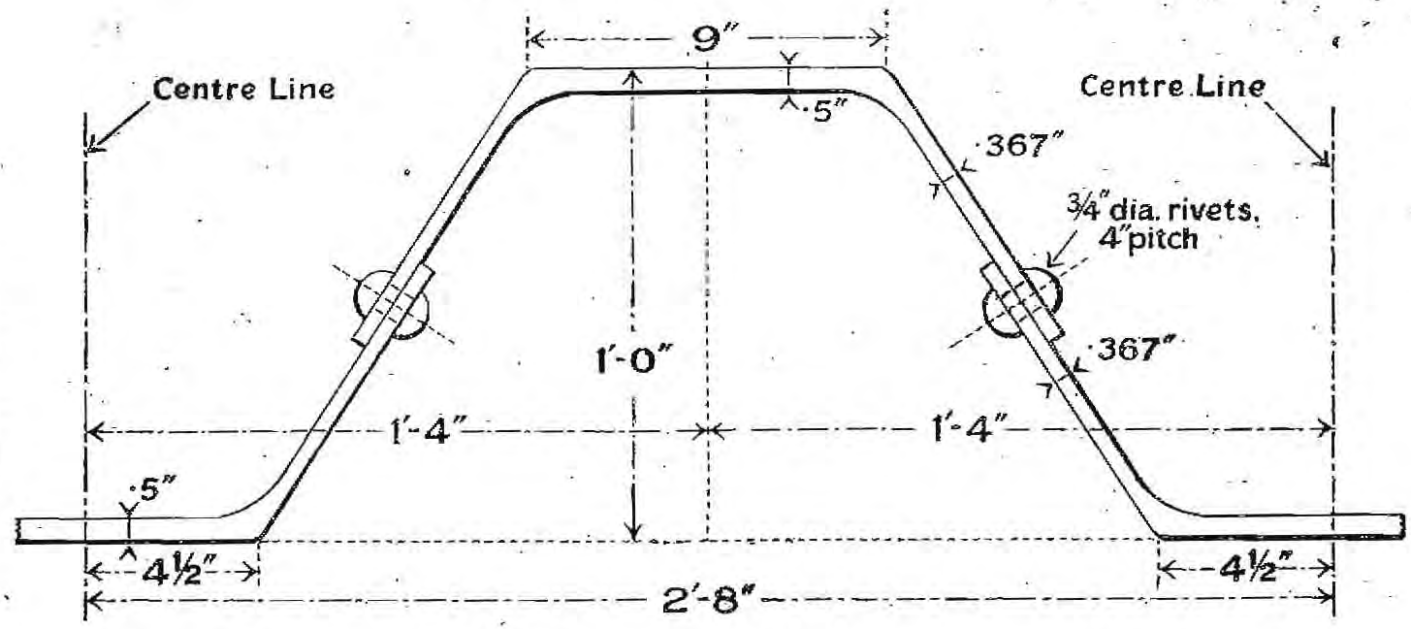
C¹ MAXIMUM.

Weight per sq. ft. of covered area = 35·02 lbs

Section Modulus = 51·45

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

STEEL TROUGHING



D MINIMUM

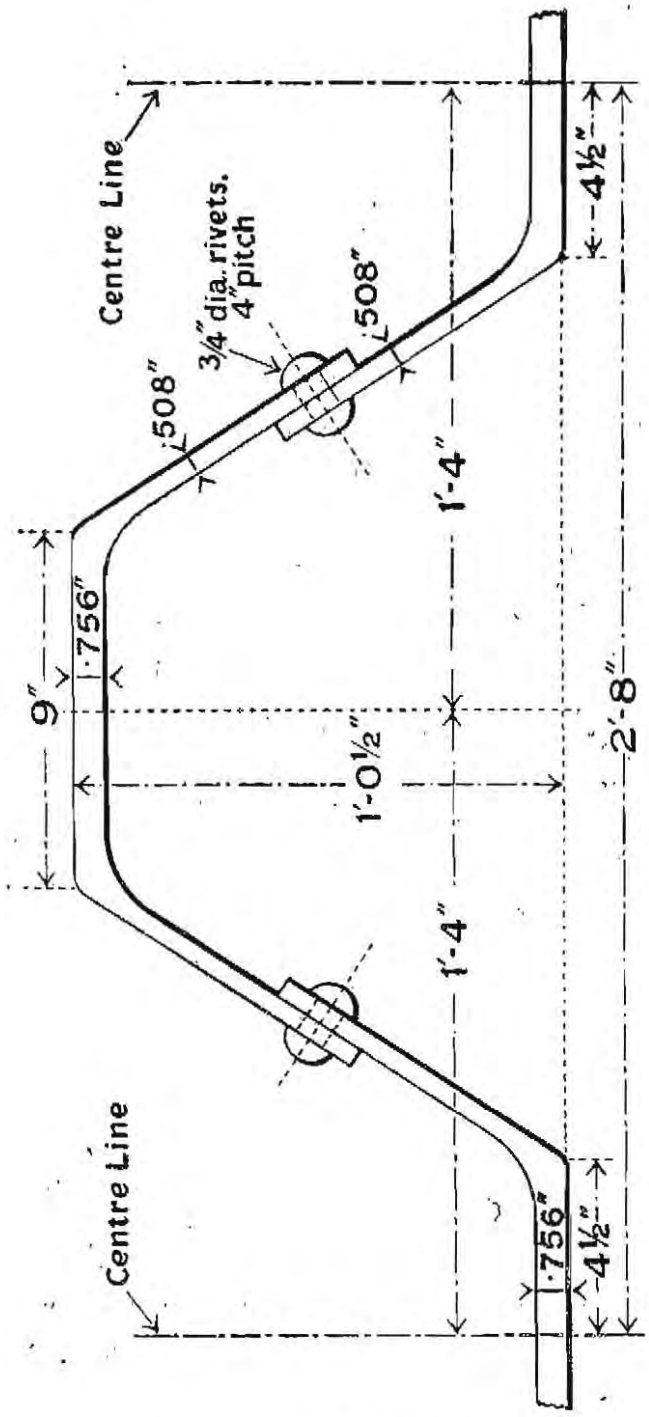
Weight per sq. ft. of covered area = 28·78 lbs

Section Modulus = 72·67

D MINIMUM

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

STEEL TROUGHING



D MEDIUM

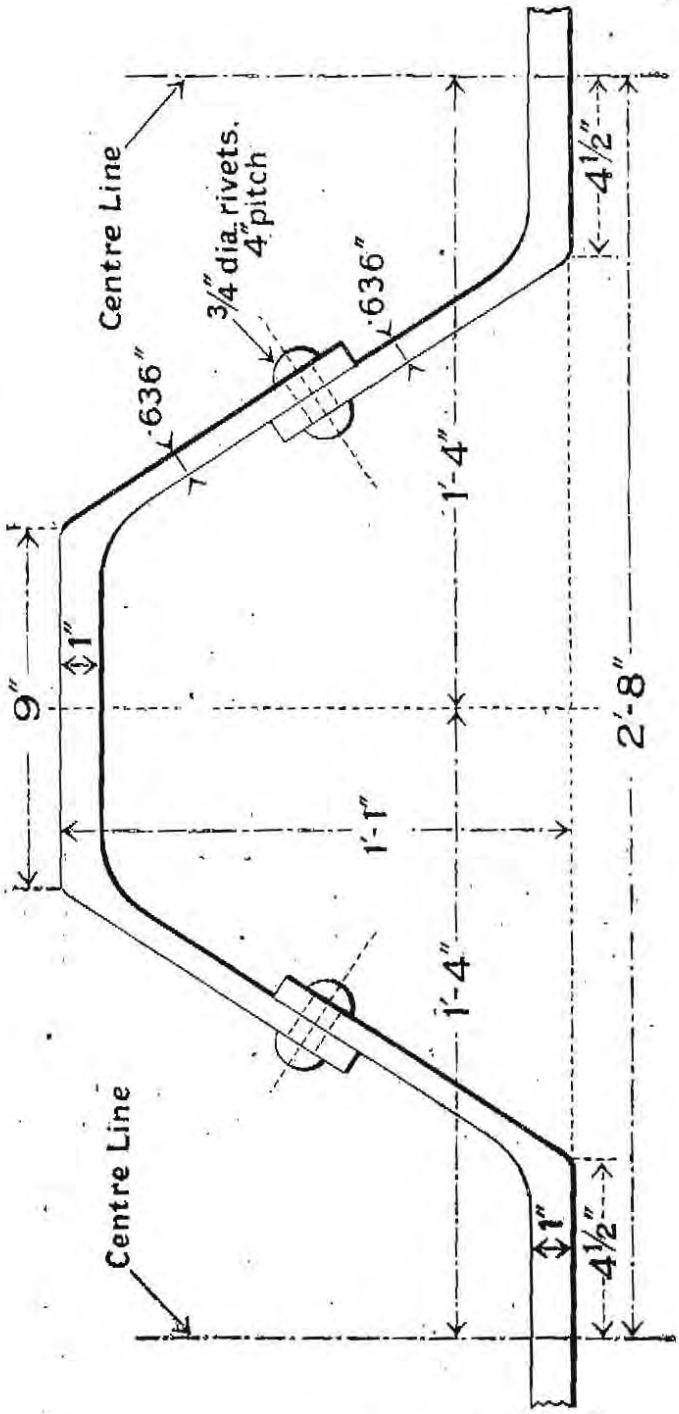
Weight per sq. ft. of covered area = 40·5 lbs

Section Modulus = 103·54

D MEDIUM

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

STEEL TROUGHING



D MAXIMUM

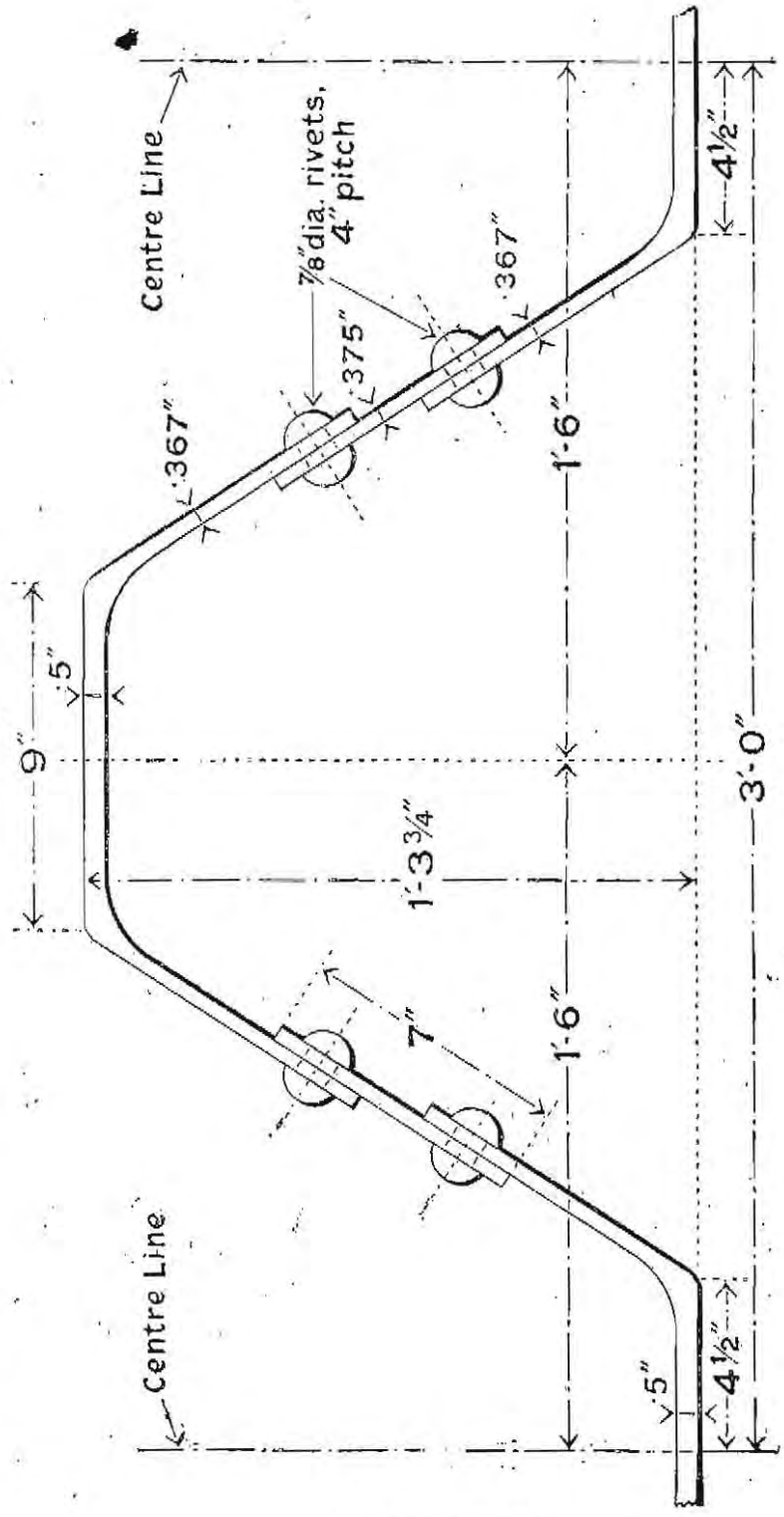
Weight per sq. ft. of covered area = 51·83 lbs

Section Modulus = 135·8

D MAXIMUM

FOR PROPERTIES & SAFE LOADS SEE PAGES 200 AND 201.

STEEL TROUGHING



E MINIMUM

Weight per sq. ft. of covered area = 32 lbs

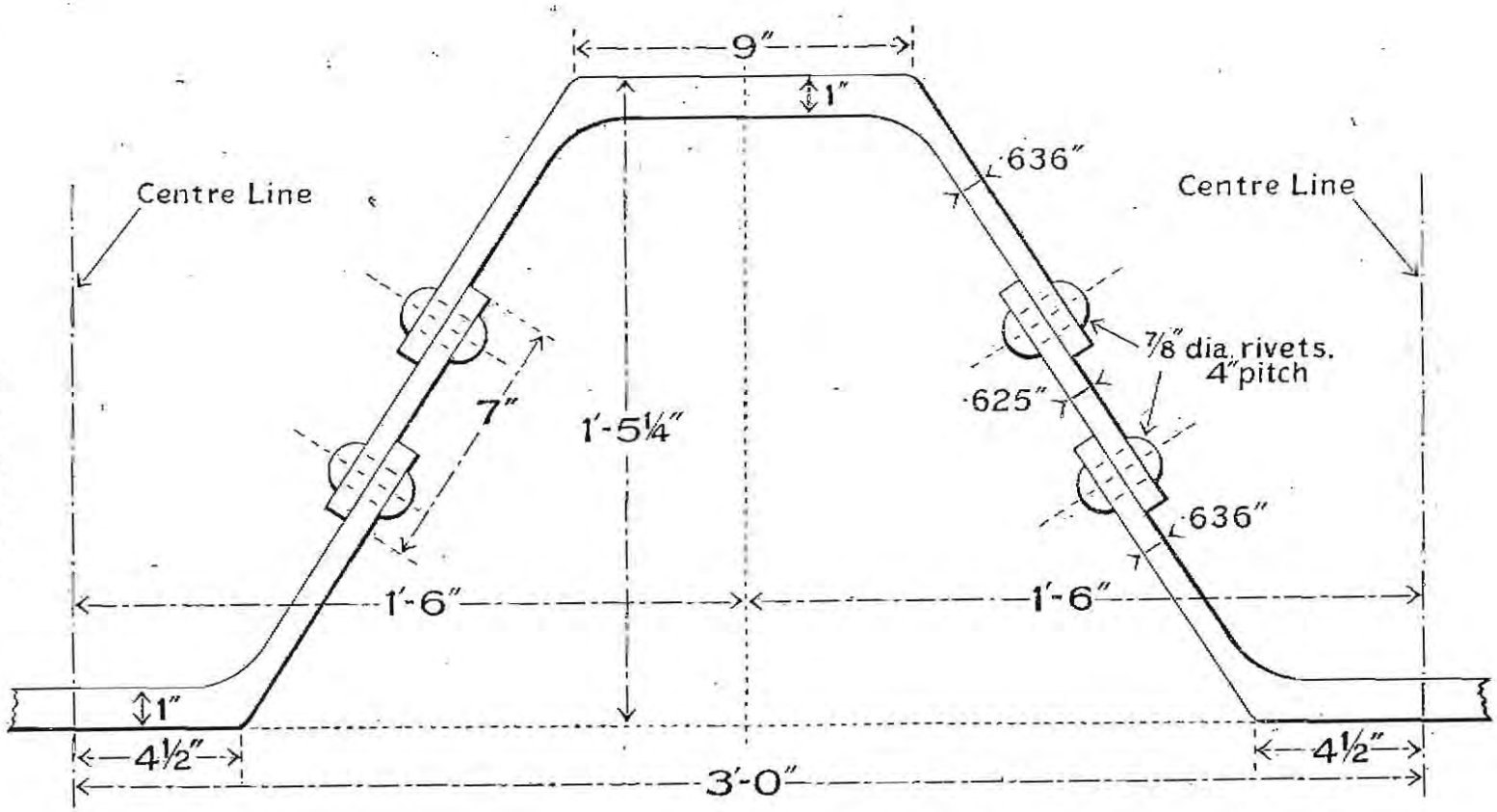
Section Modulus = 104·61

E MINIMUM

FOR PROPERTIES & SAFE LOADS SEE PAGE 202.

DORMAN, LONG & CO. LIMITED.

STEEL TROUGHING



E MAXIMUM

Weight per sq. ft. of covered area = 56·76 lbs

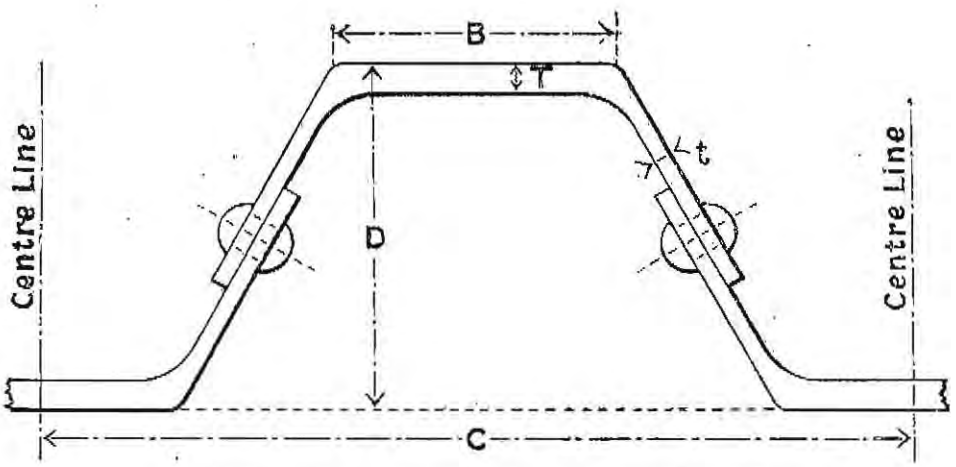
Section Modulus = 203·87

E MAXIMUM

FOR PROPERTIES & SAFE LOADS SEE PAGE 202.

DORMAN, LONG & CO. LIMITED.

STEEL TROUGHING.



DIMENSIONS AND PROPERTIES.

Reference Mark	Weight per sq. ft. of covered area in lbs.	Centres C		Depths D		Width of Flange B	Thickness of Flange T	Thickness of Web t	Rivets		Section Modulus for width "C"
									Dia.	Pitch	
		ft.	in.	ft.	in.	ins.	ins.	ins.	ins.	ins.	
D. Max.	51·83	2	8	1	1	9	1·000	·636	¾	4	135·80
D. Med.	40·50	2	8	1	0½	9	·756	·508	¾	4	103·54
D. Min.	28·78	2	8	1	0	9	·500	·367	¾	4	72·67
C¹ Max.	35·02	2	0		9⅜	7½	·625	·401	¾	4	51·45
C¹ Min.	26·26	2	0		9	7½	·438	·307	¾	4	36·57
C. Max.	32·97	1	8		7⅜	6	·616	·400	⅝	4	30·60
C. Min.	24·52	1	8		7	6	·438	·300	⅝	4	21·62
B. Max.	28·00	1	4		6¼	5⅛	·503	·304	⅝	4	17·50
B. Min.	21·80	1	4		6	5⅛	·375	·240	⅝	4	13·50
A. Max.	23·10	1	2		5¼	4½	·453	·247	½	4	11·05
A. Min.	17·61	1	2		5	4½	·336	·188	½	4	8·40
O. Max.	18·84	1	0		4¼	4	·370	·193	½	4	6·48
O. Min.	15·32	1	0		4⅛	4	·297	·156	½	4	5·27

STEEL TROUGHING.

SAFE LOADS IN CWTS. PER SQUARE FOOT.

Reference Mark	SPANS IN FEET													
	6	8	10	12	14	16	18	20	22	24	26	28	30	32
D. Max.	..	..	44·1	30·6	22·5	17·2	13·6	11·0	9·1	7·7	6·5	5·6	4·9	4·3
D. Med.	..	..	33·7	23·4	17·2	13·1	10·4	8·4	7·0	5·8	5·0	4·3	3·7	3·3
D. Min.	..	..	23·6	16·4	12·0	9·2	7·3	5·9	4·9	4·1	3·5	3·0	2·6	..
C¹ Max.	..	..	22·3	15·5	11·4	8·7	6·9	5·6	4·6	3·9	..	..	..	..
C¹ Min.	..	..	15·8	11·0	8·1	6·2	4·9	4·0	3·3	..	..	..	..	..
C. Max.	..	24·8	15·9	11·0	8·1	6·2	4·9	..	..	..	..	..	..	..
C. Min.	..	17·6	11·2	7·8	5·7	4·4	3·5	..	..	..	..	..	..	..
B. Max.	31·6	17·8	11·4	7·9	5·8	4·4	..	..	..	..	..	..	..	..
B. Min.	24·4	13·7	8·8	6·1	4·5	3·4	..	..	..	..	..	..	..	..
A. Max.	22·8	12·8	8·2	5·7	4·2	..	..	..	..	..	..	..	..	..
A. Min.	17·3	9·7	6·2	4·3	3·2	..	..	..	..	..	..	..	..	..
O. Max.	15·6	8·8	5·6	3·9	..	..	..	..	..	..	..	..	..	..
O. Min.	12·7	7·2	4·6	3·2	..	..	..	..	..	..	..	..	..	..

SAFE DISTRIBUTED LOADS IN TONS FOR WIDTH "C."

Reference Mark	SPANS IN FEET													
	6	8	10	12	14	16	18	20	22	24	26	28	30	32
D. Max.	..	..	58·8	49·0	42·0	36·8	32·7	29·4	26·7	24·5	22·6	21·1	19·6	18·4
D. Med.	..	..	44·9	37·4	32·1	28·0	24·9	22·4	20·4	18·7	17·2	16·0	14·9	14·0
D. Min.	..	..	31·5	26·2	22·5	19·7	17·5	15·7	14·3	13·1	12·1	11·2	10·5	..
C¹ Max.	..	..	22·3	18·6	15·9	13·9	12·4	11·1	10·1	9·3	..	..	..	..
C¹ Min.	..	..	15·8	13·2	11·3	9·9	8·8	7·9	7·2	..	..	..	..	..
C. Max.	..	16·6	13·3	11·0	9·5	8·3	7·4	..	..	..	..	..	..	..
C. Min.	..	11·7	9·4	7·8	6·7	5·8	5·2	..	..	..	..	..	..	..
B. Max.	12·6	9·5	7·6	6·3	5·4	4·7	..	..	..	..	..	..	..	..
B. Min.	9·7	7·3	5·8	4·9	4·2	3·6	..	..	..	..	..	..	..	..
A. Max.	8·0	6·0	4·8	4·0	3·4	..	..	..	..	..	..	..	..	..
A. Min.	6·1	4·5	3·6	3·0	2·6	..	..	..	..	..	..	..	..	..
O. Max.	4·7	3·5	2·8	2·3	..	..	..	..	..	..	..	..	..	..
O. Min.	3·8	2·9	2·3	1·9	..	..	..	..	..	..	..	..	..	..

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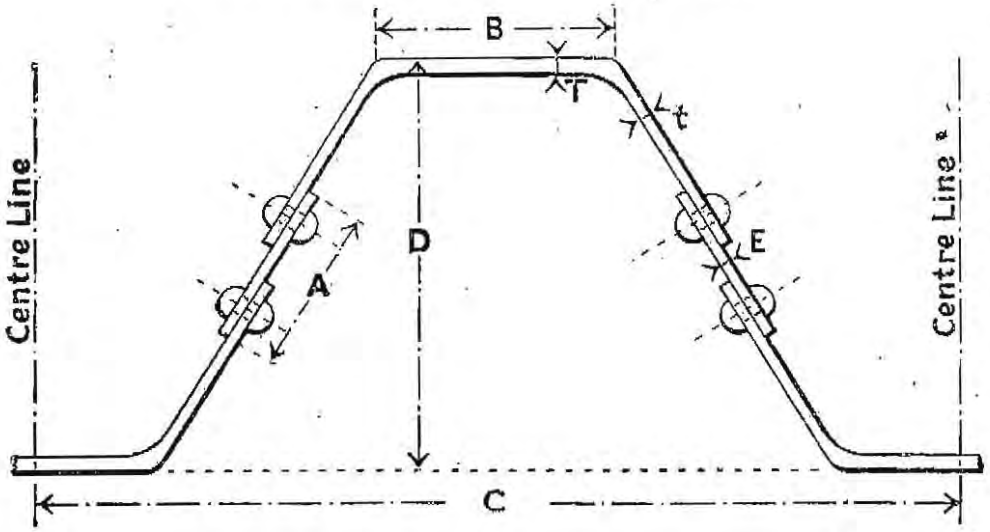
STEEL TROUGHING.



DIMENSIONS AND PROPERTIES.

Reference Mark	Weight per sq. ft. of covered area in lbs.	Centres C	Depths D	Width of Flange B	Thickness of Flange T	Thickness of Web t	Flats Width A	Flats Thickness E	Rivets Dia.	Rivets Pitch	Section Modulus for width "C"
		ft. in.	ft. in.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	
E. Max.	56·76	3 0	1 5¼	9	1·000	·636	7	⅝	⅞	4	203·87
E. Min.	32·6	3 0	1 3¾	9	·500	·367	7	⅜	⅞	4	104·61

SAFE LOADS IN CWTS. PER SQUARE FOOT.

Reference Mark	SPANS IN FEET													
	14	16	18	20	22	24	26	28	30	32	34	36	38	40
E. Max.	30·0	23·0	18·2	14·7	12·2	10·2	8·7	7·6	6·5	5·7	5·1	4·5	4·1	3·7
E. Min.	15·4	11·8	9·3	7·5	6·2	5·2	4·4	3·8	3·3	2·9	2·6	2·3	2·1	1·9

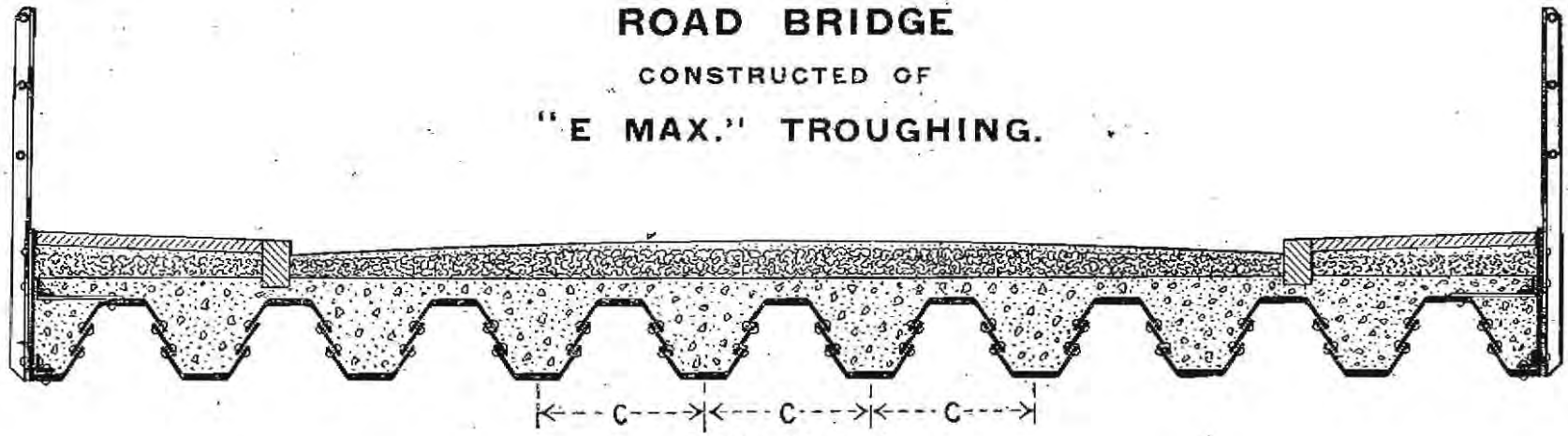
SAFE DISTRIBUTED LOADS IN TONS FOR WIDTH "C."

Reference Mark	SPANS IN FEET													
	14	16	18	20	22	24	26	28	30	32	34	36	38	40
E. Max.	63·1	55·2	49·1	44·2	40·2	36·8	34·0	31·8	29·4	27·6	26·0	24·5	23·2	22·1
E. Min.	32·4	28·3	25·2	22·7	20·6	18·9	17·4	16·2	15·1	14·2	13·3	12·6	11·9	11·3

ROAD BRIDGE

CONSTRUCTED OF

"E MAX." TROUGHING.



CROSS SECTION

STRENGTH OF TROUGHING AS SHEWN FOR 30'-0" SPAN.

LIVE LOAD.

Ministry of Transport Loading, including Impact, as shewn on page 254, the loads from 2 passing wheels being taken as distributed over 2 Widths "C" = 6'-0".

DEAD LOAD.

Inclusive load per square foot = 2 cwts.

Total Dead Load = $30' \times 6' \times \frac{2^{T.}}{20} = 18$ tons.

MAXIMUM BENDING MOMENT.

Live Load	=	2412	inch-tons.
Dead Load = $18^{T.} \times \frac{360''}{8}$	=	810	" "
Total Bending Moment	=	3222	" "

"E MAX." TROUGHING.

Section Modulus of 2 Widths "C" = 2 × 203·87 = 407·74.

Stress = $\frac{3222}{407 \cdot 74} = 7 \cdot 9$ tons per square inch.

NOTE.

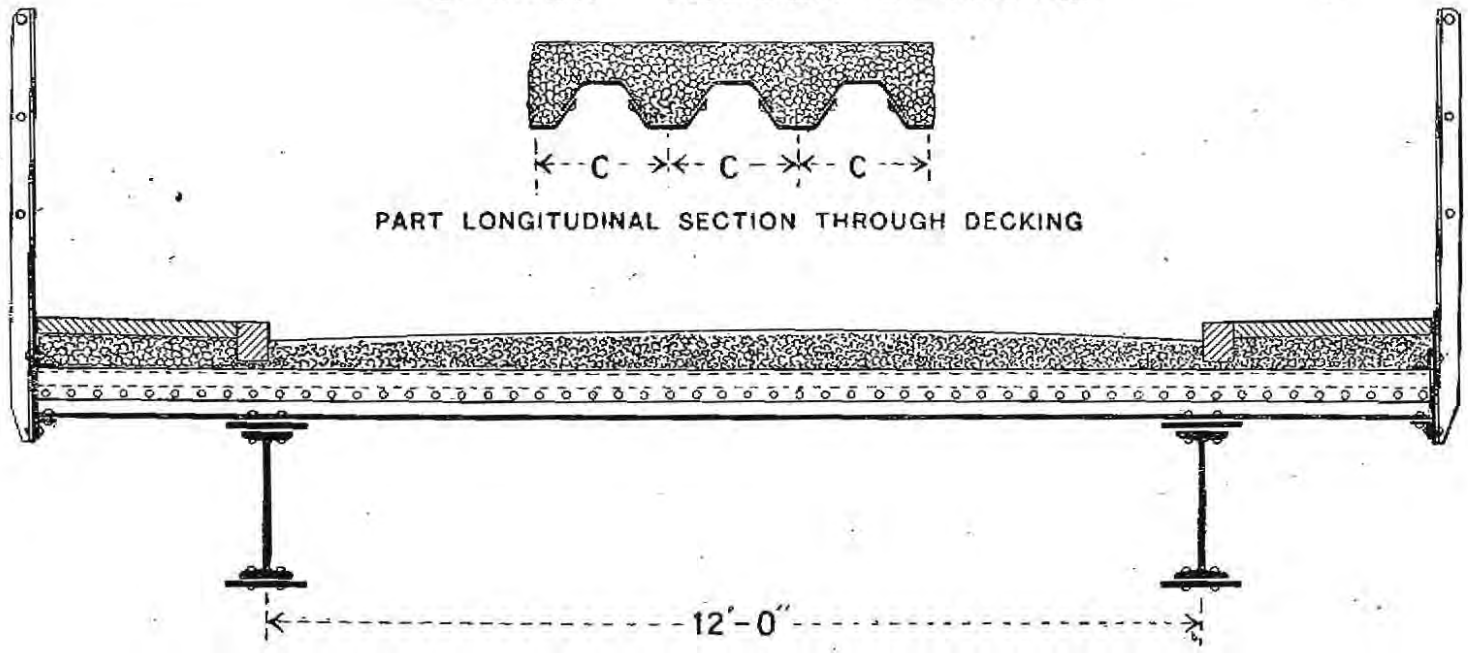
The above type of bridge floor is adaptable to any width of roadway, allowance having been made for more than one line of traffic with the possibility of 2 wheels passing within a 6 foot width of floor.

Where the width of roadway will permit only one line of traffic, the wheel load may be taken as distributed over a greater width of troughing.

DORMAN, LONG & CO. LIMITED.

ROAD BRIDGE

CONSTRUCTED OF COMPOUND GIRDERS AND "C MAX." TROUGH DECKING.



PART LONGITUDINAL SECTION THROUGH DECKING

CROSS SECTION

STRENGTH OF TROUGHING AS SHEWN (MAIN GIRDERS 12'-0" CENTRES).

LIVE LOAD.

Ministry of Transport Loading, including Impact, as shewn on page 254, distributed over 2 Widths "C" = 3'-4".

DEAD LOAD.

Inclusive load per square foot = 1½ cwts.

Total Dead Load = $12' \times \frac{10'}{3} \times \frac{1\frac{1}{2}^{T}}{20} = 3$ tons.

MAXIMUM BENDING MOMENT.

Live Load	= 396 inch-tons.
Dead Load = $3^{T} \times \frac{144''}{8}$	= 54 " "
Total Bending Moment	= 450 " "

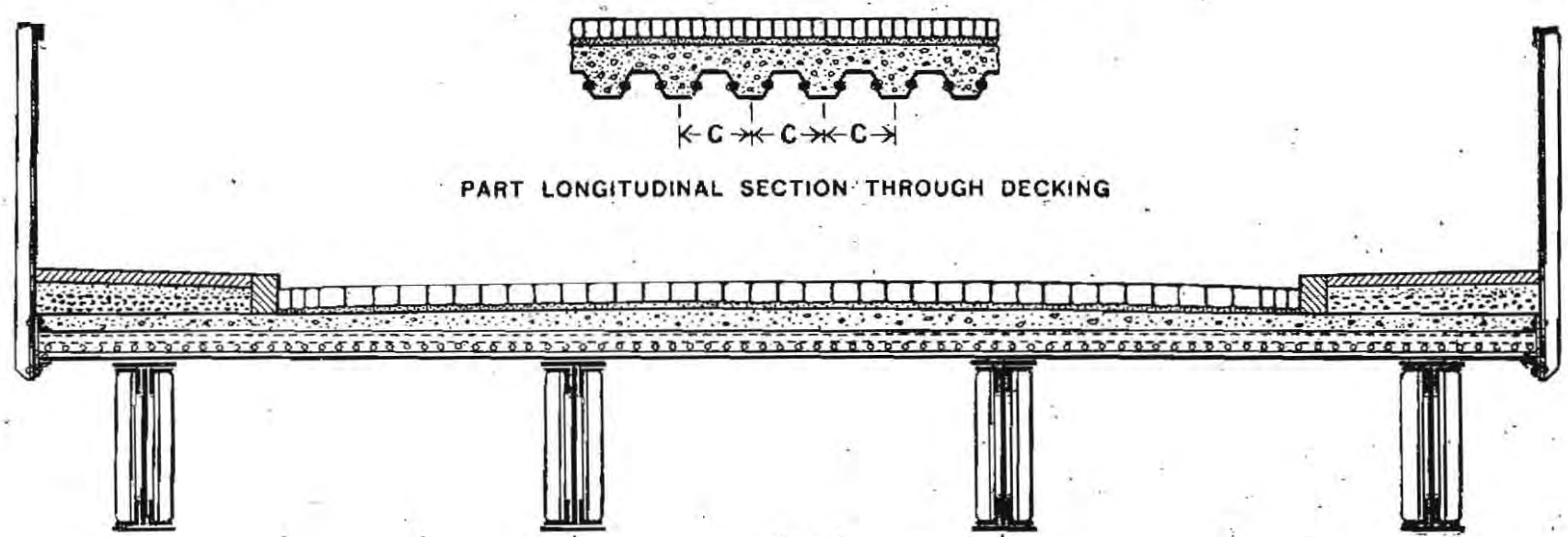
"C MAX." TROUGHING.

Section Modulus of 2 Widths "C" = 2 × 30·6 = 61·2.

Stress = $\frac{450}{61 \cdot 2} = 7 \cdot 4$ tons per square inch.

ROAD BRIDGE

CONSTRUCTED OF PLATE GIRDERS AND "B MAX." TROUGH DECKING.



PART LONGITUDINAL SECTION THROUGH DECKING

CROSS SECTION

STRENGTH OF TROUGHING AS SHEWN (MAIN GIRDERS 8'-0" CENTRES).

LIVE LOAD.

Ministry of Transport Loading, including Impact, as shewn on page 254, distributed over 3 Widths "C" = 4'-0".

DEAD LOAD.

Inclusive load per square foot = 2 cwts.

Total Dead Load = $8' \times 4' \times \frac{2^{T.}}{20} = 3{\cdot}2$ tons.

MAXIMUM BENDING MOMENT.

Live Load	= 349 inch-tons.
Dead Load = $3{\cdot}2^{T.} \times \frac{96''}{8}$	= 38 " "
Total Bending Moment	= 387 " "

"B MAX." TROUGHING.

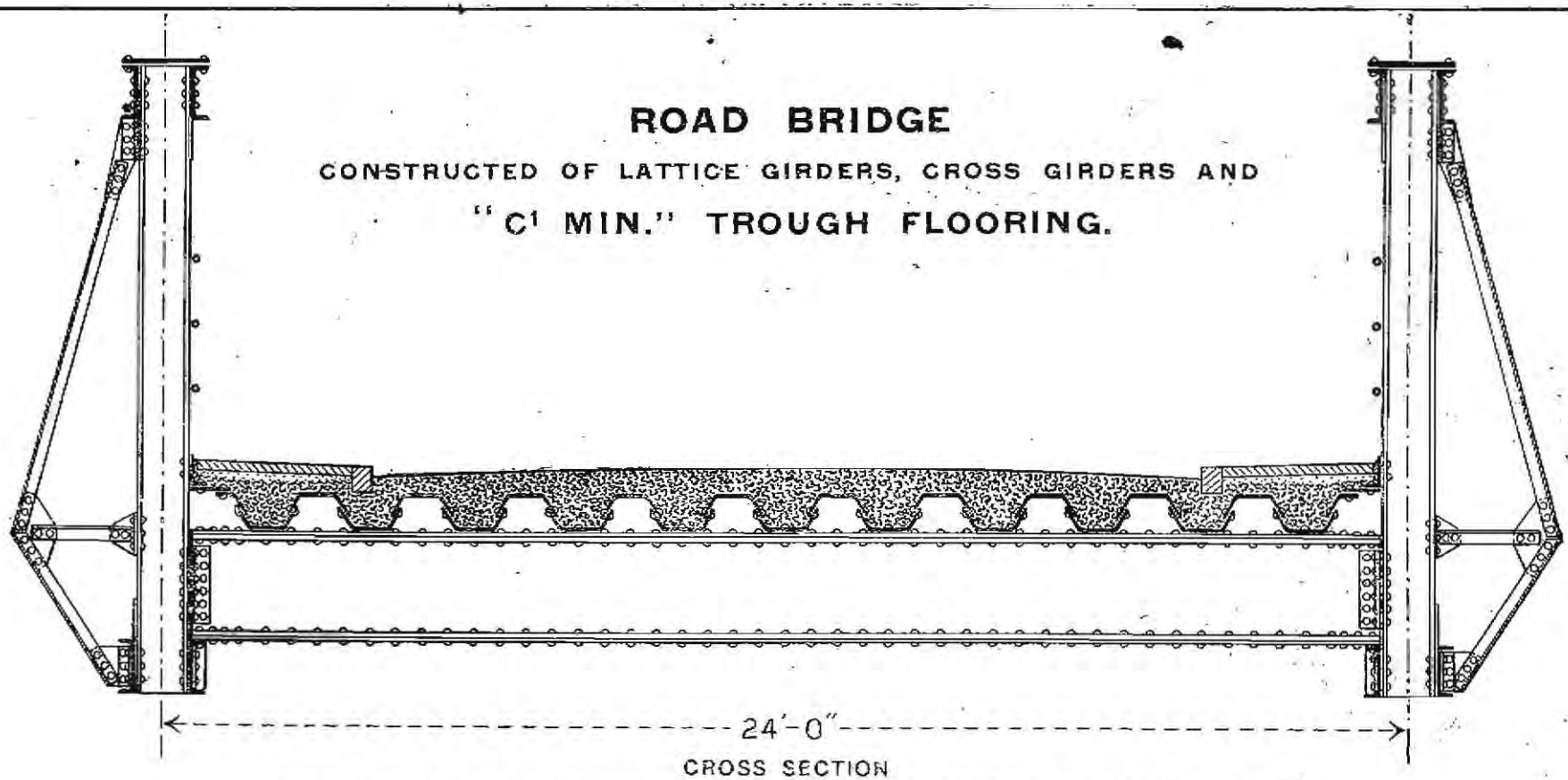
Section Modulus of 3 Widths "C" = $3 \times 17{\cdot}5 = 52{\cdot}5$.

Stress = $\frac{387}{52{\cdot}5} = 7{\cdot}4$ tons per square inch.

DORMAN, LONG & CO. LIMITED.

ROAD BRIDGE

CONSTRUCTED OF LATTICE GIRDERS, CROSS GIRDERS AND "C¹ MIN." TROUGH FLOORING.



CROSS SECTION

STRENGTH OF TROUGHING AS SHEWN (CROSS GIRDERS 12'-0" CENTRES).

LIVE LOAD.

Ministry of Transport Loading, including Impact, as shewn on page 254, the loads from 2 passing wheels being taken as distributed over 3 Widths "C" = 6'-0".

DEAD LOAD.

Inclusive load per square foot = 1¼ cwts.

Total Dead Load = $12' \times 6' \times \frac{1\frac{1}{4}^{T.}}{20} = 4{\cdot}5$ tons.

MAXIMUM BENDING MOMENT.

Live Load	$= 22^{T.} \times \frac{144''}{4}$ ..	=	792 inch-tons.
Dead Load	$= 4{\cdot}5^{T.} \times \frac{144''}{8}$ ..	=	81 " "
Total Bending Moment	.. ..	=	873 " "

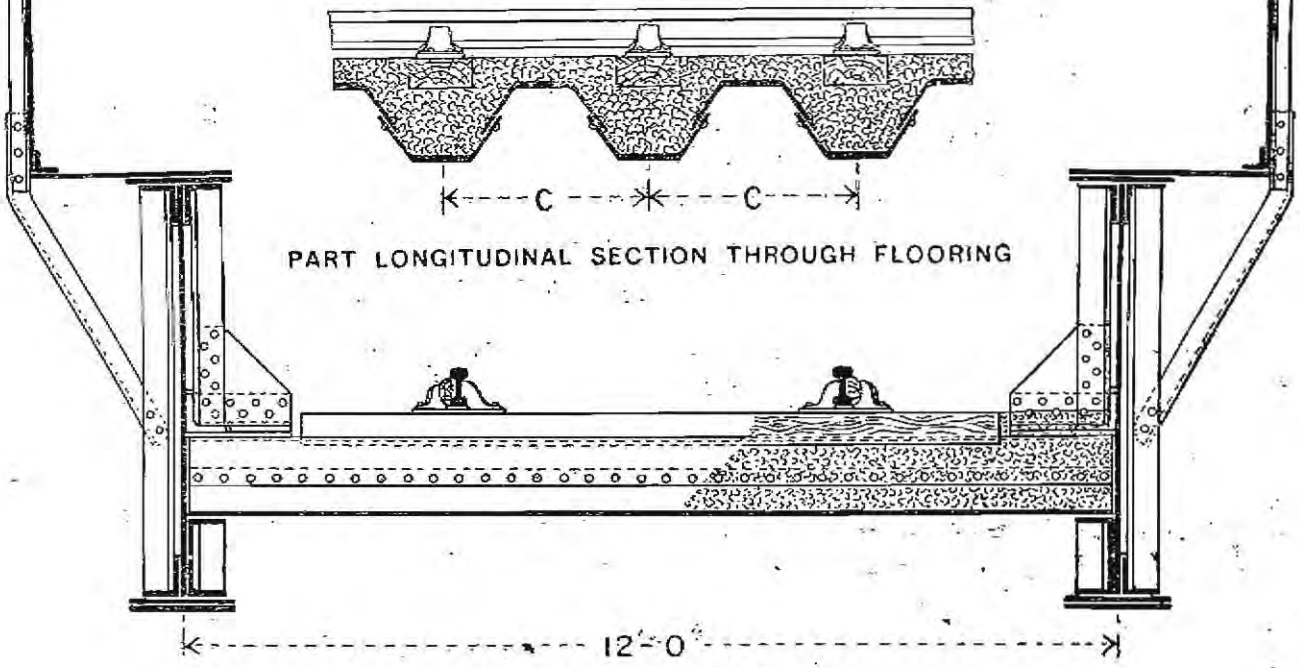
"C¹ MIN." TROUGHING.

Section Modulus of 3 Widths "C" = 3 × 36·57 = 109·71.

$\text{Stress} = \frac{873}{109{\cdot}71} = 8$ tons per square inch.

BRIDGE FOR SINGLE LINE RAILWAY

CONSTRUCTED OF PLATE GIRDERS AND "D MIN." TROUGH FLOORING.



PART LONGITUDINAL SECTION THROUGH FLOORING

CROSS SECTION

STRENGTH OF TROUGHING AS SHEWN (MAIN GIRDERS 12'-0" CENTRES).

LIVE LOAD.

Maximum axle load, including Impact allowance in accordance with British Standard Specification No. 153, = 48 tons, distributed over two Widths "C" = 5'-4" = $\frac{16'}{3}$.

DEAD LOAD.

Inclusive load per square foot = 1½ cwts.

Total Dead Load = $12' \times \frac{16'}{3} \times \frac{1\frac{1}{2}^{T.}}{20} = 5$ tons.

MAXIMUM BENDING MOMENT.

Live Load = $24^{T.} \times 42''$	.. ..	=	1008 inch-tons.
Dead Load = $5^{T.} \times \frac{144''}{8}$	.. ..	=	90 " "
Total Bending Moment	.. ..	=	1098 " "

"D MIN." TROUGHING.

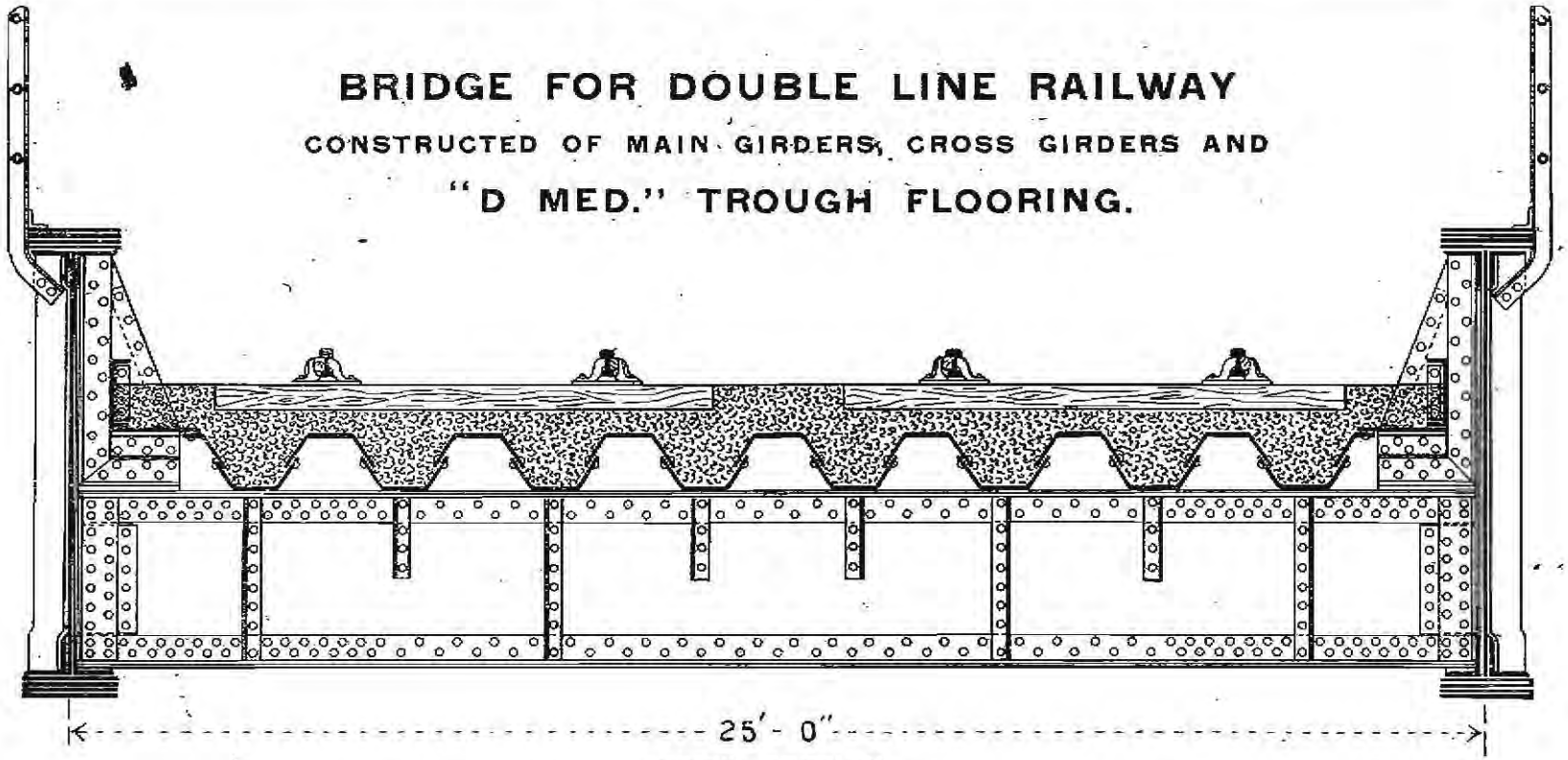
Section Modulus of 2 Widths "C" = 2 × 72·67 = 145·34.

Stress = $\frac{1098}{145 \cdot 34}$ = 7·6 tons per square inch.

DORMAN, LONG & CO. LIMITED.

BRIDGE FOR DOUBLE LINE RAILWAY

CONSTRUCTED OF MAIN GIRDERS, CROSS GIRDERS AND "D MED." TROUGH FLOORING.



CROSS SECTION

STRENGTH OF TROUGHING AS SHEWN (CROSS GIRDERS 13'-0" CENTRES).

LIVE LOAD.

Equivalent uniformly distributed live load, including Impact allowance in accordance with British Standard Specification No. 153, = 108 tons, supported by 3 Widths "C" = 8'-0".

DEAD LOAD.

Inclusive load per square foot = 2¼ cwts.

Total Dead Load = $13' \times 8' \times \frac{2\frac{1}{4}^{T.}}{20} = 12$ tons.

MAXIMUM BENDING MOMENT.

Live Load = $108^{T.} \times \frac{156''}{8}$	.. ..	=	2106 inch-tons.
Dead Load = $12^{T.} \times \frac{156''}{8}$	.. ..	=	234 " "
Total Bending Moment	.. ..	=	2340 " "

"D MED." TROUGHING.

Section Modulus of 3 Widths "C" = 3 × 103·54 = 310·62.

Stress = $\frac{2340}{310 \cdot 62} = 7 \cdot 6$ tons per square inch.

NOTES ON PRESSED AND BUILT-UP FLOORING.

The flooring shewn on the preceding pages is composed of Rolled Troughing.

Alternative forms of construction may be obtained by the use of either :—

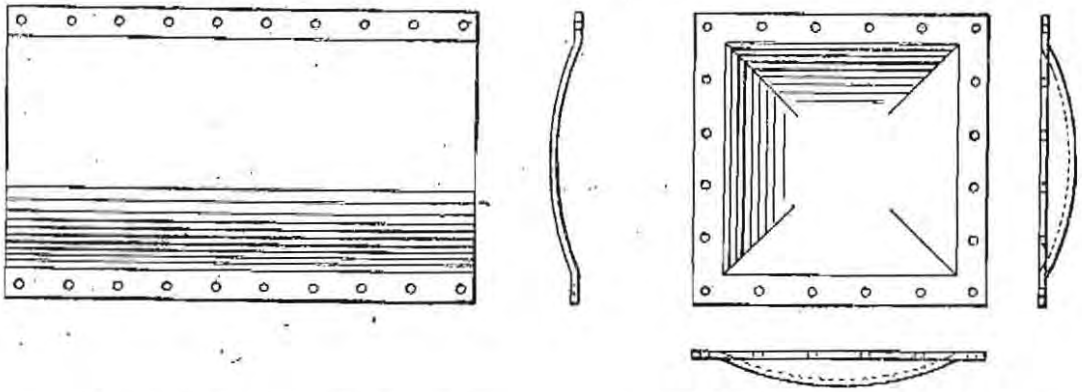
(A) Pressed Flooring as shewn on the next six pages.

(B) Built-up Flooring as illustrated below.

(C) Cambered or Buckled Plates as illustrated below.

Variations of (B) and (C) can be arranged to suit the requirements of particular cases.

TYPES OF BUILT-UP FLOORING.

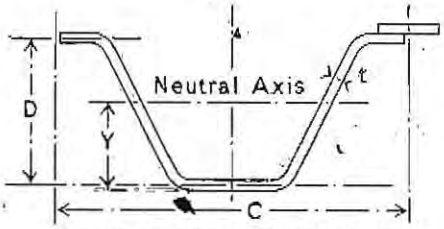


CAMBERED PLATES. BUCKLED PLATES.

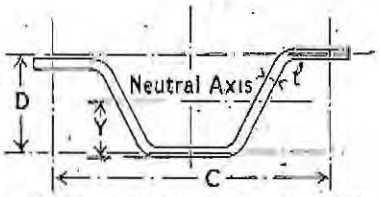
On pages 209E and 209F particulars are given of Pressed Steel Kerb Plates ; other sections can be supplied where the tonnage required is sufficient to warrant the preparation of suitable tools.

DORMAN, LONG & CO., LIMITED.

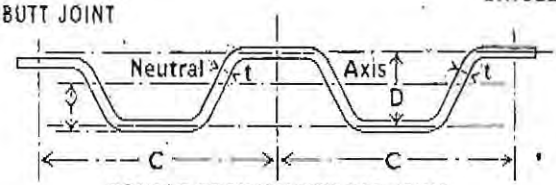
PRESSED STEEL TROUGH SECTIONS.



SINGLE TROUGH WITH BUTT JOINT



SINGLE TROUGH WITH LAP JOINT



DOUBLE TROUGH WITH LAP JOINT

Ref. Mark	Section				Type		Slope of Webs	Area of Section (including cover for Butted Trough)	Weight (including Rivets) per sq. ft. covered	Dimension Y	Minimum Modulus of Complete Section (including cover for Butted Trough)
	D	C		t	Trough	Joint					
	ins.	ft.	ins.	ins.				sq. ins.	lbs.	ins.	ins.³
1	15	3	0	¾	Single	Butt	1 : 2	44·35	50·86	8·68	180·79
2	"	"	"	⅝	"	"	"	36·96	42·48	8·61	151·08
3	"	"	"	½	"	"	"	29·57	34·10	8·53	121·24
4	12	2	8	¾	"	"	"	38·57	49·85	7·13	129·17
5	"	"	"	⅝	"	"	"	32·14	41·65	7·06	107·94
6	"	"	"	½	"	"	"	25·71	33·45	6·98	86·62
7	"	"	"	⅜	"	"	"	19·28	25·26	6·90	65·19
8	10	2	4	¾	"	"	"	33·71	49·61	6·11	94·40
9	"	"	"	⅝	"	"	"	28·09	41·42	6·04	78·84
10	"	"	"	½	"	"	"	22·48	33·23	5·96	63·24
11	"	"	"	⅜	"	"	"	16·86	25·05	5·88	47·58
12	10	2	4	¾	Single	Lap	"	31·30	45·85	5·58	84·02
13	"	"	"	⅝	"	"	"	26·13	38·32	5·54	71·23
14	"	"	"	½	"	"	"	20·95	30·76	5·50	57·99
15	"	"	"	⅜	"	"	"	15·74	23·17	5·47	44·28
16	9	2	0	⅝	Single	Butt	"	24·59	42·37	5·50	60·85
17	"	"	"	½	"	"	"	19·67	34·01	5·42	48·78
18	"	"	"	⅜	"	"	"	14·75	25·65	5·34	36·69
19	9	2	0	⅝	Single	Lap	"	22·94	39·28	5·05	54·45
20	"	"	"	½	"	"	"	18·39	31·55	5·01	44·41
21	"	"	"	⅜	"	"	"	13·82	23·78	4·97	33·97

PRESSED STEEL TROUGHING.

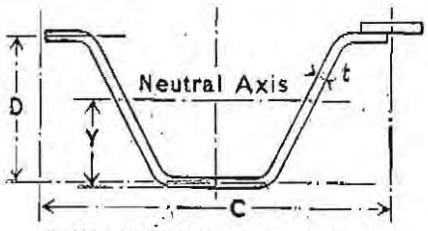
The tabular loads are based on an extreme fibre stress of 8 tons per square inch and include the weight of the troughing itself.

The areas and Section Moduli tabulated are for one complete unit as pressed, in which case these properties for double troughs are for the complete section.

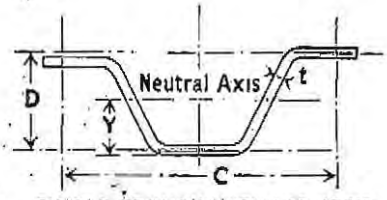
In the case of troughs with "butt" joints the tabulated properties include for the covers.

DORMAN, LONG & CO. LIMITED.

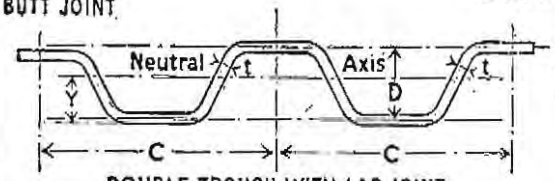
PRESSED STEEL TROUGH SECTIONS.



SINGLE TROUGH WITH BUTT JOINT



SINGLE TROUGH WITH LAP JOINT



DOUBLE TROUGH WITH LAP JOINT

DISTRIBUTED DEAD LOADS IN CWTS. PER SQUARE FOOT

Ref. Mark	SPANS IN FEET													
	8	10	12	14	16	18	20	22	24	26	28	30	32	34
1	..	64·28	44·64	32·80	25·11	19·84	16·07	13·28	11·16	9·51	8·19	7·14	6·28	5·56
2	..	53·72	37·30	27·41	20·98	16·58	13·43	11·10	9·33	7·95	6·85	5·97	5·25	4·65
3	..	43·11	29·93	21·99	16·84	13·30	10·78	8·91	7·48	6·38	5·50	4·79	4·21	3·73
4	..	51·67	35·88	26·36	20·18	15·95	12·92	10·68	8·97	7·64	6·59	..	..	..
5	..	43·18	29·98	22·03	16·87	13·33	10·79	8·92	7·49	6·39	5·51	..	..	..
6	..	34·65	24·06	17·68	13·53	10·69	8·66	7·16	6·02	5·13	4·42	..	..	..
7	..	26·08	18·11	13·30	10·19	8·05	6·52	5·39	4·53	3·86	3·33	..	..	..
8	..	43·16	29·97	22·02	16·86	13·32	10·79	8·92	..	..	..	..	..	..
9	..	36·04	25·03	18·39	14·08	11·12	9·01	7·45	..	..	..	..	..	..
10	..	28·91	20·08	14·75	11·29	8·92	7·23	5·97	..	..	..	..	..	..
11	..	21·75	15·10	11·10	8·50	6·71	5·44	4·49	..	..	..	..	..	..
12	..	38·41	26·67	19·60	15·00	11·85	9·60	7·94	..	..	..	..	..	..
13	..	32·56	22·61	16·61	12·72	10·05	8·14	6·73	..	..	..	..	..	..
14	..	26·51	18·41	13·53	10·36	8·18	6·63	5·48	..	..	..	..	..	..
15	..	20·24	14·06	10·33	7·91	6·25	5·06	4·18	..	..	..	..	..	..
16	50·71	32·45	22·54	16·56	12·68	10·01	8·11	..	..	..	..	..	..	..
17	40·65	26·02	18·07	13·27	10·16	8·03	6·50	..	..	..	..	..	..	..
18	30·57	19·57	13·59	9·98	7·64	6·04	4·89	..	..	..	..	..	..	..
19	45·37	29·04	20·17	14·82	11·34	8·96	7·26	..	..	..	..	..	..	..
20	37·00	23·68	16·45	12·08	9·25	7·31	5·92	..	..	..	..	..	..	..
21	28·31	18·12	12·58	9·24	7·08	5·59	4·53	..	..	..	..	..	..	..

PRESSED STEEL TROUGHING.

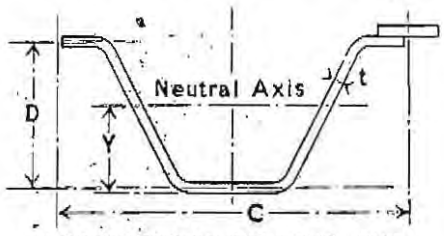
The tabular loads are based on an extreme fibre stress of 8 tons per square inch and include the weight of the troughing itself.

The areas and Section Moduli tabulated are for one complete unit as pressed, in which case these properties for double troughs are for the complete section.

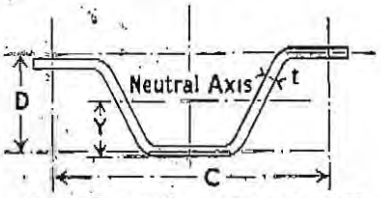
In the case of troughs with " butt " joints the tabulated properties include for the covers.

DORMAN, LONG & CO. LIMITED.

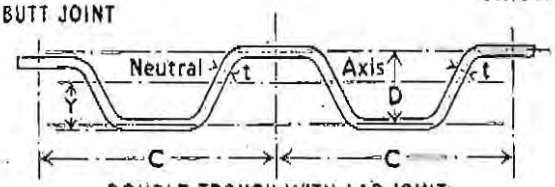
PRESSED STEEL TROUGH SECTIONS.



SINGLE TROUGH WITH BUTT JOINT



SINGLE TROUGH WITH LAP JOINT



DOUBLE TROUGH WITH LAP JOINT

Ref. Mark	Section			Type		Slope of Webs	Area of Section (including cover for Butted Trough)	Weight (including Rivets) per sq. ft. covered	Dimension Y	Minimum Modulus of Complete Section (including cover for Butted Trough)
	D	C	t	Trough	Joint					
	ins.	ft. ins.	ins.				sq. ins.	lbs.	ins.	ins.³
22	7½	2 0	½	Single	Butt	1 : 2	18·74	32·43	4·60	40·76
23	"	" "	⅜	"	"	"	14·06	24·46	4·52	30·67
24	"	" "	5/16	"	"	"	11·72	20·59	4·48	25·60
25	7½	2 0	½	"	Lap	"	17·47	29·97	4·21	36·81
26	"	" "	⅜	"	"	"	13·13	22·60	4·18	28·26
27	"	" "	5/16	"	"	"	10·95	18·96	4·16	23·83
28	7½	2 0	½	Double	"	"	33·58	28·69	4·11	78·38
29	"	" "	⅜	"	"	"	25·22	21·58	4·06	56·09
30	"	" "	5/16	"	"	"	21·03	18·04	4·04	47·20
31	6	1 8	⅜	Single	"	"	10·98	22·74	3·41	18·61
32	"	" "	5/16	"	"	"	9·16	19·10	3·39	15·73
33	"	" "	¼	"	"	"	7·34	15·48	3·38	12·77
34	6	1 8	⅜	Double	"	"	20·92	21·51	3·30	36·95
35	"	" "	5/16	"	"	"	17·45	18·00	3·28	31·16
36	"	" "	¼	"	"	"	13·97	14·50	3·26	25·24
37	4	1 4	⅜	"	"	"	15·98	20·50	2·26	19·09
38	"	" "	5/16	"	"	"	13·33	17·14	2·23	16·18
39	"	" "	¼	"	"	"	10·67	13·79	2·21	13·17
40	5	1 6	⅜	"	"	60°	18·55	21·13	2·79	27·38
41	"	" "	5/16	"	"	"	15·47	17·66	2·77	23·14
42	"	" "	¼	"	"	"	12·39	14·20	2·75	18·78
43	5	2 6	⅜	Single	Butt	1 : 2	15·84	21·12	3·09	25·68
44	"	" "	5/16	"	"	"	12·78	17·69	3·05	21·48
45	"	" "	¼	"	"	"	10·22	14·30	3·01	17·25

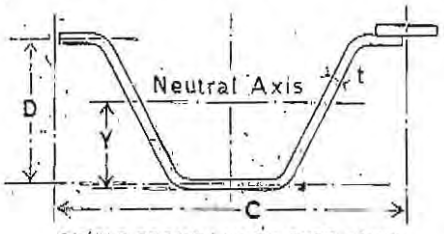
PRESSED STEEL TROUGHING.

The tabular loads are based on an extreme fibre stress of 8 tons per square inch and include the weight of the troughing itself.

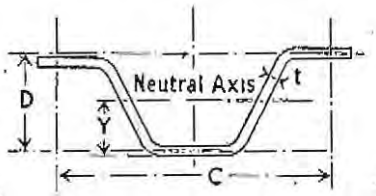
The areas and Section Moduli tabulated are for one complete unit as pressed, in which case these properties for double troughs are for the complete section.

In the case of troughs with " butt " joints the tabulated properties include for the covers.

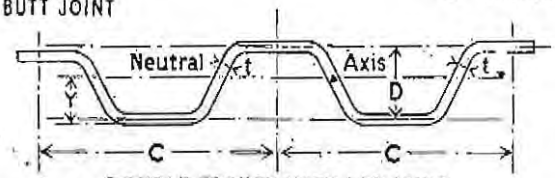
PRESSED STEEL TROUGH SECTIONS.



SINGLE TROUGH WITH BUTT JOINT



SINGLE TROUGH WITH LAP JOINT



DOUBLE TROUGH WITH LAP JOINT

Ref. Mark	DISTRIBUTED DEAD LOADS IN CWTS. PER SQUARE FOOT. SPANS IN FEET					
	6	8	10	12	14	16
22	..	38·96	21·74	15·10	11·09	8·49
23	..	25·56	16·36	11·36	8·34	6·39
24	..	21·34	13·66	9·48	6·97	5·33
25	..	30·68	19·63	13·63	10·02	7·67
26	..	23·55	15·07	10·47	7·69	5·89
27	..	19·86	12·71	8·83	6·48	4·96
28	..	30·57	19·57	13·59	9·98	7·64
29	..	23·87	14·96	10·39	7·63	5·84
30	..	19·67	12·59	8·74	6·42	4·92
31	33·08	18·61	11·91	8·27	6·08	..
32	27·97	15·73	10·07	6·99	5·14	..
33	22·71	12·77	8·17	5·68	4·17	..
34	32·84	18·48	11·82	8·21	6·03	..
35	27·70	15·58	9·97	6·92	5·09	..
36	22·48	12·62	8·08	5·61	4·12	..
37	21·21	11·93	7·64	5·30	..	..
38	17·98	10·11	6·47	4·49	..	..
39	14·64	8·23	5·27	3·66	..	..
40	2[illegible]	15·21	9·74	6·76	..	..
41	22·86	12·86	8·23	5·71	..	..
42	18·55	10·43	6·68	4·64	..	..
43	30·44	17·12	10·96	7·61	..	..
44	25·46	14·32	9·16	6·36	..	..
45	20·45	11·50	7·36	5·11	..	..

PRESSED STEEL TROUGHING.

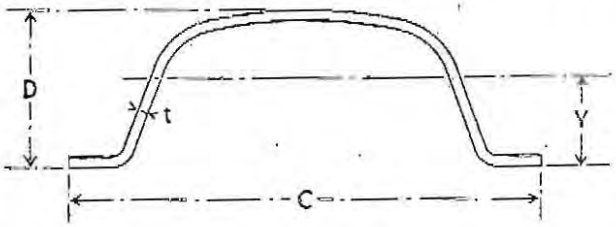
The tabular loads are based on an extreme fibre stress of 8 tons per square inch and include the weight of the troughing itself.

The areas and Section Moduli tabulated are for one complete unit as pressed, in which case these properties for double troughs are for the complete section.

In the case of troughs with "butt" joints the tabulated properties include for the covers.

DORMAN, LONG & CO. LIMITED.

PRESSED STEEL TROUGH SECTIONS.



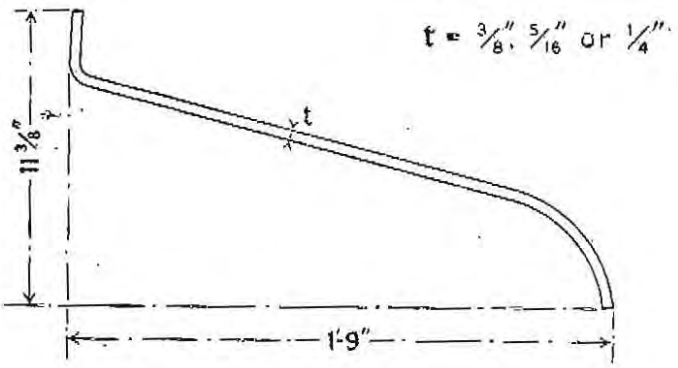
Ref. Mark	Section			Area of Section	Weight of Section per sq. foot Covered	Dimension Y	Minimum Section Modulus
	D	C	t				
	ins.	ft. ins.	ins.	sq. ins.	lbs.	ins.	ins.^{3}
60	6	1 6	3/8	9·2	20·8	8·5	12·7
61	5 5/16	" "	5/16	7·6	17·3	8·4	10·6
62	5 7/8	" "	1/4	6·1	13·9	3·4	8·5

63	3	1 5	5/16	6·1	14·6	1·8	3·9
64	2 5/16	" "	1/4	4·9	11·6	1·8	3·1

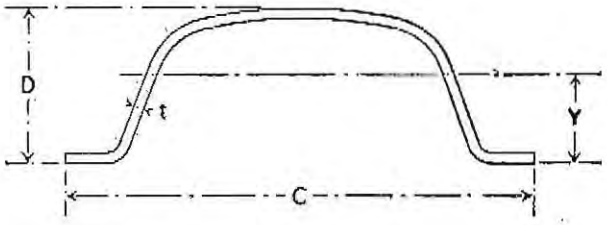
NOTE.

The tabular loads shewn in above tables are based on an extreme fibre stress of 8 tons per square inch and include the weight of the Troughing itself.

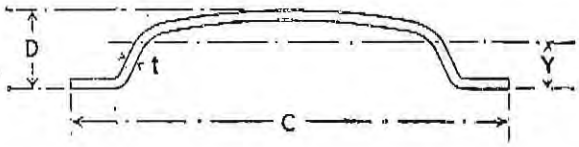
PRESSED STEEL KERB PLATES.



PRESSED STEEL TROUGH SECTIONS.



Ref. Mark	DISTRIBUTED DEAD LOADS IN CWTS. PER SQUARE FOOT. SPANS IN FEET					
	6	8	10	12	14	16
60	25·1	14·1	9·0	6·8	4·6	3·5
61	20·9	11·8	7·5	5·2	3·8	2·9
62	16·8	9·4	6·0	4·2	3·1	2·4

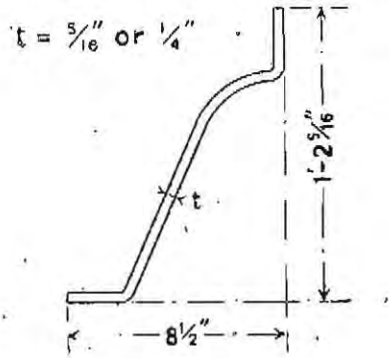


63	8·2	4·6	2·9	2·0	1·5	1·1
64	6·5	3·6	2·3	1·6	1·2	0·9

NOTE.

The tabular loads shown in above tables are based on an extreme fibre stress of 8 tons per square inch and include the weight of the Troughing itself.

PRESSED STEEL KERB PLATES.



OLD
BRITISH STANDARD
AND
OTHER SECTIONS.

DORMAN, LONG & CO. LIMITED.

DIMENSIONS, PROPERTIES, &c.

OF

OLD BRITISH STANDARD

AND

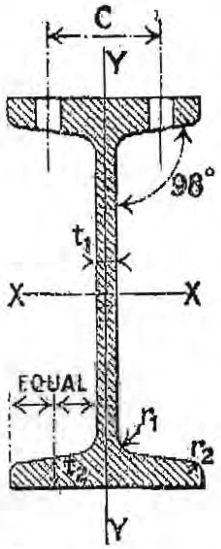
OTHER BEAMS, CHANNELS, BULB ANGLES, UNEQUAL & EQUAL ANGLES AND TEES.

DORMAN, LONG & CO. LIMITED.

BEAMS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

For safe distributed loads see pages 210M and 210N.



Reference Mark	Size Inches	Weight per foot lbs.	Standard Thicknesses		Radii		Centres of Holes C Inches
			Web t_1	Flange t_2	Root r_1	Toe r_2	
BSB 30	24×7½	100	·60	1·070	·70	·35	4·5
" 29	20×7½	89	·60	1·010	·70	·35	4·5
" 28	18×7	75	·55	·928	·65	·325	4·0
" 27	16×6	62	·55	·847	·65	·325	3·5
BSB 26	15×6	59	·50	·880	·60	·30	3·5
" 25	15×5	42	·42	·647	·52	·26	2·75
" 24	14×6H	57	·50	·873	·60	·30	3·5
" 23	14×6L	46	·40	·698	·50	·25	3·5
BSB 22	12×6H	54	·50	·883	·60	·30	3·5
" 21	12×6L	44	·40	·717	·50	·25	3·5
" 20	12×5	32	·35	·550	·45	·225	2·75
BSB 19	10×8	70	·60	·970	·70	·35	4·75
" 18	10×6	42	·40	·736	·50	·25	3·5
" 17	10×5	30	·36	·552	·46	·23	2·75
" 16	9×7	58	·55	·924	·65	·325	4·0
BSB 13	8×5	28	·35	·575	·45	·225	2·75
" 11	7×4	16	·25	·387	·35	·175	2·25
" 9	6×4½	20	·37	·431	·47	·235	2·5
" 7	5×4½	18	·29	·448	·39	·195	2·5
BSB 6	5×3	11	·22	·376	·32	·16	1·5
" 5	4¾×1¾	6·5	·18	·325	·28	·14	..
" 4	4×3	9·5	·22	·336	·32	·16	1·5
" 2	3×3	8·5	·20	·332	·30	·15	1·5

DORMAN, LONG & CO. LIMITED.

BEAMS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

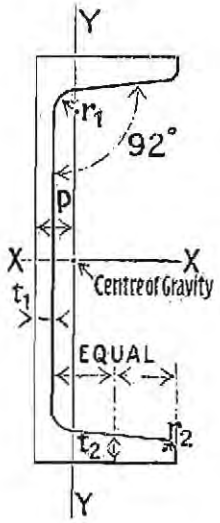
For safe distributed loads see pages 210M and 210N.

Area Square Inches	Moments of Inertia		Radii of Gyration Inches		Section Moduli		Size Inches
	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	
29·40	2654	66·92	9·50	1·50	221·1	17·84	24 ×7½
26·17	1670	62·63	7·99	1·54	167·0	16·70	20 ×7½
22·06	1149	47·04	7·21	1·46	127·6	13·44	18 ×7
18·23	725·7	27·08	6·81	1·21	90·71	9·026	16 ×6
17·35	628·9	28·22	6·02	1·27	83·85	9·406	15 ×6
12·35	428·0	11·81	5·88	·978	57·06	4·724	15 ×5
16·76	532·9	27·96	5·63	1·29	76·12	9·320	14 ×6H
13·53	440·5	21·60	5·70	1·26	62·92	7·200	14 ×6L
15·88	375·5	28·30	4·86	1·33	62·58	9·433	12 ×6H
12·94	315·3	22·27	4·93	1·31	52·55	7·423	12 ×6L
9·41	220·0	9·753	4·83	1·01	36·66	3·901	12 ×5
20·60	344·9	71·67	4·09	1·86	68·98	17·91	10 ×8
12·35	211·5	22·95	4·13	1·36	42·30	7·650	10 ×6
8·82	145·6	9·790	4·06	1·05	29·12	3·916	10 ×5
17·06	229·5	46·30	3·66	1·64	51·00	13·22	9 ×7
8·240	89·32	10·26	3·29	1·11	22·33	4·104	8 ×5
4·706	39·21	3·414	2·88	·851	11·20	1·707	7 ×4
5·880	34·62	5·415	2·42	·959	11·54	2·406	6 ×4½
5·290	22·69	5·664	2·07	1·08	9·076	2·517	5 ×4½
3·235	13·61	1·462	2·05	·672	5·444	·974	5 ×3
1·912	6·780	·263	1·87	·370	2·833	·300	4¾ ×1¾
2·794	7·520	1·281	1·64	·677	3·760	·854	4 ×3
2·500	3·787	1·262	1·23	·710	2·524	·841	3 ×3

DORMAN, LONG & CO. LIMITED.

CHANNELS.

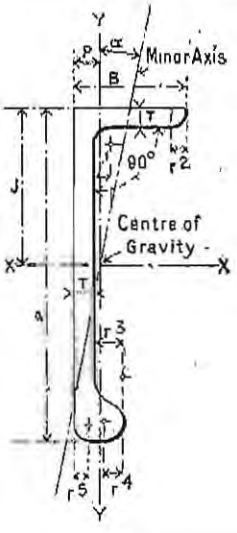
DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches	Weight per foot lbs.	Standard Thicknesses		Radii		P Dimension
			Web t_1	Flange t_2	Root r_1	Toe r_2	
BSC 27	15 ×4	41·94	·525	·630	·630	·440	·935
" 26	12 ×4	36·47	·525	·625	·625	·425	1·031
" 22	11 ×3½	29·82	·475	·575	·575	·400	·896
" 21	10 ×4H	30·16	·475	·575	·575	·400	1·102
DLC 21A	10 ×4L	18·86	·312	·312	·600	·200	·929
BSC 20	10 ×3½	28·21	·475	·575	·575	·400	·933
" 12	8 ×3	19·30	·375	·500	·500	·350	·844
DLC 9A	7 ×2⅛	9·75	·230	·325	·325	·230	·547
BSC 6	6 ×3	14·49	·312	·437	·437	·300	·988
DLC 5A	5⅛×2⅞	16·08	·437	·500	·500	·350	·922
" 3A	4 ×3H	14·20	·375	·500	·500	·350	1·081
" 3B	4 ×3L	11·89	·375	·375	·375	·260	·985
BSC 3	4 ×2	7·96	·250	·375	·375	·260	·656
" 2	3½×2	6·75	·250	·312	·312	·220	·645
DLC 2A	2½×1	4·14	·312	·312	·250	·200	·325

BULB ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches A × B	Standard Thickness T	Area Square Inches	Weight per foot lbs.	Radii	
					r^1	r^2
DLBA 18A	10½×3½	·525	8·167	27·77	·575	·400
BSBA 17	9½×3½	·500	7·277	24·74	·550	·375
" 14	8½×3½	·475	6·339	21·55	·525	·350
" 13	8½×3	·450	5·837	19·85	·525	·350
BSBA 10	7½×3½	·425	5·236	17·80	·475	·325
" 9	7½×3	·425	5·023	17·08	·475	·325
" 6	6½×3½	·400	4·420	15·03	·425	·275
" 5	6½×3	·375	4·002	13·61	·425	·275

DORMAN, LONG & CO. LIMITED.

CHANNELS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

Area Square Inches	Moments of Inertia		Radii of Gyration Inches		Section Moduli		Size Inches
	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	
12·334	377·0	14·55	5·53	1·09	50·27	4·748	15 ×4
10·727	218·2	13·65	4·51	1·13	36·36	4·599	12 ×4
8·771	148·6	8·421	4·12	·980	27·02	3·234	11 ×3½
8·871	130·7	12·02	3·84	1·16	26·14	4·147	10 ×4H
5·548	82·58	7·136	3·86	1·13	16·52	2·324	10 ×4L
8·296	117·9	8·194	3·77	·994	23·59	3·192	10 ×3½
5·675	53·43	4·329	3·07	·873	13·36	2·008	8 ×3
2·863	20·48	1·069	2·67	·611	5·852	·677	7 ×2⅛
4·261	24·01	3·503	2·37	·907	8·003	1·699	6 ×3
4·728	18·13	3·385	1·96	·846	7·075	1·733	5⅛×2⅞
4·175	10·15	3·432	1·56	·907	5·076	1·788	4 ×3H
3·498	8·543	2·839	1·56	·901	4·271	1·409	4 ×3L
2·341	5·709	·843	1·56	·600	2·855	·627	4 ×2
1·986	3·701	·713	1·37	·599	2·115	·526	3½×2
1·218	·927	·085	·872	·264	·742	·126	2½×1

BULB ANGLES.

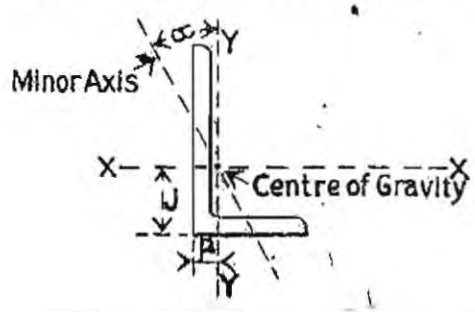
DIMENSIONS AND PROPERTIES IN INCH UNITS.

Radii			Dimensions		Moments of Inertia		Section Moduli		Angle ∝ Degrees	Least Radius of Gyration Ins.	Size Inches A × B
r^3	r^4	r^5	J	P	About X-X	About Y-Y	About X-X	About Y-Y			
·975	·575	·500	4·866	·679	111·120	4·885	19·723	1·732	4½	·735	10½×3½
·950	·550	·475	4·361	·694	82·418	4·585	16·038	1·634	5½	·729	9½×3½
·850	·525	·425	3·798	·706	57·725	4·265	12·277	1·526	7	·740	8½×3½
·850	·525	·425	3·956	·598	52·685	2·603	11·594	1·084	5	·621	8½×3
·800	·475	·400	3·290	·717	37·824	3·772	8·984	1·355	9	·750	7½×3½
·800	·475	·400	3·419	·612	35·725	2·405	8·754	1·007	6	·632	7½×3
·700	·425	·350	2·723	·747	23·943	3·494	6·339	1·269	11½	·764	6½×3½
·700	·425	·350	2·865	·619	21·677	2·098	5·963	·881	8½	·644	6½×3

DORMAN, LONG & CO. LIMITED.

UNEQUAL ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

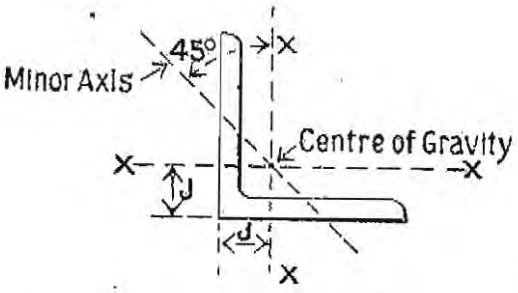


Reference Mark	Size and Thickness	Area Square Inches	Weight per foot Lbs.	Radii		Dimensions		Moments of Inertia		Minimum Section Moduli		Angle α Degrees	Least Radius of Gyration
				Root	Toe	J	p	About X-X	About Y-Y	About X-X	About Y-Y		
BSUA 26	7 × 4 × ½	5·248	17·84	·45	·325	2·39	·90	26·24	6·32	5·69	2·04	18½	·86
" 26	" " ⅝	6·482	22·04	·45	·325	2·44	·95	31·99	7·64	7·02	2·51	18	·85
" 26	" " ¾	7·686	26·13	·45	·325	2·49	1·00	37·41	8·86	8·30	2·95	18	·85
BSUA 24	6½ × 4½ × ⅜	3·982	13·54	·45	·325	2·03	1·04	17·08	6·76	3·82	1·95	25½	·98
" 24	" " ½	5·248	17·84	·45	·325	2·08	1·09	22·2	8·75	5·02	2·57	25	·97
" 24	" " ⅝	6·482	22·04	·45	·325	2·13	1·14	27·09	10·60	6·20	3·15	25	·96
" 24	" " ¾	7·686	26·13	·45	·325	2·18	1·19	31·66	12·32	7·33	3·72	25	·96
BSUA 22	6½ × 3½ × ⅜	3·610	12·27	·425	·30	2·22	·74	15·7	3·27	3·67	1·18	16½	·75
" 22	" " ½	4·750	16·15	·425	·30	2·28	·79	20·4	4·20	4·83	1·55	16½	·75
" 22	" " ⅝	5·860	19·92	·425	·30	2·33	·84	24·83	5·06	5·95	1·90	16	·74
" 22	" " ¾	6·938	23·59	·425	·30	2·38	·89	28·96	5·84	7·03	2·24	16	·74
BSUA 19	5½ × 3½ × 5/16	2·717	9·24	·40	·275	1·77	·78	8·39	2·68	2·25	·98	22	·76
" 19	" " ⅜	3·236	11·00	·40	·275	1·80	·81	9·93	3·15	2·68	1·17	22	·76
" 19	" " ½	4·252	14·46	·40	·275	1·85	·86	12·80	4·05	3·51	1·53	22	·75
" 19	" " ⅝	5·236	17·80	·40	·275	1·90	·91	15·6	4·86	4·33	1·87	21½	·75
BSUA 18	5½ × 3 × 5/16	2·562	8·71	·375	·25	1·87	·64	8·00	1·72	2·20	·73	17	·65
18	" " ⅜	3·050	10·37	·375	·25	1·90	·66	9·45	2·02	2·62	·86	17	·64
" 18	" " ½	4·003	13·61	·375	·25	1·95	·71	12·2	2·58	3·44	1·13	16½	·64
" 18	" " ⅝	4·925	16·74	·375	·25	2·00	·76	14·7	3·08	4·20	1·37	16½	·63
BSUA 14	4½ × 3½ × 5/16	2·402	8·17	·35	·25	1·36	·87	4·82	2·55	1·54	·97	30½	·74
" 14	" " ⅜	2·859	9·72	·35	·25	1·39	·89	5·69	3·00	1·83	1·15	30½	·74
" 14	" " ½	3·749	12·75	·35	·25	1·44	·94	7·31	3·84	2·39	1·5	30	·74
" 14	" " ⅝	4·609	15·67	·35	·25	1·48	·99	8·81	4·61	2·92	1·83	30	·74
BSUA 13	4½ × 3 × 5/16	2·246	7·63	·35	·25	1·44	·70	4·58	1·63	1·50	·71	23½	·65
" 13	" " ⅜	2·671	9·08	·35	·25	1·47	·73	5·40	1·92	1·78	·84	23½	·64
" 13	" " 7/16	3·089	10·50	·35	·25	1·50	·75	6·18	2·19	2·06	·97	23½	·64
" 13	" " ½	3·499	11·90	·35	·25	1·52	·78	6·93	2·44	2·33	1·10	23	·64
" 13	" " ⅝	4·296	14·61	·35	·25	1·57	·82	8·34	2·91	2·85	1·34	23	·64
BSUA 10	4 × 2½ × ¼	1·563	5·31	·325	·225	1·30	·56	2·54	·767	·94	·40	21	·54
" 10	" " 5/16	1·934	6·58	·325	·225	1·33	·59	3·11	·935	1·16	·49	21	·54
" 10	" " ⅜	2·298	7·81	·325	·225	1·35	·61	3·65	1·09	1·38	·58	21	·53
" 10	" " ½	3·001	10·20	·325	·225	1·40	·66	4·66	1·38	1·79	·75	20½	·53

DORMAN, LONG & CO. LIMITED.

EQUAL ANGLES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.

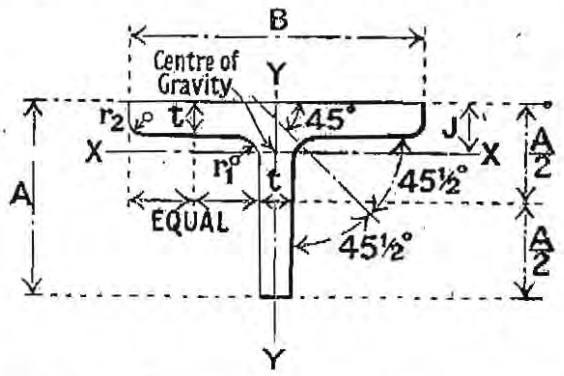


Reference Mark	Size and Thickness	Area Square Inches	Weight per foot Lbs.	Radii		Dimension	Moment of Inertia	Section Modulus	Least Radius of Gyration
				Root	Toe	J	X-X	X-X	
DLEA 20	12×12× ⅞	20·236	68·80	·84	·59	3·29	277·71	31·87	2·36
" 20	" " 1	23·002	78·21	·84	·59	3·34	313·36	36·17	2·36
" 20	" " 1¼	28·440	96·69	·84	·59	3·43	381·43	44·53	2·34
BSEA 12	4½×4½×⅜	3·236	11·00	·400	·275	1·22	6·14	1·87	·88
" 12	" " ½	4·252	14·46	·400	·275	1·29	7·92	2·47	·87
" 12	" " ⅝	5·236	17·80	·400	·275	1·34	9·56	3·03	·87
" 12	" " ¾	6·189	21·04	·400	·275	1·39	11·1	3·57	·87

DORMAN, LONG & CO. LIMITED.

TEES.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size and Thickness Inches B × A × t	Area Square Inches	Weight per foot lbs.	Radii Root r_1	Radii Toe r_2	Dimension J	Moments of Inertia About X-X	Moments of Inertia About Y-Y	Section Moduli About X-X	Section Moduli About Y-Y	Radii of Gyration About X-X	Radii of Gyration About Y-Y
BST 21	6 × 4 × ⅜	3·634	12·36	·425	·300	·915	4·700	6·344	1·52	2·11	1·137	1·321
" 20	6 × 3 × ⅜	3·260	11·08	·400	·275	·633	2·062	6·389	·871	2·13	·795	1·400
" 20	" " ½	4·272	14·53	·400	·275	·684	2·635	8·649	1·14	2·88	·785	1·423
" 19	5 × 4 × ⅜	3·257	11·07	·400	·275	·998	4·471	3·691	1·49	1·48	1·172	1·065
" 15	4 × 4 × ⅜	2·872	9·77	·350	·250	1·11	4·189	1·901	1·45	·95	1·208	·814
" 15	" " ½	3·758	12·78	·350	·250	1·16	5·402	2·590	1·90	1·29	1·199	·830
" 13	3½ × 3½ × ⅜	2·496	8·49	·325	·225	·988	2·768	1·284	1·10	·73	1·053	·717
" 13	" " ½	3·259	11·08	·325	·225	1·04	3·543	1·752	1·44	1·00	1·043	·733
" 11	3 × 3 × ½	2·760	9·38	·300	·200	·918	2·165	1·115	1·04	·74	·886	·636
" 10	3 × 2½ × ⅜	1·929	6·56	·275	·200	·695	1·015	·814	·56	·54	·725	·650
" 10	" " ½	2·506	8·52	·275	·200	·742	1·275	1·109	·73	·74	·713	·665
" 7	2¼ × 2¼ × ¼	1·071	3·64	·250	·175	·638	·488	·224	·30	·20	·675	·457
" 7	" " ⅜	1·554	5·28	·250	·175	·689	·685	·349	·44	·31	·664	·474
DLT 6A	2 × 1¼ × ¼	·820	2·79	·225	·150	·408	·148	·159	·14	·16	·425	·441
" 6A	" " ⅜	1·180	4·01	·225	·150	·455	·202	·246	·19	·25	·414	·457
BST 5	1½ × 2 × ¼	·820	2·79	·225	·150	·648	·307	·068	·23	·09	·612	·288
" 5	" " 5/16	1·003	3·41	·225	·150	·674	·369	·088	·28	·12	·607	·296
" 4	1¾ × 1¾ × 3/16	·629	2·14	·225	·150	·492	·173	·077	·14	·09	·524	·350
" 4	" " ¼	·820	2·79	·225	·150	·519	·221	·107	·18	·12	·520	·361
" 4	" " 5/16	·999	3·40	·225	·150	·544	·265	·137	·22	·16	·515	·370

DORMAN, LONG & CO. LIMITED.

INFORMATION

RELATING TO THE

CARRYING CAPACITY, &c.

OF

BEAMS AND STANCHIONS

COMPOSED OF

OLD BRITISH STANDARD

AND

OTHER SECTIONS.

DORMAN, LONG & CO. LIMITED.

BEAMS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see pages 210D and 210E.

Reference Mark	Size Inches	Weight per foot lbs.	SPANS IN FEET								
			2	4	6	8	10	12	14	16	18
BSB 30	24×7½	100	..	..	..	..	103	98·3	84·2	73·7	65·5
" 29	20×7½	89	..	..	..	103	89·1	74·2	63·6	55·7	49·5
" 28	18×7	75	..	..	86·9	85·1	68·1	56·7	48·6	42·5	37·8
" 27	16×6	62	..	..	79·2	60·5	48·4	40·3	34·6	30·2	26·9
BSB 26	15×6	59	..	..	67·5	55·9	44·7	37·3	31·9	28·0	24·8
" 25	15×5	42	..	..	50·4	38·0	30·4	25·4	21·7	19·0	16·9
" 24	14×6H	57	..	..	63·0	50·7	40·6	33·8	29·0	25·4	22·6
" 23	14×6L	46	..	..	46·7	41·9	33·6	28·0	24·0	21·0	18·6
BSB 22	12×6H	54	..	..	54·0	41·7	33·4	27·8	23·8	20·9	18·5
" 21	12×6L	44	..	..	43·2	35·0	28·0	23·4	20·0	17·5	15·6
" 20	12×5	32	..	35·3	32·6	24·4	19·6	16·3	14·0	12·2	10·9
BSB 19	10×8	70	..	..	54·0	46·0	36·8	30·7	26·3	23·0	20·4
" 18	10×6	42	..	..	36·0	28·2	22·6	18·8	16·1	14·1	12·5
" 17	10×5	30	..	32·4	25·9	19·4	15·5	12·9	11·1	9·71	8·63
" 16	9×7	58	..	..	44·6	34·0	27·2	22·7	19·4	17·0	15·1
BSB 13	8×5	28	..	25·2	19·8	14·9	11·9	9·92	8·51	7·44	6·62
" 11	7×4	16	15·8	14·9	9·96	7·47	5·97	4·98	4·27	3·73	3·32
" 9	6×4½	20	20·0	15·4	10·3	7·69	6·15	5·13	4·40	3·85	3·42
" 7	5×4½	18	13·1	12·1	8·07	6·05	4·84	4·03	3·46	3·03	..
BSB 6	5×3	11	9·90	7·26	4·84	3·63	2·90	2·42	2·07	1·81	..
" 5	4¾×1¾	6·5	7·55	3·78	2·52	1·89	1·51	1·26	1·08	..	..
" 4	4×8	9·5	7·92	5·01	3·34	2·51	2·01	1·67	..	..	..
" 2	3×3	8·5	5·40	3·37	2·24	1·68	1·35	..	..	..	..

DORMAN, LONG & CO. LIMITED.

BEAMS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

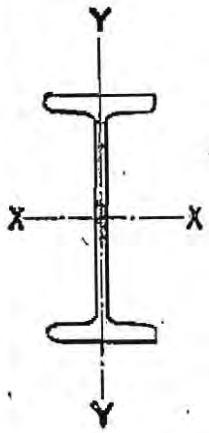
For dimensions and properties of sections see pages 210D and 210E.

SPANS IN FEET										Section Modulus	Size Inches
20	22	24	26	28	30	32	36	40	44		
59·0	53·6	49·1	45·4	42·1	39·3	36·9	32·8	29·5	26·8	221·1	24×7½
44·5	40·5	37·1	34·3	31·8	29·7	27·8	24·7	22·3	20·2	167·0	20×7½
34·0	30·9	28·4	26·2	24·3	22·7	21·3	18·9	17·0	15·5	127·6	18×7
24·2	22·0	20·2	18·6	17·3	16·1	15·1	13·4	..	..	90·71	16×6
22·4	20·3	18·6	17·2	16·0	14·9	14·0	..	..	..	83·85	15×6
15·2	13·8	12·7	11·7	10·9	10·1	9·51	..	..	..	57·06	15×5
20·3	18·5	16·9	15·6	14·5	13·5	..	..	..	..	76·12	14×6H
16·8	15·3	14·0	12·9	12·0	11·2	..	..	..	..	62·92	14×6L
16·7	15·2	13·9	12·8	11·9	..	..	..	..	..	62·58	12×6H
14·0	12·7	11·7	10·8	10·0	..	..	..	..	..	52·55	12×6L
9·78	8·89	8·15	7·52	6·98	..	..	..	..	..	36·66	12×5
18·4	16·7	15·3	14·1	..	..	..	..	..	..	68·98	10×8
11·3	10·3	9·40	8·68	..	..	..	..	..	..	42·30	10×6
7·77	7·06	6·47	5·97	..	..	..	..	..	..	29·12	10×5
13·6	12·4	11·3	..	..	..	..	..	..	..	51·00	9×7
5·95	5·41	..	..	..	..	..	..	..	..	22·33	8×5
2·99	..	..	..	..	..	..	..	..	..	11·20	7×4
..	..	..	..	..	..	..	..	..	..	11·54	6×4½
..	..	..	..	..	..	..	..	..	..	9·076	5×4½
..	..	..	..	..	..	..	..	..	..	5·444	5×3
..	..	..	..	..	..	..	..	..	..	2·833	4¾×1¾
..	..	..	..	..	..	..	..	..	..	3·760	4×3
..	..	..	..	..	..	..	..	..	..	2·524	3×3

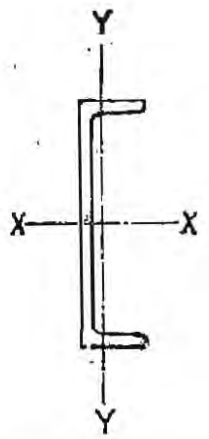
DORMAN, LONG & CO. LIMITED.

BEAMS AND CHANNELS AS STANCHIONS.

DIMENSIONS AND PROPERTIES IN INCH UNITS.



Reference Mark	Size Inches	Weight per foot lbs.	Area Square Inches	Radii of Gyration Inches		Section Moduli	
				About X-X	About Y-Y	About X-X	About Y-Y
BEAMS.							
BSB 30	24×7½	100	29·40	9·50	1·50	221·1	17·84
" 29	20×7½	89	26·17	7·99	1·54	167·0	16·70
" 28	18×7	75	22·06	7·21	1·46	127·6	13·44
" 27	16×6	62	18·23	6·31	1·21	90·71	9·026
" 26	15×6	59	17·35	6·02	1·27	83·85	9·406
" 25	15×5	42	12·35	5·88	·978	57·06	4·724
" 24	14×6H	57	16·76	5·63	1·29	76·12	9·320
" 23	14×6L	46	13·53	5·70	1·26	62·92	7·200
" 22	12×6H	54	15·88	4·86	1·33	62·58	9·433
" 21	12×6L	44	12·94	4·93	1·31	52·55	7·423
" 20	12×5	32	9·41	4·83	1·01	36·66	3·901
" 19	10×8	70	20·60	4·09	1·86	68·98	17·91
" 18	10×6	42	12·35	4·13	1·36	42·30	7·650
" 17	10×5	30	8·82	4·06	1·05	29·12	3·916
" 16	9×7	58	17·06	3·66	1·64	51·00	13·22
" 13	8×5	28	8·240	3·29	1·11	22·33	4·104
" 11	7×4	16	4·706	2·88	·851	11·20	1·707
" 9	6×4½	20	5·880	2·42	·959	11·54	2·406
" 7	5×4½	18	5·290	2·07	1·03	9·076	2·517
CHANNELS.							
BSC 27	15×4	41·94	12·33	5·53	1·09	50·27	4·748
" 26	12×4	36·47	10·73	4·51	1·13	36·36	4·599
" 22	11×3½	29·82	8·771	4·12	·980	27·02	3·234
" 21	10×4H	30·16	8·871	3·84	1·16	26·14	4·147
" 20	10×3½	28·21	8·296	3·77	·994	23·59	3·192
" 12	8×3	19·30	5·675	3·07	·873	13·36	2·008
" 6	6×3	14·49	4·261	2·37	·907	8·003	1·699
DLC 5A	5⅛×2⅞	16·08	4·728	1·96	·846	7·075	1·733
" 3A	4×3H	14·20	4·175	1·56	·907	5·076	1·788



DORMAN, LONG & CO. LIMITED.

BEAMS AND CHANNELS AS STANCHIONS.

SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 113.

SAFE LOADS IN TONS FOR LENGTHS IN FEET									Size Inches
4	6	8	10	12	14	16	18	20	
BEAMS.									
170	164	154	143	130	115	100	87	76	24×7½
152	146	138	129	118	105	92	80	70	20×7½
128	122	115	106	96	84	73	63	..	18×7
104	98	89	79	67	57	48	..	..	16×6
99	94	86	77	67	57	48	..	..	15×6
69	62	54	44	36	..	..	..	..	15×5
96	91	84	76	66	56	48	..	..	14×6H
77	73	67	60	52	44	37	..	..	14×6L
91	87	80	73	64	55	47	..	..	12×6H
74	70	65	59	51	44	38	..	..	12×6L
52	48	42	35	28	..	..	..	..	12×5
121	118	113	108	101	94	86	78	70	10×8
71	68	63	57	51	44	38	32	..	10×6
49	45	40	34	28	23	..	..	..	10×5
99	96	92	86	79	72	64	56	50	9×7
46	43	39	33	28	23	..	..	..	8×5
25	22	18	14	..	..	..	..	..	7×4
33	29	25	21	17	..	..	..	..	6×4½
30	27	24	20	16	..	..	..	..	5×4½
CHANNELS.									
69	64	57	49	41	..	..	..	..	15×4
61	57	51	44	37	..	..	..	..	12×4
49	44	38	31	25	..	..	..	..	11×3½
50	47	43	37	31	..	..	..	..	10×4H
46	42	36	30	24	..	..	..	..	10×3½
31	27	23	18	..	..	..	..	..	8×3
23	21	18	14	..	..	..	..	..	6×3
26	22	18	..	..	..	..	..	..	5⅛×2⅞
23	21	17	14	..	..	..	..	..	4×3H

SHEET WORKS

AYRTON ROLLING MILLS
MIDDLESBROUGH

ROLLING MILLS, CLOSE ANNEALING FURNACES
GALVANIZING AND CORRUGATING SHOPS

BLACK STEEL SHEETS

ORDINARY AND CLOSE ANNEALED

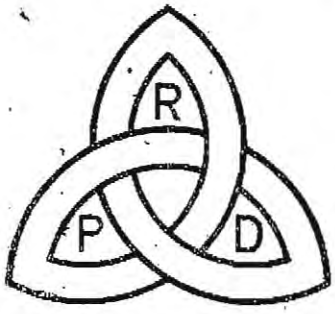
GALVANIZED SHEETS

PLAIN OR CORRUGATED

SCANDINAVIAN TILES

FITTINGS OF ALL DESCRIPTIONS

REGISTERED BRANDS ON SHEETS.



INDIA AND
SOUTH AMERICA.

DIAMOND

SOUTH AFRICA.

DORMAN, LONG & CO. LIMITED.

APPROXIMATE NUMBER OF GALVANIZED CORRUGATED SHEETS PER TON.

Thickness	Corrugations	LENGTHS IN FEET					
		5	5½	6	6½	7	7½
16 B. G.	5/5″	68	62	56	52	48	45
"	8/3″ } 6/4″ }	70	64	58	54	50	47
"	7/4″	61	56	51	47	44	41
"	6/5″	57	52	47	43	40	37
"	10/3″	59	54	49	45	42	39
18 B. G.	5/5″	86	78	72	66	62	57
"	8/3″ } 6/4″ }	89	81	74	68	64	59
"	7/4″	76	70	64	59	54	51
"	6/5″	72	65	60	54	51	48
"	10/3″	74	67	62	56	53	50
20 B. G.	5/5″	113	103	94	87	80	75
"	8/3″ } 6/4″ }	114	104	95	88	81	76
"	7/4″	97	89	81	75	70	65
"	6/5″ } 10/3″ }	95	86	79	73	68	64
22 B. G.	8/3″	139	127	116	107	99	93
"	10/3″	116	105	97	90	83	78
24 B. G.	8/3″	168	153	140	130	120	112
"	9/3″	154	140	128	119	110	103
"	10/3″	140	128	117	108	100	94
26 B. G.	8/3″	223	203	186	172	159	149
"	9/3″	204	186	170	157	146	136
"	10/3″	186	169	155	143	133	124
28 B. G.	8/3″	240	219	200	185	172	161
"	9/3″	220	200	183	169	158	147
"	10/3″	200	182	167	154	143	133

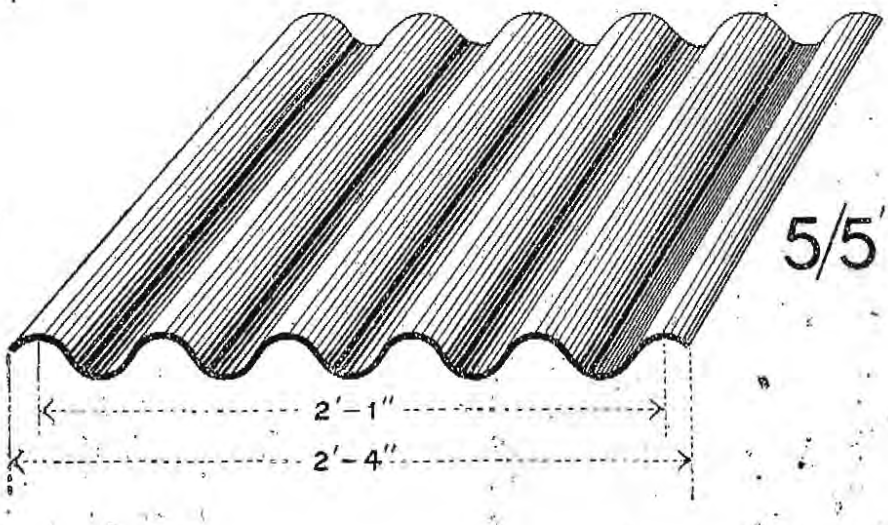
Flat Sheets 30″ wide count the same as 8/3″ corrugations, and 36″ wide the same as 10/3″ corrugations.

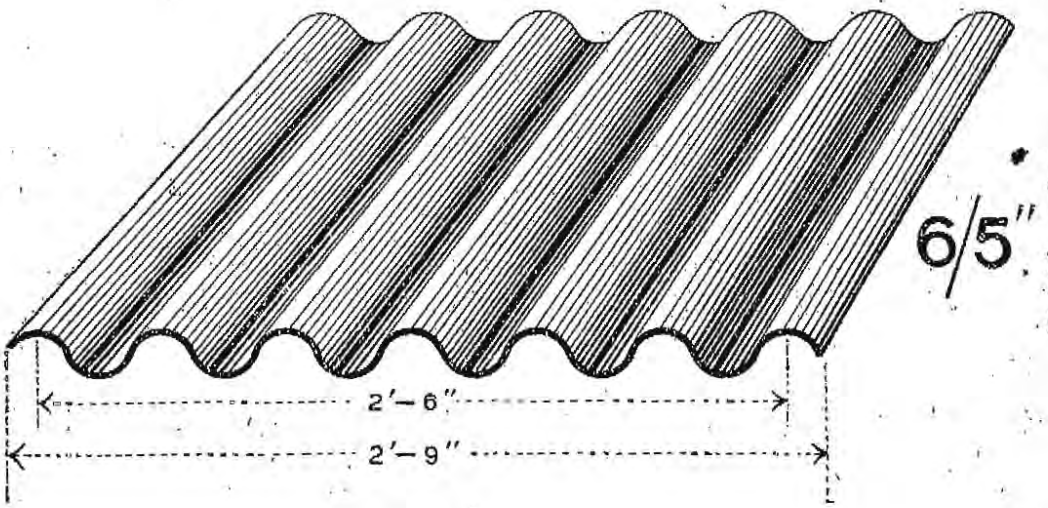
APPROXIMATE NUMBER OF GALVANIZED CORRUGATED SHEETS PER TON.

LENGTHS IN FEET							Corrugations	Thickness
8	8½	9	9½	10	11	12		
42	..	..	..	..	..	..	5/5″	16 B. G.
44	..	..	..	..	..	..	8/3″	″
							6/4″	″
38	..	..	..	..	..	..	7/4″	″
35	..	..	..	..	..	..	6/5″	″
37	..	..	..	..	..	..	10/3″	″
54	51	48	45	43	..	..	5/5″	18 B. G.
56	52	49	46	44	..	..	8/3″	″
							6/4″	″
48	45	42	40	38	..	..	7/4″	″
45	42	40	38	36	..	..	6/5″	″
46	43	41	39	37	..	..	10/3″	″
70	66	62	59	56	..	..	5/5″	20 B. G.
71	67	63	60	57	..	..	8/3″	″
							6/4″	″
61	57	54	51	49	..	..	7/4″	″
59	56	53	50	47	..	..	6/5″	″
							10/3″	″
87	82	77	73	69	63	..	8/3″	22 B. G.
73	68	65	61	58	..	..	10/3″	″
105	98	93	88	84	76	70	8/3″	24 B. G.
96	90	85	81	77	70	64	9/3″	″
88	83	78	74	70	64	58	10/3″	″
139	131	124	117	111	101	93	8/3″	26 B. G.
127	120	113	107	101	93	85	9/3″	″
116	109	103	98	93	84	77	10/3″	″
150	..	..	..	..	..	..	8/3″	28 B. G.
137	..	..	..	..	..	..	9/3″	″
125	..	..	..	..	..	..	10/3″	″

Flat Sheets 30″ wide count the same as 8/3″ corrugations, and 36″ wide the same as 10/3″ corrugations.

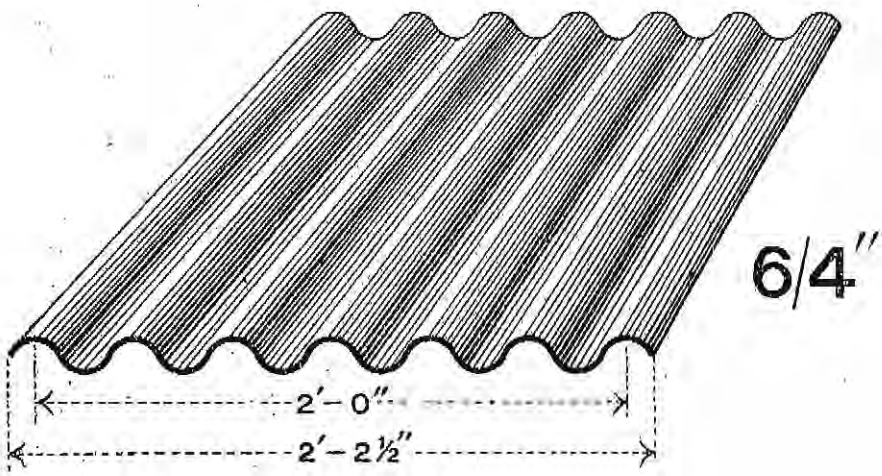
CORRUGATED SHEETS.

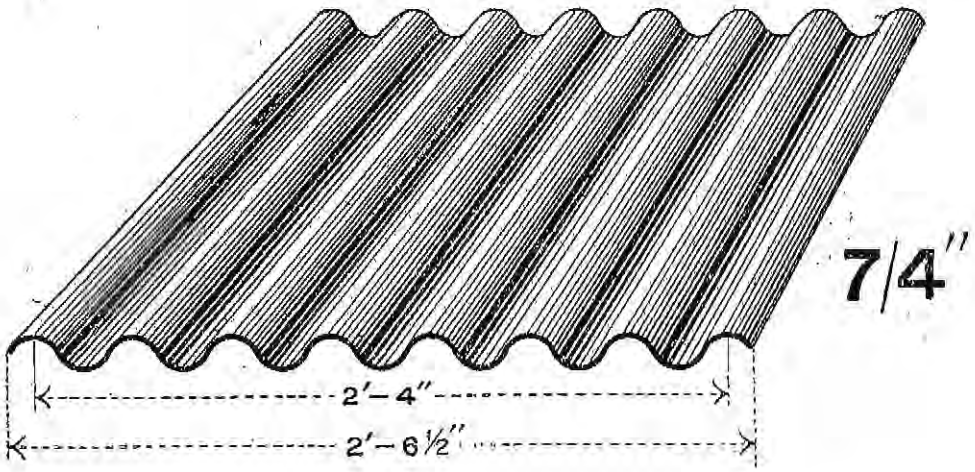




GAUGES 16, 18 AND 20 B.G.

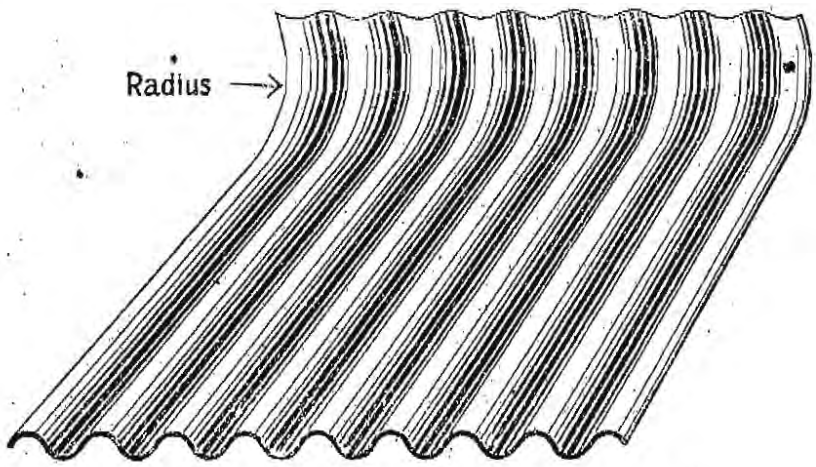
CORRUGATED SHEETS.





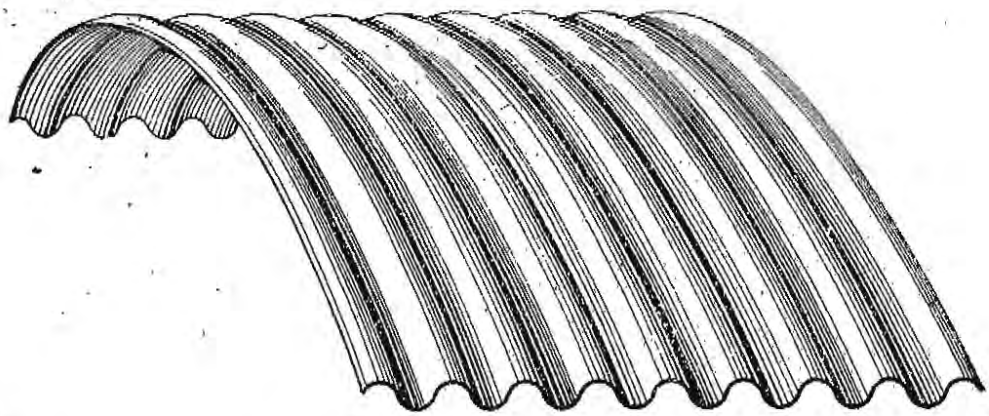
GAUGES 16, 18 AND 20 B.G.

CRAMPED CORRUGATED SHEETS.



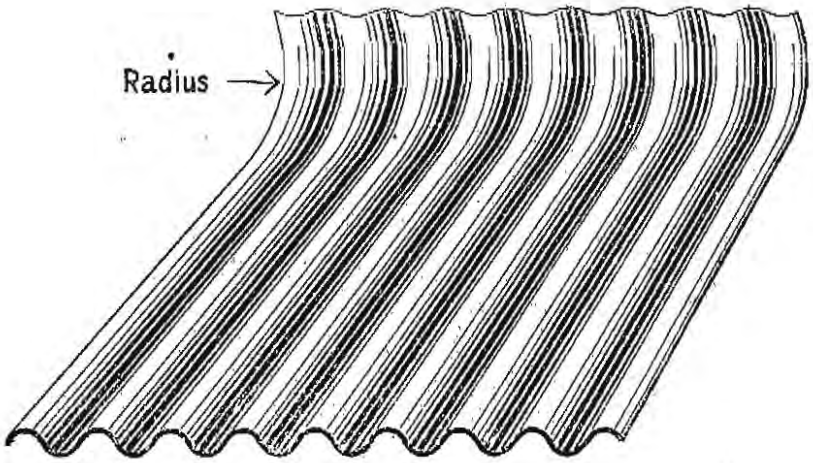
8/3″ OR 10/3″. FROM 16 TO 26 GAUGE. 12″ RADIUS.
5/5″ " 6/5″. " 16 " 20 " 18″ "

CURVED CORRUGATED SHEETS.



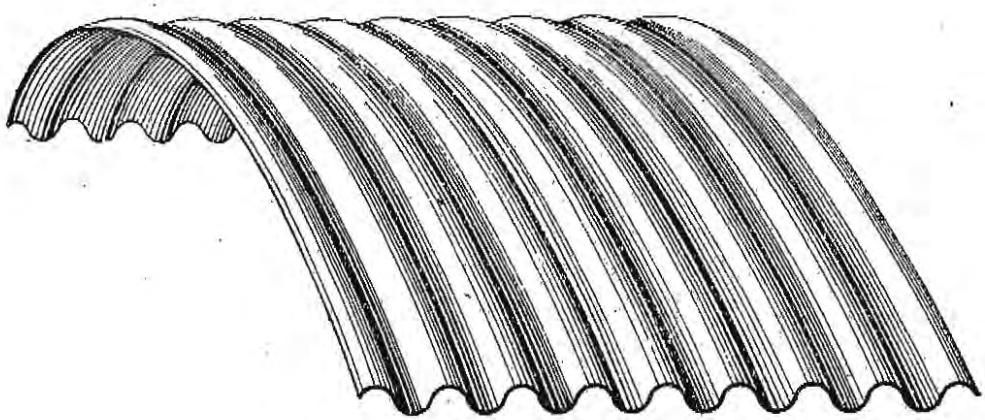
8/3″ OR 10/3″. FROM 16 TO 26 GAUGE.
5/5″ " 6/5″. " 16 " 20 "

CRAMPED CORRUGATED SHEETS.



8/3″ OR 10/3″. FROM 16 TO 26 GAUGE. 12″ RADIUS.
5/5″ " 6/5″. " 16 " 20 " 18″ "

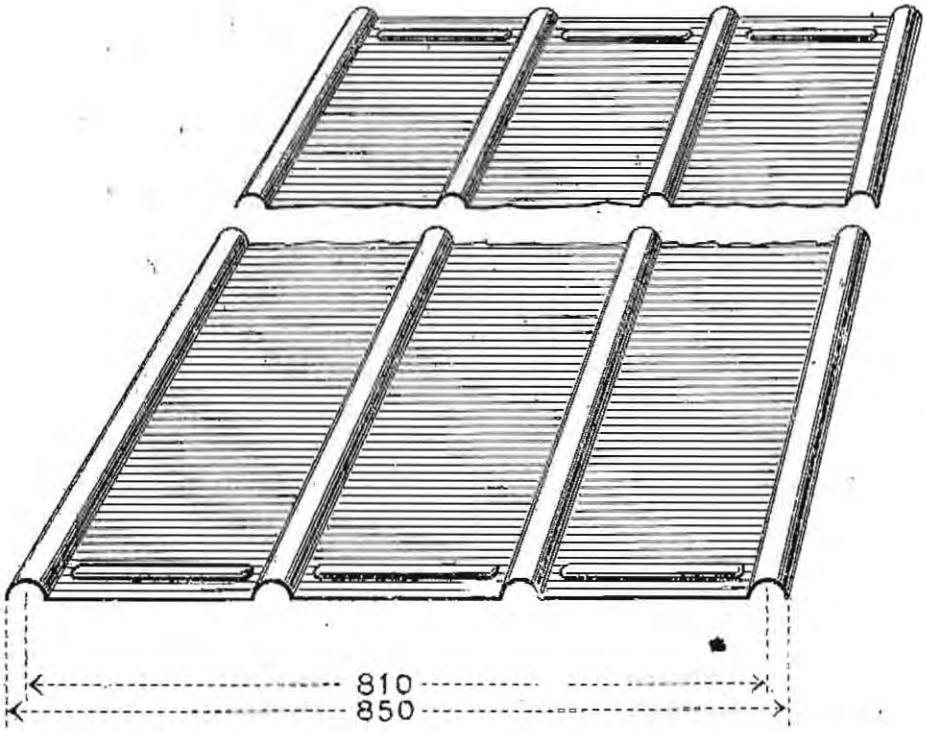
CURVED CORRUGATED SHEETS.



8/3″ OR 10/3″. FROM 16 TO 26 GAUGE.
5/5″ " 6/5″. " 16 " 20 "

GALVANIZED SCANDINAVIAN TILES.

DIMENSIONS IN MILLIMETRES.



This form of sheet is made in a standard width of 810 mm. with four equally spaced corrugations as shown above, and in the following lengths:—

1·00, 1·25, 1·50, 1·75, 2·00, 2·25 and 2·50 metres.

GAUGES 20 TO 26 B.G.

BLACK SHEETS.

Close Annealed and Patent Flattened Black Sheets are made in the following sizes :—

Gauge	Width	Maximum Length
8 to 9	22″ to 30″	8′ 0″
10 „ 17	„ „	10′ 0″
18 „ 26	„ „	12′ 0″
27 „ 28	„ „	10′ 0″
29 „ 30	„ „	8′ 0″
8 to 9	over 30″ to 36″	8′ 0″
10 „ 17	„ „ „	10′ 0″
18 „ 22	„ „ „	12′ 0″
23 „ 27	„ „ „	10′ 0″
28 „ 30	„ „ „	8′ 0″
10 to 13	over 36″ to 40″	10′ 0″
14 „ 22	„ „ „	10′ 0″
23 „ 26	„ „ „	8′ 0″
27 „ 30	„ „ „	7′ 0″
10 to 16	over 40″ to 48″	12′ 0″

ROLLING MARGIN of 5% over and 2½% under calculated weights to be allowed.

FLATTENING either by Mangling or by Stretching (Patent Flattening) ; the latter process leaves an indentation at each end of the sheet. If these marks are required to be eliminated, they can be sheared off.

The length of Patent Flattened Sheets naturally varies ; if exact lengths are required, reshearing is necessary.

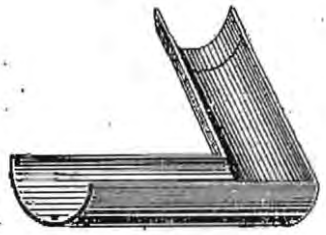
RESHEARING. The mill shearing margin is ¼″ in length and ⅛″ in width.

GALVANIZED GUTTERS AND DOWN PIPES.

GAUGE 16 TO 26.

SOCKET.

ANGLE.



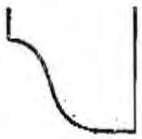
HALF ROUND.

STOP END.

GIRTH 10″ TO 36″. LENGTH ABOUT 6′ 0″.

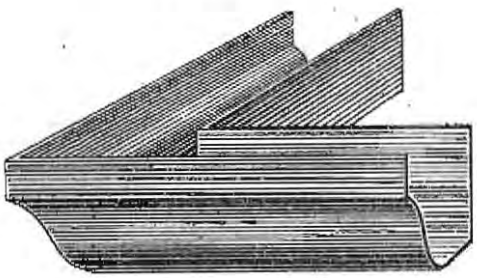
O G GUTTER.

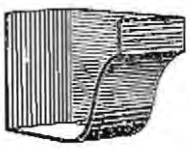
SECTION.



GIRTH 10″ TO 36″. LENGTH ABOUT 6′ 0″.

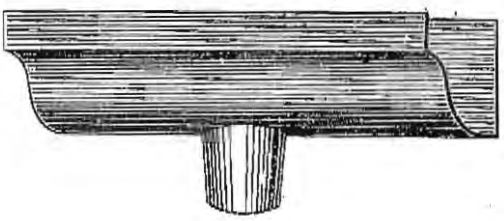
ANGLE.





STOP END.

SOCKET.



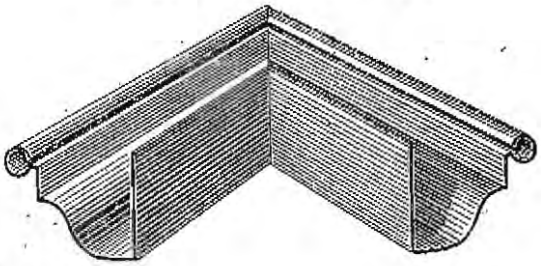
DORMAN, LONG & CO. LIMITED.

GALVANIZED GUTTERS AND DOWN PIPES.

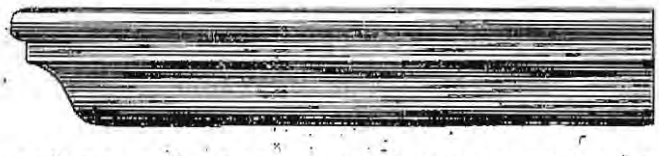
BEADED GUTTER.

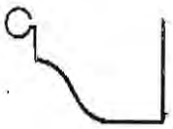
GIRTH 10″ TO 36″. GAUGE 24. LENGTH ABOUT 6′ 0″.

MOULDED O G ANGLE.



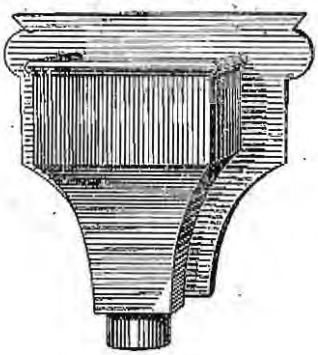
STAMPED O G GUTTER, WITH SLIP JOINTS. SECTION.



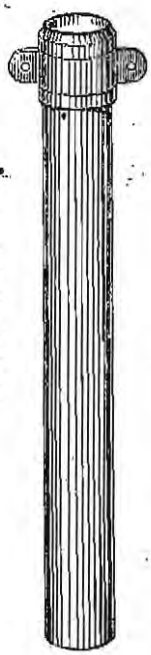


GIRTH 10″ TO 36″. GAUGE 24. LENGTH ABOUT 6′ 0″.

FOUNTAIN HEAD.



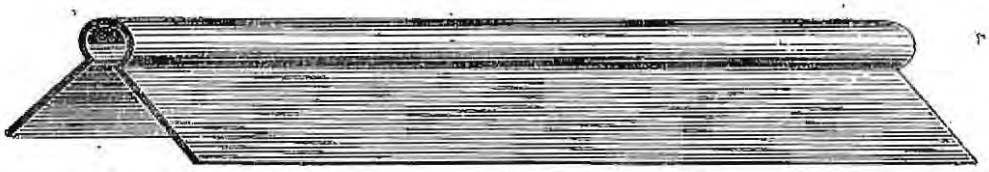
DOWN PIPE.



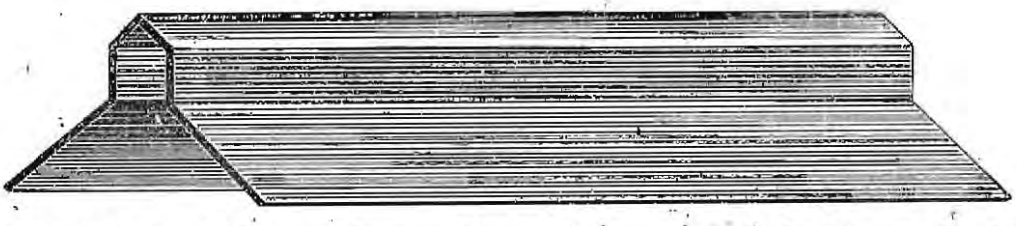
DIAMETER 3″ TO 12″. GAUGE 20 TO 26.
LENGTH ABOUT 6′ 0″.
16 & 18 GAUGE IN SHORTER LENGTHS.

SHOE.

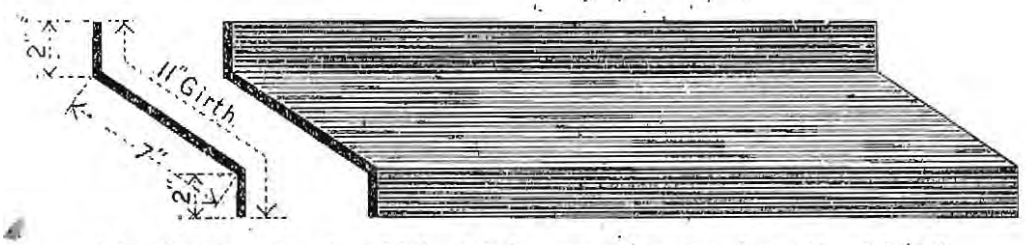
GALVANIZED RIDGING AND LOUVRE BLADES.



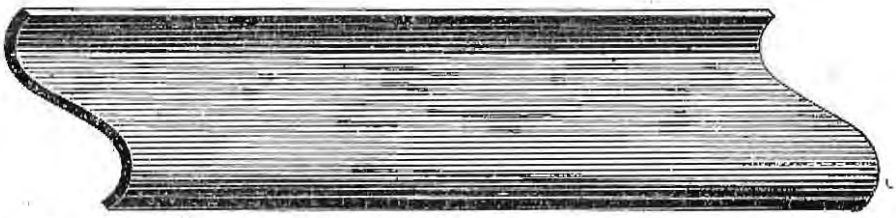
Girth 12" to 36". Gauge 16 to 26. Length about 6′ 0″.



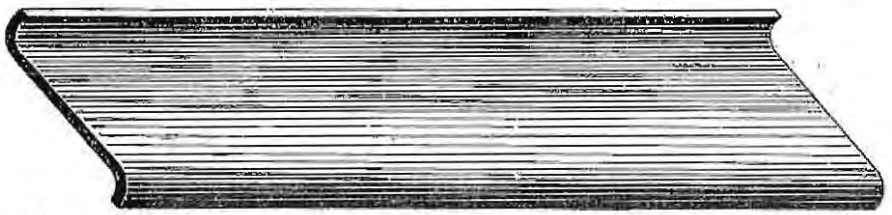
Girth 12″ to 36″. Gauge 16 to 26. Length about 6′ 0″.



16 Gauge up to ⅛″ thick, maximum length 6′ 0″.
Under 16 Gauge, ,, ,, 8′ 0″.



Girth 11″.—16 Gauge up to ⅛″ thick, maximum length 6′ 0″.
Under 16 Gauge, ,, ,, 8′ 0″.

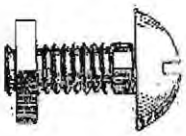


Girth 11″.—16 Gauge up to ⅛″ thick, maximum length 6′ 0″.
Under 16 Gauge, ,, ,, 8′ 0″.

GALVANIZED FITTINGS.

Weight of Rivets.

⅜″ × ¼″	-	57 Gross	to 1 cwt.
½″ × ¼″	-	52 ,,	,,
⅝″ × ¼″	-	48 ,,	,,



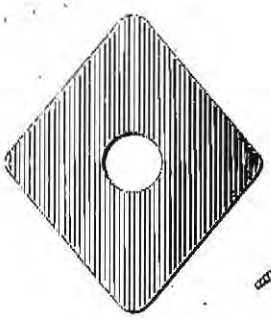
Weight of Bolts and Nuts.

1½″ × ¼″	-	20 Gross	to 1 cwt.
1¼″ × ¼″	-	22 ,,	,,
1″ × ¼″	-	24 ,,	,,
¾″ × ¼″	-	27 ,,	,,
½″ × ¼″	-	28 ,,	,,

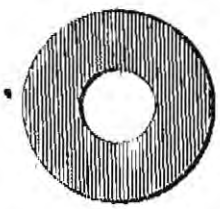
2½″	-	22 Gross	to 1 cwt.
3″	-	19 ,,	,,

2¼″	-	24 Gross	to 1 cwt.
2½″	-	21 ,,	,,
3″	-	16 ,,	,,

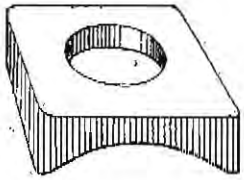
4″ × 5/16″	diameter	- 5½ Gross	to 1 cwt.
4½″ × 5/16″	,,	- 5 ,,	,,
5″ × 5/16″	,,	- 4½ ,,	,,
4″ × ⅜″	,,	- 4 ,,	,,
4½″ × ⅜″	,,	- 3½ ,,	,,
5″ × ⅜″	,,	- 3 ,,	,,



18 Gross to 1 cwt.



For ¼″ Rivets and Nails :
57 Gross to 1 cwt.



11 Gross to 1 cwt.

WIRE AND ROD WORKS

CLEVELAND WIRE MILLS
MIDDLESBROUGH

ROLLING MILLS

WIRE DRAWING

AND

GALVANIZING SHOPS

THE CLEVELAND WIRE MILLS

WIRE RODS

rolled in 3 cwt. pieces from $\frac{7}{16}$" to No. 6 S.W.G.
Rods cut to straight lengths for Ferro-Concrete purposes.

These Rods are not classed as Sectional Material, and cannot be rolled within the same limits of rolling margin.

ALL KINDS OF STEEL WIRE.

SPECIALITIES :

GALVANIZED OR BRIGHT FENCING WIRE.
GALVANIZED HIGH STRAIN OVAL WIRE.

GALVANIZED TELEGRAPH
(HIGH CONDUCTIVITY) WIRE.

GALVANIZED TELEPHONE WIRE.

SIGNAL STRAND, Etc.

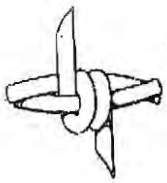
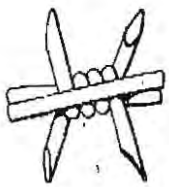
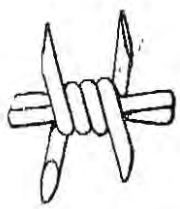
GALVANIZED PATENT STEEL HAWSER WIRE
To Lloyd's Specification.

Bright Patent and Plough Steel Rope Wire of all grades and of Highest Tensile Strength and Ductility.

DRAWN AND ANNEALED PIT GUIDE RODS,
WELDS GUARANTEED.

DORMAN, LONG & CO. LIMITED.

GALVANIZED STEEL BARB FENCING WIRE.

Style	Description	Weight of		Length of 112lbs. or 51 Kilos
		100 yds.	Mile	
		lbs.	lbs.	
	2 Point Ordinary Barbs round One Wire only, 5in. apart	19	335	589 yards 539 metres
	2 Point Thickset Barbs round One Wire only, 2½in. apart	21	370	533 yards 487 metres
	4 Point Ordinary Barbs round One Wire only, 6in. apart	20	352	560 yards 512 metres
	4 Point Thickset Barbs round One Wire only, 3in. apart	25	440	448 yards 410 metres
	4 Point Ordinary Barbs round Both Wires, 6in. apart	20	352	560 yards 512 metres
	4 Point Thickset Barbs round Both Wires, 3in. apart	25	440	448 yards 410 metres

DORMAN, LONG & CO. LIMITED.

GALVANIZED FENCING STRAND.

THREE PLY.

Gauge	Size of Single Wire	Lbs. per Mile	Kilos per Mile	Yards per Cwt.	Metres per Cwt.
0	8	1100	499	179	164
1	8½	994	451	198	181
2	9½	800	363	246	225
3	10	704	319	280	256
4	11	580	263	340	311
5	12	466	211	423	387
6	12½	414	188	476	435
7	13¼	340	154	580	530
8	14	275	125	717	656
9	15	223	101	884	808
10	16	176	80	1120	1024

FIVE PLY.

Gauge	Size of Single Wire	Lbs. per Mile	Kilos per Mile	Yards per Cwt.	Metres per Cwt.
0	10½	1070	485	184	168
1	11½	870	395	226	207
2	12	778	353	253	231
3	13	607	275	324	298
4	13½	530	240	372	340
5	14	460	209	428	391
6	15	372	169	530	485
7	16	294	133	670	613
8	16½	250	113	788	720
9	17	225	102	876	801
10	18	165	75	1194	1092

FOUR PLY.

0	9½	1063	482	185	169
1	10½	855	388	231	211
2	11	773	351	255	233
3	12	620	281	318	291
4	12½	552	250	356	325
5	13¼	454	206	434	397
6	14	367	166	537	491
7	14½	330	150	593	542
8	15½	265	120	743	679
9	16¼	220	100	896	819
10	17	180	82	1095	1001

SEVEN PLY.

0	11½	1211	549	162	148
1	12½	963	437	205	187
2	13	850	386	232	212
3	13½	741	336	266	243
4	14¼	610	277	323	295
5	15	520	236	379	346
6	16	410	186	481	440
7	16½	351	159	560	512
8	17¼	292	132	675	617
9	18	230	104	853	780
10	18½	195	88	1011	924
11	19	160	73	1230	1124
12	20	130	59	1520	1390

The sizes in most general use are Nos. 4, 5 & 6 in 7-ply Wire.

DORMAN, LONG & CO. LIMITED.

STRENGTH OF WIRE.

LOAD IN LBS. ON WIRE TO PRODUCE A TENSION OF 1 TON PER SQUARE INCH.

Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.
·3	158·3	·265	123·6	·23	93·1	·195	67·	·16	45·
·299	157·3	·264	122·6	·229	92·3	·194	66·2	·159	44·5
·298	156·2	·263	121·7	·228	91·5	·193	65·6	·158	43·9
·297	155·2	·262	120·8	·227	90·7	·192	64·8	·157	43·4
·296	154·2	·261	119·8	226	89·9	·191	64·2	·156	42·8
·295	153·1	·26	118·9	·225	89·01	·19	63·6	·155	42·3
·294	152·1	·259	118·	·224	88·2	·189	62·9	·154	41·7
·293	151·	·258	117·1	·223	87·51	·188	62·2	·153	41·2
·292	150·	·257	116·2	·222	86·7	·187	61·5	·152	40·6
·291	149·	·256	115·3	·221	85·9	·186	60·9	·151	40·1
·29	147·9	·255	114·4	·22	85·1	·185	60·2	·15	39·6
·289	146·9	·254	113·5	·219	84·3	·184	59·5	·149	39·
·288	145·9	·253	112·6	·218	83·6	·183	59·	·148	38·5
·287	144·9	·252	111·7	·217	82·84	·182	58·3	·147	38·
·286	143·9	·251	110·8	·216	82·1	·181	57·7	·146	37·5
·285	142·9	·25	110·	·215	81·3	·18	57·	·145	37·
·284	141·9	·249	109·1	·214	80·6	·179	56·4	·144	36·5
·283	140·9	·248	108·2	·213	79·8	·178	55·7	·143	36·
·282	139·9	·247	107·3	·212	79·	·177	55·2	·142	35·5
·281	138·9	·246	106·4	·211	78·3	·176	54·5	·141	35·
·28	137·9	·245	105·6	·21	77·6	·175	53·8	·14	34·5
·279	136·9	·244	104·7	·209	76·9	·174	53·3	·139	34·
·278	135·9	·243	103·9	·208	76·2	·173	52·7	·138	33·5
·277	135·	·242	103·	·207	75·4	·172	52·	·137	33·
·276	134·1	·241	102·	·206	74·7	·171	51·5	·136	32·5
·275	133·	·24	101·1	·205	73·9	·17	50·9	·135	32·
·274	132·1	·239	100·51	·204	73·2	·169	50·2	·134	31·6
·273	131·1	·238	99·71	·203	72·5	·168	49·6	·133	31·1
·272	130·2	·237	98·8	·202	71·8	·167	49·	·132	30·7
·271	129·2	·236	98·	·201	71·	·166	48·5	·131	30·2
·27	128·2	·235	97·	·2	70·4	·165	47·9	·13	29·7
·269	127·3	·234	96·3	·199	69·7	·164	47·3	·129	29·3
·268	126·3	·233	95·5	·198	69·	·163	46·7	·128	28·8
·267	125·4	·232	94·7	·197	68·3	·162	46·2	·127	28·4
·266	124·4	·231	93·9	·196	67·6	·161	45·6	·126	28·

STRENGTH OF WIRE.

LOAD IN LBS. ON WIRE TO PRODUCE A TENSION OF 1 TON PER SQUARE INCH—CONTINUED.

Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.	Diameter of Wire Inches	Load in Lbs.
·125	27·5	·1	17·6	·075	9·9	·05	4·4	·025	1·1
·124	27·	·099	17·24	·074	9·6	·049	4·2	·024	1·014
·123	26·6	·098	16·9	·073	9·4	·048	4·0	·023	·93
·122	26·2	·097	16·6	·072	9·1	·047	3·8	·022	·85
·121	25·8	·096	16·2	·071	8·9	·046	3·7	·021	·775
·12	25·3	·095	15·9	·07	8·6	·045	3·55	·02	·7
·119	24·9	·094	15·55	·069	8·4	·044	3·4	·019	·635
·118	24·5	·093	15·2	·068	8·1	·043	3·25	·018	·57
·117	24·1	·092	14·9	·067	7·9	·042	3·12	·017	·508
·116	23·7	·091	14·6	·066	7·7	·041	2·95	·016	·45
·115	23·3	·09	14·3	·065	7·4	·04	2·8	·015	·396
·114	22·9	·089	13·9	·064	7·2	·039	2·7	·014	·3448
·113	22·5	·088	13·6	·063	7·	·038	2·56	·013	·297
·112	22·1	·087	13·3	·062	6·8	·037	2·4	·012	·253
·111	21·7	·086	13·	·061	6·5	·036	2·3	·011	·2128
·11	21·3	·085	12·7	·06	6·33	·035	2·16	·01	·176
·109	20·9	·084	12·4	·059	6·1	·034	2·04	·009	·1425
·108	20·5	·083	12·1	·058	5·9	·033	1·93	·008	·1126
·107	20·1	·082	11·8	·057	5·7	·032	1·8	·007	·0862
·106	19·7	·081	11·5	·056	5·5	·031	1·7	·006	·0633
·105	19·4	·08	11·26	·055	5·3	·03	1·58	·005	·04398
·104	19·	·079	11·	·054	5·1	·029	1·48	·004	·02815
·103	18·7	·078	10·7	·053	4·9	·028	1·38	·003	·01583
·102	18·3	·077	10·4	·052	4·8	·027	1·28	·002	·007
·101	17·9	·076	10·16	·051	4·6	·026	1·188	·001	·00176

EXAMPLE shewing the application of the above table:—

Take a wire of any diameter, say ·084 inches; according to the table a load of 12·4 lbs. on this wire would be equivalent to a tension of 1 ton per sq. inch. If such a wire on testing broke under a load of 620 lbs., the corresponding tension would be $\frac{620}{12·4}$ = 50 tons per sq. inch.

DORMAN, LONG & CO. LIMITED.

IMPERIAL STANDARD WIRE GAUGE.

STEEL WIRE

TABLE OF SIZES, WEIGHTS, LENGTHS, AND BREAKING LOADS.

As adopted by the Iron and Steel Wire Manufacturers' Association—January, 1904.

Approximate Diameter Inches	Size on Wire Gauge	Diameter		Sectional Area in Square Inches	Approximate Weight lbs.			Approximate Length yards		Approximate Breaking Load lbs.	
		Inches	Milli-metres		100 Yards	1 Mile	1 Kilo-metre	1 Cwt.	100 Kilos.	25 Tons per Sq. Inch	35 Tons per Sq. Inch
1/2	7/0	·500	12·7	·19635	200·11	3522	2188	56	110	10995	15393
15/32	6/0	·464	11·8	·16910	172·33	3033	1885	65	128	9469	13257
7/16	5/0	·432	11·0	·14657	149·37	2629	1634	75	147	8208	11490
13/32	4/0	·400	10·2	·12568	128·07	2254	1400	87·5	172	7035	9851
3/8	3/0	·372	9·4	·10869	110·80	1950	1211	101	198	6086	8521
11/32	2/0	·348	8·8	·09510	96·93	1706	1060	115	226	5326	7457
..	1/0	·324	8·2	·08244	84·03	1479	919	133	261	4616	6463
..	1	·300	7·6	·07069	72·04	1268	788	155	305	3958	5542
..	2	·276	7·0	·05982	60·97	1073	667	183	360	3350	4690
1/4	3	·252	6·4	·04987	50·85	895	556	220	433	2792	3910
..	4	·232	5·9	·04227	43·07	758	471	260	512	2366	3313
..	5	·212	5·4	·03530	35·97	633	393	311	612	1977	2767
3/16	6	·192	4·9	·02896	29·43	518	323	380	748	1621	2269
..	7	·176	4·5	·02432	24·77	436	271	452	890	1362	1908
..	8	·160	4·1	·02011	20·45	360	224	546	1075	1125	1576
..	9	·144	3·7	·01628	16·59	292	182	675	1329	911	1276
1/8	10	·128	3·3	·01287	13·12	231	143	854	1681	720	1008
..	11	·116	3·0	·01057	10·80	190	118	1040	2047	592	828
..	12	·104	2·6	·00850	8·63	152	95	1293	2545	475	666
3/32	13	·092	2·3	·00665	6·76	119	74	1653	3254	373	521
..	14	·080	2·0	·00503	5·11	90	56	2186	4303	281	394
..	15	·072	1·8	·00407	4·15	73	45	2699	5313	227	318
1/16	16	·064	1·6	·00322	3·29	58	36	3416	6724	180	252
..	17	·056	1·4	·00246	2·50	44	27·5	4462	8783	138	192
3/64	18	·048	1·2	·00181	1·83	32·5	20·2	6073	11954	101	141
..	19	·040	1·0	·00126	1·27	22·54	14·0	8745	17214	70	98
..	20	·036	0·9	·00102	1·03	18·25	11·34	10796	21251	57	79
1/32	21	·032	0·8	·00080	·819	14·42	8·96	13663	26894	45	63
..	22	·028	0·7	·00062	·628	11·04	6·86	17846	35128	34·4	48·2
..	23	·024	0·6	·00045	·461	8·11	5·04	24290	47813	25·2	35·3
3/128	24	·022	0·55	·00038	·387	6·82	4·24	28908	56903	21·2	29·8
..	25	·020	0·5	·00031	·320	5·63	3·5	34978	68851	17·6	24·6
..	26	·018	0·45	·00025	·259	4·56	2·84	43184	85003	14·2	19·9
..	27	·0164	0·4	·00021	·215	3·79	2·35	52021	102498	11·8	16·6
1/64	28	·0148	0·37	·00017	·175	3·09	1·92	63877	125735	9·6	13·5
..	29	·0136	0·35	·00014	·148	2·61	1·62	75646	148903	8·1	11·4
..	30	·0124	0·32	·00012	·123	2·17	1·35	90996	179118	6·8	9·5

DORMAN, LONG & CO. LIMITED.

COMPARISON OF WIRE GAUGES.

Size on Wire Gauge	Diameter in Inches				Diameter in Millimetres				Size on Wire Gauge
	Imperial Standard Wire Gauge (S.W.G.)	Birmingham Wire Gauge (B.W.G.)	American Wire or Browne & Sharpe's Gauge (B. & S.)	Paris Gauge (J.de P.)	Imperial Standard Wire Gauge (S.W.G.)	Birmingham Wire Gauge (B.W.G.)	American Wire or Browne & Sharpe's Gauge (B. & S.)	Paris Gauge (J.de P.)	
7/0	·500	..	..	..	12·699	..	..	..	7/0
6/0	·464	..	·5800	..	11·785	..	14·73	..	6/0
5/0	·432	·500	·5165	..	10·972	12·700	13·12	..	5/0
4/0	·400	·454	·4600	..	10·159	11·531	11·68	..	4/0
3/0	·372	·425	·4096	..	9·448	10·794	10·40	..	3/0
2/0	·348	·380	·3648	..	8·839	9·651	9·266	..	2/0
0	·324	·340	·3249	..	8·229	8·635	8·255	..	0
1	·300	·300	·2893	·0236	7·620	7·620	7·348	·6	1
2	·276	·284	·2576	·0276	7·010	7·213	6·543	·7	2
3	·252	·259	·2294	·0315	6·400	6·578	5·827	·8	3
4	·232	·238	·2043	·0354	5·892	6·045	5·189	·9	4
5	·212	·220	·1819	·0394	5·384	5·588	4·620	1·0	5
6	·192	·203	·1620	·0433	4·876	5·156	4·115	1·1	6
7	·176	·180	·1443	·0472	4·470	4·571	3·665	1·2	7
8	·160	·165	·1285	·0512	4·064	4·191	3·264	1·3	8
9	·144	·148	·1144	·0551	3·657	3·759	2·906	1·4	9
10	·128	·134	·1019	·0591	3·251	3·403	2·588	1·5	10
11	·116	·120	·0907	·0630	2·946	3·047	2·304	1·6	11
12	·104	·109	·0808	·0709	2·641	2·768	2·052	1·8	12
13	·092	·095	·0720	·0787	2·336	2·412	1·829	2·0	13
14	·080	·083	·0641	·0866	2·032	2·108	1·628	2·2	14
15	·072	·072	·0571	·0945	1·828	1·828	1·450	2·4	15
16	·064	·065	·0508	·1063	1·625	1·650	1·290	2·7	16
17	·056	·058	·0453	·1181	1·421	1·472	1·151	3·0	17
18	·048	·049	·0403	·1339	1·218	1·244	1·024	3·4	18
19	·040	·042	·0359	·1535	1·016	1·066	·912	3·9	19
20	·036	·035	·0320	·1732	·914	·889	·813	4·4	20
21	·032	·032	·0285	·1929	·812	·812	·724	4·9	21
22	·028	·028	·0253	·2126	·711	·711	·643	5·4	22
23	·024	·025	·0226	·2323	·609	·635	·574	5·9	23
24	·022	·022	·0201	·2520	·559	·559	·511	6·4	24
25	·020	·020	·0179	·2756	·508	·508	·455	7·0	25
26	·018	·018	·0159	·2992	·457	·457	·404	7·6	26
27	·0164	·016	·0142	·3228	·417	·406	·361	8·2	27
28	·0148	·014	·0126	·3465	·376	·356	·320	8·8	28
29	·0136	·013	·0113	·3701	·345	·330	·287	9·4	29
30	·0124	·012	·0100	·3937	·315	·305	·254	10·0	30

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF TONS PER SQUARE INCH IN KILOGRAMMES PER SQUARE MILLIMETRE.

Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre
0	..	38	59·85	76	119·69	114	179·54
1	1·57	39	61·42	77	121·27	115	181·12
2	3·15	40	63·00	78	122·84	116	182·69
3	4·72	41	64·57	79	124·42	117	184·27
4	6·30	42	66·15	80	125·99	118	185·84
5	7·87	43	67·72	81	127·57	119	187·42
6	9·45	44	69·30	82	129·14	120	188·99
7	11·02	45	70·87	83	130·72	121	190·57
8	12·60	46	72·45	84	132·29	122	192·14
9	14·17	47	74·02	85	133·87	123	193·72
10	15·75	48	75·60	86	135·44	124	195·29
11	17·32	49	77·17	87	137·02	125	196·87
12	18·90	50	78·75	88	138·59	126	198·44
13	20·47	51	80·32	89	140·17	127	200·02
14	22·05	52	81·90	90	141·74	128	201·59
15	23·62	53	83·47	91	143·32	129	203·17
16	25·20	54	85·05	92	144·89	130	204·74
17	26·77	55	86·62	93	146·47	131	206·32
18	28·35	56	88·20	94	148·04	132	207·89
19	29·92	57	89·77	95	149·62	133	209·47
20	31·50	58	91·35	96	151·19	134	211·04
21	33·07	59	92·92	97	152·77	135	212·62
22	34·65	60	94·50	98	154·34	136	214·19
23	36·22	61	96·07	99	155·92	137	215·77
24	37·80	62	97·65	100	157·49	138	217·34
25	39·37	63	99·22	101	159·07	139	218·92
26	40·95	64	100·80	102	160·64	140	220·49
27	42·52	65	102·37	103	162·22	141	222·07
28	44·10	66	103·95	104	163·79	142	223·64
29	45·67	67	105·52	105	165·37	143	225·22
30	47·25	68	107·10	106	166·94	144	226·79
31	48·82	69	108·67	107	168·52	145	228·37
32	50·40	70	110·25	108	170·09	146	229·94
33	51·97	71	111·82	109	171·67	147	231·52
34	53·55	72	113·40	110	173·24	148	233·09
35	55·12	73	114·97	111	174·82	149	234·67
36	56·70	74	116·55	112	176·39	150	236·24
37	58·27	75	118·12	113	177·97		

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF KILOGRAMMES PER SQUARE MILLIMETRE IN TONS PER SQUARE INCH.

Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch	Kilogrammes per Square Millimetre	Tons per Square Inch
0	...	45	28·57	90	57·15	135	85·72	180	114·29
1	·63	46	29·21	91	57·78	136	86·35	181	114·93
2	1·27	47	29·84	92	58·42	137	86·99	182	115·56
3	1·90	48	30·48	93	59·05	138	87·62	183	116·20
4	2·54	49	31·11	94	59·69	139	88·26	184	116·83
5	3·17	50	31·75	95	60·32	140	88·89	185	117·47
6	3·81	51	32·38	96	60·95	141	89·53	186	118·10
7	4·44	52	33·02	97	61·59	142	90·16	187	118·74
8	5·08	53	33·65	98	62·22	143	90·80	188	119·37
9	5·71	54	34·29	99	62·86	144	91·43	189	120·01
10	6·35	55	34·92	100	63·49	145	92·07	190	120·64
11	6·98	56	35·56	101	64·13	146	92·70	191	121·27
12	7·62	57	36·19	102	64·76	147	93·34	192	121·91
13	8·25	58	36·83	103	65·40	148	93·97	193	122·54
14	8·89	59	37·46	104	66·03	149	94·61	194	123·18
15	9·52	60	38·10	105	66·67	150	95·24	195	123·81
16	10·16	61	38·73	106	67·30	151	95·88	196	124·45
17	10·79	62	39·37	107	67·94	152	96·51	197	125·08
18	11·43	63	40·00	108	68·57	153	97·15	198	125·72
19	12·06	64	40·64	109	69·21	154	97·78	199	126·35
20	12·70	65	41·27	110	69·84	155	98·42	200	126·99
21	13·33	66	41·91	111	70·48	156	99·05	201	127·62
22	13·97	67	42·54	112	71·11	157	99·69	202	128·26
23	14·60	68	43·18	113	71·75	158	100·32	203	128·89
24	15·24	69	43·81	114	72·38	159	100·96	204	129·53
25	15·87	70	44·45	115	73·02	160	101·59	205	130·16
26	16·51	71	45·08	116	73·65	161	102·23	206	130·80
27	17·14	72	45·72	117	74·29	162	102·86	207	131·43
28	17·78	73	46·35	118	74·92	163	103·50	208	132·07
29	18·41	74	46·99	119	75·56	164	104·13	209	132·70
30	19·05	75	47·62	120	76·19	165	104·77	210	133·34
31	19·68	76	48·26	121	76·83	166	105·40	211	133·97
32	20·32	77	48·89	122	77·46	167	106·04	212	134·61
33	20·95	78	49·53	123	78·10	168	106·67	213	135·24
34	21·59	79	50·16	124	78·73	169	107·31	214	135·88
35	22·22	80	50·80	125	79·37	170	107·94	215	136·51
36	22·86	81	51·43	126	80·00	171	108·58	216	137·15
37	23·49	82	52·07	127	80·64	172	109·21	217	137·78
38	24·13	83	52·70	128	81·27	173	109·85	218	138·42
39	24·76	84	53·34	129	81·91	174	110·48	219	139·05
40	25·40	85	53·97	130	82·54	175	111·12	220	139·69
41	26·03	86	54·61	131	83·18	176	111·75	221	140·32
42	26·67	87	55·24	132	83·81	177	112·39	222	140·96
43	27·30	88	55·88	133	84·45	178	113·02	223	141·59
44	27·94	89	56·51	134	85·08	179	113·66	224	142·23
								225	142·86

DORMAN, LONG & CO. LIMITED.

GALVANIZED WIRE STRAND FOR GUYS, STAYS, SIGNALS AND FENCING. SEVEN PLY.

Size of Strand Inches	Exact Diameter Inches	Size of each Wire S.W.G.	Approximate Weight per 100 yards Pounds	Approximate Length per cwt. Yards	Approximate breaking strain in Galvanised Mild Steel Pounds
31/64	·480	8	148	75	11,347
29/64	·456	8½	133	84	10,257
7/16	·432	9	122	90	9,186
13/32	·408	9½	108	104	8,209
25/64	·384	10	96	117	7,264
3/8	·366	10½	88	127	6,603
11/32	·348	11	80	140	5,960
21/64	·330	11½	72	155	5,355
5/16	·312	12	64	175	4,795
19/64	·294	12½	57	196	4,247
9/32	·276	13	50	224	3,755
1/4	·258	13½	43	260	3,276
31/128	·240	14	38	294	2,836
29/128	·228	14½	34	330	2,558
7/32	·216	15	31	362	2,294
13/64	·204	15½	28	400	2,042
3/16	·192	16	24	466	1,815
23/128	·180	16½	21	533	1,600
11/64	·168	17	18½	610	1,386
5/32	·156	17½	16	700	1,197
9/64	·144	18	14	800	1,015
17/128	·132	18½	11½	975	857
1/8	·120	19	9½	1,180	706
15/128	·114	19½	8½	1,320	643
7/64	·108	20	7¾	1,445	574

IRON OR STEEL GALVANIZED STAY STRAND.

APPROXIMATE WEIGHTS AND LENGTHS.

No. 8 Wire (4·06 m/m)	3-ply	4-ply	5-ply	7-ply
Yards per cwt. ...	180	130	108	76
Metres " " ...	164	119	99	70
Lbs. per mile... ...	1,095	1,517	1,825	2,594
Kilos " "	497	688	828	1,177

CLARENCE
IRON & STEEL WORKS

PORT CLARENCE

IRON & STEEL WORKS

ROLLING MILLS

RAILWAY & CONDUCTOR RAILS
AND ACCESSORIES

HIGH-CLASS STEEL
"CLARENCE" QUALITY
Billets, Blooms, Slabs, etc.

ACKLAM
IRON & STEEL WORKS

MIDDLESBROUGH

IRON & STEEL WORKS

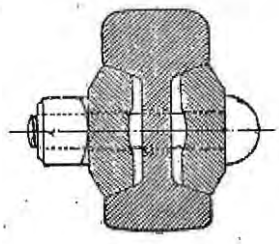
ROLLING MILLS

Railway and Tramway Rails and Accessories, Sheet Bars, Billets, etc.

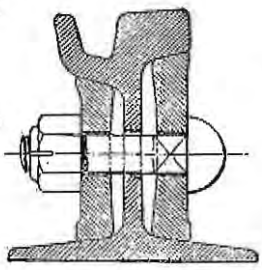
ACKLAM IRON & STEEL WORKS

MIDDLESBROUGH

BASIC OPEN HEARTH STEEL



RAILWAY RAILS. Flange and bullhead, together with fishplates, to British Standard Sections and specifications, or to buyer's own section and specification; also soleplates and sleeper plates.



GROOVED GIRDER TRAMWAY RAILS and accessories, to British Standard Sections and specification, or to buyer's own section and specification.

These works are suppliers to most of the Tramway Undertakings in the United Kingdom and the Colonies.

DORMAN, LONG & CO. LIMITED.

CLEVELAND
IRON & STEEL WORKS
SOUTH BANK

IRON & STEEL WORKS

ROLLING MILLS

Railway and Tramway Rails and Accessories.

Steel Sleepers.

Steel Plates, Joists, Sections and Bars.

CLEVELAND IRONWORKS

PRODUCTION :

CLEVELAND FOUNDRY PIG IRON,
All grades.

SPECIAL SANDLESS BASIC PIG IRON.

ORDINARY BASIC PIG IRON.

FERRO MANGANESE AND SPIEGELEISEN.

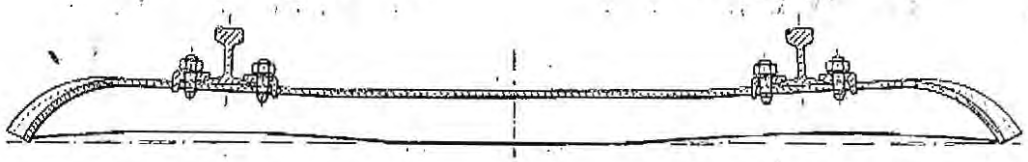
CLEVELAND STEELWORKS

BASIC OPEN HEARTH STEEL

Flange and Bull Head Railway Rails and Accessories.

Steel Girder Tramway Rails and Accessories.

Steel Sleepers for Home, Foreign and Colonial Railways.



COLONIAL TYPE.

Steel Plates for Shipbuilding, Boiler, Constructional Engineering purposes, etc.

Steel Joists, Angles, Channels and other Sectional Material.

Steel Arches for Collieries.

GENERAL INFORMATION, FORMULÆ, TABLES, ETC.

GENERAL FORMULÆ FOR THE FLEXURE OF BEAMS.

A = area of section in square inches.
L = length of span in feet.
l = length of span in inches.
W = total distributed load in tons.
f = safe stress, in tons per square inch, in extreme fibres of beam.
d = total depth of cross section in inches.
y = distance in inches of outermost fibre from neutral axis. (in a symmetrical section $y = \frac{d}{2}$)
M = maximum bending moment in inch tons.
D = maximum deflection in inches.
I = greatest moment of Inertia about the neutral axis. (passing through the centre of gravity of section)
Ip = moment of Inertia about an axis parallel to above, but not passing through the centre of gravity.
v = distance in inches between these axes.
Z = section modulus.
r = radius of gyration in inches.
E = modulus of elasticity. (assumed at 12,000 tons per square inch for steel)

$$Z = \frac{I}{y} \qquad Ip = I + A.v^2 \qquad r = \sqrt{\frac{I}{A}}$$

$$M = \frac{f.I}{y} = fZ \qquad \text{Stress} = \frac{M.y}{I} = \frac{M}{Z}$$

For a beam supported at both ends and uniformly loaded,

$$W = \frac{8 \times f \times Z}{l} = \frac{8 \times f \times I}{l \times y}$$

(I) $D = \frac{5\ W.l^3}{384\ E.I}$ for beams of uniform section, supported at both ends and uniformly loaded

(II) $D = \frac{P.l^3}{48\ E.I}$ for beams of uniform section, supported at both ends and loaded with a single load, P, at centre of span

(III) $D = \frac{W.l^3}{8\ E.I}$ for beams of uniform section fixed at one end and unsupported at the other, and uniformly loaded

(IV) $D = \frac{P.l^3}{3\ E.I}$ for beams of uniform section fixed at one end and unsupported at the other, and loaded with a single load, P, at the latter end

For girders with equal flanges and f taken at 8 tons per square inch, the deflection is as follows :—

(I) $D = \frac{\cdot 02\ L^2}{d}$; (III) $D = \frac{\cdot 048\ L^2}{d}$;

(II) $D = \frac{\cdot 016\ L^2}{d}$; (IV) $D = \frac{\cdot 064\ L^2}{d}$

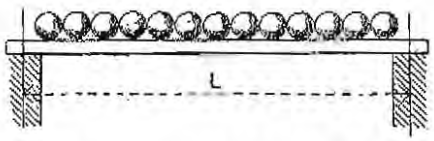
DORMAN, LONG & CO. LIMITED.

BENDING MOMENT, SHEAR AND DEFLECTION OF BEAMS UNDER VARIOUS SYSTEMS OF LOADING.

W = total load in tons.
I = moment of inertia.
E = modulus of elasticity, assumed at 12,000 tons per square inch for steel.
d = depth of beam in inches.

L = span in feet.
l = span in inches.
A = distance in feet.
a = same distance in inches.
B = distance in feet.
b = same distance in inches.

(1).—BEAM SUPPORTED AT BOTH ENDS AND HAVING AN UNIFORMLY DISTRIBUTED LOAD.



Safe load = that given in the tables.

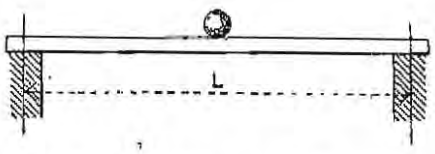
Maximum bending moment, in inch tons at middle of span $= \frac{W.l}{8} = \frac{3\ W.L.}{2}$

Maximum shear at points of support $= \frac{W.}{2}$

Maximum deflection in inches $= \frac{5\ W.l^3.}{384\ E.I}$

Maximum deflection in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch $= \frac{\cdot 02\ L^2.}{d}$

(2).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A CONCENTRATED LOAD IN THE MIDDLE.



Safe load = half that given in the tables for case (1).

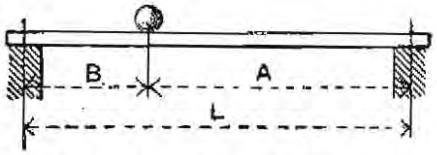
Maximum bending moment, in inch tons, at middle of span $= \frac{W.l}{4} = 3\ W.L.$

Maximum shear between load and points of support $= \frac{W.}{2}$

Maximum deflection in inches $= \frac{W.l^3.}{48\ E.I}$

Maximum deflection in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch $= \frac{\cdot 016\ L^2.}{d}$

(3).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A CONCENTRATED LOAD AT ANY POINT.



Safe load = that given in the tables for case (1) $\times \frac{L^2}{8\ A.B}$

Maximum bending moment, in inch tons, at point of application of load $= \frac{W.a.b}{l} = \frac{12\ W.A.B.}{L}$

Maximum shear between load and the nearer support $= \frac{W.A.}{L}$ and between load and the other support $= \frac{W.B.}{L}$

Maximum deflection, in inches $= \frac{W.a.b(2l-a)}{9\ E.I\ l} \sqrt{\frac{a}{3}(2l-a).}$

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch $= \frac{2\ (2\ L-A)}{1125\ d} \sqrt{48\ A\ (2\ L-A).}$

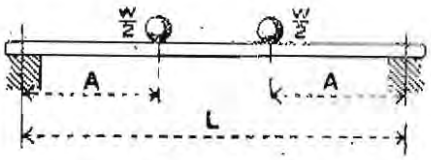
NOTE.—Care should be taken that the maximum shear, in the above cases, does not exceed half the maximum load given in the tables.

BENDING MOMENT, SHEAR AND DEFLECTION OF BEAMS UNDER VARIOUS SYSTEMS OF LOADING.

W = total load in tons.
I = moment of inertia.
E = modulus of elasticity, assumed at 12,000 tons per square inch for steel.
d = depth of beam in inches.

L = span in feet.
l = span in inches.
A = distance in feet.
a = same distance in inches.
B = distance in feet.
b = same distance in inches.

(4).—BEAM SUPPORTED AT BOTH ENDS AND HAVING TWO EQUAL LOADS, $\frac{W}{2}$, CONCENTRATED AT EQUAL DISTANCES FROM CENTRE OF BEAM.



Safe load = that given in the tables for case (1) $\times \frac{L}{4A}$

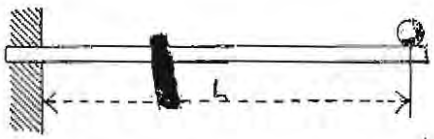
Maximum bending moment, in inch tons, between loads $= \frac{W.a}{2} = 6\ W.A.$

Maximum shear between load and nearer support $= \frac{W.}{2}$

Maximum deflection, in inches $= \frac{Wa}{48\ E.I}(3l^2 - 4a^2).$

Maximum deflection in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch $= \frac{\cdot 008}{d}(3\ L^2 - 4\ A^2).$

(5).—BEAM FIXED AT ONE END AND HAVING A CONCENTRATED LOAD AT THE FREE END.



Safe load = ⅛ that given in the tables for case (1).

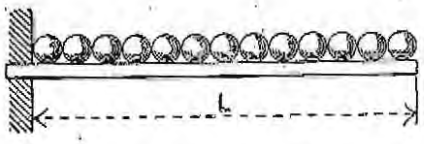
Maximum bending moment, in inch tons, at point of support $= W.l = 12\ W.L.$

Maximum shear between load and point of support $= W.$

Maximum deflection, in inches $= \frac{W.l^3}{3\ E.I}$

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch $= \frac{\cdot 064\ L^2}{d}$

(6).—BEAM FIXED AT ONE END AND HAVING AN UNIFORMLY DISTRIBUTED LOAD.



Safe load = ¼ that given in the tables for case (1).

Maximum bending moment, in inch tons, at point of support $= \frac{W.l}{2} = 6\ W.L.$

Maximum shear at point of support $= W.$

Maximum deflection, in inches $= \frac{W.l^3}{8\ E.I}$

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch $= \frac{\cdot 048\ L^2}{d}$

NOTE.—Care should be taken that the maximum shear in the above cases, does not exceed half the maximum load given in the tables.

BENDING MOMENT, SHEAR, DEFLECTION, &c., OF BEAMS UNDER VARIOUS SYSTEMS OF LOADING.

W = total load in tons.

I = moment of inertia.

E = modulus of elasticity, assumed at 12,000 tons per square inch for steel.

d = depth of beam in inches.

D = distance in feet.

L = span in feet.

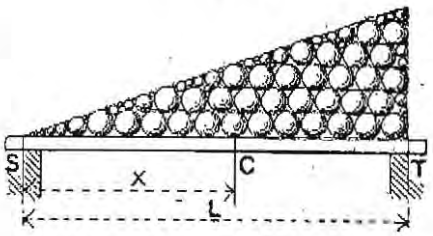
l = span in inches.

y = length in feet over which load is distributed.

C = point at which maximum bending moment occurs.

x = distance in feet of C from support S.

(7).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A DISTRIBUTED LOAD INCREASING, BY A UNIFORM INCREMENT, FROM ONE SUPPORT TO THE OTHER.



Safe load = ·9766 × that given in the tables for case (1).

x = ·5773 L.

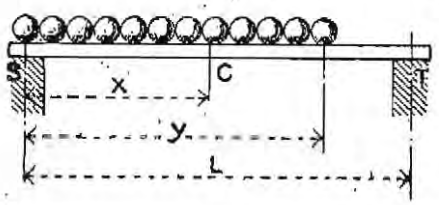
Maximum bending moment, in inch tons, at point C = ·1283 W.l = 1·5396 W.L.

Maximum shear at support $T = \frac{2}{3}$ W.

Maximum deflection, in inches = $\frac{\cdot 013\ W.l^3}{E.I}$

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at 8 tons per square inch = $\frac{\cdot 01946\ L^2}{d}$

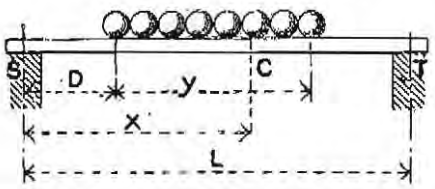
(8).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A LOAD UNIFORMLY DISTRIBUTED OVER A PORTION OF ITS LENGTH, EXTENDING FROM ONE SUPPORT.



Formula for finding the position of the point C, at which the maximum bending moment occurs.

$$x = y\left(1 - \frac{y}{2L}\right)$$

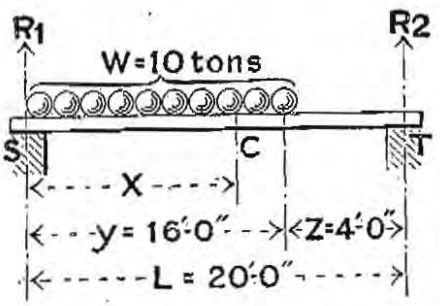
(9).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A LOAD UNIFORMLY DISTRIBUTED OVER A PORTION OF ITS LENGTH, NOT EXTENDING TO EITHER SUPPORT.



Formula for finding the position of the point C, at which the maximum bending moment occurs.

$$x = D + y\left(1 - \frac{2D + y}{2L}\right)$$

BEAMS UNSYMMETRICALLY LOADED.



Example shewing how to find the size of a beam necessary to carry a load uniformly distributed over a portion of its length, and extending from one support, as shewn in diagram; the beam being supported at both ends and of uniform section throughout.

Assume that W is 10 tons, span 20′ 0″ and distance that load extends from one support is 16′ 0″.

Let R_1 = reaction at end, S, where load commences.

R_2 = reaction at other end, T.

C = point where maximum bending moment occurs.

x = distance in feet of C from end S.

P = distributed load on length x.

W_E = equivalent distributed load, over the whole beam, which would produce the same maximum bending moment as that caused by load W.

$$\text{Then } R_1 = \frac{W\left(\frac{y}{2} + z\right)}{L} = \frac{10\ (8+4)}{20} = 6 \text{ tons.}$$

$$R_2 = 10 - 6 = 4 \text{ tons.}$$

From formula on previous page $x = y\left(1 - \frac{y}{2L}\right) = 16\left(1 - \frac{16}{2\times 20}\right)$

$= 9{\cdot}6$ feet.

$$P = \frac{W.x}{y} = \frac{9{\cdot}6 \times 10}{16} = 6 \text{ tons.}$$

$$\text{The maximum bending moment} = (R_1 \times x) - \left(P \times \frac{x}{2}\right)$$

$$= 6 \times 9{\cdot}6 - 6 \times 4{\cdot}8 = 28{\cdot}8 \text{ ft. tons.}$$

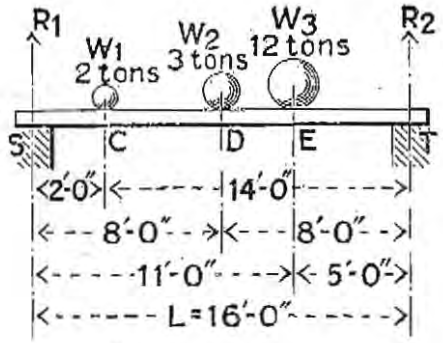
The maximum bending moment in ft. tons on a beam supported at both ends and having an uniformly distributed load, W_1, is $\frac{W_1.\ L.}{8}$

$$\text{Therefore the equivalent distributed load } W_E = \frac{\text{Maximum bending moment in ft. tons} \times 8.}{L}$$

$$\text{Hence } W_E \text{ in this case} = \frac{28{\cdot}8 \times 8}{20} = 11{\cdot}52 \text{ tons.}$$

Reference to the table of safe distributed loads on beams will shew that N.B.S.B. 11 (13″ × 5″ × 35 lbs.) is capable of carrying 11·6 tons at 20 feet span; and, as half the maximum load given in the table for this beam $\left(\frac{35{\cdot}5}{2} = 17{\cdot}75 \text{ tons}\right)$ is greater than the maximum reaction R_1 (6 tons), this beam will meet the requirements.

BEAMS UNSYMMETRICALLY LOADED.



Example shewing how to find the size of a beam necessary to carry three loads concentrated at different points in its length, as shewn in diagram; the beam being supported at both ends, and of uniform cross section throughout.

Let W_1, W_2 and W_3 be 3 concentrated loads of 2, 3 and 12 tons respectively.

R_1 = reaction at end S.

R_2 = reaction at end T.

W_E = equivalent distributed load over the whole beam which would produce the same maximum bending moment as that caused by $(W_1 + W_2 + W_3)$.

Then $R_1 = \dfrac{(12 \times 5) + (3 \times 8) + (2 \times 14)}{16} = 7$ tons.

$R_2 = 12 + 3 + 2 - 7 = 10$ tons.

The maximum bending moment occurs at the point of application of one of the loads, and may be found as follows :—

The bending moment at C $= R_1 \times 2 = 7 \times 2 = 14$ ft. tons.

,, ,, ,, D $= R_1 \times 8 - 2 \times 6 = 56 - 12 = 44$,,

,, ,, ,, E $= R_2 \times 5 = 10 \times 5 = 50$,,

Hence the maximum bending moment is at E, and = 50 ft. tons.

The maximum bending moment, in ft. tons, on a beam supported at both ends and having an uniformly distributed load, W, is $\dfrac{W.L.}{8}$

Therefore the equivalent distributed load W_E $= \dfrac{\text{Maximum bending moment in ft. tons} \times 8.}{L}$

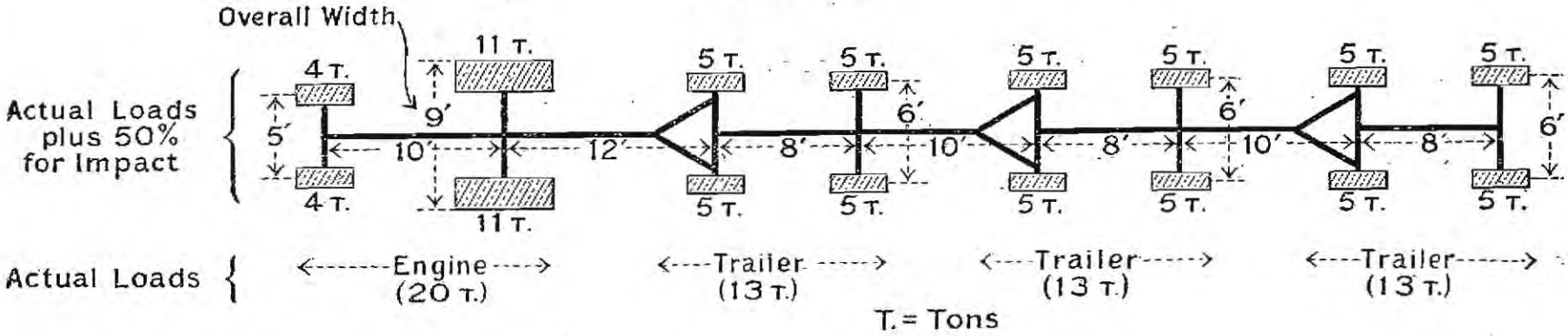
Hence W_E in this case $= \dfrac{50 \times 8}{16} = 25$ tons.

Reference to the table of safe distributed loads on beams will shew that N.B.S.B. 14 (16" × 6" × 50 lbs.) is capable of carrying 25·8 tons at 16 feet span; and, as half the maximum load given in the table for this beam $\left(\dfrac{46{\cdot}3}{2} = 23{\cdot}15 \text{ tons}\right)$ is greater than the maximum reaction R_2 (10 tons), this beam will meet the requirements.

STANDARD LOAD FOR HIGHWAY BRIDGES.

MINISTRY OF TRANSPORT, ROADS DEPARTMENT.

JUNE, 1922.



NOTE.

The Bridge shall be assumed to be carrying such standard loads or parts of standard loads as will produce the maximum stress in any bridge member or material under consideration, provided that in any train of loads there shall not be more than one engine per 70′ 0″ of the span of the bridge and that the distance between the centre lines of two adjacent trains of loads shall be taken as 10′ 0″ in normal cases where the width of the carriageway is a multiple of 10′ 0″. Where a smaller multiple is adopted (but not less in any case than 8′ 0″) it shall be assumed that the distance between the centre lines of two adjacent trains of loads is reduced to the dimension of the lesser multiple so adopted. The "Overall Width" of 9′ 0″ shown on the diagram must then be assumed to be reduced so as to leave 1′ 0″ clearance between the wheels of two adjacent trains.

The above loading is the MINIMUM recognised by the Ministry of Transport, Roads Department.

APPROXIMATE SUPERIMPOSED LOADS ON FLOORS.

LBS. PER SQUARE FOOT.

Crowd of People	84 to 112
Dwellings and Offices	56 to 112
Public Halls, Theatres, &c.	112 to 168
Retail Shops, Work Rooms, &c.	112
Heavy Machine Shops and Warehouses	Not less than 224

APPROXIMATE WEIGHTS OF VARIOUS SUBSTANCES.

LBS. PER CUBIC FOOT.

Cast Iron	450	Portland Cement—loose	90
Wrought Iron	480	Breeze Concrete	90
Rolled and Cast Steel	489·6	Brick Concrete	112
Lead	712	Stone or Thames Ballast Concrete	140
Spelter or Zinc	440	Reinforced Concrete	150
Cleveland Ironstone	135	Common Brickwork	112
Iron Ore, Spanish	150	Pressed Brickwork in Cement	140
" " Swedish	230	Terra-cotta	112
Coal—loose	50-56	Freestone Masonry	140
Ashes and Coke—loose	30-46	Granite Masonry	160
Pitch and Tar	75-80	Plaster	96
Asphalt	144	Sheet and Plate Glass	155-175
Ballast	120	Slate	180
Slag—Broken, 1"—2"	90	Constructional Timber	42
Macadam	150	Petrol	42
Limestone	160	Fuel, Lubricating and Linseed Oils	56
Granite, Whinstone & Basalt Setts	160-170	Snow, newly fallen	6
Yorkstone Setts	140	Fresh Water	62·5
Wood Block Paving	42-56	Sea Water	64

SHEET GLASS.

APPROXIMATE THICKNESSES.

21oz.	=	$\frac{1}{16}$"
26oz.	=	$\frac{1}{8}$"
32oz.	=	$\frac{3}{32}$"

ROLLED PLATE & ROUGH CAST GLASS, WIRED OR PLAIN.

APPROXIMATE WEIGHTS PER SQUARE FOOT.

$\frac{3}{16}$"	=	2¾lbs.
$\frac{1}{4}$"	=	3½lbs.

STEAM RAILWAYS.

Permanent way for single track exclusive of ballast = 180 lbs. per foot run.

Expansion of Steel per degree Fahrenheit = $\frac{1}{150,000}$

1 Gallon of Water = 10lbs.

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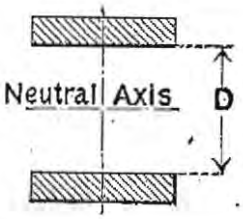

MOMENTS OF INERTIA OF TWO FLANGES,

PER INCH OF WIDTH.

Distance D Inches	THICKNESS OF EACH FLANGE IN INCHES								
	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8
6	7·63	10·58	13·76	17·16	20·79	24·67	28·79	33·18	37·83
7	10·21	14·08	18·21	22·59	27·24	32·17	37·37	42·86	48·65
8	13·16	18·08	23·29	28·78	34·57	40·67	47·07	53·80	60·86
9	16·49	22·58	28·99	35·72	42·77	50·17	57·90	65·99	74·44
10	20·19	27·58	35·32	43·41	51·85	60·67	69·86	79·43	89·39
11	24·27	33·08	42·27	51·84	61·81	72·17	82·93	94·11	105·72
12	28·72	39·08	49·85	61·03	72·63	84·67	97·14	110·05	123·42
13	33·55	45·58	58·05	70·97	84·34	98·17	112·46	127·24	142·50
14	38·75	52·58	66·88	81·66	96·92	112·67	128·92	145·68	162·95
15	44·33	60·08	76·33	93·09	110·37	128·17	146·50	165·36	184·78
16	50·29	68·08	86·41	105·28	124·70	144·67	165·20	186·30	207·98
17	56·61	76·58	97·12	118·22	139·90	162·17	185·03	208·49	232·56
18	63·32	85·58	108·44	131·91	155·98	180·67	205·98	231·93	258·51
19	70·39	95·08	120·40	146·34	172·93	200·17	228·06	256·61	285·84
20	77·85	105·08	132·98	161·53	190·76	220·67	251·26	282·55	314·55
21	85·68	115·58	146·18	177·47	209·46	242·17	275·59	309·74	344·62
22	93·88	126·58	160·01	194·16	229·04	264·67	301·04	338·18	376·08
23	102·46	138·08	174·46	211·59	249·49	288·17	327·62	367·86	408·90
24	111·41	150·08	189·54	229·78	270·82	312·67	355·32	398·80	443·11
25	120·74	162·58	205·24	248·72	293·02	338·17	384·15	430·99	478·69
26	130·44	175·58	221·57	268·41	316·10	364·67	414·11	464·43	515·64
27	140·52	189·08	238·52	288·84	340·06	392·17	445·18	499·11	553·97
28	150·97	203·08	256·10	310·03	364·88	420·67	477·39	535·05	593·67
29	161·80	217·58	274·30	331·97	390·59	450·17	510·71	572·24	634·75
30	173·00	232·58	293·13	354·66	417·17	480·67	545·17	610·68	677·20
31	184·58	248·08	312·58	378·09	444·62	512·17	580·75	650·36	721·03
32	196·54	264·08	332·66	402·28	472·95	544·67	617·45	691·30	766·23
33	208·86	280·58	353·37	427·22	502·15	578·17	655·28	733·49	812·81
34	221·57	297·58	374·69	452·91	532·23	612·67	694·23	776·93	860·76
35	234·64	315·08	396·65	479·34	563·18	648·17	734·31	821·61	910·09
36	248·10	333·08	419·23	506·53	595·01	684·67	775·51	867·55	960·80
37	261·93	351·58	442·43	534·47	627·71	722·17	817·84	914·74	1012·9
38	276·13	370·58	466·26	563·16	661·29	760·67	861·29	963·18	1066·3
39	290·71	390·08	490·71	592·59	695·74	800·17	905·87	1012·9	1121·2
40	305·66	410·08	515·79	622·78	731·07	840·67	951·57	1063·8	1177·4
41	320·99	430·58	541·49	653·72	767·27	882·17	998·40	1116·0	1234·9
42	336·69	451·58	567·82	685·41	804·35	924·67	1046·4	1169·4	1293·9
48	438·79	588·08	738·91	891·28	1045·2	1200·7	1357·7	1516·3	1676·5
54	554·38	742·58	932·51	1124·2	1317·5	1512·7	1709·5	1908·2	2108·6
60	683·47	915·08	1148·6	1384·0	1621·4	1860·7	2101·9	2345·1	2590·2
66	826·07	1105·6	1387·2	1670·9	1956·7	2244·7	2534·7	2826·9	3121·3
72	982·16	1314·1	1648·3	1984·8	2323·6	2664·7	3008·1	3353·8	3701·9
78	1151·8	1540·6	1931·9	2325·7	2721·9	3120·7	3521·9	3925·7	4332·0
84	1334·8	1785·1	2238·0	2693·5	3151·8	3612·7	4076·3	4542·6	5011·5
90	1531·4	2047·6	2566·6	3088·4	3613·1	4140·7	4671·1	5204·4	5740·6
96	1741·5	2328·1	2917·7	3510·3	4105·9	4704·7	5306·4	5911·3	6519·2

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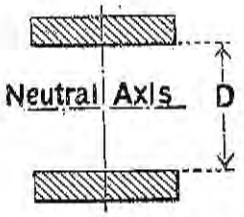
MOMENTS OF INERTIA OF TWO FLANGES,

PER INCH OF WIDTH.



THICKNESS OF EACH FLANGE IN INCHES									Distance D Inches
1½	1⅝	1¾	1⅞	2	2¼	2½	2¾	3	
42·75	47·95	53·45	59·24	65·33	78·47	92·92	108·74	126·00	6
54·75	61·16	67·89	74·94	82·33	98·16	115·42	134·18	154·50	7
68·25	75·99	84·07	92·52	101·33	120·09	140·42	162·36	186·00	8
83·25	92·44	102·01	111·97	122·33	144·28	167·92	193·30	220·50	9
99·75	110·52	121·70	133·30	145·33	170·72	197·92	226·99	258·00	10
117·75	130·22	143·14	156·50	170·33	199·41	230·42	263·43	298·50	11
137·25	151·55	166·32	181·58	197·33	230·34	265·42	302·61	342·00	12
158·25	174·50	191·26	208·54	226·33	263·53	302·92	344·55	388·50	13
180·75	199·08	217·95	237·36	257·33	298·97	342·92	389·24	438·00	14
204·75	225·28	246·39	268·07	290·33	336·66	385·42	436·68	490·50	15
230·25	253·11	276·57	300·64	325·33	376·59	430·42	486·86	546·00	16
257·25	282·56	308·51	335·10	362·33	418·78	477·92	539·80	604·50	17
285·75	313·64	342·20	371·43	401·33	463·22	527·92	595·49	666·00	18
315·75	346·35	377·64	409·63	442·33	509·91	580·42	653·93	730·50	19
347·25	380·67	414·82	449·71	485·33	558·84	635·42	715·11	798·00	20
380·25	416·63	453·76	491·66	530·33	610·03	692·92	779·05	868·50	21
414·75	454·20	494·45	535·49	577·33	663·47	752·92	845·74	942·00	22
450·75	493·41	536·89	581·19	626·33	719·16	815·42	915·18	1018·5	23
488·25	534·24	581·07	628·77	677·33	777·09	880·42	987·36	1098·0	24
527·25	576·69	627·01	678·22	730·33	837·28	947·92	1062·3	1180·5	25
567·75	620·77	674·70	729·55	785·33	899·72	1017·9	1140·0	1266·0	26
609·75	666·47	724·14	782·75	842·33	964·41	1090·4	1220·4	1354·5	27
653·25	713·80	775·32	837·83	901·33	1031·3	1165·4	1303·6	1446·0	28
698·25	762·75	828·26	894·79	962·33	1100·5	1242·9	1389·6	1540·5	29
744·75	813·33	882·95	953·61	1025·33	1172·0	1322·9	1478·2	1638·0	30
792·75	865·53	939·39	1014·3	1090·3	1245·7	1405·4	1569·7	1738·5	31
842·25	919·36	997·57	1076·9	1157·3	1321·6	1490·4	1663·9	1842·0	32
893·25	974·81	1057·5	1141·3	1226·3	1399·8	1577·9	1760·8	1948·5	33
945·75	1031·9	1119·2	1207·7	1297·3	1480·2	1667·9	1860·5	2058·0	34
999·75	1090·6	1182·6	1275·9	1370·3	1562·9	1760·4	1962·9	2170·5	35
1055·3	1150·9	1247·8	1346·0	1445·3	1647·8	1855·4	2068·1	2286·0	36
1112·3	1212·9	1314·8	1417·9	1522·3	1735·0	1952·9	2176·1	2404·5	37
1170·8	1276·5	1383·4	1491·7	1601·3	1824·5	2052·9	2286·7	2526·0	38
1230·8	1341·7	1453·9	1567·4	1682·3	1916·2	2155·4	2400·2	2650·5	39
1292·3	1408·5	1526·1	1645·0	1765·3	2010·1	2260·4	2516·4	2778·0	40
1355·3	1476·9	1600·0	1724·5	1850·3	2106·3	2367·9	2635·3	2908·5	41
1419·8	1547·0	1675·7	1805·8	1937·3	2204·7	2477·9	2757·0	3042·0	42
1838·3	2001·6	2166·6	2333·1	2501·3	2842·6	3190·4	3544·9	3906·0	48
2310·8	2514·7	2720·4	2928·0	3137·3	3561·5	3992·9	4431·7	4878·0	54
2837·3	3086·3	3337·3	3590·3	3845·3	4361·3	4885·4	5417·6	5958·0	60
3417·8	3716·4	4017·2	4320·2	4625·3	5242·2	5867·9	6502·5	7146·0	66
4052·3	4405·0	4760·1	5117·5	5477·3	6204·1	6940·4	7686·4	8442·0	72
4740·8	5152·1	5565·9	5982·4	6401·3	7247·0	8102·9	8969·2	9846·0	78
5483·3	5957·7	6434·8	6914·7	7397·3	8370·8	9355·4	10351·1	11358·0	84
6279·8	6821·8	7366·7	7914·6	8465·3	9575·7	10697·9	11832·0	12978·0	90
7130·3	7744·4	8361·6	8981·9	9605·3	10861·6	12130·4	13411·9	14706·0	96

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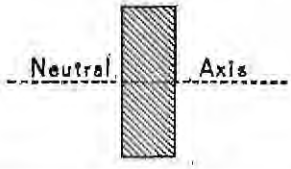
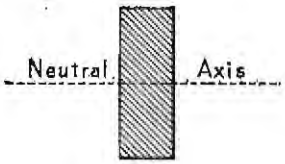
MOMENTS OF INERTIA OF RECTANGLES.



Depth in Inches	WIDTH OF RECTANGLE IN INCHES						
	¼	5/16	⅜	7/16	½	9/16	⅝
1	·021	·026	·031	·036	·042	·047	·052
2	·17	·21	·25	·29	·33	·38	·42
3	·56	·70	·84	·98	1·13	1·27	1·41
4	1·33	1·67	2·	2·33	2·67	3·	3·33
5	2·60	3·26	3·91	4·56	5·21	5·86	6·51
6	4·50	5·63	6·75	7·88	9·	10·13	11·25
7	7·15	8·93	10·72	12·51	14·29	16·08	17·86
8	10·67	13·33	16·	18·67	21·33	24·	26·67
9	15·19	18·98	22·78	26·58	30·38	34·17	37·97
10	20·83	26·04	31·25	36·46	41·67	46·87	52·08
11	27·73	34·66	41·59	48·53	55·46	62·39	69·32
12	36·	45·	54·	63·	72·	81·	90·
13	45·77	57·21	68·66	80·10	91·54	102·98	114·43
14	57·17	71·46	85·75	100·04	114·33	128·63	142·92
15	70·31	87·89	105·47	123·05	140·63	158·20	175·78
16	85·33	106·67	128·	149·33	170·67	192·	213·33
17	102·35	127·94	153·53	179·12	204·71	230·30	255·89
18	121·50	151·88	182·25	212·63	243·	273·38	303·75
19	142·90	178·62	214·34	250·07	285·79	321·52	357·24
20	166·67	208·33	250·	291·67	333·33	375·	416·67
21	192·94	241·17	289·41	337·64	385·88	434·11	482·34
22	221·83	277·29	332·75	388·21	443·67	499·13	554·58
23	253·48	316·85	380·22	443·59	506·96	570·33	633·70
24	288·	360·	432·	504·	576·	648·	720·
25	325·52	406·90	488·28	569·66	651·04	732·42	813·80
26	366·17	457·71	549·25	640·79	732·33	823·88	915·42
27	410·06	512·58	615·09	717·61	820·13	922·64	1025·16
28	457·33	571·67	686·	800·33	914·67	1029·	1143·33
29	508·10	635·13	762·16	889·18	1016·21	1143·23	1270·26
30	562·50	703·13	843·75	984·38	1125·	1265·63	1406·25
32	682·67	853·33	1024·	1194·67	1365·33	1536·	1706·67
34	818·83	1023·54	1228·25	1432·96	1637·67	1842·38	2047·08
36	972·	1215·	1458·	1701·	1944·	2187·	2430·
38	1143·17	1428·96	1714·75	2000·54	2286·33	2572·13	2857·92
40	1333·33	1666·67	2000·	2333·33	2666·67	3000·	3333·33
42	1543·50	1929·38	2315·25	2701·13	3087·	3472·88	3858·75
44	1774·67	2218·33	2662·	3105·67	3549·33	3993·	4436·67
46	2027·83	2534·79	3041·75	3548·71	4055·67	4562·63	5069·58
48	2304·	2880·	3456·	4032·	4608·	5184·	5760·
50	2604·17	3255·21	3906·25	4557·29	5208·33	5859·38	6510·42
52	2929·33	3661·67	4394·	5126·33	5858·67	6591·	7323·33
54	3280·50	4100·63	4920·75	5740·88	6561·	7381·13	8201·25
56	3658·67	4573·33	5488·	6402·67	7317·33	8232·	9146·67
58	4064·83	5081·04	6097·25	7113·46	8129·67	9145·87	10162·08
60	4500·	5625·	6750·	7875·	9000·	10125·	11250·

DORMAN, LONG & CO. LIMITED.

MOMENTS OF INERTIA OF RECTANGLES.



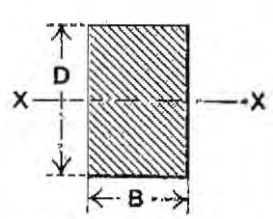
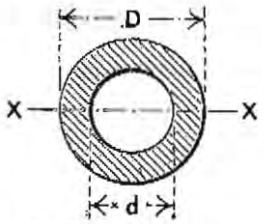
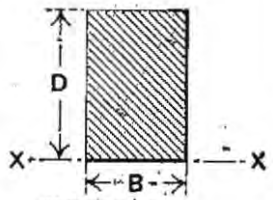
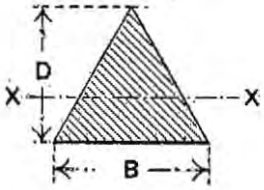
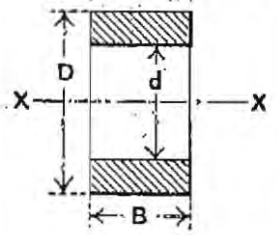
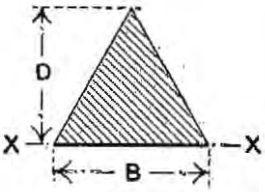
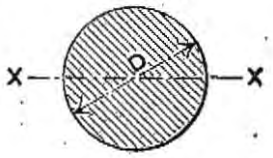
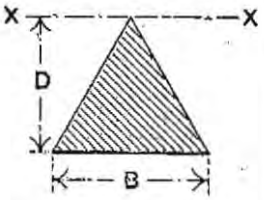
WIDTH OF RECTANGLE IN INCHES						Depth in Inches
11/16	< 3/4	13/16	7/8	15/16	1	
·057	·062	·068	·073	·078	·083	1
·46	·50	·54	·58	·63	·67	2
1·55	1·69	1·83	1·97	2·11	2·25	3
3·67	4·	4·33	4·67	5·	5·33	4
7·16	7·81	8·46	9·11	9·77	10·42	5
12·38	13·50	14·63	15·75	16·88	18·	6
19·65	21·44	23·22	25·01	26·80	28·58	7
29·33	32·	34·67	37·33	40·	42·67	8
41·77	45·56	49·36	53·16	56·95	60·75	9
57·29	62·50	67·71	72·92	78·13	83·33	10
76·26	83·19	90·12	97·05	103·98	110·92	11
99·	108·	117·	126·	135·	144·	12
125·87	137·31	148·75	160·20	171·64	183·08	13
157·21	171·50	185·79	200·08	214·38	228·67	14
193·36	210·94	228·52	246·09	263·67	281·25	15
234·67	256·	277·33	298·67	320·	341·33	16
281·47	307·06	332·65	358·24	383·83	409·42	17
334·13	364·50	394·88	425·25	455·63	486·	18
392·96	428·69	464·41	500·14	535·86	571·58	19
458·33	500·	541·67	583·33	625·	666·67	20
530·58	578·81	627·05	675·28	723·52	771·75	21
610·04	665·50	720·96	776·42	831·87	887·33	22
697·07	760·44	823·81	887·18	950·55	1013·92	23
792·	864·	936·	1008·	1080·	1152·	24
895·18	976·56	1057·94	1139·32	1220·70	1302·08	25
1006·96	1098·50	1190·04	1281·58	1373·13	1464·67	26
1127·67	1230·19	1332·70	1435·22	1537·73	1640·25	27
1257·67	1372·	1486·33	1600·67	1715·	1829·33	28
1397·29	1524·31	1651·34	1778·36	1905·39	2032·42	29
1546·88	1687·50	1828·13	1968·75	2109·38	2250·	30
1877·33	2048·	2218·67	2389·33	2560·	2730·67	32
2251·79	2456·50	2661·21	2865·92	3070·63	3275·33	34
2673·	2916·	3159·	3402·	3645·	3888·	36
3143·71	3429·50	3715·29	4001·08	4286·88	4572·67	38
3666·67	4000·	4333·33	4666·67	5000·	5333·33	40
4244·63	4630·50	5016·38	5402·25	5788·13	6174·	42
4880·33	5324·	5767·67	6211·33	6655·	7098·67	44
5576·54	6083·50	6590·46	7097·42	7604·38	8111·33	46
6336·	6912·	7488·	8064·	8640·	9216·	48
7161·46	7812·50	8463·54	9114·58	9765·63	10416·67	50
8055·67	8788·	9520·33	10252·67	10985·	11717·33	52
9021·38	9841·50	10661·63	11481·75	12301·88	13122·	54
10061·33	10976·	11890·67	12805·33	13720·	14634·67	56
11178·29	12194·50	13210·71	14226·92	15243·12	16259·33	58
12375·	13500·	14625·	15750·	16875·	18000·	60

DORMAN, LONG & CO. LIMITED.

MOMENTS OF INERTIA OF RECTANGLES.

Depths in Inches	WIDTHS IN INCHES									
	8	9	10	12	13	14	16	18	20	24
3/8	·035	·040	·044	·053	·057	·062	·070	·079	·088	·105
7/16	·056	·063	·070	·084	·091	·098	·112	·126	·140	·167
1/2	·083	·094	·104	·125	·135	·146	·167	·187	·208	·250
9/16	·119	·133	·148	·178	·193	·208	·237	·267	·297	·356
5/8	·163	·183	·203	·244	·264	·285	·326	·366	·407	·488
11/16	·217	·244	·271	·325	·352	·379	·433	·487	·542	·650
3/4	·281	·316	·352	·422	·457	·492	·562	·633	·703	·844
13/16	·358	·402	·447	·536	·581	·626	·715	·805	·894	1·073
7/8	·447	·502	·558	·670	·726	·782	·893	1·005	1·117	1·340
15/16	·549	·618	·687	·824	·893	·961	1·099	1·236	1·373	1·648
1	·667	·750	·833	1·000	1·083	1·167	1·333	1·500	1·667	2·000
1 1/16	·800	·900	1·000	1·199	1·299	1·399	1·599	1·799	1·999	2·399
1 1/8	·949	1·068	1·187	1·424	1·542	1·661	1·898	2·136	2·373	2·848
1 3/16	1·116	1·256	1·395	1·675	1·814	1·954	2·233	2·512	2·791	3·349
1 1/4	1·302	1·465	1·628	1·953	2·116	2·279	2·604	2·930	3·255	3·906
1 5/16	1·507	1·696	1·884	2·261	2·449	2·638	3·015	3·391	3·768	4·522
1 3/8	1·733	1·950	2·166	2·600	2·816	3·033	3·466	3·899	4·333	5·199
1 7/16	1·980	2·228	2·475	2·970	3·218	3·466	3·961	4·456	4·951	5·941
1 1/2	2·250	2·531	2·812	3·375	3·656	3·937	4·500	5·062	5·625	6·750
1 9/16	2·543	2·861	3·179	3·815	4·133	4·450	5·086	5·722	6·358	7·629
1 5/8	2·861	3·218	3·576	4·291	4·649	5·006	5·721	6·437	7·152	8·582
1 11/16	3·204	3·604	4·005	4·805	5·206	5·606	6·407	7·208	8·009	9·611
1 3/4	3·573	4·020	4·466	5·359	5·806	6·253	7·146	8·039	8·932	10·719
1 13/16	3·970	4·466	4·962	5·954	6·451	6·947	7·939	8·932	9·924	11·909
1 7/8	4·395	4·944	5·493	6·592	7·141	7·690	8·789	9·888	10·986	13·184
1 15/16	4·849	5·455	6·061	7·273	7·879	8·485	9·698	10·910	12·122	14·546
2	5·333	6·000	6·667	8·000	8·667	9·333	10·667	12·000	13·333	16·000
2 1/16	5·849	6·580	7·311	8·774	9·505	10·236	11·698	13·161	14·623	17·547
2 1/8	6·397	7·197	7·996	9·596	10·395	11·195	12·794	14·394	15·993	19·191
2 3/16	6·978	7·851	8·723	10·468	11·340	12·212	13·957	15·701	17·446	20·935
2 1/4	7·594	8·543	9·492	11·391	12·340	13·289	15·187	17·086	18·984	22·781
2 5/16	8·244	9·275	10·305	12·366	13·397	14·428	16·489	18·550	20·611	24·733
2 3/8	8·931	10·047	11·164	13·396	14·513	15·629	17·862	20·095	22·327	26·793
2 7/16	9·655	10·862	12·068	14·482	15·689	16·896	19·310	21·723	24·137	28·964
2 1/2	10·417	11·719	13·021	15·625	16·927	18·229	20·833	23·437	26·042	31·250
2 9/16	11·218	12·620	14·022	16·826	18·229	19·631	22·435	25·240	28·044	33·653
2 5/8	12·059	13·566	15·073	18·088	19·595	21·103	24·117	27·132	30·146	36·176
2 11/16	12·941	14·558	16·176	19·411	21·028	22·646	25·881	29·116	32·351	38·822
2 3/4	13·865	15·598	17·331	20·797	22·530	24·263	27·729	31·195	34·661	41·594
2 13/16	14·832	16·685	18·539	22·247	24·101	25·955	29·663	33·371	37·079	44·495
2 7/8	15·842	17·823	19·803	23·764	25·744	27·724	31·685	35·646	39·606	47·527
2 15/16	16·898	19·011	21·123	25·347	27·460	29·572	33·797	38·021	42·246	50·695
3	18·000	20·250	22·500	27·000	29·250	31·500	36·000	40·500	45·000	54·000

MOMENTS OF INERTIA OF VARIOUS SECTIONS.

Sections	Moments of Inertia about xx	Sections	Moments of Inertia about xx
	$\frac{B.\,D^3}{12}$		$\frac{\pi\,(D^4 - d^4)}{64} =$ $\cdot0491\,(D^4 - d^4)$
	$\frac{B.\,D^3}{3}$		$\frac{B.\,D^3}{36}$
	$\frac{B\,(D^3 - d^3)}{12}$		$\frac{B.\,D^3}{12}$
	$\frac{\pi.D^4}{64} =$ $\cdot0491\ D^4$		$\frac{B.\,D^3}{4}$

AREAS OF SMALL CIRCLES, ADVANCING BY 32NDS OF AN INCH.

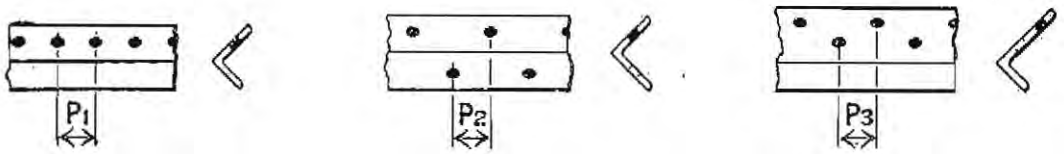
Diameter in inches	Area in square inches	Diameter in inches	Area in square inches	Diameter in inches	Area in square inches	Diameter in inches	Area in square inches
... $\frac{1}{32}$	·0008	... $\frac{9}{32}$	·0621	... $\frac{17}{32}$	·2217	... $\frac{25}{32}$	·4794
$\frac{1}{16}$ ...	·0031	$\frac{5}{16}$ ...	·0767	$\frac{9}{16}$ ...	·2485	$\frac{13}{16}$ ...	·5185
... $\frac{3}{32}$	·0069	... $\frac{11}{32}$	·0928	... $\frac{19}{32}$	·2769	... $\frac{27}{32}$	·5591
$\frac{1}{8}$ ...	·0123	$\frac{3}{8}$ ...	·1104	$\frac{5}{8}$ ...	·3068	$\frac{7}{8}$ ...	·6013
... $\frac{5}{32}$	·0192	... $\frac{13}{32}$	·1296	... $\frac{21}{32}$	·3382	... $\frac{29}{32}$	·6450
$\frac{3}{16}$ ...	·0276	$\frac{7}{16}$ ...	·1503	$\frac{11}{16}$ ...	·3712	$\frac{15}{16}$ ...	·6903
... $\frac{7}{32}$	·0376	... $\frac{15}{32}$	·1726	... $\frac{23}{32}$	·4057	... $\frac{31}{32}$	·7371
$\frac{1}{4}$ ...	·0491	$\frac{1}{2}$ ...	·1963	$\frac{3}{4}$ ...	·4418	1 ...	·7854

ANGLES IN TENSION.

SAFE LOADS IN TONS.

Stress 8 Tons per Square Inch of Net Sectional Area.

ONE HOLE DEDUCTED.



Deduction from Gross Area	Sum of Flanges Inches	SAFE LOADS IN TONS FOR THICKNESSES IN INCHES							Minimum Pitch for Tabulated Safe Loads Inches		
		¼	5/16	⅜	7/16	½	⅝	¾	P1	P2	P3
	4½	6·9	8·4	9·9	..	..	..	..	2¼	..	..
	5	7·9	9·7	11·4	13·1	14·8	..	..	2¼	2⅛	..
	5½	8·9	10·9	12·9	14·9	16·8	..	..	2¼	2¼	..
	6	9·9	12·2	14·4	16·6	18·8	22·8	..	2¼	2⅜	..
One Hole 13/16" Diameter	6½	10·9	13·4	15·9	18·4	20·8	25·3	..	2¼	2½	..
	7	..	14·7	17·4	20·1	22·8	27·8	..	2¼	2⅝	..
	7½	..	16·0	19·0	21·9	24·8	30·3	..	2¼	2⅝	..
	8	..	17·2	20·5	23·6	26·8	32·8	..	2¼	2¾	1⅞
	8½	..	18·5	22·0	25·4	28·8	35·3	..	2¼	2⅞	1⅞
	9	..	19·7	23·5	27·1	30·8	37·8	44·6	2¼	2⅞	2
	9½	..	20·9	24·9	28·9	32·8	40·3	47·6	2¼	3	2
	10	..	22·2	26·5	30·6	34·8	42·8	50·6	2¼	3	2
	5	..	9·4	11·1	12·7	14·2	..	..	2⅝	..	..
	5½	..	10·6	12·6	14·4	16·3	..	..	2⅝	..	..
	6	..	11·9	14·1	16·2	18·3	22·2	..	2⅝	2⅝	..
	6½	..	13·1	15·6	17·9	20·3	24·7	..	2⅝	2⅝	..
One Hole 15/16" Diameter	7	..	14·4	17·1	19·7	22·3	27·2	..	2⅝	2¾	..
	7½	..	15·6	18·6	21·5	24·3	29·7	..	2⅝	2⅞	..
	8	..	16·9	20·1	23·2	26·3	32·2	..	2⅝	3	2
	8½	..	18·1	21·6	25·0	28·3	34·7	..	2⅝	3	2
	9	..	19·4	23·1	26·7	30·3	37·2	43·9	2⅝	3⅛	2¼
	9½	..	20·6	24·6	28·4	32·2	39·7	46·9	2⅝	3¼	2¼
	10	..	21·9	26·1	30·2	34·3	42·2	49·9	2⅝	3¼	2¼
	10½	..	..	27·6	31·9	36·3	44·7	52·9	2⅝	3⅜	2½

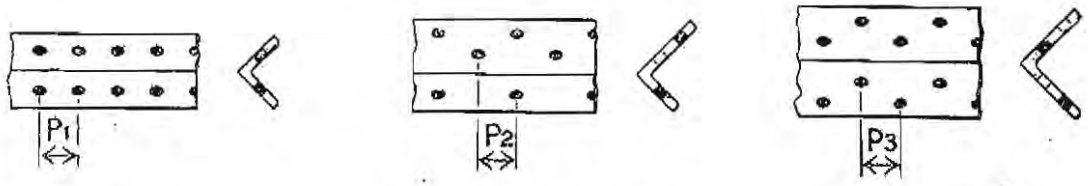
The above pitches are based on the "Table of spacing of holes," from the backs of angles, as given on page 174.

ANGLES IN TENSION.

SAFE LOADS IN TONS.

Stress 8 Tons per Square Inch of Net Sectional Area.

TWO HOLES DEDUCTED.



Deduction from Gross Area	Sum of Flanges Inches	SAFE LOADS IN TONS FOR THICKNESSES IN INCHES							Minimum Pitch for Tabulated Safe Loads Inches		
		1/4	5/16	3/8	7/16	1/2	5/8	3/4	P1	P2	P3
Two Holes 13/16" Diameter	6	8·3	10·2	12·0	13·8	15·5	18·8	..	2¼	..	..
	6½	9·3	11·4	13·5	15·5	17·5	21·3	..	2¼	..	..
	7	..	12·7	15·0	17·3	19·5	23·8	..	2¼	..	..
	7½	..	13·9	16·5	19·0	21·5	26·3	..	2¼	..	..
	8	..	15·2	18·0	20·8	23·5	28·8	..	2¼	1½	..
	8½	..	16·4	19·5	22·5	25·5	31·3	..	2¼	1½	..
	9	..	17·7	21·0	24·3	27·5	33·8	39·8	2¼	1⅝	..
	9½	..	18·9	22·5	26·0	29·5	36·3	42·8	2¼	1⅝	..
	10	..	20·2	24·0	27·8	31·5	38·8	45·8	2¼	1⅝	1⅞
	10½	..	..	25·5	29·5	33·5	41·3	48·8	2¼	1¾	..
	11	..	..	27·0	31·3	35·5	43·7	51·7	2¼	1¾	..
	12	..	..	30·0	34·8	39·5	48·8	57·8	2¼	1¾	2
Two Holes 15/16" Diameter	6	..	9·5	11·3	12·9	14·5	17·5	..	2⅝	..	..
	6½	..	10·8	12·8	14·7	16·5	20·0	..	2⅝	..	..
	7	..	12·0	14·3	16·4	18·5	22·5	..	2⅝	..	..
	7½	..	13·3	15·8	18·2	20·5	25·0	..	2⅝	..	..
	8	..	14·5	17·3	19·9	22·5	27·5	..	2⅝	1⅞	..
	8½	..	15·8	18·8	21·7	24·5	30·0	..	2⅝	1⅞	..
	9	..	17·0	20·3	23·4	26·5	32·5	38·3	2⅝	1⅞	..
	9½	..	18·3	21·8	25·2	28·5	35·0	41·2	2⅝	1⅞	..
	10	..	19·5	23·3	26·9	30·5	37·5	44·3	2⅝	1⅞	2
	10½	..	..	24·8	28·7	32·5	40·0	47·3	2⅝	1⅞	..
	11	..	..	26·3	30·4	34·5	42·5	50·2	2⅝	1⅞	..
	12	..	..	29·3	33·9	38·5	47·5	56·2	2⅝	2	2¼

The above pitches are based on the "Table of spacing of holes," from the backs of angles, as given on page 174.

DORMAN, LONG & CO. LIMITED.

RIVET HOLES IN TENSION MEMBERS.

AREA IN SQUARE INCHES TO BE DEDUCTED FOR EACH RIVET HOLE.

Thickness of Material passed through Inches	DIAMETER OF RIVET HOLE IN INCHES											
	5/8	11/16	3/4	13/16	7/8	15/16	1	1 1/16	1 1/8	1 3/16	1 1/4	1 5/16
1/16 ..	·039	·043	·047	·051	·055	·059	·063	·066	·070	·074	·078	·082
.. 1/8	·078	·086	·094	·102	·109	·117	·125	·133	·141	·148	·156	·164
3/16 ..	·117	·129	·141	·152	·164	·176	·188	·199	·211	·223	·234	·246
.. 1/4	·156	·172	·188	·203	·219	·234	·250	·266	·281	·297	·313	·328
5/16 ..	·195	·215	·234	·254	·273	·293	·313	·332	·352	·371	·391	·410
.. 3/8	·234	·258	·281	·305	·328	·352	·375	·398	·422	·445	·469	·492
7/16 ..	·273	·301	·328	·355	·383	·410	·438	·465	·492	·520	·547	·574
.. 1/2	·313	·344	·375	·406	·438	·469	·500	·531	·563	·594	·625	·656
9/16 ..	·352	·387	·422	·457	·492	·527	·563	·598	·633	·668	·703	·738
.. 5/8	·391	·430	·469	·508	·547	·586	·625	·664	·703	·742	·781	·820
11/16 ..	·430	·473	·516	·559	·602	·645	·688	·730	·773	·816	·859	·902
.. 3/4	·469	·516	·563	·609	·656	·703	·750	·797	·844	·891	·938	·984
13/16 ..	·508	·559	·609	·660	·711	·762	·813	·863	·914	·965	1·016	1·066
.. 7/8	·547	·602	·656	·711	·766	·820	·875	·930	·984	1·039	1·094	1·148
15/16 ..	·586	·645	·703	·762	·820	·879	·938	·996	1·055	1·113	1·172	1·230
.. 1	·625	·688	·750	·813	·875	·938	1·000	1·063	1·125	1·188	1·250	1·313
1 1/8 ..	·703	·773	·844	·914	·984	1·055	1·125	1·195	1·266	1·336	1·406	1·477
.. 1 1/4	·781	·859	·938	1·016	1·094	1·172	1·250	1·328	1·406	1·484	1·563	1·641
1 3/8 ..	·859	·945	1·031	1·117	1·203	1·289	1·375	1·461	1·547	1·633	1·719	1·805
.. 1 1/2	·938	1·031	1·125	1·219	1·313	1·406	1·500	1·594	1·688	1·781	1·875	1·969
1 5/8 ..	1·016	1·117	1·219	1·320	1·422	1·523	1·625	1·727	1·828	1·930	2·031	2·133
.. 1 3/4	1·094	1·203	1·313	1·422	1·531	1·641	1·750	1·859	1·969	2·078	2·188	2·297
1 7/8 ..	1·172	1·289	1·406	1·523	1·641	1·758	1·875	1·992	2·109	2·227	2·344	2·461
.. 2	1·250	1·375	1·500	1·625	1·750	1·875	2·000	2·125	2·250	2·375	2·500	2·625
2 1/4 ..	1·406	1·547	1·688	1·828	1·969	2·109	2·250	2·391	2·531	2·672	2·813	2·953
.. 2 1/2	1·563	1·719	1·875	2·031	2·188	2·344	2·500	2·656	2·813	2·969	3·125	3·281
2 3/4 ..	1·719	1·891	2·063	2·234	2·406	2·578	2·750	2·922	3·094	3·266	3·438	3·609
.. 3	1·875	2·063	2·250	2·438	2·625	2·813	3·000	3·188	3·375	3·563	3·750	3·938

DORMAN, LONG & CO. LIMITED.

SHEARING AND BEARING VALUES OF RIVETS.

Dia. of Rivet in inches	Area in Square inches	Shearing Value at 4 tons per sq. inch		BEARING VALUES AT 8 TONS PER SQ. INCH — Thickness in inches of plate passed through										
		Single Shear	Double Shear	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1
⅜	·1104	·44	·88	·75	·94	..	..	..	..	..	..	..	..	..
½	·1963	·79	1·57	1·00	1·25	1·50	1·75	..	..	..	..	..	..	..
⅝	·3068	1·23	2·45	1·25	1·56	1·88	2·19	2·50	..	..	..	..	..	..
¾	·4418	1·77	3·53	1·50	1·88	2·25	2·63	3·00	3.38	3·75	..	..	..	..
⅞	·6013	2·41	4·81	1·75	2·19	2·63	3·06	3·50	3·94	4·38	4·81	..	..	..
1	·7854	3·14	6·28	2·00	2·50	3·00	3·50	4·00	4·50	5·00	5·50	6·00	7·00	..
1⅛	·9940	3·98	7·95	2·25	2·81	3·38	3·94	4·50	5·06	5·63	6·19	6·75	7·88	9·00
1¼	1·2272	4·91	9·82	2·50	3·13	3·75	4·38	5·00	5·63	6·25	6·88	7·50	8·75	10·00

Dia. of Rivet in inches	Area in Square inches	Shearing Value at 5 tons per sq. inch		BEARING VALUES AT 10 TONS PER SQ. INCH — Thickness in inches of plate passed through										
		Single Shear	Double Shear	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1
⅜	·1104	·55	1·10	·94	1·17	..	..	..	..	..	..	..	..	..
½	·1963	·98	1·96	1·25	1·56	1·88	2·19	..	..	..	..	..	..	..
⅝	·3068	1·53	3·07	1·56	1·95	2·34	2·73	3·13	..	..	..	..	..	..
¾	·4418	2·21	4·42	1·88	2·34	2·81	3·28	3·75	4·22	4·69	..	..	..	..
⅞	·6013	3·01	6·01	2·19	2·73	3·28	3·83	4·38	4·92	5·47	6·02	..	..	..
1	·7854	3·93	7·85	2·50	3·13	3·75	4·38	5·00	5·63	6·25	6·88	7·50	8·75	..
1⅛	·9940	4·97	9·94	2·81	3·52	4·22	4·92	5·63	6·33	7·03	7·73	8·44	9·84	11·25
1¼	1·2272	6·14	12·27	3·13	3·91	4·69	5·47	6·25	7·03	7·81	8·59	9·38	10·94	12·50

Dia. of Rivet in inches	Area in Square inches	Shearing Value at 6 tons per sq. inch		BEARING VALUES AT 12 TONS PER SQ. INCH — Thickness in inches of plate passed through										
		Single Shear	Double Shear	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1
⅜	·1104	·66	1·33	1·13	1·41	..	..	..	..	..	..	..	..	..
½	·1963	1·18	2·36	1·50	1·88	2·25	2·63	..	..	..	..	..	..	..
⅝	·3068	1·84	3·68	1·88	2·34	2·81	3·28	3·75	..	..	..	..	..	..
¾	·4418	2·65	5·30	2·25	2·81	3·38	3·94	4·50	5·06	5·63	..	..	..	..
⅞	·6013	3·61	7·22	2·63	3·28	3·94	4·59	5·25	5·91	6·56	7·22	..	..	..
1	·7854	4·71	9·43	3·00	3·75	4·50	5·25	6·00	6·75	7·50	8·25	9·00	10·50	..
1⅛	·9940	5·96	11·93	3·38	4·22	5·06	5·91	6·75	7·59	8·44	9·28	10·13	11·81	13·50
1¼	1·2272	7·36	14·73	3·75	4·69	5·63	6·56	7·50	8·44	9·38	10·31	11·25	13·13	15·00

In the above tables double shear is calculated at twice single shear; and the bearing stress per square inch at twice the shearing stress.

The bearing values above and to the right of the upper zig-zag lines in the tables are greater than double shear for the corresponding diameters, so that in these cases the shearing values are the determining factors.

The bearing values between the lower and upper zig-zag lines are greater than single and less than double shear for the corresponding diameters, so that in the case of single shear the shearing value is the determining factor, and in the case of double shear the bearing value is the determining factor.

The bearing values below and to the left of the lower zig-zag lines are less than single shear, so that in these cases the bearing values are the determining factors.

DORMAN, LONG & CO. LIMITED.

SHEARING & BEARING VALUES OF $\frac{3}{4}$" RIVETS,

FOR GROUPS UP TO 10 IN NUMBER.

No. of Rivets	Shearing Value at 4 tons per square inch		BEARING VALUES AT 8 TONS PER SQ. INCH						
			Thickness in inches of plate passed through						
	Single Shear	Double Shear	¼	5/16	⅜	7/16	½	9/16	⅝
1	1·77	3·53	1·50	1·88	2·25	2·63	3·00	3·38	3·75
2	3·53	7·07	3·00	3·75	4·50	5·25	6·00	6·75	7·50
3	5·30	10·60	4·50	5·63	6·75	7·88	9·00	10·13	11·25
4	7·07	14·14	6·00	7·50	9·00	10·50	12·00	13·50	15·00
5	8·84	17·67	7·50	9·38	11·25	13·13	15·00	16·88	18·75
6	10·60	21·20	9·00	11·25	13·50	15·75	18·00	20·25	22·50
7	12·37	24·74	10·50	13·13	15·75	18·38	21·00	23·63	26·25
8	14·14	28·27	12·00	15·00	18·00	21·00	24·00	27·00	30·00
9	15·90	31·81	13·50	16·88	20·25	23·63	27·00	30·38	33·75
10	17·67	35·34	15·00	18·75	22·50	26·25	30·00	33·75	37·50

No. of Rivets	Shearing Value at 5 tons per square inch		BEARING VALUES AT 10 TONS PER SQ. INCH						
			Thickness in inches of plate passed through						
	Single Shear	Double Shear	¼	5/16	⅜	7/16	½	9/16	⅝
1	2·21	4·42	1·88	2·34	2·81	3·28	3·75	4·22	4·69
2	4·42	8·84	3·75	4·69	5·63	6·56	7·50	8·44	9·38
3	6·63	13·25	5·63	7·03	8·44	9·84	11·25	12·66	14·06
4	8·84	17·67	7·50	9·38	11·25	13·13	15·00	16·88	18·75
5	11·04	22·09	9·38	11·72	14·06	16·41	18·75	21·09	23·44
6	13·25	26·51	11·25	14·06	16·88	19·69	22·50	25·31	28·13
7	15·46	30·93	13·13	16·41	19·69	22·97	26·25	29·53	32·81
8	17·67	35·34	15·00	18·75	22·50	26·25	30·00	33·75	37·50
9	19·88	39·76	16·88	21·09	25·31	29·53	33·75	37·97	42·19
10	22·09	44·18	18·75	23·44	28·13	32·81	37·50	42·19	46·88

No. of Rivets	Shearing Value at 6 tons per square inch		BEARING VALUES AT 12 TONS PER SQ. INCH						
			Thickness in inches of plate passed through						
	Single Shear	Double Shear	¼	5/16	⅜	7/16	½	9/16	⅝
1	2·65	5·30	2·25	2·81	3·38	3·94	4·50	5·06	5·63
2	5·30	10·60	4·50	5·63	6·75	7·88	9·00	10·13	11·25
3	7·95	15·90	6·75	8·44	10·13	11·81	13·50	15·19	16·88
4	10·60	21·21	9·00	11·25	13·50	15·75	18·00	20·25	22·50
5	13·25	26·51	11·25	14·06	16·88	19·69	22·50	25·31	28·13
6	15·90	31·81	13·50	16·88	20·25	23·63	27·00	30·38	33·75
7	18·56	37·11	15·75	19·69	23·63	27·56	31·50	35·44	39·38
8	21·21	42·41	18·00	22·50	27·00	31·50	36·00	40·50	45·00
9	23·86	47·71	20·25	25·31	30·38	35·44	40·50	45·56	50·63
10	26·51	53·02	22·50	28·13	33·75	39·38	45·00	50·63	56·25

DORMAN, LONG & CO. LIMITED.

SHEARING & BEARING VALUES OF 7/8" RIVETS,

FOR GROUPS UP TO 10 IN NUMBER.

No. of Rivets	Shearing Value at 4 tons per square inch		BEARING VALUES AT 8 TONS PER SQ. INCH						
			Thickness in inches of plate passed through						
	Single Shear	Double Shear	5/16	3/8	7/16	1/2	9/16	5/8	11/16
1	2·41	4·81	2·19	2·63	3·06	3·50	3·94	4·38	4·81
2	4·81	9·62	4·38	5·25	6·13	7·00	7·88	8·75	9·63
3	7·22	14·43	6·56	7·88	9·19	10·50	11·81	13·13	14·44
4	9·62	19·24	8·75	10·50	12·25	14·00	15·75	17·50	19·25
5	12·03	24·05	10·94	13·13	15·31	17·50	19·69	21·88	24·06
6	14·43	28·86	13·13	15·75	18·38	21·00	23·63	26·25	28·88
7	16·84	33·67	15·31	18·38	21·44	24·50	27·56	30·63	33·69
8	19·24	38·48	17·50	21·00	24·50	28·00	31·50	35·00	38·50
9	21·65	43·29	19·69	23·63	27·56	31·50	35·44	39·38	43·31
10	24·05	48·10	21·88	26·25	30·63	35·00	39·38	43·75	48·13

No. of Rivets	Shearing Value at 5 tons per square inch		BEARING VALUES AT 10 TONS PER SQ. INCH						
			Thickness in inches of plate passed through						
	Single Shear	Double Shear	5/16	3/8	7/16	1/2	9/16	5/8	11/16
1	3·01	6·01	2·73	3·28	3·83	4·38	4·92	5·47	6·02
2	6·01	12·03	5·47	6·56	7·66	8·75	9·84	10·94	12·03
3	9·02	18·04	8·20	9·84	11·48	13·13	14·77	16·41	18·05
4	12·03	24·05	10·94	13·13	15·31	17·50	19·69	21·88	24·06
5	15·03	30·07	13·67	16·41	19·14	21·88	24·61	27·34	30·08
6	18·04	36·08	16·41	19·69	22·97	26·25	29·53	32·81	36·09
7	21·05	42·09	19·14	22·97	26·80	30·63	34·45	38·28	42·11
8	24·05	48·10	21·88	26·25	30·63	35·00	39·38	43·75	48·13
9	27·06	54·12	24·61	29·53	34·45	39·38	44·30	49·22	54·14
10	30·07	60·13	27·34	32·81	38·28	43·75	49·22	54·69	60·16

No. of Rivets	Shearing Value at 6 tons per square inch		BEARING VALUES AT 12 TONS PER SQ. INCH						
			Thickness in inches of plate passed through						
	Single Shear	Double Shear	5/16	3/8	7/16	1/2	9/16	5/8	11/16
1	3·61	7·22	3·28	3·94	4·59	5·25	5·91	6·56	7·22
2	7·22	14·43	6·56	7·88	9·19	10·50	11·81	13·13	14·44
3	10·82	21·65	9·84	11·81	13·78	15·75	17·72	19·69	21·66
4	14·43	28·86	13·13	15·75	18·38	21·00	23·63	26·25	28·88
5	18·04	36·08	16·41	19·69	22·97	26·25	29·53	32·81	36·09
6	21·65	43·30	19·69	23·63	27·56	31·50	35·44	39·38	43·31
7	25·25	50·51	22·97	27·56	32·16	36·75	41·34	45·94	50·53
8	28·86	57·73	26·25	31·50	36·75	42·00	47·25	52·50	57·75
9	32·47	64·94	29·53	35·44	41·34	47·25	53·16	59·06	64·97
10	36·08	72·16	32·81	39·38	45·94	52·50	59·06	65·63	72·19

DORMAN, LONG & CO. LIMITED.

WEIGHTS OF ANGLES IN LBS. PER LINEAL FOOT.

Thickness of Angle in inches	SUM OF FLANGES IN INCHES											
	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8
3/16 ..	1·48	1·79	2·11	2·43	2·75	3·07	..	..	..	..	..	..
.. 1/4	1·91	2·34	2·76	3·19	3·61	4·04	4·46	4·89	5·32	..	..	..
5/16 ..	2·33	2·86	3·39	3·92	4·45	4·98	5·51	6·05	6·58	7·11	7·64	8·17
.. 3/8	..	..	3·98	4·62	5·26	5·90	6·54	7·17	7·81	8·45	9·09	9·72
7/16 ..	..	..	..	..	6·05	6·79	7·53	8·28	9·02	9·76	10·51	11·25
.. 1/2	..	..	..	..	..	7·65	8·50	9·35	10·20	11·05	11·91	12·75
9/16 ..	..	..	..	..	..	..	9·45	10·40	11·36	12·31	13·27	14·23
.. 5/8	..	..	..	..	..	..	..	11·42	12·49	13·55	14·61	15·67
11/16 ..	..	..	..	..	..	..	..	..	..	14·76	15·93	17·10
.. 3/4	..	..	..	..	..	..	..	..	..	..	..	18·49
13/16 ..	..	..	..	..	..	..	..	..	..	..	..	..
.. 7/8	..	..	..	..	..	..	..	..	..	..	..	..
15/16 ..	..	..	..	..	..	..	..	..	..	..	..	..
.. 1	..	..	..	..	..	..	..	..	..	..	..	..

AREAS OF ANGLES IN SQUARE INCHES.

Thickness of Angle in inches	SUM OF FLANGES IN INCHES											
	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8
3/16 ..	·434	·527	·621	·715	·809	·902	..	..	..	..	..	..
.. 1/4	·563	·687	·813	·937	1·063	1·188	1·313	1·438	1·564	..	..	..
5/16 ..	·684	·840	·996	1·152	1·309	1·465	1·622	1·778	1·935	2·091	2·248	2·403
.. 3/8	..	..	1·172	1·359	1·547	1·735	1·923	2·110	2·298	2·485	2·673	2·860
7/16 ..	..	..	..	..	1·778	1·996	2·216	2·434	2·654	2·872	3·091	3·310
.. 1/2	..	..	..	..	..	2·250	2·501	2·750	3·001	3·251	3·502	3·751
9/16 ..	..	..	..	..	..	..	2·778	3·059	3·341	3·622	3·904	4·185
.. 5/8	..	..	..	..	..	..	..	3·360	3·673	3·985	4·298	4·610
11/16 ..	..	..	..	..	..	..	..	..	..	4·341	4·685	5·028
.. 3/4	..	..	..	..	..	..	..	..	..	..	..	5·438
13/16 ..	..	..	..	..	..	..	..	..	..	..	..	..
.. 7/8	..	..	..	..	..	..	..	..	..	..	..	..
15/16 ..	..	..	..	..	..	..	..	..	..	..	..	..
.. 1	..	..	..	..	..	..	..	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

WEIGHTS OF ANGLES IN LBS. PER LINEAL FOOT.

SUM OF FLANGES IN INCHES											Thickness of Angle in inches
8½	9	9½	10	10½	11	12	13	14	16	18	
..	..	..	..	..	..	..	..	..	..	..	.. 3/16
..	..	..	..	..	..	..	..	..	..	..	¼ ..
8·71	9·23	9·76	10·30	..	..	..	..	..	..	..	.. 5/16
10·37	11·00	11·63	12·28	12·91	13·55	14·82	..	..	..	..	⅜ ..
12·00	12·74	13·48	14·23	14·97	15·71	17·20	18·69	20·18	..	..	.. 7/16
13·61	14·45	15·30	16·16	17·00	17·85	19·55	21·25	22·95	26·36	..	½ ..
15·19	16·14	17·09	18·05	19·01	19·96	21·87	23·79	25·70	29·53	33·36	.. 9/16
16·74	17·80	18·86	19·93	20·98	22·05	24·17	26·30	28·42	32·68	36·93	⅝ ..
18·27	19·43	20·60	21·77	22·94	24·10	26·44	28·78	31·12	35·80	40·48	.. 11/16
19·77	21·04	22·31	23·59	24·86	26·14	28·69	31·24	33·79	38·89	44·00	¾ ..
21·24	22·62	24·00	25·39	26·76	28·14	30·91	33·67	36·43	41·96	47·49	.. 13/16
..	24·18	25·66	27·15	28·63	30·12	33·10	36·07	39·05	45·00	50·96	⅞ ..
..	..	27·29	28·89	30·48	32·07	35·26	38·45	41·64	48·02	54·40	.. 15/16
..	..	..	30·61	32·30	34·00	37·40	40·80	44·20	51·01	57·81	1 ..

AREAS OF ANGLES IN SQUARE INCHES.

SUM OF FLANGES IN INCHES											Thickness of Angle in inches
8½	9	9½	10	10½	11	12	13	14	16	18	
..	..	..	..	..	..	..	..	..	..	..	.. 3/16
..	..	..	..	..	..	..	..	..	..	..	¼ ..
2·561	2·716	2·871	3·029	..	..	..	..	..	..	..	.. 5/16
3·049	3·236	3·422	3·611	3·797	8·984	4·359	..	..	..	..	⅜ ..
3·529	3·747	3·965	4·185	4·403	4·621	5·058	5·496	5·934	..	..	.. 7/16
4·002	4·251	4·500	4·752	5·000	5·250	5·750	6·250	6·751	7·752	..	½ ..
4·467	4·747	5·027	5·310	5·590	5·871	6·433	6·996	7·559	8·685	9·811	.. 9/16
4·924	5·236	5·547	5·861	6·172	6·484	7·109	7·735	8·360	9·611	10·862	⅝ ..
5·373	5·716	6·059	6·404	6·746	7·089	7·777	8·465	9·153	10·529	11·905	.. 11/16
5·814	6·189	6·562	6·989	7·313	7·687	8·437	9·188	9·938	11·439	12·940	¾ ..
6·248	6·654	7·059	7·467	7·871	8·277	9·090	9·903	10·715	12·341	13·968	.. 13/16
..	7·111	7·547	7·986	8·422	8·859	9·734	10·610	11·485	13·236	14·987	⅞ ..
..	..	8·027	8·498	8·965	9·433	10·371	11·309	12·247	14·123	15·999	.. 15/16
..	..	..	9·002	9·500	10·000	11·000	12·000	13·001	15·002	17·003	1 ..

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS. PER LINEAL FOOT.

Width in Inches	THICKNESS IN INCHES							
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2
1	·213	·425	·638	·850	1·06	1·28	1·49	1·70
1¼	·266	·531	·797	1·06	1·33	1·59	1·86	2·13
1½	·319	·638	·956	1·28	1·59	1·91	2·23	2·55
1¾	·372	·744	1·12	1·49	1·86	2·23	2·60	2·98
2	·425	·850	1·28	1·70	2·13	2·55	2·98	3·40
2¼	·478	·956	1·43	1·91	2·39	2·87	3·35	3·83
2½	·531	1·06	1·59	2·13	2·66	3·19	3·72	4·25
2¾	·584	1·17	1·75	2·34	2·92	3·51	4·09	4·68
3	·638	1·28	1·91	2·55	3·19	3·83	4·46	5·10
3¼	·691	1·38	2·07	2·76	3·45	4·14	4·83	5·53
3½	·744	1·49	2·23	2·98	3·72	4·46	5·21	5·95
3¾	·797	1·59	2·39	3·19	3·98	4·78	5·58	6·38
4	·850	1·70	2·55	3·40	4·25	5·10	5·95	6·80
4¼	·903	1·81	2·71	3·61	4·52	5·42	6·32	7·23
4½	·956	1·91	2·87	3·83	4·78	5·74	6·69	7·65
4¾	1·01	2·02	3·03	4·04	5·05	6·06	7·07	8·08
5	1·06	2·13	3·19	4·25	5·31	6·38	7·44	8·50
5¼	1·12	2·23	3·35	4·46	5·58	6·69	7·81	8·93
5½	1·17	2·34	3·51	4·68	5·84	7·01	8·18	9·35
5¾	1·22	2·44	3·67	4·89	6·11	7·33	8·55	9·78
6	1·28	2·55	3·83	5·10	6·38	7·65	8·93	10·20
6¼	1·33	2·66	3·98	5·31	6·64	7·97	9·30	10·63
6½	1·38	2·76	4·14	5·53	6·91	8·29	9·67	11·05
6¾	1·43	2·87	4·30	5·74	7·17	8·61	10·04	11·48
7	1·49	2·98	4·46	5·95	7·44	8·93	10·41	11·90
7¼	1·54	3·08	4·62	6·16	7·70	9·24	10·78	12·33
7½	1·59	3·19	4·78	6·38	7·97	9·56	11·16	12·75
7¾	1·65	3·29	4·94	6·59	8·23	9·88	11·53	13·18
8	1·70	3·40	5·10	6·80	8·50	10·20	11·90	13·60
8¼	1·75	3·51	5·26	7·01	8·77	10·52	12·27	14·03
8½	1·81	3·61	5·42	7·23	9·03	10·84	12·64	14·45
8¾	1·86	3·72	5·58	7·44	9·30	11·16	13·02	14·88
9	1·91	3·83	5·74	7·65	9·56	11·48	13·39	15·30
9¼	1·97	3·93	5·90	7·86	9·83	11·80	13·76	15·73
9½	2·02	4·04	6·06	8·08	10·09	12·11	14·13	16·15
9¾	2·07	4·14	6·22	8·29	10·36	12·43	14·50	16·58
10	2·13	4·25	6·38	8·50	10·63	12·75	14·88	17·00
10¼	2·18	4·36	6·53	8·71	10·89	13·07	15·25	17·43
10½	2·23	4·46	6·70	8·93	11·16	13·39	15·62	17·85
10¾	2·28	4·57	6·85	9·14	11·42	13·71	15·99	18·28
11	2·34	4·68	7·01	9·35	11·69	14·03	16·36	18·70
11¼	2·39	4·78	7·17	9·56	11·95	14·34	16·73	19·13
11½	2·44	4·89	7·33	9·78	12·22	14·66	17·11	19·55
11¾	2·50	5·00	7·49	9·99	12·48	14·98	17·48	19·98
12	2·55	5·10	7·65	10·20	12·75	15·30	17·85	20·40

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS. PER LINEAL FOOT.

THICKNESS IN INCHES								Width in Inches		
9/16	5/8	11/16	3/4	13/16	7/8	15/16	1			
1·91	2·13	2·34	2·55	2·76	2·98	3·19	3·40	1	..	..
2·39	2·66	2·92	3·19	3·45	3·72	3·98	4·25	..	1¼	..
2·87	3·19	3·51	3·83	4·14	4·46	4·78	5·10	..	..	1½
3·35	3·72	4·09	4·46	4·83	5·21	5·58	5·95	..	1¾	..
3·83	4·25	4·68	5·10	5·53	5·95	6·38	6·80	2	..	..
4·30	4·78	5·26	5·74	6·22	6·69	7·17	7·65	..	2¼	..
4·78	5·31	5·84	6·38	6·91	7·44	7·97	8·50	..	..	2½
5·26	5·84	6·43	7·01	7·60	8·18	8·77	9·35	..	2¾	..
5·74	6·38	7·01	7·65	8·29	8·93	9·56	10·20	3	..	..
6·22	6·91	7·60	8·29	8·98	9·67	10·36	11·05	..	3¼	..
6·70	7·44	8·18	8·93	9·67	10·41	11·16	11·90	..	..	3½
7·17	7·97	8·77	9·56	10·36	11·16	11·95	12·75	..	3¾	..
7·65	8·50	9·35	10·20	11·05	11·90	12·75	13·60	4	..	..
8·13	9·03	9·93	10·84	11·74	12·64	13·55	14·45	..	4¼	..
8·61	9·56	10·52	11·48	12·43	13·39	14·34	15·30	..	..	4½
9·08	10·09	11·10	12·11	13·12	14·13	15·14	16·15	..	4¾	..
9·56	10·63	11·69	12·75	13·81	14·88	15·94	17·00	5	..	..
10·04	11·16	12·27	13·39	14·50	15·62	16·73	17·85	..	5¼	..
10·52	11·69	12·86	14·03	15·19	16·36	17·53	18·70	..	..	5½
11·00	12·22	13·44	14·66	15·88	17·11	18·33	19·55	..	5¾	..
11·48	12·75	14·03	15·30	16·58	17·85	19·13	20·40	6	..	..
11·95	13·28	14·61	15·94	17·27	18·59	19·92	21·25	..	6¼	..
12·43	13·81	15·19	16·58	17·96	19·34	20·72	22·10	..	..	6½
12·91	14·34	15·78	17·21	18·65	20·08	21·52	22·95	..	6¾	..
13·39	14·88	16·36	17·85	19·34	20·83	22·31	23·80	7	..	..
13·87	15·41	16·95	18·49	20·03	21·57	23·11	24·65	..	7¼	..
14·34	15·94	17·53	19·13	20·72	22·31	23·91	25·50	..	..	7½
14·82	16·47	18·12	19·76	21·41	23·06	24·70	26·35	..	7¾	..
15·30	17·00	18·70	20·40	22·10	23·80	25·50	27·20	8	..	..
15·78	17·53	19·28	21·04	22·79	24·54	26·30	28·05	..	8¼	..
16·26	18·06	19·87	21·68	23·48	25·29	27·10	28·90	..	..	8½
16·73	18·59	20·45	22·31	24·17	26·03	27·89	29·75	..	8¾	..
17·21	19·13	21·04	22·95	24·86	26·78	28·69	30·60	9	..	..
17·69	19·66	21·62	23·59	25·55	27·52	29·48	31·45	..	9¼	..
18·17	20·19	22·21	24·23	26·24	28·26	30·28	32·30	..	..	9½
18·65	20·72	22·79	24·86	26·93	29·01	31·08	33·15	..	9¾	..
19·13	21·25	23·38	25·50	27·63	29·75	31·88	34·00	10	..	..
19·60	21·78	23·96	26·14	28·32	30·49	32·67	34·85	..	10¼	..
20·08	22·31	24·54	26·78	29·01	31·24	33·47	35·70	..	..	10½
20·56	22·84	25·13	27·41	29·70	31·98	34·27	36 55	..	10¾	..
21·04	23·38	25·71	28·05	30·39	32·73	35·06	37·40	11	..	..
21·52	23·91	26·30	28·69	31·08	33·47	35·86	38·25	..	11¼	..
22·00	24·44	26·88	29·33	31·77	34·21	36·66	39·10	..	..	11½
22·47	24·97	27·47	29·96	32·46	34·96	37·45	39·95	..	11¾	..
22·95	25·50	28·05	30·60	33·15	35·70	38·25	40·80	12	..	..

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS. PER LINEAL FOOT.

Width in inches	THICKNESS IN INCHES							
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2
13	2·76	5·53	8·29	11·05	13·81	16·58	19·34	22·10
14	2·98	5·95	8·93	11·90	14·88	17·85	20·83	23·80
15	3·19	6·38	9·56	12·75	15·94	19·13	22·31	25·50
16	3·40	6·80	10·20	13·60	17·00	20·40	23·80	27·20
17	3·61	7·23	10·84	14·45	18·06	21·68	25·29	28·90
18	3·83	7·65	11·48	15·30	19·13	22·95	26·78	30·60
19	4·04	8·08	12·11	16·15	20·19	24·23	28·26	32·30
20	4·25	8·50	12·75	17·00	21·25	25·50	29·75	34·00
21	4·46	8·93	13·39	17·85	22·31	26·78	31·24	35·70
22	4·68	9·35	14·03	18·70	23·38	28·05	32·72	37·40
23	4·89	9·78	14·66	19·55	24·44	29·33	34·21	39·10
24	5·10	10·20	15·30	20·40	25·50	30·60	35·70	40·80
25	5·31	10·63	15·94	21·25	26·56	31·88	37·19	42·50
26	5·53	11·05	16·58	22·10	27·63	33·15	38·68	44·20
27	5·74	11·48	17·21	22·95	28·69	34·43	40·16	45·90
28	5·95	11·90	17·85	23·80	29·75	35·70	41·65	47·60
29	6·16	12·33	18·49	24·65	30·81	36·98	43·14	49·30
30	6·38	12·75	19·13	25·50	31·88	38·25	44·63	51·00
31	6·59	13·18	19·76	26·35	32·94	39·53	46·11	52·70
32	6·80	13·60	20·40	27·20	34·00	40·80	47·60	54·40
33	7·01	14·03	21·04	28·05	35·06	42·08	49·09	56·10
34	7·23	14·45	21·68	28·90	36·13	43·35	50·58	57·80
35	7·44	14·88	22·31	29·75	37·19	44·63	52·06	59·50
36	7·65	15·30	22·95	30·60	38·25	45·90	53·55	61·20
37	7·86	15·73	23·59	31·45	39·31	47·18	55·04	62·90
38	8·08	16·15	24·23	32·30	40·38	48·45	56·53	64·60
39	8·29	16·58	24·86	33·15	41·44	49·73	58·01	66·30
40	8·50	17·00	25·50	34·00	42·50	51·00	59·50	68·00
41	8·71	17·43	26·14	34·85	43·56	52·28	60·99	69·70
42	8·93	17·85	26·78	35·70	44·63	53·55	62·48	71·40
43	9·14	18·28	27·41	36·55	45·69	54·83	63·96	73·10
44	9·35	18·70	28·05	37·40	46·75	56·10	65·45	74·80
45	9·56	19·13	28·69	38·25	47·81	57·38	66·94	76·50
46	9·78	19·55	29·33	39·10	48·88	58·65	68·43	78·20
47	9·99	19·98	29·96	39·95	49·94	59·93	69·91	79·90
48	10·20	20·40	30·60	40·80	51·00	61·20	71·40	81·60
49	10·41	20·83	31·24	41·65	52·06	62·48	72·89	83·30
50	10·63	21·25	31·88	42·50	53·13	63·75	74·38	85·00
51	10·84	21·68	32·51	43·35	54·19	65·03	75·86	86·70
52	11·05	22·10	33·15	44·20	55·25	66·30	77·35	88·40
53	11·26	22·53	33·79	45·05	56·31	67·58	78·84	90·10
54	11·48	22·95	34·43	45·90	57·38	68·85	80·33	91·80
VALUES FOR ADDITIONAL WIDTHS OF 1/4", 1/2" AND 3/4".								
1/4	·053	·106	·159	·213	·266	·319	·372	·425
1/2	·106	·213	·319	·425	·531	·638	·744	·850
3/4	·159	·319	·478	·638	·797	·956	1·116	1·275

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS. PER LINEAL FOOT.

THICKNESS IN INCHES								Width in inches
9/16	5/8	11/16	3/4	13/16	7/8	15/16	1	
24·86	27·63	30·39	33·15	35·91	38·68	41·44	44·20	13
26·78	29·75	32·73	35·70	38·66	41·65	44·63	47·60	14
28·69	31·88	35·06	38·25	41·44	44·63	47·81	51·00	15
30·60	34·00	37·40	40·80	44·20	47·60	51·00	54·40	16
32·51	36·13	39·74	43·35	46·96	50·58	54·19	57·80	17
34·43	38·25	42·08	45·90	49·73	53·55	57·38	61·20	18
36·34	40·38	44·41	48·45	52·49	56·53	60·56	64·60	19
38·25	42·50	46·75	51·00	55·25	59·50	63·75	68·00	20
40·16	44·63	49·09	53·55	58·01	62·48	66·94	71·40	21
42·08	46·75	51·43	56·10	60·78	65·45	70·13	74·80	22
43·99	48·88	53·76	58·65	63·54	68·43	73·31	78·20	23
45·90	51·00	56·10	61·20	66·30	71·40	76·50	81·60	24
47·81	53·13	58·44	63·75	69·06	74·38	79·69	85·00	25
49·73	55·25	60·78	66·30	71·83	77·35	82·88	88·40	26
51·64	57·38	63·11	68·85	74·59	80·33	86·06	91·80	27
53·55	59·50	65·45	71·40	77·35	83·30	89·25	95·20	28
55·46	61·63	67·79	73·95	80·11	86·28	92·44	98·60	29
57·38	63·75	70·13	76·50	82·88	89·25	95·63	102·00	30
59·29	65·88	72·46	79·05	85·64	92·23	98·81	105·40	31
61·20	68·00	74·80	81·60	88·40	95·20	102·00	108·80	32
63·11	70·13	77·14	84·15	91·16	98·18	105·19	112·20	33
65·03	72·25	79·48	86·70	93·93	101·15	108·38	115·60	34
66·94	74·38	81·81	89·25	96·69	104·13	111·56	119·00	35
68·85	76·50	84·15	91·80	99·45	107·10	114·75	122·40	36
70·76	78·63	86·49	94·35	102·21	110·08	117·94	125·80	37
72·68	80·75	88·83	96·90	104·98	113·05	121·13	129·20	38
74·59	82·88	91·16	99·45	107·74	116·03	124·31	132·60	39
76·50	85·00	93·50	102·00	110·50	119·00	127·50	136·00	40
78·41	87·13	95·84	104·55	113·26	121·98	130·69	139·40	41
80·33	89·25	98·18	107·10	116·03	124·95	133·88	142·80	42
82·24	91·38	100·51	109·65	118·79	127·93	137·06	146·20	43
84·15	93·50	102·85	112·20	121·55	130·90	140·25	149·60	44
86·06	95·63	105·19	114·75	124·31	133·88	143·44	153·00	45
87·98	97·75	107·53	117·30	127·08	136·85	146·63	156·40	46
89·89	99·88	109·86	119·85	129·84	139·83	149·81	159·80	47
91·80	102·00	112·20	122·40	132·60	142·80	153·00	163·20	48
93·71	104·13	114·54	124·95	135·36	145·78	156·19	166·60	49
95·63	106·25	116·88	127·50	138·13	148·75	159·38	170·00	50
97·54	108·38	119·21	130·05	140·89	151·73	162·56	173·40	51
99·45	110·50	121·55	132·60	143·65	154·70	165·75	176·80	52
101·36	112·63	123·89	135·15	146·41	157·68	168·94	180·20	53
103·28	114·75	126·23	137·70	149·18	160·65	172·13	183·60	54

VALUES FOR ADDITIONAL WIDTHS OF ¼", ½" AND ¾".

·478	·531	·584	·638	·691	·744	·797	·850	.. .. ¼
·956	1·063	1·169	1·275	1·381	1·488	1·594	1·700	.. ½ ..
1·434	1·594	1·753	1·913	2·072	2·231	2·391	2·550	¾ .. ..

DORMAN, LONG & CO. LIMITED.

WEIGHT OF ROUND AND SQUARE STEEL BARS IN LBS. PER LINEAL FOOT.

Diameter or Side in inches	Round ●	Square ■	Diameter or Side in inches	Round ●	Square ■	Diameter or Side in inches	Round ●	Square ■
.. ¼	·167	·213	.. 1¼	4·172	5·312	.. 3	24·03	30·60
1/16 ..	·261	·332	1⅜ ..	5·049	6·428	3¼ ..	28·21	35·91
.. ⅜	·376	·478	.. 1½	6·008	7·650	.. 3½	32·71	41·65
1/16 ..	·511	·651	1⅝ ..	7·051	8·978	3¾ ..	37·55	47·81
.. ½	·668	·849	.. 1¾	8·178	10·41	.. 4	42·73	54·40
1/16 ..	·845	1·076	1⅞ ..	9·388	11·95	4¼ ..	48·23	61·41
.. ⅝	1·043	1·328	.. 2	10·68	13·60	.. 4½	54·07	68·85
1/16 ..	1·262	1·607	2⅛ ..	12·06	15·35	4¾ ..	60·25	76·71
.. ¾	1·502	1·912	.. 2¼	13·52	17·21	.. 5	66·76	85·00
1/16 ..	1·763	2·245	2⅜ ..	15·06	19·18	5¼ ..	73·60	93·71
.. ⅞	2·044	2·603	.. 2½	16·69	21·25	.. 5½	80·78	102·85
1/16 ..	2·347	2·988	2⅝ ..	18·40	23·43	5¾ ..	88·29	112·41
.. 1	2·670	3·400	.. 2¾	20·19	25·71	.. 6	96·13	122·40
1⅛ ..	3·380	4·303	2⅞ ..	22·07	28·10	..	..	..

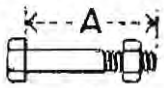
WHITWORTH'S STANDARD SIZES OF BOLTS, BOLT-HEADS AND NUTS.

Diameter of Bolt in inches	No. of Threads per inch	Diameter at Bottom of Thread in inches	Hex. Head & Nut		Thicknesses in inches		Sectional Area at Bottom of Thread in square inches	Diameter of Bolt in inches
			Distance over Flats in inches	Distance over Corners in inches	Bolt Head	Nut		
¼ ..	20	·186	·53	·61	·22	·25	·027	.. ¼
.. ⅜	16	·295	·71	·82	·33	·38	·068	⅜ ..
½ ..	12	·393	·92	1·06	·44	·50	·121	.. ½
.. ⅝	11	·509	1·10	1·27	·55	·63	·203	⅝ ..
¾ ..	10	·622	1·30	1·50	·66	·75	·304	.. ¾
.. ⅞	9	·733	1·48	1·71	·77	·88	·422	⅞ ..
1 ..	8	·840	1·67	1·93	·88	1·00	·554	.. 1
.. 1⅛	7	·942	1·86	2·15	·98	1·13	·697	1⅛ ..
1¼ ..	7	1·067	2·05	2·37	1·09	1·25	·894	.. 1¼
.. 1⅜	6	1·161	2·22	2·56	1·20	1·38	1·060	1⅜ ..
1½ ..	6	1·287	2·41	2·78	1·31	1·50	1·300	.. 1½
.. 1¾	5	1·494	2·76	3·19	1·53	1·75	1·753	1¾ ..
2 ..	4·5	1·715	3·15	3·64	1·75	2·00	2·311	.. 2
.. 2¼	4	1·930	3·55	4·10	1·97	2·25	2·925	2¼ ..
2½ ..	4	2·180	3·89	4·49	2·19	2·50	3·732	.. 2½
.. 2¾	3·5	2·384	4·18	4·83	2·41	2·75	4·464	2¾ ..
3 ..	3·5	2·634	4·53	5·23	2·63	3·00	5·450	.. 3

DORMAN, LONG & CO. LIMITED.

CALCULATED WEIGHTS IN POUNDS OF
WHITWORTH'S STANDARD BOLTS & NUTS.

Hexagonal Head and Nut.

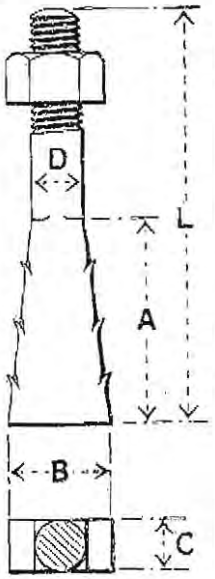


Length A in Inches	DIAMETER OF BOLT IN INCHES										
	¼	⅜	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½
1	·042	·106	·222	·376	·612	..	..	..	..	..	..
1⅛	·044	·110	·229	·387	·628	..	..	..	..	..	..
1¼	·045	·114	·236	·398	·643	·944	..	..	..	..	..
1⅜	·047	·118	·243	·408	·659	·965	..	..	..	..	..
1½	·049	·122	·250	·419	·675	·986	1·394	..	..	..	..
1⅝	·050	·126	·257	·430	·690	1·008	1·421	..	..	..	..
1¾	·052	·130	·264	·441	·706	1·029	1·449	1·966	..	..	..
1⅞	·054	·134	·271	·452	·722	1·050	1·477	2·001	..	..	..
2	·056	·138	·278	·463	·737	1·072	1·505	2·036	2·671	..	..
2¼	·059	·145	·292	·484	·769	1·114	1·561	2·107	2·758	..	..
2½	·063	·153	·305	·506	·800	1·157	1·616	2·177	2·845	3·572	..
2¾	·065	·161	·319	·528	·831	1·199	1·672	2·247	2·932	3·678	..
3	·069	·169	·333	·549	·862	1·242	1·727	2·318	3·019	3·783	4·766
3¼	·071	·177	·347	·571	·894	1·284	1·783	2·388	3·106	3·888	4·891
3½	·075	·185	·361	·593	·925	1·327	1·838	2·459	3·193	3·993	5·016
3¾	·079	·192	·375	·615	·956	1·369	1·893	2·529	3·280	4·098	5·142
4	·082	·200	·389	·637	·988	1·412	1·950	2·600	3·367	4·204	5·267
4¼	·085	·208	·403	·658	1·019	1·455	2·005	2·670	3·454	4·309	5·392
4½	·089	·216	·417	·680	1·050	1·497	2·061	2·740	3·541	4·414	5·517
4¾	·092	·224	·431	·702	1·081	1·540	2·116	2·810	3·627	4·519	5·642
5	·096	·232	·445	·724	1·113	1·583	2·172	2·881	3·714	4·624	5·767
5¼	·099	·240	·459	·745	1·144	1·625	2·228	2·952	3·801	4·730	5·893
5½	·103	·247	·472	·767	1·175	1·667	2·283	3·022	3·888	4·835	6·018
5¾	·106	·255	·486	·789	1·207	1·710	2·339	3·092	3·975	4·940	6·143
6	·110	·263	·500	·810	1·238	1·753	2·394	3·163	4·062	5·045	6·268
6½	·117	·279	·528	·854	1·300	1·838	2·506	3·303	4·236	5·256	6·518
7	·124	·294	·556	·897	1·363	1·923	2·617	3·444	4·410	5·466	6·769
7½	·130	·310	·584	·941	1·425	2·008	2·728	3·585	4·584	5·676	7·019
8	·138	·326	·612	·984	1·488	2·094	2·839	3·726	4·757	5·887	7·270
8½	..	·341	·639	1·028	1·550	2·179	2·950	3·867	4·931	6·097	7·520
9	..	·357	·667	1·071	1·613	2·264	3·062	4·008	5·105	6·308	7·770
9½	..	..	·695	1·115	1·676	2·349	3·173	4·149	5·279	6·518	8·021
10	..	..	·723	1·158	1·739	2·434	3·284	4·290	5·453	6·728	8·271
10½	..	..	..	1·202	1·801	2·519	3·396	4·430	5·627	6·939	8·521
11	..	..	..	1·245	1·863	2·605	3·507	4·571	5·800	7·149	8·772
11½	..	..	..	..	1·926	2·689	3·618	4·712	5·974	7·360	9·022
12	..	..	..	..	1·989	2·775	3·729	4·853	6·148	7·570	9·272
Weight in lbs. of one Nut	·0134	·0345	·0757	·1394	·2164	·3203	·4611	·6379	·8511	1·075	1·391
Weight in lbs. of Shank per 1 inch of length	·0139	·0313	·0557	·0869	·1252	·1703	·2225	·2817	·3477	·4208	·5007
Weight in lbs. of Shank per 1 foot of length	·167	·376	·668	1·043	1·502	2·044	2·670	3·380	4·172	5·049	6·008

DORMAN, LONG & CO. LIMITED.

LEWIS BOLTS, WASHERS AND GAS TUBING.

APPROXIMATE WEIGHTS AND SIZES.



LEWIS BOLTS AND NUTS.

Dimensions in inches					Weight in lbs.	
Diameter D	Length L	A	B	C	Each	One inch of Shank
⅝ ..	5	2½	1¼	⅝ ..	·77	·087
.. ¾	6	3	1½	.. ¾	1·31	·125
⅞ ..	7	3½	1¾	⅞ ..	2·06	·170
.. 1	8	4	2	.. 1	3·05	·223
1⅛ ..	9	4½	2¼	1⅛ ..	4·33	·282
.. 1¼	10	5	2½	.. 1¼	5·91	·348
1⅜ ..	11	5½	2¾	1⅜ ..	7·81	·421
.. 1½	12	6	3	.. 1½	10·13	·501

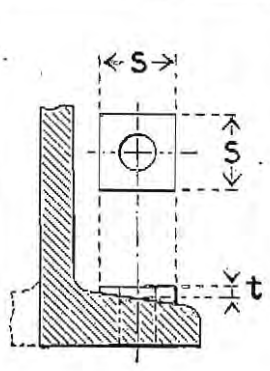
ORDINARY ROUND WASHERS.

Diameter of Bolt in inches	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1¾	2	2¼	2½	2¾	3
Outside Diameter of Washer in inches	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	2⅝	2⅞	3⅛	3½	4	4½	5	5½	6
Thickness in inches	⅛	⅛	⅛	⅛	3/16	3/16	3/16	3/16	3/16	¼	¼	5/16	5/16	⅜	⅜
Weight in lbs. per 100	2½	4	5½	7½	14	17½	21½	26	30½	48½	64	102	126	183	219

APPROXIMATE WEIGHTS & SIZES OF GAS TUBING.

Nominal Bore in inches	External Diameter in inches	Weight in lbs. per lineal foot
¾ ..	1 1/16 ..	1·176
.. 1	.. 1 5/16	1·680
1¼ ..	1 5/8 ..	2·464
.. 1½	.. 1⅞	3·136
1¾ ..	2 1/16 ..	3·463

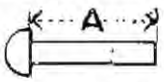
SQUARE BEVELLED WASHERS FOR BEAMS & CHANNELS.



Diam. of Bolt in inches	Side "S" of Square in inches	Mean thickness "t" in inches	Weight in lbs. per 100
½ ..	1⅛ ..	3/16 ..	6 ..
.. ⅝	.. 1⅜	.. 3/16	.. 8½
¾ ..	1 5/8 ..	3/16 ..	10½ ..
.. ⅞	.. 1⅞	.. 3/16	.. 15½
1 ..	2⅛ ..	3/16 ..	20 ..

DORMAN, LONG & CO. LIMITED.

APPROXIMATE WEIGHT IN LBS. OF 100 STEEL CUP-HEADED RIVETS.



Length A in Inches	DIAMETER OF RIVET IN INCHES							
	⅜	½	⅝	¾	⅞	1	1⅛	1¼
1	4·89	9·7	..	..	..	..	..	..
1⅛	5·28	10·4	..	..	..	..	..	..
1¼	5·67	11·1	..	..	..	..	..	..
1⅜	6·06	11·8	..	..	..	..	..	..
1½	6·45	12·5	21·2	32·9	..	..	..	..
1⅝	6·85	13·2	22·3	34·4	..	..	..	..
1¾	7·24	13·9	23·4	36·0	..	..	..	..
1⅞	7·63	14·6	24·4	37·6	..	..	..	..
2	8·02	15·3	25·5	39·1	56·4	77·9	..	..
2⅛	8·41	16·0	26·6	40·7	58·6	80·7	..	..
2¼	8·80	16·7	27·7	42·2	60·7	83·4	..	..
2⅜	9·19	17·4	28·8	43·8	62·8	86·2	..	..
2½	9·58	18·1	29·9	45·4	65·0	89·0	118	152
2⅝	9·97	18·8	31·0	46·9	67·1	91·8	121	156
2¾	10·4	19·5	32·1	48·5	69·2	94·6	125	161
2⅞	10·8	20·2	33·1	50·1	71·3	97·4	129	165
3	11·1	20·9	34·2	51·6	73·5	100	132	169
3⅛	11·5	21·6	35·3	53·2	75·6	103	136	174
3¼	11·9	22·3	36·4	54·8	77·7	106	139	178
3⅜	12·3	22·9	37·5	56·3	79·9	108	143	183
3½	..	23·6	38·6	57·9	82·0	111	146	187
3⅝	..	24·3	39·7	59·5	84·1	114	150	191
3¾	..	25·0	40·7	61·0	86·2	117	153	196
3⅞	..	25·7	41·8	62·6	88·4	120	157	200
4	..	..	42·9	64·2	90·5	122	160	204
4¼	..	..	45·1	67·3	94·8	128	167	213
4½	..	..	47·3	70·4	99·0	134	174	222
4¾	..	..	49·4	73·5	103	139	181	230
5	..	..	..	76·7	108	145	188	239
5¼	..	..	..	79·8	112	150	195	248
5½	..	..	..	82·9	116	156	202	256
5¾	..	..	..	86·1	120	161	209	265
6	..	..	..	..	125	167	217	274
6¼	..	..	..	..	129	172	224	282
6½	..	..	..	..	133	178	231	291
6¾	..	..	..	..	137	184	238	300
7	..	..	..	..	..	189	245	309
7¼	..	..	..	..	..	195	252	317
7½	..	..	..	..	..	200	259	326
7¾	..	..	..	..	..	206	266	335
8	..	..	..	..	..	211	273	343
Approximate weight in lbs. of 100 Heads	1·76	4·17	8·15	14·1	22·4	33·4	47·5	65·2
Variation in weight of 100 Rivets per inch of length	3·13	5·56	8·69	12·5	17·0	22·3	28·2	34·8

DORMAN, LONG & CO. LIMITED.

LBS. RISING BY 7, EXPRESSED IN CWTS., QRS. & LBS. AND IN DECIMALS OF A TON.

Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton
					336	3	0	0	·15	672	6	0	0	·3
7	..	..	7	·003125	343	3	0	7	·153125	679	6	0	7	·303125
14	..	..	14	·00625	350	3	0	14	·15625	686	6	0	14	·30625
21	..	..	21	·009375	357	3	0	21	·159375	693	6	0	21	·309375
28	..	1	0	·0125	364	3	1	0	·1625	700	6	1	0	·3125
35	..	1	7	·015625	371	3	1	7	·165625	707	6	1	7	·315625
42	..	1	14	·01875	378	3	1	14	·16875	714	6	1	14	·31875
49	..	1	21	·021875	385	3	1	21	·171875	721	6	1	21	·321875
56	..	2	0	·025	392	3	2	0	·175	728	6	2	0	·325
63	..	2	7	·028125	399	3	2	7	·178125	735	6	2	7	·328125
70	..	2	14	·03125	406	3	2	14	·18125	742	6	2	14	·33125
77	..	2	21	·034375	413	3	2	21	·184375	749	6	2	21	·334375
84	..	3	0	·0375	420	3	3	0	·1875	756	6	3	0	·3375
91	..	3	7	·040625	427	3	3	7	·190625	763	6	3	7	·340625
98	..	3	14	·04375	434	3	3	14	·19375	770	6	3	14	·34375
105	..	3	21	·046875	441	3	3	21	·196875	777	6	3	21	·346875
112	1	0	0	·05	448	4	0	0	·2	784	7	0	0	·35
119	1	0	7	·053125	455	4	0	7	·203125	791	7	0	7	·353125
126	1	0	14	·05625	462	4	0	14	·20625	798	7	0	14	·35625
133	1	0	21	·059375	469	4	0	21	·209375	805	7	0	21	·359375
140	1	1	0	·0625	476	4	1	0	·2125	812	7	1	0	·3625
147	1	1	7	·065625	483	4	1	7	·215625	819	7	1	7	·365625
154	1	1	14	·06875	490	4	1	14	·21875	826	7	1	14	·36875
161	1	1	21	·071875	497	4	1	21	·221875	833	7	1	21	·371875
168	1	2	0	·075	504	4	2	0	·225	840	7	2	0	·375
175	1	2	7	·078125	511	4	2	7	·228125	847	7	2	7	·378125
182	1	2	14	·08125	518	4	2	14	·23125	854	7	2	14	·38125
189	1	2	21	·084375	525	4	2	21	·234375	861	7	2	21	·384375
196	1	3	0	·0875	532	4	3	0	·2375	868	7	3	0	·3875
203	1	3	7	·090625	539	4	3	7	·240625	875	7	3	7	·390625
210	1	3	14	·09375	546	4	3	14	·24375	882	7	3	14	·39375
217	1	3	21	·096875	553	4	3	21	·246875	889	7	3	21	·396875
224	2	0	0	·1	560	5	0	0	·25	896	8	0	0	·4
231	2	0	7	·103125	567	5	0	7	·253125	903	8	0	7	·403125
238	2	0	14	·10625	574	5	0	14	·25625	910	8	0	14	·40625
245	2	0	21	·109375	581	5	0	21	·259375	917	8	0	21	·409375
252	2	1	0	·1125	588	5	1	0	·2625	924	8	1	0	·4125
259	2	1	7	·115625	595	5	1	7	·265625	931	8	1	7	·415625
266	2	1	14	·11875	602	5	1	14	·26875	938	8	1	14	·41875
273	2	1	21	·121875	609	5	1	21	·271875	945	8	1	21	·421875
280	2	2	0	·125	616	5	2	0	·275	952	8	2	0	·425
287	2	2	7	·128125	623	5	2	7	·278125	959	8	2	7	·428125
294	2	2	14	·13125	630	5	2	14	·28125	966	8	2	14	·43125
301	2	2	21	·134375	637	5	2	21	·284375	973	8	2	21	·434375
308	2	3	0	·1375	644	5	3	0	·2875	980	8	3	0	·4375
315	2	3	7	·140625	651	5	3	7	·290625	987	8	3	7	·440625
322	2	3	14	·14375	658	5	3	14	·29375	994	8	3	14	·44375
329	2	3	21	·146875	665	5	3	21	·296875	1001	8	3	21	·446875

DORMAN, LONG & CO. LIMITED.

LBS. RISING BY 7, EXPRESSED IN CWTS., QRS. & LBS. AND IN DECIMALS OF A TON.

Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton
1008	9	0	0	·45	1344	12	0	0	·6	1680	15	0	0	·75
1015	9	0	7	·453125	1351	12	0	7	·603125	1687	15	0	7	·753125
1022	9	0	14	·45625	1358	12	0	14	·60625	1694	15	0	14	·75625
1029	9	0	21	·459375	1365	12	0	21	·609375	1701	15	0	21	·759375
1036	9	1	0	·4625	1372	12	1	0	·6125	1708	15	1	0	·7625
1043	9	1	7	·465625	1379	12	1	7	·615625	1715	15	1	7	·765625
1050	9	1	14	·46875	1386	12	1	14	·61875	1722	15	1	14	·76875
1057	9	1	21	·471875	1393	12	1	21	·621875	1729	15	1	21	·771875
1064	9	2	0	·475	1400	12	2	0	·625	1736	15	2	0	·775
1071	9	2	7	·478125	1407	12	2	7	·628125	1743	15	2	7	·778125
1078	9	2	14	·48125	1414	12	2	14	·63125	1750	15	2	14	·78125
1085	9	2	21	·484375	1421	12	2	21	·634375	1757	15	2	21	·784375
1092	9	3	0	·4875	1428	12	3	0	·6375	1764	15	3	0	·7875
1099	9	3	7	·490625	1435	12	3	7	·640625	1771	15	3	7	·790625
1106	9	3	14	·49375	1442	12	3	14	·64375	1778	15	3	14	·79375
1113	9	3	21	·496875	1449	12	3	21	·646875	1785	15	3	21	·796875
1120	10	0	0	·5	1456	13	0	0	·65	1792	16	0	0	·8
1127	10	0	7	·503125	1463	13	0	7	·653125	1799	16	0	7	·803125
1134	10	0	14	·50625	1470	13	0	14	·65625	1806	16	0	14	·80625
1141	10	0	21	·509375	1477	13	0	21	·659375	1813	16	0	21	·809375
1148	10	1	0	·5125	1484	13	1	0	·6625	1820	16	1	0	·8125
1155	10	1	7	·515625	1491	13	1	7	·665625	1827	16	1	7	·815625
1162	10	1	14	·51875	1498	13	1	14	·66875	1834	16	1	14	·81875
1169	10	1	21	·521875	1505	13	1	21	·671875	1841	16	1	21	·821875
1176	10	2	0	·525	1512	13	2	0	·675	1848	16	2	0	·825
1183	10	2	7	·528125	1519	13	2	7	·678125	1855	16	2	7	·828125
1190	10	2	14	·53125	1526	13	2	14	·68125	1862	16	2	14	·83125
1197	10	2	21	·534375	1533	13	2	21	·684375	1869	16	2	21	·834375
1204	10	3	0	·5375	1540	13	3	0	·6875	1876	16	3	0	·8375
1211	10	3	7	·540625	1547	13	3	7	·690625	1883	16	3	7	·840625
1218	10	3	14	·54375	1554	13	3	14	·69375	1890	16	3	14	·84375
1225	10	3	21	·546875	1561	13	3	21	·696875	1897	16	3	21	·846875
1232	11	0	0	·55	1568	14	0	0	·7	1904	17	0	0	·85
1239	11	0	7	·553125	1575	14	0	7	·703125	1911	17	0	7	·853125
1246	11	0	14	·55625	1582	14	0	14	·70625	1918	17	0	14	·85625
1253	11	0	21	·559375	1589	14	0	21	·709375	1925	17	0	21	·859375
1260	11	1	0	·5625	1596	14	1	0	·7125	1932	17	1	0	·8625
1267	11	1	7	·565625	1603	14	1	7	·715625	1939	17	1	7	·865625
1274	11	1	14	·56875	1610	14	1	14	·71875	1946	17	1	14	·86875
1281	11	1	21	·571875	1617	14	1	21	·721875	1953	17	1	21	·871875
1288	11	2	0	·575	1624	14	2	0	·725	1960	17	2	0	·875
1295	11	2	7	·578125	1631	14	2	7	·728125	1967	17	2	7	·878125
1302	11	2	14	·58125	1638	14	2	14	·73125	1974	17	2	14	·88125
1309	11	2	21	·584375	1645	14	2	21	·734375	1981	17	2	21	·884375
1316	11	3	0	·5875	1652	14	3	0	·7375	1988	17	3	0	·8875
1323	11	3	7	·590625	1659	14	3	7	·740625	1995	17	3	7	·890625
1330	11	3	14	·59375	1666	14	3	14	·74375	2002	17	3	14	·89375
1337	11	3	21	·596875	1673	14	3	21	·746875	2009	17	3	21	·896875

DORMAN, LONG & CO. LIMITED.

LBS. RISING BY 7, EXPRESSED IN CWTS., QRS. & LBS. AND IN DECIMALS OF A TON— CONTINUED.

Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton
2016	18	0	0	·9	2100	18	3	0	·9375	2184	19	2	0	·975
2023	18	0	7	·903125	2107	18	3	7	·940625	2191	19	2	7	·978125
2030	18	0	14	·90625	2114	18	3	14	·94375	2198	19	2	14	·98125
2037	18	0	21	·909375	2121	18	3	21	·946875	2205	19	2	21	·984375
2044	18	1	0	·9125	2128	19	0	0	·95	2212	19	3	0	·9875
2051	18	1	7	·915625	2135	19	0	7	·953125	2219	19	3	7	·990625
2058	18	1	14	·91875	2142	19	0	14	·95625	2226	19	3	14	·99375
2065	18	1	21	·921875	2149	19	0	21	·959375	2233	19	3	21	·996875
2072	18	2	0	·925	2156	19	1	0	·9625	2240	20	0	0	1·
2079	18	2	7	·928125	2163	19	1	7	·965625					
2086	18	2	14	·93125	2170	19	1	14	·96875					
2093	18	2	21	·934375	2177	19	1	21	·971875					

CONVERSION TABLE—TONS INTO POUNDS.

Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds
1	2,240	26	58,240	51	114,240	76	170,240
2	4,480	27	60,480	52	116,480	77	172,480
3	6,720	28	62,720	53	118,720	78	174,720
4	8,960	29	64,960	54	120,960	79	176,960
5	11,200	30	67,200	55	123,200	80	179,200
6	13,440	31	69,440	56	125,440	81	181,440
7	15,680	32	71,680	57	127,680	82	183,680
8	17,920	33	73,920	58	129,920	83	185,920
9	20,160	34	76,160	59	132,160	84	188,160
10	22,400	35	78,400	60	134,400	85	190,400
11	24,640	36	80,640	61	136,640	86	192,640
12	26,880	37	82,880	62	138,880	87	194,880
13	29,120	38	85,120	63	141,120	88	197,120
14	31,360	39	87,360	64	143,360	89	199,360
15	33,600	40	89,600	65	145,600	90	201,600
16	35,840	41	91,840	66	147,840	91	203,840
17	38,080	42	94,080	67	150,080	92	206,080
18	40,320	43	96,320	68	152,320	93	208,320
19	42,560	44	98,560	69	154,560	94	210,560
20	44,800	45	100,800	70	156,800	95	212,800
21	47,040	46	103,040	71	159,040	96	215,040
22	49,280	47	105,280	72	161,280	97	217,280
23	51,520	48	107,520	73	163,520	98	219,520
24	53,760	49	109,760	74	165,760	99	221,760
25	56,000	50	112,000	75	168,000	100	224,000

DECIMAL EQUIVALENTS.

EXACT DECIMAL EQUIVALENTS OF FRACTIONS OF AN INCH.

Fractions				Decimals	Fractions				Decimals
1/64	...	...	...	·015625	33/64	...	...	...	·515625
...	1/32	...	...	·03125	...	17/32	...	...	·53125
3/64	...	...	...	·046875	35/64	...	...	...	·546875
...	...	1/16	...	·0625	...	...	9/16	...	·5625
5/64	...	...	...	·078125	37/64	..	...	...	·578125
...	3/32	...	...	·09375	...	19/32	...	...	·59375
7/64	...	...	...	·109375	39/64	...	...	...	·609375
...	...	...	1/8	·125	...	...	...	5/8	·625
9/64	...	...	...	·140625	41/64	..	...	...	·640625
...	5/32	...	...	·15625	...	21/32	...	...	·65625
11/64	...	...	...	·171875	43/64	...	...	...	·671875
...	....	3/16	...	·1875	...	...	11/16	...	·6875
13/64	...	...	...	·203125	45/64	...	...	...	·703125
...	7/32	...	...	·21875	...	23/32	...	...	·71875
15/64	...	...	...	·234375	47/64	...	...	...	·734375
...	...	...	1/4	·25	....	...	...	3/4	·75
17/64	...	...	...	·265625	49/64	...	...	...	·765625
...	9/32	...	...	·28125	...	25/32	...	...	·78125
19/64	...	...	...	·296875	51/64	...	...	...	·796875
...	...	5/16	...	·3125	...	...	13/16	...	·8125
21/64	...	...	...	·328125	53/64	...	...	...	·828125
...	11/32	...	...	·34375	...	27/32	...	...	·84375
23/64	...	...	...	·359375	55/64	...	...	...	·859375
...	...	...	3/8	·375	...	...	...	7/8	·875
25/64	..	...	...	·390625	57/64	...	...	...	·890625
...	13/32	...	...	·40625	...	29/32	...	...	·90625
27/64	...	...	...	·421875	59/64	...	...	...	·921875
...	...	7/16	...	·4375	...	...	15/16	...	·9375
29/64	...	...	...	·453125	61/64	...	...	...	·953125
...	15/32	..	..	·46875	...	31/32	...	...	·96875
31/64	...	...	...	·484375	63/64	..	...	...	·984375
...	...	...	1/2	·5	...	...	...	1	1·00

DORMAN, LONG & CO. LIMITED.

DECIMALS OF A FOOT FOR EACH 1/64TH OF AN INCH.

Inch	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	10″	11″
… … … 0	0	·0833	·1667	·2500	·3333	·4167	·5000	·5833	·6667	·7500	·8333	·9167
1/64 … … …	·0013	·0846	·1680	·2513	·3346	·4180	·5013	·5846	·6680	·7513	·8346	·9180
… 1/32 … …	·0026	·0859	·1693	·2526	·3359	·4193	·5026	·5859	·6693	·7526	·8359	·9193
3/64 … … …	·0039	·0872	·1706	·2539	·3372	·4206	·5039	·5872	·6706	·7539	·8372	·9206
… … 1/16 …	·0052	·0885	·1719	·2552	·3385	·4219	·5052	·5885	·6719	·7552	·8385	·9219
5/64 … … …	·0065	·0898	·1732	·2565	·3398	·4232	·5065	·5898	·6732	·7565	·8398	·9232
… 3/32 … …	·0078	·0911	·1745	·2578	·3411	·4245	·5078	·5911	·6745	·7578	·8411	·9245
7/64 … … …	·0091	·0924	·1758	·2591	·3424	·4258	·5091	·5924	·6758	·7591	·8424	·9258
… … … 1/8	·0104	·0937	·1771	·2604	·3437	·4271	·5104	·5937	·6771	·7604	·8437	·9271
9/64 … … …	·0117	·0951	·1784	·2617	·3451	·4284	·5117	·5951	·6784	·7617	·8451	·9284
… 5/32 … …	·0130	·0964	·1797	·2630	·3464	·4297	·5130	·5964	·6797	·7630	·8464	·9297
11/64 … … …	·0143	·0977	·1810	·2643	·3477	·4310	·5143	·5977	·6810	·7643	·8477	·9310
… … 3/16 …	·0156	·0990	·1823	·2656	·3490	·4323	·5156	·5990	·6823	·7656	·8490	·9323
13/64 … … …	·0169	·1003	·1836	·2669	·3503	·4336	·5169	·6003	·6836	·7669	·8503	·9336
… 7/32 … ..	·0182	·1016	·1849	·2682	·3516	·4349	·5182	·6016	·6849	·7682	·8516	·9349
15/64 … … …	·0195	·1029	·1862	·2695	·3529	·4362	·5195	·6029	·6862	·7695	·8529	·9362
… … … 1/4	·0208	·1042	·1875	·2708	·3542	·4375	·5208	·6042	·6875	·7708	·8542	·9375
17/64 … … …	·0221	·1055	·1888	·2721	·3555	·4388	·5221	·6055	·6888	·7721	·8555	·9388
… 9/32 … …	·0234	·1068	·1901	·2734	·3568	·4401	·5234	·6068	·6901	·7734	·8568	·9401
19/64 … … …	·0247	·1081	·1914	·2747	·3581	·4414	·5247	·6081	·6914	·7747	·8581	·9414
… … 5/16 …	·0260	·1094	·1927	·2760	·3594	·4427	·5260	·6094	·6927	·7760	·8594	·9427
21/64 … … …	·0273	·1107	·1940	·2773	·3607	·4440	·5273	·6107	·6940	·7773	·8607	·9440
… 11/32 … …	·0286	·1120	·1953	·2786	·3620	·4453	·5286	·6120	·6953	·7786	·8620	·9453
23/64 … … …	·0299	·1133	·1966	·2799	·3633	·4466	·5299	·6133	·6966	·7799	·8633	·9466
… … … 3/8	·0312	·1146	·1979	·2812	·3646	·4479	·5312	·6146	·6979	·7812	·8646	·9479
25/64 … … …	0326	·1159	·1992	·2826	·3659	·4492	·5326	·6159	·6992	·7826	·8659	·9492
… 13/32 … …	·0339	·1172	·2005	·2839	·3672	·4505	·5339	·6172	·7005	·7839	·8672	·9505
27/64 … … …	·0352	·1185	·2018	·2852	·3685	·4518	·5352	·6185	·7018	·7852	·8685	·9518
… … 7/16 …	·0365	·1198	·2031	·2865	·3698	·4531	·5365	·6198	·7031	·7865	·8698	·9531
29/64 … … …	·0378	·1211	·2044	·2878	·3711	·4544	·5378	·6211	·7044	·7878	·8711	·9544
… 15/32 … …	·0391	·1224	·2057	·2891	·3724	·4557	·5391	·6224	·7057	·7891	·8724	·9557
31/64 … … …	·0404	·1237	·2070	·2904	·3737	·4570	·5404	·6237	·7070	·7904	·8737	·9570
… … … 1/2	·0417	·1250	·2083	·2917	·3750	·4583	·5417	·6250	·7083	·7917	·8750	·9583

DORMAN, LONG & CO. LIMITED.

DECIMALS OF A FOOT FOR EACH $\frac{1}{64}$TH OF AN INCH.

Inch	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	10″	11″
$\frac{2}{64}$	·0430	·1263	·2096	·2930	·3763	·4596	·5430	·6263	·7096	·7930	·8763	·9596
$\frac{17}{32}$	·0443	·1276	·2109	·2943	·3776	·4609	·5443	·6276	·7109	·7943	·8776	·9609
$\frac{5}{64}$	·0456	·1289	·2122	·2956	·3789	·4622	·5456	·6289	·7122	·7956	·8789	·9622
$\frac{9}{16}$	·0469	·1302	·2135	·2969	·3802	·4635	·5469	·6302	·7135	·7969	·8802	·9635
$\frac{7}{64}$	·0482	·1315	·2148	·2982	·3815	·4648	·5482	·6315	·7148	·7982	·8815	·9648
$\frac{19}{32}$	·0495	·1328	·2161	·2995	·3828	·4661	·5495	·6328	·7161	·7995	·8828	·9661
$\frac{9}{64}$	·0508	·1341	·2174	·3008	·3841	·4674	·5508	·6341	·7174	·8008	·8841	·9674
$\frac{5}{8}$	·0521	·1354	·2188	·3021	·3854	·4688	·5521	·6354	·7188	·8021	·8854	·9688
$\frac{11}{64}$	·0534	·1367	·2201	·3034	·3867	·4701	·5534	·6367	·7201	·8034	·8867	·9701
$\frac{21}{32}$	·0547	·1380	·2214	·3047	·3880	·4714	·5547	·6380	·7214	·8047	·8880	·9714
$\frac{13}{64}$	·0560	·1393	·2227	·3060	·3893	·4727	·5560	·6393	·7227	·8060	·8893	·9727
$\frac{11}{16}$	·0573	·1406	·2240	·3073	·3906	·4740	·5573	·6406	·7240	·8073	·8906	·9740
$\frac{15}{64}$	·0586	·1419	·2253	·3086	·3919	·4753	·5586	·6419	·7253	·8086	·8919	·9753
$\frac{23}{32}$	·0599	·1432	·2266	·3099	·3932	·4766	·5599	·6432	·7266	·8099	·8932	·9766
$\frac{17}{64}$	·0612	·1445	·2279	·3112	·3945	·4779	·5612	·6445	·7279	·8112	·8945	·9779
$\frac{3}{4}$	·0625	·1458	·2292	·3125	·3958	·4792	·5625	·6458	·7292	·8125	·8958	·9792
$\frac{19}{64}$	·0638	·1471	·2305	·3138	·3971	·4805	·5638	·6471	·7305	·8138	·8971	·9805
$\frac{25}{32}$	·0651	·1484	·2318	·3151	·3984	·4818	·5651	·6484	·7318	·8151	·8984	·9818
$\frac{21}{64}$	·0664	·1497	·2331	·3164	·3997	·4831	·5664	·6497	·7331	·8164	·8997	·9831
$\frac{13}{16}$	·0677	·1510	·2344	·3177	·4010	·4844	·5677	·6510	·7344	·8177	·9010	·9844
$\frac{23}{64}$	·0690	·1523	·2357	·3190	·4023	·4857	·5690	·6523	·7357	·8190	·9023	·9857
$\frac{27}{32}$	·0703	·1536	·2370	·3203	·4036	·4870	·5703	·6536	·7370	·8203	·9036	·9870
$\frac{25}{64}$	·0716	·1549	·2383	·3216	·4049	·4883	·5716	·6549	·7383	·8216	·9049	·9883
$\frac{7}{8}$	·0729	·1562	·2396	·3229	·4062	·4896	·5729	·6562	·7396	·8229	·9062	·9896
$\frac{27}{64}$	·0742	·1576	·2409	·3242	·4076	·4909	·5742	·6576	·7409	·8242	·9076	·9909
$\frac{29}{32}$	·0755	·1589	·2422	·3255	·4089	·4922	·5755	·6589	·7422	·8255	·9089	·9922
$\frac{29}{64}$	·0768	·1602	·2435	·3268	·4102	·4935	·5768	·6602	·7435	·8268	·9102	·9935
$\frac{15}{16}$	·0781	·1615	·2448	·3281	·4115	·4948	·5781	·6615	·7448	·8281	·9115	·9948
$\frac{31}{64}$	·0794	·1628	·2461	·3294	·4128	·4961	·5794	·6628	·7461	·8294	·9128	·9961
$\frac{31}{32}$	·0807	·1641	·2474	·3307	·4141	·4974	·5807	·6641	·7474	·8307	·9141	·9974
$\frac{33}{64}$	·0820	·1654	·2487	·3320	·4154	·4987	·5820	·6654	·7487	·8320	·9154	·9987
1	..	..	..	..	..	..	..	..	..	..	..	1·0000

DORMAN, LONG & CO. LIMITED.

AREAS OF CIRCLES ADVANCING BY EIGHTHS.

Diameter	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
0	..	·012	·049	·110	·196	·307	·442	·601
1	·785	·994	1·227	1·485	1·767	2·074	2·405	2·761
2	3·142	3·547	3·976	4·430	4·909	5·412	5·940	6·492
3	7·069	7·670	8·296	8·946	9·621	10·321	11·045	11·793
4	12·566	13·364	14·186	15·033	15·904	16·800	17·721	18·665
5	19·635	20·629	21·648	22·691	23·758	24·850	25·967	27·109
6	28·274	29·465	30·680	31·919	33·183	34·472	35·785	37·122
7	38·485	39·871	41·282	42·718	44·179	45·664	47·173	48·707
8	50·265	51·849	53·456	55·088	56·745	58·426	60·132	61·862
9	63·617	65·397	67·201	69·029	70·882	72·760	74·662	76·589
10	78·540	80·516	82·516	84·541	86·590	88·664	90·763	92·886
11	95·033	97·205	99·402	101·62	103·87	106·14	108·43	110·75
12	113·10	115·47	117·86	120·28	122·72	125·19	127·68	130·19
13	132·73	135·30	137·89	140·50	143·14	145·80	148·49	151·20
14	153·94	156·70	159·48	162·30	165·13	167·99	170·87	173·78
15	176·71	179·67	182·65	185·66	188·69	191·75	194·83	197·93
16	201·06	204·22	207·39	210·60	213·82	217·08	220·35	223·65
17	226·98	230·33	233·71	237·10	240·53	243·98	247·45	250·95
18	254·47	258·02	261·59	265·18	268·80	272·45	276·12	279·81
19	283·53	287·27	291·04	294·83	298·65	302·49	306·35	310·24
20	314·16	318·10	322·06	326·05	330·06	334·10	338·16	342·25
21	346·36	350·50	354·66	358·84	363·05	367·28	371·54	375·83
22	380·13	384·46	388·82	393·20	397·61	402·04	406·49	410·97
23	415·48	420·00	424·56	429·13	433·74	438·36	443·01	447·69
24	452·39	457·11	461·86	466·64	471·44	476·26	481·11	485·98
25	490·87	495·79	500·74	505·71	510·71	515·72	520·77	525·84
26	530·93	536·05	541·19	546·35	551·55	556·76	562·00	567·27
27	572·56	577·87	583·21	588·57	593·96	599·37	604·81	610·27
28	615·75	621·26	626·80	632·36	637·94	643·55	649·18	654·84
29	660·52	666·23	671·96	677·71	683·49	689·30	695·13	700·98
30	706·86	712·76	718·69	724·64	730·62	736·62	742·64	748·69
31	754·77	760·87	766·99	773·14	779·31	785·51	791·73	797·98
32	804·25	810·54	816·86	823·21	829·58	835·97	842·39	848·83
33	855·30	861·79	868·31	874·85	881·41	888·00	894·62	901·26
34	907·92	914·61	921·32	928·06	934·82	941·61	948·42	955·25
35	962·11	969·00	975·91	982·84	989·80	996·78	1003·8	1010·8
36	1017·9	1025·0	1032·1	1039·2	1046·3	1053·5	1060·7	1068·0
37	1075·2	1082·5	1089·8	1097·1	1104·5	1111·8	1119·2	1126·7
38	1134·1	1141·6	1149·1	1156·6	1164·2	1171·7	1179·3	1186·9
39	1194·6	1202·3	1210·0	1217·7	1225·4	1233·2	1241·0	1248·8
40	1256·6	1264·5	1272·4	1280·3	1288·2	1296·2	1304·2	1312·2
41	1320·3	1328·3	1336·4	1344·5	1352·7	1360·8	1369·0	1377·2
42	1385·4	1393·7	1402·0	1410·3	1418·6	1427·0	1435·4	1443·8
43	1452·2	1460·7	1469·1	1477·6	1486·2	1494·7	1503·3	1511·9
44	1520·5	1529·2	1537·9	1546·6	1555·3	1564·0	1572·8	1581·6
45	1590·4	1599·3	1608·2	1617·0	1626·0	1634·9	1643·9	1652·9
46	1661·9	1670·9	1680·0	1689·1	1698·2	1707·4	1716·5	1725·7
47	1734·9	1744·2	1753·5	1762·7	1772·1	1781·4	1790·8	1800·1
48	1809·6	1819·0	1828·5	1837·9	1847·5	1857·0	1866·5	1876·1
49	1885·7	1895·4	1905·0	1914·7	1924·4	1934·2	1943·9	1953·7
50	1963·5	1973·3	1983·2	1993·1	2003·0	2012·9	2022·8	2032·8

DORMAN, LONG & CO. LIMITED.

AREAS OF CIRCLES ADVANCING BY EIGHTHS.

Diameter	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
51	2042·8	2052·8	2062·9	2073·0	2083·1	2093·2	2103·3	2113·5
52	2123·7	2133·9	2144·2	2154·5	2164·8	2175·1	2185·4	2195·8
53	2206·2	2216·6	2227·0	2237·5	2248·0	2258·5	2269·1	2279·6
54	2290·2	2300·8	2311·5	2322·1	2332·8	2343·5	2354·3	2365·0
55	2375·8	2386·6	2397·5	2408·3	2419·2	2430·1	2441·1	2452·0
56	2463·0	2474·0	2485·0	2496·1	2507·2	2518·3	2529·4	2540·6
57	2551·8	2563·0	2574·2	2585·4	2596·7	2608·0	2619·4	2630·7
58	2642·1	2653·5	2664·9	2676·4	2687·8	2699·3	2710·9	2722·4
59	2734·0	2745·6	2757·2	2768·8	2780·5	2792·2	2803·9	2815·7
60	2827·4	2839·2	2851·0	2862·9	2874·8	2886·6	2898·6	2910·5
61	2922·5	2934·5	2946·5	2958·5	2970·6	2982·7	2994·8	3006·9
62	3019·1	3031·3	3043·5	3055·7	3068·0	3080·3	3092·6	3104·9
63	3117·2	3129·6	3142·0	3154·5	3166·9	3179·4	3191·9	3204·4
64	3217·0	3229·6	3242·2	3254·8	3267·5	3280·1	3292·8	3305·6
65	3318·3	3331·1	3343·9	3356·7	3369·6	3382·4	3395·3	3408·2
66	3421·2	3434·2	3447·2	3460·2	3473·2	3486·3	3499·4	3512·5
67	3525·7	3538·8	3552·0	3565·2	3578·5	3591·7	3605·0	3618·3
68	3631·7	3645·0	3658·4	3671·8	3685·3	3698·7	3712·2	3725·7
69	3739·3	3752·8	3766·4	3780·0	3793·7	3807·3	3821·0	3834·7
70	3848·5	3862·2	3876·0	3889·8	3903·6	3917·5	3931·4	3945·3
71	3959·2	3973·1	3987·1	4001·1	4015·2	4029·2	4043·3	4057·4
72	4071·5	4085·7	4099·8	4114·0	4128·2	4142·5	4156·8	4171·1
73	4185·4	4199·7	4214·1	4228·5	4242·9	4257·4	4271·8	4286·3
74	4300·8	4315·4	4329·9	4344·5	4359·2	4373·8	4388·5	4403·2
75	4417·9	4432·6	4447·4	4462·2	4477·0	4491·8	4506·7	4521·5
76	4536·5	4551·4	4566·4	4581·3	4596·3	4611·4	4626·4	4641·5
77	4656·6	4671·8	4686·9	4702·1	4717·3	4732·5	4747·8	4763·1
78	4778·4	4793·7	4809·0	4824·4	4839·8	4855·2	4870·7	4886·2
79	4901·7	4917·2	4932·7	4948·3	4963·9	4979·5	4995·2	5010·9
80	5026·5	5042·3	5058·0	5073·8	5089·6	5105·4	5121·2	5137·1
81	5153·0	5168·9	5184·9	5200·8	5216·8	5232·8	5248·9	5264·9
82	5281·0	5297·1	5313·3	5329·4	5345·6	5361·8	5378·1	5394·3
83	5410·6	5426·9	5443·3	5459·6	5476·0	5492·4	5508·8	5525·3
84	5541·8	5558·3	5574·8	5591·4	5607·9	5624·5	5641·2	5657·8
85	5674·5	5691·2	5707·9	5724·7	5741·5	5758·3	5775·1	5791·9
86	5808·8	5825·7	5842·6	5859·6	5876·5	5893·5	5910·6	5927·6
87	5944·7	5961·8	5978·9	5996·0	6013·2	6030·4	6047·6	6064·9
88	6082·1	6099·4	6116·7	6134·1	6151·4	6168·8	6186·2	6203·7
89	6221·1	6238·6	6256·1	6273·7	6291·2	6308·8	6326·4	6344·1
90	6361·7	6379·4	6397·1	6414·9	6432·6	6450·4	6468·2	6486·0
91	6503·9	6521·8	6539·7	6557·6	6575·5	6593·5	6611·5	6629·6
92	6647·6	6665·7	6683·8	6701·9	6720·1	6738·2	6756·4	6774·7
93	6792·9	6811·2	6829·5	6847·8	6866·1	6884·5	6902·9	6921·3
94	6939·8	6958·2	6976·7	6995·3	7013·8	7032·4	7051·0	7069·6
95	7088·2	7106·9	7125·6	7144·3	7163·0	7181·8	7200·6	7219·4
96	7238·2	7257·1	7276·0	7294·9	7313·8	7332·8	7351·8	7370·8
97	7389·8	7408·9	7428·0	7447·1	7466·2	7485·3	7504·5	7523·7
98	7543·0	7562·2	7581·5	7600·8	7620·1	7639·5	7658·9	7678·3
99	7697·7	7717·1	7736·6	7756·1	7775·6	7795·2	7814·8	7834·4
100	7854·0	7873·6	7893·3	7913·0	7932·7	7952·5	7972·2	7992·0

DORMAN, LONG & CO. LIMITED.

CIRCUMFERENCES OF CIRCLES ADVANCING BY EIGHTHS.

Diameter	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
0	..	·393	·785	1·178	1·571	1·963	2·356	2·749
1	3·142	3·534	3·927	4·320	4·712	5·105	5·498	5·890
2	6·283	6·676	7·069	7·461	7·854	8·247	8·639	9·032
3	9·425	9·817	10·210	10·603	10·996	11·388	11·781	12·174
4	12·566	12·959	13·352	13·744	14·137	14·530	14·923	15·315
5	15·708	16·101	16·493	16·886	17·279	17·671	18·064	18·457
6	18·850	19·242	19·635	20·028	20·420	20·813	21·206	21·598
7	21·991	22·384	22·777	23·169	23·562	23·955	24·347	24·740
8	25·133	25·525	25·918	26·311	26·704	27·096	27·489	27·882
9	28·274	28·667	29·060	29·452	29·845	30·238	30·631	31·023
10	31·416	31·809	32·201	32·594	32·987	33·379	33·772	34·165
11	34·558	34·950	35·343	35·736	36·128	36·521	36·914	37·306
12	37·699	38·092	38·485	38·877	39·270	39·663	40·055	40·448
13	40·841	41·233	41·626	42·019	42·412	42·804	43·197	43·590
14	43·982	44·375	44·768	45·160	45·553	45·946	46·338	46·731
15	47·124	47·517	47·909	48·302	48·695	49·087	49·480	49·873
16	50·265	50·658	51·051	51·444	51·836	52·229	52·622	53·014
17	53·407	53·800	54·192	54·585	54·978	55·371	55·763	56·156
18	56·549	56·941	57·334	57·727	58·119	58·512	58·905	59·298
19	59·690	60·083	60·476	60·868	61·261	61·654	62·046	62·439
20	62·832	63·225	63·617	64·010	64·403	64·795	65·188	65·581
21	65·973	66·366	66·759	67·152	67·544	67·937	68·330	68·722
22	69·115	69·508	69·900	70·293	70·686	71·079	71·471	71·864
23	72·257	72·649	73·042	73·435	73·827	74·220	74·613	75·006
24	75·398	75·791	76·184	76·576	76·969	77·362	77·754	78·147
25	78·540	78·933	79·325	79·718	80·111	80·503	80·896	81·289
26	81·681	82·074	82·467	82·860	83·252	83·645	84·038	84·430
27	84·823	85·216	85·608	86·001	86·394	86·786	87·179	87·572
28	87·965	88·357	88·750	89·143	89·535	89·928	90·321	90·713
29	91·106	91·499	91·892	92·284	92·677	93·070	93·462	93·855
30	94·248	94·640	95·033	95·426	95·819	96·211	96·604	96·997
31	97·389	97·782	98·175	98·567	98·960	99·353	99·746	100·14
32	100·53	100·92	101·32	101·71	102·10	102·49	102·89	103·28
33	103·67	104·07	104·46	104·85	105·24	105·64	106·03	106·42
34	106·81	107·21	107·60	107·99	108·38	108·78	109·17	109·56
35	109·96	110·35	110·74	111·13	111·53	111·92	112·31	112·70
36	113·10	113·49	113·88	114·28	114·67	115·06	115·45	115·85
37	116·24	116·63	117·02	117·42	117·81	118·20	118·60	118·99
38	119·38	119·77	120·17	120·56	120·95	121·34	121·74	122·13
39	122·52	122·91	123·31	123·70	124·09	124·49	124·88	125·27
40	125·66	126·06	126·45	126·84	127·23	127·63	128·02	128·41
41	128·81	129·20	129·59	129·98	130·38	130·77	131·16	131·55
42	131·95	132·34	132·73	133·12	133·52	133·91	134·30	134·70
43	135·09	135·48	135·87	136·27	136·66	137·05	137·44	137·84
44	138·23	138·62	139·02	139·41	139·80	140·19	140·59	140·98
45	141·37	141·76	142·16	142·55	142·94	143·34	143·73	144·12
46	144·51	144·91	145·30	145·69	146·08	146·48	146·87	147·26
47	147·65	148·05	148·44	148·83	149·23	149·62	150·01	150·40
48	150·80	151·19	151·58	151·97	152·37	152·76	153·15	153·55
49	153·94	154·33	154·72	155·12	155·51	155·90	156·29	156·69
50	157·08	157·47	157·86	158·26	158·65	159·04	159·44	159·83

DORMAN, LONG & CO. LIMITED.

CIRCUMFERENCES OF CIRCLES ADVANCING BY EIGHTHS.

Diameter	0	⅛	¼	⅜	½	⅝	¾	⅞
51	160·22	160·61	161·01	161·40	161·79	162·18	162·58	162·97
52	163·36	163·76	164·15	164·54	164·93	165·33	165·72	166·11
53	166·50	166·90	167·29	167·68	168·08	168·47	168·86	169·25
54	169·65	170·04	170·43	170·82	171·22	171·61	172·00	172·39
55	172·79	173·18	173·57	173·97	174·36	174·75	175·14	175·54
56	175·93	176·32	176·71	177·11	177·50	177·89	178·29	178·68
57	179·07	179·46	179·86	180·25	180·64	181·03	181·43	181·82
58	182·21	182·61	183·00	183·39	183·78	184·18	184·57	184·96
59	185·35	185·75	186·14	186·53	186·92	187·32	187·71	188·10
60	188·50	188·89	189·28	189·67	190·07	190·46	190·85	191·24
61	191·64	192·03	192·42	192·82	193·21	193·60	193·99	194·39
62	194·78	195·17	195·56	195·96	196·35	196·74	197·13	197·53
63	197·92	198·31	198·71	199·10	199·49	199·88	200·28	200·67
64	201·06	201·45	201·85	202·24	202·63	203·03	203·42	203·81
65	204·20	204·60	204·99	205·38	205·77	206·17	206·56	206·95
66	207·35	207·74	208·13	208·52	208·92	209·31	209·70	210·09
67	210·49	210·88	211·27	211·66	212·06	212·45	212·84	213·24
68	213·63	214·02	214·41	214·81	215·20	215·59	215·98	216·38
69	216·77	217·16	217·56	217·95	218·34	218·73	219·13	219·52
70	219·91	220·30	220·70	221·09	221·48	221·87	222·27	222·66
71	223·05	223·45	223·84	224·23	224·62	225·02	225·41	225·80
72	226·19	226·59	226·98	227·37	227·77	228·16	228·55	228·94
73	229·34	229·73	230·12	230·51	230·91	231·30	231·69	232·09
74	232·48	232·87	233·26	233·66	234·05	234·44	234·83	235·23
75	235·62	236·01	236·40	236·80	237·19	237·58	237·98	238·37
76	238·76	239·15	239·55	239·94	240·33	240·72	241·12	241·51
77	241·90	242·30	242·69	243·08	243·47	243·87	244·26	244·65
78	245·04	245·44	245·83	246·22	246·62	247·01	247·40	247·79
79	248·19	248·58	248·97	249·36	249·76	250·15	250·54	250·93
80	251·33	251·72	252·11	252·51	252·90	253·29	253·68	254·08
81	254·47	254·86	255·25	255·65	256·04	256·43	256·83	257·22
82	257·61	258·00	258·40	258·79	259·18	259·57	259·97	260·36
83	260·75	261·14	261·54	261·93	262·32	262·72	263·11	263·50
84	263·89	264·29	264·68	265·07	265·46	265·86	266·25	266·64
85	267·04	267·43	267·82	268·21	268·61	269·00	269·39	269·78
86	270·18	270·57	270·96	271·36	271·75	272·14	272·53	272·93
87	273·32	273·71	274·10	274·50	274·89	275·28	275·67	276·07
88	276·46	276·85	277·25	277·64	278·03	278·42	278·82	279·21
89	279·60	279·99	280·39	280·78	281·17	281·57	281·96	282·35
90	282·74	283·14	283·53	283·92	284·31	284·71	285·10	285·49
91	285·88	286·28	286·67	287·06	287·46	287·85	288·24	288·63
92	289·03	289·42	289·81	290·20	290·60	290·99	291·38	291·78
93	292·17	292·56	292·95	293·35	293·74	294·13	294·52	294·92
94	295·31	295·70	296·10	296·49	296·88	297·27	297·67	298·06
95	298·45	298·84	299·24	299·63	300·02	300·41	300·81	301·20
96	301·59	301·99	302·38	302·77	303·16	303·56	303·95	304·34
97	304·73	305·13	305·52	305·91	306·31	306·70	307·09	307·48
98	307·88	308·27	308·66	309·05	309·45	309·84	310·23	310·62
99	311·02	311·41	311·80	312·20	312·59	312·98	313·37	313·77
100	314·16	314·55	314·94	315·34	315·73	316·12	316·52	316·91

DORMAN, LONG & CO. LIMITED.

SQUARES OF NUMBERS AND FRACTIONAL PARTS.

No.	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
0	..	·0156	·0625	·1406	·2500	·3906	·5625	·7656
1	1	1·2656	1·5625	1·8906	2·2500	2·6406	3·0625	3·5156
2	4	4·5156	5·0625	5·6406	6·2500	6·8906	7·5625	8·2656
3	9	9·7656	10·5625	11·3906	12·2500	13·1406	14·0625	15·0156
4	16	17·0156	18·0625	19·1406	20·2500	21·3906	22·5625	23·7656
5	25	26·2656	27·5625	28·8906	30·2500	31·6406	33·0625	34·5156
6	36	37·5156	39·0625	40·6406	42·2500	43·8906	45·5625	47·2656
7	49	50·7656	52·5625	54·3906	56·2500	58·1406	60·0625	62·0156
8	64	66·0156	68·0625	70·1406	72·2500	74·3906	76·5625	78·7656
9	81	83·2656	85·5625	87·8906	90·2500	92·6406	95·0625	97·5156
10	100	102·5156	105·0625	107·6406	110·2500	112·8906	115·5625	118·2656
11	121	123·7656	126·5625	129·3906	132·2500	135·1406	138·0625	141·0156
12	144	147·0156	150·0625	153·1406	156·2500	159·3906	162·5625	165·7656
13	169	172·2656	175·5625	178·8906	182·2500	185·6406	189·0625	192·5156
14	196	199·5156	203·0625	206·6406	210·2500	213·8906	217·5625	221·2656
15	225	228·7656	232·5625	236·3906	240·2500	244·1406	248·0625	252·0156
16	256	260·0156	264·0625	268·1406	272·2500	276·3906	280·5625	284·7656
17	289	293·2656	297·5625	301·8906	306·2500	310·6406	315·0625	319·5156
18	324	328·5156	333·0625	337·6406	342·2500	346·8906	351·5625	356·2656
19	361	365·7656	370·5625	375·3906	380·2500	385·1406	390·0625	395·0156
20	400	405·0156	410·0625	415·1406	420·2500	425·3906	430·5625	435·7656
21	441	446·2656	451·5625	456·8906	462·2500	467·6406	473·0625	478·5156
22	484	489·5156	495·0625	500·6406	506·2500	511·8906	517·5625	523·2656
23	529	534·7656	540·5625	546·3906	552·2500	558·1406	564·0625	570·0156
24	576	582·0156	588·0625	594·1406	600·2500	606·3906	612·5625	618·7656
25	625	631·2656	637·5625	643·8906	650·2500	656·6406	663·0625	669·5156
26	676	682·5156	689·0625	695·6406	702·2500	708·8906	715·5625	722·2656
27	729	735·7656	742·5625	749·3906	756·2500	763·1406	770·0625	777·0156
28	784	791·0156	798·0625	805·1406	812·2500	819·3906	826·5625	833·7656
29	841	848·2656	855·5625	862·8906	870·2500	877·6406	885·0625	892·5156
30	900	907·5156	915·0625	922·6406	930·2500	937·8906	945·5625	953·2656

SQUARES OF NUMBERS AND FRACTIONAL PARTS.

No.	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
31	961	968·7656	976·5625	984·3906	992·2500	1000·1406	1008·0625	1016·0156
32	1024	1032·0156	1040·0625	1048·1406	1056·2500	1064·3906	1072·5625	1080·7656
33	1089	1097·2656	1105·5625	1113·8906	1122·2500	1130·6406	1139·0625	1147·5156
34	1156	1164·5156	1173·0625	1181·6406	1190·2500	1198·8906	1207·5625	1216·2656
35	1225	1233·7656	1242·5625	1251·3906	1260·2500	1269·1406	1278·0625	1287·0156
36	1296	1305·0156	1314·0625	1323·1406	1332·2500	1341·3906	1350·5625	1359·7656
37	1369	1378·2656	1387·5625	1396·8906	1406·2500	1415·6406	1425·0625	1434·5156
38	1444	1453·5156	1463·0625	1472·6406	1482·2500	1491·8906	1501·5625	1511·2656
39	1521	1530·7656	1540·5625	1550·3906	1560·2500	1570·1406	1580·0625	1590·0156
40	1600	1610·0156	1620·0625	1630·1406	1640·2500	1650·3906	1660·5625	1670·7656
41	1681	1691·2656	1701·5625	1711·8906	1722·2500	1732·6406	1743·0625	1753·5156
42	1764	1774·5156	1785·0625	1795·6406	1806·2500	1816·8906	1827·5625	1838·2656
43	1849	1859·7656	1870·5625	1881·3906	1892·2500	1903·1406	1914·0625	1925·0156
44	1936	1947·0156	1958·0625	1969·1406	1980·2500	1991·3906	2002·5625	2013·7656
45	2025	2036·2656	2047·5625	2058·8906	2070·2500	2081·6406	2093·0625	2104·5156
46	2116	2127·5156	2139·0625	2150·6406	2162·2500	2173·8906	2185·5625	2197·2656
47	2209	2220·7656	2232·5625	2244·3906	2256·2500	2268·1406	2280·0625	2292·0156
48	2304	2316·0156	2328·0625	2340·1406	2352·2500	2364·3906	2376·5625	2388·7656
49	2401	2413·2656	2425·5625	2437·8906	2450·2500	2462·6406	2475·0625	2487·5156
50	2500	2512·5156	2525·0625	2537·6406	2550·2500	2562·8906	2575·5625	2588·2656
51	2601	2613·7656	2626·5625	2639·3906	2652·2500	2665·1406	2678·0625	2691·0156
52	2704	2717·0156	2730·0625	2743·1406	2756·2500	2769·3906	2782·5625	2795·7656
53	2809	2822·2656	2835·5625	2848·8906	2862·2500	2875·6406	2889·0625	2902·5156
54	2916	2929·5156	2943·0625	2956·6406	2970·2500	2983·8906	2997·5625	3011·2656
55	3025	3038·7656	3052·5625	3066·3906	3080·2500	3094·1406	3108·0625	3122·0156
56	3136	3150·0156	3164·0625	3178·1406	3192·2500	3206·3906	3220·5625	3234·7656
57	3249	3263·2656	3277·5625	3291·8906	3306·2500	3320·6406	3335·0625	3349·5156
58	3364	3378·5156	3393·0625	3407·6406	3422·2500	3436·8906	3451·5625	3466·2656
59	3481	3495·7656	3510·5625	3525·3906	3540·2500	3555·1406	3570·0625	3585·0156
60	3600	3615·0156	3630·0625	3645·1406	3660·2500	3675·3906	3690·5625	3705·7656

DORMAN, LONG & CO. LIMITED.

CUBES OF NUMBERS AND FRACTIONAL PARTS.

No.	0	⅛	¼	⅜	½	⅝	¾	⅞
0	..	·002	·016	·053	·125	·244	·422	·670
1	1	1·424	1·953	2·600	3·375	4·291	5·359	6·592
2	8	9·596	11·391	13·396	15·625	18·088	20·797	23·764
3	27	30·518	34·328	38·443	42·875	47·635	52·734	58·186
4	64	70·189	76·766	83·740	91·125	98·932	107·172	115·857
5	125	134·611	144·703	155·287	166·375	177·979	190·109	202·779
6	216	229·783	244·141	259·084	274·625	290·775	307·547	324·951
7	343	361·705	381·078	401·131	421·875	443·322	465·484	488·373
8	512	536·377	561·516	587·428	614·125	641·619	669·922	699·045
9	729	759·799	791·453	823·975	857·375	891·666	926·859	962·967
10	1000	1037·971	1076·891	1116·771	1157·625	1199·463	1242·297	1286·139
11	1331	1376·893	1423·828	1471·818	1520·875	1571·010	1622·234	1674·561
12	1728	1782·564	1838·266	1895·115	1953·125	2012·307	2072·672	2134·232
13	2197	2260·986	2326·203	2392·662	2460·375	2529·354	2599·609	2671·154
14	2744	2818·158	2893·641	2970·459	3048·625	3128·150	3209·047	3291·326
15	3375	3460·080	3546·578	3634·506	3723·875	3814·697	3906·984	4000·748
16	4096	4192·752	4291·016	4390·803	4492·125	4594·994	4699·422	4805·420
17	4913	5022·174	5132·953	5245·350	5359·375	5475·041	5592·359	5711·342
18	5832	5954·346	6078·391	6204·146	6331·625	6460·838	6591·797	6724·514
19	6859	6995·268	7133·328	7273·193	7414·875	7558·385	7703·734	7850·936
20	8000	8150·939	8303·766	8458·490	8615·125	8773·682	8934·172	9096·607
21	9261	9427·361	9595·703	9766·037	9938·375	10112·729	10289·109	10467·529
22	10648	10830·533	11015·141	11201·834	11390·625	11581·525	11774·547	11969·701
23	12167	12366·455	12568·078	12771·881	12977·875	13186·072	13396·484	13609·123
24	13824	14041·127	14260·516	14482·178	14706·125	14932·369	15160·922	15391·795
25	15625	15860·549	16098·453	16338·725	16581·375	16826·416	17073·859	17323·717
26	17576	17830·721	18087·891	18347·521	18609·625	18874·213	19141·297	19410·889
27	19683	19957·643	20234·828	20514·568	20796·875	21081·760	21369·234	21659·311
28	21952	22247·315	22545·266	22845·865	23149·125	23455·057	23763·672	24074·982
29	24389	24705·736	25025·203	25347·412	25672·375	26000·104	26330·609	26663·904
30	27000	27338·908	27680·641	28025·209	28372·625	28722·900	29076·047	29432·076

CUBES OF NUMBERS AND FRACTIONAL PARTS.

No.	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
31	29791	30152·83	30517·58	30885·26	31255·87	31629·45	32005·98	32385·50
32	32768	33153·50	33542·02	33933·55	34328·12	34725·74	35126·42	35530·17
33	35937	36346·92	36759·95	37176·10	37595·37	38017·79	38443·36	38872·09
34	39304	39739·10	40177·39	40618·90	41063·62	41511·59	41962·80	42417·26
35	42875	43336·02	43800·33	44267·94	44738·87	45213·13	45690·73	46171·69
36	46656	47143·69	47634·77	48129·24	48627·12	49128·43	49633·17	50141·36
37	50653	51168·11	51686·70	52208·79	52734·37	53263·48	53796·11	54332·28
38	54872	55415·28	55962·14	56512·58	57066·62	57624·28	58185·55	58750·45
39	59319	59891·21	60467·08	61046·63	61629·87	62216·82	62807·48	63401·87
40	64000	64601·88	65207·52	65816·93	66430·12	67047·12	67667·92	68292·54
41	68921	69553·30	70189·45	70829·47	71473·37	72121·17	72772·86	73428·47
42	74088	74751·47	75418·89	76090·27	76765·62	77444·96	78128·30	78815·64
43	79507	80202·39	80901·83	81605·32	82312·87	83024·51	83740·23	84460·06
44	85184	85912·06	86644·27	87380·62	88121·12	88865·81	89614·67	90367·73
45	91125	91886·49	92652·20	93422·16	94196·37	94974·85	95757·61	96544·65
46	97336	98131·66	98931·64	99735·96	100544·62	101357·65	102175·05	102996·83
47	103823	104653·58	105488·58	106328·01	107171·87	108020·20	108872·98	109730·25
48	110592	111458·25	112329·02	113204·30	114084·12	114968·49	115857·42	116750·92
49	117649	118551·67	119458·95	120370·85	121287·37	122208·54	123134·36	124064·84
50	125000	125939·85	126884·39	127833·65	128787·62	129746·34	130709·80	131678·01
51	132651	133628·77	134611·33	135598·69	136590·87	137587·88	138589·73	139596·44
52	140608	141624·44	142645·77	143671·99	144703·12	145739·18	146780·17	147826·11
53	148877	149932·86	150993·70	152059·54	153130·37	154206·23	155287·11	156373·03
54	157464	158560·03	159661·14	160767·33	161878·62	162995·03	164116·55	165243·20
55	166375	167511·96	168654·08	169801·38	170953·87	172111·57	173274·48	174442·62
56	175616	176794·63	177978·52	179167·68	180362·12	181561·87	182766·92	183977·29
57	185193	186414·05	187640·45	188872·22	190109·37	191351·92	192599·86	193853·22
58	195112	196376·22	197645·89	198921·02	200201·62	201487·71	202779·30	204076·39
59	205379	206687·14	208000·83	209320·07	210644·87	211975·26	213311·23	214652·81
60	216000	217352·81	218711·27	220075·37	221445·12	222820·56	224201·67	225588·48

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
					50	2500	125000	7·0711	3·6840
1	1	1	1·0000	1·0000	51	2601	132651	7·1414	3·7084
2	4	8	1·4142	1·2599	52	2704	140608	7·2111	3·7325
3	9	27	1·7321	1·4422	53	2809	148877	7·2801	3·7563
4	16	64	2·0000	1·5874	54	2916	157464	7·3485	3·7798
5	25	125	2·2361	1·7100	55	3025	166375	7·4162	3·8030
6	36	216	2·4495	1·8171	56	3136	175616	7·4833	3·8259
7	49	343	2·6458	1·9129	57	3249	185193	7·5498	3·8485
8	64	512	2·8284	2·0000	58	3364	195112	7·6158	3·8709
9	81	729	3·0000	2·0801	59	3481	205379	7·6811	3·8930
10	100	1000	3·1623	2·1544	60	3600	216000	7·7460	3·9149
11	121	1331	3·3166	2·2240	61	3721	226981	7·8102	3·9365
12	144	1728	3·4641	2·2894	62	3844	238328	7·8740	3·9579
13	169	2197	3·6056	2·3513	63	3969	250047	7·9373	3·9791
14	196	2744	3·7417	2·4101	64	4096	262144	8·0000	4·0000
15	225	3375	3·8730	2·4662	65	4225	274625	8·0623	4·0207
16	256	4096	4·0000	2·5198	66	4356	287496	8·1240	4·0412
17	289	4913	4·1231	2·5713	67	4489	300763	8·1854	4·0615
18	324	5832	4·2426	2·6207	68	4624	314432	8·2462	4·0817
19	361	6859	4·3589	2·6684	69	4761	328509	8·3066	4·1016
20	400	8000	4·4721	2·7144	70	4900	343000	8·3666	4·1213
21	441	9261	4·5826	2·7589	71	5041	357911	8·4261	4·1408
22	484	10648	4·6904	2·8020	72	5184	373248	8·4853	4·1602
23	529	12167	4·7958	2·8439	73	5329	389017	8·5440	4·1793
24	576	13824	4·8990	2·8845	74	5476	405224	8·6023	4·1983
25	625	15625	5·0000	2·9240	75	5625	421875	8·6603	4·2172
26	676	17576	5·0990	2·9625	76	5776	438976	8·7178	4·2358
27	729	19683	5·1962	3·0000	77	5929	456533	8·7750	4·2543
28	784	21952	5·2915	3·0366	78	6084	474552	8·8318	4·2727
29	841	24389	5·3852	3·0723	79	6241	493039	8·8882	4·2908
30	900	27000	5·4772	3·1072	80	6400	512000	8·9443	4·3089
31	961	29791	5·5678	3·1414	81	6561	531441	9·0000	4·3267
32	1024	32768	5·6569	3·1748	82	6724	551368	9·0554	4·3445
33	1089	35937	5·7446	3·2075	83	6889	571787	9·1104	4·3621
34	1156	39304	5·8310	3·2396	84	7056	592704	9·1652	4·3795
35	1225	42875	5·9161	3·2711	85	7225	614125	9·2195	4·3968
36	1296	46656	6·0000	3·3019	86	7396	636056	9·2736	4·4140
37	1369	50653	6·0828	3·3322	87	7569	658503	9·3274	4·4310
38	1444	54872	6·1644	3·3620	88	7744	681472	9·3808	4·4480
39	1521	59319	6·2450	3·3912	89	7921	704969	9·4340	4·4647
40	1600	64000	6·3246	3·4200	90	8100	729000	9·4868	4·4814
41	1681	68921	6·4031	3·4482	91	8281	753571	9·5394	4·4979
42	1764	74088	6·4807	3·4760	92	8464	778688	9·5917	4·5144
43	1849	79507	6·5574	3·5034	93	8649	804357	9·6437	4·5307
44	1936	85184	6·6332	3·5303	94	8836	830584	9·6954	4·5468
45	2025	91125	6·7082	3·5569	95	9025	857375	9·7468	4·5629
46	2116	97336	6·7823	3·5830	96	9216	884736	9·7980	4·5789
47	2209	103823	6·8557	3·6088	97	9409	912673	9·8489	4·5947
48	2304	110592	6·9282	3·6342	98	9604	941192	9·8995	4·6104
49	2401	117649	7·0000	3·6593	99	9801	970299	9·9499	4·6261

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
100	10000	1000000	10·0000	4·6416	150	22500	3375000	12·2474	5·3133
101	10201	1030301	10·0499	4·6570	151	22801	3442951	12·2882	5·3251
102	10404	1061208	10·0995	4·6723	152	23104	3511808	12·3288	5·3368
103	10609	1092727	10·1489	4·6875	153	23409	3581577	12·3693	5·3485
104	10816	1124864	10·1980	4·7027	154	23716	3652264	12·4097	5·3601
105	11025	1157625	10·2470	4·7177	155	24025	3723875	12·4499	5·3717
106	11236	1191016	10·2956	4·7326	156	24336	3796416	12·4900	5·3832
107	11449	1225043	10·3441	4·7475	157	24649	3869893	12·5300	5·3947
108	11664	1259712	10·3923	4·7622	158	24964	3944312	12·5698	5·4061
109	11881	1295029	10·4403	4·7769	159	25281	4019679	12·6095	5·4175
110	12100	1331000	10·4881	4·7914	160	25600	4096000	12·6491	5·4288
111	12321	1367631	10·5357	4·8059	161	25921	4173281	12·6886	5·4401
112	12544	1404928	10·5830	4·8203	162	26244	4251528	12·7279	5·4514
113	12769	1442897	10·6301	4·8346	163	26569	4330747	12·7671	5·4626
114	12996	1481544	10·6771	4·8488	164	26896	4410944	12·8062	5·4737
115	13225	1520875	10·7238	4·8629	165	27225	4492125	12·8452	5·4848
116	13456	1560896	10·7703	4·8770	166	27556	4574296	12·8841	5·4959
117	13689	1601613	10·8167	4·8910	167	27889	4657463	12·9228	5·5069
118	13924	1643032	10·8628	4·9049	168	28224	4741632	12·9615	5·5178
119	14161	1685159	10·9087	4·9187	169	28561	4826809	13·0000	5·5288
120	14400	1728000	10·9545	4·9324	170	28900	4913000	13·0384	5·5397
121	14641	1771561	11·0000	4·9461	171	29241	5000211	13·0767	5·5505
122	14884	1815848	11·0454	4·9597	172	29584	5088448	13·1149	5·5613
123	15129	1860867	11·0905	4·9732	173	29929	5177717	13·1529	5·5721
124	15376	1906624	11·1355	4·9866	174	30276	5268024	13·1909	5·5828
125	15625	1953125	11·1803	5·0000	175	30625	5359375	13·2288	5·5934
126	15876	2000376	11·2250	5·0133	176	30976	5451776	13·2665	5·6041
127	16129	2048383	11·2694	5·0265	177	31329	5545233	13·3041	5·6147
128	16384	2097152	11·3137	5·0397	178	31684	5639752	13·3417	5·6252
129	16641	2146689	11·3578	5·0528	179	32041	5735339	13·3791	5·6357
130	16900	2197000	11·4018	5·0658	180	32400	5832000	13·4164	5·6462
131	17161	2248091	11·4455	5·0788	181	32761	5929741	13·4536	5·6567
132	17424	2299968	11·4891	5·0916	182	33124	6028568	13·4907	5·6671
133	17689	2352637	11·5326	5·1045	183	33489	6128487	13·5277	5·6774
134	17956	2406104	11·5758	5·1172	184	33856	6229504	13·5647	5·6877
135	18225	2460375	11·6190	5·1299	185	34225	6331625	13·6015	5·6980
136	18496	2515456	11·6619	5·1426	186	34596	6434856	13·6382	5·7083
137	18769	2571353	11·7047	5·1551	187	34969	6539203	13·6748	5·7185
138	19044	2628072	11·7473	5·1676	188	35344	6644672	13·7113	5·7287
139	19321	2685619	11·7898	5·1801	189	35721	6751269	13·7477	5·7388
140	19600	2744000	11·8322	5·1925	190	36100	6859000	13·7840	5·7489
141	19881	2803221	11·8743	5·2048	191	36481	6967871	13·8203	5·7590
142	20164	2863288	11·9164	5·2171	192	36864	7077888	13·8564	5·7690
143	20449	2924207	11·9583	5·2293	193	37249	7189057	13·8924	5·7790
144	20736	2985984	12·0000	5·2415	194	37636	7301384	13·9284	5·7890
145	21025	3048625	12·0416	5·2536	195	38025	7414875	13·9642	5·7989
146	21316	3112136	12·0830	5·2656	196	38416	7529536	14·0000	5·8088
147	21609	3176523	12·1244	5·2776	197	38809	7645373	14·0357	5·8186
148	21904	3241792	12·1655	5·2896	198	39204	7762392	14·0712	5·8285
149	22201	3307949	12·2066	5·3015	199	39601	7880599	14·1067	5·8383

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
200	40000	8000000	14·1421	5·8480	250	62500	15625000	15·8114	6·2996
201	40401	8120601	14·1774	5·8578	251	63001	15813251	15·8430	6·3080
202	40804	8242408	14·2127	5·8675	252	63504	16003008	15·8745	6·3164
203	41209	8365427	14·2478	5·8771	253	64009	16194277	15·9060	6·3247
204	41616	8489664	14·2829	5·8868	254	64516	16387064	15·9374	6·3330
205	42025	8615125	14·3178	5·8964	255	65025	16581375	15·9687	6·3413
206	42436	8741816	14·3527	5·9059	256	65536	16777216	16·0000	6·3496
207	42849	8869743	14·3875	5·9155	257	66049	16974593	16·0312	6·3579
208	43264	8998912	14·4222	5·9250	258	66564	17173512	16·0624	6·3661
209	43681	9129329	14·4568	5·9345	259	67081	17373979	16·0935	6·3743
210	44100	9261000	14·4914	5·9439	260	67600	17576000	16·1245	6·3825
211	44521	9393931	14·5258	5·9533	261	68121	17779581	16·1555	6·3907
212	44944	9528128	14·5602	5·9627	262	68644	17984728	16·1864	6·3988
213	45369	9663597	14·5945	5·9721	263	69169	18191447	16·2173	6·4070
214	45796	9800344	14·6287	5·9814	264	69696	18399744	16·2481	6·4151
215	46225	9938375	14·6629	5·9907	265	70225	18609625	16·2788	6·4232
216	46656	10077696	14·6969	6·0000	266	70756	18821096	16·3095	6·4312
217	47089	10218313	14·7309	6·0092	267	71289	19034163	16·3401	6·4393
218	47524	10360232	14·7648	6·0185	268	71824	19248832	16·3707	6·4473
219	47961	10503459	14·7986	6·0277	269	72361	19465109	16·4012	6·4553
220	48400	10648000	14·8324	6·0368	270	72900	19683000	16·4317	6·4633
221	48841	10793861	14·8661	6·0459	271	73441	19902511	16·4621	6·4713
222	49284	10941048	14·8997	6·0550	272	73984	20123648	16·4924	6·4792
223	49729	11089567	14·9332	6·0641	273	74529	20346417	16·5227	6·4872
224	50176	11239424	14·9666	6·0732	274	75076	20570824	16·5529	6·4951
225	50625	11390625	15·0000	6·0822	275	75625	20796875	16·5831	6·5030
226	51076	11543176	15·0333	6·0912	276	76176	21024576	16·6132	6·5108
227	51529	11697083	15·0665	6·1002	277	76729	21253933	16·6433	6·5187
228	51984	11852352	15·0997	6·1091	278	77284	21484952	16·6733	6·5265
229	52441	12008989	15·1327	6·1180	279	77841	21717639	16·7033	6·5343
230	52900	12167000	15·1658	6·1269	280	78400	21952000	16·7332	6·5421
231	53361	12326391	15·1987	6·1358	281	78961	22188041	16·7631	6·5499
232	53824	12487168	15·2315	6·1446	282	79524	22425768	16·7929	6·5577
233	54289	12649337	15·2643	6·1534	283	80089	22665187	16·8226	6·5654
234	54756	12812904	15·2971	6·1622	284	80656	22906304	16·8523	6·5731
235	55225	12977875	15·3297	6·1710	285	81225	23149125	16·8819	6·5808
236	55696	13144256	15·3623	6·1797	286	81796	23393656	16·9115	6·5885
237	56169	13312053	15·3948	6·1885	287	82369	23639903	16·9411	6·5962
238	56644	13481272	15·4272	6·1972	288	82944	23887872	16·9706	6·6039
239	57121	13651919	15·4596	6·2058	289	83521	24137569	17·0000	6·6115
240	57600	13824000	15·4919	6·2145	290	84100	24389000	17·0294	6·6191
241	58081	13997521	15·5242	6·2231	291	84681	24642171	17·0587	6·6267
242	58564	14172488	15·5563	6·2317	292	85264	24897088	17·0880	6·6343
243	59049	14348907	15·5885	6·2403	293	85849	25153757	17·1172	6·6419
244	59536	14526784	15·6205	6·2488	294	86436	25412184	17·1464	6·6494
245	60025	14706125	15·6525	6·2573	295	87025	25672375	17·1756	6·6569
246	60516	14886936	15·6844	6·2658	296	87616	25934336	17·2047	6·6644
247	61009	15069223	15·7162	6·2743	297	88209	26198073	17·2337	6·6719
248	61504	15252992	15·7480	6·2828	298	88804	26463592	17·2627	6·6794
249	62001	15438249	15·7797	6·2912	299	89401	26730899	17·2916	6·6869

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
300	90000	27000000	17·3205	6·6943	350	122500	42875000	18·7083	7·0473
301	90601	27270901	17·3494	6·7018	351	123201	43243551	18·7350	7·0540
302	91204	27543608	17·3781	6·7092	352	123904	43614208	18·7617	7·0607
303	91809	27818127	17·4069	6·7166	353	124609	43986977	18·7883	7·0674
304	92416	28094464	17·4356	6·7240	354	125316	44361864	18·8149	7·0740
305	93025	28372625	17·4642	6·7313	355	126025	44738875	18·8414	7·0807
306	93636	28652616	17·4929	6·7387	356	126736	45118016	18·8680	7·0873
307	94249	28934443	17·5214	6·7460	357	127449	45499293	18·8944	7·0940
308	94864	29218112	17·5499	6·7533	358	128164	45882712	18·9209	7·1006
309	95481	29503629	17·5784	6·7606	359	128881	46268279	18·9473	7·1072
310	96100	29791000	17·6068	6·7679	360	129600	46656000	18·9737	7·1138
311	96721	30080231	17·6352	6·7752	361	130321	47045881	19·0000	7·1204
312	97344	30371328	17·6635	6·7824	362	131044	47437928	19·0263	7·1269
313	97969	30664297	17·6918	6·7897	363	131769	47832147	19·0526	7·1335
314	98596	30959144	17·7200	6·7969	364	132496	48228544	19·0788	7·1400
315	99225	31255875	17·7482	6·8041	365	133225	48627125	19·1050	7·1466
316	99856	31554496	17·7764	6·8113	366	133956	49027896	19·1311	7·1531
317	100489	31855013	17·8045	6·8185	367	134689	49430863	19·1572	7·1596
318	101124	32157432	17·8326	6·8256	368	135424	49836032	19·1833	7·1661
319	101761	32461759	17·8606	6·8328	369	136161	50243409	19·2094	7·1726
320	102400	32768000	17·8885	6·8399	370	136900	50653000	19·2354	7·1791
321	103041	33076161	17·9165	6·8470	371	137641	51064811	19·2614	7·1855
322	103684	33386248	17·9444	6·8541	372	138384	51478848	19·2873	7·1920
323	104329	33698267	17·9722	6·8612	373	139129	51895117	19·3132	7·1984
324	104976	34012224	18·0000	6·8683	374	139876	52313624	19·3391	7·2048
325	105625	34328125	18·0278	6·8753	375	140625	52734375	19·3649	7·2112
326	106276	34645976	18·0555	6·8824	376	141376	53157376	19·3907	7·2177
327	106929	34965783	18·0831	6·8894	377	142129	53582633	19·4165	7·2240
328	107584	35287552	18·1108	6·8964	378	142884	54010152	19·4422	7·2304
329	108241	35611289	18·1384	6·9034	379	143641	54439939	19·4679	7·2368
330	108900	35937000	18·1659	6·9104	380	144400	54872000	19·4936	7·2432
331	109561	36264691	18·1934	6·9174	381	145161	55306341	19·5192	7·2495
332	110224	36594368	18·2209	6·9244	382	145924	55742968	19·5448	7·2558
333	110889	36926037	18·2483	6·9313	383	146689	56181887	19·5704	7·2622
334	111556	37259704	18·2757	6·9382	384	147456	56623104	19·5959	7·2685
335	112225	37595375	18·3030	6·9451	385	148225	57066625	19·6214	7·2748
336	112896	37933056	18·3303	6·9521	386	148996	57512456	19·6469	7·2811
337	113569	38272753	18·3576	6·9589	387	149769	57960603	19·6723	7·2874
338	114244	38614472	18·3848	6·9658	388	150544	58411072	19·6977	7·2936
339	114921	38958219	18·4120	6·9727	389	151321	58863869	19·7231	7·2999
340	115600	39304000	18·4391	6·9795	390	152100	59319000	19·7484	7·3061
341	116281	39651821	18·4662	6·9864	391	152881	59776471	19·7737	7·3124
342	116964	40001688	18·4932	6·9932	392	153664	60236288	19·7990	7·3186
343	117649	40353607	18·5203	7·0000	393	154449	60698457	19·8242	7·3248
344	118336	40707584	18·5472	7·0068	394	155236	61162984	19·8494	7·3310
345	119025	41063625	18·5742	7·0136	395	156025	61629875	19·8746	7·3372
346	119716	41421736	18·6011	7·0203	396	156816	62099136	19·8997	7·3434
347	120409	41781923	18·6279	7·0271	397	157609	62570773	19·9249	7·3496
348	121104	42144192	18·6548	7·0338	398	158404	63044792	19·9499	7·3558
349	121801	42508549	18·6815	7·0406	399	159201	63521199	19·9750	7·3619

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
400	160000	64000000	20·0000	7·3681	450	202500	91125000	21·2132	7·6631
401	160801	64481201	20·0250	7·3742	451	203401	91733851	21·2368	7·6688
402	161604	64964808	20·0499	7·3803	452	204304	92345408	21·2603	7·6744
403	162409	65450827	20·0749	7·3864	453	205209	92959677	21·2838	7·6801
404	163216	65939264	20·0998	7·3925	454	206116	93576664	21·3073	7·6857
405	164025	66430125	20·1246	7·3986	455	207025	94196375	21·3307	7·6914
406	164836	66923416	20·1494	7·4047	456	207936	94818816	21·3542	7·6970
407	165649	67419143	20·1742	7·4108	457	208849	95443993	21·3776	7·7026
408	166464	67917312	20·1990	7·4169	458	209764	96071912	21·4009	7·7082
409	167281	68417929	20·2237	7·4229	459	210681	96702579	21·4243	7·7138
410	168100	68921000	20·2485	7·4290	460	211600	97336000	21·4476	7·7194
411	168921	69426531	20·2731	7·4350	461	212521	97972181	21·4709	7·7250
412	169744	69934528	20·2978	7·4410	462	213444	98611128	21·4942	7·7306
413	170569	70444997	20·3224	7·4470	463	214369	99252847	21·5174	7·7362
414	171396	70957944	20·3470	7·4530	464	215296	99897344	21·5407	7·7418
415	172225	71473375	20·3715	7·4590	465	216225	100544625	21·5639	7·7473
416	173056	71991296	20·3961	7·4650	466	217156	101194696	21·5870	7·7529
417	173889	72511713	20·4206	7·4710	467	218089	101847563	21·6102	7·7584
418	174724	73034632	20·4450	7·4770	468	219024	102503232	21·6333	7·7639
419	175561	73560059	20·4695	7·4829	469	219961	103161709	21·6564	7·7695
420	176400	74088000	20·4939	7·4889	470	220900	103823000	21·6795	7·7750
421	177241	74618461	20·5183	7·4948	471	221841	104487111	21·7025	7·7805
422	178084	75151448	20·5426	7·5007	472	222784	105154048	21·7256	7·7860
423	178929	75686967	20·5670	7·5067	473	223729	105823817	21·7486	7·7915
424	179776	76225024	20·5913	7·5126	474	224676	106496424	21·7715	7·7970
425	180625	76765625	20·6155	7·5185	475	225625	107171875	21·7945	7·8025
426	181476	77308776	20·6398	7·5244	476	226576	107850176	21·8174	7·8079
427	182329	77854483	20·6640	7·5302	477	227529	108531333	21·8403	7·8134
428	183184	78402752	20·6882	7·5361	478	228484	109215352	21·8632	7·8188
429	184041	78953589	20·7123	7·5420	479	229441	109902239	21·8861	7·8243
430	184900	79507000	20·7364	7·5478	480	230400	110592000	21·9089	7·8297
431	185761	80062991	20·7605	7·5537	481	231361	111284641	21·9317	7·8352
432	186624	80621568	20·7846	7·5595	482	232324	111980168	21·9545	7·8406
433	187489	81182737	20·8087	7·5654	483	233289	112678587	21·9773	7·8460
434	188356	81746504	20·8327	7·5712	484	234256	113379904	22·0000	7·8514
435	189225	82312875	20·8567	7·5770	485	235225	114084125	22·0227	7·8568
436	190096	82881856	20·8806	7·5828	486	236196	114791256	22·0454	7·8622
437	190969	83453453	20·9045	7·5886	487	237169	115501303	22·0681	7·8676
438	191844	84027672	20·9284	7·5944	488	238144	116214272	22·0907	7·8730
439	192721	84604519	20·9523	7·6001	489	239121	116930169	22·1133	7·8784
440	193600	85184000	20·9762	7·6059	490	240100	117649000	22·1359	7·8837
441	194481	85766121	21·0000	7·6117	491	241081	118370771	22·1585	7·8891
442	195364	86350888	21·0238	7·6174	492	242064	119095488	22·1811	7·8944
443	196249	86938307	21·0476	7·6232	493	243049	119823157	22·2036	7·8998
444	197136	87528384	21·0713	7·6289	494	244036	120553784	22·2261	7·9051
445	198025	88121125	21·0950	7·6346	495	245025	121287375	22·2486	7·9105
446	198916	88716536	21·1187	7·6403	496	246016	122023936	22·2711	7·9158
447	199809	89314623	21·1424	7·6460	497	247009	122763473	22·2935	7·9211
448	200704	89915392	21·1660	7·6517	498	248004	123505992	22·3159	7·9264
449	201601	90518849	21·1896	7·6574	499	249001	124251499	22·3383	7·9317

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
500	250000	125000000	22·3607	7·9370	550	302500	166375000	23·4521	8·1932
501	251001	125751501	22·3830	7·9423	551	303601	167284151	23·4734	8·1982
502	252004	126506008	22·4054	7·9476	552	304704	168196608	23·4947	8·2031
503	253009	127263527	22·4277	7·9528	553	305809	169112377	23·5160	8·2081
504	254016	128024064	22·4499	7·9581	554	306916	170031464	23·5372	8·2130
505	255025	128787625	22·4722	7·9634	555	308025	170953875	23·5584	8·2180
506	256036	129554216	22·4944	7·9686	556	309136	171879616	23·5797	8·2229
507	257049	130323843	22·5167	7·9739	557	310249	172808693	23·6008	8·2278
508	258064	131096512	22·5389	7·9791	558	311364	173741112	23·6220	8·2327
509	259081	131872229	22·5610	7·9843	559	312481	174676879	23·6432	8·2377
510	260100	132651000	22·5832	7·9896	560	313600	175616000	23·6643	8·2426
511	261121	133432831	22·6053	7·9948	561	314721	176558481	23·6854	8·2475
512	262144	134217728	22·6274	8·0000	562	315844	177504328	23·7065	8·2524
513	263169	135005697	22·6495	8·0052	563	316969	178453547	23·7276	8·2573
514	264196	135796744	22·6716	8·0104	564	318096	179406144	23·7487	8·2621
515	265225	136590875	22·6936	8·0156	565	319225	180362125	23·7697	8·2670
516	266256	137388096	22·7156	8·0208	566	320356	181321496	23·7908	8·2719
517	267289	138188413	22·7376	8·0260	567	321489	182284263	23·8118	8·2768
518	268324	138991832	22·7596	8·0311	568	322624	183250432	23·8328	8·2816
519	269361	139798359	22·7816	8·0363	569	323761	184220009	23·8537	8·2865
520	270400	140608000	22·8035	8·0415	570	324900	185193000	23·8747	8·2913
521	271441	141420761	22·8254	8·0466	571	326041	186169411	23·8956	8·2962
522	272484	142236648	22·8473	8·0517	572	327184	187149248	23·9165	8·3010
523	273529	143055667	22·8692	8·0569	573	328329	188132517	23·9374	8·3059
524	274576	143877824	22·8910	8·0620	574	329476	189119224	23·9583	8·3107
525	275625	144703125	22·9129	8·0671	575	330625	190109375	23·9792	8·3155
526	276676	145531576	22·9347	8·0723	576	331776	191102976	24·0000	8·3203
527	277729	146363183	22·9565	8·0774	577	332929	192100033	24·0208	8·3251
528	278784	147197952	22·9783	8·0825	578	334084	193100552	24·0416	8·3300
529	279841	148035889	23·0000	8·0876	579	335241	194104539	24·0624	8·3348
530	280900	148877000	23·0217	8·0927	580	336400	195112000	24·0832	8·3396
531	281961	149721291	23·0434	8·0978	581	337561	196122941	24·1039	8·3443
532	283024	150568768	23·0651	8·1028	582	338724	197137368	24·1247	8·3491
533	284089	151419437	23·0868	8·1079	583	339889	198155287	24·1454	8·3539
534	285156	152273304	23·1084	8·1130	584	341056	199176704	24·1661	8·3587
535	286225	153130375	23·1301	8·1180	585	342225	200201625	24·1868	8·3634
536	287296	153990656	23·1517	8·1231	586	343396	201230056	24·2074	8·3682
537	288369	154854153	23·1733	8·1281	587	344569	202262003	24·2281	8·3730
538	289444	155720872	23·1948	8·1332	588	345744	203297472	24·2487	8·3777
539	290521	156590819	23·2164	8·1382	589	346921	204336469	24·2693	8·3825
540	291600	157464000	23·2379	8·1433	590	348100	205379000	24·2899	8·3872
541	292681	158340421	23·2594	8·1483	591	349281	206425071	24·3105	8·3919
542	293764	159220088	23·2809	8·1533	592	350464	207474688	24·3311	8·3967
543	294849	160103007	23·3024	8·1583	593	351649	208527857	24·3516	8·4014
544	295936	160989184	23·3238	8·1633	594	352836	209584584	24·3721	8·4061
545	297025	161878625	23·3452	8·1683	595	354025	210644875	24·3926	8·4108
546	298116	162771336	23·3666	8·1733	596	355216	211708736	24·4131	8·4155
547	299209	163667323	23·3880	8·1783	597	356409	212776173	24·4336	8·4202
548	300304	164566592	23·4094	8·1833	598	357604	213847192	24·4540	8·4249
549	301401	165469149	23·4307	8·1882	599	358801	214921799	24·4745	8·4296

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
600	360000	216000000	24·4949	8·4343	650	422500	274625000	25·4951	8·6624
601	361201	217081801	24·5153	8·4390	651	423801	275894451	25·5147	8·6668
602	362404	218167208	24·5357	8·4437	652	425104	277167808	25·5343	8·6713
603	363609	219256227	24·5561	8·4484	653	426409	278445077	25·5539	8·6757
604	364816	220348864	24·5764	8·4530	654	427716	279726264	25·5734	8·6801
605	366025	221445125	24·5967	8·4577	655	429025	281011375	25·5930	8·6845
606	367236	222545016	24·6171	8·4623	656	430336	282300416	25·6125	8·6890
607	368449	223648543	24·6374	8·4670	657	431649	283593393	25·6320	8·6934
608	369664	224755712	24·6577	8·4716	658	432964	284890312	25·6515	8·6978
609	370881	225866529	24·6779	8·4763	659	434281	286191179	25·6710	8·7022
610	372100	226981000	24·6982	8·4809	660	435600	287496000	25·6905	8·7066
611	373321	228099131	24·7184	8·4856	661	436921	288804781	25·7099	8·7110
612	374544	229220928	24·7386	8·4902	662	438244	290117528	25·7294	8·7154
613	375769	230346397	24·7588	8·4948	663	439569	291434247	25·7488	8·7198
614	376996	231475544	24·7790	8·4994	664	440896	292754944	25·7682	8·7241
615	378225	232608375	24·7992	8·5040	665	442225	294079625	25·7876	8·7285
616	379456	233744896	24·8193	8·5086	666	443556	295408296	25·8070	8·7329
617	380689	234885113	24·8395	8·5132	667	444889	296740963	25·8263	8·7373
618	381924	236029032	24·8596	8·5178	668	446224	298077632	25·8457	8·7416
619	383161	237176659	24·8797	8·5224	669	447561	299418309	25·8650	8·7460
620	384400	238328000	24·8998	8·5270	670	448900	300763000	25·8844	8·7503
621	385641	239483061	24·9199	8·5316	671	450241	302111711	25·9037	8·7547
622	386884	240641848	24·9399	8·5362	672	451584	303464448	25·9230	8·7590
623	388129	241804367	24·9600	8·5408	673	452929	304821217	25·9422	8·7634
624	389376	242970624	24·9800	8·5453	674	454276	306182024	25·9615	8·7677
625	390625	244140625	25·0000	8·5499	675	455625	307546875	25·9808	8·7721
626	391876	245314376	25·0200	8·5544	676	456976	308915776	26·0000	8·7764
627	393129	246491883	25·0400	8·5590	677	458329	310288733	26·0192	8·7807
628	394384	247673152	25·0599	8·5635	678	459684	311665752	26·0384	8·7850
629	395641	248858189	25·0799	8·5681	679	461041	313046839	26·0576	8·7893
630	396900	250047000	25·0998	8·5726	680	462400	314432000	26·0768	8·7937
631	398161	251239591	25·1197	8·5772	681	463761	315821241	26·0960	8·7980
632	399424	252435968	25·1396	8·5817	682	465124	317214568	26·1151	8·8023
633	400689	253636137	25·1595	8·5862	683	466489	318611987	26·1343	8·8066
634	401956	254840104	25·1794	8·5907	684	467856	320013504	26·1534	8·8109
635	403225	256047875	25·1992	8·5952	685	469225	321419125	26·1725	8·8152
636	404496	257259456	25·2190	8·5997	686	470596	322828856	26·1916	8·8194
637	405769	258474853	25·2389	8·6043	687	471969	324242703	26·2107	8·8237
638	407044	259694072	25·2587	8·6088	688	473344	325660672	26·2298	8·8280
639	408321	260917119	25·2784	8·6132	689	474721	327082769	26·2488	8·8323
640	409600	262144000	25·2982	8·6177	690	476100	328509000	26·2679	8·8366
641	410881	263374721	25·3180	8·6222	691	477481	329939371	26·2869	8·8408
642	412164	264609288	25·3377	8·6267	692	478864	331373888	26·3059	8·8451
643	413449	265847707	25·3574	8·6312	693	480249	332812557	26·3249	8·8493
644	414736	267089984	25·3772	8·6357	694	481636	334255384	26·3439	8·8536
645	416025	268336125	25·3969	8·6401	695	483025	335702375	26·3629	8·8578
646	417316	269586136	25·4165	8·6446	696	484416	337153536	26·3818	8·8621
647	418609	270840023	25·4362	8·6490	697	485809	338608873	26·4008	8·8663
648	419904	272097792	25·4558	8·6535	698	487204	340068392	26·4197	8·8706
649	421201	273359449	25·4755	8·6579	699	488601	341532099	26·4386	8·8748

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
700	490000	343000000	26·4575	8·8790	750	562500	421875000	27·3861	9·0856
701	491401	344472101	26·4764	8·8833	751	564001	423564751	27·4044	9·0896
702	492804	345948408	26·4953	8·8875	752	565504	425259008	27·4226	9·0937
703	494209	347428927	26·5141	8·8917	753	567009	426957777	27·4408	9·0977
704	495616	348913664	26·5330	8·8959	754	568516	428661064	27·4591	9·1017
705	497025	350402625	26·5518	8·9001	755	570025	430368875	27·4773	9·1057
706	498436	351895816	26·5707	8·9043	756	571536	432081216	27·4955	9·1098
707	499849	353393243	26·5895	8·9085	757	573049	433798093	27·5136	9·1138
708	501264	354894912	26·6083	8·9127	758	574564	435519512	27·5318	9·1178
709	502681	356400829	26·6271	8·9169	759	576081	437245479	27·5500	9·1218
710	504100	357911000	26·6458	8·9211	760	577600	438976000	27·5681	9·1258
711	505521	359425431	26·6646	8·9253	761	579121	440711081	27·5862	9·1298
712	506944	360944128	26·6833	8·9295	762	580644	442450728	27·6043	9·1338
713	508369	362467097	26·7021	8·9337	763	582169	444194947	27·6225	9·1378
714	509796	363994344	26·7208	8·9378	764	583696	445943744	27·6405	9·1418
715	511225	365525875	26·7395	8·9420	765	585225	447697125	27·6586	9·1458
716	512656	367061696	26·7582	8·9462	766	586756	449455096	27·6767	9·1498
717	514089	368601813	26·7769	8·9503	767	588289	451217663	27·6948	9·1537
718	515524	370146232	26·7955	8·9545	768	589824	452984832	27·7128	9·1577
719	516961	371694959	26·8142	8·9587	769	591361	454756609	27·7308	9·1617
720	518400	373248000	26·8328	8·9628	770	592900	456533000	27·7489	9·1657
721	519841	374805361	26·8514	8·9670	771	594441	458314011	27·7669	9·1696
722	521284	376367048	26·8701	8·9711	772	595984	460099648	27·7849	9·1736
723	522729	377933067	26·8887	8·9752	773	597529	461889917	27·8029	9·1775
724	524176	379503424	26·9072	8·9794	774	599076	463684824	27·8209	9·1815
725	525625	381078125	26·9258	8·9835	775	600625	465484375	27·8388	9·1855
726	527076	382657176	26·9444	8·9876	776	602176	467288576	27·8568	9·1894
727	528529	384240583	26·9629	8·9918	777	603729	469097433	27·8747	9·1933
728	529984	385828352	26·9815	8·9959	778	605284	470910952	27·8927	9·1973
729	531441	387420489	27·0000	9·0000	779	606841	472729139	27·9106	9·2012
730	532900	389017000	27·0185	9·0041	780	608400	474552000	27·9285	9·2052
731	534361	390617891	27·0370	9·0082	781	609961	476379541	27·9464	9·2091
732	535824	392223168	27·0555	9·0123	782	611524	478211768	27·9643	9·2130
733	537289	393832837	27·0740	9·0164	783	613089	480048687	27·9821	9·2170
734	538756	395446904	27·0924	9·0205	784	614656	481890304	28·0000	9·2209
735	540225	397065375	27·1109	9·0246	785	616225	483736625	28·0179	9·2248
736	541696	398688256	27·1293	9·0287	786	617796	485587656	28·0357	9·2287
737	543169	400315553	27·1477	9·0328	787	619369	487443403	28·0535	9·2326
738	544644	401947272	27·1662	9·0369	788	620944	489303872	28·0713	9·2365
739	546121	403583419	27·1846	9·0410	789	622521	491169069	28·0891	9·2404
740	547600	405224000	27·2029	9·0450	790	624100	493039000	28·1069	9·2443
741	549081	406869021	27·2213	9·0491	791	625681	494913671	28·1247	9·2482
742	550564	408518488	27·2397	9·0532	792	627264	496793088	28·1425	9·2521
743	552049	410172407	27·2580	9·0572	793	628849	498677257	28·1603	9·2560
744	553536	411830784	27·2764	9·0613	794	630436	500566184	28·1780	9·2599
745	555025	413493625	27·2947	9·0654	795	632025	502459875	28·1957	9·2638
746	556516	415160936	27·3130	9·0694	796	633616	504358336	28·2135	9·2677
747	558009	416832723	27·3313	9·0735	797	635209	506261573	28·2312	9·2716
748	559504	418508992	27·3496	9·0775	798	636804	508169592	28·2489	9·2754
749	561001	420189749	27·3679	9·0816	799	638401	510082399	28·2666	9·2793

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
800	640000	512000000	28·2843	9·2832	850	722500	614125000	29·1548	9·4727
801	641601	513922401	28·3019	9·2870	851	724201	616295051	29·1719	9·4764
802	643204	515849608	28·3196	9·2909	852	725904	618470208	29·1890	9·4801
803	644809	517781627	28·3373	9·2948	853	727609	620650477	29·2062	9·4838
804	646416	519718464	28·3549	9·2986	854	729316	622835864	29·2233	9·4875
805	648025	521660125	28·3725	9·3025	855	731025	625026375	29·2404	9·4912
806	649636	523606616	28·3901	9·3063	856	732736	627222016	29·2575	9·4949
807	651249	525557943	28·4077	9·3102	857	734449	629422793	29·2746	9·4986
808	652864	527514112	28·4253	9·3140	858	736164	631628712	29·2916	9·5023
809	654481	529475129	28·4429	9·3179	859	737881	633839779	29·3087	9·5060
810	656100	531441000	28·4605	9·3217	860	739600	636056000	29·3258	9·5097
811	657721	533411731	28·4781	9·3255	861	741321	638277381	29·3428	9·5134
812	659344	535387328	28·4956	9·3294	862	743044	640503928	29·3598	9·5171
813	660969	537367797	28·5132	9·3332	863	744769	642735647	29·3769	9·5207
814	662596	539353144	28·5307	9·3370	864	746496	644972544	29·3939	9·5244
815	664225	541343375	28·5482	9·3408	865	748225	647214625	29·4109	9·5281
816	665856	543338496	28·5657	9·3447	866	749956	649461896	29·4279	9·5317
817	667489	545338513	28·5832	9·3485	867	751689	651714363	29·4449	9·5354
818	669124	547343432	28·6007	9·3523	868	753424	653972032	29·4618	9·5391
819	670761	549353259	28·6182	9·3561	869	755161	656234909	29·4788	9·5427
820	672400	551368000	28·6356	9·3599	870	756900	658503000	29·4958	9·5464
821	674041	553387661	28·6531	9·3637	871	758641	660776311	29·5127	9·5501
822	675684	555412248	28·6705	9·3675	872	760384	663054848	29·5296	9·5537
823	677329	557441767	28·6880	9·3713	873	762129	665338617	29·5466	9·5574
824	678976	559476224	28·7054	9·3751	874	763876	667627624	29·5635	9·5610
825	680625	561515625	28·7228	9·3789	875	765625	669921875	29·5804	9·5647
826	682276	563559976	28·7402	9·3827	876	767376	672221376	29·5973	9·5683
827	683929	565609283	28·7576	9·3865	877	769129	674526133	29·6142	9·5719
828	685584	567663552	28·7750	9·3902	878	770884	676836152	29·6311	9·5756
829	687241	569722789	28·7924	9·3940	879	772641	679151439	29·6479	9·5792
830	688900	571787000	28·8097	9·3978	880	774400	681472000	29·6648	9·5828
831	690561	573856191	28·8271	9·4016	881	776161	683797841	29·6816	9·5865
832	692224	575930368	28·8444	9·4053	882	777924	686128968	29·6985	9·5901
833	693889	578009537	28·8617	9·4091	883	779689	688465387	29·7153	9·5937
834	695556	580093704	28·8791	9·4129	884	781456	690807104	29·7321	9·5973
835	697225	582182875	28·8964	9·4166	885	783225	693154125	29·7489	9·6010
836	698896	584277056	28·9137	9·4204	886	784996	695506456	29·7658	9·6046
837	700569	586376253	28·9310	9·4241	887	786769	697864103	29·7825	9·6082
838	702244	588480472	28·9482	9·4279	888	788544	700227072	29·7993	9·6118
839	703921	590589719	28·9655	9·4316	889	790321	702595369	29·8161	9·6154
840	705600	592704000	28·9828	9·4354	890	792100	704969000	29·8329	9·6190
841	707281	594823321	29·0000	9·4391	891	793881	707347971	29·8496	9·6226
842	708964	596947688	29·0172	9·4429	892	795664	709732288	29·8664	9·6262
843	710649	599077107	29·0345	9·4466	893	797449	712121957	29·8831	9·6298
844	712336	601211584	29·0517	9·4503	894	799236	714516984	29·8998	9·6334
845	714025	603351125	29·0689	9·4541	895	801025	716917375	29·9166	9·6370
846	715716	605495736	29·0861	9·4578	896	802816	719323136	29·9333	9·6406
847	717409	607645423	29·1033	9·4615	897	804609	721734273	29·9500	9·6442
848	719104	609800192	29·1204	9·4652	898	806404	724150792	29·9666	9·6477
849	720801	611960049	29·1376	9·4690	899	808201	726572699	29·9833	9·6513

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
900	810000	729000000	30·0000	9·6549	950	902500	857375000	30·8221	9·8305
901	811801	731432701	30·0167	9·6585	951	904401	860085351	30·8383	9·8339
902	813604	733870808	30·0333	9·6620	952	906304	862801408	30·8545	9·8374
903	815409	736314327	30·0500	9·6656	953	908209	865523177	30·8707	9·8408
904	817216	738763264	30·0666	9·6692	954	910116	868250664	30·8869	9·8443
905	819025	741217625	30·0832	9·6727	955	912025	870983875	30·9031	9·8477
906	820836	743677316	30·0998	9·6763	956	913936	873722816	30·9192	9·8511
907	822649	746142643	30·1164	9·6799	957	915849	876467493	30·9354	9·8546
908	824464	748613312	30·1330	9·6834	958	917764	879217912	30·9516	9·8580
909	826281	751089429	30·1496	9·6870	959	919681	881974079	30·9677	9·8614
910	828100	753571000	30·1662	9·6905	960	921600	884736000	30·9839	9·8648
911	829921	756058031	30·1828	9·6941	961	923521	887503681	31·0000	9·8683
912	831744	758550528	30·1993	9·6976	962	925444	890277128	31·0161	9·8717
913	833569	761048497	30·2159	9·7012	963	927369	893056347	31·0322	9·8751
914	835396	763551944	30·2324	9·7047	964	929296	895841344	31·0483	9·8785
915	837225	766060875	30·2490	9·7082	965	931225	898632125	31·0644	9·8819
916	839056	768575296	30·2655	9·7118	966	933156	901428696	31·0805	9·8854
917	840889	771095213	30·2820	9·7153	967	935089	904231063	31·0966	9·8888
918	842724	773620632	30·2985	9·7188	968	937024	907039232	31·1127	9·8922
919	844561	776151559	30·3150	9·7224	969	938961	909853209	31·1288	9·8956
920	846400	778688000	30·3315	9·7259	970	940900	912673000	31·1448	9·8990
921	848241	781229961	30·3480	9·7294	971	942841	915498611	31·1609	9·9024
922	850084	783777448	30·3645	9·7329	972	944784	918330048	31·1769	9·9058
923	851929	876330467	30·3809	9·7364	973	946729	921167317	31·1929	9·9092
924	853776	788889204	30·3974	9·7400	974	948676	924010424	31·2090	9·9126
925	855625	791453125	30·4138	9·7435	975	950625	926859375	31·2250	9·9160
926	857476	794022776	30·4302	9·7470	976	952576	929714176	31·2410	9·9194
927	859329	796597983	30·4467	9·7505	977	954529	932574833	31·2570	9·9227
928	861184	799178752	30·4631	9·7540	978	956484	935441352	31·2730	9·9261
929	863041	801765089	30·4795	9·7575	979	958441	938313739	31·2890	9·9295
930	864900	804357000	30·4959	9·7610	980	960400	941192000	31·3050	9·9329
931	866761	806954491	30·5123	9·7645	981	962361	944076141	31·3209	9·9363
932	868624	809557568	30·5287	9·7680	982	964324	946966168	31·3369	9·9396
933	870489	812166237	30·5450	9·7715	983	966289	949862087	31·3528	9·9430
934	872356	814780504	30·5614	9·7750	984	968256	952763904	31·3688	9·9464
935	874225	817400375	30·5778	9·7785	985	970225	955671625	31·3847	9·9497
936	876096	820025856	30·5941	9·7819	986	972196	958585256	31·4006	9·9531
937	877969	822656953	30·6105	9·7854	987	974169	961504803	31·4166	9·9565
938	879844	825293672	30·6268	9·7889	988	976144	964430272	31·4325	9·9598
939	881721	827936019	30·6431	9·7924	989	978121	967361669	31·4484	9·9632
940	883600	830584000	30·6594	9·7959	990	980100	970299000	31·4643	9·9666
941	885481	833237621	30·6757	9·7993	991	982081	973242271	31·4802	9·9699
942	887364	835896888	30·6920	9·8028	992	984064	976191488	31·4960	9·9733
943	889249	838561807	30·7083	9·8063	993	986049	979146657	31·5119	9·9766
944	891136	841232384	30·7246	9·8097	994	988036	982107784	31·5278	9·9800
945	893025	843908625	30·7409	9·8132	995	990025	985074875	31·5436	9·9833
946	894916	846590536	30·7571	9·8167	996	992016	988047936	31·5595	9·9866
947	896809	849278123	30·7734	9·8201	997	994009	991026973	31·5753	9·9900
948	898704	851971392	30·7896	9·8236	998	996004	994011992	31·5911	9·9933
949	900601	854670349	30·8058	9·8270	999	998001	997002999	31·6070	9·9967

DORMAN, LONG & CO. LIMITED.

LOGARITHMS OF NUMBERS FROM 0 TO 1,000.

No.	0	1	2	3	4	5	6	7	8	9
0	0	00000	30103	47712	60206	69897	77815	84510	90309	95424
10	00000	00432	00860	01284	01703	02119	02531	02938	03342	03743
11	04139	04532	04922	05308	05690	06070	06446	06819	07188	07555
12	07918	08279	08636	08991	09342	09691	10037	10380	10721	11059
13	11394	11727	12057	12385	12710	13033	13354	13672	13988	14301
14	14613	14922	15229	15534	15836	16137	16435	16732	17026	17319
15	17609	17898	18184	18469	18752	19033	19312	19590	19866	20140
16	20412	20683	20951	21219	21484	21748	22011	22272	22531	22789
17	23045	23300	23553	23805	24055	24304	24551	24797	25042	25285
18	25527	25768	26007	26245	26482	26717	26951	27184	27416	27646
19	27875	28103	28330	28556	28780	29003	29226	29447	29667	29885
20	30103	30320	30535	30750	30963	31175	31387	31597	31806	32015
21	32222	32428	32634	32838	33041	33244	33445	33646	33846	34044
22	34242	34439	34635	34830	35025	35218	35411	35603	35793	35984
23	36173	36361	36549	36736	36922	37107	37291	37475	37658	37840
24	38021	38202	38382	38561	38739	38917	39094	39270	39445	39620
25	39794	39967	40140	40312	40483	40654	40824	40993	41162	41330
26	41497	41664	41830	41996	42160	42325	42488	42651	42813	42975
27	43136	43297	43457	43616	43775	43933	44091	44248	44404	44560
28	44716	44871	45025	45179	45332	45484	45637	45788	45939	46090
29	46240	46389	46538	46687	46835	46982	47129	47276	47422	47567
30	47712	47857	48001	48144	48287	48430	48572	48714	48855	48996
31	49136	49276	49415	49554	49693	49831	49969	50106	50243	50379
32	50515	50650	50786	50920	51054	51188	51322	51455	51587	51720
33	51851	51983	52114	52244	52375	52504	52634	52763	52892	53020
34	53148	53275	53403	53529	53656	53782	53908	54033	54158	54283
35	54407	54531	54654	54777	54900	55023	55145	55267	55388	55509
36	55630	55751	55871	55991	56110	56229	56348	56467	56585	56703
37	56820	56937	57054	57171	57287	57403	57519	57634	57749	57864
38	57978	58092	58206	58320	58433	58546	58659	58771	58883	58995
39	59106	59218	59329	59439	59550	59660	59770	59879	59988	60097
40	60206	60314	60423	60530	60638	60745	60853	60959	61066	61172
41	61278	61384	61490	61595	61700	61805	61909	62014	62118	62221
42	62325	62428	62531	62634	62737	62839	62941	63043	63144	63246
43	63347	63448	63548	63649	63749	63849	63949	64048	64147	64246
44	64345	64444	64542	64640	64738	64836	64933	65031	65128	65225
45	65321	65418	65514	65610	65706	65801	65896	65992	66087	66181
46	66276	66370	66464	66558	66652	66745	66839	66932	67025	67117
47	67210	67302	67394	67486	67578	67669	67761	67852	67943	68034
48	68124	68215	68305	68395	68485	68574	68664	68753	68842	68931
49	69020	69108	69197	69285	69373	69461	69548	69636	69723	69810
50	69897	69984	70070	70157	70243	70329	70415	70501	70586	70672
51	70757	70842	70927	71012	71096	71181	71265	71349	71433	71517
52	71600	71684	71767	71850	71933	72016	72099	72181	72263	72346
53	72428	72509	72591	72673	72754	72835	72916	72997	73078	73159
54	73239	73320	73400	73480	73560	73640	73719	73799	73878	73957

DORMAN, LONG & CO. LIMITED.

LOGARITHMS OF NUMBERS FROM 0 TO 1,000.

No.	0	1	2	3	4	5	6	7	8	9
55	74036	74115	74194	74273	74351	74429	74507	74586	74663	74741
56	74819	74896	74974	75051	75128	75205	75282	75358	75435	75511
57	75587	75664	75740	75815	75891	75967	76042	76118	76193	76268
58	76343	76418	76492	76567	76641	76716	76790	76864	76938	77012
59	77085	77159	77232	77305	77379	77452	77525	77597	77670	77743
60	77815	77887	77960	78032	78104	78176	78247	78319	78390	78462
61	78533	78604	78675	78746	78817	78888	78958	79029	79099	79169
62	79239	79309	79379	79449	79518	79588	79657	79727	79796	79865
63	79934	80003	80072	80140	80209	80277	80346	80414	80482	80550
64	80618	80686	80753	80821	80889	80956	81023	81090	81157	81224
65	81291	81358	81425	81491	81558	81624	81690	81757	81823	81889
66	81954	82020	82086	82151	82217	82282	82347	82413	82478	82543
67	82607	82672	82737	82802	82866	82930	82995	83059	83123	83187
68	83251	83315	83378	83442	83506	83569	83632	83696	83759	83822
69	83885	83948	84011	84073	84136	84198	84261	84323	84386	84448
70	84510	84572	84634	84696	84757	84819	84880	84942	85003	85065
71	85126	85187	85248	85309	85370	85431	85491	85552	85612	85673
72	85733	85794	85854	85914	85974	86034	86094	86153	86213	86273
73	86332	86392	86451	86510	86570	86629	86688	86747	86806	86864
74	86923	86982	87040	87099	87157	87216	87274	87332	87390	87448
75	87506	87564	87622	87679	87737	87795	87852	87910	87967	88024
76	88081	88138	88195	88252	88309	88366	88423	88480	88536	88593
77	88649	88705	88762	88818	88874	88930	88986	89042	89098	89154
78	89209	89265	89321	89376	89432	89487	89542	89597	89653	89708
79	89763	89818	89873	89927	89982	90037	90091	90146	90200	90255
80	90309	90363	90417	90472	90526	90580	90633	90687	90741	90795
81	90848	90902	90956	91009	91062	91116	91169	91222	91275	91328
82	91381	91434	91487	91540	91593	91645	91698	91751	91803	91855
83	91908	91960	92012	92064	92117	92169	92221	92273	92324	92376
84	92428	92480	92531	92583	92634	92686	92737	92788	92840	92891
85	92942	92993	93044	93095	93146	93197	93247	93298	93349	93399
86	93450	93500	93551	93601	93651	93702	93752	93802	93852	93902
87	93952	94002	94052	94101	94151	94201	94250	94300	94349	94399
88	94448	94498	94547	94596	94645	94694	94743	94792	94841	94890
89	94939	94988	95036	95085	95134	95182	95231	95279	95328	95376
90	95424	95472	95521	95569	95617	95665	95713	95761	95809	95856
91	95904	95952	95999	96047	96095	96142	96190	96237	96284	96332
92	96379	96426	96473	96520	96567	96614	96661	96708	96755	96802
93	96848	96895	96942	96988	97035	97081	97128	97174	97220	97267
94	97313	97359	97405	97451	97497	97543	97589	97635	97681	97727
95	97772	97818	97864	97909	97955	98000	98046	98091	98137	98182
96	98227	98272	98318	98363	98408	98453	98498	98543	98588	98632
97	98677	98722	98767	98811	98856	98900	98945	98989	99034	99078
98	99123	99167	99211	99255	99300	99344	99388	99432	99476	99520
99	99564	99607	99651	99695	99739	99782	99826	99870	99913	99957

MENSURATION.

LENGTH.

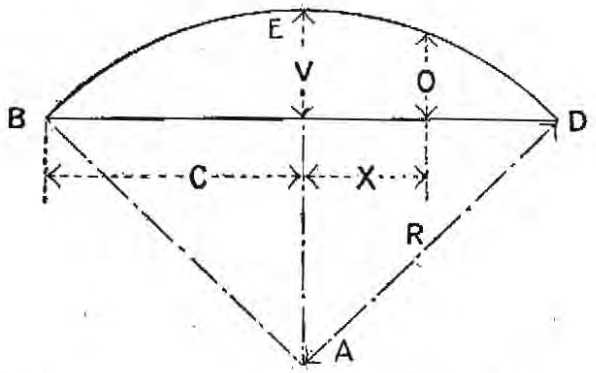
Circumference of Circle = diameter $\times \pi$

Diameter of Circle = circumference $\times$ ·31831

Length of Arc = number of degrees $\times$ radius $\times$ ·017453

Degrees in an Arc whose length = radius = $57^{\circ}\cdot2957795$

$\pi = 3\cdot14159265 +$



V = versed sine.

C = half the chord.

R = radius.

O = any ordinate.

X = distance of ordinate from centre.

$$O = \sqrt{R^2 - X^2} - (R - V).$$

$$R = \frac{V^2 + C^2}{2V} \text{ or diameter } = \frac{V^2 + C^2}{V}$$

$$V = R - \sqrt{R^2 - C^2}$$

$$X = \sqrt{R^2 - (O + R - V)^2}$$

AREA.

Area of Triangle = base $\times$ half the perpendicular height.

,, Circle $= \frac{\pi D^2}{4} = \pi R^2$ where D = diameter of circle.
R = radius of circle.

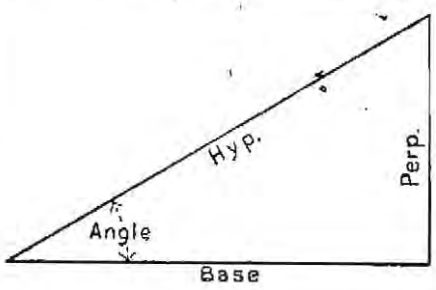
Area of Sector of Circle = Area A B E D = length of arc $\times$ half the radius

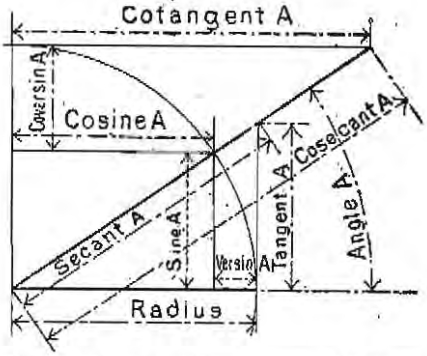
$$= \frac{\text{number of degrees in arc} \times \text{area of circle}}{360}$$

Area of Segment of Circle = Area B D E = area of Sector less area of triangle.

Area of Parabola = base $\times \frac{2}{3}$ height.

TRIGONOMETRICAL FUNCTIONS.





This diagram shews the different trigonometrical functions in terms of the angle A to the radius of 1.

$$\text{Sine} = \frac{\text{Perp.}}{\text{Hyp.}};\ \text{Cosine} = \frac{\text{Base}}{\text{Hyp.}};\ \text{Tangent} = \frac{\text{Perp.}}{\text{Base}};$$

$$\text{Cotangent} = \frac{\text{Base}}{\text{Perp.}};\ \text{Secant} = \frac{\text{Hyp.}}{\text{Base}};$$

$$\text{Cosecant} = \frac{\text{Hyp.}}{\text{Perp.}};\ \text{Versed sine} = \frac{\text{Hyp.} - \text{Base}}{\text{Hyp.}};$$

$$\text{Coversed sine} = \frac{\text{Hyp.} - \text{Perp.}}{\text{Hyp.}}$$

$$\text{Sin.} = \frac{\text{tan.}}{\text{sec.}} = \frac{1}{\text{cosec.}} = \sqrt{1 - \text{cos.}^2} = \frac{\text{cos.}}{\text{cot.}}$$

$$\text{Cos.} = \frac{\text{cot.}}{\text{cosec.}} = \frac{1}{\text{sec.}} = \sqrt{1 - \text{sin.}^2} = \frac{\text{sin.}}{\text{tan.}} = \text{sin.} \times \text{cot.}$$

$$\text{Tan.} = \frac{\text{sin.}}{\text{cos.}} = \frac{1}{\text{cot.}} = \text{sin.} \times \text{sec.} = \sqrt{\text{sec.}^2 - 1}.$$

$$\text{Cot.} = \frac{1}{\text{tan.}} = \sqrt{\text{cosec.}^2 - 1} = \frac{\text{cos.}}{\text{sin.}}$$

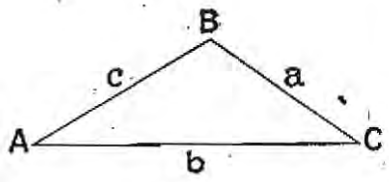
$$\text{Sec.} = \frac{1}{\text{cos.}} = \sqrt{1 + \text{tan.}^2} = \frac{\text{tan.}}{\text{sin.}}$$

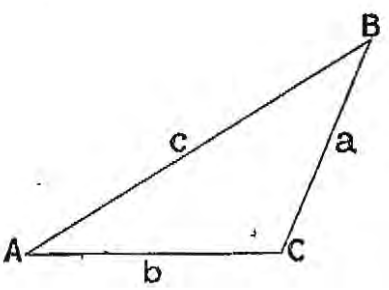
$$\text{Cosec.} = \frac{1}{\text{sin.}} = \sqrt{1 + \text{cot.}^2} \qquad \text{Cos.}^2 + \text{sin.}^2 = 1$$

$$\text{Versin.} = 1 - \text{cos.} \qquad 1 + \text{tan.}^2 = \text{sec.}^2$$

$$\text{Coversin.} = 1 - \text{sin.} \qquad 1 + \text{cot.}^2 = \text{cosec.}^2$$

SOLUTION OF TRIANGLES.





$$a + b + c = 2s \qquad a = b.\cos.\ C + c.\cos.\ B$$

$$\frac{a}{\sin.\ A} = \frac{b}{\sin.\ B} = \frac{c}{\sin.\ C} = \frac{abc}{2Q}$$

$$\cos.\ A = \frac{b^2 + c^2 - a^2}{2\,bc} \text{ or } a^2 = b^2 + c^2 - 2\,b.c.\cos.\ A$$

$$\sin.\frac{A}{2} = \sqrt{\frac{(s-b)\ (s-c)}{bc}};\ \cos.\frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}};$$

$$\tan.\frac{A}{2} = \sqrt{\frac{(s-b)\ (s-c)}{s(s-a)}}$$

$$\sin.\ A = \frac{2}{bc}\sqrt{s(s-a)\ (s-b)\ (s-c)} = \frac{2Q}{bc} \text{ where } Q = \sqrt{s(s-a)\ (s-b)\ (s-c)}$$

$$\frac{\tan.\frac{B+C}{2}}{\tan.\frac{B-C}{2}} = \frac{b+c}{b-c};\ \tan.\frac{B-C}{2} = \frac{b-c}{b+c} \times \cot.\frac{A}{2}$$

$$\left.\begin{matrix}\text{Area of} \\ \text{triangle}\end{matrix}\right\} = \frac{a.b.\sin.\ C}{2} = \frac{b.c.\sin.A}{2} = \frac{a.c.\sin.B}{2} = \sqrt{s(s-a)\ (s-b)\ (s-c)} = Q$$

DORMAN, LONG & CO. LIMITED.

SINE

Degrees	0′	10′	20′	30′	40′	50′	60′	
0		·00291	·00582	·00873	·01164	·01454	·01745	89
1	·01745	·02036	·02327	·02618	·02908	·03199	·03490	88
2	·03490	·03781	·04071	·04362	·04653	·04943	·05234	87
3	·05234	·05524	·05814	·06105	·06395	·06685	·06976	86
4	·06976	·07266	·07556	·07846	·08136	·08426	·08716	85
5	·08716	·09005	·09295	·09585	·09874	·10164	·10453	84
6	·10453	·10742	·11031	·11320	·11609	·11898	·12187	83
7	·12187	·12476	·12764	·13053	·13341	·13629	·13917	82
8	·13917	·14205	·14493	·14781	·15069	·15356	·15643	81
9	·15643	·15931	·16218	·16505	·16792	·17078	·17365	80
10	·17365	·17651	·17937	·18224	·18509	·18795	·19081	79
11	·19081	·19366	·19652	·19937	·20222	·20507	·20791	78
12	·20791	·21076	·21360	·21644	·21928	·22212	·22495	77
13	·22495	·22778	·23062	·23345	·23627	·23910	·24192	76
14	·24192	·24474	·24756	·25038	·25320	·25601	·25882	75
15	·25882	·26163	·26443	·26724	·27004	·27284	·27564	74
16	·27564	·27843	·28123	·28402	·28680	·28959	·29237	73
17	·29237	·29515	·29793	·30071	·30348	·30625	·30902	72
18	·30902	·31178	·31454	·31730	·32006	·32282	·32557	71
19	·32557	·32832	·33106	·33381	·33655	·33929	·34202	70
20	·34202	·34475	·34748	·35021	·35293	·35565	·35837	69
21	·35837	·36108	·36379	·36650	·36921	·37191	·37461	68
22	·37461	·37730	·37999	·38268	·38537	·38805	·39073	67
23	·39073	·39341	·39608	·39875	·40142	·40408	·40674	66
24	·40674	·40939	·41204	·41469	·41734	·41998	·42262	65
25	·42262	·42525	·42788	·43051	·43313	·43575	·43837	64
26	·43837	·44098	·44359	·44620	·44880	·45140	·45399	63
27	·45399	·45658	·45917	·46175	·46433	·46690	·46947	62
28	·46947	·47204	·47460	·47716	·47971	·48226	·48481	61
29	·48481	·48735	·48989	·49242	·49495	·49748	·50000	60
30	·50000	·50252	·50503	·50754	·51004	·51254	·51504	59
31	·51504	·51753	·52002	·52250	·52498	·52745	·52992	58
32	·52992	·53238	·53484	·53730	·53975	·54220	·54464	57
33	·54464	·54708	·54951	·55194	·55436	·55678	·55919	56
34	·55919	·56160	·56401	·56641	·56880	·57119	·57358	55
35	·57358	·57596	·57833	·58070	·58307	·58543	·58779	54
36	·58779	·59014	·59248	·59482	·59716	·59949	·60182	53
37	·60182	·60414	·60645	·60876	·61107	·61337	·61566	52
38	·61566	·61795	·62024	·62251	·62479	·62706	·62932	51
39	·62932	·63158	·63383	·63608	·63832	·64056	·64279	50
40	·64279	·64501	·64723	·64945	·65166	·65386	·65606	49
41	·65606	·65825	·66044	·66262	·66480	·66697	·66913	48
42	·66913	·67129	·67344	·67559	·67773	·67987	·68200	47
43	·68200	·68412	·68624	·68835	·69046	·69256	·69466	46
44	·69466	·69675	·69883	·70091	·70298	·70505	·70711	45
	60′	50′	40′	30′	20′	10′	0′	Degrees

COSINE

DORMAN, LONG & CO. LIMITED.

Degrees	COSINE 0′	10′	20′	30′	40′	50′	60′	
0	1·	1·	·99998	·99996	·99993	·99989	·99985	89
1	·99985	·99979	·99973	·99966	·99958	·99949	·99939	88
2	·99939	·99929	·99917	·99905	·99892	·99878	·99863	87
3	·99863	·99847	·99831	·99813	·99795	·99776	·99756	86
4	·99756	·99736	·99714	·99692	·99668	·99644	·99619	85
5	·99619	·99594	·99567	·99540	·99511	·99482	·99452	84
6	·99452	·99421	·99390	·99357	·99324	·99290	·99255	83
7	·99255	·99219	·99182	·99144	·99106	·99067	·99027	82
8	·99027	·98986	·98944	·98902	·98858	·98814	·98769	81
9	·98769	·98723	·98676	·98629	·98580	·98531	·98481	80
10	·98481	·98430	·98378	·98325	·98272	·98218	·98163	79
11	·98163	·98107	·98050	·97992	·97934	·97875	·97815	78
12	·97815	·97754	·97692	·97630	·97566	·97502	·97437	77
13	·97437	·97371	·97304	·97237	·97169	·97100	·97030	76
14	·97030	·96959	·96887	·96815	·96742	·96667	·96593	75
15	·96593	·96517	·96440	·96363	·96285	·96206	·96126	74
16	·96126	·96046	·95964	·95882	·95799	·95715	·95630	73
17	·95630	·95545	·95459	·95372	·95284	·95195	·95106	72
18	·95106	·95015	·94924	·94832	·94740	·94646	·94552	71
19	·94552	·94457	·94361	·94264	·94167	·94068	·93969	70
20	·93969	·93869	·93769	·93667	·93565	·93462	·93358	69
21	·93358	·93253	·93148	·93042	·92935	·92827	·92718	68
22	·92718	·92609	·92499	·92388	·92276	·92164	·92050	67
23	·92050	·91936	·91822	·91706	·91590	·91472	·91355	66
24	·91355	·91236	·91116	·90996	·90875	·90753	·90631	65
25	·90631	·90507	·90383	·90259	·90133	·90007	·89879	64
26	·89879	·89752	·89623	·89493	·89363	·89232	·89101	63
27	·89101	·88968	·88835	·88701	·88566	·88431	·88295	62
28	·88295	·88158	·88020	·87882	·87743	·87603	·87462	61
29	·87462	·87321	·87178	·87036	·86892	·86748	·86603	60
30	·86603	·86457	·86310	·86163	·86015	·85866	·85717	59
31	·85717	·85567	·85416	·85264	·85112	·84959	·84805	58
32	·84805	·84650	·84495	·84339	·84182	·84025	·83867	57
33	·83867	·83708	·83549	·83389	·83228	·83066	·82904	56
34	·82904	·82741	·82577	·82413	·82248	·82082	·81915	55
35	·81915	·81748	·81580	·81412	·81242	·81072	·80902	54
36	·80902	·80730	·80558	·80386	·80212	·80038	·79864	53
37	·79864	·79688	·79512	·79335	·79158	·78980	·78801	52
38	·78801	·78622	·78442	·78261	·78079	·77897	·77715	51
39	·77715	·77531	·77347	·77162	·76977	·76791	·76604	50
40	·76604	·76417	·76229	·76041	·75851	·75661	·75471	49
41	·75471	·75280	·75088	·74896	·74703	·74509	·74314	48
42	·74314	·74120	·73924	·73728	·73531	·73333	·73135	47
43	·73135	·72937	·72737	·72537	·72337	·72136	·71934	46
44	·71934	·71732	·71529	·71325	·71121	·70916	·70711	45
	60′	50′	40′	30′	20′	10′	0′	
	SINE							Degrees

DORMAN, LONG & CO. LIMITED.

TANGENT

Degrees	0′	10′	20′	30′	40′	50′	60′	
0	..	·00291	·00582	·00873	·01164	·01455	·01746	89
1	·01746	·02036	·02328	·02619	·02910	·03201	·03492	88
2	·03492	·03783	·04075	·04366	·04658	·04949	·05241	87
3	·05241	·05533	·05824	·06116	·06408	·06700	·06993	86
4	·06993	·07285	·07578	·07870	·08163	·08456	·08749	85
5	·08749	·09042	·09335	·09629	·09923	·10216	·10510	84
6	·10510	·10805	·11099	·11394	·11688	·11983	·12278	83
7	·12278	·12574	·12869	·13165	·13461	·13758	·14054	82
8	·14054	·14351	·14648	·14945	·15243	·15540	·15838	81
9	·15838	·16137	·16435	·16734	·17033	·17333	·17633	80
10	·17633	·17933	·18233	·18534	·18835	·19136	·19438	79
11	·19438	·19740	·20042	·20345	·20648	·20952	·21256	78
12	·21256	·21560	·21864	·22169	·22475	·22781	·23087	77
13	·23087	·23393	·23700	·24008	·24316	·24624	·24933	76
14	·24933	·25242	·25552	·25862	·26172	·26483	·26795	75
15	·26795	·27107	·27419	·27732	·28046	·28360	·28675	74
16	·28675	·28990	·29305	·29621	·29938	·30255	·30573	73
17	·30573	·30891	·31210	·31530	·31850	·32171	·32492	72
18	·32492	·32814	·33136	·33460	·33783	·34108	·34433	71
19	·34433	·34758	·35085	·35412	·35740	·36068	·36397	70
20	·36397	·36727	·37057	·37388	·37720	·38053	·38386	69
21	·38386	·38721	·39055	·39391	·39727	·40065	·40403	68
22	·40403	·40741	·41081	·41421	·41763	·42105	·42447	67
23	·42447	·42791	·43136	·43481	·43828	·44175	·44523	66
24	·44523	·44872	·45222	·45573	·45924	·46277	·46631	65
25	·46631	·46985	·47341	·47698	·48055	·48414	·48773	64
26	·48773	·49134	·49495	·49858	·50222	·50587	·50953	63
27	·50953	·51320	·51688	·52057	·52427	·52798	·53171	62
28	·53171	·53545	·53920	·54296	·54673	·55051	·55431	61
29	·55431	·55812	·56194	·56577	·56962	·57348	·57735	60
30	·57735	·58124	·58513	·58905	·59297	·59691	·60086	59
31	·60086	·60483	·60881	·61280	·61681	·62083	·62487	58
32	·62487	·62892	·63299	·63707	·64117	·64528	·64941	57
33	·64941	·65355	·65771	·66189	·66608	·67028	·67451	56
34	·67451	·67875	·68301	·68728	·69157	·69588	·70021	55
35	·70021	·70455	·70891	·71329	·71769	·72211	·72654	54
36	·72654	·73100	·73547	·73996	·74447	·74900	·75355	53
37	·75355	·75812	·76272	·76733	·77196	·77661	·78129	52
38	·78129	·78598	·79070	·79544	·80020	·80498	·80978	51
39	·80978	·81461	·81946	·82434	·82923	·83415	·83910	50
40	·83910	·84407	·84906	·85408	·85912	·86419	·86929	49
41	·86929	·87441	·87955	·88473	·88992	·89515	·90040	48
42	·90040	·90569	·91099	·91633	·92170	·92709	·93252	47
43	·93252	·93797	·94345	·94896	·95451	·96008	·96569	46
44	·96569	·97133	·97700	·98270	·98843	·99420	1·	45

COTANGENT

	60′	50′	40′	30′	20′	10′	0′	Degrees

DORMAN, LONG & CO. LIMITED.

COTANGENT

Degrees	0′	10′	20′	30′	40′	50′	60′	Degrees
0	..	343·77371	171·88540	114·58865	85·93979	68·75009	57·28996	89
1	57·28996	49·10388	42·96408	38·18846	34·36777	31·24158	28·63625	88
2	28·63625	26·43160	24·54176	22·90377	21·47040	20·20555	19·08114	87
3	19·08114	18·07498	17·16934	16·34986	15·60478	14·92442	14·30067	86
4	14·30067	13·72674	13·19688	12·70621	12·25051	11·82617	11·43005	85
5	11·43005	11·05943	10·71191	10·38540	10·07803	9·78817	9·51436	84
6	9·51436	9·25530	9·00983	8·77689	8·55555	8·34496	8·14435	83
7	8·14435	7·95302	7·77035	7·59575	7·42871	7·26873	7·11537	82
8	7·11537	6·96823	6·82694	6·69116	6·56055	6·43484	6·31375	81
9	6·31375	6·19703	6·08444	5·97576	5·87080	5·76937	5·67128	80
10	5·67128	5·57638	5·48451	5·39552	5·30928	5·22566	5·14455	79
11	5·14455	5·06584	4·98940	4·91516	4·84300	4·77286	4·70463	78
12	4·70463	4·63825	4·57363	4·51071	4·44942	4·38969	4·33148	77
13	4·33148	4·27471	4·21933	4·16530	4·11256	4·06107	4·01078	76
14	4·01078	3·96165	3·91364	3·86671	3·82083	3·77595	3·73205	75
15	3·73205	3·68909	3·64705	3·60588	3·56557	3·52609	3·48741	74
16	3·48741	3·44951	3·41236	3·37594	3·34023	3·30521	3·27085	73
17	3·27085	3·23714	3·20406	3·17159	3·13972	3·10842	3·07768	72
18	3·07768	3·04749	3·01783	2·98869	2·96004	2·93189	2·90421	71
19	2·90421	2·87700	2·85023	2·82391	2·79802	2·77254	2·74748	70
20	2·74748	2·72281	2·69853	2·67462	2·65109	2·62791	2·60509	69
21	2·60509	2·58261	2·56046	2·53865	2·51715	2·49597	2·47509	68
22	2·47509	2·45451	2·43422	2·41421	2·39449	2·37504	2·35585	67
23	2·35585	2·33693	2·31826	2·29984	2·28167	2·26374	2·24604	66
24	2·24604	2·22857	2·21132	2·19430	2·17749	2·16090	2·14451	65
25	2·14451	2·12832	2·11233	2·09654	2·08094	2·06553	2·05030	64
26	2·05030	2·03526	2·02039	2·00569	1·99116	1·97680	1·96261	63
27	1·96261	1·94858	1·93470	1·92098	1·90741	1·89400	1·88073	62
28	1·88073	1·86760	1·85462	1·84177	1·82906	1·81649	1·80405	61
29	1·80405	1·79174	1·77955	1·76749	1·75556	1·74375	1·73205	60
30	1·73205	1·72047	1·70901	1·69766	1·68643	1·67530	1·66428	59
31	1·66428	1·65337	1·64256	1·63185	1·62125	1·61074	1·60033	58
32	1·60033	1·59002	1·57981	1·56969	1·55966	1·54972	1·53987	57
33	1·53987	1·53010	1·52043	1·51084	1·50133	1·49190	1·48256	56
34	1·48256	1·47330	1·46411	1·45501	1·44598	1·43703	1·42815	55
35	1·42815	1·41934	1·41061	1·40195	1·39336	1·38484	1·37638	54
36	1·37638	1·36800	1·35968	1·35142	1·34323	1·33511	1·32704	53
37	1·32704	1·31904	1·31110	1·30323	1·29541	1·28764	1·27994	52
38	1·27994	1·27230	1·26471	1·25717	1·24969	1·24227	1·23490	51
39	1·23490	1·22758	1·22031	1·21310	1·20593	1·19882	1·19175	50
40	1·19175	1·18474	1·17777	1·17085	1·16398	1·15715	1·15037	49
41	1·15037	1·14363	1·13694	1·13029	1·12369	1·11713	1·11061	48
42	1·11061	1·10414	1·09770	1·09131	1·08496	1·07864	1·07237	47
43	1·07237	1·06613	1·05994	1·05378	1·04766	1·04158	1·03553	46
44	1·03553	1·02952	1·02355	1·01761	1·01170	1·00583	1·	45
	60′	50′	40′	30′	20′	10′	0′	Degrees

TANGENT

DORMAN, LONG & CO. LIMITED.

SECANT.

Degrees	0′	10′	20′	30′	40′	50′	60′	
0	1·00000	1·00001	1·00002	1·00004	1·00007	1·00011	1·00015	89
1	1·00015	1·00021	1·00027	1·00034	1·00042	1·00051	1·00061	88
2	1·00061	1·00072	1·00083	1·00095	1·00108	1·00122	1·00137	87
3	1·00137	1·00153	1·00169	1·00187	1·00205	1·00224	1·00244	86
4	1·00244	1·00265	1·00287	1·00309	1·00333	1·00357	1·00382	85
5	1·00382	1·00408	1·00435	1·00463	1·00491	1·00521	1·00551	84
6	1·00551	1·00582	1·00614	1·00647	1·00681	1·00715	1·00751	83
7	1·00751	1·00787	1·00825	1·00863	1·00902	1·00942	1·00983	82
8	1·00983	1·01024	1·01067	1·01111	1·01155	1·01200	1·01247	81
9	1·01247	1·01294	1·01342	1·01391	1·01440	1·01491	1·01543	80
10	1·01543	1·01595	1·01649	1·01703	1·01758	1·01815	1·01872	79
11	1·01872	1·01930	1·01989	1·02049	1·02110	1·02171	1·02234	78
12	1·02234	1·02298	1·02362	1·02428	1·02494	1·02562	1·02630	77
13	1·02630	1·02700	1·02770	1·02842	1·02914	1·02987	1·03061	76
14	1·03061	1·03137	1·03213	1·03290	1·03368	1·03447	1·03528	75
15	1·03528	1·03609	1·03691	1·03774	1·03858	1·03944	1·04030	74
16	1·04030	1·04117	1·04206	1·04295	1·04385	1·04477	1·04569	73
17	1·04569	1·04663	1·04757	1·04853	1·04950	1·05047	1·05146	72
18	1·05146	1·05246	1·05347	1·05449	1·05552	1·05657	1·05762	71
19	1·05762	1·05869	1·05976	1·06085	1·06195	1·06306	1·06418	70
20	1·06418	1·06531	1·06645	1·06761	1·06878	1·06995	1·07115	69
21	1·07115	1·07235	1·07356	1·07479	1·07602	1·07727	1·07853	68
22	1·07853	1·07981	1·08109	1·08239	1·08370	1·08503	1·08636	67
23	1·08636	1·08771	1·08907	1·09044	1·09183	1·09323	1·09464	66
24	1·09464	1·09606	1·09750	1·09895	1·10041	1·10189	1·10338	65
25	1·10338	1·10488	1·10640	1·10793	1·10947	1·11103	1·11260	64
26	1·11260	1·11419	1·11579	1·11740	1·11903	1·12067	1·12233	63
27	1·12233	1·12400	1·12568	1·12738	1·12910	1·13083	1·13257	62
28	1·13257	1·13433	1·13610	1·13789	1·13970	1·14152	1·14335	61
29	1·14335	1·14521	1·14707	1·14896	1·15085	1·15277	1·15470	60
30	1·15470	1·15665	1·15861	1·16059	1·16259	1·16460	1·16663	59
31	1·16663	1·16868	1·17075	1·17283	1·17493	1·17704	1·17918	58
32	1·17918	1·18133	1·18350	1·18569	1·18790	1·19012	1·19236	57
33	1·19236	1·19463	1·19691	1·19920	1·20152	1·20386	1·20622	56
34	1·20622	1·20859	1·21099	1·21341	1·21584	1·21830	1·22077	55
35	1·22077	1·22327	1·22579	1·22833	1·23089	1·23347	1·23607	54
36	1·23607	1·23869	1·24134	1·24400	1·24669	1·24940	1·25214	53
37	1·25214	1·25489	1·25767	1·26047	1·26330	1·26615	1·26902	52
38	1·26902	1·27191	1·27483	1·27778	1·28075	1·28374	1·28676	51
39	1·28676	1·28980	1·29287	1·29597	1·29909	1·30223	1·30541	50
40	1·30541	1·30861	1·31183	1·31509	1·31837	1·32168	1·32501	49
41	1·32501	1·32838	1·33177	1·33519	1·33864	1·34212	1·34563	48
42	1·34563	1·34917	1·35274	1·35634	1·35997	1·36363	1·36733	47
43	1·36733	1·37105	1·37481	1·37860	1·38242	1·38628	1·39016	46
44	1·39016	1·39409	1·39804	1·40203	1·40606	1·41012	1·41421	45

COSECANT.

	60′	50′	40′	30′	20′	10′	0′	Degrees

DORMAN, LONG & CO. LIMITED.

COSECANT.

Degrees	0′	10′	20′	30′	40′	50′	60′	
0	..	343·77516	171·88831	114·59301	85·94561	68·75736	57·29869	89
1	57·29869	49·11406	42·97571	38·20155	34·38232	31·25758	28·65371	88
2	28·65371	26·45051	24·56212	22·92559	21·49368	20·23028	19·10732	87
3	19·10732	18·10262	17·19843	16·38041	15·63679	14·95788	14·33559	86
4	14·33559	13·76312	13·23472	12·74550	12·29125	11·86837	11·47371	85
5	11·47371	11·10455	10·75849	10·43343	10·12752	9·83912	9·56677	84
6	9·56677	9·30917	9·06515	8·83367	8·61379	8·40466	8·20551	83
7	8·20551	8·01565	7·83443	7·66130	7·49571	7·33719	7·18530	82
8	7·18530	7·03962	6·89979	6·76547	6·63633	6·51208	6·39245	81
9	6·39245	6·27719	6·16607	6·05886	5·95536	5·85539	5·75877	80
10	5·75877	5·66533	5·57493	5·48740	5·40263	5·32049	5·24084	79
11	5·24084	5·16359	5·08863	5·01585	4·94517	4·87649	4·80973	78
12	4·80973	4·74482	4·68167	4·62023	4·56041	4·50216	4·44541	77
13	4·44541	4·39012	4·33622	4·28366	4·23239	4·18238	4·13357	76
14	4·13357	4·08591	4·03938	3·99393	3·94952	3·90613	3·86370	75
15	3·86370	3·82223	3·78166	3·74198	3·70315	3·66515	3·62796	74
16	3·62796	3·59154	3·55587	3·52094	3·48671	3·45317	3·42030	73
17	3·42030	3·38808	3·35649	3·32551	3·29512	3·26531	3·23607	72
18	3·23607	3·20737	3·17920	3·15155	3·12440	3·09774	3·07155	71
19	3·07155	3·04584	3·02057	2·99574	2·97135	2·94737	2·92380	70
20	2·92380	2·90063	2·87785	2·85545	2·83342	2·81175	2·79043	69
21	2·79043	2·76945	2·74881	2·72850	2·70851	2·68884	2·66947	68
22	2·66947	2·65040	2·63162	2·61313	2·59491	2·57698	2·55930	67
23	2·55930	2·54190	2·52474	2·50784	2·49119	2·47477	2·45859	66
24	2·45859	2·44264	2·42692	2·41142	2·39614	2·38107	2·36620	65
25	2·36620	2·35154	2·33708	2·32282	2·30875	2·29487	2·28117	64
26	2·28117	2·26766	2·25432	2·24116	2·22817	2·21535	2·20269	63
27	2·20269	2·19019	2·17786	2·16568	2·15366	2·14178	2·13005	62
28	2·13005	2·11847	2·10704	2·09574	2·08458	2·07356	2·06267	61
29	2·06267	2·05191	2·04128	2·03077	2·02039	2·01014	2·00000	60
30	2·00000	1·98998	1·98008	1·97029	1·96062	1·95106	1·94160	59
31	1·94160	1·93226	1·92302	1·91388	1·90485	1·89591	1·88708	58
32	1·88708	1·87834	1·86990	1·86116	1·85271	1·84435	1·83608	57
33	1·83608	1·82790	1·81981	1·81180	1·80388	1·79604	1·78829	56
34	1·78829	1·78062	1·77303	1·76552	1·75808	1·75073	1·74345	55
35	1·74345	1·73624	1·72911	1·72205	1·71506	1·70815	1·70130	54
36	1·70130	1·69452	1·68782	1·68117	1·67460	1·66809	1·66164	53
37	1·66164	1·65526	1·64894	1·64268	1·63648	1·63035	1·62427	52
38	1·62427	1·61825	1·61229	1·60639	1·60054	1·59475	1·58902	51
39	1·58902	1·58333	1·57771	1·57213	1·56661	1·56114	1·55572	50
40	1·55572	1·55036	1·54504	1·53977	1·53455	1·52938	1·52425	49
41	1·52425	1·51918	1·51415	1·50916	1·50422	1·49933	1·49448	48
42	1·49448	1·48967	1·48491	1·48019	1·47551	1·47087	1·46628	47
43	1·46628	1·46173	1·45721	1·45274	1·44831	1·44391	1·43956	46
44	1·43956	1·43524	1·43096	1·42672	1·42251	1·41835	1·41421	45
	60′	50′	40′	30′	20′	10′	0′	Degrees

SECANT.

DORMAN, LONG & CO. LIMITED.

WEIGHTS AND MEASURES.

LINEAR MEASURE.

Inches	Feet	Yards	Poles	Furlongs	Mile
1·	·08333	·02778	·0050505	·00012626	·00001578
12	1·	·33333	·0606061	·00151515	·00018939
36	3·	1·	·1818182	·00454545	·00056818
198	16·5	5·5	1·	·025	·003125
7920	660·	220·	40·	1·	·125
63360	5280·	1760·	320·	8·	1·

SURVEYING MEASURE (LINEAL).

Inches	Links	Feet	Yards	Chains	Mile
1·	·126	·0833	·0278	·00126	·0000158
7·92	1·	·66	·22	·01	·000125
12·	1·515	1·	·333	·01515	·000189
36·	4·545	3·	1·	·04545	·000568
792·	100·	66·	22·	1·	·0125
63360·	8000·	5280·	1760·	80·	1·

CUBIC MEASURE.

Inches	Feet	Yards
1	·0005787	·00002143
1728	1·	·03704
46656	27·	1·

WEIGHTS AND MEASURES.

SQUARE MEASURE.

Square Inches	Square Feet	Square Yards	Square Poles	Roods	Acres	Square Mile
1	·00694	·000772	....	....	....	....
144	1·	·11111	·003673	....	....	....
1296	9·	1·	·033058	·000826	....	....
..	272·25	30·25	1·	·025	·00625	....
..	10890·	1210·	40·	1·	·25	·0003906
..	43560·	4840·	160·	4·	1·	·0015615
..	....	3097600·	102400·	2560·	640·	1·

MEASURE OF CAPACITY.

Pints	Quarts	Gallons	Pecks	Bushels	Quarters	Cubic Inches
1	·5	·125	·0625	·015625	·001953125	34·683
2	1·	·25	·125	·03125	·00390625	69·366
8	4·	1·	·5	·125	·015625	277·463
16	8·	2·	1·	·25	·03125	554·926
64	32·	8·	4·	1·	·125	2219·704
512	256·	64·	32·	8·	1·	17757·632

AVOIRDUPOIS WEIGHT.

Grains	Drams	Ounces	Pounds	Hundred-weights	Gross Ton
1·	·03657	·002286	·000143	·00000128	·0000000637
27·34375	1·	·0625	·003906	·00003488	·000001744
437·5	16·	1·	·0625	·00055804	·00002790
7000·	256·	16·	1·	·0089286	·0004464
784000·	28672·	1792·	112·	1·	·05
15680000·	573440·	35840·	2240·	20·	1·

DORMAN, LONG & CO. LIMITED.

METRIC MEASURES.

LINEAR MEASURE.

Millimetres	Centimetres	Decimetres	Metres	Dekametres	Hectometres	Kilometre
1	·1	·01	·001	·0001	·00001	·000001
·10	1·	·1	·01	·001	·0001	·00001
100	10·	1·	·1	·01	·001	·0001
·1000	100·	10·	1·	·1	·01	·001
10000	1000·	100·	10·	1·	·1	·01
100000	10000·	1000·	100·	10·	·1·	·1
1000000	100000·	10000·	1000·	100·	10·	1·

SQUARE MEASURE.

Square Centimetres	Square Decimetres	Square Metres	Ares or Square Dekametres	Hectare or Square Hectometre
1	·01	·0001	·000001	·00000001
100	1·	·01	·0001	·000001
10000	100·	1·	·01	·0001
1000000	10000·	100·	1·	·01
100000000	1000000·	10000·	100·	1·

CUBIC MEASURE.

Cubic Centimetres	Cubic Decimetres	Cubic Metre
1	·001	·000001
1000	1·	·001
1000000	1000·	1·

DORMAN, LONG & CO. LIMITED.

METRIC MEASURES.

MEASURES OF CAPACITY.

Millilitres	Centilitres	Decilitres	Litres	Dekalitres	Hectolitres	Kilolitre
1	·1	·01	·001	·0001	·00001	·000001
10	1·	·1	·01	·001	·0001	·00001
100	10·	1·	·1	·01	·001	·0001
1000	100·	10·	1·	·1	·01	·001
10000	1000·	100·	10·	1·	·1	·01
100000	10000·	1000·	100·	10·	1·	·1
1000000	100000·	10000·	1000·	100·	10·	1·

WEIGHTS.

Milli-grammes	Centi-grammes	Deci-grammes	Grammes	Deka-grammes	Hecto-grammes	Kilo-gramme
1	·1	·01	·001	·0001	·00001	·000001
10	1·	·1	·01	·001	·0001	·00001
100	10·	1·	·1	·01	·001	·0001
1000	100·	10·	1·	·1	·01	·001
10000	1000·	100·	10·	1·	·1	·01
100000	10000·	1000·	100·	10·	1·	·1
1000000	100000·	10000·	1000·	100·	10·	1·

DORMAN, LONG & CO. LIMITED.

METRICAL EQUIVALENTS OF BRITISH UNITS.

LINEAR MEASURE.

British Units		Metrical Equivalents	Metrical Units		British Equivalents
1 inch	=	2·5399541 centimetres	1 millimetre	=	·03937 inches
1 ,,	=	·02539954 metres	1 centimetre	=	·393708 ,,
1 foot	=	·30479449 ,,	1 metre	=	39·37079 ,,
1 yard	=	·91438348 ,,	1 ,,	=	3·2808992 feet
1 fathom	=	1·82876696 ,,	1 ,,	=	1·093633 yards
1 pole	=	5·02911 ,,	1 kilometre	=	1093·63306 ,,
1 chain	=	20·116437 ,,	1 ,,	=	49·71059 chains
1 furlong	=	201·16437 ,,	1 ,,	=	3280·89917 feet
1 mile	=	1609·31493 ,,	1 ,,	=	·6213824 mile

SQUARE MEASURE.

British Units		Metrical Equivalents	Metrical Units		British Equivalents
1 sq. inch	=	6·451367 sq. centimetres	1 sq. centimetre	=	·1550059 sq. inch
1 ,, foot	=	·09289968 sq. metre	1 ,, metre	=	10·7642994 ,, feet
1 ,, yard	=	·8360971 ,, ,,	1 ,, ,,	=	1·1960333 ,, yards
1 ,, ,,	=	·008360971 are	1 are	=	119·60333 ,, ,,
1 acre	=	·404671 hectare	1 hectare	=	2·47114 acres
1 sq. mile	=	258·98945 ,,	1 ,,	=	·0038612 sq. mile

CUBIC MEASURE.

British Units		Metrical Equivalents	Metrical Units		British Equivalents
1 cubic inch	=	16·3861759 cubic centimetres	1 cubic centimetre	=	·06102705 cubic inch
1 ,, foot	=	·02831531 ,, metre	1 ,, metre	=	35·31658074 ,, feet
1 ,, yard	=	·76451342 ,, ,,	1 ,, ,,	=	1·30802151 ,, yards

CAPACITY.

British Units		Metrical Equivalents	Metrical Units		British Equivalents
1 cubic inch	=	16·386176 millilitres	1 millilitre	=	·061027 cubic inch
1 ,, ,,	=	1·6386176 centilitres	1 centilitre	=	·61027 ,, ,,
1 gill	=	14·1983 ,,	1 ,,	=	·07043 gill
1 pint	=	·567932 litres	1 litre	=	1·76077 pints
1 quart	=	1·135864 ,,	1 ,,	=	·880387 quart
1 gallon	=	4·543458 ,,	1 ,,	=	·2200967 gallons
1 ,,	=	·4543458 dekalitres	1 dekalitre	=	2·20097 ,,
1 bushel	=	3·634766 ,,	1 ,,	=	·275121 bushels
1 ,,	=	·3634766 hectolitre	1 hectolitre	=	2·75121 ,,

METRIC EQUIVALENTS OF BRITISH UNITS.

WEIGHT.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
Avoirdupois			Avoirdupois
1 grain	= 64·79895 milligrammes	1 milligramme	= ·01543235 grains
1 "	= 6·479895 centigrammes	1 centigramme	= ·1543235 "
1 "	= ·06479895 grammes	1 gramme	= 15·43235 "
1 ounce	= 28·34954 "	1 "	= ·0352739 ounces
1 "	= ·02834954 kilogrammes	1 kilogramme	= 35·27394 "
1 pound	= ·45359265 "	1 "	= 2·20462125 pounds
1 hundredweight	= ·50802377 quintals	1 quintal	= 1·96841 hundredweights
1 ton	= 1·01604754 milliers or tonnes	1 millier or tonne	= ·98420591 tons
		1 " "	= 2204·6 pounds

MISCELLANEOUS COMPOUND MEASURES.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
1 foot per second	= ·3048 metres per second	1 metre per second	= 3·2809 feet per second
1 foot per minute	= ·3048 metres per minute	1 metre per minute	= 3·2809 feet per minute
1 mile per hour	= 1·6093 kilometres per hour	1 kilometre per hour	= ·6214 miles per hour
1 pound per foot	= 1·48819 kilogrammes per metre	1 kilogramme per metre	= ·67196 pounds per foot
1 pound per yard	= ·49606 kilogrammes per metre	1 kilogramme per metre	= 2·01587 pounds per yard
1 pound per square inch	= ·07031 kilogrammes per square centimetre	1 kilogramme per square centimetre	= 14·22282 pounds per square inch
1 pound per square foot	= 4·88261 kilogrammes per square metre	1 kilogramme per square metre	= ·20481 pounds per square foot
1 ton per square inch	= 1·57493 kilogrammes per square millimetre	1 kilogramme per square millimetre	= ·63495 tons per square inch
1 ton per square foot	= 10·93704 tonnes per square metre	1 tonne per square metre	= ·09143 tons per square foot
1 pound per cubic inch	= ·02768 kilogrammes per cubic centimetre	1 kilogramme per cubic centimetre	= 36·1253 pounds per cubic inch
1 pound per cubic foot	= 16·019 kilogrammes per cubic metre	1 kilogramme per cubic metre	= ·0624245 pounds per cubic foot
1 pound per cubic yard	= ·5933 kilogrammes per cubic metre	1 kilogramme per cubic metre	= 1·68546 pounds per cubic yard
1 pound per gallon	= ·09983 kilogrammes per litre	1 kilogramme per litre	= 10·0166 pounds per gallon

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS IN MILLIMETRES

OF INCHES AND FRACTIONS OF AN INCH ADVANCING BY 32NDS.

Inches	0″	1″	2″	3″	4″	5″
0	..	25·400	50·799	76·199	101·598	126·998
1/32	·794	26·193	51·593	76·992	102·392	127·791
1/16	1·587	26·987	52·387	77·786	103·186	128·585
3/32	2·381	27·781	53·180	78·580	103·979	129·379
1/8	3·175	28·574	53·974	79·374	104·773	130·173
5/32	3·969	29·368	54·768	80·167	105·567	130·966
3/16	4·762	30·162	55·561	80·961	106·361	131·760
7/32	5·556	30·956	56·355	81·755	107·154	132·554
1/4	6·350	31·749	57·149	82·549	107·948	133·348
9/32	7·144	32·543	57·943	83·342	108·742	134·141
5/16	7·937	33·337	58·736	84·136	109·536	134·935
11/32	8·731	34·131	59·530	84·930	110·329	135·729
3/8	9·525	34·924	60·324	85·723	111·123	136·523
13/32	10·319	35·718	61·118	86·517	111·917	137·316
7/16	11·112	36·512	61·911	87·311	112·710	138·110
15/32	11·906	37·306	62·705	88·105	113·504	138·904
1/2	12·700	38·099	63·499	88·898	114·298	139·697
17/32	13·494	38·893	64·293	89·692	115·092	140·491
9/16	14·287	39·687	65·086	90·486	115·885	141·285
19/32	15·081	40·481	65·880	91·280	116·679	142·079
5/8	15·875	41·274	66·674	92·073	117·473	142·872
21/32	16·668	42·068	67·468	92·867	118·267	143·666
11/16	17·462	42·862	68·261	93·661	119·060	144·460
23/32	18·256	43·655	69·055	94·455	119·854	145·254
3/4	19·050	44·449	69·849	95·248	120·648	146·047
25/32	19·843	45·243	70·642	96·042	121·442	146·841
13/16	20·637	46·037	71·436	96·836	122·235	147·635
27/32	21·431	46·830	72·230	97·629	123·029	148·429
7/8	22·225	47·624	73·024	98·423	123·823	149·222
29/32	23·018	48·418	73·817	99·217	124·616	150·016
15/16	23·812	49·212	74·611	100·011	125·410	150·810
31/32	24·606	50·005	75·405	100·804	126·204	151·604

12 Inches = 304·794 Millimetres.

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS IN MILLIMETRES

OF INCHES AND FRACTIONS OF AN INCH ADVANCING BY 32NDS.

Inches	6″	7″	8″	9″	10″	11″
… … 0	152·397	177·797	203·196	228·596	253·995	279·395
1/32 … …	153·191	178·591	203·990	229·390	254·789	280·189
… 1/16 …	153·985	179·384	204·784	230·183	255·583	280·982
3/32 … …	154·778	180·178	205·578	230·977	256·377	281·776
… … 1/8	155·572	180·972	206·371	231·771	257·170	282·570
5/32 … …	156·366	181·765	207·165	232·565	257·964	283·364
… 3/16 …	157·160	182·559	207·959	233·358	258·758	284·157
7/32 … …	157·953	183·353	208·752	234·152	259·552	284·951
… … 1/4	158·747	184·147	209·546	234·946	260·345	285·745
9/32 … …	159·541	184·940	210·340	235·739	261·139	286·539
… 5/16 …	160·335	185·734	211·134	236·533	261·933	287·332
11/32 … …	161·128	186·528	211·927	237·327	262·727	288·126
… … 3/8	161·922	187·322	212·721	238·121	263·520	288·920
13/32 … …	162·716	188·115	213·515	238·914	264·314	289·714
… 7/16 …	163·510	188·909	214·309	239·708	265·108	290·507
15/32 … …	164·303	189·703	215·102	240·502	265·901	291·301
… … 1/2	165·097	190·497	215·896	241·296	266·695	292·095
17/32 … …	165·891	191·290	216·690	242·089	267·489	292·888
… 9/16 …	166·684	192·084	217·484	242·883	268·283	293·682
19/32 … …	167·478	192·878	218·277	243·677	269·076	294·476
… … 5/8	168·272	193·672	219·071	244·471	269·870	295·270
21/32 … …	169·066	194·465	219·865	245·264	270·664	296·063
… 11/16 …	169·859	195·259	220·659	246·058	271·458	296·857
23/32 … …	170·653	196·053	221·452	246·852	272·251	297·651
… … 3/4	171·447	196·846	222·246	247·646	273·045	298·445
25/32 … …	172·241	197·640	223·040	248·439	273·839	299·238
… 13/16 …	173·034	198·434	223·833	249·233	274·633	300·032
27/32 … …	173·828	199·228	224·627	250·027	275·426	300·826
… … 7/8	174·622	200·021	225·421	250·820	276·220	301·620
29/32 … …	175·416	200·815	226·215	251·614	277·014	302·413
… 15/16 …	176·209	201·609	227·008	252·408	277·807	303·207
31/32 … …	177·003	202·403	227·802	253·202	278·601	304·001

12 Inches = 304·794 Millimetres.

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches
1	·039	51	2·008	101	3·976	151	5·945	201	7·913
2	·079	52	2·047	102	4·016	152	5·984	202	7·953
3	·118	53	2·087	103	4·055	153	6·024	203	7·992
4	·157	54	2·126	104	4·095	154	6·063	204	8·032
5	·197	55	2·165	105	4·134	155	6·102	205	8·071
6	·236	56	2·205	106	4·173	156	6·142	206	8·110
7	·276	57	2·244	107	4·213	157	6·181	207	8·150
8	·315	58	2·283	108	4·252	158	6·221	208	8·189
9	·354	59	2·323	109	4·291	159	6·260	209	8·228
10	·394	60	2·362	110	4·331	160	6·299	210	8·268
11	·433	61	2·402	111	4·370	161	6·339	211	8·307
12	·472	62	2·441	112	4·409	162	6·378	212	8·347
13	·512	63	2·480	113	4·449	163	6·417	213	8·386
14	·551	64	2·520	114	4·488	164	6·457	214	8·425
15	·591	65	2·559	115	4·528	165	6·496	215	8·465
16	·630	66	2·598	116	4·567	166	6·535	216	8·504
17	·669	67	2·638	117	4·606	167	6·575	217	8·543
18	·709	68	2·677	118	4·646	168	6·614	218	8·583
19	·748	69	2·717	119	4·685	169	6·654	219	8·622
20	·787	70	2·756	120	4·724	170	6·693	220	8·661
21	·827	71	2·795	121	4·764	171	6·732	221	8·701
22	·866	72	2·835	122	4·803	172	6·772	222	8·740
23	·906	73	2·874	123	4·843	173	6·811	223	8·780
24	·945	74	2·913	124	4·882	174	6·850	224	8·819
25	·984	75	2·953	125	4·921	175	6·890	225	8·858
26	1·024	76	2·992	126	4·961	176	6·929	226	8·898
27	1·063	77	3·032	127	5·000	177	6·969	227	8·937
28	1·102	78	3·071	128	5·039	178	7·008	228	8·976
29	1·142	79	3·110	129	5·079	179	7·047	229	9·016
30	1·181	80	3·150	130	5·118	180	7·087	230	9·055
31	1·220	81	3·189	131	5·158	181	7·126	231	9·095
32	1·260	82	3·228	132	5·197	182	7·165	232	9·134
33	1·299	83	3·268	133	5·236	183	7·205	233	9·173
34	1·339	84	3·307	134	5·276	184	7·244	234	9·213
35	1·378	85	3·346	135	5·315	185	7·284	235	9·252
36	1·417	86	3·386	136	5·354	186	7·323	236	9·291
37	1·457	87	3·425	137	5·394	187	7·362	237	9·331
38	1·496	88	3·465	138	5·433	188	7·402	238	9·370
39	1·535	89	3·504	139	5·472	189	7·441	239	9·410
40	1·575	90	3·543	140	5·512	190	7·480	240	9·449
41	1·614	91	3·583	141	5·551	191	7·520	241	9·488
42	1·654	92	3·622	142	5·591	192	7·559	242	9·528
43	1·693	93	3·661	143	5·630	193	7·598	243	9·567
44	1·732	94	3·701	144	5·669	194	7·638	244	9·606
45	1·772	95	3·740	145	5·709	195	7·677	245	9·646
46	1·811	96	3·780	146	5·748	196	7·717	246	9·685
47	1·850	97	3·819	147	5·787	197	7·756	247	9·724
48	1·890	98	3·858	148	5·827	198	7·795	248	9·764
49	1·929	99	3·898	149	5·866	199	7·835	249	9·803
50	1·969	100	3·937	150	5·906	200	7·874	250	9·843

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches
251	9·882	301	11·850	351	13·819	401	15·788	451	17·756
252	9·921	302	11·890	352	13·858	402	15·827	452	17·795
253	9·961	303	11·929	353	13·898	403	15·866	453	17·835
254	10·000	304	11·969	354	13·937	404	15·906	454	17·874
255	10·039	305	12·008	355	13·977	405	15·945	455	17·914
256	10·079	306	12·047	356	14·016	406	15·984	456	17·953
257	10·118	307	12·087	357	14·055	407	16·024	457	17·992
258	10·158	308	12·126	358	14·095	408	16·063	458	18·032
259	10·197	309	12·165	359	14·134	409	16·103	459	18·071
260	10·236	310	12·205	360	14·173	410	16·142	460	18·110
261	10·276	311	12·244	361	14·213	411	16·181	461	18·150
262	10·315	312	12·284	362	14·252	412	16·221	462	18·189
263	10·354	313	12·323	363	14·291	413	16·260	463	18·229
264	10·394	314	12·362	364	14·331	414	16·299	464	18·268
265	10·433	315	12·402	365	14·370	415	16·339	465	18·307
266	10·473	316	12·441	366	14·410	416	16·378	466	18·347
267	10·512	317	12·480	367	14·449	417	16·417	467	18·386
268	10·551	318	12·520	368	14·488	418	16·457	468	18·425
269	10·591	319	12·559	369	14·528	419	16·496	469	18·465
270	10·630	320	12·599	370	14·567	420	16·536	470	18·504
271	10·669	321	12·638	371	14·606	421	16·575	471	18·543
272	10·709	322	12·677	372	14·646	422	16·614	472	18·583
273	10·748	323	12·717	373	14·685	423	16·654	473	18·622
274	10·787	324	12·756	374	14·725	424	16·693	474	18·662
275	10·827	325	12·795	375	14·764	425	16·732	475	18·701
276	10·866	326	12·835	376	14·803	426	16·772	476	18·740
277	10·906	327	12·874	377	14·843	427	16·811	477	18·780
278	10·945	328	12·913	378	14·882	428	16·851	478	18·819
279	10·984	329	12·953	379	14·921	429	16·890	479	18·858
280	11·024	330	12·992	380	14·961	430	16·929	480	18·898
281	11·063	331	13·032	381	15·000	431	16·969	481	18·937
282	11·102	332	13·071	382	15·040	432	17·008	482	18·977
283	11·142	333	13·110	383	15·079	433	17·047	483	19·016
284	11·181	334	13·150	384	15·118	434	17·087	484	19·055
285	11·221	335	13·189	385	15·158	435	17·126	485	19·095
286	11·260	336	13·228	386	15·197	436	17·166	486	19·134
287	11·299	337	13·268	387	15·236	437	17·205	487	19·173
288	11·339	338	13·307	388	15·276	438	17·244	488	19·213
289	11·378	339	13·347	389	15·315	439	17·284	489	19·252
290	11·417	340	13·386	390	15·354	440	17·323	490	19·292
291	11·457	341	13·425	391	15·394	441	17·362	491	19·331
292	11·496	342	13·465	392	15·433	442	17·402	492	19·370
293	11·536	343	13·504	393	15·473	443	17·441	493	19·410
294	11·575	344	13·543	394	15·512	444	17·480	494	19·449
295	11·614	345	13·583	395	15·551	445	17·520	495	19·488
296	11·654	346	13·622	396	15·591	446	17·559	496	19·528
297	11·693	347	13·662	397	15·630	447	17·599	497	19·567
298	11·732	348	13·701	398	15·669	448	17·638	498	19·606
299	11·772	349	13·740	399	15·709	449	17·677	499	19·646
300	11·811	350	13·780	400	15·748	450	17·717	500	19·685

EQUIVALENTS OF MILLIMETRES IN INCHES.

Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches
501	19·725	551	21·693	601	23·662	651	25·630	701	27·599
502	19·764	552	21·732	602	23·701	652	25·670	702	27·638
503	19·803	553	21·772	603	23·740	653	25·709	703	27·677
504	19·843	554	21·811	604	23·780	654	25·748	704	27·717
505	19·882	555	21·851	605	23·819	655	25·788	705	27·756
506	19·921	556	21·890	606	23·858	656	25·827	706	27·796
507	19·961	557	21·929	607	23·898	657	25·866	707	27·835
508	20·000	558	21·969	608	23·937	658	25·906	708	27·874
509	20·040	559	22·008	609	23·977	659	25·945	709	27·914
510	20·079	560	22·047	610	24·016	660	25·984	710	27·953
511	20·118	561	22·087	611	24·055	661	26·024	711	27·992
512	20·158	562	22·126	612	24·095	662	26·063	712	28·032
513	20·197	563	22·166	613	24·134	663	26·103	713	28·071
514	20·236	564	22·205	614	24·173	664	26·142	714	28·110
515	20·276	565	22·244	615	24·213	665	26·181	715	28·150
516	20·315	566	22·284	616	24·252	666	26·221	716	28·189
517	20·355	567	22·323	617	24·292	667	26·260	717	28·229
518	20·394	568	22·362	618	24·331	668	26·299	718	28·268
519	20·433	569	22·402	619	24·370	669	26·339	719	28·307
520	20·473	570	22·441	620	24·410	670	26·378	720	28·347
521	20·512	571	22·481	621	24·449	671	26·418	721	28·386
522	20·551	572	22·520	622	24·488	672	26·457	722	28·425
523	20·591	573	22·559	623	24·528	673	26·496	723	28·465
524	20·630	574	22·599	624	24·567	674	26·536	724	28·504
525	20·669	575	22·638	625	24·607	675	26·575	725	28·544
526	20·709	576	22·677	626	24·646	676	26·614	726	28·583
527	20·748	577	22·717	627	24·685	677	26·654	727	28·622
528	20·788	578	22·756	628	24·725	678	26·693	728	28·662
529	20·827	579	22·795	629	24·764	679	26·733	729	28·701
530	20·866	580	22·835	630	24·803	680	26·772	730	28·740
531	20·906	581	22·874	631	24·843	681	26·811	731	28·780
532	20·945	582	22·914	632	24·882	682	26·851	732	28·819
533	20·984	583	22·953	633	24·921	683	26·890	733	28·859
534	21·024	584	22·992	634	24·961	684	26·929	734	28·898
535	21·063	585	23·032	635	25·000	685	26·969	735	28·937
536	21·103	586	23·071	636	25·040	686	27·008	736	28·977
537	21·142	587	23·110	637	25·079	687	27·047	737	29·016
538	21·181	588	23·150	638	25·118	688	27·087	738	29·055
539	21·221	589	23·189	639	25·158	689	27·126	739	29·095
540	21·260	590	23·229	640	25·197	690	27·166	740	29·134
541	21·299	591	23·268	641	25·236	691	27·205	741	29·173
542	21·339	592	23·307	642	25·276	692	27·244	742	29·213
543	21·378	593	23·347	643	25·315	693	27·284	743	29·252
544	21·418	594	23·385	644	25·355	694	27·323	744	29·292
545	21·457	595	23·424	645	25·394	695	27·362	745	29·331
546	21·496	596	23·464	646	25·433	696	27·402	746	29·370
547	21·536	597	23·503	647	25·473	697	27·441	747	29·410
548	21·575	598	23·543	648	25·512	698	27·481	748	29·449
549	21·614	599	23·582	649	25·551	699	27·520	749	29·488
550	21·654	600	23·622	650	25·591	700	27·559	750	29·528

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches	Millimetres	Inches
751	29·567	801	31·536	851	33·504	901	35·473	951	37·441
752	29·607	802	31·575	852	33·544	902	35·512	952	37·481
753	29·646	803	31·614	853	33·583	903	35·552	953	37·520
754	29·685	804	31·654	854	33·622	904	35·591	954	37·559
755	29·725	805	31·693	855	33·662	905	35·630	955	37·599
756	29·764	806	31·733	856	33·701	906	35·670	956	37·638
757	29·803	807	31·772	857	33·740	907	35·709	957	37·677
758	29·843	808	31·811	858	33·780	908	35·748	958	37·717
759	29·882	809	31·851	859	33·819	909	35·788	959	37·756
760	29·922	810	31·890	860	33·859	910	35·827	960	37·796
761	29·961	811	31·929	861	33·898	911	35·866	961	37·835
762	30·000	812	31·969	862	33·937	912	35·906	962	37·874
763	30·040	813	32·008	863	33·977	913	35·945	963	37·914
764	30·079	814	32·048	864	34·016	914	35·985	964	37·953
765	30·118	815	32·087	865	34·055	915	36·024	965	37·992
766	30·158	816	32·126	866	34·095	916	36·063	966	38·032
767	30·197	817	32·166	867	34·134	917	36·103	967	38·071
768	30·236	818	32·205	868	34·174	918	36·142	968	38·111
769	30·276	819	32·244	869	34·213	919	36·181	969	38·150
770	30·315	820	32·284	870	34·252	920	36·221	970	38·189
771	30·355	821	32·323	871	34·292	921	36·260	971	38·229
772	30·394	822	32·362	872	34·331	922	36·300	972	38·268
773	30·433	823	32·402	873	34·370	923	36·339	973	38·307
774	30·473	824	32·441	874	34·410	924	36·378	974	38·347
775	30·512	825	32·481	875	34·449	925	36·418	975	38·386
776	30·551	826	32·520	876	34·488	926	36·457	976	38·426
777	30·591	827	32·559	877	34·528	927	36·496	977	38·465
778	30·630	828	32·599	878	34·567	928	36·536	978	38·504
779	30·670	829	32·638	879	34·607	929	36·575	979	38·544
780	30·709	830	32·677	880	34·646	930	36·615	980	38·583
781	30·748	831	32·717	881	34·685	931	36·654	981	38·622
782	30·788	832	32·756	882	34·725	932	36·693	982	38·662
783	30·827	833	32·796	883	34·764	933	36·733	983	38·701
784	30·866	834	32·835	884	34·803	934	36·772	984	38·741
785	30·906	835	32·874	885	34·843	935	36·811	985	38·780
786	30·945	836	32·914	886	34·882	936	36·851	986	38·819
787	30·985	837	32·953	887	34·922	937	36·890	987	38·859
788	31·024	838	32·992	888	34·961	938	36·929	988	38·898
789	31·063	839	33·032	889	35·000	939	36·969	989	38·937
790	31·103	840	33·071	890	35·040	940	37·008	990	38·977
791	31·142	841	33·111	891	35·079	941	37·048	991	39·016
792	31·181	842	33·150	892	35·118	942	37·087	992	39·055
793	31·221	843	33·189	893	35·158	943	37·126	993	39·095
794	31·260	844	33·229	894	35·197	944	37·166	994	39·134
795	31·299	845	33·268	895	35·237	945	37·205	995	39·174
796	31·339	846	33·307	896	35·276	946	37·244	996	39·213
797	31·378	847	33·347	897	35·315	947	37·284	997	39·252
798	31·418	848	33·386	898	35·355	948	37·323	998	39·292
799	31·457	849	33·425	899	35·394	949	37·363	999	39·331
800	31·496	850	33·465	900	35·433	950	37·402	1000	39·370

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF METRES IN FEET.

1 Metre = 3·280899 Feet.

Metres	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·3281	·6562	·9843	1·3124	1·6404	1·9685	2·2966	2·6247	2·9528
1	3·2809	3·6090	3·9371	4·2652	4·5933	4·9213	5·2494	5·5775	5·9056	6·2337
2	6·5618	6·8899	7·2180	7·5461	7·8742	8·2022	8·5303	8·8584	9·1865	9·5146
3	9·8427	10·1708	10·4989	10·8270	11·1551	11·4831	11·8112	12·1393	12·4674	12·7955
4	13·1236	13·4517	13·7798	14·1079	14·4360	14·7640	15·0921	15·4202	15·7483	16·0764
5	16·4045	16·7326	17·0607	17·3888	17·7169	18·0449	18·3730	18·7011	19·0292	19·3573
6	19·6854	20·0135	20·3416	20·6697	20·9978	21·3258	21·6539	21·9820	22·3101	22·6382
7	22·9663	23·2944	23·6225	23·9506	24·2787	24·6067	24·9348	25·2629	25·5910	25·9191
8	26·2472	26·5753	26·9034	27·2315	27·5596	27·8876	28·2157	28·5438	28·8719	29·2000
9	29·5281	29·8562	30·1843	30·5124	30·8405	31·1685	31·4966	31·8247	32·1528	32·4809
10	32·8090	33·1371	33·4652	33·7933	34·1213	34·4494	34·7775	35·1056	35·4337	35·7618

EQUIVALENTS OF FEET IN METRES.

1 Foot = ·3047945 of a Metre.

Feet	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·03048	·06096	·09144	·12192	·15240	·18288	·21336	·24384	·27432
1	·30480	·33527	·36575	·39623	·42671	·45719	·48767	·51815	·54863	·57911
2	·60959	·64007	·67055	·70103	·73151	·76199	·79247	·82295	·85342	·88390
3	·91438	·94486	·97534	1·00582	1·03630	1·06678	1·09726	1·12774	1·15822	1·18870
4	1·21918	1·24966	1·28014	1·31062	1·34110	1·37158	1·40205	1·43253	1·46301	1·49349
5	1·52397	1·55445	1·58493	1·61541	1·64589	1·67637	1·70685	1·73733	1·76781	1·79829
6	1·82877	1·85925	1·88973	1·92020	1·95068	1·98116	2·01164	2·04212	2·07260	2·10308
7	2·13356	2·16404	2·19452	2·22500	2·25548	2·28596	2·31644	2·34692	2·37740	2·40788
8	2·43836	2·46884	2·49931	2·52979	2·56027	2·59075	2·62123	2·65171	2·68219	2·71267
9	2·74315	2·77363	2·80411	2·83459	2·86507	2·89555	2·92603	2·95651	2·98699	3·01747
10	3·04794	3·07842	3·10890	3·13938	3·16986	3·20034	3·23082	3·26130	3·29178	3·32226

EQUIVALENTS OF SQUARE CENTIMETRES IN SQUARE INCHES.

1 Square Centimetre = ·1550059 of a Square Inch.

Square Cent.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·01550	·03100	·04650	·06200	·07750	·09300	·10850	·12400	·13951
1	·15501	·17051	·18601	·20151	·21701	·23251	·24801	·26351	·27901	·29451
2	·31001	·32551	·34101	·35651	·37201	·38751	·40301	·41852	·43402	·44952
3	·46502	·48052	·49602	·51152	·52702	·54252	·55802	·57352	·58902	·60452
4	·62002	·63552	·65102	·66652	·68203	·69753	·71303	·72853	·74403	·75953
5	·77503	·79053	·80603	·82153	·83703	·85253	·86803	·88353	·89903	·91453
6	·93004	·94554	·96104	·97654	·99204	1·00754	1·02304	1·03854	1·05404	1·06954
7	1·08504	1·10054	1·11604	1·13154	1·14704	1·16254	1·17804	1·19355	1·20905	1·22455
8	1·24005	1·25555	1·27105	1·28655	1·30205	1·31755	1·33305	1·34855	1·36405	1·37955
9	1·39505	1·41055	1·42605	1·44156	1·45706	1·47256	1·48806	1·50356	1·51906	1·53456
10	1·55006	1·56556	1·58106	1·59656	1·61206	1·62756	1·64306	1·65856	1·67406	1·68956

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF SQUARE INCHES IN SQUARE CENTIMETRES.

1 Square Inch = 6·451367 Square Centimetres.

Square Inches	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·6451	1·2903	1·9354	2·5805	3·2257	3·8708	4·5160	5·1611	5·8062
1	6·4514	7·0965	7·7416	8·3868	9·0319	9·6770	10·3222	10·9673	11·6125	12·2576
2	12·9027	13·5479	14·1930	14·8381	15·4833	16·1284	16·7736	17·4187	18·0638	18·7090
3	19·3541	19 9992	20·6444	21·2895	21·9346	22·5798	23·2249	23·8701	24·5152	25·1603
4	25·8055	26·4506	27·0957	27·7409	28·3860	29·0312	29·6763	30·3214	30·9666	31·6117
5	32·2568	32·9020	33·5471	34·1922	34·8374	35·4825	36·1277	36·7728	37·4179	38·0631
6	38·7082	39·3533	39·9985	40·6436	41·2887	41·9339	42·5790	43·2242	43·8693	44·5144
7	45·1596	45·8047	46·4498	47·0950	47·7401	48·3853	49·0304	49·6755	50·3207	50·9658
8	51·6109	52·2561	52·9012	53·5463	54·1915	54·8366	55·4818	56·1269	56·7720	57·4172
9	58·0623	58·7074	59·3526	59·9977	60·6428	61·2880	61·9331	62·5783	63·2234	63·8685
10	64·5137	65·1588	65·8039	66·4491	67·0942	67·7394	68·3845	69·0296	69·6748	70·3199

EQUIVALENTS OF SQUARE METRES IN SQUARE FEET.

1 Square Metre = 10·764299 Square Feet.

Square Metres	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	1·076	2·153	3·229	4·306	5·382	6·459	7·535	8·611	9·688
1	10·764	11·841	12·917	13·994	15·070	16·146	17·223	18·299	19·376	20·452
2	21·529	22·605	23·681	24·758	25·834	26·911	27·987	29·064	30·140	31·216
3	32·293	33·369	34·446	35·522	36·599	37·675	38·751	39·828	40·904	41·981
4	43·057	44·134	45·210	46·286	47·363	48·439	49·516	50·592	51·669	52·745
5	53·821	54·898	55·974	57·051	58·127	59·204	60·280	61·356	62·433	63·509
6	64·586	65·662	66·739	67·815	68·892	69·968	71·044	72·121	73·197	74·274
7	75·350	76·427	77·503	78·579	79·656	80·732	81·809	82·885	83·962	85·038
8	86·114	87·191	88·267	89·344	90·420	91·497	92·573	93·649	94·726	95·802
9	96·879	97·955	99·032	100·108	101·184	102·261	103·337	104·414	105·490	106·567
10	107·643	108·719	109·796	110·872	111·949	113·025	114·102	115·178	116·254	117·331

EQUIVALENTS OF SQUARE FEET IN SQUARE METRES.

1 Square Foot = ·0928997 of a Square Metre.

Square Feet	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·00929	·01858	·02787	·03716	·04645	·05574	·06503	·07432	·08361
1	·09290	·10219	·11148	·12077	·13006	·13935	·14864	·15793	·16722	·17651
2	·18580	·19509	·20438	·21367	·22296	·23225	·24154	·25083	·26012	·26941
3	·27870	·28799	·29728	·30657	·31586	·32515	·33444	·34373	·35302	·36231
4	·37160	·38089	·39018	·39947	·40876	·41805	·42734	·43663	·44592	·45521
5	·46450	·47379	·48308	·49237	·50166	·51095	·52024	·52953	·53882	·54811
6	·55740	·56669	·57598	·58527	·59456	·60385	·61314	·62243	·63172	·64101
7	·65030	·65959	·66888	·67817	·68746	·69675	·70604	·71533	·72462	·73391
8	·74320	·75249	·76178	·77107	·78036	·78965	·79894	·80823	·81752	·82681
9	·83610	·84539	·85468	·86397	·87326	·88255	·89184	·90113	·91042	·91971
10	·92900	·93829	·94758	·95687	·96616	·97545	·98474	·99403	1·00332	1·01261

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF CUBIC CENTIMETRES IN CUBIC INCHES.

1 Cubic Centimetre = ·06102705 of a Cubic Inch.

Cubic Cent.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·006103	·012205	·018308	·024411	·030514	·036616	·042719	·048822	·054924
1	·061027	·067130	·073232	·079335	·085438	·091541	·097643	·103746	·109849	·115951
2	·122054	·128157	·134260	·140362	·146465	·152568	·158670	·164773	·170876	·176978
3	·183081	·189184	·195287	·201389	·207492	·213595	·219697	·225800	·231903	·238005
4	·244108	·250211	·256314	·262416	·268519	·274622	·280724	·286827	·292930	·299033
5	·305135	·311238	·317341	·323443	·329546	·335649	·341751	·347854	·353957	·360060
6	·366162	·372265	·378368	·384470	·390573	·396676	·402779	·408881	·414984	·421087
7	·427189	·433292	·439395	·445497	·451600	·457703	·463806	·469908	·476011	·482114
8	·488216	·494319	·500422	·506525	·512627	·518730	·524833	·530935	·537038	·543141
9	·549243	·555346	·561449	·567552	·573654	·579757	·585860	·591962	·598065	·604168
10	·610271	·616373	·622476	·628579	·634681	·640784	·646887	·652989	·659092	·665195

EQUIVALENTS OF CUBIC INCHES IN CUBIC CENTIMETRES.

1 Cubic Inch = 16·386176 Cubic Centimetres.

Cubic Inches	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	1·639	3·277	4·916	6·554	8·193	9·832	11·470	13·109	14·748
1	16·386	18·025	19·663	21·302	22·941	24·579	26·218	27·856	29·495	31·134
2	32·772	34·411	36·050	37·688	39·327	40·965	42·604	44·243	45·881	47·520
3	49·158	50·797	52·436	54·074	55·713	57·352	58·990	60·629	62·267	63·906
4	65·545	67·183	68·822	70·461	72·099	73·738	75·376	77·015	78·654	80·292
5	81·931	83·569	85·208	86·847	88·485	90·124	91·763	93·401	95·040	96·678
6	98·317	99·956	101·594	103·233	104·872	106·510	108·149	109·787	111·426	113·065
7	114·703	116·342	117·980	119·619	121·258	122·896	124·535	126·174	127·812	129·451
8	131·089	132·728	134·367	136·005	137·644	139·282	140·921	142·560	144·198	145·837
9	147·476	149·114	150·753	152·391	154·030	155·669	157·307	158·946	160·585	162·223
10	163·862	165·500	167·139	168·778	170·416	172·055	173·693	175·332	176·971	178·609

EQUIVALENTS OF CUBIC METRES IN CUBIC FEET.

1 Cubic Metre = 35·31658 Cubic Feet.

Cubic Metres	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	3·532	7·063	10·595	14·127	17·658	21·190	24·722	28·253	31·785
1	35·317	38·848	42·380	45·912	49·443	52·975	56·507	60·038	63·570	67·101
2	70·633	74·165	77·696	81·228	84·760	88·291	91·823	95·355	98·886	102·418
3	105·950	109·481	113·013	116·545	120·076	123·608	127·140	130·671	134·203	137·735
4	141·266	144·798	148·330	151·861	155·393	158·925	162·456	165·988	169·520	173·051
5	176·583	180·115	183·646	187·178	190·710	194·241	197·773	201·305	204·836	208·368
6	211·899	215·431	218·963	222·494	226·026	229·558	233·089	236·621	240·153	243·684
7	247·216	250·748	254·279	257·811	261·343	264·874	268·406	271·938	275·469	279·001
8	282·533	286·064	289·596	293·128	296·659	300·191	303·723	307·254	310·786	314·318
9	317·849	321·381	324·913	328·444	331·976	335·508	339·039	342·571	346·103	349·634
10	353·166	356·697	360·229	363·761	367·292	370·824	374·356	377·887	381·419	384·951

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EQUIVALENTS OF CUBIC FEET IN CUBIC METRES.

1 Cubic Foot = ·02831531 of a Cubic Metre.

Cubic Feet	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·002832	·005663	·008495	·011326	·014158	·016989	·019821	·022652	·025484
1	·028315	·031147	·033978	·036810	·039641	·042473	·045304	·048136	·050968	·053799
2	·056631	·059462	·062294	·065125	·067957	·070788	·073620	·076451	·079283	·082114
3	·084946	·087777	·090609	·093441	·096272	·099104	·101935	·104767	·107598	·110430
4	·113261	·116093	·118924	·121756	·124587	·127419	·130250	·133082	·135913	·138745
5	·141577	·144408	·147240	·150071	·152903	·155734	·158566	·161397	·164229	·167060
6	·169892	·172723	·175555	·178386	·181218	·184050	·186881	·189713	·192544	·195376
7	·198207	·201039	·203870	·206702	·209533	·212365	·215196	·218028	·220859	·223691
8	·226522	·229354	·232186	·235017	·237849	·240680	·243512	·246343	·249175	·252006
9	·254838	·257669	·260501	·263332	·266164	·268995	·271827	·274659	·277490	·280322
10	·283153	·285985	·288816	·291648	·294479	·297311	·300142	·302974	·305805	·308637

EQUIVALENTS OF KILOGRAMMES IN POUNDS.

1 Kilogramme = 2·20462125 Pounds.

Kilogrammes	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·2205	·4409	·6614	·8818	1·1023	1·3228	1·5432	1·7637	1·9842
1	2·2046	2·4251	2·6455	2·8660	3·0865	3·3069	3·5274	3·7479	3·9683	4·1888
2	4·4092	4·6297	4·8502	5·0706	5·2911	5·5116	5·7320	5·9525	6·1729	6·3934
3	6·6139	6·8343	7·0548	7·2752	7·4957	7·7162	7·9366	8·1571	8·3776	8·5980
4	8·8185	9·0389	9·2594	9·4799	9·7003	9·9208	10·1413	10·3617	10·5822	10·8026
5	11·0231	11·2436	11·4640	11·6845	11·9050	12·1254	12·3459	12·5663	12·7868	13·0073
6	13·2277	13·4482	13·6687	13·8891	14·1096	14·3300	14·5505	14·7710	14·9914	15·2119
7	15·4323	15·6528	15·8733	16·0937	16·3142	16·5347	16·7551	16·9756	17·1960	17·4165
8	17·6370	17·8574	18·0779	18·2984	18·5188	18·7393	18·9597	19·1802	19·4007	19·6211
9	19·8416	20·0621	20·2825	20·5030	20·7234	20·9439	21·1644	21·3848	21·6053	21·8258
10	22·0462	22·2667	22·4871	22·7076	22·9281	23·1485	23·3690	23·5894	23·8099	24·0304

EQUIVALENTS OF POUNDS IN KILOGRAMMES.

1 Pound = ·45359265 of a Kilogramme.

Pounds	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·04536	·09072	·13608	·18144	·22680	·27216	·31751	·36287	·40823
1	·45359	·49895	·54431	·58967	·63503	·68039	·72575	·77111	·81647	·86183
2	·90719	·95254	·99790	1·04326	1·08862	1·13398	1·17934	1·22470	1·27006	1·31542
3	1·36078	1·40614	1·45150	1·49686	1·54222	1·58757	1·63293	1·67829	1·72365	1·76901
4	1·81437	1·85973	1·90509	1·95045	1·99581	2·04117	2·08653	2·13189	2·17724	2·22260
5	2·26796	2·31332	2·35868	2·40404	2·44940	2·49476	2·54012	2·58548	2·63084	2·67620
6	2·72156	2·76692	2·81227	2·85763	2·90299	2·94835	2·99371	3·03907	3·08443	3·12979
7	3·17515	3·22051	3·26587	3·31123	3·35659	3·40194	3·44730	3·49266	3·53802	3·58338
8	3·62874	3·67410	3·71946	3·76482	3·81018	3·85554	3·90090	3·94626	3·99162	4·03697
9	4·08233	4·12769	4·17305	4·21841	4·26377	4·30913	4·35449	4·39985	4·44521	4·49057
10	4·53593	4·58129	4·62664	4·67200	4·71736	4·76272	4·80808	4·85344	4·89880	4·94416

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EQUIVALENTS OF KILOGRAMMES PER SQUARE CENTIMETRE IN POUNDS PER SQUARE INCH.

1 Kilogramme per Square Centimetre = 14·22282 Pounds per Square Inch.

Kilogram'e per Square Centimetre	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	1·422	2·845	4·267	5·689	7·111	8·534	9·956	11·378	12·801
1	14·223	15·645	17·067	18·490	19·912	21·334	22·757	24·179	25·601	27·023
2	28·446	29·868	31·290	32·712	34·135	35·557	36·979	38·402	39·824	41·246
3	42·668	44·091	45·513	46·935	48·358	49·780	51·202	52·624	54·047	55·469
4	56·891	58·314	59·736	61·158	62·580	64·003	65·425	66·847	68·270	69·692
5	71·114	72·536	73·959	75·381	76·803	78·226	79·648	81·070	82·492	83·915
6	85·337	86·759	88·181	89·604	91·026	92·448	93·871	95·293	96·715	98·137
7	99·560	100·982	102·404	103·827	105·249	106·671	108·093	109·516	110·938	112·360
8	113·783	115·205	116·627	118·049	119·472	120·894	122·316	123·739	125·161	126·583
9	128·005	129·428	130·850	132·272	133·695	135·117	136·539	137·961	139·384	140·806
10	142·228	143·650	145·073	146·495	147·917	149·340	150·762	152·184	153·606	155·029

EQUIVALENTS OF POUNDS PER SQUARE INCH IN KILOGRAMMES PER SQUARE CENTIMETRE.

1 Pound per Square Inch = ·07030954 of a Kilogramme per Square Centimetre.

Pounds	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·007031	·014062	·021093	·028124	·035155	·042186	·049217	·056248	·063279
1	·070310	·077340	·084371	·091402	·098433	·105464	·112495	·119526	·126557	·133588
2	·140619	·147650	·154681	·161712	·168743	·175774	·182805	·189836	·196867	·203898
3	·210929	·217960	·224991	·232021	·239052	·246083	·253114	·260145	·267176	·274207
4	·281238	·288269	·295300	·302331	·309362	·316393	·323424	·330455	·337486	·344517
5	·351548	·358579	·365610	·372641	·379672	·386702	·393733	·400764	·407795	·414826
6	·421857	·428888	·435919	·442950	·449981	·457012	·464043	·471074	·478105	·485136
7	·492167	·499198	·506229	·513260	·520291	·527322	·534353	·541383	·548414	·555445
8	·562476	·569507	·576538	·583569	·590600	·597631	·604662	·611693	·618724	·625755
9	·632786	·639817	·646848	·653879	·660910	·667941	·674972	·682003	·689033	·696064
10	·703095	·710126	·717157	·724188	·731219	·738250	·745281	·752312	·759343	·766374

EQUIVALENTS OF KILOGRAMMES PER METRE IN POUNDS PER FOOT.

1 Kilogramme per Metre = ·6719564 Pounds per Foot.

Kilo-grammes per Metre	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·0672	·1344	·2016	·2688	·3360	·4032	·4704	·5376	·6048
1	·6720	·7392	·8063	·8735	·9407	1·0079	1·0751	1·1423	1·2095	1·2767
2	1·3439	1·4111	1·4783	1·5455	1·6127	1·6799	1·7471	1·8143	1·8815	1·9487
3	2·0159	2·0831	2·1503	2·2175	2·2847	2·3518	2·4190	2·4862	2·5534	2·6206
4	2·6878	2·7550	2·8222	2·8894	2·9566	3·0238	3·0910	3·1582	3·2254	3·2926
5	3·3598	3·4270	3·4942	3·5614	3·6286	3·6958	3·7630	3·8302	3·8973	3·9645
6	4·0317	4·0989	4·1661	4·2333	4·3005	4·3677	4·4349	4·5021	4·5693	4·6365
7	4·7037	4·7709	4·8381	4·9053	4·9725	5·0397	5·1069	5·1741	5·2413	5·3085
8	5·3757	5·4428	5·5100	5·5772	5·6444	5·7116	5·7788	5·8460	5·9132	5·9804
9	6·0476	6·1148	6·1820	6·2492	6·3164	6·3836	6·4508	6·5180	6·5852	6·6524
10	6·7196	6·7868	6·8540	6·9212	6·9883	7·0555	7·1227	7·1899	7·2571	7·3243

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EQUIVALENTS OF POUNDS PER FOOT IN KILOGRAMMES PER METRE.

1 Pound per Foot = 1·4881918 Kilogrammes per Metre.

Pounds per Foot	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	..	·1488	·2976	·4465	·5953	·7441	·8929	1·0417	1·1906	1·3394
1	1·4882	1·6370	1·7858	1·9346	2·0835	2·2323	2·3811	2·5299	2·6787	2·8276
2	2·9764	3·1252	3·2740	3·4228	3·5717	3·7205	3·8693	4·0181	4·1669	4·3158
3	4·4646	4·6134	4·7622	4·9110	5·0599	5·2087	5·3575	5·5063	5·6551	5·8039
4	5·9528	6·1016	6·2504	6·3992	6·5480	6·6969	6·8457	6·9945	7·1433	7·2921
5	7·4410	7·5898	7·7386	7·8874	8·0362	8·1851	8·3339	8·4827	8·6315	8·7803
6	8·9292	9·0780	9·2268	9·3756	9·5244	9·6732	9·8221	9·9709	10·1197	10·2685
7	10·4173	10·5662	10·7150	10·8638	11·0126	11·1614	11·3103	11·4591	11·6079	11·7567
8	11·9055	12·0544	12·2032	12·3520	12·5008	12·6496	12·7984	12·9473	13·0961	13·2449
9	13·3937	13·5425	13·6914	13·8402	13·9890	14·1378	14·2866	14·4355	14·5843	14·7331
10	14·8819	15·0307	15·1796	15·3284	15·4772	15·6260	15·7748	15·9237	16·0725	16·2213

EQUIVALENTS OF MOMENTS OF INERTIA AND SECTION MODULI.

Moment of Inertia in centimetre units = Moment of Inertia in inch units × 41·62
Moment of Inertia in inch units = Moment of Inertia in centimetre units × ·024
Section Modulus in centimetre units = Section Modulus in inch units × 16·386
Section Modulus in inch units = Section Modulus in centimetre units × ·061

CONTRACTIONS GENERALLY ADOPTED.

Linear Measure	Square Measure	Cubic Measure	Capacity	Weight
km = kilometre	km^2 = sq. kilometre	km^3 = cub. kilom'tre	*hl* = hectolitre	*t* = tonne = 1000*kg*
m = metre	m^2 = " metre	m^3 = " metre	*l* = litre	*q* = quintal = 100*kg*
dm = decimetre	dm^2 = " decimetre	dm^3 = " decimetre	*dl* = decilitre	*kg* = kilogramme
cm = centimetre	cm^2 = " centimetre	cm^3 = " centimetre	*cl* = centilitre	*dkg* = dekagramme
mm = millimetre	mm^2 = " millimetre	mm^3 = " millimetre		*g* = gramme
	ha = hectare			*dg* = decigramme
	a = are			*cg* = centigramme
				mg = milligramme

ITALIC letters are used for these contractions, and no stop is used at the right of them.

The contractions succeed the figures to which they refer, on the same line and after the last decimal place, when decimals are used.

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COMPARISON OF WEIGHTS OF STEEL PLATES UP TO 1 INCH THICK.

Divided into 32nds and 40ths of an Inch, and Millimetres.

Millimetres	Weight in lbs. per sq. foot	32nds	16ths	20ths	40ths	Weight in lbs. per sq. foot	Millimetres
25	40·80	32	16	20	40	40·80	25
	39·525	31			39	39·78	
24	38·25	30	15	19	38	38·76	24
					37	37·74	
23	36·975	29		18	36	36·72	23
22	35·70	28	14		35	35·70	22
	34·425	27		17	34	34·68	
21					33	33·66	21
	33·15	26	13	16	32	32·64	
20	31·875	25			31	31·62	20
19	30·60	24	12	15	30	30·60	19
	29·325	23			29	29·58	
18				14	28	28·56	18
	28·05	22	11		27	27·54	
17				13	26	26·52	17
	26·775	21			25	25·50	
16	25·50	20	10	12	24	24·48	16
15	24·225	19			23	23·46	15
	22·95	18	9	11	22	22·44	
14					21	21·42	14
	21·675	17		10	20	20·40	
13	20·40	16	8		19	19·38	13
12	19·125	15		9	18	18·36	12
	17·85	14	7		17	17·34	
11				8	16	16·32	11
	16·575	13			15	15·30	
10	15·30	12	6	7	14	14·28	10
9	14·025	11			13	13·26	9
	12 75	10	5	6	12	12·24	
8					11	11·22	8
	11·475	9		5	10	10·20	
7					9	9·18	7
	10·20	8	4	4	8	8·16	
6	8·925	7			7	7·14	6
	7·65	6	3	3	6	6·12	
5					5	5·10	5
	6·375	5		2	4	4·08	
4					3	3·06	4
	5·10	4	2	1	2	2·04	
3					1	1·02	3
	3·825	3					
2							2
	2·55	2	1				
1							1
	1·275	1					

DORMAN, LONG & CO. LIMITED.

BRITISH STANDARD SPECIFICATION

FOR

STRUCTURAL STEEL

FOR

BRIDGES, ETC.,

AND

GENERAL BUILDING CONSTRUCTION.

(REVISED MAY, 1930.)

SPECIFICATION: TABLE OF CLAUSES.

APPENDIX.

NOTE.—*The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to include all the necessary provisions of a Contract.*

FOREWORD.

The British Standard Specification for Structural Steel for Bridges and General Building Construction (B.S.S. No. 15) was first issued in 1906 and a revised edition appeared in 1912.

The following are the principal alterations which have been made in the present edition of the Specification :—

(i) All reference to the Basic Bessemer process is now omitted.

(ii) Drawn steel wire from 0·5 to 0·125 inches in diameter which has subsequently been suitably heat treated to enable it to conform with the requirements of this Specification is now included. Hard drawn Steel wire for concrete re-inforcement, not so treated, is dealt with under Specification No. 165.

(iii) A tensile test in addition to a bend test is required for bars for concrete re-inforcement.

(iv) Temper bend tests are not now specified.

(v) The radius of the bend in the cold bend test has been made smaller for bars of 1 inch diameter and under.

(vi) Tolerances on the specified depth of beams and channels have been inserted.

The figures in British measures are to be regarded as the Standard. Approximate metric equivalents are given for the convenience of users in countries in which the metric system has been generally adopted.

NOTE.—This Specification shall apply to Drawn Steel Wire from 0·5 to 0·125 inches (12·70 to 3·18 mm.) in diameter which has subsequently been suitably heat treated and when so applied the words " bar " or " bars," where they occur, shall be deemed to include such wire and shall be read as " wire " or " wires," " coil of wire " or " coils of wire " as the context may require.

BRITISH STANDARD SPECIFICATION—CONTINUED.

1. Process of Manufacture.

A steel shall be made by the Open Hearth Process (Acid or Basic), unless either process is required or specified, and shall not show on analysis more than 0·06 per cent. of Sulphur or of Phosphorus.

B steel may be made either by the Open Hearth Process (Acid or Basic), or by the Acid Bessemer Process, and shall not show on analysis more than 0·08 per cent. of Phosphorous, and not more than 0·06 per cent. of Sulphur.

NOTE.—**B** steel is not intended for Bridges, Plates ¾ inch in thickness and over, Rivet Bars, or for Heat Treated Wire.

2. Quality of Finished Steel.

All finished steel as sent from the mills shall, subject to the provisions of Clause 17, be well and cleanly rolled to the dimensions, sections and weights specified or required. It shall be sound and free from cracks, surface flaws, laminations, rough, jagged and imperfect edges, and all other defects, shall be finished in a workmanlike manner and shall in all respects comply with the tests and requirements, herein mentioned, applicable to the description of material (*e.g.*, plates, sections, bars, rivets, etc.) required or specified.

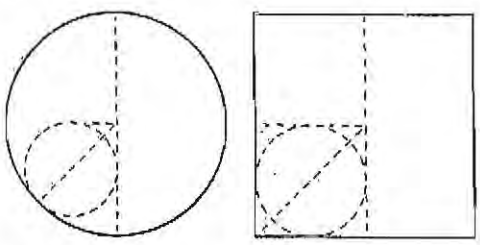
3. Tensile Test Pieces.

The tensile strength and elongation of all steel shall be determined from Standard Test Pieces cut lengthwise and crosswise from plates, and lengthwise from sections and bars.

The test pieces shall not be annealed, or otherwise subjected to heat treatment, unless the material from which they are cut is similarly treated, in which case the test pieces shall be similarly and simultaneously treated with the material before testing.

Any straightening of test pieces which may be required shall be done cold.

The rolled surface of the steel wherever practicable shall be retained on two opposite sides of the test piece, but in the case of bars having diameters or sides not exceeding 3 inches (76·20 mm.) the bars may be reduced by machining. For bars having diameters or sides above 3 inches the test piece may, at the option of the Maker, be taken from the position shown in the sketches.



BRITISH STANDARD SPECIFICATION—CONTINUED.

4. Selection of Tensile Test Pieces.

Tensile test pieces shall be selected by the Purchaser or by the Engineer* or Inspector† either—

(*a*) from shearings or cuttings of the plates, sections, and bars, or

(*b*) if he so desire, from the plates, sections, and bars, after they have been cut to the sizes required or specified.

In the latter case (*b*), if the test is satisfactory, the Purchaser shall pay the Maker the value of the plate, section, or bar from which the test piece had been cut, or accept delivery of the same as though such test piece had not been cut therefrom.

In neither case (*a* or *b*) shall the test pieces be detached from the plates, sections, or bars, except in the presence or with the approval of the Purchaser or of the Engineer or Inspector.

5. Tensile Tests.

The tensile breaking strength of all steel determined from the Standard Test Pieces hereinafter referred to, shall be as follows :—

(*a*) *Plates, Sections* (e.g., *Angles, Tees, Joists, Channels, etc.*), *and Flat Bars.*—The tensile breaking strength of all plates, sections (such as angles, tees, joists, channels, etc.) and flat bars, shall be between the limits of 28 and 33 tons (62,720 and 73,920 lb.) per square inch (44·10 and 51·97 kg. per mm.^{2}) of section. The elongation measured on the Standard Test Piece **A** (see Appendix, page 342) shall be not less than 20 per cent. for steel of 0·375 inch (9·53 mm.) in thickness and upwards, and not less than 16 per cent. for steel below 0·375 inch in thickness. In the case of sections the thickness of which is not uniform throughout the profile, these limits shall be applied according to the actual maximum thickness of the piece selected for testing.

(*b*) *Round and Square Bars.*—The tensile breaking strength of round and square bars (other than rivet bars) shall be between the limits of 28 and 33 tons per square inch of section, with an elongation of not less than 20 per cent. measured on the Standard Test Piece **B** (see Appendix, page 343), or not less than 24 per cent. measured on the Standard Test Piece **F** (see Appendix, page 344). The bars may be tested the full size as rolled.

(*c*) *Rivet Bars.*—The tensile breaking strength of rivet bars shall be between the limits of 25 and 30 tons (56,000 and 67,200 lb.) per square inch (39·37 and 47·25 kg. per mm.^{2}) of section, with an

* The word "Engineer" shall mean the Engineer or Architect supervising or acting as Engineer or Architect for the Purchaser.

† The word "Inspector" shall include any person acting under the direction of such Engineer or Architect.

elongation of not less than 25 per cent. measured on the Standard Test Piece **B** (see Appendix, page 343) or not less than 30 per cent. measured on Standard Test Piece **F** (see Appendix, page 344). The bars may be tested the full size as rolled.

Generally.—Provided that, except for bars for concrete reinforcement, bend tests only shall be required for steel under ¼ inch (6·35 mm.) in thickness or diameter.

6. Number of Tensile Tests.

(A) *For Tensile Tests Clause* 5, *Sub-Section* (*a*).—One tensile test shall be made from the finished steel from each cast for any quantity up to 25 tons (56,000 lb. = 25,400 kg.) of plates, each type of section, and flat bars rolled from that cast, a separate test being made for each class (*e.g.*, plates, types of sections, and flat bars). A second tensile test shall be made of the material in any class when the quantity in that class exceeds 25 tons.

Where plates, types of sections, or flat bars of more than one thickness are rolled from the same cast, one additional tensile test shall be made from the material in each class for each variation in thickness of 0·2 inch (5·08 mm.) above or below the thickness of the test piece first selected in such class.

(B) *For Tensile Tests Clause* 5, *Sub-Section* (*b*).—One tensile test shall be made from the finished steel from each cast for any quantity up to 25 tons, and a second tensile test shall be made where the quantity exceeds 25 tons. When more than one diameter or thickness of bar is required or specified one additional tensile test shall be made from each diameter or thickness of bar ordered, if desired by the Purchaser or by the Engineer or Inspector.

NOTE.—For heat treated wire the words "10 coils of wire" shall be substituted for "25 tons" in this Sub-Section.

(C) *For Tensile Tests Clause* 5, *Sub-Section* (*c*).—One tensile test shall be made from the finished steel from each cast for any quantity up to 10 tons (22,400 lb. = 10,160 kg.) and a second tensile test shall be made for each further 10 tons or part thereof, from that cast.

NOTE.—For heat treated wire the words "10 coils of wire" shall be substituted for "10 tons" in this Sub-Section.

7. Cold Bend Test Pieces.

Bend tests of all steel (other than rivet bars) shall be made from test pieces prepared as follows:—Bend test pieces shall be sheared or cut lengthwise and crosswise from plates and lengthwise from sections and round and square bars and, when the section permits, shall be not less than 1½ inches (38·10 mm.) wide. In cases where the section is less than 1½ inches wide, or if the Maker so desires, round, square and flat bars shall be bent in the full section of the bar as rolled.

BRITISH STANDARD SPECIFICATION—CONTINUED.

In all bend tests the rough edge or arris caused by shearing may be removed by filing or grinding, and samples 1 inch (25·40 mm.) in thickness and above may have the edges machined, but the test pieces shall receive no other preparation.

The test pieces shall not be annealed, or otherwise subjected to heat treatment, unless the material from which they are cut is similarly treated, in which cases the test pieces shall be similarly and simultaneously treated with the material before testing.

8. Selection of Cold Bend Test Pieces.

Bend test pieces shall be selected by the Purchaser or by the Engineer or Inspector either—

(*a*) from shearings or cuttings of the plates, sections, and bars, or

(*b*) if he so desire, from the plates, sections, and bars, after they have been cut to the sizes required or specified.

In the latter case (*b*), if the test is satisfactory, the Purchaser shall pay the Maker the value of the plate, section, or bar from which the test piece has been cut, or accept delivery of the same as though such test piece had not been cut therefrom.

9. Cold Bend Tests.

For cold bend tests, except in the case of round bars 1 inch (25·40 mm.) in diameter and under, the test piece shall withstand, without fracture, being doubled over either by pressure or by blows from a hammer until the internal radius is not greater than $1\frac{1}{2}$ times the thickness of the test piece, and the sides are parallel.

In the case of round bars, 1 inch in diameter and under, the internal radius of the bend shall be not greater than the diameter of the bar.

For sections having flanges less than 2 inches (50·80 mm.) wide these bend tests may be made from the flattened section.

10. Number of Cold Bend Tests.

A cold bend test shall be made from each plate, section, or bar (other than rivet bars) as rolled.

For rivet bars bend tests are not required.

11. Number and Kind of Tests of Manufactured Rivets.

Manufactured rivets selected from the bulk, in such number as may be specified, or as may be approved by the Purchaser or by the Engineer, shall withstand the following tests :—

BRITISH STANDARD SPECIFICATION—CONTINUED.

(*a*) The rivet shanks shall be bent cold, and hammered until the two parts of the shank touch in the manner shown in Fig. 1, without fracture on the outside of the bend.

(*b*) The rivet heads shall be flattened, while hot, in the manner shown in Fig. 2, without cracking at the edges. The head shall be flattened until its diameter is 2½ times the diameter of the shank.

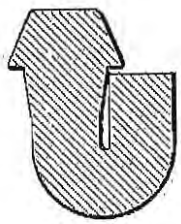


FIG. 1

FIG. 2

12. Tests by Chemical Analysis.

The Maker shall supply an analysis of each cast of steel when required so to do by the Purchaser or by the Engineer, but samples may also be taken by the Purchaser or by the Engineer or Inspector, and at the expense of the Purchaser may be subjected to complete analysis by a metallurgist appointed by him.

13. Maker's Tests at his Works.

All the test pieces after they have been marked for testing shall (except as provided in Clause 14) be prepared by the Maker and tested at his works and at his cost, and, if the Purchaser or Engineer so desire, in the presence of the Purchaser or of the Engineer or Inspector. If the Maker fails to prepare properly the test pieces for testing or to test the steel properly at his works in the manner herein provided, the Purchaser or the Engineer may, at the Maker's cost, have the test pieces prepared for testing and the steel tested elsewhere.

14. Purchaser's Tests Elsewhere.

Four days' notice shall be given by the Maker to the Purchaser and to the Engineer of the date when he will be ready for the Purchaser or the Engineer or Inspector to select the test pieces. If within 7 days after the receipt of such notice the Purchaser or the Engineer shall give notice in writing to the Maker that he desires the test pieces to be prepared and tested at a place to be named in the notice within the United Kingdom, the tests shall then be carried out at such place and at the Purchaser's cost (and if the Maker so desire in the presence of the Maker or of the person deputed by him to witness the tests). In the event of such notice

being given by the Purchaser or by the Engineer, the Maker shall be allowed at least 7 days from the receipt of such notice before the selection of the test pieces. The tests must be completed within 14 days from the selection of the test pieces, failing which the tests shall be carried out at the Makers' works.

15. Additional Tests.

Should a tensile test piece break outside the middle-half of its gauge length, the test may, at the Maker's option, be discarded, and another test be made of the same plate, section or bar. In all other cases should any one of the test pieces or rivets first selected not fulfil the tests applicable to the description of material to be tested, two additional test pieces or rivets in respect of each failure may be taken from the material represented by that test, and should either of them fail to fulfil such tests, all the material so represented may be rejected. The additional tests shall be carried out in the same manner in all respects as the tests hereinbefore required to be made in the first instance, but at the cost of the Maker.

16. Inspection.

The Purchaser, the Engineer and the Inspector shall at all reasonable times have free access to the Maker's works, and to all places under his control where steel is being manufactured, and shall be at liberty to inspect the manufacture of the steel at all stages.

17. Margin Over and Under Dimensions and Weights.

(*a*) *Specified lengths.*—When steel in bars or sections is specified to be cut to certain lengths it shall be cut within a margin of 1 inch (25·40 mm.) under or 1 inch over the specified length, but when minimum lengths are specified the margin shall be within 2 inches (50·80 mm.) over.

(*b*) *"Exact" lengths.*—When lengths are specified to be "exact," the steel in bars or sections shall be cold sawn or machined within a margin of $\frac{1}{8}$ inch (3·18 mm.) over and $\frac{1}{8}$ inch under the length specified.

(*c*) *Weights.*—When a minimum weight is specified the rolling margin on plates, sections and bars shall be 5 per cent. over and when a maximum weight is specified the rolling margin shall be 5 per cent. under the specified weight.

When the specified weight is not stated to be either a minimum or maximum, the rolling margin shall be between $2\frac{1}{2}$ per cent. over and $2\frac{1}{2}$ per cent. under the specified weight.

BRITISH STANDARD SPECIFICATION—CONTINUED.

The margin shall be ascertained separately for plates, each section (*e.g.*, angles, tees, beams, channels, etc.) and bars.

NOTE.—In the case of heat treated wire the tolerance shall be determined on the diameter and not on the weight. When a minimum diameter of wire is specified the tolerance shall be 2 per cent. over and where the maximum diameter is specified the tolerance shall be 2 per cent. under the specified diameter. When the specified diameter is not stated to be a minimum or a maximum the tolerance shall be 1 per cent. over and 1 per cent. under the specified diameter. Heat treated wire may be sheared to length.

(*d*) *Cross sectional dimensions of Beams and Channels.*—The permissible upwards and downwards variation in the specified depth of beams and channels shall not exceed the following :—

Specified Depth of Beam or Channel	Variation	
	Upward	Downward
Up to and including 12 in. (305 mm.)	$\frac{1}{8}$ in. (3·18 mm.)	$\frac{1}{32}$ in. (0·79 mm.)
Over 12 in. and up to and including 16 in. (406 mm.) ..	$\frac{5}{32}$ in. (3·97 mm.)	$\frac{1}{16}$ in. (1·59 mm.)
Over 16 in. and up to and including 24 in. (610 mm.) ..	$\frac{3}{16}$ in. (4·76 mm.)	$\frac{1}{16}$ in. (1·59 mm.)

18. Calculation of Weight.

The weight of plates shall be calculated on the basis that steel weighs 40·8 lb. per square foot per inch of thickness (78·43 kg. per m.^{2}, 1 cm. thick) and the weight of sections and bars on the basis that steel weighs 3·4 lb. per square inch of sectional area per foot run (0·7843 kg. per cm.^{2} per metre run).

19. Identification of Cast.

The Maker shall mark the ingots, billets, slabs, plates, sections, bars, etc., in such a way as to enable all finished steel to be traced to the original cast. Every facility for tracing the steel to the original cast shall be given to the Purchaser and to the Engineer and Inspector.

20. Branding or Marking.

Every piece of steel shall be legibly marked with the Maker's name or trade mark, and with cast numbers or identification marks by which the steel can be traced to the cast from which it was made, except that in the case of such bars and small pieces as are securely bundled, a metal tag attached to each bundle and marked as above will be sufficient.

Before the test pieces are selected, the Maker shall furnish the Purchaser with copies of the mill sheets, giving complete lists of all plates, sections or bars in each cast, with sizes and weights, and the numbers or marks by which each plate, section or bar can be identified.

21. Maker's Certificate.

(*a*) *When no Inspection has taken place.*—In the case of any steel which has not been inspected at the Maker's works, the Maker or Merchant, as the case may be, shall supply the Purchaser and the Engineer with a certificate stating the process of manufacture and a test sheet signed by the Maker giving the results of each of the mechanical tests applicable to the description of material purchased, and if and when required of the chemical analysis also. Each test sheet shall indicate the numbers or identification marks of the casts to which it applies, corresponding with the numbers to be found on the plates, sections, bars, etc.

(*b*) *When Steel is taken from Stock.*—Where any steel is taken from a Merchant's stock, the Purchaser or the Engineer may either (i) have the steel tested at such place as is in Clause 14 provided or (ii) the Merchant shall satisfy the Purchaser or the Engineer by means of numbers or identification marks on the steel, combined with a Maker's certificate, that such steel has been tested, and complies with the whole of the tests and requirements of this Specification applicable to the description of material required or specified.

22. Non-compliance with Tests and Requirements.

Should any steel not comply with the whole of the foregoing tests and requirements applicable to the description of material required or specified, all the steel in the cast from which the tests have been taken may, subject to the option of making additional tests as provided in Clause 15, be rejected.

23. Delivery.

No steel shall be despatched from the Maker's works until it has been tested and complies with, or has been certified (in the cases mentioned in Clause 21) to comply with, the whole of the tests and requirements of this Specification applicable to the description of material required or specified.

24. Rejection after Delivery.

The foregoing tests shall, except as provided for in Clause 14 and in Clause 21 Sub-Section (*b*), be made at the Maker's works prior to despatch, but in the event of any of the steel being found

not to be in accordance with this Specification in the course of being worked, such steel may be rejected, notwithstanding any previous acceptance, provided that the steel has not been improperly treated in working.

25. Arbitration.

In case any dispute shall arise between the parties to any contract in which this Specification is in whole or part incorporated as to whether any process of manufacture required or specified, or any test or requirement of this Specification has or has not been carried out or complied with, or as to whether any steel is or is not of the quality or free from the defects mentioned in Clause 2, or as to whether any steel proves unsatisfactory in the course of being worked as provided in Clause 24, then such dispute shall be referred to the arbitration of a person to be agreed upon between the parties or failing agreement to be appointed, at the request of either party to the said dispute, by the Chairman for the time being of the British Engineering Standards Association, provided always that if such dispute is within the terms of any other agreement to refer or submit to arbitration this Clause shall be of no effect.

NOTE.

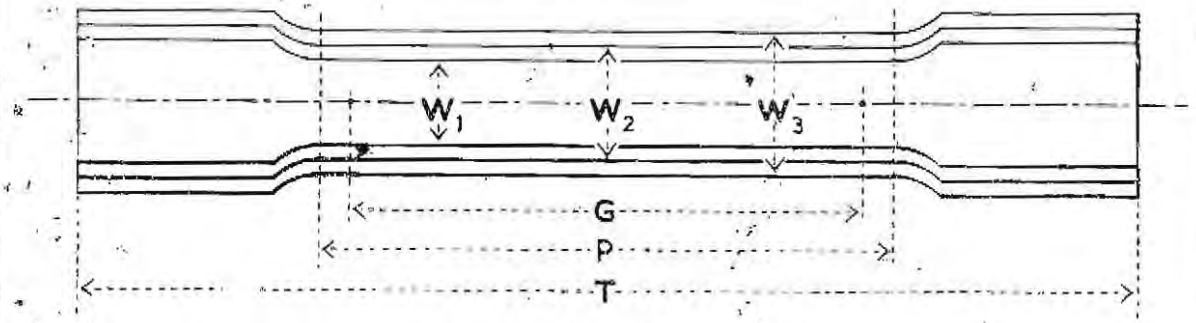
Hard drawn steel Wire for concrete re-inforcement is dealt with in British Standard Specification No. 165.

BRITISH STANDARD SPECIFICATION—CONTINUED.

APPENDIX.

FORMS OF BRITISH STANDARD TENSILE TEST PIECES.

TEST PIECE A.



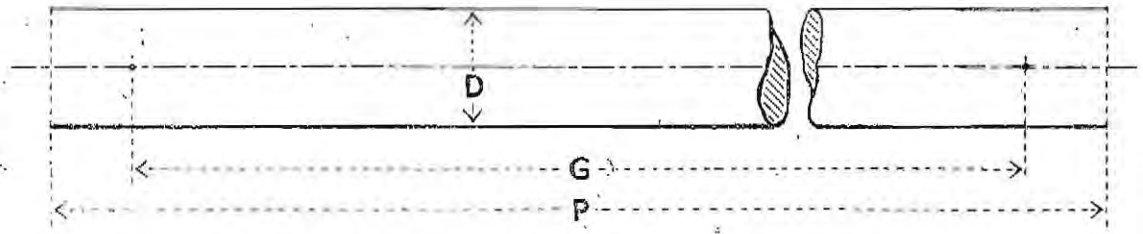
Gauge Length **G** = 8 inches (203·20 mm.).
Parallel Length **P** to be not less than 9 inches (228·60 mm.).
Total Length **T** = About 18 inches (457·20 mm.).

Thickness of Test Piece	Maximum Width allowed
Over $\frac{7}{8}$ in. (22·23 mm.)	W_1 = $1\frac{1}{2}$ ins. (38·10 mm.)
$\frac{3}{8}$ in. to $\frac{7}{8}$ in. (9·53 to 22·23 mm.)	W_2 = 2 ins. (50·80 mm.)
Under $\frac{3}{8}$ in. (9·53 mm.)	W_3 = $2\frac{1}{2}$ ins. (63·50 mm.)

The widths of the test pieces for plates were selected to comply with the two following conditions. (1) As the great bulk of plates to be tested are from $\frac{3}{8}$ inch to $\frac{7}{8}$ inch (9·53 to 22·23 mm.) thick, it was desirable for the sake of convenience that the test pieces for such plates should be of uniform width, and, in accordance with very general practice, a width of 2 inches (50·80 mm.) was selected. (2) With a test piece of a given form, the percentage of elongation was found to be less for thick plates than for thin ones; with steel of the same quality in other respects it was desirable therefore to choose widths of test piece which would be slightly in favour of the thicker plates. This is secured with the widths selected for the Standard Test piece of form **A**.

BRITISH STANDARD SPECIFICATION—CONTINUED.

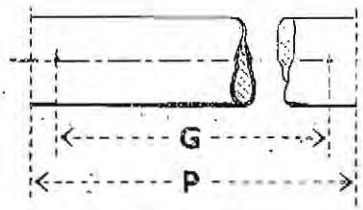
TEST PIECE B.



Gauge Length **G** to be not less than 8 times the diameter **D.**
With enlarged ends :- Parallel Length **P** to be not less than 9 times the reduced diameter **D.**

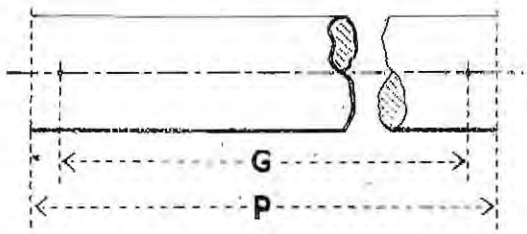
All test pieces of form **B** are strictly similar, and for the same material give the same percentage of elongation. They are nearly similar to a test piece of form **A,** 8 inches (203·20 mm.) in gauge length, 2 inches (50·80 mm.) wide and $\frac{3}{8}$ inch (9·53 mm.) thick.

TEST PIECE C.



Gauge Length **G** = 2 inches (50·80 mm.).
Parallel Length **P** to be not less than $2\frac{1}{4}$ inches (57·15 mm.).
Dia. = 0·564 inch (14·33 mm.).
Area = $\frac{1}{4}$ sq. inch (161·29 mm.^{2}).

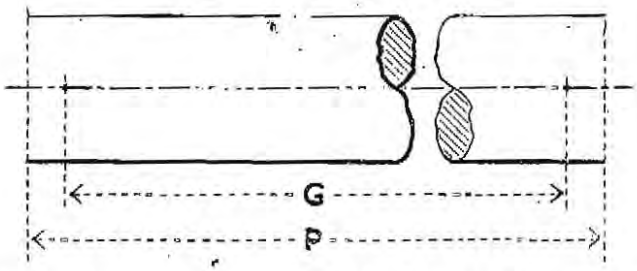
TEST PIECE D.



Gauge Length **G** = 3 inches (76·20 mm.).
Parallel Length **P** to be not less than $3\frac{3}{8}$ inches (85·72 mm.).
Dia. = 0·798 inch (20·27 mm.).
Area = $\frac{1}{2}$ sq. inch (322·58 mm.^{2}).

BRITISH STANDARD SPECIFICATION—CONTINUED.

TEST PIECE E.

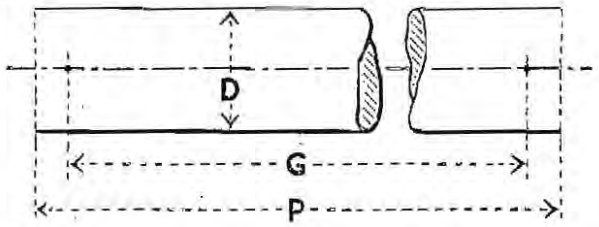


Gauge Length **G** = 3½ inches (88·90 mm.).
Parallel Length **P** to be not less than 4 inches (101·60 mm.).
Dia. = 0·977 inch (24·82 mm.).
Area = ¾ sq. inch (483·87 mm.²).

Test pieces **C, D** and **E** were arranged to meet the very common practice of making test pieces for forgings, axles, tyres, etc., of either ¼ square inch or ½ square inch (161·29 or 322·58 mm.²) in sectional area. With the gauge lengths decided upon, these three forms are very nearly similar, and, for a given material, give very approximately the same percentage of elongation. Though not exactly, they are approximately similar to the Standard Test Piece **F,** and for the same material give a nearly identical, but slightly greater, percentage of elongation.

TEST PIECE F.

(For Test Pieces over 1 inch (25·40 mm.) diameter.)



Gauge Length **G** to be not less than 4 times the diameter **D.**
With enlarged ends :—Parallel Length **P** to be not less than 4½ times the reduced diameter **D.**

In some testing machines it was found inconvenient to use form **B** for bars of over 1 inch (25·40 mm.) in diameter, and form **F** of half the gauge length is designed to meet such cases. For a given material the percentage of elongation with test piece **F** is greater than with test piece **B,** and this difference is provided for in the British Standard Specifications.

FORM OF ENDS.

In the case of the round test pieces **B, C, D, E** and **F,** the form of the ends is to be as required in order to suit the various methods employed for gripping the test piece. When enlarged ends are used the length of the parallel portion of the test piece must in no case be less than that noted on the diagrams.

ILLUSTRATIONS

OF

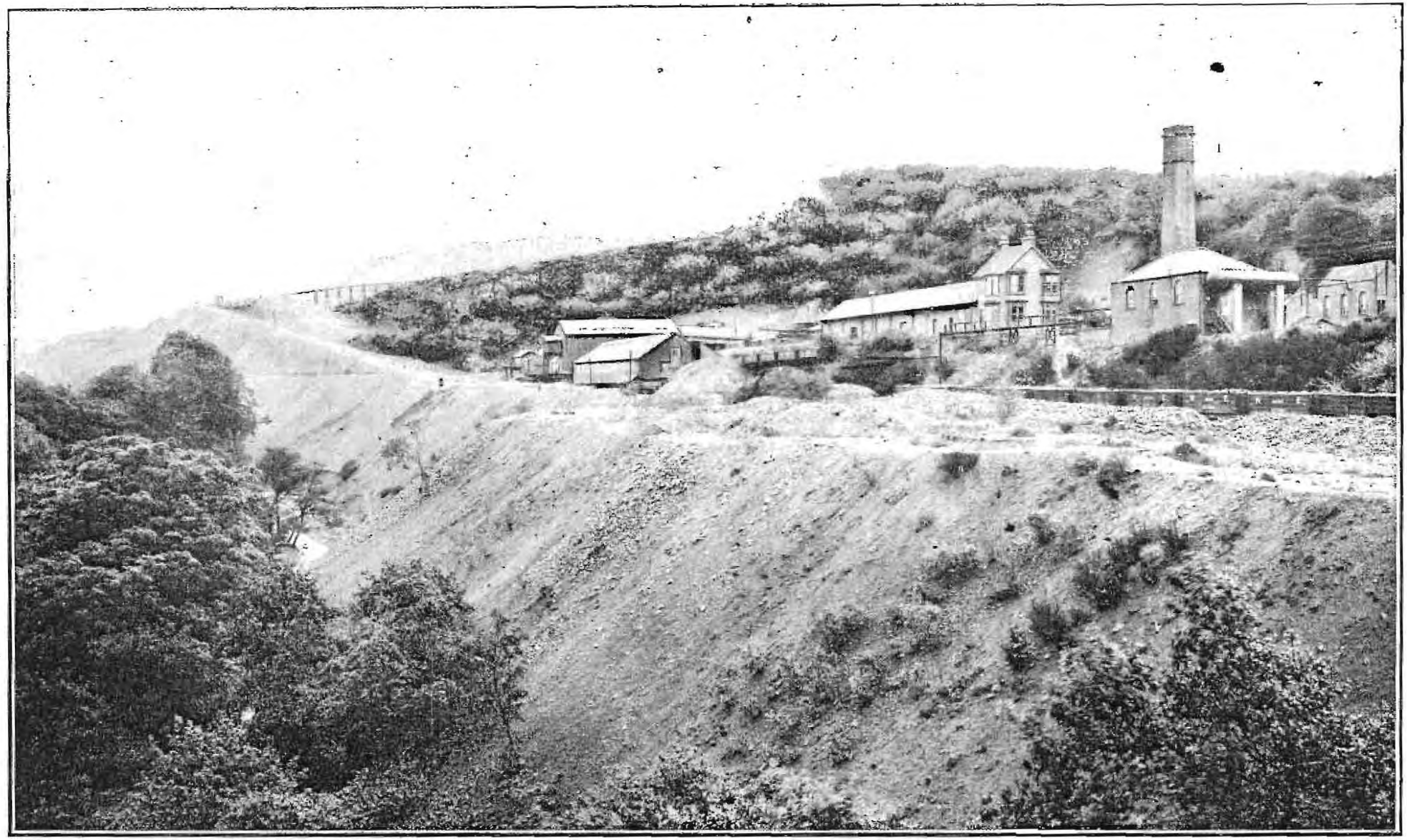
THE COMPANY'S PROPERTIES

AND OF

WORK EXECUTED.

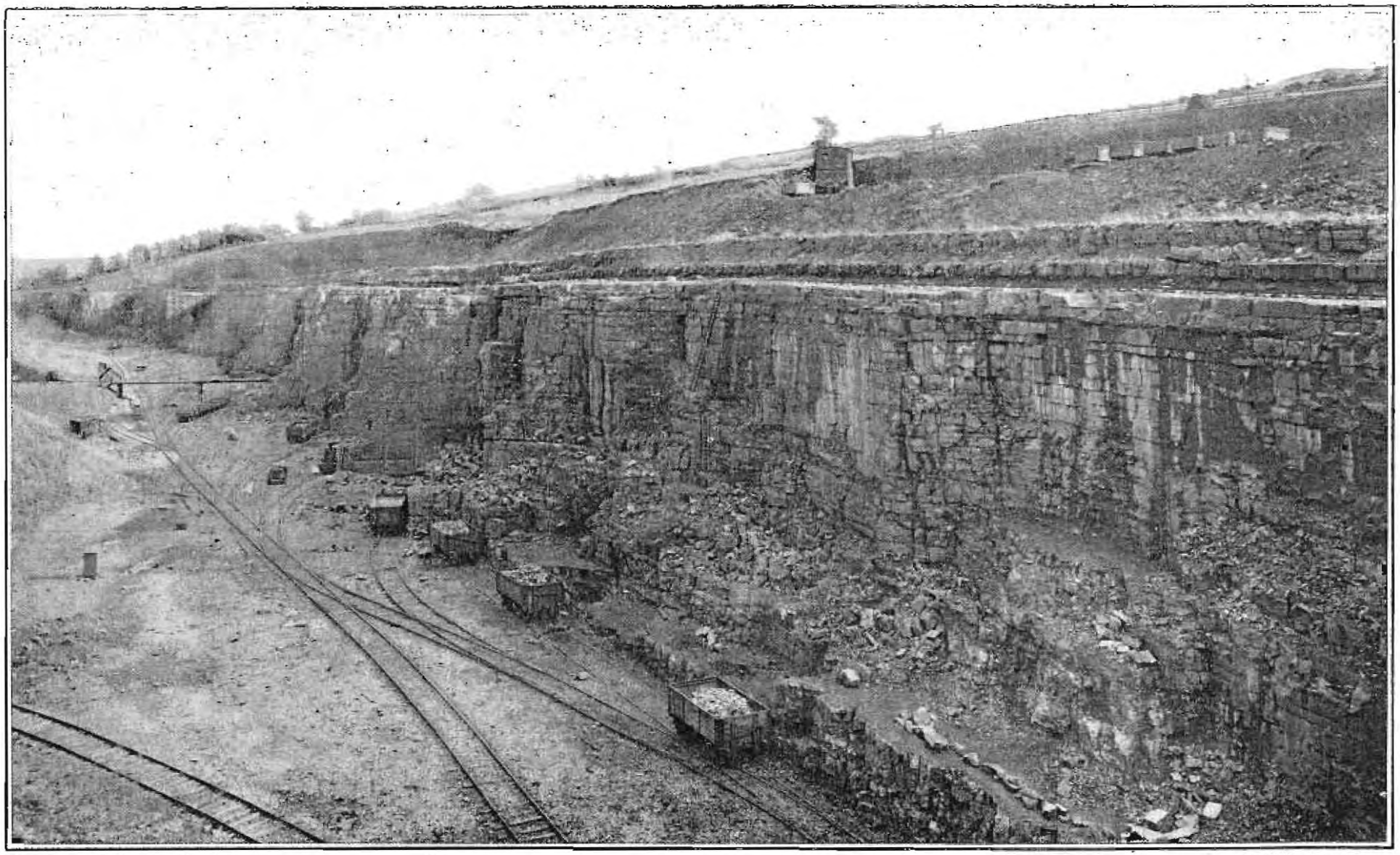
Dorman, Long & Co. Ld. *Middlesbrough.*

MAINSFORTH COLLIERY, Co. DURHAM.



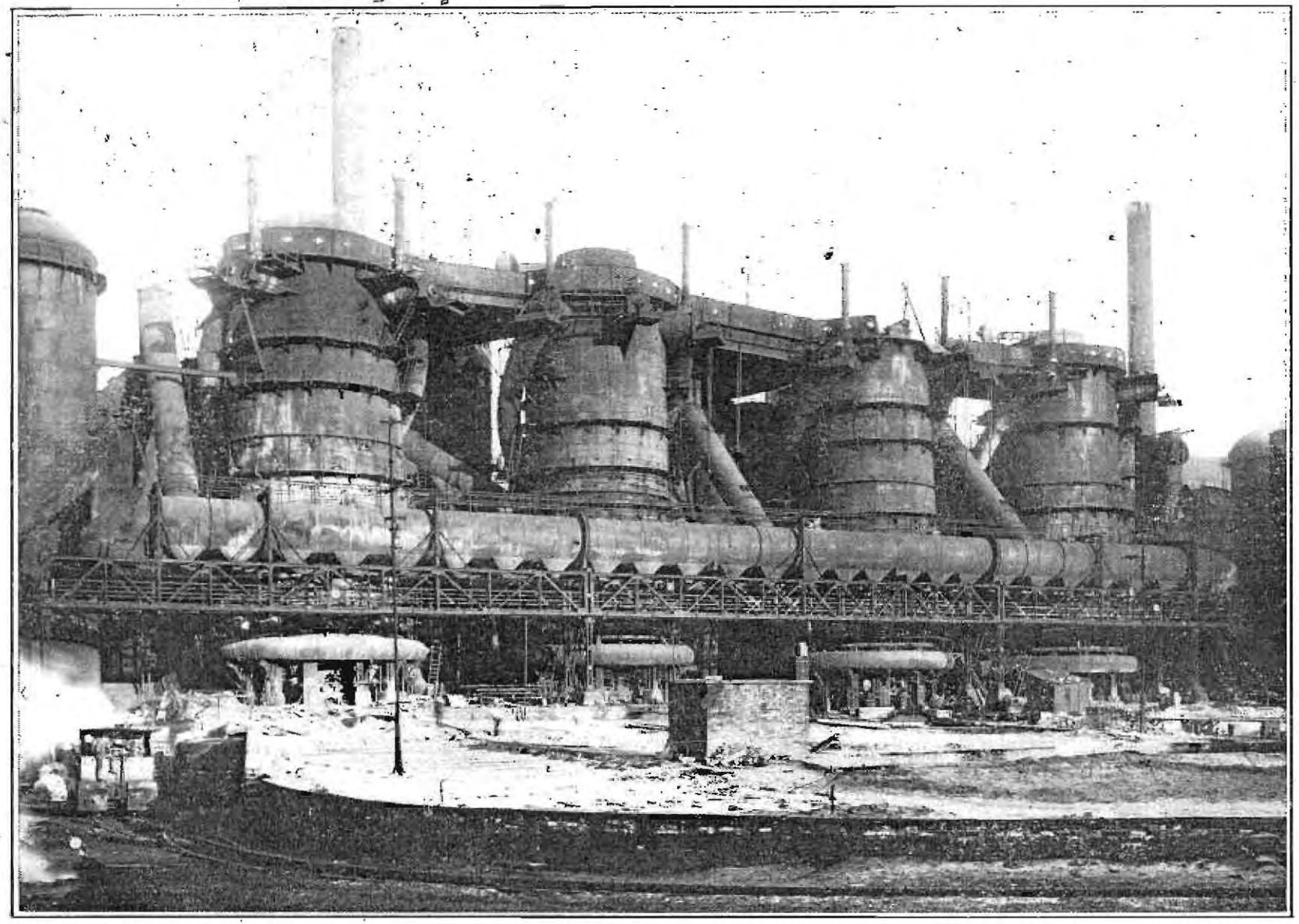
Dorman Long & Co. Ld. *Middlesbrough.*

SPAWOOD IRON MINES, CLEVELAND.



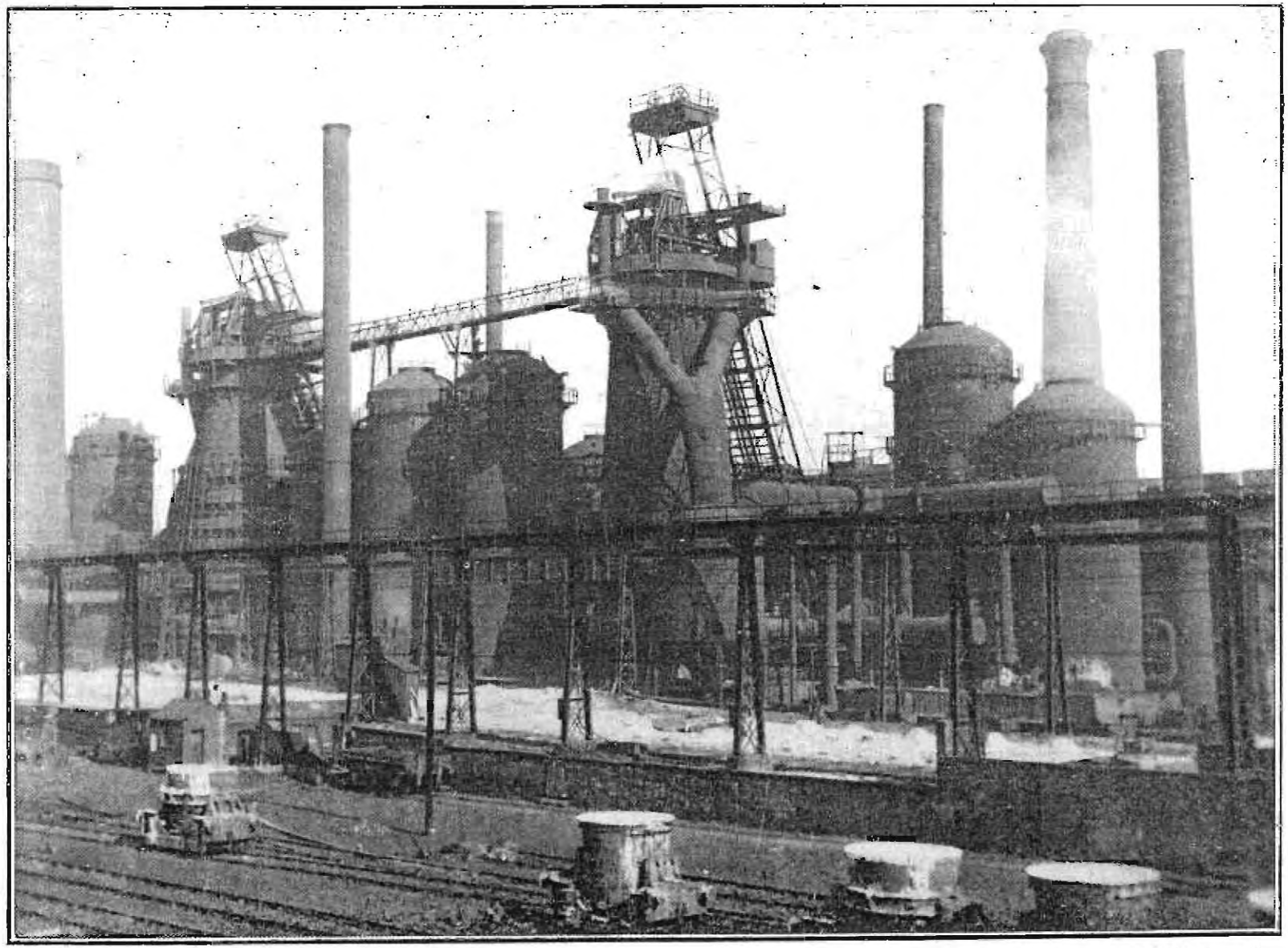
Dorman, Long & Co. Ld. *Middlesbrough.*

PARSONS BYERS LIMESTONE QUARRIES, CO. DURHAM.



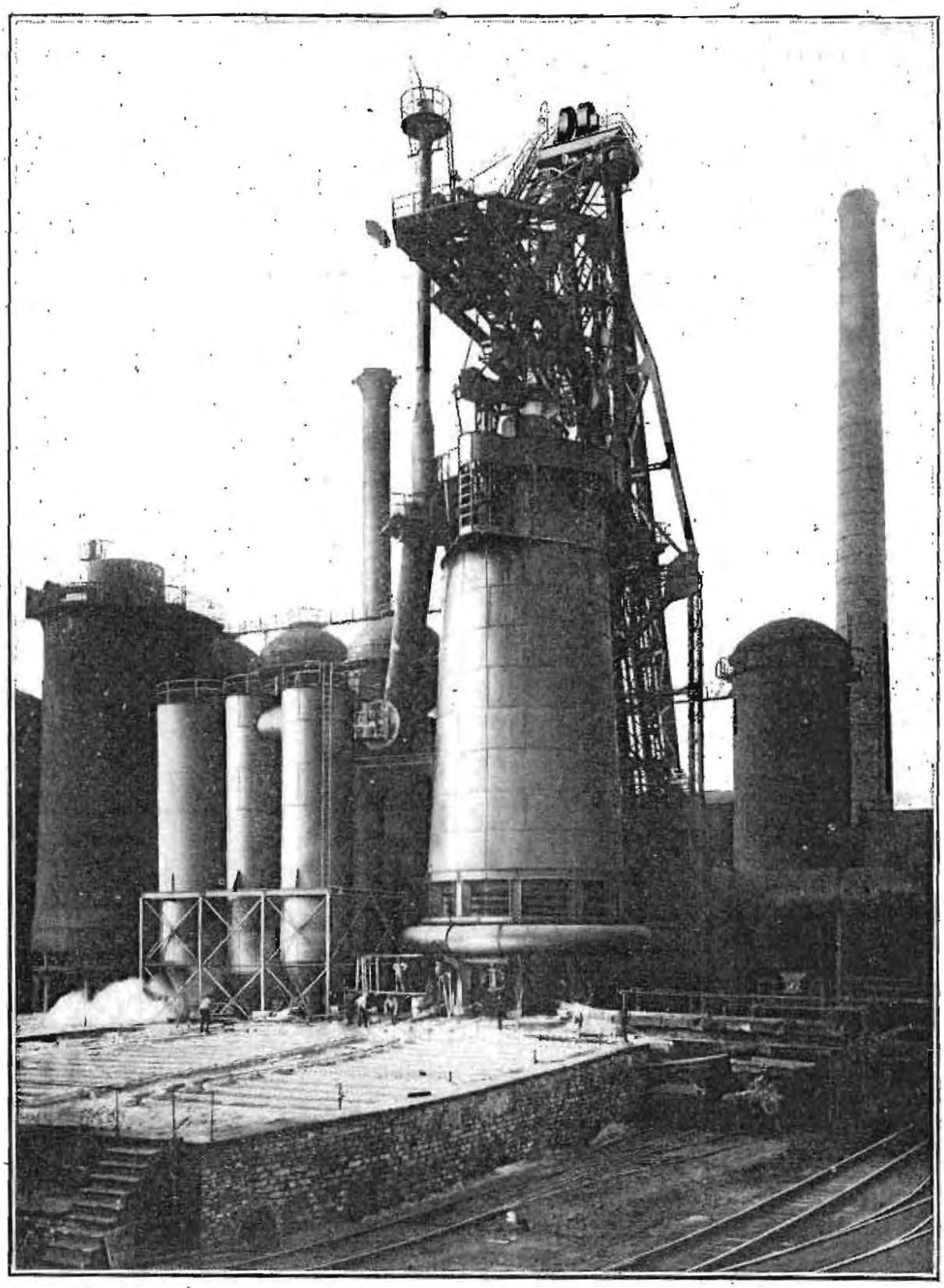
Dorman, Long & Co. Ld. *Middlesbrough.*

ACKLAM IRONWORKS, MIDDLESBROUGH.



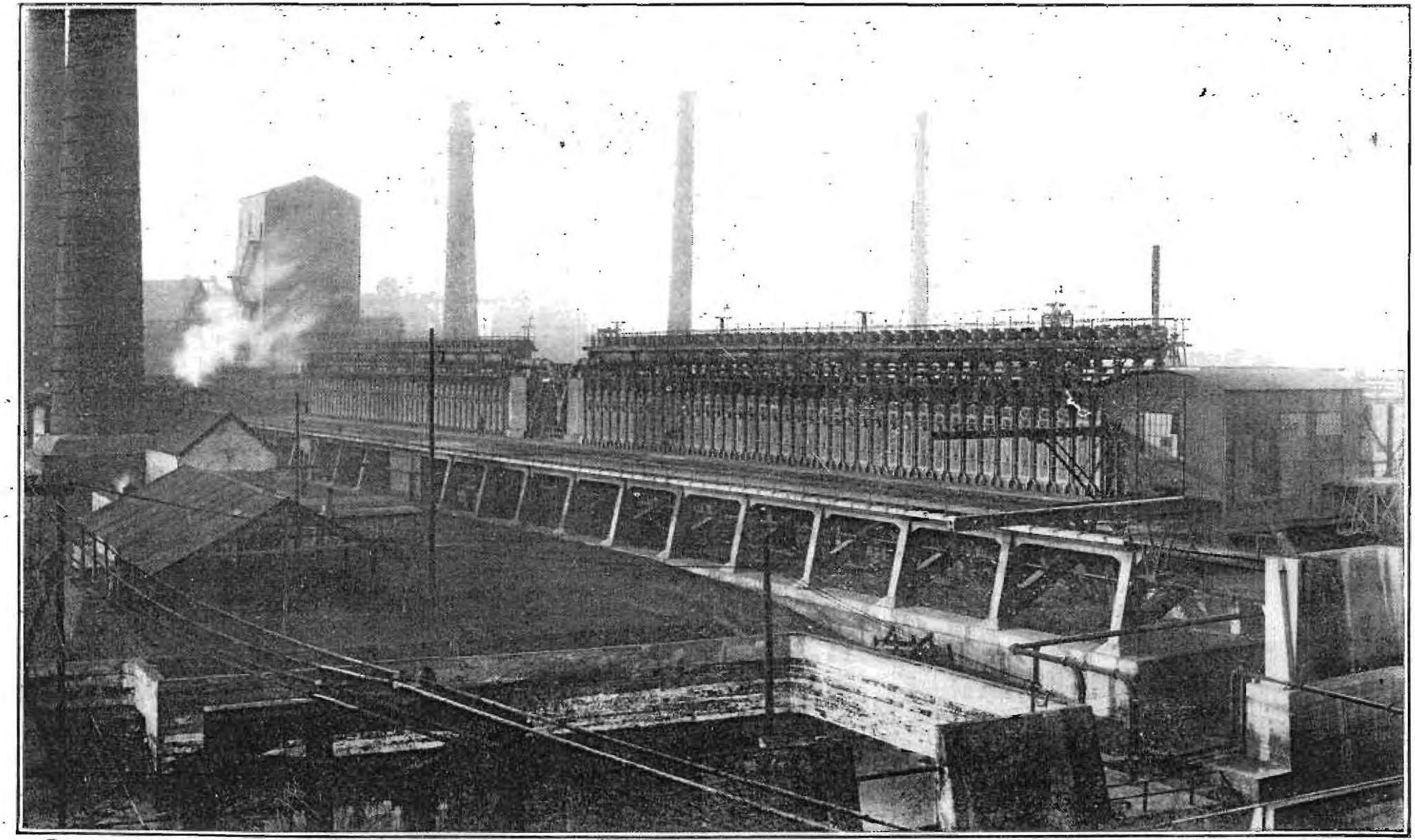
Dorman, Long & Co. Ld. *Middlesbrough.*

BLASTFURNACE PLANT AT CLEVELAND WORKS, MIDDLESBROUGH.



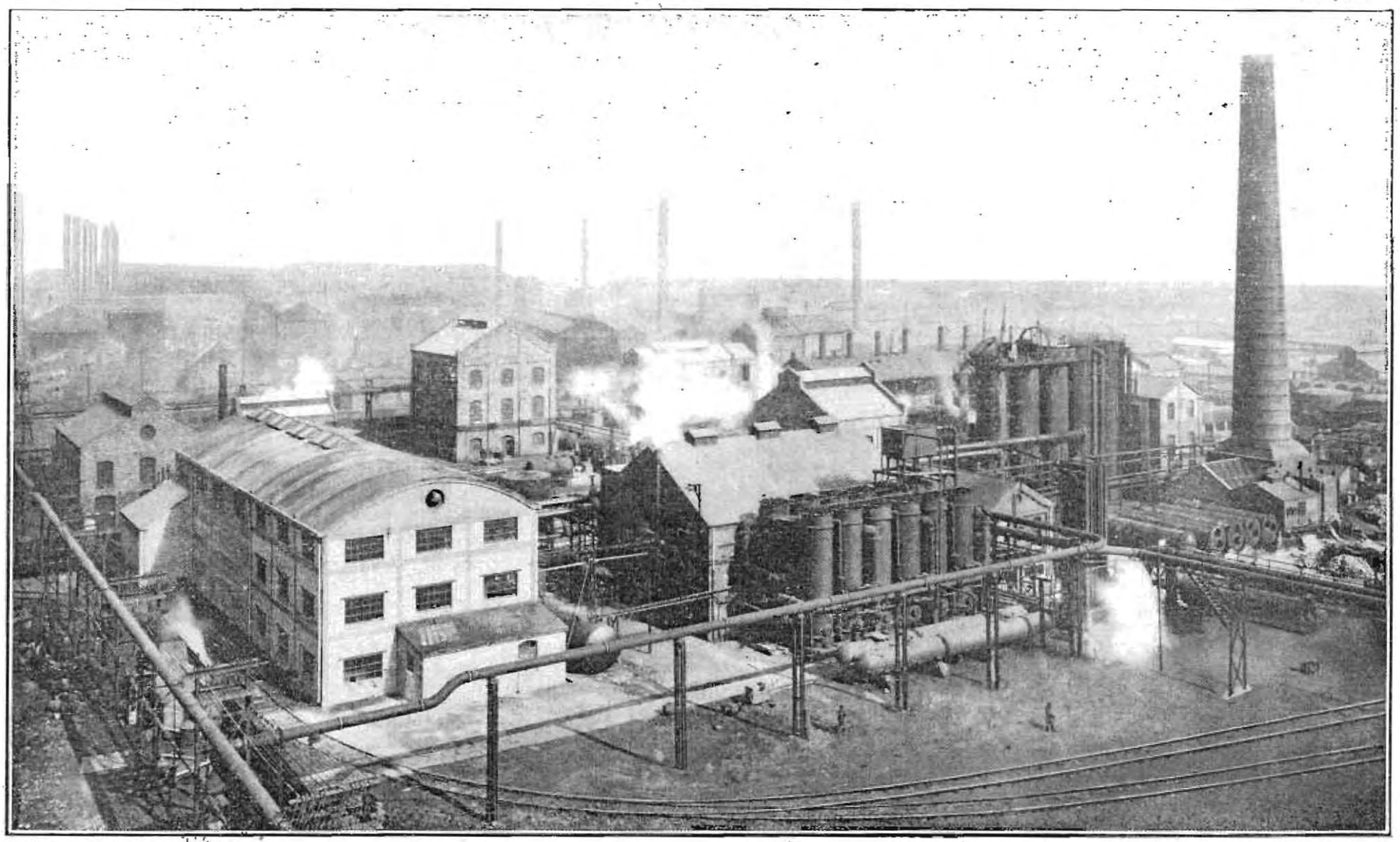
Dorman, Long & Co. Ld. *Middlesbrough.*

BLAST FURNACES, CLARENCE IRON WORKS, MIDDLESBROUGH.



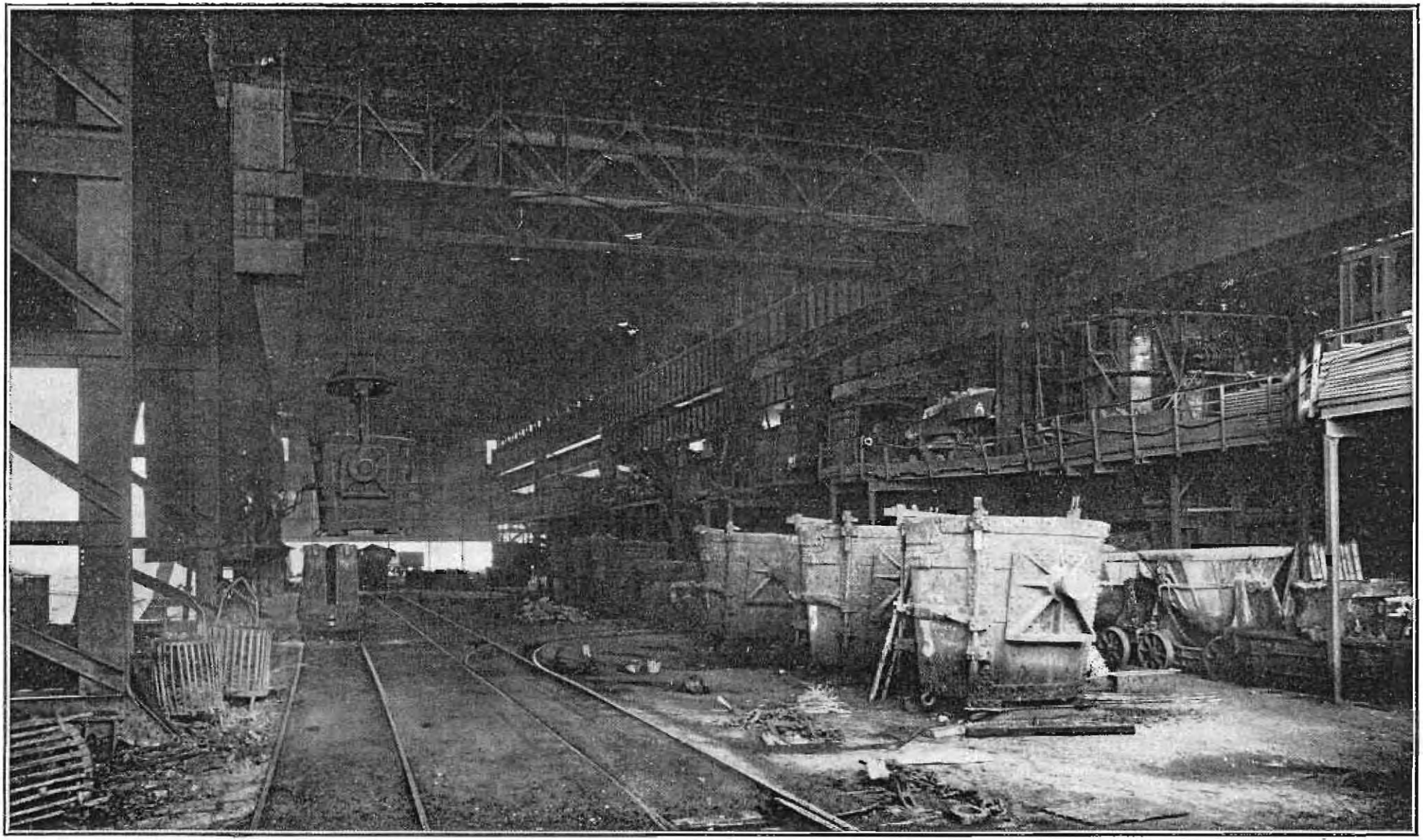
Dorman, Long & Co. Ld. *Middlesbrough.*

COKE OVENS, CLARENCE IRON WORKS, MIDDLESBROUGH.



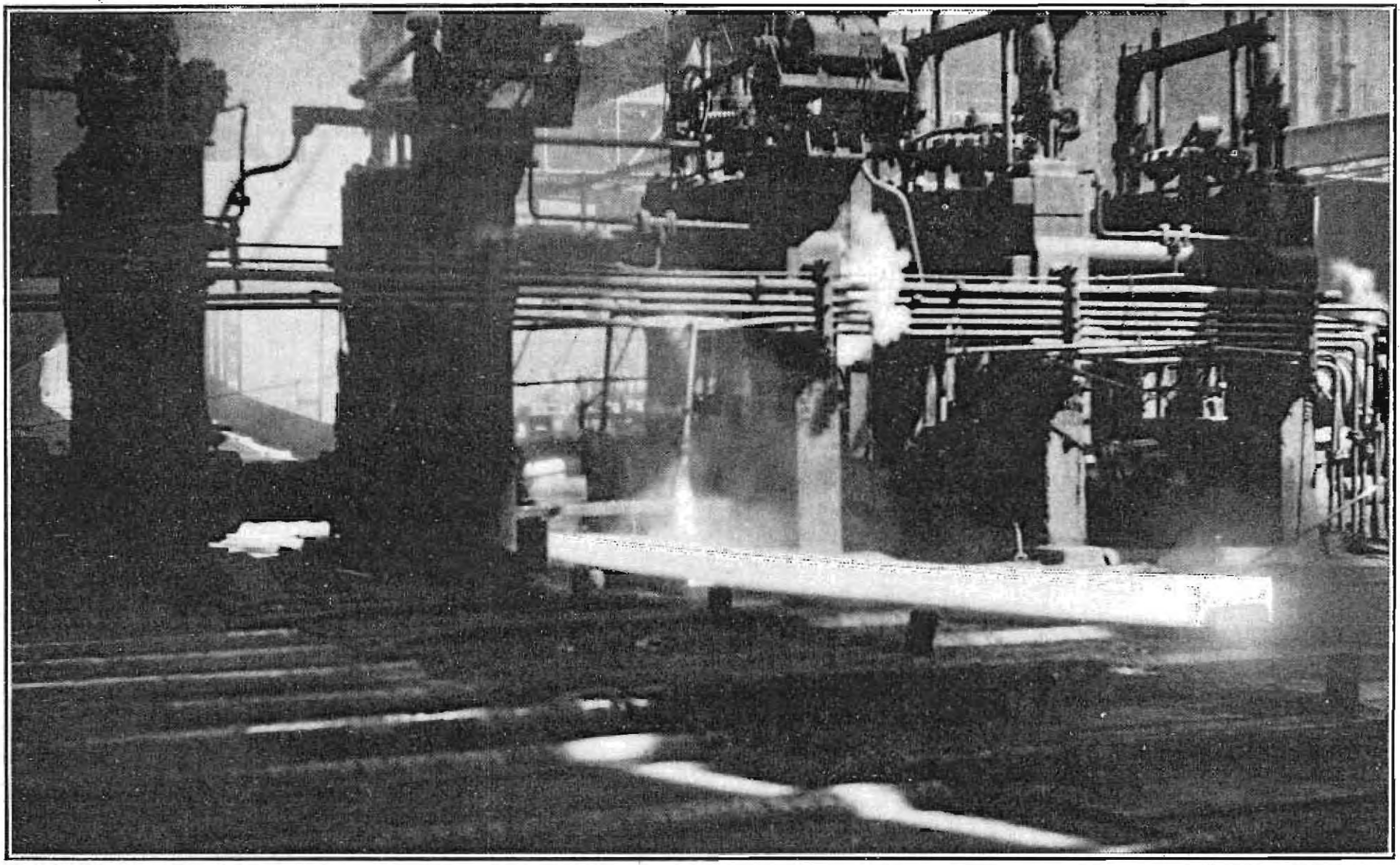
Dorman, Long & Co. Ld. *Middlesbrough.*

BY-PRODUCTS PLANT, CLARENCE IRON WORKS, MIDDLESBROUGH.



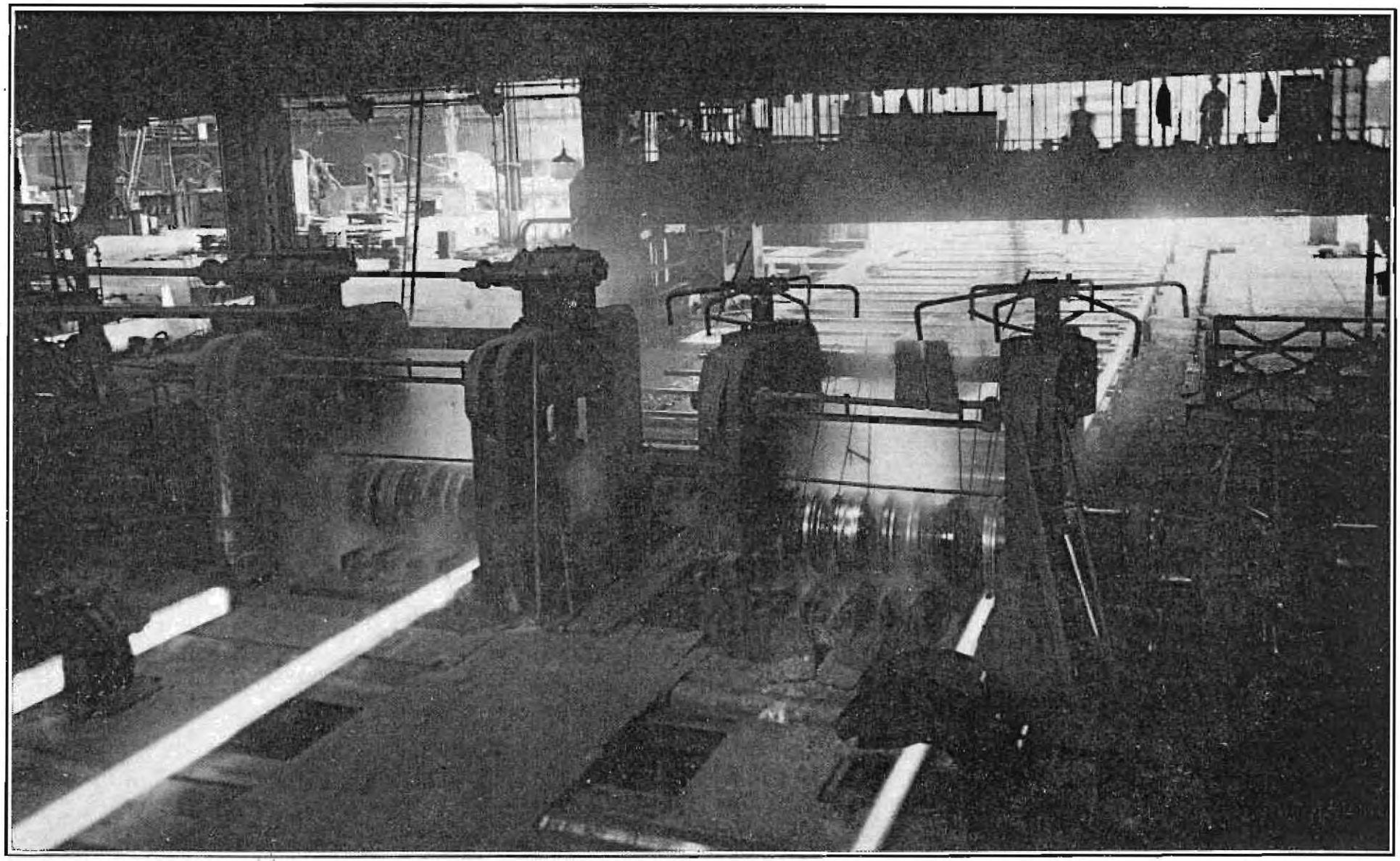
Dorman, Long & Co. Ld. *Middlesbrough.*

SMELTING FURNACES, ACKLAM STEEL WORKS, MIDDLESBROUGH.



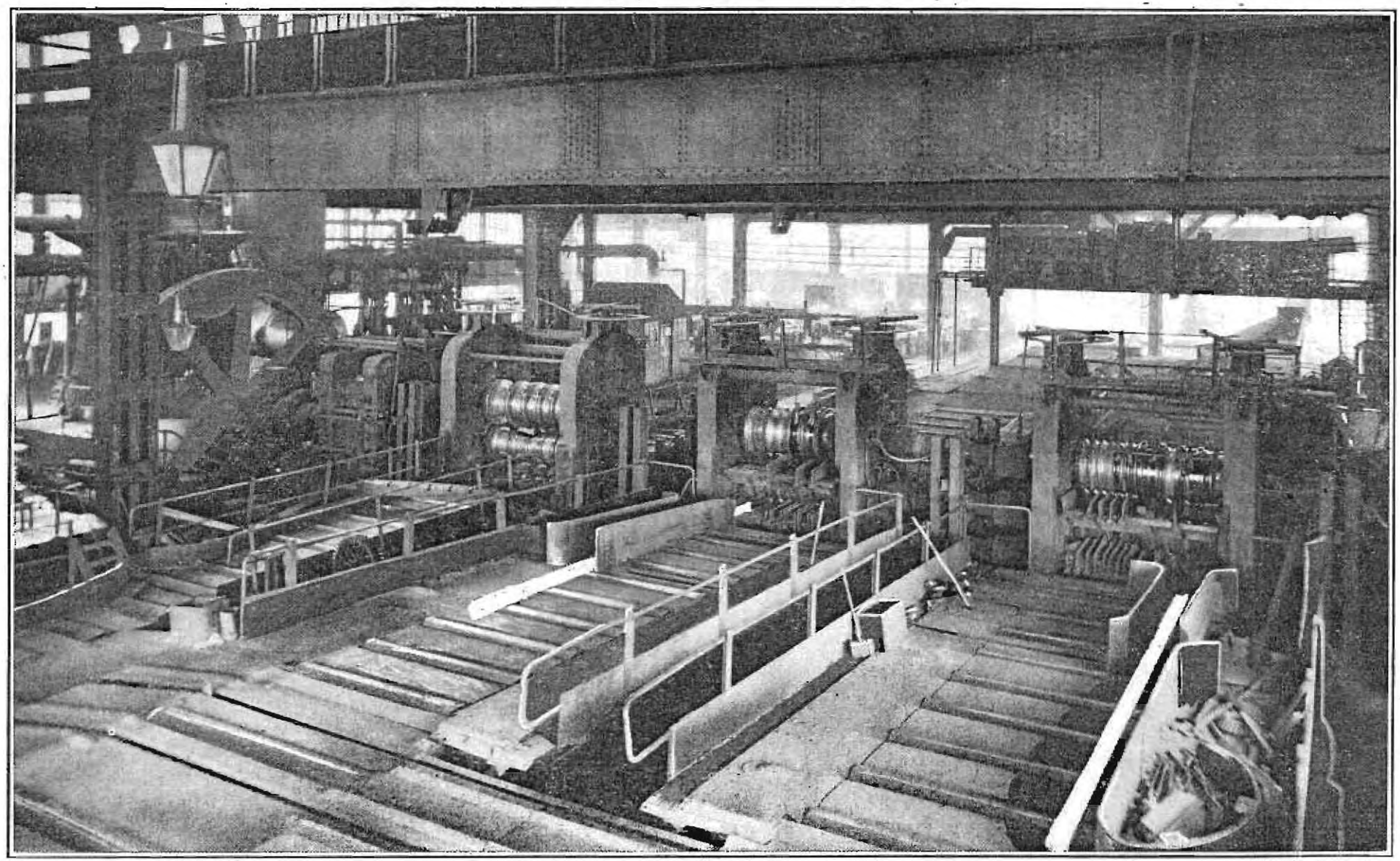
Dorman, Long & Co. Ld. *Middlesbrough.*

SECTION ROLLING MILL, BRITANNIA WORKS, MIDDLESBROUGH.



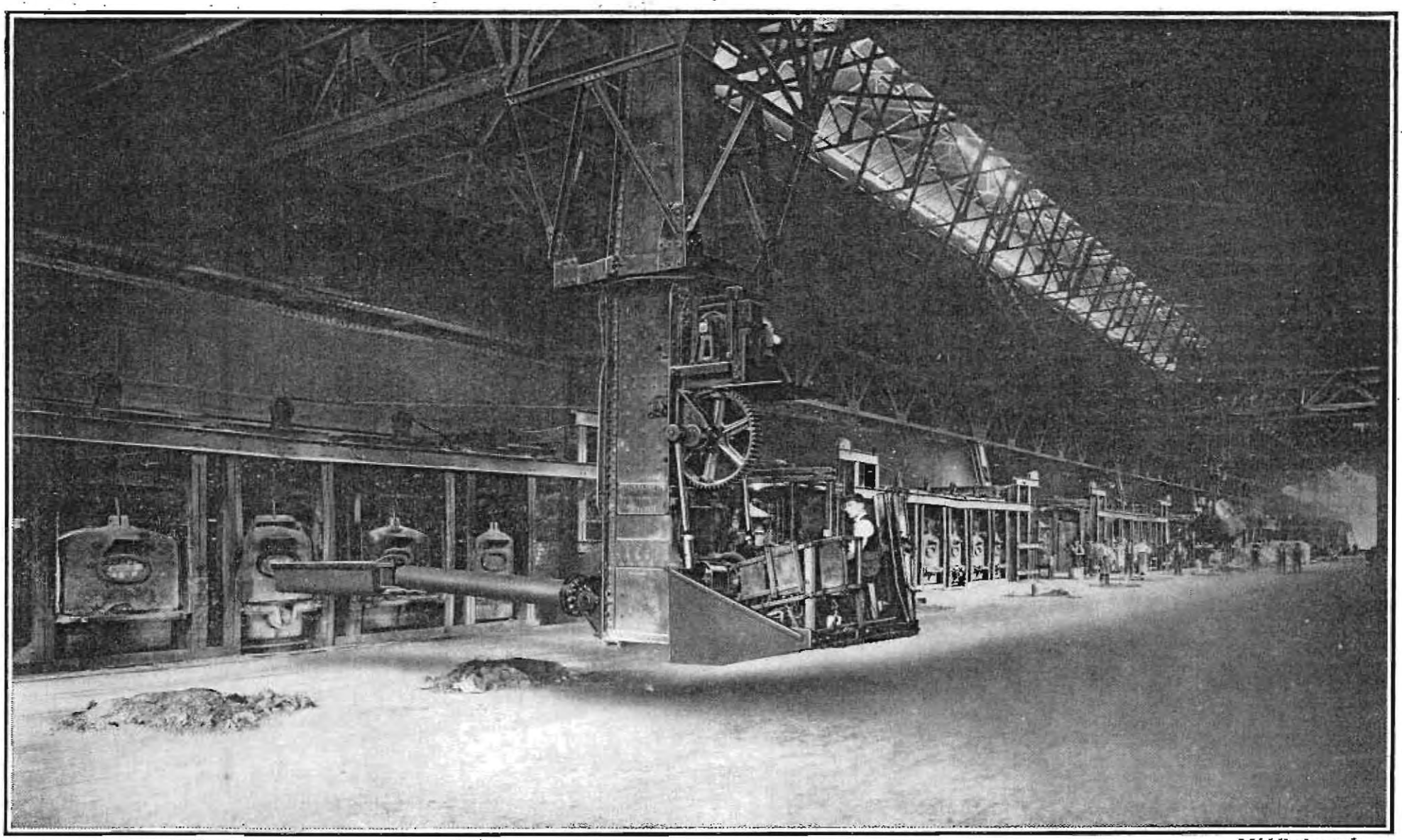
Dorman, Long & Co. Ld. *Middlesbrough.*

36" RAIL AND SECTION MILL AT CLEVELAND STEELWORKS.



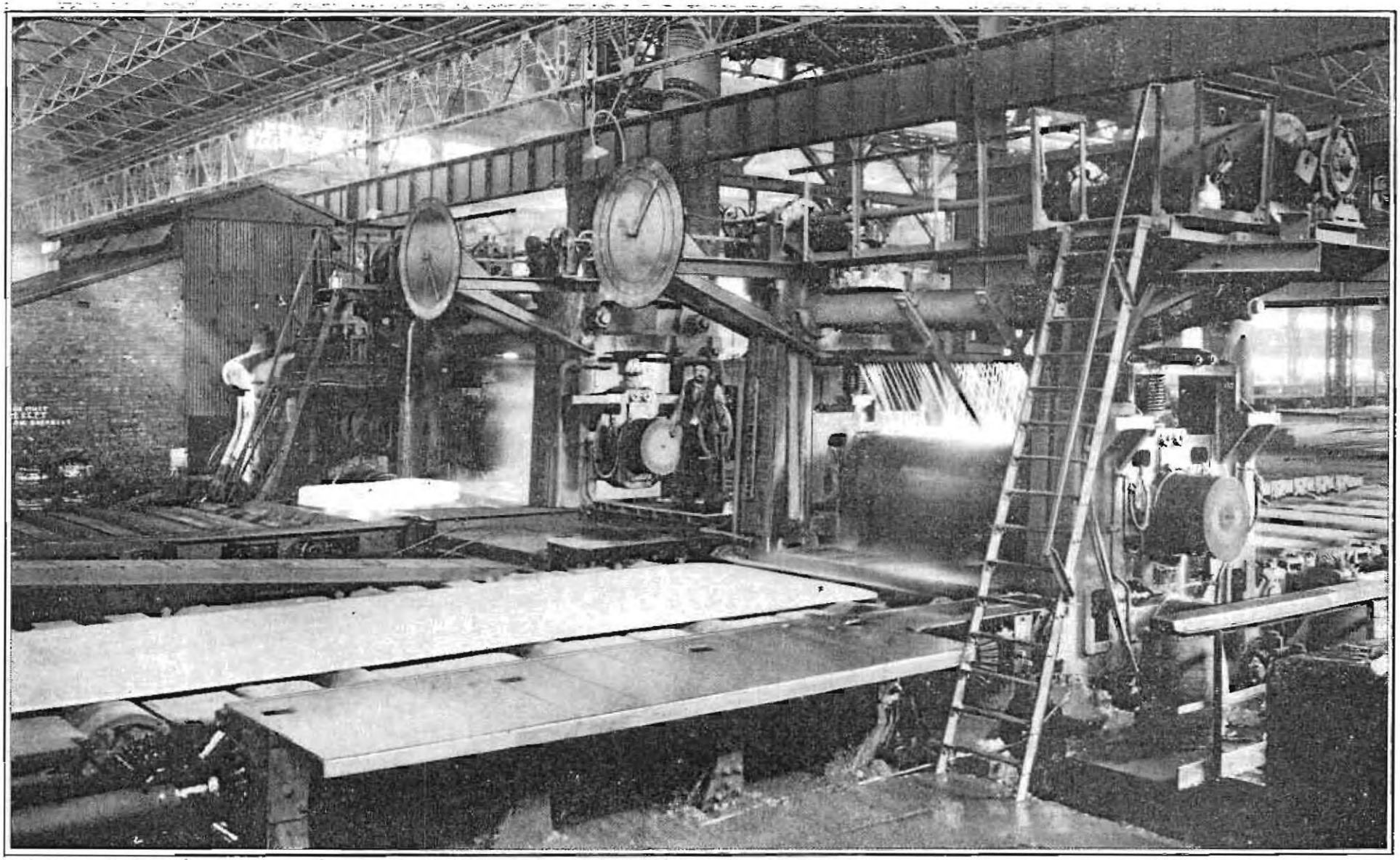
Dorman, Long & Co. Ld. *Middlesbrough.*

RAIL MILL, CLARENCE STEEL WORKS, MIDDLESBROUGH.



Dorman, Long & Co. Ld. *Middlesbrough.*

SMELTING FURNACES, REDCAR.



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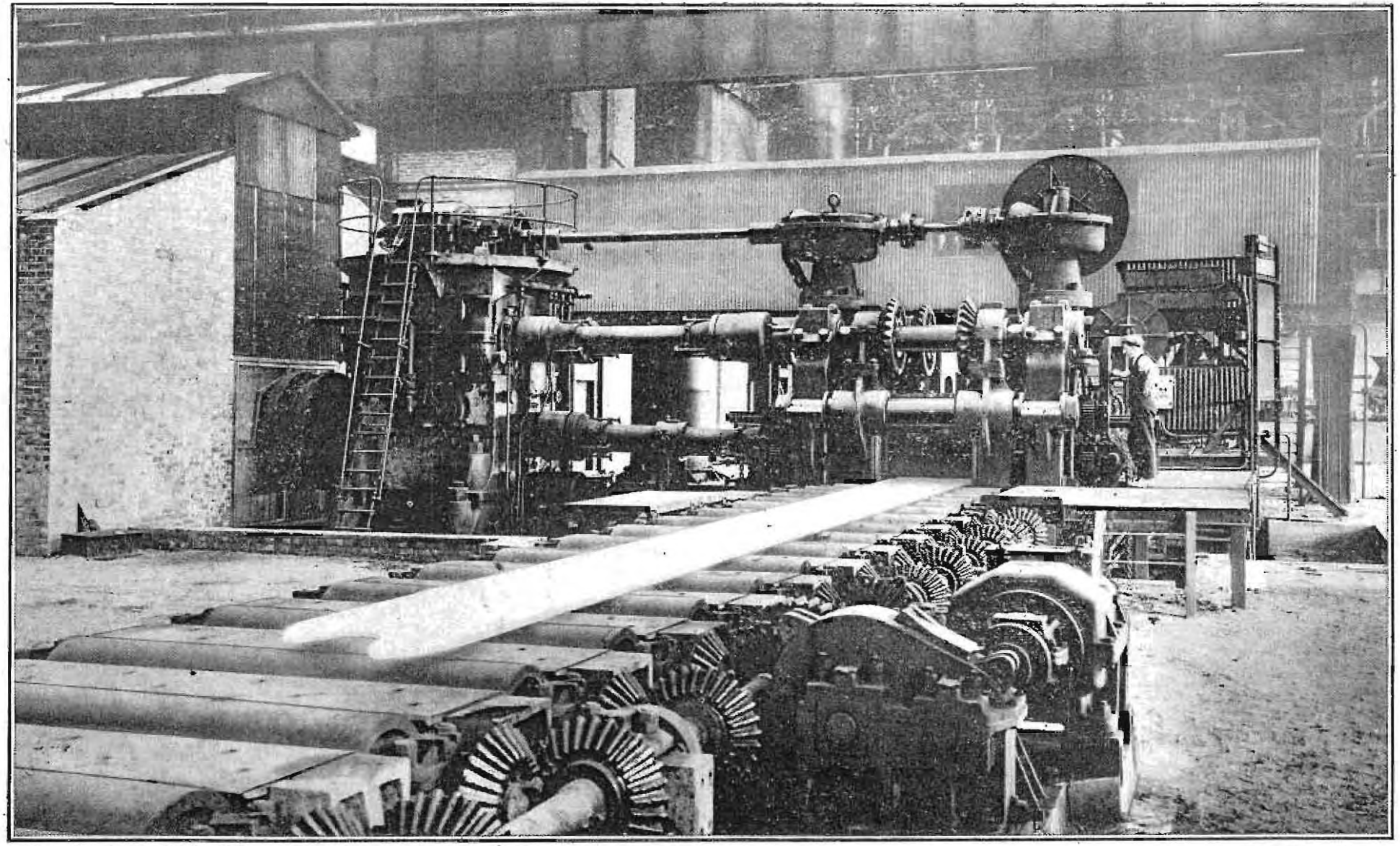
9' 6" PLATE MILL, REDCAR.



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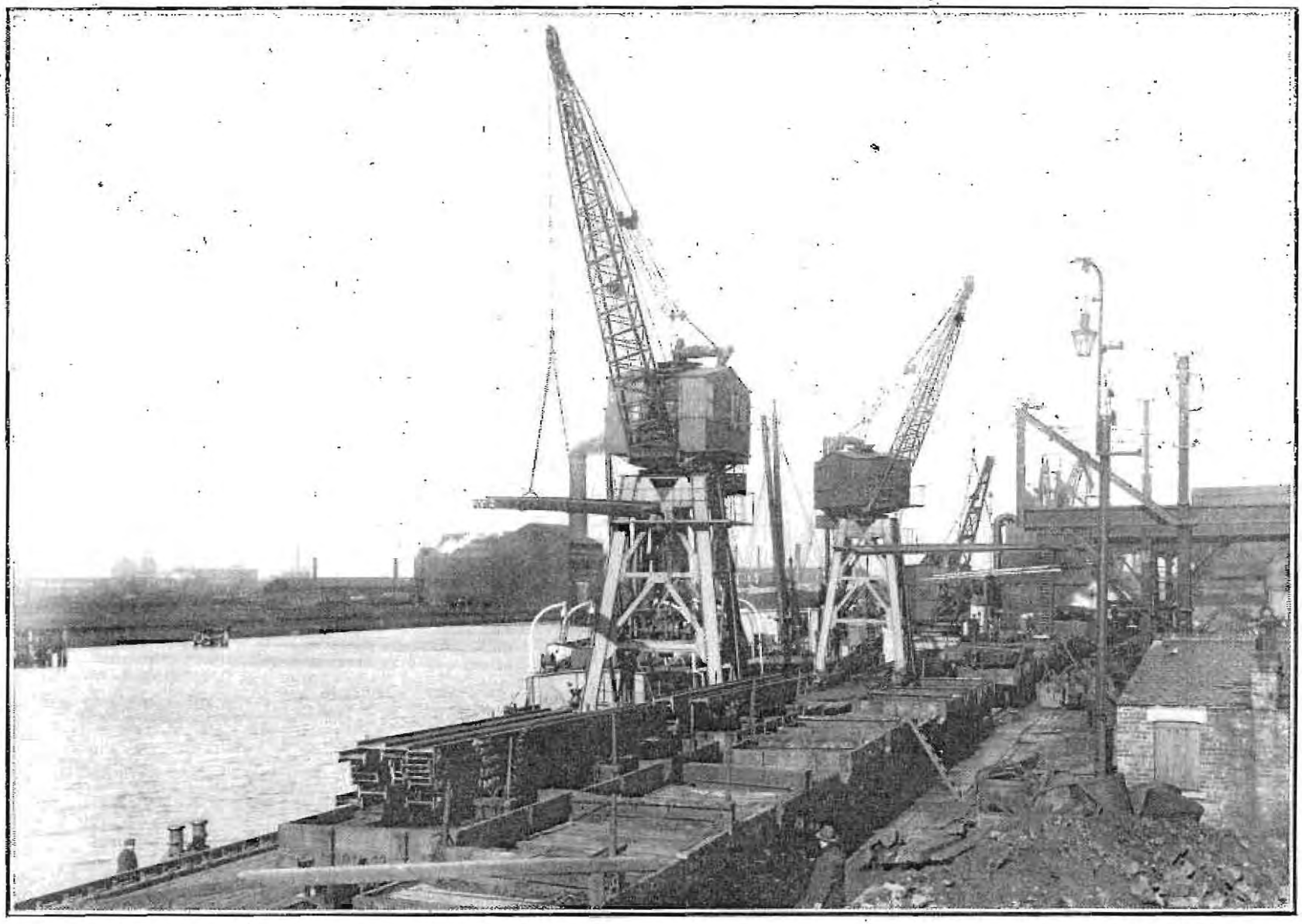
UNIVERSAL PLATE MILL, REDCAR.



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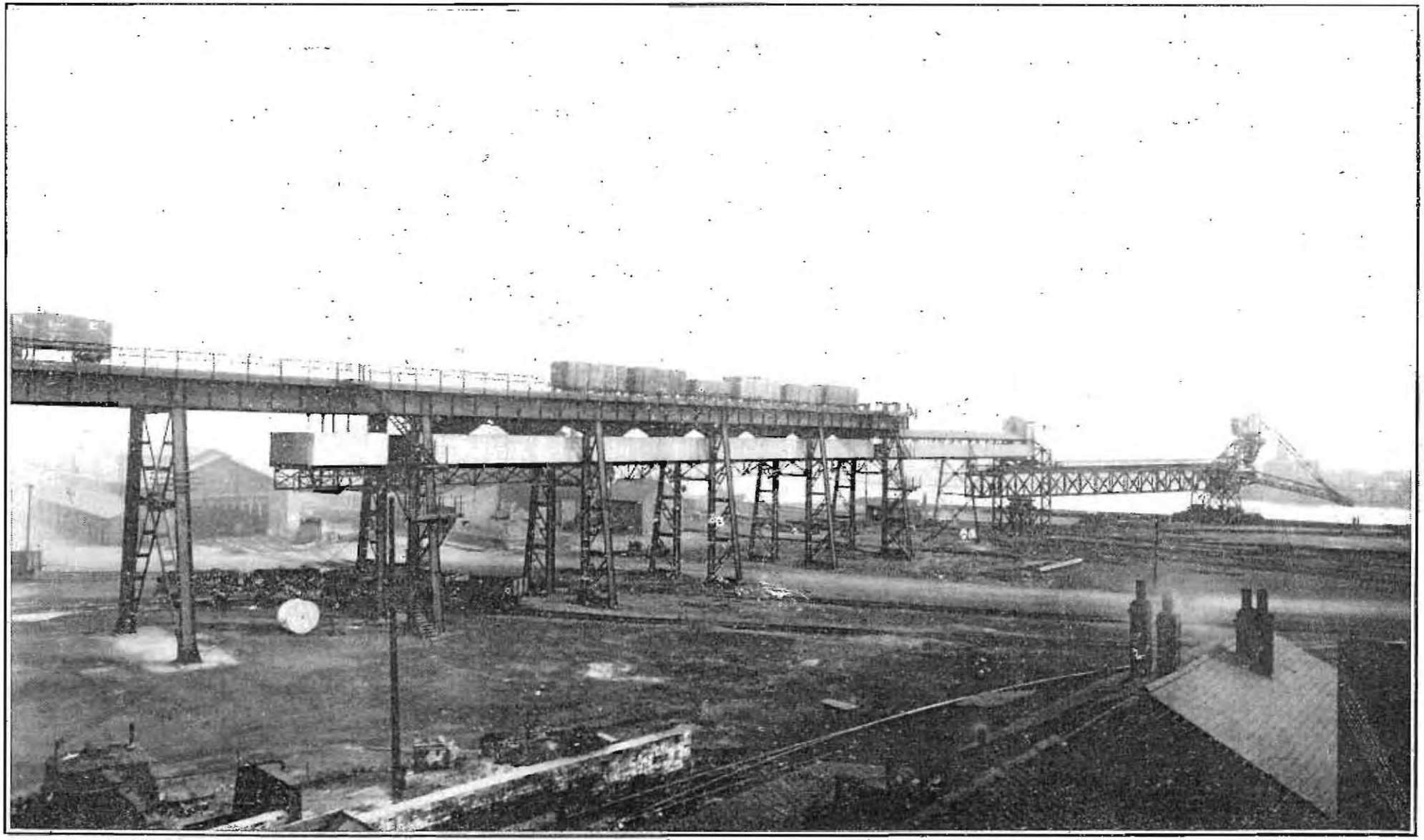
BRITANNIA WHARF, MIDDLESBROUGH.



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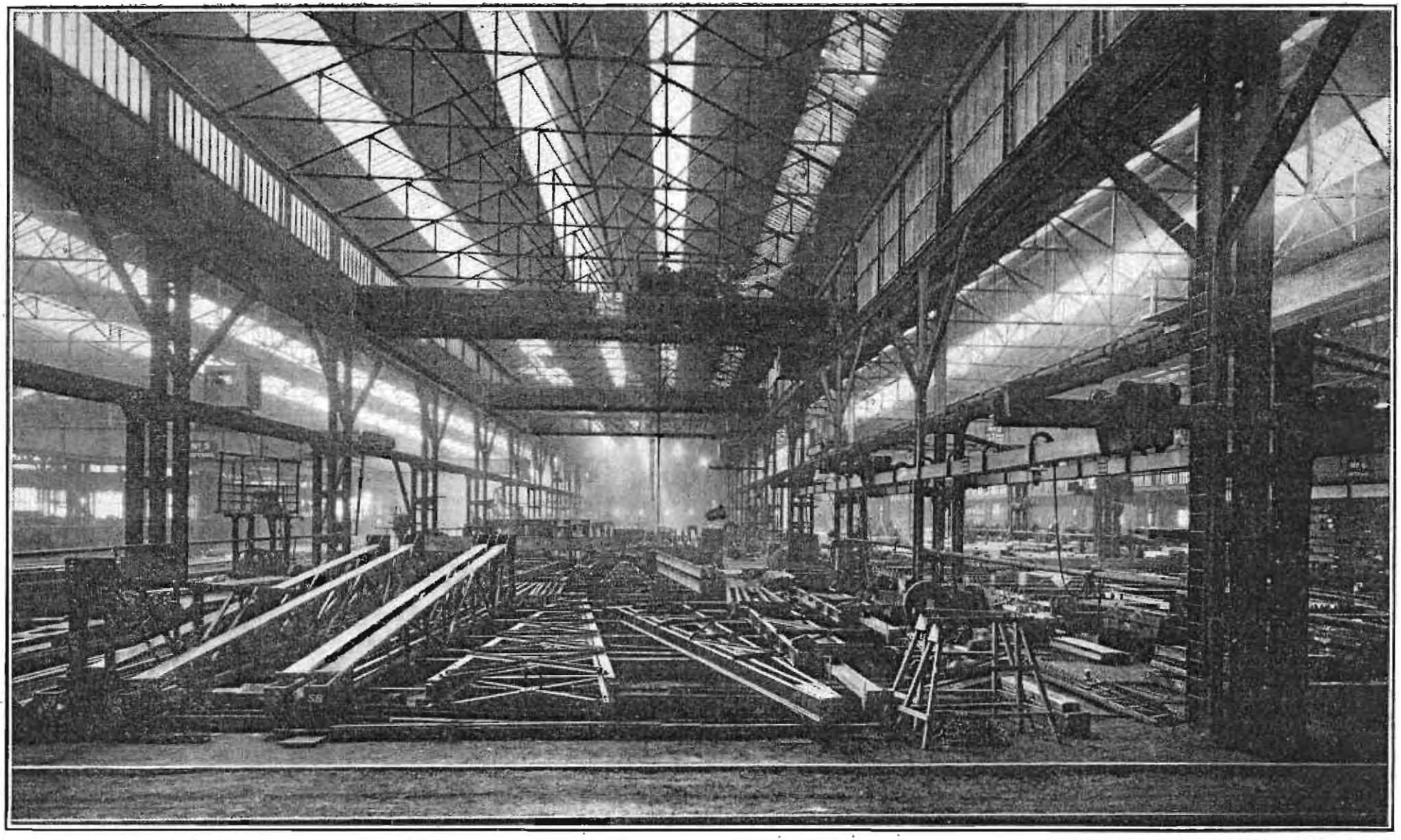
COAL SHIPPING PLANT, CLARENCE IRON WORKS, MIDDLESBROUGH.



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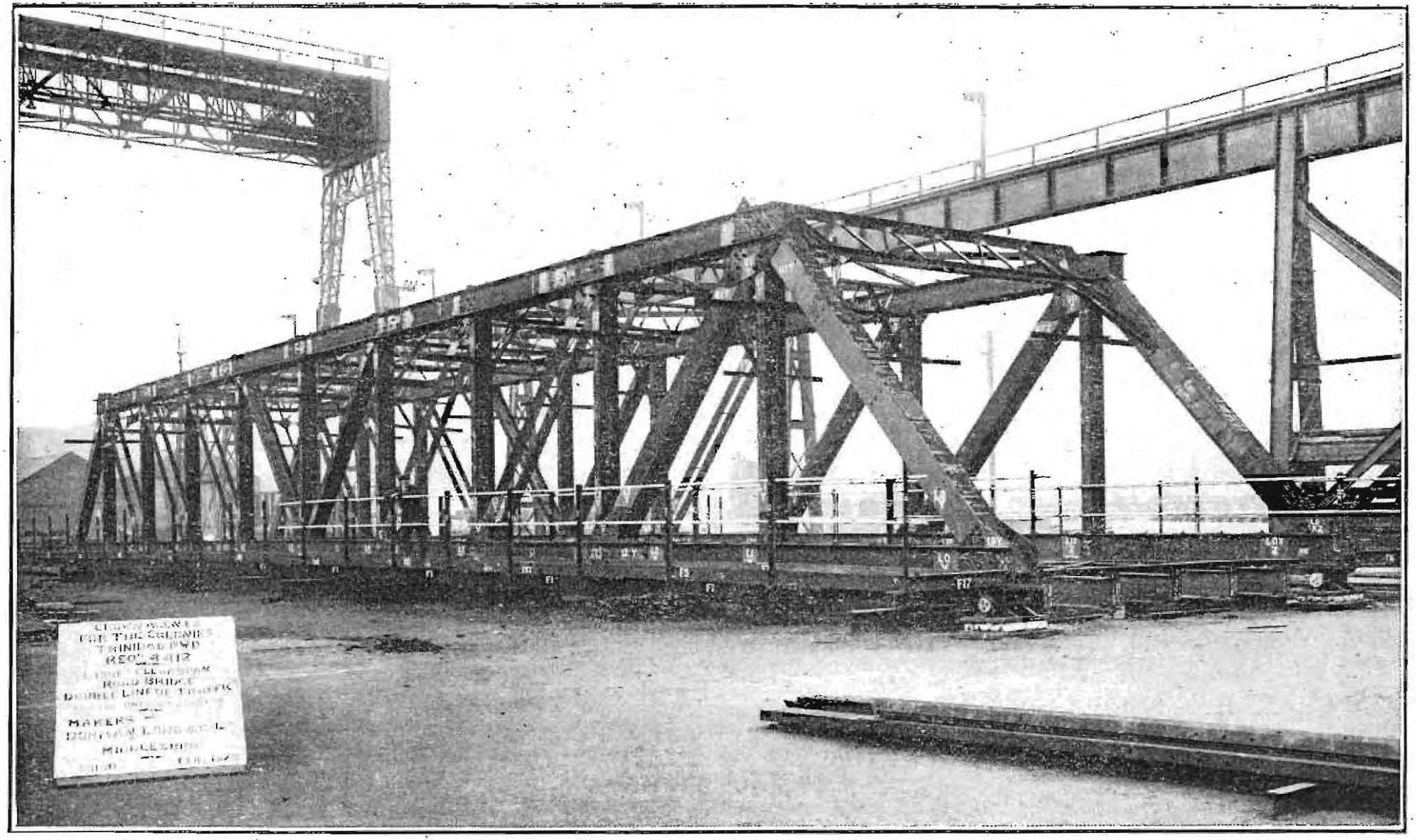
BRIDGE & CONSTRUCTIONAL WORKS, MIDDLESBROUGH.
FABRICATING SHOP.



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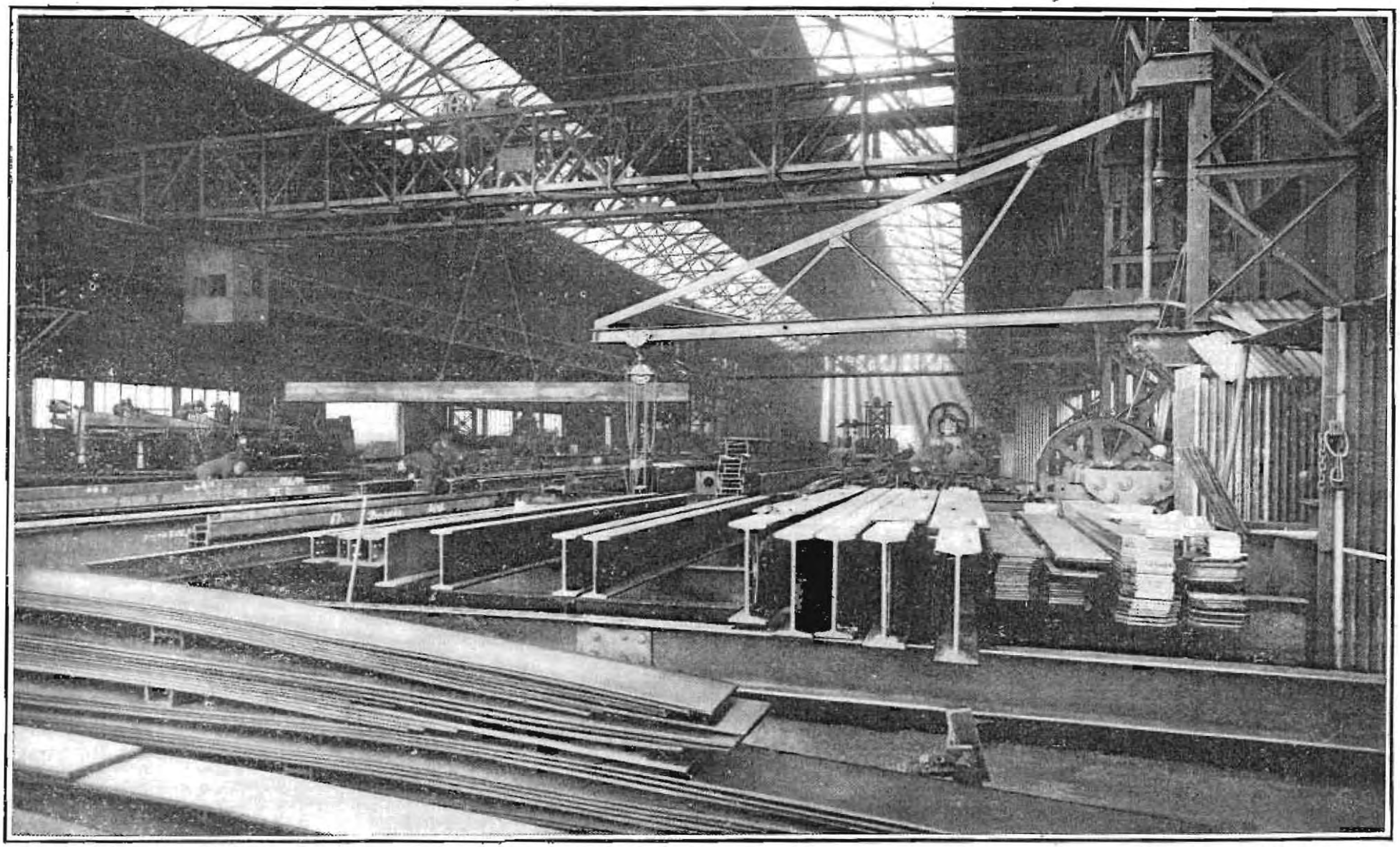
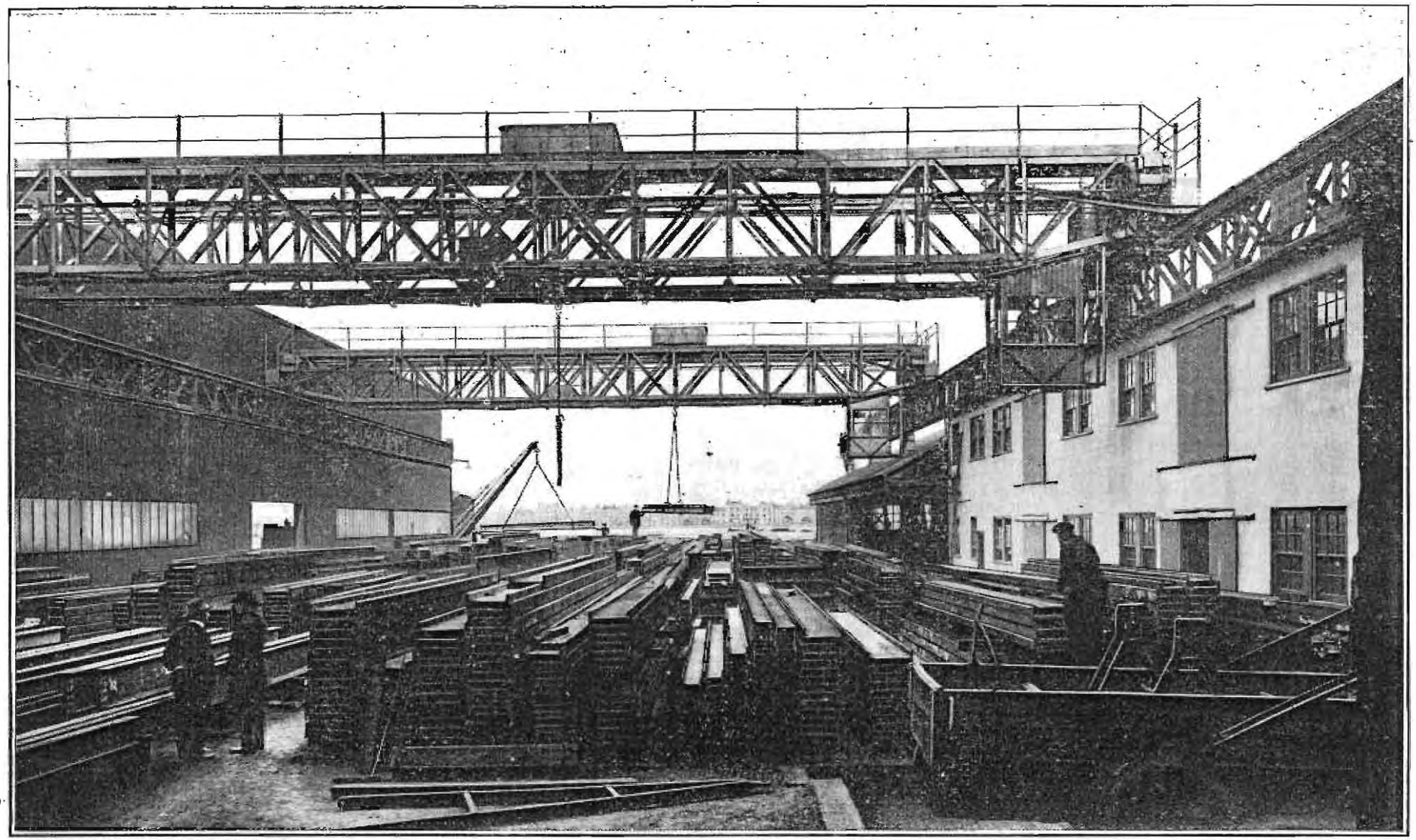
SHOP ASSEMBLY OF 100′ SPAN BRIDGE FOR THE CROWN AGENTS FOR THE COLONIES.



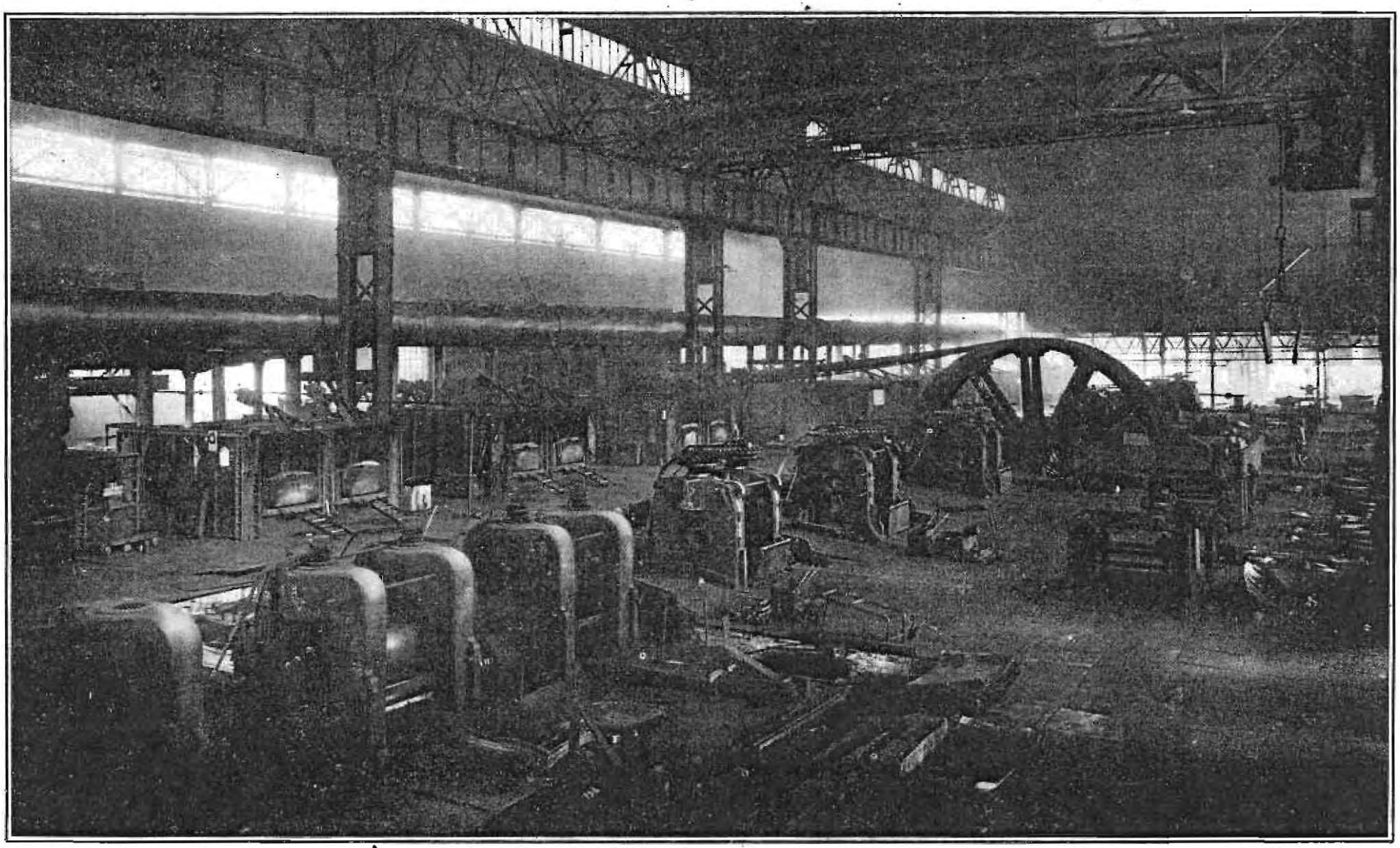
Dorman Long & Co. Ld. *Middlesbrough.*

CONSTRUCTIONAL SHOP, LONDON.



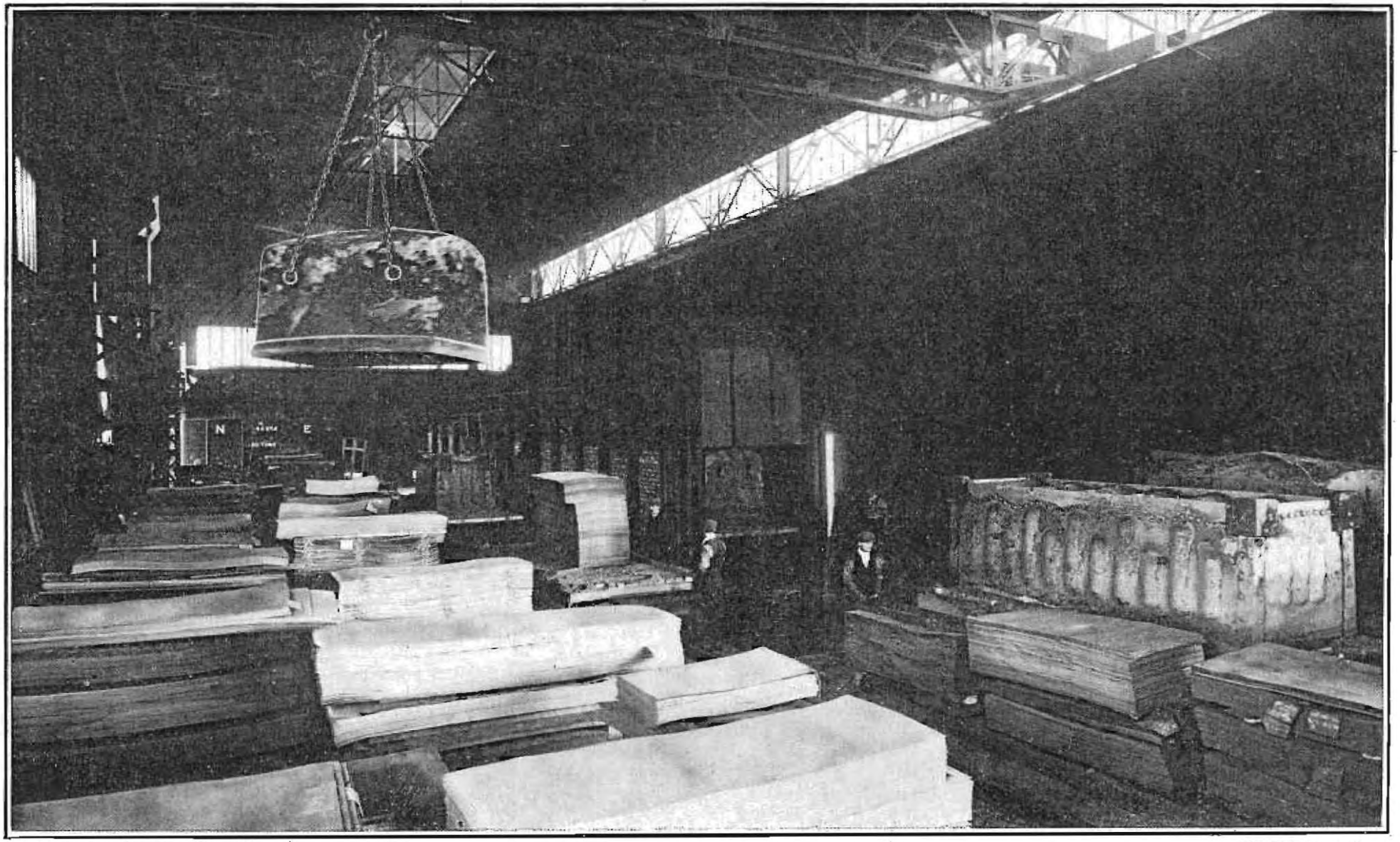
Dorman, Long & Co. Ld. *Middlesbrough.*

STOCKYARD, LONDON.



Dorman, Long & Co. Ld. *Middlesbrough.*

ROLLING MILL, SHEET DEPARTMENT, MIDDLESBROUGH.



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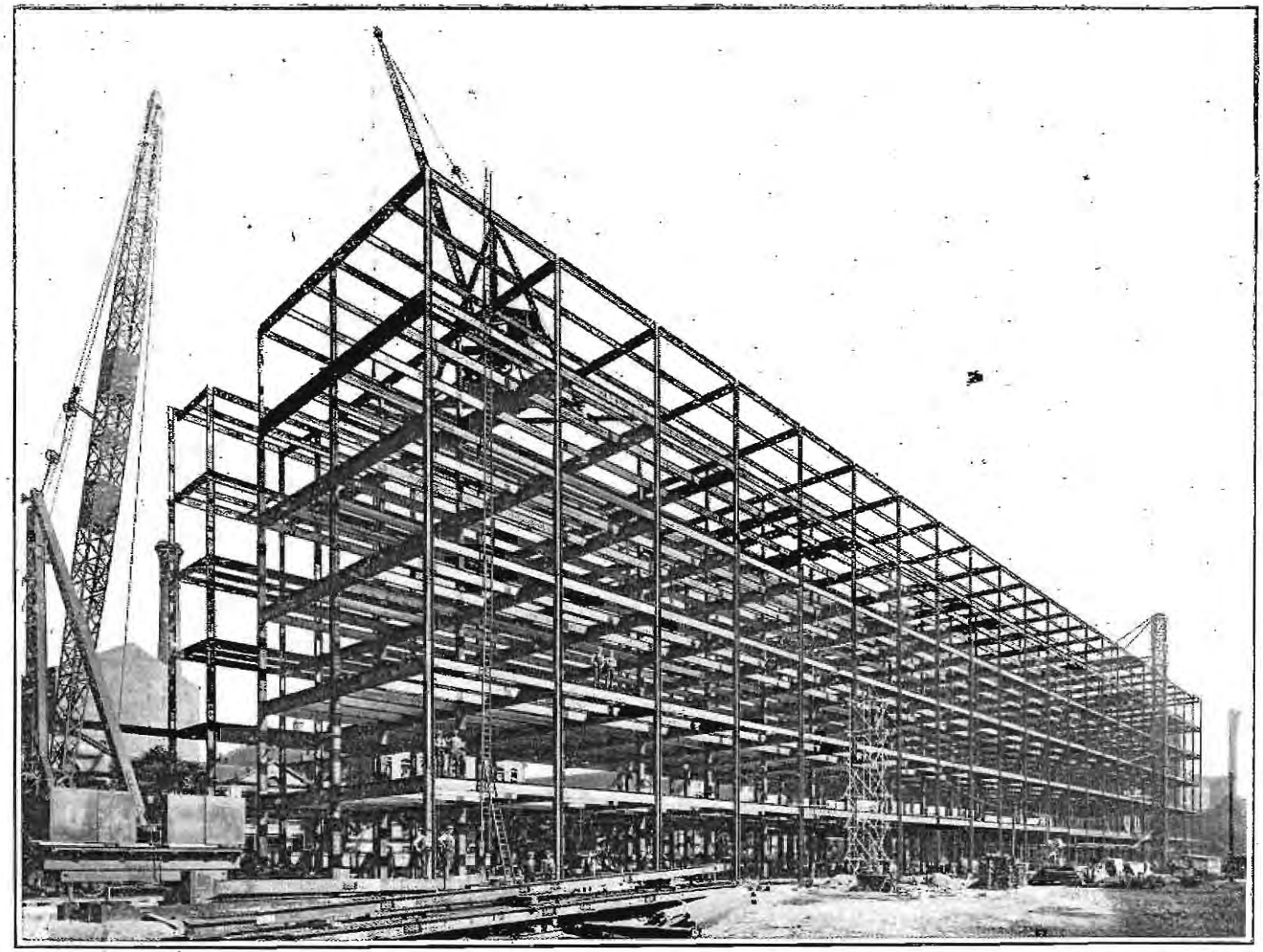
ANNEALING SHOP, SHEET DEPARTMENT, MIDDLESBROUGH.

Dorman, Long & Co. Ld. *Middlesbrough.*

COILING AND BUNDLING SHOP, CLEVELAND WIRE MILLS, MIDDLESBROUGH.



Dorman, Long & Co. Ld. *Middlesbrough.*

IMPERIAL TOBACCO CO. LD., CIGARETTE FACTORY, NOTTINGHAM.

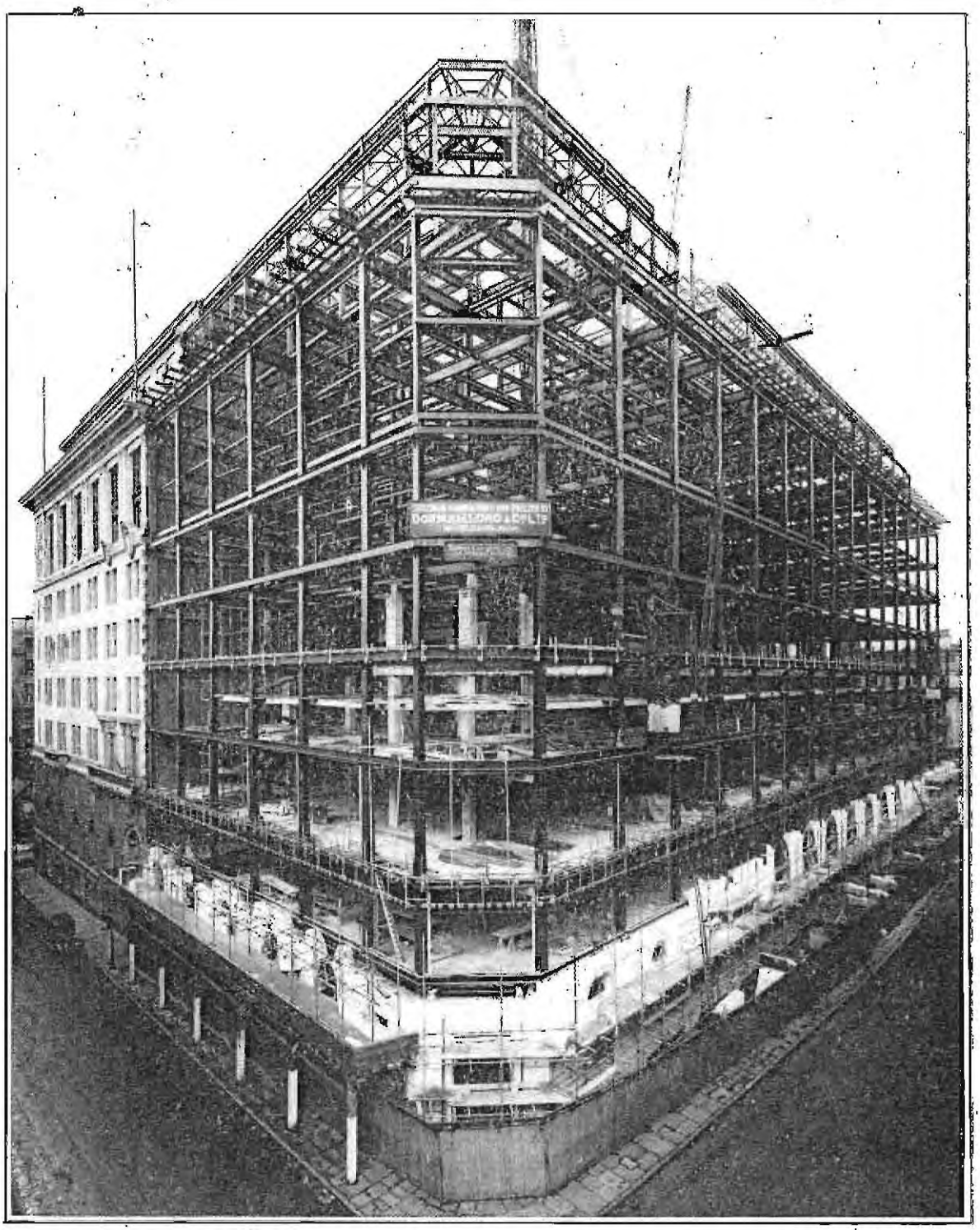
Dorman, Long & Co. Ld. *Middlesbrough.*

SASSOON HOUSE, SHANGHAI,

FOR

MESSRS. E. D. SASSOON & CO. LD.

Architects and Engineers - MESSRS. PALMER & TURNER, SHANGHAI.



Dorman, Long & Co. Ld. *Middlesbrough.*

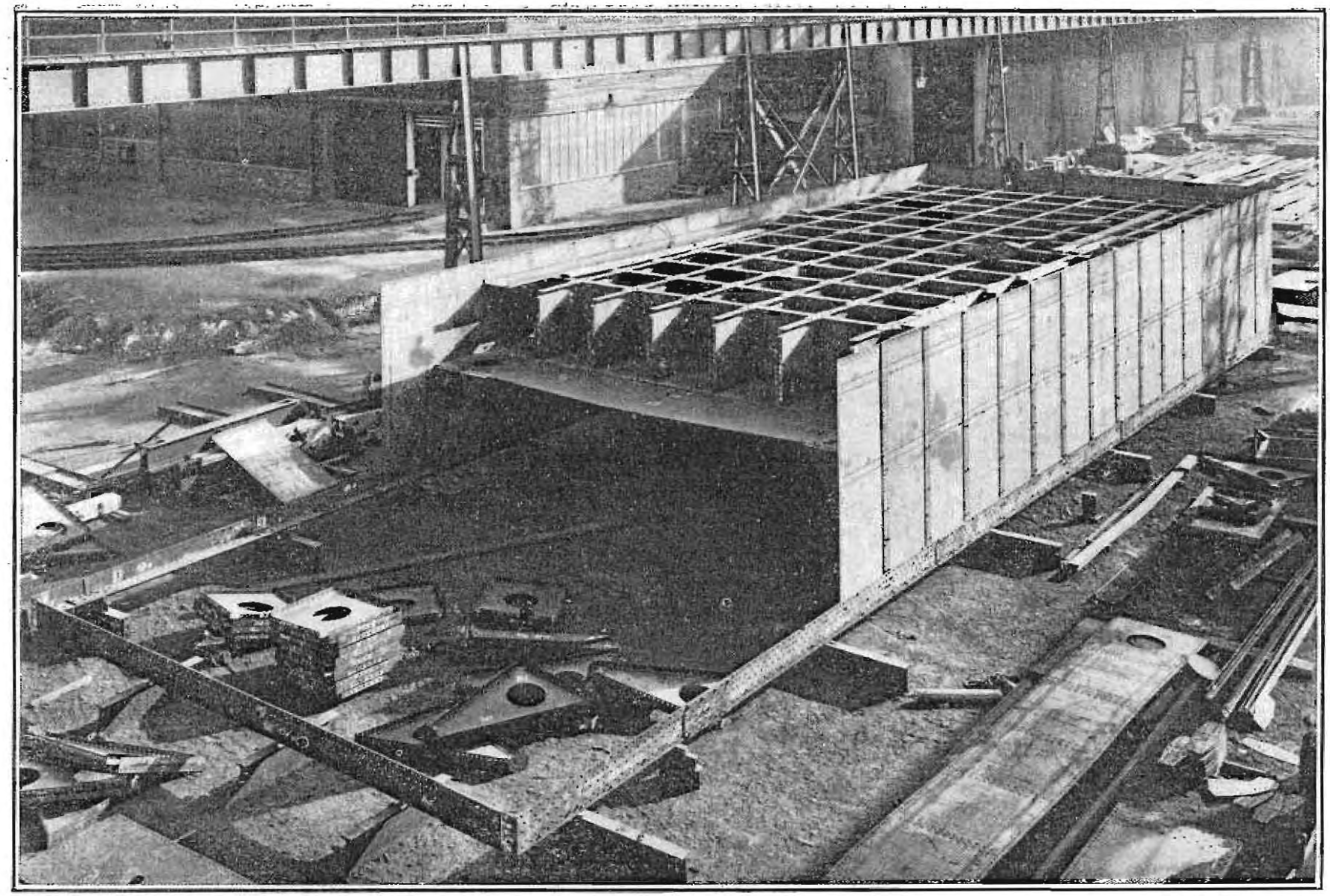
INDIA BUILDING, LIVERPOOL,

FOR

INDIA BUILDING, LTD.

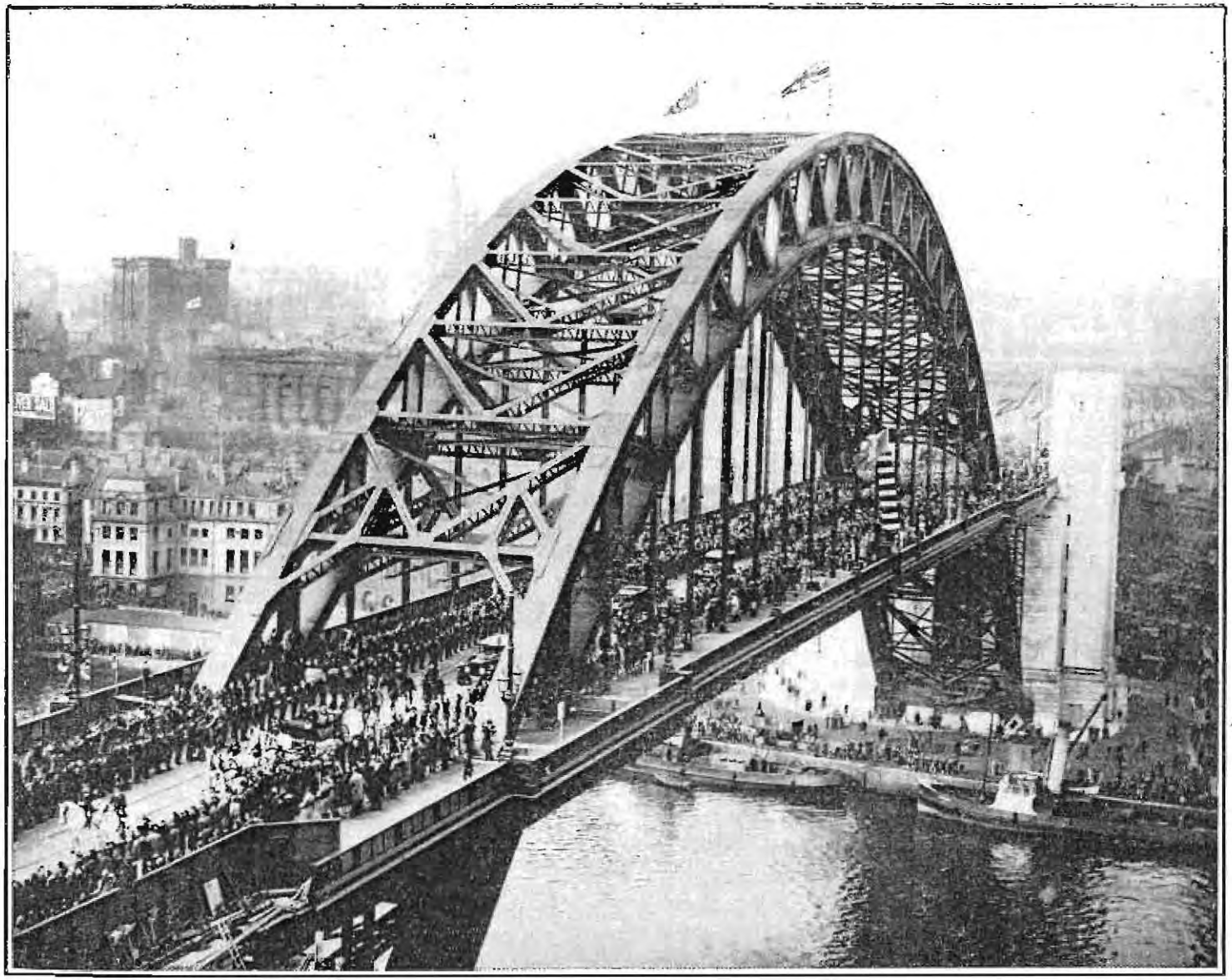
Architects - MESSRS. BRIGGS & THORNELY, F.F.R.I.B.A. AND HERBERT J. ROWSE, A.R.I.B.A.

Engineers - MESSRS. SHARMAN & TRAVERS-MORGAN.



Dorman, Long & Co. Ld. *Middlesbrough.*

LONDON COUNTY COUNCIL.—LAMBETH BRIDGE.—CUTTING EDGE OF CAISSON.



Dorman, Long & Co. Ld. *Middlesbrough.*

NEW TYNE BRIDGE.

Engineers - MESSRS. MOTT, HAY & ANDERSON, AND MESSRS. COODE, WILSON, MITCHELL & VAUGHAN-LEE, AND RALPH FREEMAN, ESQ., CONSULTING ENGINEER FOR DORMAN, LONG & CO., LD.

Architect for Abutments and Towers - R. BURNS DICK, ESQ.

Dorman, Long & Co. Ld. *Middlesbrough.*

SYDNEY HARBOUR BRIDGE, AUSTRALIA,

In course of Construction.

Total length, 3,770 feet. Main Arch, 1,650 feet clear span.

Height to top of arch 470 feet above high water.

Headroom for vessels when completed, 170 feet above high water.

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MIDDLESBROUGH:

WM. APPLEYARD AND SONS, LD., PRINTERS, ALBERT ROAD.