

LYSAGHT REFEREE

A HANDBOOK OF
USEFUL INFORMATION

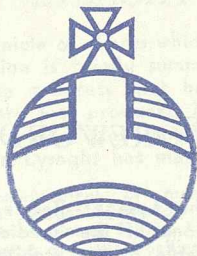
22ND EDITION



ORB
TRADE MARK

With the Compliments of
JOHN LYSAGHT (Australia) LIMITED

LYSAGHT



ORB

TRADE MARK

REFEREE

TWENTY-SECOND EDITION

JOHN LYSAGHT (Australia) LIMITED

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WORKS:

Port Kembla
Newcastle

FOREWORD

For many years the Lysaght Referee has enjoyed the reputation of being one of the handiest and most useful reference books available to the architect, builder, farmer, plumber, student, and country storekeeper.

It is with special pride that John Lysaght (Australia) Limited presents this completely revised and up-to-date twenty-second edition.

Compiled by an expert staff and from recognised authoritative sources, the user will find it a mine of practical information, the greatest care having been taken throughout to ensure the accuracy of the data and tables supplied. At the same time, no responsibility can be accepted for any errors that may have escaped the attention of the editors, nor is any originality claimed for any information contained in its pages that may be readily obtainable elsewhere. The Company will be glad to receive suggestions for inclusion in later editions.

Each copy is, of course, issued entirely without cost and with the compliments of the Company.

JOHN LYSAGHT (Australia) LIMITED

50 YOUNG STREET, SYDNEY

March, 1963

LYSAGHT — 1857-1963

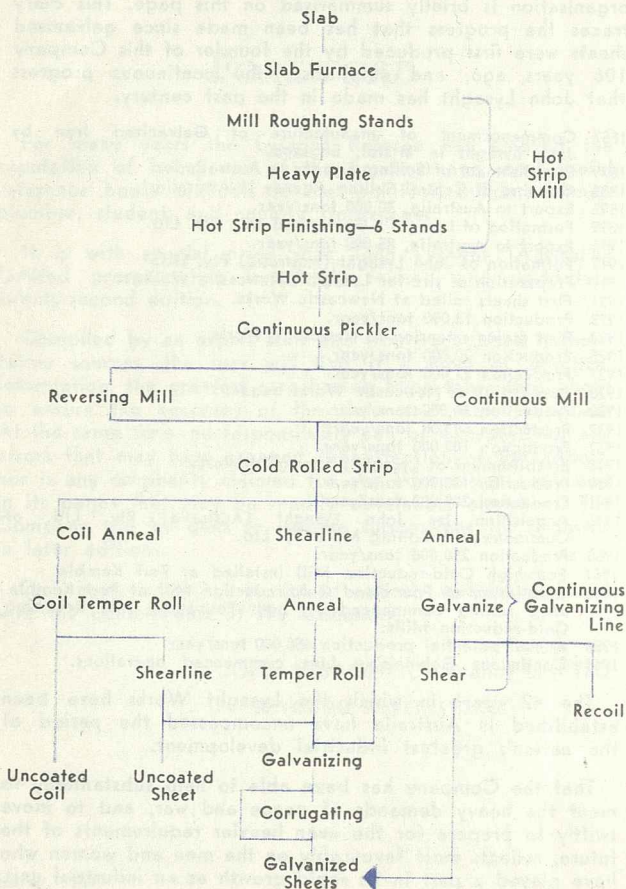
A chronicle of events which mark the history of the Lysaght organisation is briefly summarised on this page. This diary traces the progress that has been made since galvanized sheets were first produced by the founder of this Company 106 years ago, and emphasises the continuous progress that John Lysaght has made in the past century.

- 1857 Commencement of manufacture of Galvanized Iron by John Lysaght in Bristol, England.
- 1879 Establishment of Selling Agency in Australia.
- 1880 Opening of Central Selling Agency in Australia.
- 1895 Export to Australia, 30,000 tons/year.
- 1899 Formation of Lysaght's Galvanized Iron Pty. Ltd.
- 1913 Export to Australia, 85,000 tons/year.
- 1917 Formation of John Lysaght (Australia) Pty. Ltd.
- 1918 Preparation of site for Lysaght's Newcastle Works.
- 1921 First sheets rolled at Newcastle Works.
- 1923 Production 13,000 tons/year.
- 1924 First major extension to Newcastle Works.
- 1925 Production 20,000 tons/year.
- 1927 Production 27,000 tons/year.
- 1928 Duplication of Newcastle Works began.
- 1930 Production 36,000 tons/year.
- 1932 Production 58,000 tons/year.
- 1937 Production 100,000 tons/year.
- 1938 Establishment of Lysaght's Springhill Works.
- 1939 Production 130,000 tons/year.
- 1941 Production 200,000 tons/year.
- 1946 Acquisition by John Lysaght (Australia) Pty. Ltd. of Commonwealth Rolling Mills Pty. Ltd.
- 1950 Production 250,000 tons/year.
- 1951 Four-high Cold-reduction Mill installed at Port Kembla.
- 1955 Installation of Four-stand Cold-reduction Mill at Port Kembla. Strip rolling commenced on both Four-stand and Reversing Cold-reduction Mills.
- 1956 Annual potential production 650,000 tons/year.
- 1961 Continuous Galvanizing Line commenced operations.

The 42 years in which the Lysaght Works have been established in Australia have encompassed the period of the nation's greatest industrial development.

That the Company has been able to help substantially to meet the heavy demands of peace and war, and to move swiftly to prepare for the even heavier requirements of the future, reflects most favourably on the men and women who have played a part in its rapid growth as an industrial unit.

PRODUCTION OF STEEL SHEET FLOW DIAGRAM



GALVANIZED STEEL SHEET

Ferrous metals, being susceptible to corrosion, must be protected from the action of air and water to prevent deterioration from rusting. The most satisfactory protective process is one of galvanizing, zinc affording valuable electro-chemical protection to steel.

The LIFE of a GALVANIZED STEEL SHEET

is dependent

upon the WEIGHT and PERFECTION of its zinc coating.

Produced entirely from the highest quality Australian steel—now recognised as being the equal of the finest British steel—Lysaght Steel Sheets are galvanized with an evenly deposited coating of protective zinc, the quality of which has long been a feature of Lysaght Galvanized Steel Sheet, effectively safeguarding the sheet from the effects of corrosion.

One of the best-known and most widely recommended building sheets in the world to-day is Lysaght Orb brand Corrugated Galvanized Steel Sheet. First introduced in England in 1857, and manufactured in Australia since 1921, Corrugated Galvanized Steel Sheet has proved itself unequalled for all types of roofing, walling and fencing projects, particularly where economy, ease of erection, great tensile strength, long life, and the ability to withstand the ravages of fire are important considerations. It has thus been used extensively in the construction of factories, storage bins and silos, stables, dairies, as well as country homes.

Equally well and favourably known to the plumber and builder is Lysaght Queen's Head brand Galvanized Steel Sheet, used by the trade for working-up purposes for many years.

More recently, with the installation of continuous galvanizing equipment, Lysaght Galvabond has become available as a superior sheet for more severe working-up applications.

Lysaght sheets conform to the standards set down by the Standards Association of Australia.

ZINCANNEAL

GENERAL.—Zincanneal quality sheets are an outstanding Lysaght development. By suitable high temperature treatment, zinc is combined with the steel base to form a zinc-iron alloy having remarkable properties as a coating. The resistance to atmospheric corrosion is particularly good, excellent service being obtained under severe conditions such as those met with in coastal locations. Zincanneal is marketed both as a flat sheet and a pressed panel known as V-crimp.

PAINTING.—Painting can be carried out immediately on erection or fabrication without priming or fear of subsequent peeling. Zincanneal is uninjured by heat up to a temperature of 600°F. It can be stove enamelled without damaging the protective surface in any way.

ZINCANNEAL SOLDERING.—Zincanneal is quite satisfactory for soldered joints, but it is generally found to require more care than ordinary galvanized sheets. The flux should be more active than that used with an ordinary galvanized sheet, and raw spirits, or 50% raw spirits and 50% killed spirits are recommended. Equally good results have been obtained with 60/40 and 50/50 solder. Experience has shown that the soldering iron should not be too hot.

WELDING.—Having a steel base, Zincanneal can be welded or brazed by any normal means. The heat generated by electric arc welding does not destroy the rust-resisting properties, and this material is quite suitable for spot welding. High pressure and high current should be employed, with a minimum time of application. Extensive weathering and corrosion tests have shown that in spite of the temperature involved in the electric welding processes, considerable protection still remains at the weld.

NOTE.—Zincanneal coatings must NOT be confused with lead Terne coatings. Containers of Zincanneal are made to hold ice, water, and food, as in refrigerator cabinets and ice moulds, and the coatings are NOT injurious or poisonous in any way.

BRANDS AND QUALITIES CORRUGATED SHEET

RED ORB.—This universally known sheet has a uniformly heavy zinc coating applied to an especially hard steel base. The extreme rigidity and stiffness specially recommend it for applications such as roofing, walling, or fixing where maximum strength is required. This quality is available in 26 and 24 gauges, and is not suitable for curving.

LYSAGHT



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AUSTRALIA

BLUE ORB.—Blue Orb sheets carry the same high-grade coatings as Red Orb, applied to a ductile steel base of the highest quality. It is particularly suitable for applications requiring curving.

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LEOPARD.—Standard corrugated sheets for use in roofing or walling but not to be used for curving. The zinc coating ensures satisfactory life in the above applications.

MILL REJECTS:

Corrugated Mill Rejects.—Corrugated sheets for use in roofing or walling but not to be used for curving.

Flat Mill Rejects.—For general application where severe forming or bending qualities are not required.



AUSTRALIA

PACKING

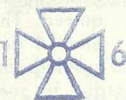
GALVANIZED CORRUGATED.—All Red Orb sheets are packed in one-ton bundles or skidded packs. Blue Orb sheets are packed in one-ton skidded packs, or an optional $\frac{1}{2}$ -ton galvanized skidded pack is available. Corrugated Leopard sheets are normally packed in one-ton unprotected bundles.

CORRUGATED SHEETS

Explanatory Notes on Brands and Sheet Marks

For the information of users, to facilitate identification and to provide means of determining the life of Australian-made sheets, Lysaght steel sheets carry certain identifying numbers and symbols.

DATE OF MANUFACTURE.— The day and number of the month of manufacture are stamped to the left and right of the Orb brand and the year of manufacture between the Orb and "Australia."



Sheets are branded on one side only, with the exception of 24G Blue Orb (which is used mainly for tankmaking). On the reverse side of these sheets is a Tect-A-Tank brand, incorporating the year of manufacture.



INSPECTOR'S NUMBER.—Between the brand and the end of the sheet is stamped the identification number of the inspector who passed the sheet.

PLACE OF ORIGIN.—Sheets manufactured at Port Kembla Works have the letter "K" incorporated in all brands.

Sheets manufactured at Newcastle Works have the letter "N" incorporated in all brands.

GAUGE NUMBER.—Below the brand on all 16, 18, 20, 22, 24 and 26 gauge sheets are stamped the respective figures, 16G, 18G, 20G, 22G, 24G, 26G.

PACKING.—The packer's initials or number are stamped on the side of a skidded pack, and a packer's slip, giving the packer's initials and the date of packing, is included in all skidded packs and bundles.

PACK AND BUNDLE MARKINGS

Corrugated Sheet — Galvanized

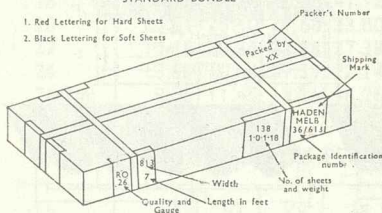
Flat Sheet — Galvanized and Zincanneal

GALVANIZED

QUEEN'S HEAD.—When in bundles the number and weight of sheets is stencilled on a clip in the side of the bundle. 14G and heavier are not branded, the tally being marked Q.H.N.B.

CORRUGATED SHEET — GALVANIZED.—Similar identification markings are stencilled on skidded packs and bundles for corrugated sheets. Details include:—

STANDARD BUNDLE



Quality.

Gauge and size.

Number of sheets.

Weight.

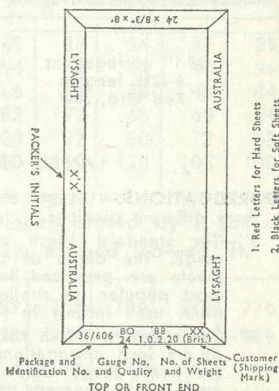
Package Identification No.

Shipping Mark.

Packer's Initials.

SKIDDED PACK

BOTTOM OR BACK END



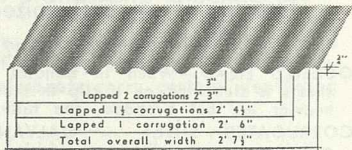
Red lettering is used for hard sheets and black for soft, both on a yellow background.

26G (1"Corr.) the size, number and weight of sheets is marked on the other end of the pack.

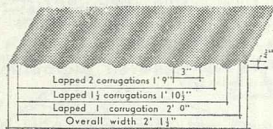
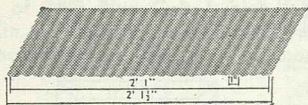
Markings for Mill Rejects are the same as on packs containing primes, except for quality.

STANDARD CORRUGATED GALVANIZED STEEL SHEETS

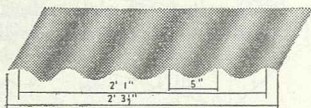
10-3" corrugations,
5-12ft. lengths
Blue Orb, 16G-26G
Red Orb, 24G & 26G



8-3" corrugations,
5-12ft. lengths.
Blue Orb, 16G-26G
Red Orb, 24G & 26G



25-1" corrugations,
6-12ft. lengths
Red Orb, 26G



5-5" corrugations,
5-12ft. lengths
Blue Orb, 12G-20G
Red Orb, 26G
5-8ft. lengths

LAPPED ONE CORRUGATION

CORRUGATIONS.—Lysaght sheets are produced in corrugations of three different spacings.

3"—The standard 3-inch corrugation is the pitch in common usage. The depth of corrugation is approximately $\frac{3}{4}$ ", and sheets are produced in two widths: 10-3 inch corrugations, most popular for roofing and siding; and 8-3 inch corrugations, used largely in the Blue Orb quality for tank-making.

5"—The standard 5-inch corrugated pitch is produced in a width of 5-5 inch corrugations $1\frac{1}{4}$ " deep. This corrugation is used for heavy-gauge sheets. These are recommended for wide unsupported coverage tasks, such as awnings, where maximum strength of the sheet as a beam is desirable, or for domestic or industrial roofs.

1"—The standard 1" corrugation sheet, produced in 26G only, is 25 corrugations wide, $\frac{1}{4}$ " deep. This sheet makes an attractive and economical lining material for soffits, ceilings, feature walls, as a base for sprayed plaster and similar applications.

8-3in. CORRUGATED GALVANIZED STEEL SHEET

APPROXIMATE WEIGHT PER SHEET—LBS.

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
16	32.76	39.25	45.74	52.22	58.71	65.19	71.68	78.16
18	26.18	31.36	36.54	41.72	46.90	52.08	57.27	62.45
20	21.21	25.40	29.60	33.80	38.00	42.19	46.39	50.59
22	17.18	20.58	23.98	27.38	30.78	34.18	37.58	40.98
24	13.89	16.64	19.39	22.14	24.89	27.64	30.38	33.13
26Cml	9.55	11.45	13.36	15.26	17.16	19.06	20.97	22.87

COUNT OF SHEETS PER NOMINAL TON

16	68	57	49	43	38	34	31	29
18	86	72	62	54	48	44	40	36
20	106	88	76	66	58	54	48	44
22	130	108	94	82	72	66	60	54
24	160	136	116	100	92	80	72	68
26Cml	235	195	165	150	130	120	105	100

COVERAGE.—Mean area of surface covered by 1 ton of sheet—1½ corrugations side lap, 6" end lap—sq. ft.

18	726	743	756	759	765	784	788	776
20	894	908	926	928	924	962	945	949
22	1097	1114	1146	1153	1148	1176	1181	1164
24	1350	1403	1414	1406	1466	1425	1418	1466
26Cml	1983	2011	2011	2109	2072	2138	2067	2156

NOTE.—Following long-established British practice, 26 gauge Galvanized Steel Sheet, both corrugated and plain, manufactured in Australia, is lighter than true 26 gauge.

10-3in. CORRUGATED GALVANIZED STEEL SHEET

APPROXIMATE WEIGHT PER SHEET—LBS.

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
16	40.12	48.06	56.01	63.95	71.89	79.83	87.77	95.72
18	32.06	38.40	44.75	51.09	57.44	63.78	70.13	76.47
20	25.97	31.11	36.25	41.39	46.53	51.67	56.81	61.95
22	21.04	25.20	29.36	33.53	37.69	41.85	46.02	50.18
24	17.01	20.38	23.74	27.11	30.48	33.84	37.21	40.58
26Cml	11.70	14.03	16.36	18.69	21.02	23.34	25.67	28.00

COUNT OF SHEETS PER NOMINAL TON

16	56	47	40	35	31	28	26	23
18	70	58	50	44	40	36	32	29
20	86	72	62	54	48	44	40	36
22	106	88	76	66	60	54	48	44
24	132	108	96	84	72	68	60	56
26Cml	195	160	135	120	105	95	90	80

COVERAGE.—Mean area of surface covered by 1 ton of sheet— $1\frac{1}{2}$ corrugations side lap, 6" end lap—sq. ft.

18	748	758	772	784	808	812	798	792
20	919	941	957	962	969	993	998	983
22	1133	1150	1173	1176	1211	1218	1197	1202
24	1411	1411	1482	1496	1454	1534	1496	1530
26Cml	2084	2090	2084	2138	2120	2143	2244	2185

NOTE.—Following long-established British practice, 26 gauge Galvanized Steel Sheet, both corrugated and plain, manufactured in Australia, is lighter than true 26 gauge.

5-5in. CORRUGATED GALVANIZED STEEL SHEET

APPROXIMATE WEIGHT PER SHEET—LBS.

Gauge	Length				
	6'	7'	8'	9'	10'
16	41.58	48.45	55.32	62.19	69.06
18	33.22	38.71	44.20	49.69	55.17
20	26.91	31.36	35.80	40.25	44.70

COUNT OF SHEETS PER NOMINAL TON

16	54	46	40	36	32
18	67	58	51	45	41
20	83	71	63	56	50

COVERAGE.—Mean area of surface covered by 1 ton of Sheet— $1\frac{1}{2}$ corrugations side lap, 6" end lap—sq. ft.

16	601	603	604	615	610
18	746	760	770	768	781
20	924	931	951	956	952

25-1in. CORRUGATED GALVANIZED STEEL SHEET

APPROXIMATE WEIGHT PER SHEET—LBS.

Gauge	Length				
	6'	7'	8'	9'	10'
26 Cml.	10.78	12.57	14.36	16.15	17.94

COUNT OF SHEETS PER NOMINAL TON

26 Cml.	208	178	156	139	125
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GALVANIZED FLAT SHEETS

GALVABOND is a zinc-coated sheet available in cut lengths or coils, produced by continuous galvanizing process. The tightly adherent coating will not flake or peel during severe forming operations such as roll forming, pressing, and especially Pittsburgh lockseaming.

Coating Weight: Standard sheet has nominal 1.25 oz./sq. ft.

Supplied on request at 1.00, 1.50, 1.75, 2.00 or 2.50 oz./sq. ft.

Normal sizes: Up to 16 ft. lengths.

28-30 gauges up to 36" width.

26G Cml. to 12G up to 48" width.

"ZINCMATTE" is a continuously-coated sheet with similar forming characteristics to Galvabond, but processed to give a smooth surface for higher finish applications. Normally produced at 1.0 oz./sq. ft. coating weight.

"ZINCSKIN" is a continuously-coated product of light coating weight with a highly-finished matte surface, eminently suitable for articles where a degree of corrosion resistance is required under an adherent paint finish.

QUEEN'S HEAD is the standard prime flat sheet quality, suitable for normal working up applications, produced only with the 1.25 oz./sq. ft. coating.

Normal sizes:

Gauge	Width	Length
10-12	6"-48"	5'-12'
14-26 Cml.	6"-48"	5'-15'
28-30	6"-36"	5'-15'

LYSAGHT



QUEEN'S HEAD

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LEOPARD is a high-grade sheet of lower cost, to be used when minor surface blemishes will not detract from the article manufactured.

EXPLANATORY NOTES ON MARKINGS OF FLAT SHEETS.

Year of manufacture is incorporated in frame of Queen's Head brand, the figure being at base of Queen's neck. Figures on either side of brand show day and month of manufacture. Works identifications are "K" for Port Kembla and "N" for Newcastle. Inspector's mark is stamped between brand and end of sheet. Packer's initials are stencilled on side of skidded pack. Packer's slip showing initials and date is enclosed in all skidded packs. Should reference be necessary, please quote packer's initials, inspector's number, year of manufacture, and any other details to help identify particular pack.



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PACKING—GALVANIZED FLATS:

Galvabond: 17G and lighter, one, two or three-ton skidded packs; 16G and heavier, one-ton unprotected bundles, one, two or three-ton skidded packs.

Zincmatte and Zinckskin are packed similarly to Galvabond.

GALVANIZED FLAT SHEETS—(Continued)

Queen's Head: 17G and lighter, one, two or three-ton skidded packs; 16G and heavier, one and two-ton bundles, one, two or three-ton skidded packs.

Leopard: Flat sheets 17G and lighter, one-ton skidded packs, 16G and heavier, one-ton unprotected bundles.

Z.A. Panel and R.L.: All gauges—one-ton skidded packs. (Optional two-ton pack available).

Terne Plate: All gauges—one-ton skidded packs. (Optional two-ton pack available).

GALVANIZED COIL

GALVABOND quality, with similar coating and base characteristics to the sheet product is available in coil of the following size range:

Gauge	Width
12-15	6"-48"
16-24 Cml.	6"-48"
28-30	4"-36"

Coil Gauges.—Galvanized coil is sold on a decimal thickness and not on the weight basis applicable to sheet. When ordered to B.G. number of decimal thickness, this constitutes the base gauge. The total thickness is increased by the coating weight in accordance with the following table.

	Ounces per square foot coating				
	1.00	1.25	1.50	1.75	2.0
Coating thickness	.0017	.0021	.0025	.0029	.0034 ins.

The thickness tolerances applicable to Galvanized coil are as follows:

Gauge Range	Specified Width — Inches		
	Up to and inc. 32"	Over 32"-40" inc.	Over 40"-48" inc.
.0742-.0833	.007	.007	.007
.0591-.0741	.007	.007	.007
.0526-.0590	.006	.007	.007
.0468-.0325	.006	.006	.006
.0370-.0467	.005	.005	.005
.0293-.0369	.004	.0045	.0045
.0263-.0294	.004	.004	.004
.0208-.0262	.003	.004	.004
Below .0207	.003	.003	.003

Galvabond S is an alternative quality of higher average strength which is more suitable for roll formed decking, guttering etc. In the process of developing the stronger product, the ductility and coating adherence are slightly lowered, and this quality is not recommended for Pittsburgh lockseaming operations.

Zincmatte and Zincskin are also available in coil form.

ZINCANNEAL

GENERAL.—Zincanneal flat sheets are produced in two standard qualities—Zincanneal Roller Levelled (Z.A.R.L.) and Zincanneal Panel.

LYSAGHT
ZINCANNEAL
AUSTRALIA
PANEL QUALITY

Z.A.
SECONDS

PANEL QUALITY

ZINCANNEAL PANEL.—These sheets are subjected to a final surface-improvement process, and finished dead flat. The surface provides an ideal base for baked enamels and similar fine finishes. It is eminently suited to the manufacture of steel furniture, panelling, signboards, louvres, acoustic tiles, etc.

LYSAGHT
ZINCANNEAL
AUSTRALIA
R.L.

Z.A.
SECONDS

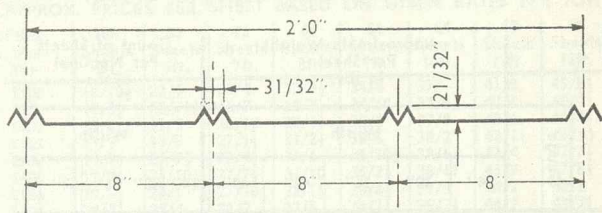
R.L.

Z.A.R.L.—This quality is roller levelled after coating to improve the flatness. It is especially suited for applications requiring a paint finish where a perfectly flat sheet is not essential. Of its many uses, air-conditioning units, louvres, signboards, rainwater goods and agricultural equipment are typical.

SECONDS.—As a result of the stringent inspection standards applied in the manufacture of Lysaght sheets, some material is produced which falls outside the acceptable limits for Prime Sheets, and are consequently classed as Seconds. These sheets may carry small uncoated areas, broken corners, or broken sides. Appearance defects such as tree marks, metal spots and stains may also be included.

PACKING.—All Zincanneal sheets are packed in galvanized skidded packs of unit weight approximately one ton. An optional pack of two tons is also available.

LYSAGHT V-CRIMP ZINCANNEAL STEEL SHEET



V-Crimp is an attractive panel for exterior walls, garage doors, eaves, awning soffits, internal ceilings, decorative shop fronts and similar applications.

MATERIAL. — V-Crimp is formed from Panel Quality Zincanneal Steel Sheets, and can be painted immediately without priming. Thicknesses are 24 and 26 gauge and standard lengths are 6, 7, 8, 9 and 10ft.

LAPS.—The recommended minimum end lap is 3"; side laps should be two full crimps.

DATA ON STANDARD ZINCANNEAL V-CRIMP SHEETS

Item	Gge.	Wgt. sq. ft.	6'	7'	8'	9'	10'	11'	12'
Sheet count per nominal 1-ton skidded pack	26	1.08 lbs.	170	146	128	114	102	93	85
	24	1.35 lbs.	137	117	103	91	82	—	—
Number of sheets required for 100 sq. ft. cov- erage with 3" end laps	—	—	8.7	7.4	6.4	5.7	5.1	4.6	4.3

Heavily GALVANIZED Custom V-Crimp which is produced in custom cut long lengths (6 ft. to 25 ft.) is also available. Whilst the profiles of both sheets are similar, they are not identical and cannot be mated.

FLAT SHEETS

GALVANIZED, GALVABOND SHEET

	Gauge	Approximate Weight Per Sheet in lbs.					Count of Sheets Per Nominal Tons				
		Width					Width				
		24"	30"	36"	42"	48"	24"	30"	36"	42"	48"
6 FEET LENGTHS	10	62.71	78.30	93.90	109.49	125.09	36	29	24	20	18
	12	49.85	62.25	74.64	87.04	99.44	45	36	30	26	23
	14	39.62	49.48	59.33	69.19	79.04	57	45	38	32	28
	16	31.68	39.56	47.44	55.32	63.20	71	57	47	40	35
	18	25.23	31.50	37.77	44.05	50.32	89	70	60	51	44
	20	20.26	25.30	30.34	35.38	40.42	111	88	74	63	56
	22	16.28	20.33	24.37	28.42	32.47	138	110	92	79	68
	24	13.06	16.30	19.55	22.80	26.04	172	138	114	98	86
	26BG	10.50	13.11	15.72	18.33	20.94	213	171	142	122	107
	26Cml	9.01	11.25	13.49	15.73	17.97	250	200	166	141	124
	28	8.52	10.64	12.76	14.88	17.00	263	211	176	151	132
	30	6.87	8.58	10.29	12.00	13.70	326	261	218	187	163
8 FEET LENGTHS	10	83.43	104.18	124.93	145.68	166.43	27	22	18	15	13
	12	66.32	82.82	99.31	115.81	132.30	34	28	23	19	17
	14	52.72	65.83	78.94	92.05	105.16	42	34	28	24	21
	16	42.15	52.63	63.12	73.60	84.08	53	43	35	30	27
	18	33.56	41.91	50.26	58.61	66.95	67	54	44	38	34
	20	26.96	33.66	40.37	47.07	53.78	83	66	56	48	42
	22	21.66	27.04	32.43	37.81	43.20	103	82	68	59	52
	24	17.37	21.69	26.01	30.33	34.65	128	103	86	74	64
	26BG	13.97	17.44	20.92	24.39	27.86	160	128	107	92	80
	26Cml	12.00	14.98	17.97	20.95	23.94	188	150	124	106	94
	28	11.34	14.16	16.98	19.80	22.61	198	158	132	113	99
	30	9.14	11.41	13.69	15.96	18.23	245	196	164	140	123

NOTE. Following long-established British practice, 26 gauge Galvanized Steel Sheet, both corrugated and plain, manufactured in Australia, is lighter than true 26G. and, as Zincanneal is now manufactured in 26 Birmingham gauge, both values are given in the above tables.

PRICE
PER
SHEET

8 x 3"

CORRUGATIONS

GALVANIZED STEEL SHEET

APPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON Gauge

Price per ton	106 Sheets 5ft.	88 Sheets 6ft.	76 Sheets 7ft.	66 Sheets 8ft.	58 Sheets 9ft.	54 Sheets 10ft.	48 Sheets 11ft.	44 Sheets 12ft.
£100	18/10½	22/9	26/4	30/3½	34/6	37/-	41/8	45/5½
£101	19/0½	22/11½	26/7	30/7½	34/10	37/5	42/1	45/11
£102	19/3	23/2	26/10	30/11	35/2	37/9	42/6	46/4½
£103	19/5	23/5	27/1½	31/2½	35/6	38/2	42/11	46/10
£104	19/7½	23/7½	27/4½	31/6	35/10½	38/6	43/4	47/3½
£105	19/9½	23/10½	27/7½	31/10	36/2½	38/11	43/9	47/8½
£106	20/-	24/1	27/10½	32/1½	36/6½	39/3	44/2	48/2
£107	20/2½	24/4	28/2	32/5	36/11	39/7½	44/7	48/7½
£108	20/4½	24/6½	28/5	32/8½	37/3	40/-	45/-	49/1
£109	20/7	24/9	28/8	33/0½	37/7	40/4½	45/5	49/6½
£110	20/9	25/-	28/11½	33/4	37/11	40/9	45/10	50/-
£111	20/11½	25/3	29/2½	33/7½	38/3	41/1	46/3	50/5½
£112	21/1½	25/5½	29/5½	33/11½	38/7½	41/6	46/8	50/11
£113	21/4	25/8	29/9	34/3	38/11½	41/10	47/1	51/4½
£114	21/6	25/11	30/-	34/6½	39/4	42/3	47/6	51/10
£115	21/8½	26/1½	30/3	34/10	39/8	42/7	47/11	52/3½
£116	21/10½	26/4½	30/6½	35/2	40/-	42/11½	48/4	52/8½
£117	22/1	26/7	30/9½	35/5½	40/4	43/4	48/9	53/2
£118	22/3	26/10	31/0½	35/9	40/8	43/8½	49/2	53/7½
£119	22/5½	27/0½	31/4	36/1	41/-	44/1	49/7	54/1

20

Price per ton	130 Sheets 5ft.	108 Sheets 6ft.	94 Sheets 7ft.	82 Sheets 8ft.	72 Sheets 9ft.	66 Sheets 10ft.	60 Sheets 11ft.	54 Sheets 12ft.
£100	15/4½	18/6	21/3	24/4½	27/9	30/3½	33/4	37/-
£101	15/6½	18/8½	21/6	24/7½	28/0½	30/7½	33/8	37/5
£102	15/8½	18/11	21/8½	24/10½	28/4	30/11	34/-	37/9
£103	15/10	19/1	21/11	25/1½	28/7	31/2½	34/4	38/2
£104	16/-	19/3	22/1½	25/4½	28/11	31/6	34/8	38/6
£105	16/2	19/5½	22/4	25/7½	29/2	31/10	35/-	38/11
£106	16/3½	19/7½	22/6½	25/10	29/5½	32/1½	35/4	39/3
£107	16/5½	19/10	22/9	26/1	29/9	32/5	35/8	39/7½
£108	16/7½	20/-	22/11½	26/4	30/-	32/8½	36/-	40/-
£109	16/9	20/2	23/2	26/7	30/3	33/0½	36/4	40/4½
£110	16/11	20/4½	23/5	26/10	30/6½	33/4	36/8	40/9
£111	17/1	20/6½	23/7	27/1	30/10	33/7½	37/-	41/1
£112	17/3	20/9	23/10	27/4	31/1	33/11½	37/4	41/6
£113	17/4½	20/11	24/0½	27/6½	31/5	34/3	37/8	41/10
£114	17/6½	21/1	24/3	27/9½	31/8	34/6½	38/-	42/3
£115	17/8½	21/3½	24/6	28/0½	31/11½	34/10½	38/4	42/7
£116	17/10	21/6	24/8	28/3½	32/3	35/2	38/8	42/11½
£117	18/-	21/8	24/11	28/6½	32/6	35/5½	39/-	43/4
£118	18/2	21/10	25/1	28/9½	32/9	35/9	39/4	43/8½

Gauge

22

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

8 x 3"

CORRUGATIONS

GALVANIZED STEEL SHEET

APPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON

Gauge

24

Price per ton	160 Sheets 5ft.	136 Sheets 6ft.	116 Sheets 7ft.	100 Sheets 8ft.	92 Sheets 9ft.	80 Sheets 10ft.	72 Sheets 11ft.	68 Sheets 12ft.
£101	12/7½	14/10	17/5	20/2½	21/11½	25/3	28/0½	29/8½
£102	12/9	15/-	17/7	20/5	22/2	25/6	28/4	30/-
£103	12/10½	15/2	17/9	20/7	22/5	25/9	28/7	30/3½
£104	13/-	15/3½	17/11	20/10	22/7	26/-	28/11	30/7
£105	13/1½	15/5½	18/1	21/-	22/10	26/3	29/2	30/10½
£106	13/3	15/7	18/3½	21/2½	23/0½	26/6	29/5½	31/2
£107	13/4½	15/9	18/5½	21/5	23/3	26/9	29/9	31/5½
£108	13/6	15/11	18/7½	21/7	23/5½	27/-	30/-	31/9
£109	13/7½	16/-	18/9½	21/10	23/8	27/3	30/3	32/0½
£110	13/9	16/2	18/11½	22/-	23/11	27/6	30/6½	32/4
£111	13/10½	16/4	19/1½	22/2½	24/1½	27/9	30/10	32/8
£112	14/-	16/5½	19/3½	22/5	24/4	28/-	31/1	32/11½
£113	14/1½	16/7	19/6	22/7	24/7	28/3	31/5	33/3
£114	14/3	16/9	19/8	22/10	24/9½	28/6	31/8	33/6½
£115	14/4½	16/11	19/10	23/-	25/-	28/9	31/11½	33/10
£116	14/6	17/0½	20/-	23/2½	25/2½	29/-	32/3	34/1½
£117	14/7½	17/2½	20/2	23/5	25/5	29/3	32/6	34/5
£118	14/9	17/4	20/4	23/7	25/8	29/6	32/9	34/8½
£119	14/10½	17/6	20/6	23/10	25/10½	29/9	33/0½	35/-
£120	15/-	17/8	20/8	24/-	26/1	30/-	40/-	35/4

Gauge

26

Price per ton	235 Sheets 5ft.	195 Sheets 6ft.	165 Sheets 7ft.	150 Sheets 8ft.	130 Sheets 9ft.	120 Sheets 10ft.	105 Sheets 11ft.	100 Sheets 12ft.
£105	8/11	10/9	12/9	14/-	16/2	17/6	20/-	21/-
£106	9/0½	10/10½	12/10	14/1½	16/4	17/8	20/2	21/2½
£107	9/1½	11/-	12/11½	14/3	16/5½	17/10	20/5	21/5
£108	9/2½	11/1	13/1	14/5	16/7	18/-	20/7	21/7
£109	9/3½	11/2	13/2½	14/6	16/9	18/2	20/9	21/10
£110	9/4½	11/3½	13/4	14/8	16/11	18/4	20/11½	22/-
£111	9/5½	11/5	13/5½	14/9½	17/1	18/6	21/2	22/2½
£112	9/6½	11/6	13/7	14/11	17/3	18/8	21/4	22/5
£113	9/7½	11/7	13/8	15/1	17/5	18/10	21/6	22/7
£114	9/8½	11/8	13/10	15/2	17/6	19/-	21/8½	22/10
£115	9/9½	11/9½	13/11	15/4	17/8	19/2	21/11	23/-
£116	9/10½	11/11	14/1	15/5½	17/10	19/4	22/1	23/2½
£117	9/11½	12/-	14/2	15/7	18/-	19/6	22/3½	23/5
£118	10/0½	12/1	14/4	15/9	18/2	19/8	22/6	23/7
£119	10/1½	12/2½	14/5	15/10½	18/4	19/10	22/8	23/10
£120	10/2½	12/4	14/6½	16/-	18/6	20/-	22/10	24/-
£121	10/3½	12/5	14/8	16/1½	18/7½	20/2	23/1	24/2½
£122	10/4½	12/6	14/9½	16/3	18/9½	20/4	23/3	24/4½
£123	10/5½	12/7	14/11	16/5	18/11	20/6	23/5	24/6½
£124	10/6½	12/8½	15/-	16/6½	19/1	20/8	23/7	24/9

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET**10 x 3" CORRUGATIONS**
GALVANIZED STEEL SHEET

APPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON

Price per ton									Gauge
	86 Sheets 5ft.	72 Sheets 6ft.	62 Sheets 7ft.	54 Sheets 8ft.	48 Sheets 9ft.	44 Sheets 10ft.	40 Sheets 11ft.	36 Sheets 12ft.	20
£100	23/3	27/9½	32/3	37/-	41/8	45/5½	50/-	55/6½	
£101	23/6	28/0½	32/7	37/5	42/1	45/11	50/6	56/1½	
£102	23/8½	28/4	32/11	37/9½	42/6	46/4½	51/-	56/8	
£103	23/11½	28/7½	33/2½	38/2	42/11	46/10	51/6	57/2½	
£104	24/2	28/10½	33/6½	38/6	43/4	47/3½	52/-	57/9½	
£105	24/5	29/2	33/10½	38/11	43/9	47/8½	52/6	58/4	
£106	24/8	29/5½	34/2½	39/3	44/2	48/2	53/-	58/10½	
£107	24/10½	29/8½	34/6	39/7½	44/7	48/7½	53/6	59/5½	
£108	25/1½	30/-	34/10	40/-	45/-	49/1	54/-	60/-	
£109	25/4	30/3½	35/2	40/4½	45/5	49/6½	54/6	60/6½	
£110	25/7	30/6½	35/6	40/9	45/10	50/-	55/-	61/1½	
£111	25/10	30/10	35/9½	41/1½	46/3	50/5½	55/6	61/8	
£112	26/0½	31/1½	36/1½	41/6	46/8	50/11	56/-	62/2½	
£113	26/3½	31/4½	36/5½	41/10	47/1	51/4½	56/6	62/9½	
£114	26/6	31/8	36/9½	42/2½	47/6	51/10	57/-	63/4	
£115	26/9	31/11½	37/1	42/7	47/11	52/3½	57/6	63/10½	
£116	26/11½	32/2½	37/5	42/11½	48/4	52/8½	58/-	64/5½	
£117	27/2½	32/6	37/9	43/4	48/9	53/2	58/6	65/-	
£118	27/5½	32/9½	38/1	43/8½	49/2	53/7½	59/-	65/6½	
£119	27/8	33/0½	38/4½	44/1	49/7	54/1	59/6	66/1½	

Price per ton									Gauge
	106 Sheets 5ft.	88 Sheets 6ft.	76 Sheets 7ft.	66 Sheets 8ft.	60 Sheets 9ft.	54 Sheets 10ft.	48 Sheets 11ft.	44 Sheets 12ft.	22
£100	18/10½	22/9	26/4	30/3½	33/4	37/-	41/8	45/5½	
£101	19/0½	22/11½	26/7	30/7½	33/8	37/5	42/1	45/11	
£102	19/3	23/2	26/10	30/11	34/-	37/9½	42/6	46/4½	
£103	19/5	23/5	27/1½	31/2½	34/4	38/2	42/11	46/10	
£104	19/7½	23/7½	27/4½	31/6	34/8	38/6	43/4	47/3½	
£105	19/9½	23/10½	27/7½	31/10	35/-	38/11	43/9	47/8½	
£106	20/-	24/1	27/10½	32/1½	35/4	39/3	44/2	48/2	
£107	20/2½	24/4	28/2	32/5	35/8	39/7½	44/7	48/7½	
£108	20/4½	24/6½	28/5	32/8½	36/-	40/-	45/-	49/1	
£109	20/7	24/9	28/8	33/0½	36/4	40/4½	45/5	49/6½	
£110	20/9	25/-	28/11½	33/4	36/8	40/9	45/10	50/-	
£111	20/11½	25/3	29/2½	33/7½	37/-	41/1½	46/3	50/5½	
£112	21/1½	25/5½	29/5½	33/11½	37/4	41/6	46/8	50/11	
£113	21/4	25/8	29/9	34/3	37/8	41/10	47/1	51/4½	
£114	21/6	25/11	30/-	34/6½	38/-	42/2½	47/6	51/10	
£115	21/8½	26/1½	30/3	34/10	38/4	42/7	47/11	52/3½	
£116	21/10½	26/4½	30/6½	35/2	38/8	42/11½	48/4	52/8½	
£117	22/1	26/7	30/9½	35/5½	39/-	43/4	48/9	53/2	
£118	22/3	26/10	31/0½	35/9	39/4	43/8½	49/2	53/7½	
£119	22/5½	27/0½	31/4	36/1	39/8	44/1	49/7	54/1	

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

10 x 3"

CORRUGATIONS
GALVANIZED STEEL SHEET

APPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON

Gauge

24

Price per ton	132 Sheets 5ft.	108 Sheets 6ft.	96 Sheets 7ft.	84 Sheets 8ft.	72 Sheets 9ft.	68 Sheets 10ft.	60 Sheets 11ft.	56 Sheets 12ft.
£101	15/3½	18/8½	21/0½	24/0½	28/0½	29/8½	33/8	36/1
£102	15/5½	18/11	21/3	24/3½	28/4	30/-	34/-	36/5
£103	15/7½	19/1	21/5½	24/6	28/7	30/3½	34/4	36/9½
£104	15/9	19/3	21/8	24/9	28/11	30/7	34/8	37/2
£105	15/11	19/5½	21/10½	25/-	29/2	30/10½	35/-	37/6
£106	16/0½	19/7½	22/1	25/2½	29/5½	31/2	35/4	37/10
£107	16/2½	19/10	22/3½	25/6	29/9	31/5½	35/8	38/2½
£108	16/4½	20/-	22/6	25/8½	30/-	31/9	36/-	38/7
£109	16/6	20/2	22/8½	25/11½	30/3	32/0½	36/4	38/11
£110	16/8	20/4½	22/11	26/2	30/6½	32/4	36/8	39/3½
£111	16/10	20/6½	23/1½	26/5	30/10	32/8	37/-	39/8
£112	16/11½	20/9	23/4	26/8	31/1	32/11½	37/4	40/-
£113	17/1½	20/11	23/6½	26/11	31/5	33/3	37/8	40/4
£114	17/3½	21/1	23/9	27/2	31/8	33/6½	38/-	40/8½
£115	17/5	21/3½	23/11½	27/5	31/11½	33/10	38/4	41/1
£116	17/7	21/6	24/2	27/7½	32/3	34/1½	38/8	41/5
£117	17/8½	21/8	24/4½	27/10	32/6	34/5	39/-	41/9½
£118	17/10½	21/10	24/7	28/1	32/9	34/8½	39/4	42/2
£119	18/0½	22/-	24/9½	28/4	33/0½	35/-	39/8	42/6
£120	18/2½	22/2	24/11½	28/7	33/3½	35/3½	40/-	42/10

Gauge

26

Price per ton	195 Sheets 5ft.	160 Sheets 6ft.	135 Sheets 7ft.	120 Sheets 8ft.	105 Sheets 9ft.	95 Sheets 10ft.	90 Sheets 11ft.	80 Sheets 12ft.
£105	10/9	13/1½	15/6½	17/6	20/-	22/1	23/4	26/3
£106	10/10½	13/3	15/8½	17/8	20/2	22/4	23/6½	26/6
£107	11/-	13/4½	15/10	17/10	20/5	22/6	23/9	26/9
£108	11/1	13/6	16/-	18/-	20/7	22/9	24/-	27/-
£109	11/2	13/7½	16/2	18/2	20/9	22/11½	24/3	27/3
£110	11/3½	13/9	16/3½	18/4	20/11½	23/2	24/5½	27/6
£111	11/5	13/10½	16/5½	18/6	21/2	23/4½	24/8	27/9
£112	11/6	14/-	16/7	18/8	21/4	23/7	24/11	28/-
£113	11/7	14/1½	16/9	18/10	21/6	23/9½	25/1	28/3
£114	11/8	14/3	16/11	19/-	21/8½	24/-	25/4	28/6
£115	11/9½	14/4½	17/-	19/2	21/11	24/2½	25/6½	28/9
£116	11/11	14/6	17/2	19/4	22/1	24/5	25/9	29/-
£117	12/-	14/7½	17/4	19/6	22/3½	24/7½	26/-	29/3
£118	12/1	14/9	17/6	19/8	22/6	24/10	26/3	29/6
£119	12/2½	14/10½	17/7½	19/10	22/8	25/0½	26/5½	29/9
£120	12/4	15/-	17/9	20/-	22/10	25/3	26/8	30/-
£121	12/5	15/1½	17/11	20/2	23/1	25/5½	26/10½	30/3
£122	12/6	15/3	18/1	20/4	23/3	25/8	27/1	30/6
£123	12/7½	15/4½	18/3	20/6	23/5	25/10½	27/4	30/9
£124	12/8½	15/6	18/4	20/8	23/7	26/1	27/6½	31/-

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

FLAT

GALVANIZED QUEEN'S
HEAD & GALVABOND

APPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON

Price per ton	6' Lengths				8' Lengths				Gauge
	111 Sheets 24in.	88 Sheets 30in.	74 Sheets 36in.	56 Sheets 48in.	83 Sheets 24in.	66 Sheets 30in.	56 Sheets 36in.	42 Sheets 48in.	20
£102	18/6½	23/2	27/7	36/5	24/7	30/11	36/5	48/7	
£103	18/8½	23/5	27/10	36/9½	24/10	31/2½	36/9½	49/0½	
£104	18/11	23/7½	28/1½	37/2	25/0½	31/6	37/2	49/6½	
£105	19/1	23/10½	28/4½	37/6	25/3½	31/10	37/6	50/-	
£106	19/3½	24/1	28/8	37/10	25/6½	32/1½	37/10	50/5½	
£107	19/5½	24/4	28/11	38/2½	25/9½	32/5	38/2½	50/11½	
£108	19/7½	24/6½	29/2½	38/7	26/-	32/8½	38/7	51/5	
£109	19/10	24/9	29/5½	38/11	26/3	33/0½	38/11	51/11	
£110	20/-	25/-	29/9	39/3½	26/6	33/4	39/3½	52/4½	
£111	20/2	25/3	30/-	39/8	26/9	33/7½	39/8	52/10½	
£112	20/4½	25/5½	30/3	40/-	27/-	33/11½	40/-	53/4	
£113	20/6½	25/8	30/6½	40/4	27/2½	34/3	40/4	53/9½	
£114	20/8½	25/11	30/9½	40/8½	27/5½	34/6½	40/8½	54/3½	
£115	20/11	26/1½	31/1	41/1	27/8½	34/10	41/1	54/9	
£116	21/1	26/4½	31/4	41/5	27/11½	35/2	41/5	55/3	
£117	21/3½	26/7	31/7½	41/9½	28/2½	35/5½	41/9½	55/8½	
£118	21/5½	26/10	31/10½	42/2	28/5	35/9	42/2	56/2½	
£119	21/6	27/-	32/2	42/6	28/8	36/1	42/6	56/8	
£120	21/7½	27/3	32/5	42/10	28/11	37/5	42/10	57/2	

Price per ton	6' Lengths				8' Lengths				Gauge
	138 Sheets 24in.	110 Sheets 30in.	92 Sheets 36in.	68 Sheets 48in.	103 Sheets 24in.	82 Sheets 30in.	68 Sheets 36in.	52 Sheets 48in.	22
£103	14/11	18/8½	22/4½	30/3½	20/-	25/1½	30/3½	39/7½	
£104	15/1	18/11	22/7½	30/7	20/2½	25/4½	30/7	40/-	
£105	15/2½	19/1	22/10	30/10½	20/4½	25/7½	30/10½	40/4½	
£106	15/4½	19/3½	23/0½	31/2	20/7	25/10	31/2	40/9	
£107	15/6	19/5½	23/3	31/5½	20/9½	26/1	31/5½	41/2	
£108	15/8	19/7½	23/5½	31/9	20/11½	26/4	31/9	41/6½	
£109	15/9½	19/10	23/8½	32/0½	21/2	26/7	32/0½	41/11	
£110	15/11½	20/-	23/11	32/4	21/4½	26/10	32/4	42/3½	
£111	16/1	20/2	24/1½	32/8	21/6½	27/1	32/8	42/8½	
£112	16/3	20/4½	24/4	32/11½	21/9	27/4	32/11½	43/1	
£113	16/4½	20/6½	24/7	33/3	21/11½	27/6½	33/3	43/5½	
£114	16/6½	20/8½	24/9½	33/6½	22/1½	27/9½	33/6½	43/10	
£115	16/8	20/11	25/-	33/10	22/4	28/0½	33/10	44/3	
£116	16/9½	21/1	25/2½	34/1½	22/6½	28/3½	34/1½	44/7½	
£117	16/11½	21/3½	25/5	34/5	22/8½	28/6½	34/5	45/-	
£118	17/1	21/5½	25/8	34/8½	22/11	28/9½	34/8½	45/4½	
£119	17/3	21/7½	25/10	35/-	23/1	29/-	35/-	45/10	
£120	17/5	21/10	26/0½	35/3	23/3½	29/3	35/3	46/1	
£121	17/7	22/-	26/4	35/6½	23/6	29/6	35/6½	46/5½	

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PRICE
PER
SHEET

FLAT

GALVANIZED QUEEN'S
HEAD & GALVABOND

APPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON

Gauge	Price per ton	6' Lengths				8' Lengths			
		172 Sheets 24in.	138 Sheets 30in.	114 Sheets 36in.	86 Sheets 48in.	128 Sheets 24in.	103 Sheets 30in.	86 Sheets 36in.	64 Sheets 48in.
24	£104	12/1	15/1	18/3	24/2	16/3	19/7½	24/2	32/6
	£105	12/2½	15/2½	18/5	24/5	16/5	19/9½	24/5	32/10
	£106	12/4	15/4½	18/7	24/8	16/7	20/-	24/8	33/1½
	£107	12/5½	15/6	18/9	24/10½	16/8½	20/2½	24/10½	33/5
	£108	12/6½	15/8	18/11½	25/1½	16/10½	20/4½	25/1½	33/9
	£109	12/8	15/9½	19/1½	25/4	17/-	20/7	25/4	34/1
	£110	12/9½	15/11½	19/3½	25/7	17/2	20/9	25/7	34/4½
	£111	12/11	16/1	19/6	25/10	17/4	20/11½	25/10	34/8
	£112	13/0½	16/3	19/8	26/0½	17/6	21/1½	26/0½	35/-
	£113	13/1½	16/4½	19/10	26/3½	17/8	21/4	26/3½	35/4
	£114	13/3	16/6	20/-	26/6	17/10	21/6	26/6	35/7½
	£115	13/4½	16/8	20/2	26/9	18/-	21/8½	26/9	35/11
	£116	13/6	16/10	20/4	26/11½	18/1½	21/10½	26/11½	36/3
	£117	13/7½	16/11½	20/6	27/2½	18/3½	22/1	27/2½	36/7
	£118	13/8½	17/1	20/8½	27/5½	18/5	22/3	27/5½	36/10½
	£119	13/10	17/3	20/10½	27/8	18/7	23/1	27/8	37/2
	£120	13/11½	17/5	21/1	27/11	18/9	23/3	27/11	37/6
	£121	14/1	17/7	21/3	28/2	18/11	23/6	28/2	37/10
	£122	14/2½	17/9	21/5	28/5½	19/1	23/8½	28/5½	38/1½

Gauge	Price per ton	6' Lengths				8' Lengths			
		250 Sheets 24in.	200 Sheets 30in.	166 Sheets 36in.	124 Sheets 48in.	188 Sheets 24in.	150 Sheets 30in.	124 Sheets 36in.	94 Sheets 48in.
26	£109	8/8½	10/11	13/1½	17/7	11/7	14/6½	17/7	23/2½
	£110	8/9½	11/-	13/3	17/9	11/8½	14/8	17/9	23/5
	£111	8/10½	11/1	13/4½	17/11	11/10	14/9½	17/11	23/7½
	£112	8/11½	11/2½	13/6	18/1	11/11	14/11	18/1	23/10
	£113	9/0½	11/3½	13/7½	18/3	12/-	15/1	18/3	24/0½
	£114	9/1½	11/5	13/9	18/5	12/1½	15/2½	18/5	24/3
	£115	9/2½	11/6	13/10½	18/6½	12/3	15/4	18/6½	24/5½
	£116	9/3½	11/7	13/11½	18/8½	12/4	15/5½	18/8½	24/8
	£117	9/4½	11/8½	14/1	18/10½	12/5½	15/7	18/10½	24/10½
	£118	9/5½	11/9½	14/2½	19/-	12/6½	15/9	19/-	25/1½
	£119	9/6	11/11	14/4½	19/2½	12/8	15/10½	19/2½	25/4
	£120	9/7	12/-	14/5½	19/4½	12/9	16/-	19/4½	25/6
	£121	9/8	12/1	14/7	19/6½	12/10½	16/1½	19/6½	25/9
	£122	9/9	12/2½	14/8½	19/8½	13/-	16/3	19/8½	25/11½
	£123	9/10	12/3½	14/10	19/10	13/1	16/5	19/10	26/2
	£124	9/11	12/4½	14/11½	20/-	13/2½	16/6½	20/-	26/4½
	£125	10/-	12/6	15/1	20/2	13/3½	16/8	20/2	26/7
	£126	10/1	12/7	15/2	20/4	13/5	16/9½	20/4	26/10
	£127	10/2	12/8½	15/3½	20/6	13/6	16/11	20/6	27/-

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TERNE PLATE

GENERAL.—Terne Plate sheets carry a tin-lead coating on a ductile steel base, and are used mainly for the production of canisters, where a tin-lead lining is essential. Terne Plate D.D. sheets are made from a deep drawing steel. The terne coating is toxic, and the sheets should not be used for the storage or handling of foodstuffs or drinking water.

WEIGHT PER SQUARE FOOT OF SHEET IN LBS.

28G	0.6394	20G	1.6012
26G	0.8020	18G	2.0015
24G	1.0121	16G	2.5319
22G	1.2769		

REGULARLY MANUFACTURED SIZES

Gauge	Nominal size Inches	Th. Sheet Weight	Sheet Count	Theoretical Weight
16G x 36 x 72		46.13	49	1 0 0 20
16G x 48 x 96		81.76	27	19 2 24
18G x 36 x 72		36.47	61	19 3 13
18G x 48 x 96		64.63	35	1 0 0 22
20G x 36 x 72		29.17	77	1 0 0 6
20G x 48 x 96		51.71	43	19 3 12
22G x 36 x 72		23.26	96	19 3 21
24G x 36 x 72		18.44	121	19 3 19
24G x 37½ x 75¼		20.06	112	1 0 0 7
26G x 36 x 96		19.44	115	19 3 24

PACKING.—Terne Plate and Seconds are normally packed in one-ton galvanized skidded packs.

An optional two-ton skidded pack is available.

PACK MARKINGS.—Terne Plate packs are marked on one end with the quality and size. The other end carries the quality, gauge, number of sheets, and net weight. The packer's initials are marked on both sides.

Packs of Terne Plate Seconds are marked similarly, except in that the quality is marked as **TERNE PLATE SECONDS** and one corner of the pack is painted red.

LYSAGHT MARVIPLATE

One of the most important developments of recent years, Lysaght Marviplate consists of a decorative vinyl film bonded permanently to a steel or aluminium sheet.

ARCHITECTURAL APPLICATIONS.—Lysaght Marviplate combines all the texture, colour and design advantages of the unlimited field of plastics with the strength, workability and durability of metal. This unique laminate will, therefore, provide a finishing material that is pleasing to the eye while, at the same time, being capable of withstanding the severest wear and tear.

MANUFACTURING.—Lysaght Marviplate may be worked by manufacturers in the same way as any conventional sheet. It can be sheared, drawn, perforated, or bent to the limits of the base metal. Provided certain precautions are taken it can be successfully welded; it may be seamed or crimped without affecting the remarkable vinyl/metal bond.

ADVANTAGES.—Lysaght Marviplate has been proven resistant to chemicals, including acids, alkalis, alcohol, salt water and corrosive atmospheres. It has insulating properties capable of withstanding from 200 to 300 volts per 0.001" film thickness.

It is resistant to humidity, colour fast, heat resistant (being regularly tested for long periods at 180°F), cold resistant and, as explained above, abrasion resistant because of the specially formulated vinyl films used in its manufacture.

FINISHES.—Lysaght Marviplate is available in a great range of colours and stylings and free literature will be forwarded upon request from any of the Lysaght branch offices.

LYSAGHT UNCOATED STEEL SHEET

BASIC STEEL TYPES

The properties exhibited by low carbon steels, from which the majority of our products are made, are determined by composition, steel type, and variation in the treatment of the flat rolled products. Composition is controlled by steel-making practice in the open hearth furnace, while steel types result from deoxidising and process control formulated for particular purposes.

The basic types of low carbon steel, which are of somewhat similar chemical composition, possess characteristics which are widely varying. In order to better understand the variations obtained by steel-making practice, a brief general description of our base types follows.

TYPICAL COMPOSITION

	C %	P %	Mn %	S %
Semi-killed steel	0.09	0.02	0.40	0.03
Capped steel	0.08	0.015	0.35	0.03
Rimmed steel	0.07	0.015	0.35	0.03
Fully-killed steel	0.05	0.01	0.30	0.02

These steels are listed in order of merit of formability. Semi-killed steel is the basis for commercial grades for general forming, while rimmed steel, in addition to drawability of a high order, possesses a base structure which allows the production of superior surface finishes. Fully-killed or stabilised steels are produced to meet extreme requirements in drawability, especially where stretch forming is involved. Capped steels possess characteristics intermediate between semi-killed and rimmed types.

CARBON AND SPECIAL STEELS

A range of carbon and special steels designed to meet specific strength, analysis and manufacturers' requirements is available.

The system of nomenclature is:—

1. HR. or CR. to indicate Hot Rolled or Cold Reduced.
2. A letter indicating the critical value or property,

followed by a number indicating the value to be met. These letters are:—

C. Nominal carbon content (carbon steels only).

Y. Yield point.

U. Ultimate strength.

E. Elongation.

For yield and ultimate strength the number following the letter will be the minimum value to be obtained in thousands of pounds per square inch. Elongation is on 2" gauge length.

3. A letter indicating the steel type.

R. Rimmed.

S. Semi-killed.

K. Killed.

4. A final suffix X if processing involves a departure from standard practice.

Example: HR.C65.S.

This is a hot rolled semi-killed steel of nominal carbon composition 0.65%.

STANDARD SURFACE FINISHES

There are six standard surface finishes listed below with their respective abbreviations and brief description of the quality. It should be noted that these various surface finishes cannot necessarily be obtained in each of the base types already described.

1. HOT ROLLED, HR.

Hot rolled qualities carry a tight layer of scale or oxide with a commercial surface finish, and are suitable for general use where the presence of scale is not objectionable.

Note.—If the scale or oxide is undesirable, the material can be supplied in a pickled and oiled condition.

2. HOT ROLLED PLANISHED, HR.PL.

When pickled hot rolled material is temper rolled, an improved surface finish is obtained. This finish is suitable for heavy-gauge material requiring a better surface than the previous grade.

3. COLD REDUCED BLACK, CR.BL.

This is a standard commercial quality carrying a light adherent oxide film. The surface is superior to that of hot rolled quality.

4. COLD REDUCED GENERAL PURPOSE, CR.GP.

Because of precautions taken during processing, this sheet is free from scale and oxide film. While the surface is clean, bright, and of good standard, it is not suitable for use as exterior panels.

5. COLD REDUCED FULL FINISH, CR.FF.

Full finish qualities are designed for use as exterior sections where a high surface standard is required (automobile bodies, furniture, etc.). The surface is completely free from scale or oxide films.

6. COLD REDUCED SPECIAL SURFACE, CR.SS.

This is the finest standard surface finish produced, and is especially suited for high-quality exterior panels such as refrigerators, etc., where metal finishing is to be kept to a minimum.

INDIVIDUAL QUALITIES

The following chapter on individual qualities has, for the customer's convenience, been divided into six sections, namely:—1. Hot Rolled Qualities; 2. Cold Reduced Commercial Qualities; 3. Cold Reduced Deep Drawing Qualities; 4. Seconds and Mill Rejects; 5. Carbon Steels; 6. Special Steels.

Where coil can be supplied as an alternative to sheet, an indication is given in the description of the individual quality of the sizes which can be provided.

The information on the following pages of sizes available for each quality is correct at the date of printing. Because of changes in plant capacities and the installation of additional plant, the sizes and gauges available will vary.

If the sizes listed do not meet your requirements, you are invited to contact the Branch Office, where the latest information is available for all of Lysaght's products.

In the case of special sheets, examples of the typical qualities only are recorded to illustrate the range available. Customers are again invited to refer all requests for special steels to the respective Branch Offices for quotation.

HR. CO. | HOT ROLLED COMMERCIAL QUALITY

GENERAL DESCRIPTION.—This is a standard heavy-gauge hot rolled sheet designed for the majority of commercial forming operations, but is not recommended for drawing operations or severe working. The surface of this grade carries an adherent layer of iron oxides.

TYPICAL USES.—Heavy-gauge drums, light structural members, shelving, formed angles, flats, etc.

SIZE RANGE

Dimension:	Cut Lengths		Coil
Length:	* 48"-192" Maximum		
Width:	Gauge	Width	
	.060"-.061"	42 $\frac{1}{4}$ " max.	
	.062"-.065"	43 $\frac{1}{4}$ " "	
	.066"-.069"	44 $\frac{3}{4}$ " "	
	.070"-.073"	46 $\frac{1}{4}$ " "	
	.074"-.077"	47 $\frac{3}{4}$ " "	
	.078"-.081"	49 $\frac{1}{4}$ " "	
	.082"-.085"	51 $\frac{1}{4}$ " "	Not available
	.086"-.089"	52 $\frac{3}{4}$ " "	
	.090"-.094"	54 $\frac{1}{4}$ " "	
	.095"-.098"	56 $\frac{1}{4}$ " "	
	.099"-.103"	57 $\frac{3}{4}$ " "	
	.104"-.125"	60 $\frac{1}{4}$ " "	
Thickness:	.060"-.125"		

PACKING

Cut Lengths.—Standard: 1 ton Bundle.

Optional: 2 and 3 ton Bundles. Skidded Pack, 1, 2, 3, 4 or 5 tons.

Coil.—Not available.

* Lengths above and below the standard range are available on certain sizes.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Stretcher Levelled Flatness and/or Cropping.
Resquaring.

HR. P. CQ. | HOT ROLLED PICKLED COMMERCIAL QUALITY

GENERAL DESCRIPTION.—This is a standard heavy-gauge hot rolled sheet designed for the majority of commercial forming operations, but it is not recommended for drawing operations or severe working. It is similar to HR.CQ., but supplied in a pickled condition. The surface is free from scale or oxide film. The material is normally supplied oiled to prevent rusting in transit or in storage.

TYPICAL USES.—Formed structural members, railway carriage body panels, automotive brackets, and heavy electrical panels, etc.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	48"-150" Maximum			
Width:	Gauge	Width	Gauge	Width
	.060"- .061"	42 $\frac{1}{4}$ " max.	.060"- .061"	18"-42 $\frac{1}{4}$ " max.
	.062"- .065"	43 $\frac{1}{4}$ " "	.062"- .065"	24"-43 $\frac{1}{4}$ " "
	.066"- .069"	44 $\frac{3}{4}$ " "	.066"- .069"	24"-44 $\frac{3}{4}$ " "
	.070"- .073"	46 $\frac{1}{4}$ " "	.070"- .073"	24"-46 $\frac{1}{4}$ " "
	.074"- .077"	47 $\frac{3}{4}$ " "	.074"- .077"	24"-47 $\frac{3}{4}$ " "
	.078"- .081"	49 $\frac{1}{4}$ " "	.078"- .081"	24"-49 $\frac{1}{4}$ " "
	.082"- .085"	51 $\frac{1}{4}$ " "	.082"- .085"	24"-51 $\frac{1}{4}$ " "
	.086"- .089"	52 $\frac{3}{4}$ " "	.086"- .089"	24"-52 $\frac{3}{4}$ " "
	.090"- .094"	54 $\frac{1}{4}$ " "	.090"- .094"	24"-54 $\frac{1}{4}$ " "
	.095"- .098"	56 $\frac{1}{4}$ " "	.095"- .098"	24"-56 $\frac{1}{4}$ " "
	.099"- .103"	57 $\frac{3}{4}$ " "	.099"- .103"	24"-57 $\frac{3}{4}$ " "
	.104"- .125"	60 $\frac{1}{4}$ " "	.104"- .125"	24"-60 $\frac{1}{4}$ " "
Thickness:	.060"- .125"		.060"- .125"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Stretcher Levelled Flatness and/or Cropping
Resquaring

Coil:

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—

HR. DD. | HOT ROLLED DEEP DRAWING

GENERAL DESCRIPTION.—Hot Rolled Deep Drawing quality is a heavy-gauge sheet supplied in the pickled and oiled condition, the surface being free from scale or oxide film. The material is suitable for pressing or drawing operations too difficult for Commercial Quality.

Sheets of this type are normally used for applications where appearance is not of primary importance.

TYPICAL USES.—Sealed unit housings, fence post caps, space heater bodies, automotive brake components, pulley wheels, shovel handles, etc.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	48"-150" Maximum			
Width:	Gauge	Width	Gauge	Width
	.075"-.077"	47 $\frac{3}{4}$ " max.	.075"-.077"	24"-47 $\frac{3}{4}$ " max.
	.078"-.081"	49 $\frac{1}{4}$ " "	.078"-.081"	24"-49 $\frac{1}{4}$ " "
	.082"-.085"	51 $\frac{1}{4}$ " "	.082"-.085"	24"-51 $\frac{1}{4}$ " "
	.086"-.089"	52 $\frac{3}{4}$ " "	.086"-.089"	24"-52 $\frac{3}{4}$ " "
	.090"-.094"	54 $\frac{1}{4}$ " "	.090"-.094"	24"-54 $\frac{1}{4}$ " "
	.095"-.098"	56 $\frac{1}{4}$ " "	.095"-.098"	24"-56 $\frac{1}{4}$ " "
	.099"-.103"	57 $\frac{3}{4}$ " "	.099"-.103"	24"-57 $\frac{3}{4}$ " "
	.104"-.125"	60 $\frac{1}{4}$ " "	.104"-.125"	24"-60 $\frac{1}{4}$ " "
Thickness:	.075"-.125"		.075"-.125"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:
Resquaring

Coil:
—

HR. EDD.**HOT ROLLED EXTRA DEEP
DRAWING**

GENERAL DESCRIPTION.—This quality is, by virtue of its special heat treatment, suited to particularly difficult pressing and drawing operations, beyond the range of HR.DD. Because this sheet is recommended for use in the more difficult drawing operations, particular attention is given to its inspection to ensure that it is free from those surface defects which would be detrimental to drawability. The sheets are supplied oiled.

TYPICAL USES.—Sealed unit compressor pistons, heavy-gauge spinings, deep drawn chassis components.

SIZE RANGE *

Dimension:	Cut Lengths		Coil
Length:	48"-150" Maximum		
Width:	Gauge	Width	
	.097"-.098"	Over 38" to 56 $\frac{1}{4}$ " max.	Not yet available
	.099"-.103"	57 $\frac{3}{4}$ " max.	
	.104"-.125"	60 $\frac{1}{4}$ " "	
Thickness:	.097"-.125"		

* HR.EDD. is not required (nor manufactured) in sizes produced in Cold Reduced Deep Drawing Qualities.

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—Not yet available.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring.

HR. PL. EDD. | HOT ROLLED PLANISHED EXTRA DEEP DRAWING

GENERAL DESCRIPTION.— This is a heavy-gauge sheet with extra deep drawing properties, for applications for which surface finish is of importance both before and after drawing. In cases where electro-plating of 10 to 12 gauge is required, this quality is most suitable. Some treatment of the surface by buffing or polishing will be required. This material is supplied in an oiled condition.

TYPICAL USES.—Automotive bumper bar components, deep drawn machinery components.

SIZE RANGE *

Dimension:	Cut Lengths		Coil
Length:	48"-150" Maximum		
Width:	Gauge	Width	Not yet available
	.097"-.098"	Over 38" to 56 $\frac{1}{4}$ " max.	
	.099"-.103"	57 $\frac{3}{4}$ " max.	
	.104"-.125"	60 $\frac{1}{4}$ " "	
Thickness:	.075"-.125"		

* HR.PL.EDD. is not required (nor manufactured) in sizes produced in Cold Rolled Full Finish Qualities.

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—Not yet available.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring.

Stretcher Levelled Flatness.

CR. BL. CQ. | COLD REDUCED BLACK COMMERCIAL QUALITY

GENERAL DESCRIPTION.—This is a commercial grade with a surface finish superior to hot rolled pickled quality, carrying a light adherent oxide film. The properties are such that the material may be formed by bending or folding operations but it is not recommended for severe forming or drawing operations. This quality is supplied uncoiled unless otherwise specified.

TYPICAL USES.—Light-gauge drums, shelving, office furniture and hollow ware.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.015"-.016"	36" max.	.015"-.016"	18"-36" max.
	.017"-.019"	38" "	.017"-.019"	18"-38" "
	.020"-.034"	48" "	.020"-.034"	18"-48" "
	.035"-.096"	60" "	.035"-.062"	18"-60" "
	.097"-.112"	38" "		
Thickness:	.015"-.112"		.015"-.062"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

4 x 1 ton Composite Black Skidded Pack.

2 x 2 tons Composite Black Skidded Pack.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Oiling

Stretcher Levelled Flatness and/or Cropping

Resquaring.

Coil:

—

—

CR. GP. CQ.**COLD REDUCED GENERAL PURPOSE
COMMERCIAL QUALITY**

GENERAL DESCRIPTION.—This is a standard commercial grade sheet with a finish free from surface oxides or scale. The surface is clean, bright and of good standard, and the properties are such that the material may be formed by bending or folding operations. This quality is supplied in an oiled condition.

For drawing operations, more severe forming or where a better surface finish is required, other qualities are available.

TYPICAL USES.—Light-gauge drums, furniture, conduit, fluorescent light fittings, transformer bodies, omnibus bodies and builders' hardware.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.015"-.016"	36" max.	.015"-.016"	18"-36" max.
	.017"-.019"	38" "	.017"-.019"	18"-38" "
	.020"-.034"	48" "	.020"-.034"	18"-48" "
	.035"-.096"	60" "	.035"-.062"	18"-60" "
	.097"-.112"	38" "		
Thickness:	.015"-.112"		.015"-.062"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

4 x 1 ton Composite Black Skidded Pack.

2 x 2 tons Composite Black Skidded Pack.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Blueing

Stretcher Levelled Flatness and/or Cropping

Resquaring.

Coil:

—

—

CR. GP. DD. | COLD REDUCED GENERAL PURPOSE DEEP DRAWING

GENERAL DESCRIPTION.—This is a standard sheet of high-grade deep drawing characteristics designed for all but the most severe drawing operations. The surface finish, which is free from oxide film, is suitable for applications where appearance both before and after drawing is of only secondary importance. This quality is supplied oiled unless otherwise specified on order.

TYPICAL USES.—Interior automotive panels, spinnings, radio and T.V. chassis and general pressings.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.017"-.019"	38" max.	.017"-.019"	18"-38" max.
	.020"-.030"	48" "	.020"-.034"	18"-48" "
	.031"-.062"	72" "	.035"-.062"	18"-60" "
	.063"-.096"	60" "		
	.097"-.112"	38" "		
Thickness:	.017"-.112"		.017"-.062"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

4 x 1 ton Composite Black Skidded Pack.

2 x 2 tons Composite Black Skidded Pack.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:
Resquaring

Coil:
—

CR. NT. DD.**COLD REDUCED NOT TEMPER
ROLLED DEEP DRAWING**

GENERAL DESCRIPTION.—This quality is available for applications requiring added drawability and reduced tendencies to ageing. The material is supplied in a dead soft condition; it is not temper rolled and therefore not subject to any flatness tolerance. The sheets are prone to stretcher straining and are only recommended for use in applications where this is not objectionable.

TYPICAL USES.—Automotive floor panels and other un-exposed panels, general spinning operations.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.020"-.030"	48" max.	.020"-.034"	18"-48" max.
	.031"-.062"	72" "	.035"-.062"	18"-60" "
	.063"-.096"	60" "		
	.097"-.112"	38" "		
Thickness:	.020"-.112"		.020"-.062"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

4 x 1 ton Composite Black Skidded Pack.

2 x 2 tons Composite Black Skidded Pack.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:
Steam blueing

Coil:

—

CR. FF. DD. | COLD REDUCED FULL FINISH DEEP DRAWING

GENERAL DESCRIPTION.—This is a high-quality sheet combining good deep drawability with a high-quality surface finish. The physical properties of the sheet are such that it will meet all but the most severe applications, whilst the surface finish is ideal for exterior panels excepting only the most critical requirements. This quality is supplied in an oiled condition.

TYPICAL USES. — Automotive exterior panels, vacuum cleaner bodies, air-conditioning equipment, metal doors.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.017"-.019"	38" max.	.017"-.019"	18"-48" max.
	.020"-.030"	48" "	.020"-.034"	18"-48" "
	.031"-.062"	72" "	.035"-.062"	18"-60" "
	.063"-.096"	60" "		
	.097"-.112"	38" "		
Thickness:	.017"-.112"		.017"-.062"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:	Coil:
Resquaring	—
Stretcher Levelled Flatness and/or Cropping	—

CR. SS. DD. | COLD REDUCED SPECIAL SURFACE DEEP DRAWING

GENERAL DESCRIPTION.—This is the premium surface finish sheet, designed specifically for applications where final appearance is of paramount importance. The quality combines excellent drawability with the sheet surface free from defects which would necessitate metal reworking prior to the application of a coloured finish. The flatness of this quality sheet is equal to stretcher levelled flatness. This quality is supplied in an oiled condition.

TYPICAL USES.—Exterior panels for refrigerators and washing machines, household appliances and T.V. cabinets.

SIZE RANGE

Dimension:	Cut Lengths		Coil
Length:	30"-192" Maximum		
Width:	Gauge	Width	
	.031"-.034"	48" max.	Not yet available
	.035"-.062"	60" ..	
Thickness:	.031"-.062"		

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—Not yet available.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring.

CR. FF. ST. | COLD REDUCED FULL FINISH STABILISED

GENERAL DESCRIPTION.— This quality is the premium drawing grade manufactured to meet extreme requirements of drawability. This material, which is rolled from fully-killed steel, is not subject to strain ageing, the cause of the loss of ductility and tendency to stretcher strain which occurs when normal types of drawing qualities are held in stock for any length of time. This quality is supplied in an oiled condition.

The surface finish is suitable for exterior panels in all but the most critical applications.

TYPICAL USES.— Automotive panels and components, petrol pump housings.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.031"	48" max.	.031"	18"-48"
	.034"	50" "	.034"	18"-50"
	.037"	54" "		
	.041"-.062"	72" "	.037"	18"-54"
	.063"-.096"	60" "		
	.097"-.112"	38" "	.041"-.062"	18"-60"
Thickness:	.031"-.112"		.031"-.062"	

PACKING

Cut Lengths.— Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.— A brochure giving details of coil packing is available on application to any John Lysaght sales office.

UNCOATED SECONDS AND MILL REJECTS

Rigid inspection standards are applied in the manufacture of Lysaght Uncoated Sheets to ensure the maintenance of the high qualities of prime sheets. Resulting from the application of these stringent standards, some material is produced which falls outside the acceptable limits for primes, and is consequently classified as "Seconds" or "Mill Rejects."

DEFINITIONS — SECONDS AND MILL REJECTS

SECONDS:

1. **Seconds** retain their quality name for which they were originally produced, e.g. CR.FF.DD. Seconds, HR.CQ. Seconds. The steel base and physical properties are as for Primes.
2. **Thickness:** To be within commercial thickness tolerances.
3. **Flatness:** To be commercially flat.
4. **Surface:** Surface may be affected by various defects but will not include lamination, holes, severe pitting, laminated surface.
5. **Rust:** To be relatively free from rust. However, light incipient rust spotting or light edge rusting may be present.
6. **Size:** Sheet not to be less than nominal size but may slightly exceed maximum tolerances.

MILL REJECTS:

1. **Mill Rejects** are normally sold in two qualities only, cold reduced and hot rolled, and unless separately specified will only contain low carbon steel sheet.
2. **Thickness:** Individual sheets may deviate from normal thickness tolerances by an additional $\pm .001$ " but the bulk of material will be within normal tolerances.
3. **Flatness:** Sheets are not necessarily commercially flat and may include minor damage, kinks, small buckles, coil breaks and corrugated edge.
4. **Surface Defects:** These sheets will include heavier surface defects than Seconds, such as severe pits, laminated surface, seams and one or more small holes with a maximum area of 1 sq. inch on a sheet up to 6 ft. x 3 ft. On larger size sheets, holes up to a total area of $1\frac{1}{2}$ sq. inches will be tolerated provided the holes are towards the edges of the sheet.
5. **Rust:** Some sheets may be affected by light rust but heavily rusted sheets will not be included.
6. **Size:** Sheets would approximate to nominal size but edge defects such as splits, edge folds and cut-outs may be included.

CARBON STEELS

Where higher tensile strength is required than that of Commercial Quality Sheets, steels of greater carbon content are used. A range of qualities is available to meet specific requirements.

HR. C15. R.

GENERAL DESCRIPTION.—This is a drawable rimmed grade steel supplied in a hot rolled pickled finish. The increased carbon content imparts extra strength making the quality suitable for shallow pressing where some increase in strength is desired. This quality is supplied in an oiled condition unless otherwise stated.

TYPICAL USES.—Automobile wheel centres and similar applications.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	48"-150" Maximum			
Width:	Gauge	Width	Gauge	Width
	.075"-.077"	42" max.	.075"-.077"	24"-42" max.
	.078"-.091"	48" "	.078"-.091"	24"-48" "
	.092"-.104"	54" "	.092"-.104"	24"-54" "
	.105"-.125"	60" "	.105"-.125"	30"-60" "
Thickness:	.075"-.125"		.075"-.125"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring

Coil:

—

HR. C20. S.

GENERAL DESCRIPTION.—This is a hot rolled semi-killed carbon steel with a nominal carbon content of 0.2%. The material is supplied in the pickled and oiled condition unless otherwise stated.

The physical properties of this grade, which is of greater mechanical strength than standard commercial quality, are such that the material is suitable for commercial forming and bending operations, but it is not recommended for drawing or pressing.

TYPICAL USES. — Automobile chassis frames and components.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	48"-150" Maximum			
Width:	Gauge	Width	Gauge	Width
	.075"-.078"	48" max.	.075"-.078"	24"-48" max.
	.079"-.099"	54" "	.079"-.099"	24"-54" "
	.100"-.125"	60" "	.100"-.125"	30"-60" "
Thickness:	.075"-.125"		.075"-.125"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring

Coil:

—

CR. C20. S.

GENERAL DESCRIPTION.—For 11-gauge sheet and lighter in the nominal 0.2% carbon grade this quality is supplied in the cold reduced commercial quality finish which is free from surface scale and oxide. This material is supplied in an oiled condition.

The physical properties are basically the same as HR.C20.S.

TYPICAL USES. — Lightweight moulds and structural members.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	30"-180" Maximum			
Width:	Gauge	Width	Gauge	Width
	.031"-.039"	48" max.	.031"-.039"	48" max.
	.040"-.096"	54" ..	.040"-.062"	54" ..
	.097"-.112"	38" ..		
Thickness:	.031"-.112"		.031"-.062"	

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.— A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:
Resquaring

Coil:
—

HR. C30. S.

GENERAL DESCRIPTION.—This quality is a semi-killed carbon steel of nominal carbon content of 0.30%. The sheets are supplied in a hot rolled mill-finished condition. The physical properties are designed for greater strength and stiffness of product while retaining limited forming ability. This quality is available in 20 gauge and heavier.

TYPICAL USES.—Light structural members.

SIZE RANGE

Dimension:	Cut Lengths		Coil	
Length:	48"-192" Maximum			
Width:	Gauge	Width	Gauge	Width
	.039"-.062"	42" max.	.075"-160"	30"-48" max.
	.063"-.125"	48" ..	.161"-.125"	30"-36" ..
Thickness:	.039"-.125"		.075"-.125"	

PACKING

Cut Lengths.—Standard: 1-ton Bundle.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.
2-ton Bundle.

Coil.—A brochure giving details of coil packing is available on application to any John Lysaght sales office.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Annealing
*Pickling
*Oiling
Stretcher Levelled Flatness and/or Cropping
Resquaring

Coil:

Annealing
Pickling
Oiling

—
—

* Pickling and Oiling is applicable to sheets 150" maximum only.

HR. C65. S.

GENERAL DESCRIPTION.—This is a semi-killed carbon steel of 0.65% nominal carbon content. The quality is primarily designed as an economical general purpose high carbon steel for uses in applications where subsequent heat treatment is necessary.

A Technical Note covering details of recommended heat treatment procedures is available on application.

Nominal composition and physical properties:—

C.—0.6%, P.—0.03%, Mn.—0.75%,

Si.—Residual, S.—0.04%.

Open Hearth Semi-killed.

Ultimate Tensile Strength: Brinell Hardness:

As rolled . . . 110,000-135,000 p.s.i. 220-270

Annealed . . . 90,000-110,000 p.s.i. 180-230

TYPICAL USES.—Shovels, plough discs, and miscellaneous hard-wearing and cutting edges.

SIZE RANGE

Dimension:	Cut Lengths		Coil
Length:	48"-96" Maximum		
Width:	Gauge	Width	
	Up to .078"	36" max.	
Length:	72"-192" Maximum		
Width:	Gauge	Width	Not yet available
	.078"-.098"	37" max.	
	.099"-.110"	45" "	
	.111"-.124"	50" "	
	.125"	56" "	
Thickness:	.039"-.125"		

PACKING

Cut Lengths.—Standard: 1-ton Bundle.

Optional: 2-ton Bundles; Skidded Packs, 1, 2 or 3 tons.

Coil.—Not yet available.

OPTIONAL EXTRA PROCESSING

	Cut Lengths:	
Annealing	Oiling	Resquaring
Pickling	Cropping	

SPECIAL STEELS

Because of limited use and specific application, certain grades are classified as Special Steels. It is the aim of the Company to meet the country's needs in the sheet steel field, and it is the policy to develop new qualities of plain carbon or low alloy steels to meet Trade requirements.

Enquiries are welcomed for steels, the uses of which are not covered by steels listed in this brochure.

L.P.G.C. | LIQUEFIABLE PETROLEUM GAS CYLINDER STEEL

GENERAL DESCRIPTION.—This is a special low alloy steel of the weldable type, possessing high strength characteristics in the normalised condition. It is specially produced to meet the requirements of Australian Standard Specification B.115-1958 for liquefiable petroleum gas cylinders.

It is supplied in the spheroidised annealed condition, pickled and oiled in order to permit easy fabrication, as required by the Australian Standard Specification. It must be finally heat treated by the customer to produce the necessary physical properties.

Typical composition and steel type:—

C.—0.17%, P.—0.03%, Mn.—1.4%,

Si.—0.3%, S.—0.04%.

Fully killed, hot topped.

PHYSICAL PROPERTIES.—After a suitable heat treatment cycle, specified on the certificate accompanying each delivery, the material will meet the requirements of Australian Standard Specification B.115-1958.

L.P.G.C. | LIQUEFIABLE PETROLEUM GAS CYLINDER STEEL (Continued)

Ultimate Tensile Strength: 70,000 p.s.i. minimum.

Yield Point : 40,000 p.s.i. minimum.

Elongation : 20% minimum of 2".

SIZE RANGE

Dimension:	Cut Lengths		Coil
Length:	48"-150" Maximum		
Width:	Gauge	Width	
	.088"-125"	48" max.	Not yet available
Thickness:	.088"-125"		

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Pack, 1, 3, 4 or 5 tons.

Coil.—Not yet available.

BRANDING.—Individual cut lengths are branded with stock card number, this and the relevant heat number being found on all certificates. Heats are normally packed and despatched as a complete run.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring.

ENAMELLING QUALITY

GENERAL DESCRIPTION.—This quality, because of its chemical composition and the special processing given, provides the ideal base for the application of porcelain enamels. Its freedom from distortion at enamelling temperatures makes it particularly satisfactory for the production of large flat enamel panels.

Enamelling quality possesses good drawability and it is capable of making all but the most severe draws.

TYPICAL USES.—Kitchen utensils, domestic appliances and hospital ware.

SIZE RANGE

Dimension:	Cut Lengths		Coil
Length:	30"-150" Maximum		
Width:	Gauge	Width	
	.020"-.034"	48" max.	Not yet available
	.035"-.096"	58" "	
	.097"-.112"	38" "	
Thickness:	.020"-.112"		

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Packs, 1, 3, 4 or 5 tons.

4 x 1 ton Composite Black Skidded Pack.

2 x 2 tons Composite Black Skidded Pack.

Coil.—Not yet available.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Stretcher Levelled Flatness and/or Cropping.

Resquaring.

TACK PLATE

GENERAL DESCRIPTION.—This quality is specially produced to meet the requirements of the tack-making trade. This material is provided in the hot rolled pickled condition in the gauge range from .072" to .125" and as cold reduced sheet in the range from .042" to .062". Tack plate is supplied oiled or unoiled as specified.

SIZE RANGE

Dimension:	Cut Lengths		Coil
Length:	30"-150" Maximum		
Width:	Gauge	Width	
Hot Rolled	.072"-.077"	42" max.	Not yet available
	.078"-.091"	48" ..	
	.092"-.104"	54" ..	
	.105"-.125"	60" ..	
Cold Reduced	.042"-.062"	60" ..	
Thickness:			
Hot Rolled	.072"-.125"		
Cold Reduced	.042"-.062"		

PACKING

Cut Lengths.—Standard: Skidded Pack, 2 tons.

Optional: Skidded Packs, 1, 3, 4 or 5 tons.

Coil.—Not yet available.

OPTIONAL EXTRA PROCESSING

Cut Lengths:

Resquaring.

BIRMINGHAM GAUGE

The standard gauge table used for Black Steel Sheets is known as the Birmingham Gauge, or B.G. It must not be confused with either the Birmingham Wire Gauge (B.W.G.) or the Standard Wire Gauge (S.W.G.). Wherever the word gauge is used in these pages the Birmingham Gauge is implied.

It is useful to remember that—

10G (B.G.) is 1/8" thick

16G (B.G.) is 1/16" thick

and that for every increase of 6 in the number of the gauge the thickness of the sheet is reduced by a half.

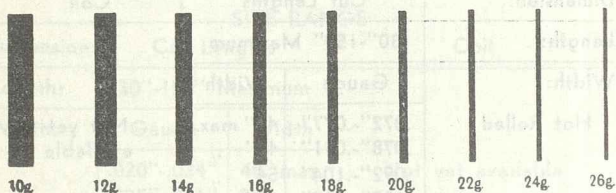


Illustration showing the approximate thickness of sheets according to the Birmingham Gauge.

GAUGE TABLE

Gauge	Thickness		lbs. per sq. ft.	Gauge	Thickness		lbs. per sq. ft.
	Ins.	Mms.			Ins.	Mms.	
8	.157	3.988	6.41	20	.039	.996	1.60
9	.140	3.551	5.70	21	.035	.886	1.42
10	.125	3.175	5.10	22	.031	.794	1.27
11	.111	2.827	4.54	23	.028	.707	1.13
12	.099	2.517	4.04	24	.025	.629	1.01
13	.088	2.240	3.60	25	.022	.560	.90
14	.078	1.994	3.20	26	.020	.498	.80
15	.070	1.775	2.85	27	.0175	.443	.71
16	.062	1.587	2.55	28	.0155	.396	.64
17	.056	1.412	2.27	29	.0140	.353	.57
18	.049	1.257	2.02	30	.0123	.312	.50
19	.044	1.118	1.80				

BLACK STEEL SHEET

	Gauge	APPROXIMATE WEIGHT PER SHEET—LBS.			COUNT OF SHEETS PER TON		
		Width			Width		
		24"	30"	36"	24"	30"	36"
6-FOOT LENGTHS	10	62.1	77.5	92.9	36	29	24
	12	49.3	61.8	73.7	46	36	30
	14	39.1	48.8	58.5	57	46	38
	16	31.0	38.7	46.5	72	58	48
	18	24.6	30.8	36.9	91	73	61
	20	19.5	24.4	29.3	115	92	77
	22	15.5	19.4	23.2	142	116	96
	24	12.3	15.4	18.4	182	146	122
	26	9.8	12.2	14.6	230	184	154
	28	7.8	9.7	11.6	289	231	193
	30	6.2	7.7	9.2	367	294	245
7-FOOT LENGTHS	10	72.3	90.3	108.3	31	25	21
	12	57.4	71.7	85.9	39	31	26
	14	45.6	56.9	68.2	49	39	33
	16	36.2	45.1	54.1	62	50	41
	18	28.7	35.0	43.0	78	63	52
	20	22.8	28.4	34.1	99	79	66
	22	18.1	22.6	27.0	124	99	83
	24	14.3	17.9	21.5	156	125	104
	26	11.4	14.2	17.0	197	158	132
	28	9.0	11.3	13.5	248	198	166
	30	7.2	9.0	10.7	315	252	110
8-FOOT LENGTHS	10	82.6	103.1	123.6	27	22	18
	12	65.5	81.8	98.1	34	27	23
	14	52.0	64.9	77.9	43	35	29
	16	41.3	51.5	61.8	54	43	36
	18	32.8	40.9	49.1	69	55	46
	20	26.0	32.5	38.9	87	69	58
	22	20.6	25.8	30.9	105	87	72
	24	16.4	20.5	24.5	137	110	91
	26	13.0	16.2	19.5	173	138	115
	28	10.3	12.9	15.5	217	174	145
	30	8.2	10.2	12.3	276	221	184

DIMENSIONAL TOLERANCES — CUT LENGTHS

1. **GAUGE.**—The following tables give the tolerances permitted by the trade in uncoated sheet, both in the hot rolled and cold reduced form.

(a) Hot Rolled Sheets:

THICKNESS TOLERANCES — CUT LENGTHS

Specified Thickness Tolerances Plus or Minus, Inch	Specified Width, Inches			
	24 to 32 incl.	Over 32 to 40 incl.	Over 40 to 48 incl.	Over 48 to 60 incl.
.1484 to .1875	.009	.009	.010	.010
.0936 to .1483	.008	.009	.010	.010
.0833 to .0935	.007	.008	.008	.008
.0742 to .0832	.007	.007	.007	—
.0591 to .0741	.006	.006	.006	—
.0468 to .0590	.005	.006	—	—

(b) Cold Reduced Sheets:

THICKNESS TOLERANCES — CUT LENGTHS

Thickness Tolerances for specified widths and thicknesses Over and under Inch	Specified Width, Inches				
	24 to 32 incl.	Over 32 to 40 incl.	Over 40 to 48 incl.	Over 48 to 60 incl.	Over 60 to 72 incl.
.0936 to .1483	.007	.008	.009	.009	—
.0834 to .0935	.006	.006	.007	.008	—
.0742 to .0833	.006	.006	.006	.007	—
.0591 to .0741	.005	.005	.005	.006	.006
.0526 to .0590	.005	.005	.005	.006	.006
.0468 to .0525	.004	.004	.004	.004	.005
.0370 to .0467	.004	.004	.004	.004	.005
.0295 to .0369	.003	.0035	.0035	.0035	.004
.0263 to .0294	.003	.003	.003	.0035	—
.0208 to .0262	.003	.003	.003	.003	—
.0147 to .0207	.002	.002	.002	—	—
.0116 to .0146	.002	.002	—	—	—
.0115 and thinner .	.0015	.0015	—	—	—

2. **LENGTH.**—For material as rolled and not resquared, the tolerance on length is:

-0 +1½% of the length.

3. WIDTH.—For material as rolled and not resquared, the width tolerances are:—

Up to 48" wide		-0 + $\frac{1}{4}$ "
Over 48" wide		-0 + $\frac{3}{8}$ "

4. CAMBER.—The cut lengths supplied are such that a sheet of nominal size can be cut from it.

5. OUT OF SQUARE.—The cut lengths supplied are such that a sheet of nominal size can be cut from it.

6. FLATNESS. — Flatness tolerances for cut lengths not specified to stretcher levelled standard of flatness are:—

Ordered width	Maximum height of buckles
36" or under	$\frac{3}{4}$ "
Over 36" to 48"	1"
Over 48" to 60"	1 $\frac{1}{4}$ "
Over 60"	1 $\frac{1}{2}$ "

FLATNESS TOLERANCES—STRETCHER LEVELLED FLATNESS:

Gauge	Width	Tolerance Max. deviation from horizontal flat surface
Over .031"	To 48" incl.	$\frac{1}{8}$ "
	Over 48"	$\frac{1}{4}$ "
.030"-.025"	To 36" incl.	$\frac{1}{4}$ "
	Over 36" to 48"	$\frac{3}{8}$ "
.024"-.020"	To 36" incl.	$\frac{3}{8}$ "
	Over 36" to 48"	$\frac{1}{2}$ "

7. RESQUARED WIDTH AND LENGTH.—

Up to 48" wide and 120" long		-0 + $\frac{1}{16}$ "
Over 48" wide and 120" long		-0 + $\frac{1}{8}$ "

DIMENSIONAL TOLERANCES — COIL

1. **GAUGE.**— The following tables give the permissible gauge tolerances applicable to uncoated hot rolled and cold reduced material in coil form. In conformity with established practice, these tolerances do not apply in the immediate vicinity of any weld in the coil, where some out-of-gauge material may be found.

(a) Hot Rolled Coil:

THICKNESS TOLERANCES

Specified Thickness Tolerances Plus or Minus, Inch	Specified Width, Inches			
	24 to 32 incl.	Over 32 to 40 incl.	Over 40 to 48 incl.	Over 48 to 60 incl.
.1484 to .1875	.009	.009	.010	.010
.0936 to .1483	.008	.009	.010	.010
.0833 to .0935	.007	.008	.008	—
.0742 to .0832	.007	.007	.007	—
.0591 to .0741	.006	.006	.006	—
.0468 to .0590	.005	.006	—	—

(b) Cold Reduced Coil:

THICKNESS TOLERANCES — CUT LENGTHS

Thickness Tolerances for specified widths and thicknesses Over and Under Inch	Specified Width, Inches				
	24 to 32 incl.	Over 32 to 40 incl.	Over 40 to 48 incl.	Over 48 to 60 incl.	Over 60 to 72 incl.
.0936 to .1483 ..	.007	.008	.009	.009	—
.0834 to .0935 ..	.006	.006	.007	.008	—
.0742 to .0833 ..	.006	.006	.006	.007	—
.0591 to .0741 ..	.005	.005	.005	.006	.006
.0526 to .0590 ..	.005	.005	.005	.006	.006
.0468 to .0525 ..	.004	.004	.004	.004	.005
.0370 to .0467 ..	.004	.004	.004	.004	.005
.0295 to .0369 ..	.003	.0035	.0035	.0035	.004
.0263 to .0294 ..	.003	.003	.003	.0035	—
.0208 to .0262 ..	.003	.003	.003	.003	—
.0147 to .0207 ..	.002	.002	.002	—	—
.0116 to .0146 ..	.002	.002	—	—	—
.0115 and thinner	.0015	.0015	—	—	—

2. **WIDTH.**— For material as rolled, width tolerances are:—

Up to 48" wide	-0 + 1/4"
Over 48" wide	-0 + 3/8"

3. **CAMBER.**— Camber does not exceed 1 inch in 20 feet.

4. **FLATNESS.**— Sheets shipped in cut lengths conform to flatness tolerances because the producer can inspect for flatness and perform corrective operations when necessary. There is no practical way to judge the flatness of material in coil form, either in the coil or as it is being wound under tension. The lack of flatness in coils may be due to buckles, wavy edges, coil set or other conditions which are corrected by supplementary operations when producing cut lengths. To assure the desired flatness of sheets cut from coils, the user should perform corrective flattening measures. When equipment comparable to that used by the producer is correctly employed, the flatness limits for cut length sheets should be obtained. Coils may contain portions which do not respond satisfactorily to ordinary flattening operations.

The flatness of sheets or strip which have been slit from a multiple-width coil is not necessarily related to the flatness of the parent multiple-width coil.

Items that require stretcher-levelled standard of flatness should be so specified, and are supplied in cut lengths only.

5. RESQUARED WIDTH.—

Up to 48" wide	..	..	-0 +1/16"
Over 48" wide	..	..	-0 +1/8"

ORDERING

To enable us to ensure that sheets are delivered at the required time, and to allow us to use our manufacturing capacity to its fullest extent, long-range programming is essential.

We have found it necessary to plan overall production for at least six months in advance, not only to achieve the objectives set out above, but also to take care of those occasional delays that can never be wholly avoided. The many steps that are involved in the production of sheets make it necessary for us to take the initial steps in the fulfilment of an order at least three months before it is due for delivery.

In particular cases, and for standard lines, a shorter period may be possible for some of our production, but the basic requirements of sufficient notice exist for co-ordinated and economical operation.

From the customer's viewpoint, a short delivery time is an asset. However, apart from stock lines, there is an inevitable processing delay calling for ordering in advance, and we must request that orders be placed for one month's supply, allowing for three to four months' delivery. For example, orders for delivery in January should be placed with Branch Offices by September 20, and so on. At the same time, we would like to have a forecast of the probable requirements for the whole of the quarter when the orders for the first month of a quarter are placed.

With this co-operation, the smooth, regular flow of material will be facilitated.

DIMENSIONS.—For gauge ranges applicable to particular grades, refer to the individual quality. Any order calling for a length, width or gauge which is not regularly manufactured is subject to a minimum quantity of 15 tons.

Standard gauges are the even Birmingham Gauge numbers. Standard widths are 30, 36, 42 and 48 inches, and standard lengths are 72, 84 and 96 inches for sheet material. In respect to material supplied in coil form, the standard weight is $3\frac{1}{2}$ -4 tons.

Lengths and widths which are not standard should be compatible with the shearing tolerance which applies to the particular quality concerned.

QUALITY.—It is sufficient if the quality is defined under the abbreviated name. (Example: HR.CQ. for Hot Rolled Commercial Quality.)

PACKING WEIGHT.—This should be in accordance with the standard packing weight shown for the particular quality. This applies to material in both sheet and coil form. Coil weights outside the standard specified are available by negotiation.

PURPOSE.—The specific purpose for which it is intended to use the material should be stated on all orders. In the case of initial orders, a sketch, blue print or sample of the product should accompany the order, together with an indication of the proposed method of manufacture. Special mention should be made of any particular requirements in the final product.

EXTRAS.—The extras available for each quality are shown in the individual descriptions. Those selected should be stated on the order.

DATE OF DELIVERY.—The month in which delivery is required should be specified on the order.

POINT OF DELIVERY.—This should be specified on the order.

SECONDS AND MILL REJECTS

UNCOATED ZINCANNEAL AND TERNE PLATE

SECONDS.—If a customer so desires, Seconds arising from the processing of an order in the above qualities may be included for delivery by arrangement with the customer. In many applications the customer will find it advantageous to accept Seconds arising, especially for fabrication where a small amount of re-work is a normal process. Any seconds included are priced accordingly.

Seconds may also be purchased separately, when available, as surplus stock items.

MILL REJECTS.—This quality is available from surplus stock.



O R B

TRADE MARK

NOTES ON PACKING

The following information has been included for reference on the methods of packing used.

SHEET.—The standard method of packing used for all Cold Reduced and Hot Rolled Pickled and Oiled material is the skidded pack. This is produced by first enclosing the sheets in a steel envelope. The envelope is placed on a wooden framework which consists of longitudinal skids extending the full length of the pack; transverse cross members serve to space the skids and raise the pack from the ground. The envelope is bound to the framework by steel straps which pass around the transverse members. There are a number of definite advantages in this form of packing. The steel sheet envelopes not only protect the contents during transit and storage, but may themselves be used for working-up purposes when empty. The wooden framework gives excellent protection to edges and corners, but, in addition, facilitates handling by slings or fork-lift trucks, and allows tidy stacking. When the pack has been removed, the timber, being of substantial section, may be found of use for dunnage or other purposes.

In the case of Hot Rolled Unpickled qualities, these are normally supplied in unwrapped bundles with longitudinal and transverse steel strapping. However, the skidded pack is available as an optional extra.

IDENTIFICATION MARKINGS.—All individual sheets are branded with the quality of material, the stock card number, and the year of manufacture.

In addition to the above information, all sheet packs carry the following stencilled information:—

Customer's Name.

Destination.

Grade of Material.

Gauge and size.

Number of sheets.

Nett weight.

Crate number.

Order number.

The various packing methods are summarised in the table below:—

Material:	Pack:	Weight:
Cold Reduced All qualities and Seconds	Standard Skidded Pack Optional Skidded Pack	2 tons 1, 3, 4 or 5 tons
Pickled and Oiled All qualities and Seconds	Standard Skidded Pack Optional Skidded Pack	2 tons 1, 3, 4 or 5 tons
Hot Rolled—Un- pickled All qualities in- cluding Carbon Steel & Seconds	Standard Skidded Pack Optional Skidded Pack	2 tons 1, 3, 4 or 5 tons
Mill Rejects	Skidded Pack Optional Bundle	1 ton 1 ton

COIL.—Set out below is a description of the types of packing used for coil:—

1. Unprotected Coil:

Unprotected coils will have:

- Two peripheral straps.
- Four bore straps.
- With or without protective film.

2. Protected Coil:

Protected coils will have:

- Three peripheral straps.
- Four bore straps.
- Two flanged end caps with or without protective film, OR
- Two flanged end caps with steel outer wrap.

3. Coils packed as for Export:

Coils packed as for export will have:

- One peripheral strap inside wrapping.
- Paper wrapped through the bore.
- Steel end cap outside and bore steel wrapping.
- Three peripheral and four bore straps outside wrapping.

IDENTIFICATION MARKINGS.—The outside wraps of each are branded with the quality of material and coil identification number.

All coil packs carry the following information:—

Customer's name.	Gauge and size.
Packing number.	Nett tonnage.
Grade of material.	Order number.

TECHNICAL SERVICE

Should any difficulty arise in the processing of our material or for any other cause, please contact your local Branch office. It would be of the greatest assistance in this respect if the following details could be provided:—

Quality.	Count.
Gauge.	Quantity of material involved.
Size.	Pack or bundle number.
Weight.	Numbers branded on the sheets.

The particular purpose for which the material is being used and exact nature of the difficulty being experienced would also be of assistance. Should it be suspected that the material is not of the correct quality or standard, production should cease on this particular material pending investigation by our Technical Representative; otherwise, as indicated in Trade Customs, liability cannot necessarily be accepted.



O R B

TRADE MARK

BLACK STEEL SHEETS

Comparison of Sheet and Wire Gauges

Gauge Name	Birmingham Gauge (B.G.)	U.S. Mnfrs. Standard Gauge	Birmingham Wire Gauge (Stubs') (B.W.G.)	Imperial Standard (British) (I.S.W.G.)	U.S. Steel Wire Gauge	Browne & Sharpe Gauge (American)
Principal Use	Steel Sheets, etc.	Steel Sheets, etc.	Steel Wire, Shts., etc.	Steel Wire, Shts., etc.	Steel Wire	Non-ferrous Sheets, Wire, etc.

Gge. No. Thickness or Diameter in Inches

4/0	.5416	—	.454	.400	.3938	.4600
3/0	.5000	—	.425	.372	.3625	.4096
2/0	.4452	—	.380	.348	.3310	.3648
0	.3964	—	.340	.324	.3065	.3249
1	.3532	—	.300	.300	.2830	.2893
2	.3147	—	.284	.276	.2625	.2576
3	.2804	.2391	.259	.252	.2437	.2294
4	.2500	.2242	.238	.232	.2253	.2043
5	.2225	.2092	.220	.212	.2070	.1819
6	.1981	.1943	.203	.192	.1920	.1620
7	.1764	.1793	.180	.176	.1770	.1443
8	.1570	.1644	.165	.160	.1620	.1285
9	.1398	.1495	.148	.144	.1483	.1144
10	.1250	.1345	.134	.128	.1350	.1019
11	.1113	.1196	.120	.116	.1205	.0907
12	.0991	.1046	.109	.104	.1055	.0808
13	.0882	.0897	.095	.092	.0915	.0720
14	.0785	.0747	.083	.080	.0800	.0641
15	.0699	.0673	.072	.072	.0720	.0571
16	.0625	.0598	.065	.064	.0625	.0508
17	.0556	.0538	.058	.056	.0540	.0453
18	.0495	.0478	.049	.048	.0475	.0403
19	.0440	.0418	.042	.040	.0410	.0359
20	.0392	.0359	.035	.036	.0348	.0320
21	.0349	.0329	.032	.032	.0317	.0285
22	.0312	.0299	.028	.028	.0286	.0253
23	.0278	.0269	.025	.024	.0258	.0226
24	.0247	.0239	.022	.022	.0230	.0201
25	.0220	.0209	.020	.020	.0204	.0179
26	.0196	.0179	.018	.018	.0181	.0159
27	.0174	.0164	.016	.0164	.0173	.0142
28	.0156	.0149	.014	.0148	.0162	.0126
29	.0139	.0135	.013	.0136	.0150	.0113
30	.0123	.0120	.012	.0124	.0140	.0100
31	.0110	.0105	.010	.0116	.0132	.00893
32	.0098	.0097	.009	.0108	.0128	.00795
33	.0087	.0090	.008	.0100	.0118	.00708
34	.0077	.0082	.007	.0092	.0104	.00630
35	.0069	.0075	.005	.0084	.0095	.00561
36	.0061	.0067	.004	.0076	.0090	.00500

ELECTRICAL STEELS

GENERAL.—The steel core components of motors, alternators, and transformers are made up of high-quality special sheet steel laminations. Stringent control of raw materials and steel processing is maintained.

A catalogue, "Lysaght Electrical Steels," is available, and provides details of magnetic and physical characteristics of the various grades produced. Briefly, the STALLOY Grades are used for transformer work and other applications where low electrical losses are essential. MOTOR 100, MEDIUM RESISTANCE, and SPECIAL LOHYS are used for motors of all types, large motor-generators, small transformers, and reactors. The SPECIAL LOW SILICON grade finds use in applications where the magnetic properties of the core steel are less critical. Sheets in a range of thicknesses are available and, to assist manufacturers in the production of laminations, all Electrical Steel grades except Lohys are available in the form of coiled strip. Sheets are precision welded by a technique which has been developed to produce a weld which is not appreciably thicker than the sheet, and the weld is therefore capable of being included in the assembled cores.

Electrical Steel sheets and coils are available in a variety of surface finishes, depending primarily on the degree of inter-lamination resistance required.

ELECTRICAL STEEL DATA

Quality	Thick- ness	Core Losses at 50 Cycles			
		Guar. Max. Loss B=10,000 gauss		Approx. equivalent	
		W./lb.	W./Kg.	B=13,000	B=15,000
				W./Kg.	W./Kg.
Stalloy 90	.014"	.41	0.90	1.57	2.12
Stalloy 95	.014"	.43	0.95	1.65	2.25
Stalloy 100	.014"	.455	1.00	1.74	2.35
Stalloy 105	.014"	.475	1.05	1.80	2.47
Stalloy 110	.014"	.50	1.10	1.87	2.55
Stalloy 120	.014"	.54	1.20	2.02	2.80
Stalloy 130	.014"	.59	1.30	2.20	3.10
Stalloy 140	.014"	.63	1.40	2.35	3.50
Stalloy 150	.014"	.68	1.50	2.52	3.75
Stalloy 120	.020"	.63	1.39	2.36	3.56
Stalloy 130	.020"	.68	1.50	2.55	3.84
Stalloy 140	.020"	.74	1.63	2.77	4.17
Stalloy 150	.020"	.81	1.78	3.04	4.55
Motor 100	.020"	1.00	2.20	3.66	5.30
Motor 100	.025"	1.12	2.47	4.20	5.95
Med. Resistance	.020"	1.14	2.51	4.18	6.00
Med. Resistance	.025"	1.29	2.84	4.72	6.78
Special Lohys ..	.018"	1.23	2.71	4.60	6.60
Spec. Low Silicon*	.025"	1.9	4.2	7.0	10.0
Spec. Low Silicon*	.031"	2.4	5.3	8.8	13.0

*Typical properties after suitable heat treatment.

GLOSSARY OF TERMS

A number of terms peculiar to the steel industry are used in our price list and in reports which are frequently circulated. Other terms which are in more common use are included in a list of definitions.

ANNEALING.—Annealing is a process of heat treatment designed for improving the ductility and general properties of sheet steel. The process consists of heating to, and holding at a suitable temperature, and then cooling at a suitable rate. Variations of the practice which are used and referred to by more specific terms are as follows:

Blue Annealing

Bright Annealing

Spheroidising

and, in some cases, Stress Relief Annealing.

BLUEING.—Blueing is a process of carefully controlled oxidation which imparts an adherent film of iron oxide over the whole surface of the sheet. The oxide is blue in colour, and from this the process gets its name.

CAMBER.—Camber is the term used to designate the horizontal edge curvature in a cut length or in a specific length of coil. This curvature must be measured in a flat position in the same plane as the sheet.

COLD FORMING.—Cold forming is a broad term used to describe metal-forming operations which are carried out at either atmospheric or very slightly elevated temperature.

COMMERCIAL FLATNESS. — Commercial flatness is the normal standard of flatness to which sheets are supplied, and this is usually achieved by roller levelling.

CROPPING. — Cropping is the term generally used to denote the end shearing operation which follows stretcher levelling, when the grip marks are to be removed.

DUCTILITY.— Ductility is a property of metals which enables them to undergo plastic deformation. Ductile metals can be deformed to a greater extent, prior to fracture, than non-ductile metals.

DRAWABILITY.— Drawability is a term used to indicate the extent to which material is suitable for deep drawing operations.

DRAWING.— Drawing or deep drawing are terms used to describe the formation of sheet metal shapes by the combined actions of a punch, a die, and a blankholder. For the operation to be considered a "drawing" the metal must flow under the blankholder and follow the punch into the die. If the metal is completely locked by the blankholder and no flow occurs, the article is said to be "stretch formed." When the shape is produced by a punch or die without the use of a blankholder, the operation is generally termed "stamping" or "pressing," although no strict definition of these terms exists.

FINISH.— Finish is a term used to define the standard of appearance of a product.

FLATNESS.— Flatness may best be defined when referring to sheet metal as the absence of any wave or buckle. The "out-of-flatness" is referred to as the measured height of buckles when the sheet is laid on a flat surface.

HEAT TREATMENT.— Heat treatment refers to any combination of heating and cooling operations which are applied to a metal with the objective of obtaining altered, and usually enhanced, physical properties.

NORMALISING.— In a normalising operation, steel is heated to a temperature slightly above its upper critical temperature, held for a sufficient length of time to soak thoroughly, and then allowed to cool freely in still air. This treatment is recommended in those cases where further cold-forming operations must be carried out on highly work-hardened sheets.

PICKLE FINISH.—Pickle finish describes the finish remaining on hot rolled sheets after removal of scale layers by pickling in acid.

PRE-STRESSING EQUIPMENT.—Pre-stressing equipment, as referred to in the "Trade Customs," covers any form of rolling or flexing machine which imparts a small amount of cold work to the sheet prior to deep drawing.

RESQUARED.—Describes a sheet which has been guillotined on all four sides to accurate limits as the last stage of production of the sheet.

STRETCH FORMING. — Stretch forming is a process of forming panels and shapes of large curvature by stretching the sheet over a punch which is of the desired shape. The best-known type of stretch-forming machine is the "d'Artz Press."

STRETCHER LEVELLED.—Stretcher levelled, as applied to sheets, indicates a standard of flatness. The term originated from the initial method used to obtain this standard of flatness, that is, the gripping of the ends of a sheet and stretching the sheet to remove surface waves.

TEMPER ROLLING. — Temper rolling, sometimes known as "skin passing," is a relatively light rolling pass given to sheets to overcome the tendency to stretcher-strain, or impart a desired amount of stiffness.

TENSILE STRENGTH OR ULTIMATE TENSILE STRENGTH.— If a prepared sample of steel is strained in a tensile testing machine until it breaks, then the ultimate tensile strength of the material is given by dividing the maximum observed load by the cross-sectional area of the sample.

WELDING.—Welding is a process used to join metals by the application of heat. Fusion welding requires that the parent metals be melted. In pressure welding, joining is accomplished by the use of heat and pressure without melting.

WORKABILITY.—Workability is the characteristic or group of characteristics that determine the ease of forming a metal into desired shapes.

TRADE CUSTOMS — COATED AND UNCOATED SHEETS

CUT LENGTHS AND COILS

GENERAL.—While there have been many trade practices developed by the mutual consent of the purchaser and manufacturer, there are possible opportunities for misunderstanding unless trade customs are thoroughly understood.

Special arrangements, not covered in these notes, apply to Electrical Steels.

In the following pages the word manufacturer refers to the manufacturer of the sheets. The word customer means the merchant, distributor or ultimate user of the sheets.

1. ORDERING OF SHEETS.—Sheets are supplied in a wide range of standard qualities and finishes and the Company is always prepared to advise customers on a suitable quality for a particular purpose. Where customers select a quality without consulting the Company, the responsibility is his, provided the sheets are up to standard for the grade ordered. Whenever possible, it is desirable to specify, on the order, the purpose for which the sheets are required as well as the quality. This is to the mutual advantage of the customer and the manufacturer.

2. SHEETS ORDERED TO SPECIFICATION.—When a customer desires a definite fabricated result, there should be the least possible stipulation on the manufacturer as to how the material must be made.

When it is necessary to supply material to chemical specifications, then the manufacturer cannot in addition assume the responsibility of meeting physical tests and workability results. Similarly, when physical specifications have to be met, there should not be imposed upon the manufacturer the additional necessity of meeting chemical analysis and workability results.

When a customer specifies a definite treatment, then the responsibility for the characteristics of the sheet rests with the customer.

Sheets ordered to a specified chemical analysis can be accepted on the basis of heat analysis only.

3. THICKNESS.—Wherever possible the customer should confine his requirements to those thicknesses which correspond with our even gauge numbers.

When ordering coated sheets it should be borne in mind that the nominal gauge is the thickness of the sheet prior to coating and that the applied coating constitutes an additional thickness.

4. **SURFACE INSPECTION.**—Each cut length will have one side which meets the surface requirements of the grade. Coils may contain imperfections beyond the grade standard because the producer does not have the same opportunity to reject portions containing such imperfections as in the case of cut lengths.

5. **SURFACE INSPECTION TOLERANCE.**—A surface inspection tolerance applies to all prime sheets shipped. This tolerance varies with the type of product and is covered in the relevant grade specifications.

Uncoated material sold in coil form can be expected to contain surface defects affecting up to 10% of individual coils, and up to 3% of an overall shipment of any one size or gauge.

In the case of coated coils, the corresponding limits are 10% and 5% respectively.

6. **OFF-GAUGE MATERIAL.**—Since it is impracticable for the manufacturers to comprehensively gauge every cut length, such thickness inspection becomes the responsibility of the user whenever it is considered a necessity.

It is standard practice in many plants to perform this gauge inspection on uncoated cut lengths and any pieces which the customer finds outside the thickness tolerances are subject to rejection. Such material must be referred to the manufacturer.

If a customer decides not to perform a thickness inspection on every piece, and, if as a result some over-gauge sheet should cause damage to his equipment, the responsibility for such damage rests on the customer.

The basis of all sheet gauging is weight per unit area and in the case of coated and some uncoated sheets, this is the only practical and acceptable criterion of gauge.

In the case of coil, the manufacturer has not the same opportunity for rejecting portions as for cut lengths and, therefore, the foregoing does not necessarily apply to coil.

It is the responsibility of the customer to establish gauge conformity prior to cutting up and fabrication.

7. **AGEING AND STRETCHER STRAINING.**—Material in the dead-soft or annealed condition is particularly suited for a variety of purposes, but is subject to stretcher straining and fluting which is not the responsibility of the manufacturer.

The tendency to stretcher strain can be overcome by prestressing, but only temporarily, since ageing will lead to the recurrence of this trouble and also to a loss of ductility and an increase in hardness. For this reason, material should be fabricated as promptly as possible and it is, in addition, customary to carry out a prestressing operation with approved equipment im-

mediately prior to fabrication. Since this process is considered the responsibility of the customer, any costs or charges for this operation are his.

The above comments do not apply to stabilized sheets which are guaranteed not to stretcher strain or strain age.

- 8. HEAT TREATMENT BY CUSTOMER.**—The manufacturer cannot assume responsibility for material behaving satisfactorily after any heat treatment which he has not approved.

When heat treatment is required for property development purposes, the manufacturer will guarantee the response of the material to his approved conditions.

9. BREAKAGE TOLERANCE — FABRICATION:

(a) **General Comment.**—Until the operations of any individual fabrication have been properly developed to produce suitable components for production runs, full absorption of breakage loss must be assumed by the customer.

(b) **Normal Breakage.**—It has long been the general practice for the customer to absorb breakage up to and including 3% of the sheets run, that is, the customer will absorb that percentage on established fabricating operations.

(c) **Special Breakage Tolerance.**—There are many applications where it is necessary for the manufacturer to be allowed more than 3% for breakage. After the blank size has been properly developed and the dies are approved for production and the processes are standardized, a special breakage tolerance shall be established on a minimum run of 500 units.

(d) **Basis for Computing Claims.**—Whenever breakage exceeds the normal breakage tolerance on any part, the manufacturer should be notified immediately and the run discontinued, or the responsibility shall rest with the customer. After inspection of the broken parts and the dies, the manufacturer shall decide whether the run is to continue or whether the material is to be withdrawn.

Percentage breakage is to be calculated on quantity production of a continuous run, which may cover a weekly or monthly period or be based on a minimum quantity of two tons or the whole order, whichever is the less.

The same tolerances which apply to breakage apply also to parts rejected as unusable for any other cause, with the exception that the manufacturer accepts all responsibility for laminated sheets.

- 10. SUB-STANDARD MATERIAL.**—The manufacturer will replace any unfabricated sheets which fail to meet the grade standards.

Rejections for such causes should be kept separate for inspection and the rejection or salvage of such material shall be subject to negotiation.

II. LIMITATION OF LIABILITY.—Should it be determined that material which has been fabricated is defective, it is not the responsibility of the manufacturer to assume any labour costs involved in the fabrication or handling of the defective sheets.

The customer should not proceed with the drawing, fabricating or pressing of the material if it is proving unsuitable and in this event the manufacturer should be notified immediately. After the latter has made an investigation and the material is found to be defective, it then becomes a matter of negotiation between the customer and the manufacturer as to what disposition is to be made of the material which has not yet been used and also to determine whether the material which has been used can be salvaged in the interests of both parties.

Footnote.—The above trade customs are designed to cover the purchase and handling of all products, and it will be obvious to readers that certain clauses apply to certain qualities only and where a clause obviously does not apply it should be ignored.



O R B

TRADE MARK

LYSAGHT EXPANDED METAL

Expanded Metal is used in almost every branch of engineering and building. It is made from sheet metal which, by slitting and expanding, without any waste of material, is converted into a network of diamond-shaped openings.

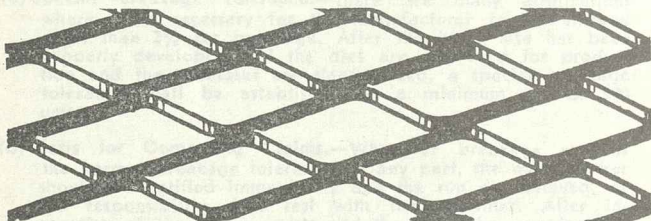
Unlike netting, Expanded Metal is not an interlacing of loose or separate pieces. The strands are all part of the parent metal, rigidly unified at their junctions.

Lysaght Expanded Metal is produced in three types:—

- (a) Metalath—for plastering work in the building trade.
- (b) Ornamesh—for industrial, decorative and general use where a high degree of accuracy and finish is required.
- (c) Gridmesh—produced from heavy steel plate for use on cat-walks, stair treads, etc.

Many ductile materials can be expanded, such as steel, aluminium, copper, brass and other alloys, but the chief material for Expanded Metal is Lysaght high-grade low carbon steel sheet.

Lysaght Metalath



LYSAGHT METALATH

Catalogue No.	Sheet sizes Width Length		No. Sheets per Bundle	Weight per Bundle
PL25, FL25 — For general plastering and wall til- ing (2.5 lbs./sq. yd.) ..	27"	8'	10 (20 sq. yds.)	50 lbs.
	27"	9'	10 (22½ sq. yds.)	56½ lbs.
PL34, FL34 — For light- weight fireproof con- struction (3.4 lbs./sq. yd.)	27"	8'	5 (10 sq. yds.)	34 lbs.
	27"	9'	5 (11¼ sq. yds.)	38½ lbs.

MATERIAL.— Steel coated with a rust inhibitor, or galvanized if specified. PL34 and FL34 have a painted yellow edge

Lysaght Metalath is most extensively used as a plaster lathing. Plaster should be applied in situ, without joints to mar the surface, on a background of Metalath. The most important requirement of the background is that it should provide an adequate key for the plaster.

In each square foot of Lysaght Metalath there are approximately 900 meshes, each forming a perfect "key" for the support and reinforcement of the rendering. The excellent "keying" property of Metalath is graphically portrayed in the accompanying illustration. Note how the rendering fills the openings and locks tightly around the tough steel strands, offering maximum resistance to shocks and stresses.

Two types of "Metalath" are available, "PL" and "FL." With the former type, auxiliary furring is necessary.

The "FL" type, however, has staggered perforations $\frac{3}{8}$ " deep which hold the body of the Metalath away from the studs, thus eliminating auxiliary furring.

For plastering purposes sheets should be fixed firmly to studs and noggings with $1\frac{1}{2}$ " flat-headed galvanized clouts spaced at 6" centres.

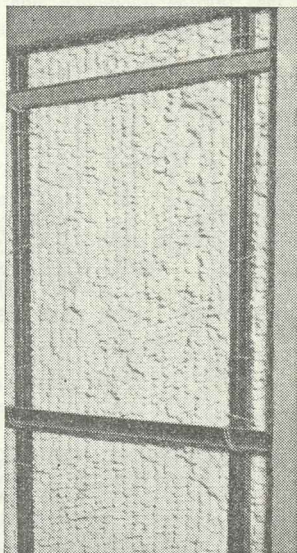
The long way of the mesh MUST be horizontal, and sheets should be fixed so that the strands all slope DOWNWARDS and

INWARDS. Sheets should not finish in a corner, but should be bent at right angles to finish at least 6" on adjoining surfaces. Laps should be not less than 1" on ends and $\frac{1}{2}$ " in sides, and all laps should be tied with 18G soft galvanized wire at 6" centres.

TIMBER-FRAMED CONSTRUCTION.—Metalath is used extensively as a background and reinforcement for wall tiles and for exterior stucco work.

Unless "FL" type Metalath is used in this type of construction, auxiliary furring is required. This generally consists of 8-gauge wire stapled to the faces of all studs and noggings. Alternatively, bottle tops may be used. These are nailed into position as the sheets of Metalath are being fitted.

PLASTER ENCASEMENT OF STEEL WORK.—Lysaght Metalath is used extensively for fire-proofing, both with concrete and light-weight plasters. Suspension channels, corner beads and other accessories are made for this type of construction, and also for lightweight solid and hollow acoustic partitions. Metalath is easily bent to suit ornamental plaster work.



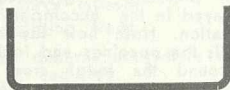
LYSAGHT COLD FORMED SECTIONS

Lysaght Cold Formed Sections are accurately formed from hot rolled steel strip into channels and angles of varying dimensions.

They provide lightweight high strength sections having many uses in the general fabrication field.

CHANNELS:

Cat. No.	Web (ins.)	Flange (ins.)	Gauge	Lin. ft. per Ton (Min.)
LC75	$\frac{3}{4}$ "	$\frac{1}{2}$ "	16	6180
LC100	1"	$\frac{1}{2}$ "	16	5270
LC150	$1\frac{1}{2}$ "	$\frac{1}{2}$ "	16	3710
LC200	2"	$\frac{1}{2}$ "	16	3100
LC225	$2\frac{1}{4}$ "	$\frac{1}{2}$ "	12	1460
LC250	$2\frac{1}{2}$ "	$\frac{1}{2}$ "	12	1460
LC375	$3\frac{3}{4}$ "	$\frac{1}{2}$ "	10	780
LC400	4"	$\frac{1}{2}$ "	10	780



LC 375

NOTE— LC225 will nest into LC250.
LC375 will nest into LC400.

TOLERANCES: LC75, LC100, LC150, LC200;

Web. $\pm \frac{1}{32}$ " Flange $\pm \frac{1}{16}$ " Length $\pm \frac{1}{0}$ "

LC225, LC250, LC375, LC400;

Web. $\pm \frac{1}{16}$ " Flange $\pm \frac{0}{8}$ " Length $\pm \frac{2}{0}$ "

STANDARD LENGTHS: LC75, LC100, LC150, LC200;

16ft. and 20ft. Coated with rust inhibitor unless ordered in hot rolled pickled finish.

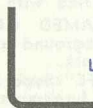
LC225, LC250, LC375, LC400;

20ft. Hot rolled pickled finish.

PACKING: LC150, LC200, } = 10 lengths per bundle.
LC 75, LC100, LC225, }
LC250, LC375, LC400, } = 20 lengths per bundle.

ANGLES:

Cat. No.	Leg (in.)	Lengths (in.)	Gauge I.S.W.G.	Lin. ft. per Ton (Min.)
LA125	$1\frac{1}{4}$ "	1"	12	3030
LA175	$1\frac{3}{4}$ "	$1\frac{1}{2}$ "	10	1590
LA200	2"	$1\frac{3}{8}$ "	10	1590



LA 175

TOLERANCES: Legs $\pm \frac{0}{8}$ " Lengths $\pm \frac{1}{0}$ "

STANDARD LENGTHS: 20ft. (Hot rolled finish).

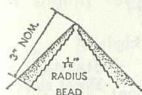
SPECIAL LENGTHS: Min. lots of 2 tons, any one size. 10ft. to 20ft. in 3" increments.

PACKING: 40 lengths per bundle.

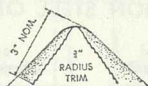
Lysaght Metalath Accessories

LYSAGHT CORNER BEAD

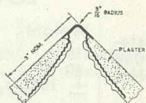
A die-straight bead with expanded wings 3" wide. Used in reinforcing the corners of columns, beams and masonry work. The expanded wings provide an excellent plaster key right up to the nose of the bead.



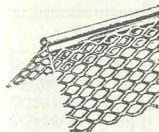
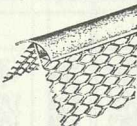
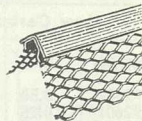
SB 30



BB 303



SQB 303



SB30 26G. Galvanized.

BB303 (20G. Zincanneal Trim)
(26G. Wing (Galvanized))

SBQ303 (20G. Zincanneal Trim)
(26G. Wing (Galvanized))

8', 9', 10' and 12'.
170 lbs./1000 lin. ft.
20 lengths per carton.
8', 9', 10' and 12'.
350 lbs./1000 lin. ft.
10 lengths per carton.
8', 9', 10' and 12'.
400 lbs./1000 lin. ft.
10 lengths per carton.



LYSAGHT BASE TRIM—BT250.—An accurately formed wall and partition Base Trim suitable for any type of wall requiring a flush plastered finish.

MATERIAL.—20G Zincanneal.

LENGTH.—10' only.

SIZE AND WEIGHT.—2½" x 5/8"—570 lb. per 1,000 l./ft.

PACKING.—10 pieces per package.

LYSAGHT BASE TRIM SPLICE PLATE—SP250.—Used to butt join Base Trims to provide an unbroken line.

LYSAGHT BASE TRIM CLIP—BC200.—A special galvanized wire clip for holding the Base Trim to the 3/4" channel studs.

LYSAGHT FLOOR RUNNER—FR100.—A steel channel suitable for 2" solid partitions with metal base trims.

LYSAGHT CASING BEAD—SC4, SC6, SC7.—A short-wing Casing Bead used as a plaster stop and trim around doors, windows and other openings.

LYSAGHT CEILING RUNNER—CR500, CR510, CR516.—A specially designed steel section for fastening to the ceiling in order to provide positive anchorage and alignment for 3/4" and 1½" channels.

LYSAGHT BEAM RUNNER—BR75, BR150.—A steel section similar in application to the Ceiling Runner. Attached to a beam, it holds the 3/4" and 1½" channels in alignment.

Lysaght Ornamesh

Lysaght Ornamesh is extensively used for industrial decorative and domestic purposes where a high degree of accuracy and finish is desired.

It is available in mesh and sheet sizes shown in the tables below.

LOW CARBON STEEL ORNAMEASH

Catalogue No.	Weight lbs. sq. ft. $\pm 10\%$	Nominal Size of Mesh		Gge.	Strand Width		Standard Sheet size
		SWM	LWM		Nom.	Actual	
Low Carbon Steel							
M2601	0.45	1/16" x 1/8"		26	1/64"	.020"	} 4' SWM x 1' LWM
P2602	0.50	1/8" x 1/4"		26	1/32"	.040"	
P2601	0.25	1/8" x 1/4"		26	1/64"	.020"	} 4' SWM x 2' LWM
Q2602	0.35	3/16" x 3/8"		26	1/32"	.040"	
Q2604	0.45	3/16" x 3/8"		26	1/16"	.060"	
R2305	0.65	5/16" x 1/2"		23	5/64"	.080"	
R2602	0.25	5/16" x 1/2"		26	1/32"	.040"	
S2302	0.35	1/4" x 5/8"		23	1/32"	.040"	
S2604	0.40	1/4" x 5/8"		26	1/16"	.060"	
T2302	0.25	3/8" x 13/16"		23	1/32"	.040"	
T2604	0.25	3/8" x 13/16"		26	1/16"	.060"	} 4' SWM x 3' or 4' LWM
A2203	0.80	1/8" x 7/16"		22	3/64"	.050"	
A2403	0.65	1/8" x 7/16"		24	3/64"	.050"	
A2602	0.45	1/8" x 7/16"		26	1/32"	.040"	
C1604	0.90	11/32" x 1-1/8"		16	1/16"	.060"	} 7' SWM x 3' or 4' LWM
C2004	0.55	11/32" x 1-1/8"		20	1/16"	.060"	
C2204	0.45	11/32" x 1-1/8"		22	1/16"	.060"	
D1606	0.65	5/8" x 1-1/2"		16	3/32"	.080"	} 9' 6" SWM x 3' or 4' LWM
D2006	0.40	5/8" x 1-1/2"		20	3/32"	.080"	
D2206	0.30	5/8" x 1-1/2"		22	3/32"	.080"	
F1408	0.80	7/8" x 2-1/4"		14	1/8"	.110"	
F1608	0.65	7/8" x 2-1/4"		16	1/8"	.110"	
G1012	1.30	1-3/8" x 3"		10	3/16"	.180"	
G1408	0.55	1-3/8" x 3"		14	1/8"	.120"	
G1606	0.35	1-3/8" x 3"		16	3/32"	.090"	
H1016	1.35	1-7/8" x 4-1/2"		10	1/4"	.250"	
H1410	0.50	1-7/8" x 4-1/2"		14	5/32"	.150"	
H1608	0.35	1-7/8" x 4-1/2"		16	1/8"	.120"	

SHEET TOLERANCES

Width: Plus $\frac{3}{4}$ ", minus 0".

Length: F, G, H, meshes plus 2", minus 0". All other meshes plus 1", minus 0".

TYPICAL USES.—Baskets, grilles, shelving, ornamental trim, screens, ventilators.

FINISH.—Oiled.

Flattened Steel Orname**sh**

Lysaght Flattened Steel Orname**sh** proves extremely satisfactory where a smooth, flat surface is required. After the steel sheet is expanded it is passed through pressure rolls which flatten the strands and bonds into the same plane. The gauge or thickness is slightly reduced without appreciably affecting the strength.

Catalogue No.	Weight lbs. sq. ft. $\pm 10\%$	Nominal Size of Mesh	Gge.	Strand Width		Standard Sheet size
		SWM LWM		Nom.	Actual	
Flattened Steel						
P2602/F	0.45	1/8" x 1/4"	26	1/32"	.044"	4' SWM x 2' LWM
P2601/F	0.25	1/8" x 1/4"	26	1/64"	.022"	
Q2602/F	0.30	3/16" x 3/8"	26	1/32"	.044"	
Q2604/F	0.40	3/16" x 3/8"	26	1/16"	.066"	
R2305/F	0.60	5/16" x 1/2"	23	5/64"	.088"	
R2602/F	0.20	5/16" x 1/2"	26	1/32"	.044"	
S2302/F	0.30	1/4" x 5/8"	23	1/32"	.044"	4' SWM x 3' or 4' LWM
S2604/F	0.35	1/4" x 5/8"	26	1/16"	.066"	
T2302/F	0.20	3/8" x 13/16"	23	1/32"	.044"	
A2203/F	0.70	1/8" x 7/16"	22	3/64"	.055"	
A2403/F	0.60	1/8" x 7/16"	24	3/64"	.055"	
A2602/F	0.40	1/8" x 7/16"	26	1/32"	.044"	
C1604/F	0.80	3/8" x 1-1/8"	16	1/16"	.066"	7' 6" SWM x 3' or 4' LWM
C2004/F	0.50	3/8" x 1-1/8"	20	1/16"	.066"	
C2204/F	0.40	3/8" x 1-1/8"	22	1/16"	.066"	
D1606/F	0.60	11/16" x 1-1/2"	16	3/32"	.099"	10' SWM x 3' or 4' LWM
D2006/F	0.35	11/16" x 1-1/2"	20	3/32"	.099"	
D2206/F	0.30	11/16" x 1-1/2"	22	3/32"	.099"	
F1408/F	0.75	1" x 2-1/4"	14	1/8"	.132"	10' SWM x 3' or 4' LWM
F1608/F	0.60	1" x 2-1/4"	16	1/8"	.132"	
G1408/F	0.50	1-1/2" x 3"	14	1/8"	.132"	
G1606/F	0.30	1-1/2" x 3"	16	3/32"	.099"	
H1410/F	0.45	2" x 4-1/2"	14	5/32"	.165"	
H1608/F	0.30	2" x 4-1/2"	16	1/8"	.132"	

SHEET TOLERANCES

Width: Plus $\frac{3}{4}$ ", minus 0".

Length: Some variation in sheet length may occur as a result of the flattening process. However, the standard lengths shown above will be the minimum length supplied.

TYPICAL APPLICATIONS.—Machinery guards, ironing boards, functional furniture, storage bins.

FINISH.—Oiled.

Aluminium Ornamesh

Catalogue No.	Weight lbs. sq. ft. $\pm 10\%$	Nominal Size of Mesh		Gge.	Strand Width		Standard Sheet size
		SWM	LWM		Nom.	Actual	
Aluminium							
MA2601	0.15	1/16" x 1/8"		26	1/64"	.020"	} 4' SWM x 1' LWM
PA2601	0.10	1/8" x 1/4"		26	1/64"	.020"	
PA2602	0.15	1/8" x 1/4"		26	1/32"	.040"	} 4' SWM x 2' LWM
QA2602	0.10	3/16" x 3/8"		26	1/32"	.040"	
QA2604	0.15	3/16" x 3/8"		26	1/16"	.060"	
RA2205	0.20	5/16" x 1/2"		22	5/64"	.080"	
RA2602	0.10	5/16" x 1/2"		26	1/32"	.040"	
SA2202	0.15	1/4" x 5/8"		22	1/32"	.040"	
SA2604	0.15	1/4" x 5/8"		26	1/16"	.060"	} 4' SWM x 3' or 4' LWM
TA2202	0.10	3/8" x 13/16"		22	1/32"	.040"	
TA2604	0.10	3/8" x 13/16"		26	1/16"	.060"	
AA2203	0.25	1/8" x 7/16"		22	3/64"	.050"	
AA2402	0.15	1/8" x 7/16"		24	1/32"	.040"	} 7' SWM x 3' or 4' LWM
CA1604	0.30	11/32" x 1-1/8"		16	1/16"	.060"	
CA2004	0.20	11/32" x 1-1/8"		20	1/16"	.060"	
CA2204	0.15	11/32" x 1-1/8"		22	1/16"	.060"	
DA1606	0.20	5/8" x 1-1/2"		16	3/32"	.080"	} 9' 6" SWM x 3' or 4' LWM
DA2006	0.15	5/8" x 1-1/2"		20	3/32"	.080"	
DA2206	0.10	5/8" x 1-1/2"		22	3/32"	.080"	
FA1608	0.20	7/8" x 2-1/4"		16	1/8"	.110"	
GA1012	0.45	1-3/8" x 3"		10	3/16"	.180"	
GA1606	0.10	1-3/8" x 3"		16	3/32"	.090"	
HA1016	0.45	1-7/8" x 4-1/2"		10	1/4"	.250"	
HA1608	0.10	1-7/8" x 4-1/2"		16	1/8"	.120"	

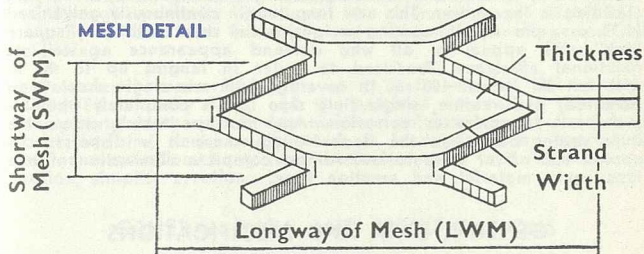
SHEET TOLERANCESWidth: Plus $\frac{3}{4}$ ", minus 0".

Length: F, G, H, meshes plus 2", minus 0". All other meshes plus 1", minus 0".

TYPICAL USES.—Electrical screening, radio and T.V. grilles, display stands, shop window displays, lampshades, room dividers.**NOTE.**—Lysaght Ornamesh can be provided also in copper, brass and stainless steel. Full details on application.

LYSAGHT GRIDMESH

Gridmesh is a light, yet strong, expanded steel walkway and grating mesh suited to many applications. The "GR" series are comparatively open general purpose meshes, whilst the "GM" series is recommended for heavy-duty applications or where a smaller mesh opening is desirable.



SPECIFICATIONS

Catalogue Number	Weight* (lb./sq. ft.)	Nominal Size of Mesh SWM x LWM	Material Thickness	Strand Width	Overall Thickness	Standard Sheet Sizes
GR300	3	1 1/4" x 5.33"	3/16"	0.31"	19/32"	10' 0" x 24", 30", 36" or 48"
GR400	4	1 1/4" x 5.33"	3/16"	0.44"	13/16"	7' 6" x 24", 30", 36" or 48"
GM450	4 1/4	0.97" x 3"	3/16"	0.30"	17/32"	6' 6" x 24", 30", 36" or 48"
GM575	5 1/4	1.15" x 3"	3/16"	0.44"	5/8"	10' 6" x 24", 30", 36" or 48"

*Non-galvanized (Black). **TOLERANCES:** Length: $\pm \frac{2}{8}"$ Width: $\pm \frac{3}{8}"$

SELECTION TABLE

Load	Span of Supports		
	24"	30"	36"
50 lbs./sq. ft. (Distributed) ..	GR300 GM450	GR300 GM450	GR400 GM575
100 lbs./sq. ft. (Distributed) ..	GR300 GM450	GR400 GM575	— —
250 lbs. @ 4 ft. centres (conc.) .	GR300 GM450	GR300 GM450	GR400 GM575

NOTE.—GR300 being lighter than GR400 is generally used for spans up to 24". Whilst it is safe for 30" spans, with a 50lbs./sq. ft. maximum distributed load or a 250 lbs. concentrated load at 4ft. centres, it is springy underfoot. Consequently light stiffening bars are customarily used under GR300 for spans in excess of 24".

FINISHES.—Galvanized and Black.

PACKING.—Bundles.

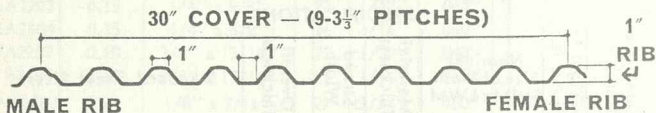
A range of "Gridmesh" Stair and Ladder Treads is also available.

SPANDEK

Galvanized Steel Cladding

Whether it is for a modern contemporary home or a new industrial or commercial building, Lysaght SPANDEK roof or wall cladding is the answer. This new long length continuously galvanized (1.75 ozs. per sq. ft. coating weight) steel sheet with the "square look" will appeal to all who demand appearance as well as functional efficiency. Produced to order in lengths up to 40 ft. with full 30" cover. 100 sq. ft. coverage with one single sheet. New patented, anti-weather, single flute side lap is completely weather-proof . . . minimises corrosion. Any moisture which enters the flute drains back into the deck trough where it is dispersed by normal run off or evaporation. Almost complete elimination of end laps saves material and erection time.

GENERAL DATA AND SPECIFICATIONS



MATERIAL.— .023" thick continuously galvanized steel sheet (1.75 ozs./sq. ft.).

WEIGHT.—1.2 lbs./sq. ft., 3.0 lbs./lin. ft.

LENGTHS.—6ft. to 40ft. cut to customer's order.

TOLERANCES.—Length $\pm \frac{1}{4}$ ". Width $\pm \frac{1}{8}$ ".

PACKING.—Approx. 1 ton packs. May vary to suit individual orders.

PURLIN SPACINGS.—Two or more Spans.—Recommended spacing 5' 6".

GIRT SPACINGS.—Recommended spacings.—Simple Spans 7' 0"; two or more spans 9' 0".

UNSUPPORTED OVERHANG.—Maximum permissible unsupported overhang is 1 ft.

ROOF PITCH.—Due to the long lengths available the pitch of a roof can be reduced to 3° (approx. 1" in 1' 6") PROVIDED only single lengths of Spandek are used from ridge to gutter and careful checks are made to ensure that the top faces of all purlins are lying in the one plane. When more than one length of SPANDEK is required, the roof pitch should be not less than 5°.

AVAILABILITY.—Obtainable through Galvanized Steel Merchants and Builders' Supply Houses factory cut to the lengths ordered.

TRIMDEK

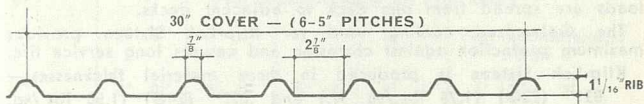
Galvanized Steel Cladding

Whether you choose high gable, low gable, skillion or butterfly style TRIMDEK galvanized steel roof deck is the obvious choice.

Although primarily developed for domestic use TRIMDEK is equally suitable for industrial and commercial roofing and wall cladding.

Produced to order in lengths up to 30 ft. with full 30" coverage, TRIMDEK is easily fixed, and the patented single flute side lap is completely weatherproof. Any moisture which enters the flute drains back into the deck trough where it is dispersed by normal run off or evaporation. Long lengths eliminate end laps, minimise corrosion, simplify erection.

GENERAL DATA AND SPECIFICATIONS



MATERIAL.— $.020''$ thick continuously galvanized steel sheet (1.75 ozs./sq. ft.).

WEIGHT.—1.0 lbs./sq. ft., 2.5 lbs./lin. ft.

LENGTHS.—6ft. to 30ft. Cut to customer's order.

TOLERANCES.—Length $\pm \frac{1}{4}''$. Width $\pm \frac{1}{8}''$.

PACKING.—Approx. 1 ton packs. May vary for individual orders.

PURLIN SPACINGS.—Two or more spans—3' 0".

GIRT SPACINGS.—Single Spans 5' 6". Two or more spans 7' 6".

UNSUPPORTED OVERHANG.—Maximum permissible unsupported overhang is 8".

ROOF PITCH.—Due to the long lengths available, the pitch of a roof can be reduced to 3° , (Approx. 1" to 1' 6") PROVIDED only single lengths of TRIMDEK are used from ridge to gutter and careful checks are made to ensure that the top faces of all purlins are lying in the one plane. Where more than one length of Trimdek is required, the roof pitch should be 5° or more.

WHERE TO BUY.—"Trimdek" is obtainable through Galvanized Steel Merchants and Builders' Supply Houses cut to the lengths ordered.

STEEL DECKING

Lightweight fireproof building construction is rapidly becoming an integral part of modern building methods.

Steel Decking is used extensively in this type of construction.

John Lysaght (Australia) Limited, who manufacture a wide range of decks for roofing, flooring and wall cladding would be pleased to advise on matters relating to the use of Steel decking in lightweight building construction.

KLIP-LOK "SIXTEEN" STEEL DECK

Australian Patent (222,046).

Other Australian and Overseas Patents Granted or Pending.

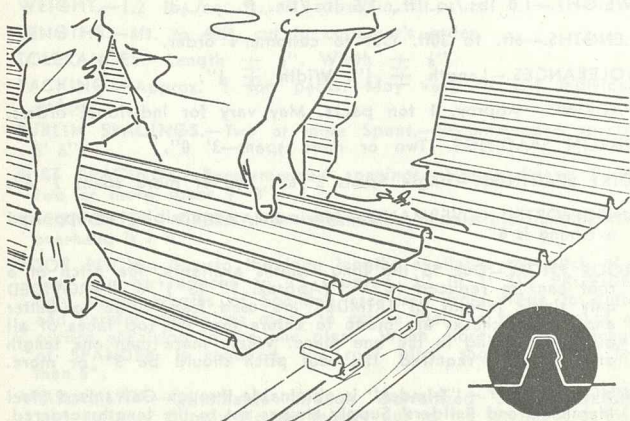
Klip-Lok Sixteen Roof and Wall Cladding is roll-formed from heavily coated (1.75 oz. per sq. ft.) continuously galvanized coiled strip. Each panel has three ribs at 8" centres giving an effective cover of 16". When fixed, the side ribs of adjacent decks are completely waterproof and interlock along their entire length. They are positively joined without additional fastening. Concentrated loads are spread from one deck to adjacent decks.

The Galvanized coating used for Klip-Lok Sixteen provides maximum protection against corrosion and ensures long service life.

Klip-Lok Sixteen is produced in three material thicknesses:—

.031" (22G) (1.75 lbs./sq. ft.) and .027" (24G) (1.50 lbs./sq. ft.)—For universal application.

.023" (26G) (1.20 lbs./sq. ft.)—For domestic and similar types of roofing and walling.



APPLICATIONS.— Klip-Lok Sixteen is used for all types of buildings and is especially suitable for near-flat roofs. Long lengths enable many structures to be covered with single lengths of deck thereby eliminating end laps.

INSTALLATION.— Klip-Lok is generally fixed "Ribs Up" for roofing and "Ribs-Out" for walling.

The maximum purlin and girt spacings are shown in the tables below.

ROOF PURLINS — MAXIMUM SPACINGS

Roof Slope Degrees	.031" Galv. Steel		.027" Galv. Steel		.023" Galv. Steel	
	1 or 2 Spans	3 or More Spans	1 or 2 Spans	3 or More Spans	1 or 2 Spans	3 or More Spans
0°	Not recommended for Flat Roofs					
1°	5' 6"	7' 6"	4' 3"	5' 9"	Not recommended below 2°	
2°	6' 0"	8' 0"	4' 8"	6' 3"	1' 10"	2' 6"
3°	6' 2"	8' 3"	4' 10"	6' 6"	2' 0"	2' 9"
5°	6' 6"	8' 9"	5' 0"	6' 9"	2' 3"	3' 0"
7° and Steeper	6' 9"	9' 0"	5' 3"	7' 0"	2' 3"	3' 0"

End spans of three or more span systems should be as for one or two spans condition.

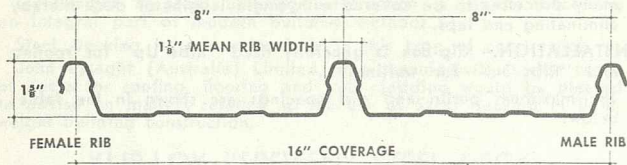
WALL GIRTS — MAXIMUM SPACINGS *

.031" Galv. Steel	.027" Galv. Steel	.023" Galv. Steel
10' 0"	9' 0"	5' 0"

* Based on a wind loading of 20 lbs./sq. ft.

SECRET FIXING STRAP.—A Galvanized Steel Fixing Strap is available for Fixing Klip-Lok Sixteen to steel or timber purlins and girts. This "secret" fixing method ensures positive fixing without puncturing the deck in any way, thereby ensuring complete watertightness. Alternatively, Klip-Lok Sixteen may be bolted to steel or screwed to timber structures.

KLIP-LOK PROFILE .031" THICKNESS



GENERAL DATA.—

.031" and .027" Decks:

Weight—.031"—1.75 lbs./sq. ft.

.027"—1.50 lbs./sq. ft.

Lengths—4 ft. to 50 ft. Cut to customer's order.

.023" Decks:

Weight—1.20 lbs./sq. ft.

Lengths—4 ft. to 36 ft. Cut to customer's order.

TOLERANCES.—Length $\pm \frac{1}{4}$ ", Width $\pm \frac{1}{16}$ ".

PACKING.—20 decks per bundle — May vary for individual orders.

DELIVERY CONDITIONS.—Supplied and delivered to site (City Areas all Capital Cities) cut to the lengths ordered.



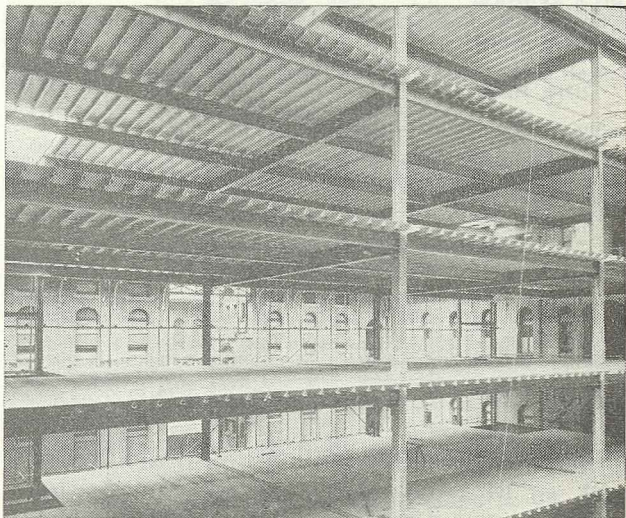
TRADE MARK

TRI-LOK STEEL DECK

Australian Patent (223,584)

Lysaght Tri-Lok Steel Deck System is a lightweight building construction system, the performance of which can be calculated by means of simple engineering principles. The result is a parallel system of strong structural interlocking members predictable in performance.

The unique design provides strength, economy, and durability. Tri-Lok Deck system is suitable for floors, roofs, walls, partitions, awnings, facings, ceilings, and numerous other applications, including combinations with Metalath and Accessories and open truss work. Tri-Lok units are fabricated from high-strength galvanized steel.

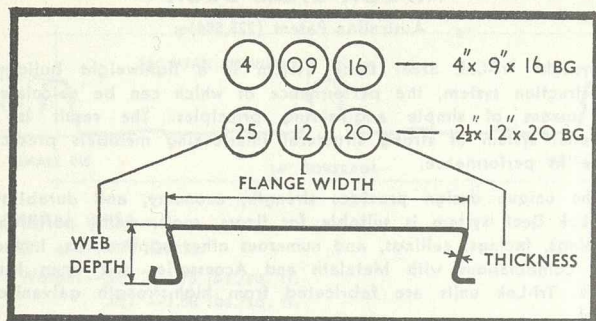


The illustration above shows Tri-Lok Steel Decks being placed in position.

MAXIMUM LENGTHS.— Galvanized finish, 25 ft.

JOHN LYSAGHT (Australia) LIMITED

The following diagram illustrates the system used in cataloguing Tri-Lok Decks.



DECK RANGE.—

Floor Decks: Catalogue Nos. 61216, 51516, 40916, 40918, 30916, 31216, 30918.

Roof Decks: Catalogue Nos. 40920, 31218, 30920, 31220, 251220, 21218, 21220.

Any of the above may be used for wall cladding.

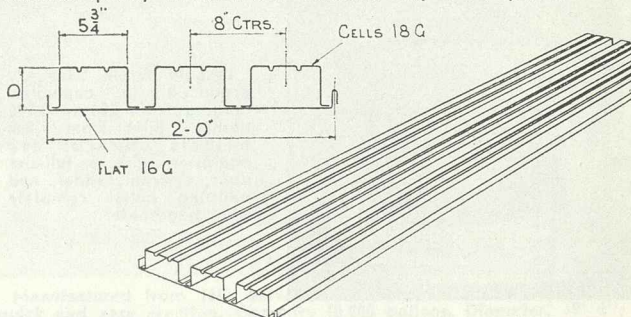
ACCESSORIES.—A range of starter and closer panels is available for use with Tri-Lok Steel Deck. Illustrations of the various types are shown below:—

TABLE OF STARTER AND CLOSER PANELS
TOP FLANGE WIDTHS

Tri-Lok Series	Type "LF"	Type "ML"	Type "SL"	Type "MS"	Type "SF"
612	10½"	9¾" to 12"	20"	21½"	20"
515	13¾"	9" to 15"	21¾"	23"	21½"
409	7½"	7" to 9"	14"	15½"	14"
312	10¾"	6" to 12"	15¾"	17"	15½"
309	7¾"	6" to 9"	12¾"	14"	12½"
2512	11"	6" to 12"	15"	16"	15"
212	11¼"	5" to 12"	14¼"	15¼"	14¼"

CELDEK STEEL DECK

A lightweight high-strength galvanized steel cellular type floor deck which provides complete electrical availability for high and low potential circuits, telephone, intercommunication or signal services throughout the entire floor area. Floor outlet fittings can be installed quickly wherever and whenever they are required.



LENGTHS.—8' to 20' in 1/4" increments.

TOLERANCE.—Length, + 1/16", - 3/16".

CELDEK PROPERTY TABLE

ALL PROPERTIES PER 1-FT. WIDTH OF DECK

CATALOGUE NUMBER	Overall Depth D in.	Assembled Weight lb./ft. ²	Coeff. of Strength Cs	Modulus of Section in. ³	Coeff. of Deflection (1/360) Cd.	Moment of Inertia in. ⁴	Max. Shear Load lb.	End Bearing	
								1" Landing lb.	Increment per 1" lb.
3/200-C18/F16	2 1/8"	6.34	16,220	1.014	57,900	1.325	3,470	970	400
3/350-C18/F16	3 5/8"	7.13	32,050	2.003	194,600	4.453	6,150	890	310
3/450-C18/F16	4 5/8"	7.65	43,830	2.740	335,700	7.682	5,230	840	250

The above properties are based on the 1962 Edition of the "Specifications for the Design of Light Gage Cold Formed Steel Structural Members".

For Simple Spans and Distributed Loading the following Formulae apply:

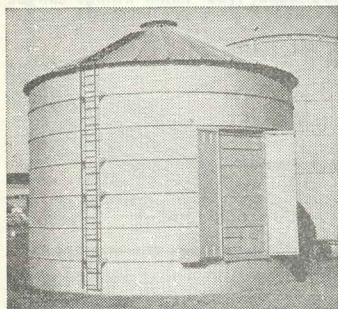
Per 1' width of deck, where Wt. = Total Distributed Load
 $\text{Lb./Ft.}^2 - W \text{ (live)} = \text{Live Load Lb./Ft.}^2$; $L = \text{Span of Deck Ft.}$;

$\text{Wt.} = Cs \div L^2$; $W \text{ (live)} \text{ (For } \frac{L}{360} \text{ Deflection)} = Cd \div L^3$.

ADVISORY SERVICE.—Our Engineering Advisory Service is available to architects, engineers and builders for advice on design and specification data. Enquiries should be directed to the Branch Office of John Lysaght (Australia) Limited in your State.

Lysaght Prefabricated Rural Products

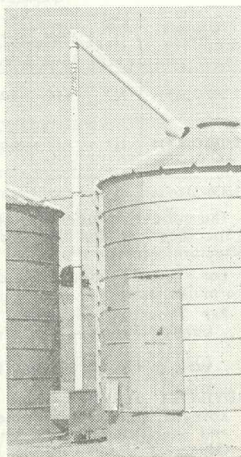
GRAIN SILOS (Patent pending)



Lysaght Grain Silos are produced in capacities ranging from 200 to 3,700 bushels. Silos from 1,200 bushels upwards are equipped with a full-size door, external ladder, and bagging outlet complete with bag-holder.

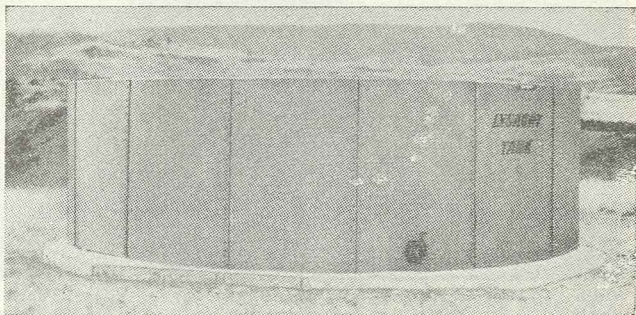
LYSAGHT VERTICAL GRAIN AUGER

There is a Lysaght Vertical Grain Auger to suit all Lysaght Silos in the 1,200 to 3,700 bushel size range. Easily operated by flat belt drive from tractor. Available in three popular sizes — 21 ft., 26 ft., 31 ft. Supplied pre-fabricated in easy-to-assemble form. Designed to fill Silo at centre of roof, enabling maximum capacity to be obtained.



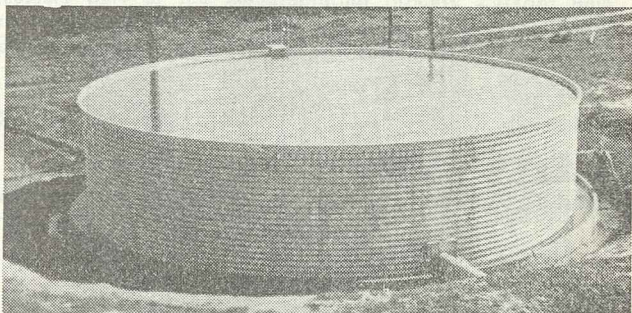
JOHN LYSAGHT (Australia) LIMITED

LARGE CAPACITY WATER TANK FLAT PLATE



Manufactured from 16G galvanized steel plate and designed for quick and easy erection. Capacity 10,000 gallons. Diameter, 19' 6"; height, 5' 10 $\frac{1}{4}$ ". Optional extra—22G steel floor.

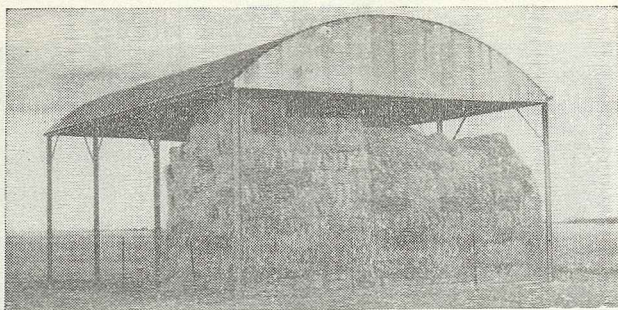
LARGE CAPACITY WATER TANKS CORRUGATED



Large-capacity Water Tanks of heavy gauge galvanized curved sheets are manufactured in four standard sizes:—25,000, 50,000, 75,000 and 100,000 gallons.

For further details and agents' names write to John Lysaght (Australia) Limited—Offices in all Capital Cities and Newcastle Works.

LYSAGHT HAY SHED

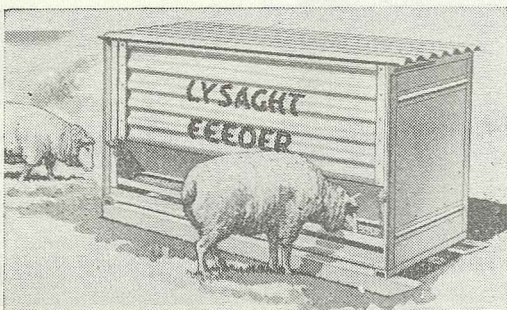


Width	30 feet	Overall height	22 feet
Length	45 feet	Capacity	4,680 bales
Height to eaves ..	16 feet		

Structural steel frame fully braced. Supplied complete with pre-curved galvanized steel roof, end gable sheeting, and all fixing accessories.

Optional extras available:—Guttering and downpiping.

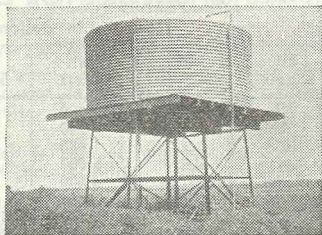
LYSAGHT SHEEP SELF FEEDER



50-bushels capacity. Total trough length 16'—8' each side. Full opening hinged lid. Adjustable swinging troughs. Sturdy skid base for towing.

For further details and agents' names write to John Lysaght (Australia) Limited—Offices in all Capital Cities and Newcastle Works.

LYSAGHT ORB CORRUGATED STEEL SHEETS FOR TANK-MAKING



In Australia to-day many millions of gallons of water are safely stored in tanks made from Lysaght Blue Orb Corrugated Galvanized Steel Sheet. Ranging in size from the familiar 500-gallon householder tank to giants capable of holding 100,000 gallons, they have proved themselves the most economical and efficient means of storing water available to the country dweller.

In industry, where supplies of "soft" rain water are a necessary part of the manufacturing process, Lysaght Blue Orb Galvanized Steel Sheet provides adequate storage facilities at low cost extended over many years.

CAPACITY OF TANKS — CALCULATIONS

SQUARE OR RECTANGULAR SECTION.—All dimensions in feet:—

length x breadth x depth x $6\frac{1}{4}$ = capacity in gallons.

CIRCULAR.—Capacity in gallons given by the following rules:—

A. Capacity = $\frac{\pi}{4}$ x (diameter)² x height x $6\frac{1}{4}$.

B. Capacity = Multiply circumference by itself and by half the height — C^2 x $h/2$.

C. Capacity = Multiply diameter by itself and by five times the height — D^2 x $5h$.

Example.—Diameter 6ft., height 6ft.

$6 \times 6 \times 30\text{ft.} = 1,080$ gals. approximately.

Capacity of Corrugated Galvanized Sheet Tanks

WALL SHEETS ALL OF ONE SIZE FOR EACH TANK

Height of Tank	No. of Sheets to the Tank Perimeter	Capacity in Gallons				
		8ft. Sheets	9ft. Sheets	10ft. Sheets	11ft. Sheets	12ft. Sheets
4' or Two Rings	1	—	—	180	220	270
	2	470	600	740	910	1,080
	3	1,060	1,350	1,680	2,050	3,450
	4	1,900	2,400	3,000	3,600	4,300
	5	3,000	3,700	4,600	5,500	6,600
	6	4,200	5,200	6,500	7,900	9,500
	7	5,500	7,000	10,900	10,300	12,400
	8	7,200	9,200	12,400	13,400	16,200
6' or Three Rings	4	2,800	3,600	4,500	5,300	6,300
	5	4,400	5,400	6,700	8,200	9,900
	6	6,100	7,800	9,700	11,300	13,600
	7	8,200	10,000	12,500	15,400	18,600
	8	10,000	13,000	16,400	20,100	24,300
	9	12,700	16,500	20,800	25,500	30,700
	10	15,700	20,400	25,600	31,500	37,900
	11	19,100	24,700	31,000	38,100	45,900
8' or Four Rings	12	22,700	29,400	36,900	45,400	54,600
	4	—	—	5,700	7,000	8,400
	5	5,600	7,200	9,000	10,500	12,600
	6	8,100	9,800	12,300	15,100	18,200
	7	10,300	13,300	16,700	20,600	24,800
	8	13,400	17,400	21,900	26,900	32,400
	9	18,200	22,000	27,700	34,000	41,000
	10	21,000	27,200	34,200	42,000	50,600
	11	25,400	32,900	41,400	50,800	61,200
	12	30,200	39,200	49,300	60,500	72,900

The above allows sheet end lap of—

4" for tanks up to 5,000 gallons.

6" for tanks from 5,000 gallons to 10,000 gallons.

9" for tanks over 10,000 gallons.

GAUGE OF WALL SHEETS

Maximum diameters allowable

Height of Tank in ft.	Gauge					
	24	22	20	18	16	14
	ft.	ft.	ft.	ft.	ft.	ft.
4	30	38	48	60	75	90
6	20	25	32	40	50	60
8	15	18	24	30	36	42

CORRUGATED GALVANIZED STEEL TANKS

RECOMMENDATIONS

1. Use only Lysaght Blue Orb Galvanized Sheet.
2. Curve sheets gently and gradually. Severe changes in curvature on each pass and rapid speeds tend to force the zinc coating off the sheets. Curving rolls should be smoothly dressed, aligned, etc.
3. Tanks intended for use as rainwater tanks should be treated with TECT-A-TANK before filling. Tanks intended for the storage of underground or river waters should be painted inside with zinc dust/zinc oxide paint containing 12lb. of zinc dust per gallon. Fuller details of these treatments are provided in Advisory Service Leaflets No. H-19 Galvanized Water Tanks, No. A1-18.1 Painting of Galvanized Steel Sheets.
4. All tanks should be fed individually from the supply, and not by connecting one tank to another. If tanks are connected to a common main, then cocks must be provided between each tank and the main to prevent inter-tank flow of water.
5. Provide strainers to prevent contamination by leaves, etc.
6. Provide ample ventilation in the case of covered tops.
7. Where practicable, install in shade.
8. In case of early failure of tank, advise the nearest office of John Lysaght (Australia) Limited, because renewal in the same form may give a repetition of the first experience. In very few cases has early failure been entirely due to any fault in the galvanized sheet.
9. If it is suspected that the water to be stored is corrosive to galvanized steel sheet, send a sample of about two pints to the nearest office of John Lysaght (Australia) Limited, together with all relevant information. When sampling water, use perfectly clean vessels and stoppers, and rinse each one several times with the water being sampled before finally filling. The water will be analysed, and a report made to the user stating any recommendations and/or precautions.

CURVING ROLLS

Experience indicates that a better and more even grip of the sheets is obtained if the flutes of the roll are slightly shallower than the flutes of the sheet. The reason for this is that the standard $\frac{3}{4}$ " depth of corrugations includes twice the thickness of metal in the sheet. As curving is applied principally to 24G, the recommended depth of flute for the curving rolls is 11/16" bare (actually 43/64").

Corr. Galv. Steel Tanks in Common Use

Capacity of Tank Gallons	Height	Dia- meter	Walls 8/3" Corrugations Orb Sheets			Bottom & Roof Widths of 6' Sheets Q.H.	
			No.	Length	Gauge	Bottom 24G	Roof 26G
100	2' 0"	3' 2"	1	10' 0"	24	1-24"	1-24"
200	4' 0"	3' 2"	2	10' 0"	24	1-24"	1-24"
300	6' 0"	3' 2"	3	10' 0"	24	1-24"	1-24"
300 Squat	4' 0"	4' 0"	2	6' 0"	24	1-36"	1-36"
			2	7' 0"	24		
400	6' 0"	3' 8"	6	6' 0"	24	1-36"	1-36"
400 Squat	4' 0"	4' 4"	4	7' 0"	24	1-36"	1-36"
500	6' 0"	4' 0"	3	6' 0"	24	1-36"	1-36"
			3	7' 0"	24		
500 Squat	4' 0"	4' 11"	4	8' 0"	24	2-30"	2-30"
600	6' 0"	4' 4"	6	7' 0"	24	1-36"	1-36"
600 Squat	4' 0"	5' 3"	2	8' 0"	24	1-36"	1-36"
			2	9' 0"	24	1-30"	1-30"
800	6' 0"	5' 0"	6	8' 0"	24	1-36"	1-36"
					24	1-30"	1-30"
800 Squat	4' 0"	6' 3"	4	10' 0"	24	1-30"	1-30"
					24	2-24"	2-24"
1,000 Small	6' 0"	5' 7"	6	9' 0"	24	2-36"	2-36"
1,000 Full	6' 0"	5' 11"	3	9' 0"	24	2-36"	2-36"
			3	10' 0"	24		
1,000 Squat	4' 0"	6' 11"	4	11' 0"	24	1-36"	1-36"
						2-30"	2-30"
1,000 Squat	4' 0"	7' 4"	6	8' 0"	24	3-36"	3-36"
1,200	6' 0"	6' 3"	6	10' 0"	24	1-30"	1-30"
						2-24"	2-24"
1,500	6' 0"	7' 1"	3	7' 0"	24	2-30"	2-30"
			6	8' 0"	24	1-36"	1-36"
2,000	6' 0"	8' 3"	9	9' 0"	24	3-36"	3-36"
						1-30"	1-30"
3,000	6' 0"	10' 0"	3	9' 0"	24	6-36"	6-36"
			9	8' 0"	24		
4,000	6' 0"	11' 6"	6	10' 0"	24		
			6	9' 0"	24	7-36"	7-36"
5,000	6' 0"	13' 0"	9	9' 0"	24		
			6	8' 0"	24	9-36"	9-36"
						36" wide	*
10,000	6' 0"	18' 0"	18	10' 0"	22	17-22G	
15,000	6' 0"	22' 6"	12	10' 0"	22	26-22G	
			12	9' 0"			
20,000	6' 0"	25' 6"	15	10' 0"	22	32-22G	
				9' 0"			
30,000	6' 0"	32' 6"	33	10' 0"	20	50-20G	

*Above 2,000 gallons only 36"-wide sheets are considered.

As tanks of 10,000 gallons capacity and above are not usually provided with tops, no material is included in this data for same.

Lysaght TECT-A-TANK

Makes Tanks Last Longer —

Another Lysaght Achievement

As a result of years of research in the field of corrosion, Lysaght's have now produced a product which greatly increases the life of new galvanized steel tanks used for the storage of rain water. This product, known as Tect-A-Tank, has proved far superior to any previously known means of protection. Field trials have proved its value. It is particularly effective in areas subject to heavy down-pours where, due to the high purity of the water, it has been common in the past for a proportion of early failures to occur in untreated tanks. Its use is limited to new tanks, and the treatment is not suitable for bore, well or river waters.

Tect-A-Tank consists of a mixture of specially developed crystals packed in hygienic plastic tubes of two lengths, suitable for use in either tall or squat tanks. Each tube will treat any tank up to 1,500 gallons. For larger tanks an additional tube is used for each 1,000 gallons increase in capacity. Tect-A-Tank is easy to use. The tube is simply hung in the new tank before it starts to fill with rain water.

The crystals commence their work immediately any water enters the tank, and dissolve completely in six to nine months, forming a microscopic protective film on the interior, the effect of which will last for the life of the tank. Because of the design of the tube, full protection is afforded to the whole of the tank, whether filling takes place at once or in stages over a lengthy period. One application of Tect-A-Tank is sufficient to obtain a long tank life. The empty tube may be removed if desired, but is not harmful if left in the tank. Tect-A-Tank dissolved in rain water is harmless for drinking purposes, has no taste or odour, and does not affect the hardness of the water.

Fuller technical details on Tect-A-Tank are provided in Advisory Service Leaflet N-19 on Galvanized Water Tanks which is obtainable on application to John Lysaght (Australia) Limited, Branch Offices.

Tect-A-Tank is available from plumbers and hardware stores. If unobtainable locally, communicate with the offices of John Lysaght (Australia) Limited in the capital cities.

MISCELLANEOUS DATA

- 1 Cubic foot of distilled water at 62°F. weighs 62.321 lb. For all practical purposes, 62.5 lb.
- 1 Gallon of water weighs 10 lb.
- 1 Cubic foot = $6\frac{1}{4}$ gallons.
- 8 Gallons = 1 bushel. 1 Bag = 3 bushels.
- 1 Bushel is equivalent to 1.28 cubic feet of space.
- 1 Bushel of wheat weighs approximately 60 lb.
- 1 Bushel of oats weighs 40 lb.

ELECTRICAL STAMPINGS . .

for all requirements

SANKEY DIVISION OF JOHN LYSAGHT (Australia) LIMITED

GENERAL.—Sankey Division is associated with a world-wide organisation who for many years have specialised in the manufacture of stampings for the electrical industry. The Newcastle plant is one of the largest in the Southern Hemisphere capable of producing a great variety of stampings.

Electrical laminations are produced from a comprehensive range of special Australian silicon steels rolled and processed in Newcastle by John Lysaght (Australia) Limited. Details of these steels are shown on page 67.

ELECTRIC MOTORS.—The essential core of an electric motor is built up of a large number of thin stampings or laminations to form a stator and a rotor. Sankeys manufacture laminations for motors of 100 h.p. or more.

Most of these laminations are manufactured to customers' particular designs, but tools are also held in stock to produce a range of standard blank sizes, in which case slot details are supplied by the customer.

RADIO AND TELEVISION.—In every radio set there is at least one small transformer; in television sets there are several. These small transformers are relatively simple, consisting mainly of a stack of laminations in the form of E's and I's.

Sankey Division manufactures a large range of standard sizes of E and I laminations from $\frac{1}{4}$ " to 3" centre limb width.

LIGHTING.—Modern fluorescent lighting operates on a very low voltage, which necessitates the use of a special type of transformer called a ballast. The standard E-shape lamination is produced by Sankeys for this purpose, as well as other special shapes to customers' designs.

WOUND CORES.—In keeping with modern technological trends, Sankey Division offers a wide range of Wound Transformer Cores, mainly in the form of C Cores and Toroids. These are usually wound from grain-oriented silicon steel and, after being heat treated and impregnated, are cut and finished or lapped to provide two matched halves to fine limits of precision.

Enquiries are welcomed for the supply of small or large quantities of stampings, either from Sankey Division's standard range or to your own particular design. In the latter case, detailed and dimensioned drawings will facilitate quotation.

Please address your enquiries to John Lysaght (Australia) Limited, SANKEY DIVISION, Post Office, Newcastle, or to John Lysaght (Australia) Limited in all capital cities.

Fixing of Corrugated Galvanized Steel Sheets

GENERAL.—Of all building materials in common use, Lysaght Corrugated Galvanized Steel Sheet is one of the most popular, being adaptable for roofs, side walls, and vertical sheeting of all descriptions.

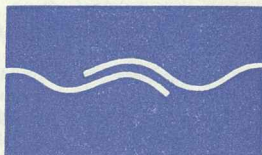
As is well known, corrugated steel sheet is produced in three pitches of corrugations, 5", 3", and 1", sometimes referred to as ripple iron. 3" pitch is that in most common use, and is produced in two widths, 8 x 3" and 10 x 3" corrugations.

When a corrugated sheet is placed flat and observed, it will be found that there are a number of crests and hollows. If these are counted there will be found to be more of one than the other. If there are more crests than hollows, then the sheet is the "right way" up. This side of the sheet should be bearing Lysaght's brand.

SIDE LAPS.—Sheets are said to be lapped one corrugation when both sheets are laid the right way up, and, as illustrated, the crest of one sheet fits over the crest of the other sheet. This lap is used for covering walls, or for roofs in dry areas.

Sheets are said to be lapped one and a half corrugations when sheets are laid with every second one up-side down, and with one crest and one hollow of each sheet matched. This is the standard lap for roofs. It is only used for wall sheeting where special protection from driving rain is required.

Sheets are said to be lapped two corrugations when two crests and one hollow of each sheet are matched, both sheets being the right way up. This is only required for special roof protection, e.g., low-pitched roofs such as awnings and lean-to's. The following table shows details of sheet sizes and coverages for the various side laps. In the following paragraphs we shall confine our remarks to the application of 3" corrugation steel sheet.



1 Corrug. Side Lap



1 1/2 Corrs. Side Lap



2 Corrs. Side Lap

COVERAGE

	8 x 3" Corr.	10 x 3" Corr.
Overall width of sheet	2' 1 1/2"	2' 7 1/2"
One corrugation lap	2' 0"	2' 6"
One and a half corrugations lap ..	1' 10 1/2"	2' 4 1/2"
Two corrugations lap	1' 9"	2' 3"

For estimating the number of sheets required for one side of a pitched roof, it is usual to divide the length of roof to be covered by the width of the corrugated sheet used, allowing the appropriate deduction for the side lap required—e.g., using 10 x 3" corrugations sheet, side lap one corrugation, length of roof 50'. Then number of sheets required = 20 —i.e., $50 \div 2.5$. It is usual to add one sheet for wastage, making a total of 21.

PITCH OF ROOFS.—Corrugated steel sheets are suitable for pitches down to 5° , though a slope greater than 1 in 4 is preferred in snow country. For most Australian conditions slopes 1 in 4 and less are more pleasing to the eye.

END LAPS.—For pitches steeper than 1 in 4 use 6" end lap minimum; for pitches less than 1 in 4 use 9" end lap.

SIDING.—For siding use one corrugation side lap and 4" end lap.

FIXING OF SHEETS.—Sheets are fixed as follows:—

1. Roof sheets should be fixed through the top of every second corrugation at ends of sheets and every third corrugation at intermediate fixings.
2. Wall sheets should be fixed through the top of every third corrugation at end fixings and every fourth corrugation at intermediate fixings.
3. Where sheets span more than 3' 0" between battens or purlins, it is advisable to fix the side lap at an intermediate point with a self-tapping screw or gutter bolt.

Following are details of the various nails, screws, etc., used for fixing corrugated sheeting.

GALVANIZED ROOFING NAILS.—Galvanized roofing nails are manufactured in lengths of 2" and $2\frac{1}{4}$ ". They are normally purchased by the cwt. from manufacturers, but may be purchased by the pound in small quantities. For estimating purposes it may be assumed that a 1-lb. packet of $2\frac{1}{4}$ " contains 100 nails, and that approx. 70 nails or 1 lb. of nails are required for one square of roofing. Galvanized roofing nails are the most suitable for fixing roofing sheets to hardwood roof timbers.

GALVANIZED TWISTED-SHANK ROOFING NAILS.—Galvanized twisted-shank roofing nails are similar to the standard roofing nail, with the exception that the shank has been twisted in order to obtain a better grip in the timber roof members. They are manufactured in lengths of 2" and $2\frac{1}{4}$ ", and are normally used where the roof timbers are oregon or cypress. These nails are purchased by the cwt. from the manufacturers, but can be obtained from local hardware stores in 1-lb. lots. Approximately 70 $2\frac{1}{4}$ " roofing nails weigh 1 lb.

GALVANIZED ROOFING SCREWS.—Galvanized roofing screws are normally used in the softer roofing timbers such as oregon and cypress. Screws should be used in conjunction with lead or diamond galvanized sheet steel washers. For estimating purposes 70 screws and washers are required per 100 sq. ft. of roof area. $1\frac{3}{4}$ " screws can be used, though 2" are normal for 3" corrugations sheet.

$2\frac{1}{4}$ " and $2\frac{1}{2}$ " are required for 5" corrugations sheet.

$1\frac{3}{4}$ "—56 screws per lb., or $1\frac{1}{4}$ lb. per square of roofing.

2"—50 screws per lb., or 1.4 lb. per square of roofing.

Though lead washers may be used alone, it is preferable that they be accompanied by a steel washer.

An impregnated paper washer should be used in conjunction with diamond metal washers.

Lead washers are bought approximately 64 per lb.

VALLEY FASTENING WITH SELF-TAPPING SCREWS.—Cadmium-plated self-tapping screws with an integral neoprene seal are now available for valley fixing (Nettlefolds Art. No. 9028) of roofing and walling to steel purlins and girts.

Where purlin spacing exceeds 3' 0", side lap fastenings should be employed (Nettlefolds Art. No. 9032) midway between supports.

For estimating purposes an average of 40 valley screws and 18 lap screws per square are required.

GALVANIZED HOOK BOLTS.—Galvanized hook bolts are used in a variety of shapes to fix corrugated steel sheet to steel structural members. These are available in length from 4" to 6", width from $2\frac{1}{4}$ " to $\frac{3}{8}$ ". For estimating purposes it may be assumed that half a gross of bolts are required for each square of roofing. Hook bolts should be ordered 2" longer than the width of purlin or rafter with which they are to be used, and to have a minimum thread of $1\frac{1}{2}$ ".

When fixing, both edges of the sheet should be secured first to prevent the sheet spreading or becoming fan-shaped, which trouble may become more pronounced as the job progresses.

When sheeting roofs or walls, the sheets of iron should be fixed in threes, the two outer sheets placed either under or over the middle sheet for one and a half corrugations; the building will then be quite proof against rain or wind.

PAINTING.—For painting recommendations see Page 144.

RIDGING

To ensure the correct finish to the ridge of a roof, it is necessary to provide ridge capping, which may be either of the Standard or Ventilating type.

STANDARD RIDGE CAPPING (See Fig. 1).—Standard Ridge Capping (Ridge Capping with Roll) should be formed to the pattern as shown in Australian Standard Specification No. SPR3-1931. It will be found, however, that manufacturers in the various States may depart slightly from the standard pattern, but, in the main, the variation will be slight. When ordering various sizes of Ridge Capping, it should be noted that the size referred to is the width of the flat sheet from which the ridging is formed. The most popular sizes are 14" to 18", the 18" being used mainly for domestic construction, 14" to 16" being used for small sheds such as country farm structures.

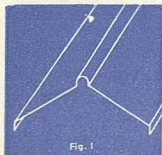


Fig. 1

Standard Ridge Capping should be of 24G Queen's Head Galvanized Steel Sheet or Zinc-anneal sheet, formed from the required width of sheet in 6' or 8' lengths—Fig. 1.

All Ridge Capping shall be securely fixed in conjunction with the roofing sheets with galvanized screws and lead washers or specially twisted galvanized roofing nails pierced through the top of every second corrugation and dressed well down into the corrugations.

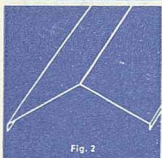


Fig. 2

PLAIN RIDGE CAPPING (See Fig. 2).—The plumber makes his own ridging, and normally forms it as a plain Ridge Capping without roll, as in Figure 2. This is prepared in lengths of 6' or 8' from 24G Queen's Head or Zinc-anneal flat sheet, and is applied to the roof in a similar manner as Standard Ridge Capping.

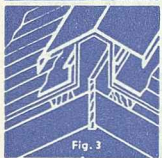


Fig. 3

VENTILATING RIDGES.—Where it is necessary to obtain the maximum amount of ventilation in a building, it will be found that the application of a Ventilating Ridge will provide the requisite flow of air. Where it is desired to bird-proof ventilating ridges, $\frac{1}{2}$ " galvanized wire mesh should be soldered to underside of Ridge Capping, taken down behind flashing, and either soldered to flashing or fixed to roof batten—Figs. 3 and 4.

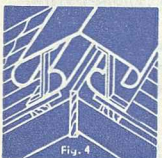


Fig. 4

EAVES GUTTERS OR SPOUTING

The chief types of Eaves Gutters (alternatively called spouting) are as illustrated. With few exceptions, common practice is to use the standard quadrant type (Fig. 1). Though the shape of this is set out in Australian Standard Specification SPRI3-1931, a number of manufacturers still fabricate quadrant guttering (or spouting) to their own particular pattern. Where replacements have to be made of small lengths of guttering to old buildings, then the material is formed to a pattern conforming to the existing installation.

STANDARD EAVES GUTTERS (OR SPOUTING).—

Eaves gutters of the type and size selected should be formed from 24G Queen's Head Galvanized or Zincanneal R.L. flat sheet in 6' or 8' lengths, fixed in position with required falls to outlets; lapped, double riveted, and soldered at joints. Cut gutters to receive thimble connection of downpipes and properly solder at these junctions.

EAVES GUTTERS FIXING.—Eaves gutters can be fixed to the eaves with a variety of straps or brackets according to the method of fixing and type of bracket or gutter selected.

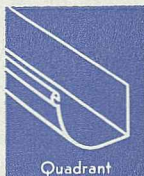
Brackets can be fixed:—

- (a) To fascia boards with galvanized nails.
- (b) To rafters with galvanized nails.
- (c) In all-steel constructions to corrugated roofing sheets with galvanized bolts, nuts, and washers.

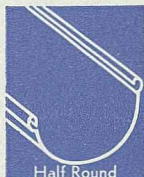
Brackets are formed from 16G galvanized strip and fastened over or on to the guttering.

In general, straps are bent over the lip of the gutter. To support the gutters against heavy snow or leaf loads, handling of gutters when cleaning, etc., an overstrap can be provided to fasten on to the rafters. Constructions exist using a distance tube and spike, or in which the bracket is riveted or attached by a nut and washer to the guttering.

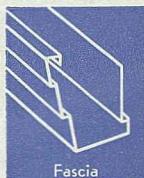
SIZE OF GUTTERS. — The size of the gutter necessary will depend upon the size and number of downpipes necessary to carry away the maximum rainfall from any given roof. The size of the gutter should be such that the entry of the downpipe will fit snugly into the bottom of the gutter, and will not project up the outer face. Galvanized crimp wire gratings must be provided at all downpipe outlets.



Quadrant



Half Round



Fascia



Valley

DOWNPIPES

GENERAL.—Downpipes are formed from 24G Queen's Head Galvanized or Zinanneal R.L. flat sheets in 6' or 8' lengths. The longitudinal joint may be formed with a $\frac{3}{8}$ " seamed joint, or alternatively lapped $\frac{1}{4}$ " and soldered.

TYPES.—Downpipes may be of round or rectangular section. The normal range of round downpipes is from 2"-6" dia., 3" being the usual size for cottage construction, 4" for farm sheds, while 5" and 6" sizes are generally confined to factory buildings.

The downpipes may be formed from tapered strips, so that one end is slightly larger than the other, to allow lengths of downpipes to be fitted together, or alternatively one end of the pipe can be crimped.

ROUND

RECTANGULAR

Dia. inches	Area sq. in.	Roof area drained sq. ft.	Area of building roofed sq. ft.	Size of Piping inches	Area sq. in.	Roof area drained sq. ft.	Area of building roofed sq. ft.
2"	3.14	314	304	3" x 2"	6	600	582
2½"	4.9	490	475	4" x 2"	8	800	775
3"	7.07	707	686	4" x 3"	12	1,200	1,165
4"	12.56	1,256	1,218	4" x 4"	16	1,600	1,555
5"	19.63	1,963	1,905	5" x 4"	20	2,000	1,940
6"	28.27	2,827	2,742	6" x 4"	24	2,400	2,315

SIZE OF DOWNPIPES.—For every 100 square feet of actual roof area drained, 1 sq. inch of downpipe is required, whether round or square. This calculation is based on the assumption that the maximum rainfall does not exceed 5" per hour.

It is considered the best practice to drain to different points, using smaller downpipes, rather than to one large outlet. Where possible, downpipes should be spaced at not more than 40' centres.

FIXING OF DOWNPIPES.—Downpipes may be secured:—

1. To weatherboards with 16G galvanized or Zinanneal straps.
2. To brickwork joints with galvanized steel wall hooks, one to each length of downpipe, or with 16G iron straps fixed to wall blocks with galvanized screws and washers.

For additional holding capacity 16G galvanized steel straps can be soldered to the downpipe and fixed to the downpipe together with a self-tapping screw through the middle of the bracket.

3. To corrugated iron wall siding sheets with 16G straps bolted to the sheet with a pair of 3/16" galvanized gutter bolts and washers.

Downpipes should be blocked out 1" clear of all walls and painted prior to fixing.

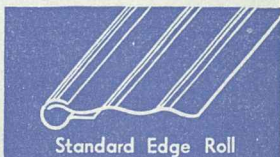
When buildings are erected on the boundary of a street alignment, the lower length of downpipe should be of cast iron, and chased into the outside face of the building for a minimum length of 6 feet.

SOLDERING.—Downpipes are fitted so that the lower length fits outside the upper length some 1½"-2". Joints are sweated and soldered.

Finishes — Edge Rolls — Barge Boards

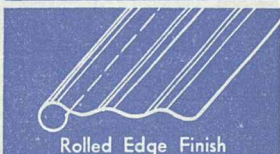
STANDARD EDGE ROLL:

To ensure a perfect finish to the end of a corrugated sheet roof, an EDGE ROLL should be used. This may be obtained through any merchant.



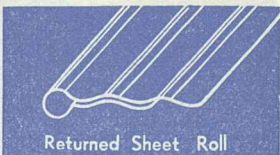
ROLLED EDGE FINISH:

Where an EDGE ROLL is unavailable, a suitable finish may be formed by rolling the last corrugation of a sheet around a pipe of suitable diameter.



RETURNED SHEET ROLL:

Where portion of a sheet remains after the roof has been fixed, the simplest edge finish is to return the corrugated sheet upon itself, as shown, to form a returned sheet roll.



BARGE FINISH:

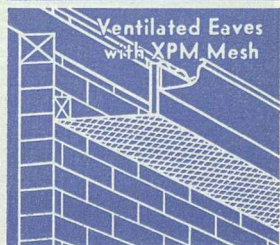
A barge finish which may be preferred to an edge roll is a one-piece moulding formed from 24G. Flat Sheet as illustrated.



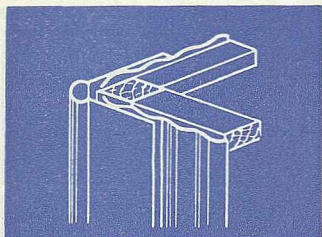
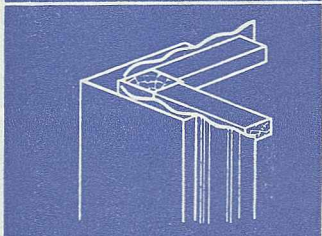
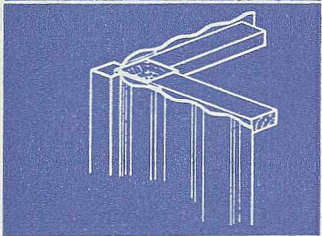
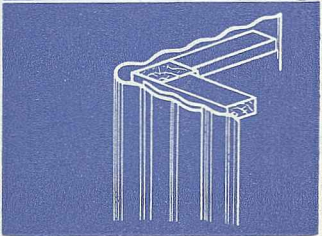
VENTILATED EAVES SOFFIT:

Where desired a ventilated eaves soffit may be formed from a galvanized or painted Expanded Metal Mesh.

The Expanded Metal Mesh should be cut into strips and fixed to supporting eaves timbers in a similar manner as to standard eaves linings.



STANDARD CORNER FINISHES



Walls of Corrugated Galvanized Steel Sheet fixed vertically may be finished at the corners in a variety of ways, as shown in the illustration.

STANDARD RIDGING. - When using standard or plain ridging, sheeting need not completely cover the side of the buildings, but may be one or two corrugations short of the length of the building, so that the capping laps over the corrugated sheet at least 3".

PLAIN RIDGING. - Plain ridging may be fixed in a similar manner to standard ridging.

SPECIAL CORNER MOULDS. - Special corner finish mouldings may be constructed from 24G Galvanized sheets in 6' or 8' lengths. These are fastened to the corner posts in conjunction with corrugated sheets by galvanized roofing nails or screws and washers.

RETURN SHEET. - Sheets can be corner finished by taking one corrugated sheet round the corner and over the adjacent sheet to give a minimum of one and a half corrugations side lap.

ROOF DRAINAGE OF CORRUGATED GALVANIZED STEEL ROOFS

The following tables show calculated sizes of box gutters and downpipes necessary to provide efficient run-off of rain water.

The figures given in these tables are based on the assumption that the distance between downpipes does not exceed 40', and that box gutters are laid with a maximum fall of 1" in 30' and a minimum fall of 1" in 60'.

The roof area drained is the product of the distance between downpipes (40') and the length of the roof slope (gutter to ridge).

ROOF DRAINAGE DETAILS FOR MAXIMUM RAINFALL INTENSITY OF 5" PER HOUR

Roof area Drained (sq. ft.)	Downpipes Area (sq. in.)	Diameter (inches)	Box Gutter Size (inches) Width x Depth
400	4	2½"	5" x 3½"
800	8	3½"	6½" x 4½"
1,200	12	4"	8" x 5"
1,600	16	4½"	9" x 5½"
2,000	20	5"	9½" x 6"
2,400	24	5½"	10" x 6½"
2,800	28	6"	10½" x 7"
3,200	32	6½"	11" x 7½"
3,600	36	7"	12" x 7½"
4,000	40	7½"	12" x 8"

RAINFALL INTENSITY OF 18" PER HOUR

Roof area Drained (sq. ft.)	Downpipes Area (sq. in.)	Diameter (inches)	Box Gutter Size (inches) Width x Depth
400	14.4	4½"	9" x 5"
800	28.8	6"	11" x 7"
1,200	43.2	7½"	12" x 8½"
1,600	57.6	8½"	14" x 9"
2,000	72	9½"	16" x 9½"
2,400	86.4	10½"	17" x 10"
2,800	100.8	11½"	18" x 11"
3,200	115.2	12"	19" x 11½"
3,600	129.6	13"	19½" x 12"
4,000	144	13½"	20" x 12½"

VARIATION OF ROOF AREA WITH SLOPE

Classification	Incline		Inclined area per sq. ft. horizontal area	Percentage increase in area over flat roof
	In. per ft. horizontal	Angle with horizontal		
Flat roofs	$\frac{1}{8}$	0° 36'	1.000	0.0
	$\frac{1}{4}$	1° 12'	1.000	0.0
	$\frac{3}{8}$	1° 47'	1.000	0.0
	$\frac{1}{2}$	2° 23'	1.001	0.1
	$\frac{5}{8}$	2° 59'	1.001	0.1
	$\frac{3}{4}$	3° 35'	1.002	0.2
	1	4° 46'	1.003	0.3
	$1\frac{1}{8}$	5° 21'	1.004	0.4
	$1\frac{1}{4}$	5° 57'	1.005	0.5
	$1\frac{1}{2}$	7° 08'	1.008	0.8
	$1\frac{3}{4}$	8° 18'	1.011	1.1
Steep roofs	2	9° 28'	1.014	1.4
	$2\frac{1}{4}$	10° 37'	1.017	1.7
	$2\frac{1}{2}$	11° 46'	1.021	2.1
	$2\frac{3}{4}$	12° 54'	1.026	2.6
	3	14° 02'	1.031	3.1
	$3\frac{1}{4}$	15° 09'	1.036	3.6
	$3\frac{1}{2}$	16° 16'	1.042	4.2
	$3\frac{3}{4}$	17° 21'	1.048	4.8
	4	18° 26'	1.054	5.4
	$4\frac{1}{4}$	19° 30'	1.061	6.1
	$4\frac{1}{2}$	20° 34'	1.068	6.8
	5	22° 37'	1.083	8.3
	6	26° 34'	1.118	11.8
	7	30° 16'	1.158	15.8
	8	33° 42'	1.202	20.2
	9	36° 52'	1.250	25.0
	10	39° 48'	1.302	30.2
	11	42° 31'	1.356	35.6
	12	45° 00'	1.414	41.4
Extra steep roofs	14	49° 24'	1.537	53.7
	16	53° 08'	1.667	66.7
	18	56° 19'	1.803	80.3
	20	59° 02'	1.943	94.3
	22	61° 23'	2.088	108.8
	24	63° 26'	2.235	123.5

BUILDING FRAMES — TIMBERS AND SIZES

(C.S.I.R.O. Pamphlet No. 112)

(Class I Construction)

RAFTERS FOR SHEET ROOFING — SUPPORTED AT ENDS ONLY

Recommended Sizes for Strength Groups — Inches

Spacing in.	Length ft.	A and B		C		D	
		Standard Grade	Common Grade	Standard Grade	Common Grade	Standard Grade	Common Grade
18	7	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 1½	4 x 1½
	8	3 x 1½	3 x 1½	3 x 1½	3 x 2	3 x 2	4 x 2
	9	3 x 2	3 x 2	4 x 1½	4 x 1½	4 x 1½	4 x 2
	10	4 x 1½	4 x 1½	4 x 1½	4 x 2	4 x 2	5 x 2
	11	4 x 1½	4 x 2	5 x 1½	5 x 1½	5 x 1½	5 x 2
	12	5 x 1½	5 x 1½	5 x 1½	5 x 1½	5 x 2	6 x 2
24	6	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 1½	4 x 1½
	7	3 x 1½	3 x 1½	3 x 1½	3 x 2	3 x 1½	4 x 2
	8	3 x 1½	3 x 2	3 x 2	4 x 1½	4 x 1½	4 x 2
	9	4 x 1½	4 x 1½	4 x 1½	4 x 2	4 x 1½	5 x 2
	10	4 x 1½	4 x 2	4 x 2	5 x 1½	5 x 1½	5 x 2
	11	4 x 2	5 x 1½	5 x 1½	5 x 2	5 x 1½	6 x 2
	12	5 x 1½	5 x 2	5 x 2	5 x 2	6 x 2	—
30	5	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 2
	6	3 x 1½	3 x 1½	3 x 1½	3 x 2	3 x 1½	4 x 1½
	7	3 x 1½	3 x 2	3 x 1½	4 x 1½	3 x 2	4 x 2
	8	3 x 2	4 x 1½	4 x 1½	4 x 2	4 x 1½	5 x 2
	9	4 x 1½	4 x 2	4 x 1½	5 x 1½	4 x 2	5 x 2
	10	4 x 1½	5 x 1½	4 x 2	5 x 2	5 x 1½	6 x 2
	11	5 x 1½	5 x 2	5 x 1½	6 x 2	5 x 2	—
	12	5 x 1½	5 x 2	5 x 2	6 x 2	6 x 2	—
36	5	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 1½	4 x 1½
	6	3 x 1½	3 x 2	3 x 1½	3 x 2	3 x 2	4 x 2
	7	3 x 1½	4 x 1½	3 x 1½	4 x 1½	4 x 1½	5 x 1½
	8	3 x 2	4 x 2	4 x 1½	4 x 2	4 x 2	5 x 2
	9	4 x 1½	5 x 1½	4 x 1½	5 x 2	5 x 1½	6 x 2
	10	4 x 2	5 x 2	5 x 1½	6 x 2	5 x 2	—
	11	5 x 1½	6 x 2	5 x 1½	6 x 2	5 x 2	—
	12	5 x 2	6 x 2	6 x 2	6 x 2	6 x 2	—
42	4	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 2
	5	3 x 1½	3 x 1½	3 x 1½	3 x 2	3 x 1½	4 x 1½
	6	3 x 1½	3 x 2	3 x 1½	4 x 1½	3 x 2	4 x 2
	7	3 x 1½	4 x 1½	3 x 2	4 x 2	4 x 1½	5 x 2
	8	4 x 1½	4 x 2	4 x 1½	5 x 1½	4 x 2	6 x 2
	9	4 x 1½	5 x 1½	4 x 2	5 x 2	5 x 1½	6 x 2
	10	4 x 2	5 x 2	5 x 1½	6 x 2	5 x 2	—
	11	5 x 1½	6 x 2	5 x 2	6 x 2	6 x 2	—
	12	5 x 2	6 x 2	6 x 2	—	6 x 2	—
48	4	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 1½	3 x 2
	5	3 x 1½	3 x 1½	3 x 1½	3 x 2	3 x 1½	4 x 2
	6	3 x 1½	4 x 1½	3 x 1½	4 x 1½	4 x 1½	5 x 1½
	7	3 x 1½	4 x 2	3 x 2	4 x 2	4 x 2	5 x 2
	8	4 x 1½	5 x 1½	4 x 1½	5 x 2	5 x 1½	6 x 2
	9	4 x 1½	5 x 2	4 x 2	6 x 2	5 x 2	—
	10	5 x 1½	6 x 2	5 x 1½	6 x 2	6 x 2	—
	11	5 x 1½	6 x 2	5 x 2	—	6 x 2	—
	12	6 x 2	—	6 x 2	—	7 x 2	—

BUILDING FRAMES — TIMBERS AND SIZES

(C.S.I.R.O. Pamphlet No. 112)

(Class I Construction)

PURLINS FOR SHEET ROOFING — SUPPORTED AT ENDS ONLY

Recommended Sizes for Strength Groups — Inches

Spacing in.	Length ft.	A and B		C		D	
		Standard Grade	Common Grade	Standard Grade	Common Grade	Standard Grade	Common Grade
30	10	4 x 1½	5 x 1½	5 x 1½	5 x 2	5 x 1½	6 x 2
	11	5 x 1½	5 x 2	5 x 1½	6 x 2	5 x 2	6 x 3
	12	5 x 1½	5 x 2	5 x 2	6 x 2	6 x 2	6 x 3
	13	6 x 2	6 x 2	6 x 2	6 x 3	6 x 2	—
	14	6 x 2	6 x 2	6 x 2	6 x 3	6 x 3	—
	15	6 x 2	6 x 3	6 x 3	6 x 3	7 x 3	—
	16	6 x 3	—	7 x 3	—	7 x 3	—
	17	7 x 3	—	8 x 3	—	8 x 3	—
	18	8 x 3	—	8 x 3	—	8 x 3	—
	19	8 x 3	—	9 x 3	—	9 x 3	—
	20	9 x 3	—	9 x 3	—	10 x 3	—
36	10	4 x 2	5 x 2	5 x 1½	6 x 2	5 x 2	6 x 3
	11	5 x 1½	6 x 2	5 x 1½	6 x 2	5 x 2	6 x 3
	12	5 x 2	6 x 2	6 x 2	6 x 3	6 x 2	6 x 3
	13	6 x 2	6 x 2	6 x 2	6 x 3	6 x 2	—
	14	6 x 2	6 x 3	6 x 3	6 x 3	6 x 3	—
	15	6 x 3	6 x 3	7 x 3	—	7 x 3	—
	16	7 x 3	—	7 x 3	—	8 x 3	—
	17	7 x 3	—	8 x 3	—	8 x 3	—
	18	8 x 3	—	8 x 3	—	9 x 3	—
	19	8 x 3	—	9 x 3	—	9 x 3	—
	20	9 x 3	—	10 x 3	—	10 x 3	—
42	10	5 x 1½	5 x 2	5 x 1½	6 x 2	5 x 2	6 x 3
	11	5 x 1½	6 x 2	5 x 2	6 x 3	6 x 2	6 x 3
	12	5 x 2	6 x 2	6 x 2	6 x 3	6 x 2	—
	13	6 x 2	6 x 3	6 x 2	6 x 3	6 x 3	—
	14	6 x 2	6 x 3	6 x 3	—	7 x 3	—
	15	6 x 3	—	7 x 3	—	7 x 3	—
	16	7 x 3	—	7 x 3	—	8 x 3	—
	17	7 x 3	—	8 x 3	—	8 x 3	—
	18	8 x 3	—	9 x 3	—	9 x 3	—
	19	8 x 3	—	9 x 3	—	9 x 3	—
	20	9 x 3	—	10 x 3	—	10 x 3	—
48	10	5 x 1½	6 x 2	5 x 1½	6 x 2	6 x 2	6 x 3
	11	5 x 1½	6 x 2	5 x 2	6 x 3	6 x 2	—
	12	6 x 2	6 x 3	6 x 2	6 x 3	6 x 3	—
	13	6 x 2	6 x 3	6 x 3	—	6 x 3	—
	14	6 x 3	6 x 3	7 x 3	—	7 x 3	—
	15	7 x 3	—	7 x 3	—	7 x 3	—
	16	7 x 3	—	8 x 3	—	8 x 3	—
	17	8 x 3	—	8 x 3	—	8 x 3	—
	18	8 x 3	—	9 x 3	—	9 x 3	—
	19	9 x 3	—	9 x 3	—	10 x 3	—
	20	9 x 3	—	10 x 3	—	10 x 3	—

SAWN TIMBER SECTIONS

RECOMMENDED SIZES

ALL MEMBERS (Class I Construction)

Use	Size in inches
Sole Plates	12 x 6 x 1½ or 9 x 9 x 1½
Stumps	4 x 4 or 5 x 3
Wall Plates (top and bottom)	4 x 2
Bearers	4 x 3 up to 5' x 5' spacing 5 x 3 up to 6' x 6' spacing
Floor Joists	4 x 2 18" centres up to 6' span
Flooring	9/16" T and G or ¾" end-matched Groups A, B and C; joists up to 18" spacing ¾" T and G, Group D or other pines; joists up to 18" spacing 13/16" T and G, Group D or other pines; joists up to 21" spacing ¾" T and G, Groups A, B and C; joists up to 24" spacing
Studs — up to 24 in. spacing	3 x 2 or 4 x 1½ for Groups A, B and C 4 x 2 for Group D 2 x 1
Braces	See Page 107
Rafters	See Page 108
Purlins	
Roofing Battens	
Tiles	1½ x 1 rafters up to 18" spacing 2 x 1 rafters up to 24" spacing 2 x 1½ rafters up to 30" spacing 2 x 1½ for Groups A, B and C 3 x 1½ for Group D
Sheet Roofing	4 x 3 3 x 1½ for Groups A, B and C 4 x 1½ for Group D
Under Purlins	4 x 3
Collar Ties	3 x 1½ for Groups A, B and C 4 x 1½ for Group D
Struts	4 x 3
Ridges, Valleys, Hips	7 x 1 or to suit rafters
Verandah Plates —	
Tiles	6 x 2 for Groups A, B and C 8 x 2½ for Group D
Sheet Roofing	5 x 2 for Groups A, B and C 6 x 2½ for Group D

- (1) Durable timbers only.
- (2) Where buildings are a considerable height above the ground as in parts of Queensland and Northern Territory, it is the usual practice to use round stumps about 9 inches in diameter.
- (3) Common grade unsuitable.
- (4) Freedom from sapwood, if prone to attack by Lyctus borers, is essential.
- (5) Battens must be of the highest quality.
- (6) For complete information obtain C.S.I.R.O. pamphlet No. 112 (Building Frames: Timbers and Sizes).

Table of Thermal Conductivities of Building Materials

Material	Description	Density lb. per cu. ft.	Con- duc- tivity K.	Res't'ce R for Thick- ness listed or 1"
Air Space:	Horizontal $\frac{3}{4}$ "-4"	—	—	0.82
	Vertical $\frac{3}{4}$ "-4"	—	—	0.92
Air Surfaces:	Still—Horizontal	—	—	0.61
	Vertical	—	—	0.68
	15 m.p.h. H. or V.	—	—	0.17
Building Boards:	Gypsum Board $\frac{3}{8}$ "	58	1.39	0.27
	Plywood $\frac{1}{4}$ "	34	—	0.31
Flooring Materials:	Carpet and U/felt	—	—	2.08
	Ceramic Tile 1"	—	—	0.08
	Lino $\frac{1}{8}$ "	—	—	0.05
	Plastic Tile $\frac{1}{8}$ "	110	6.25	0.02
	Terrazzo 1"	—	—	0.08
	Hardwood $\frac{3}{4}$ "	—	—	0.68
Insulating Materials:	Mineral Wool (Glass, Slag or Rock)	2.0-5.0	0.30	3.33
	Glass Fibre	9.5	0.25	4.00
	Cane Fibre Tile $\frac{3}{4}$ "	10.5	—	3.16
	Esterfoam	1.62	0.29	3.45
	Asbestos Fibre (Spray) ..	6.0	0.32	3.13
Roof Insulation: (For use above deck):	Cane Fibre $\frac{1}{2}$ "	16.0	0.35	1.39
	Cane Fibre 1"	16.0	0.35	2.78
	Cane Fibre 2"	16.0	0.35	5.26
Concretes:	Gypsum Mortar	116	5.00	0.20
	L.W. Aggregates	120	5.20	0.19
	Including:			
	Shale	100	3.60	0.28
	Slate, Slag	80	2.50	0.40
	Pearlite	60	1.70	0.59
	Vermiculite and Cellu- lar Concretes	40	1.15	0.86
	Sand, Gravel + Stone ..	140	12.0	0.08
Brick:	Common	120	5.00	0.20
	Face	130	9.00	0.11
Plaster:	Cement + Sand $\frac{1}{2}$ "	116	5.0	0.10
	Gypsum + Sand $\frac{1}{2}$ " ..	105	—	0.09
Woods:	Hardwoods	45	1.10	0.91
	Softwoods	32	0.80	1.25

HEAT TRANSMISSION THROUGH BUILDINGS

Heat transfer through buildings depends on the thermal conductivity of the components which form the enclosing units of that building.

Thermal Conductivity, K , is the time rate of heat flow through a given homogeneous material, and is expressed in B.t.u./hr./sq. ft. °F./1" thickness.

The overall coefficient of heat transmission, U , is the time rate of heat flow from air to air through the various materials used to construct walls, roofs or floors. U is expressed in B.t.u./hr./sq. ft./°F.

The Thermal Resistance, R , is the reciprocal of the overall coefficient, U , for a particular construction. Thus resistances are additive, i.e., $R_{\text{Total}} = R_1 + R_2 + \dots + R_n$, where $R_1, R_2, \dots, R_n$ are the individual resistances of the components.

EFFECT OF ROOFING ON INTERNAL TEMPERATURES

The rate of heat-flow through the roofing membrane depends on its thermal conductivity and its thickness. Heat flows through a 24-gauge galvanized steel roofing sheet 1,500 times and 1,000 times more rapidly than through a terra cotta tile $\frac{1}{2}$ " thick, and only one-quarter as fast as through an aluminium sheet of the same thickness. This fact, as shown later, has very little bearing on the thermal resistance of a roof.

From the underside of the roofing membrane, heat is transferred to the cooler interior of the building by three processes:—

- (i) **Conduction:** Heat is transferred to the roof frame and thence to the remainder of the structure through the purlins or battens. Only a very small quantity of heat is transferred in this manner.
- (ii) **Convection:** Heat is transferred to cool air in contact with the underside of the roof. This heated air circulates throughout the inside of the structure and, in turn, heats surfaces at cooler temperatures.
- (iii) **Radiation:** Heat radiates from the hot roof to cooler surfaces below.

The rate of heat-flow by convection and radiation from the underside of the roof is reduced to a very small proportion of its rate of flow through the roofing material by the surface air film between the sheet and the surrounding air. This rate of flow through this surface film is constant, being independent of the roofing material.

G.K.N. — LYSAGHT PTY. LTD.

Sales Divisions:

MILLS SCAFFOLDS

WILLIAMS FORM HARDWARE

UNISTRUT

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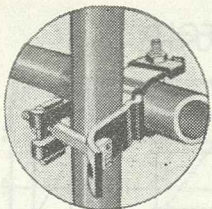
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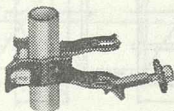


MILLS

TUBULAR SCAFFOLDING

MILLS Tubular Scaffolding is erected with steel or aluminium tube and patented scaffold fittings.

MILLS Fittings are made from hardened and tempered spring steel, with galvanized bolts and nuts. They are subject to severe tests during manufacture, and are proved capable of carrying loads far in excess of normal practice.

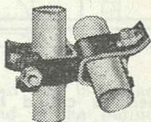
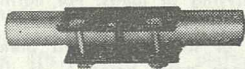


NINETY-DEGREE CLIP

The standard connection for crossing tubes at right angles and the main load-bearing fitting.

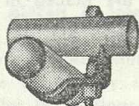
SWIVEL CLIP

The fitting used for connecting tubes at any angle other than 90°, and also for forming lap joints in tubes subject to tensional stress.



END-TO-END COUPLER

Used for joining tubes end to end, where subject to compression, or little or no tensional stress.



PUTLOG CLIP

Used for light connections at right angles where the load is fully carried by structural members: e.g., for fastening putlog tubes to ledgers.



BASE PLATE

To carry the bases of columns in all cases where distribution of the load is required.



REVEAL PIN

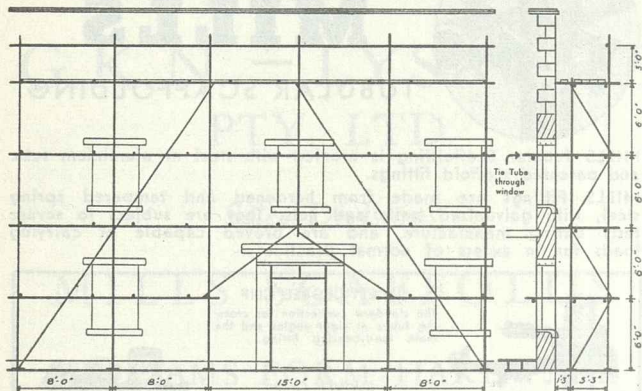
Used for bridling between window openings, on builders' scaffolding and where dead-length columns are required.



BLADE-ENDED PUTLOG TUBE

Used in bricklayers' scaffolds. Leaves only a small hole when withdrawn from the brickwork.

INDEPENDENT SCAFFOLD

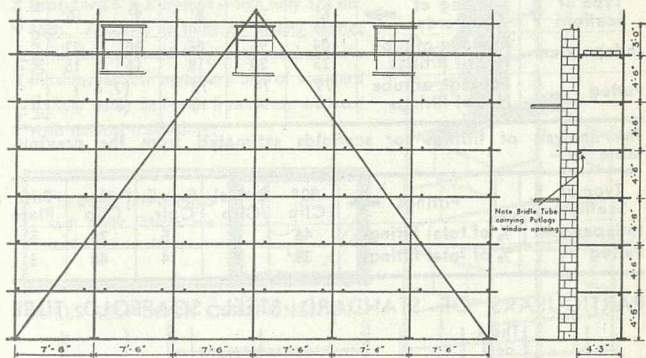


Sometimes called the double scaffold, since it incorporates two rows of uprights or standards, and is not dependent on the building itself in any way as a factor in the carrying of loads. For normal work, the standards are placed in pairs 3' 3" or 4' 0" apart (to provide a platform the width of four or five 9" scaffold planks between standards), the distance between pairs being 6' to 10'.

INTERNAL SCAFFOLD

Such a scaffold may be used for access to the ceilings and walls of a large room, cinema or theatre auditorium, or any other structure where the construction or maintenance requires access to points which are not available from ground level. The arrangement of the scaffold can be made to suit the particular work in hand, but for normal use, when such a scaffold is required as a working platform only, and not for carrying heavy loads, the uprights or standards are placed at 8' to 10' centres in each direction, and lifts are spaced at 6' intervals. These scaffolds, which are sometimes referred to as "birdcage" scaffolds, require adequate bracing to prevent movement.

PUTLOG SCAFFOLD



Sometimes called the single scaffold, as against the independent or double scaffold. In this construction, one end of the putlog is fixed between the courses of brickwork, the other end to the standard by 90° clip, or else to the ledger by Putlog clip. For normal work, the standards are placed at intervals of 7' 6", and the lifts or working platforms at intervals to suit the job. A minimum amount of bracing is required, since use is made of the wall itself. The scaffold can be rapidly erected as the work progresses if provision is made for the putlogs while the brickwork is green.

SPECIAL USES

"Mills" Scaffolding is also widely used for supporting concrete slab and wall formwork, and for an endless variety of structures, including stationary and mobile towers, temporary and semi-permanent buildings, storage racks, fun fair units, loading stages, temporary seating, grandstands, workshops, garages, jetties, foot bridges, and platforms. "Mills" trained staff will design a tubular structure to suit any purpose.

ESTIMATING DATA

The approximate quantities of tube and fittings required for standard scaffolds are:—

Type of Scaffold ↓	Spacing of Standards →	6'	7'	8'	9'	10'	Per 100 sq. ft. of wall area
Independent	Footage of tube No. of fittings	104 23	95 20	86 18	80 16	77 15	
Putlog	Footage of tube No. of fittings	79 15	74 14	72 13	(7' 6") (7' 6")		

The analysis of fittings for scaffolds estimated from the previous table is:—

Type of Scaffold ↓	Fittings →	90° Clip	Swivel Clip	E. to E. Cplr.	Putlog Clip	Base Plate
Independent	% of total fittings	46	6	15	28	5
Putlog	% of total fittings	39	4	14	40	3

PARTICULARS OF STANDARD STEEL SCAFFOLD TUBE

Trade Name	Gge.	Thick-ness of metal	I.D.	O.D.	Area sq. in.	Weight per ft. lb.	I	Z	K
2"	6	.192"	1.525"	1.909"	1.036"	3.516	.3866"	.405"	.611"

LOADING DATA FOR TUBULAR STEEL STRUCTURES

LEDGERS OR TRANSOMS

Clear Spans in feet	Safe Concentrated Load at centre of Span lbs.	Safe Distributed Load evenly distributed lbs.	Safe Concentrated Load at end of Cantilever lbs.	Safe Distributed Load on Cantilever lbs.
1	2430	4860	608	1216
2	1215	2430	304	608
3	810	1620	202	404
4	607	1214	152	304
5	486	972	121	242
6	405	810	101	202
7	347	694	87	174
8	303	606	76	152
9	270	540	67	134
10	243	486	—	121
11	221	442	—	110
12	202	404	—	101

COLUMNS OR STRUTS

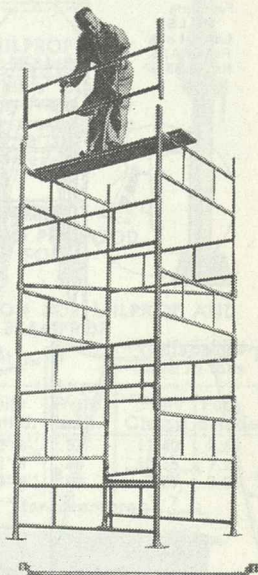
Unsupported Height in ft.	Safe Load for Welded Tube in tons
1	5.46
2	5.27
3	4.94
4	4.49
5	3.91
6	3.20
7	2.41
8	1.84
9	1.46
10	1.18
11	.97
12	.82

Dotted lines indicate practical limits of safety for general use.
Safe Load on "Mills" 90° or Swivel Clip, 2,800 lbs.

MILLS SELF-LOCK SCAFFOLD SYSTEM

Standard 5' x 2' frames weigh only 37½ lbs. each. A tower is built by adding frames until the required height is reached. As outside vertical members are of standard scaffold tube, Self-lock frames can be used with normal scaffolding.

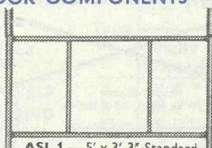
The frames just slot into each other. There are no fittings to do up.



MILLS SELF-LOCK COMPONENTS



ASL. 13 — JACKING BASE.



ASL.1 — 5' x 3' 3" Standard Frame. Also: **ASL.3 — 5' x 2' Standard Frame;** **ASL.4 — 2' x 3' 3" Frame;** **ASL.5 — 2' x 2' Frame.**



ASL. 15 — BASE UNIT.



ASL. 12 — BASE PLATE.



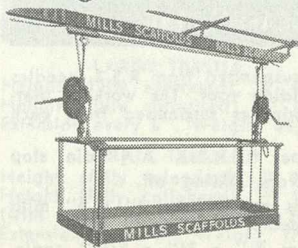
ASL. 16 — CANTILEVER BRACKET.

HORIZONTAL BRACES

ASL.9 — 5' x 5' Plan Brace.
ASL.11 — 5' x 2' Plan Brace.

TIE BARS ASL. 6 — 5 FEET
ASL. 7 — 2 FEET

ALSO — ASL. 14 — Handrail Post

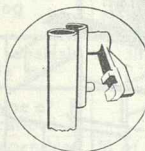


MILLS TRAVELLING CRADLE

Saves time and cuts rigging costs. The painter can traverse a building horizontally and thus avoid many weary hours of raising and lowering fixed stages.

'MILFRAME' TUBULAR FRAME SCAFFOLDING

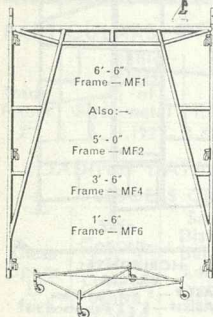
Featuring...
'MILLS'
Latch Lock
Patent App.
No. 13268 62



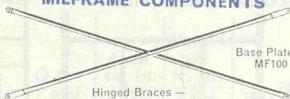
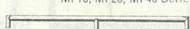
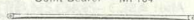
Bracing and Handrails Required
for Standard Frame Spacings

Frame	Spacing	Double (Hinged) Brace	Handrail or Tie
MF.1 6' 6" Lift	9' 6"	MF.10	MF.60
	7' 6"	MF.11	MF.61
	6' 0"	MF.12	MF.62
	4' 9"	MF.13	MF.63
MF.2 5' 0" Lift	9' 6"	MF.20	MF.60
	7' 6"	MF.21	MF.61
	6' 0"	MF.22	MF.62
	4' 9"	MF.23	MF.63
MF.4 3' 6" Lift	9' 6"	MF.40	MF.60
	7' 6"	MF.41	MF.61
	6' 0"	MF.42	MF.62
	4' 9"	MF.43	MF.63
MF.6 1' 6" Lift	9' 6"	Ties only required	MF.60
	7' 6"		MF.61
	6' 0"		MF.62
	4' 9"		MF.63

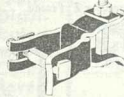
NOTE:— 1. MF.60 Handrail can be used for bracing MF.1 Frames at 7' 6" spacing.
2. MF.61 Handrail can be used for bracing MF.1 Frames at 4' 9" spacing.

MILFRAME COMPONENTS

Base Unit — MF103



Reducer Swivel Clip — MF107



Reducer 90° Clip — MF105

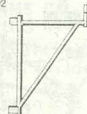
Base Plate
MF100



Handrail Post
MF101



Screw
Jack Base —
MF102



Hop Up Bracket —
MF105

MILLS HEAVY SUSPENDED SCAFFOLDING

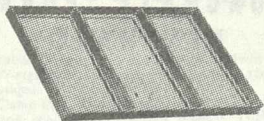
The 5' 0" wide working platform is suspended from R.S.J. needles located at 10' 0" centres on the building roof. The working platform is operated by two 1,600 lb winches suspended from each needle.

Each needle is 7" x 3½" x 15 lb. per ft. R.S.J. A ½" dia. stop bolt prevents the rope attachment from sliding off.

The rope anchor (or attachment) is made from 2" x ¾" mild steel, and wraps around the R.S.J. needle.

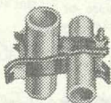
The cradle frame is fabricated from 2½" x 2½" x 5/16" angle.

MILLS STEEL FORMWORK



MILFORM

Strong and rigid in construction. In addition to the standard 36" x 24" plate there are seven other sizes, as follows:—24" x 24", 36" x 21", 24" x 21", 36" x 9", 24" x 9", 36" x 6", 24" x 6".



2" x 2 3/8" 90° CLIP
Fits outer tube of prop
for bracing purposes.



MILPROP AND BEAMPROP

"Mills" expanding Props cover a range from 6' to 15', with three types.

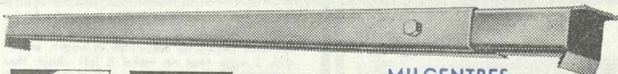


ALSO PLYWOOD FORMS

SPECIFICATION FOR MILPROP AND BEAMPROP

Type	Height		Appr. Wght. in lb.	Collapsing Load in tons	
	Fully Closed	Fully Extnd.		Fully Closed	Fully Extnd.
A	6' 0"*	10' 6"	53	11.40	8.63
B	8' 0"	12' 6"	60	10.15	7.25
C	10' 6"	15' 0"	69	7.87	3.80

*6' 6" for Beamprop.



MILCENTRES

Lightweight floor centres. Max. weight only 84 lbs. Constructed of 1/2" plate with 1/4" end plates and lips.
LARGE: Closed 8' 0", extending to 15' 6".
SMALL: Closed 4' 6", extending to 8' 6".



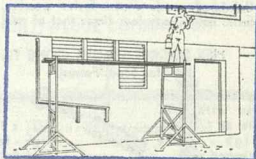
ADJUSTABLE TRESTLES

LARGE TRESTLE

Height (fully extended), 8' 0".
Height (fully collapsed), 5' 0".
Extension every 6". Weight, 88 1/2 lbs.

SMALL TRESTLE

Height (fully extended), 5' 9".
Height (fully collapsed), 2' 9".
(with board on lower bearer tube).
Extension every 6". Weight, 77 lbs.



WILLIAMS

CONCRETE FORM HARDWARE

PIONEERS OF BETTER FORMWORK

Form Clamp features originated and developed by Williams include:

- Positive disconnection of She-bolt from Inner Rod back from face of concrete.
- The use of High-tensile Inner Rods means greater working loads, lighter clamps, greater safety.
- Vibra-lock Clamps with flexible Bearing Bracket for angles up to 45°, and balanced Wing Nut for fast adjustment.
- Crimped Inner Rods and Anchors prevent turning and breaking of bond during removal of outer units, and ensure water-tight walls.
- Hex-lock Clamp combines free-turning Nut and Bearing Bracket in single unit.

VIBRA-LOCK CLAMP

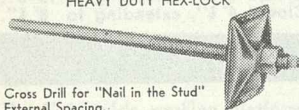
The Perfect Grip Clamp.

Cross Drill for "Nail in the Stud"
External Spacing.



Holes in Vibra-lock Bracket are convenient for nailing to forms if desired.

HEAVY DUTY HEX-LOCK

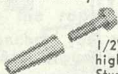


Cross Drill for "Nail in the Stud"
External Spacing.

High-tensile rods mean faster pouring, with elastic limit nearly four times that of mild steel.

HEX SOCKET SPACER CONE TIE (for Steel Forms)

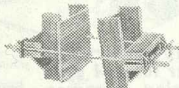
Spacer Cone for use with 3/8" dia. or 1/2" dia. high-tensile crimped rods.



1/2" x 1-1/2"
high-tensile
Stud Bolt.

SAFETY WALER SUPPORT ELIMINATES

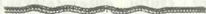
1. Nailing walers together and toe nailing to stud.
2. Building scaffolding where men can work on walers.
3. Placing and replacing wooden cleats.
4. Cutting upper and lower walers to match and breaking joints at one place.
5. Danger of stepping on nails in removed cleats.
6. Expended material due to wrecking.



ADDITIONAL SPECIFICATIONS SUGGESTED BY WILLIAMS

Forms for Architectural Concrete should be adsorptive, such as wood forms. The clamps or ties used should be adjustable in length, and of such a type that no metal is left closer than 1 1/2" from the outside exposed surfaces and 1" from the inside exposed surfaces. These ties have a positive disconnection, leaving a portion of the metal projecting into the hole where the outer unit of the tie is removed to bond the concrete. Otherwise these patches are apt to be loosened, and spalling of the concrete in later years results; eventually moisture reaching the internal ties will rust, and rust streaks will appear on the surface of the concrete. The working load of the clamps or ties should be approximately 25% greater than pressure conditions designed for, so as to provide factors of safety for unusual conditions that often enter into pouring of concrete.

CRIMPED INNER RODS AND FIG-TAIL ANCHORS

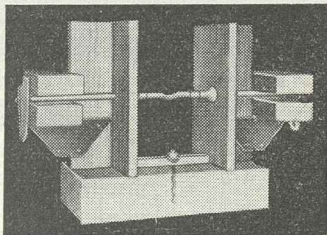
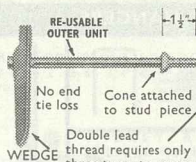
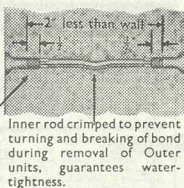
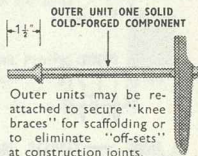


In 3/8", 1/2", 5/8" and 3/4" diameters, lengths 3" to 24" in 3" increments. Over 24" to 72" in 6" increments. Special lengths made to order.

WEDGE-LOCK

WIRE TIE

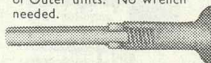
- Latest Development in the Light Tie Field.
- Wedge and outer unit good for over 100 usages.
- Clamp has positive disconnection 1" back from concrete surface.
- For rigid alignment use Williams Form Aligners in your footings. Eliminates pouring of concrete nib.



NO ...
Exposed Ties, Unbonded Patches, Water Seepage, Rust Streaks or Warped Surfaces.

BUT ...
Accurately Spaced, Rigid Forms, Positive Tie Disconnection, No Spalling, Tie Bonded Patch (will stand hammer test), Better Finish, Perfect Alignment.

Wedge also used for removal of Outer units. No wrench needed.



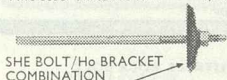
HIGH TENSILE INNER ROD



A CRIMPED WATERTIGHT TIE

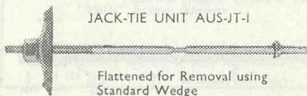
Comparative Tensile Strengths

Williams 5/16" High Tensile Rods	6,000 lbs.
Ordinary 8 Gauge Tie Wire	1,125 lbs.
3/8" Mild Steel Threaded Rod	4,000 lbs.

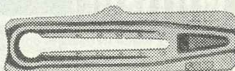


Ho Hex Lock Bracket

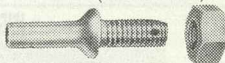
JACK-TIE UNIT AUS-JT-1



HEAVY DUTY MALLEABLE WEDGE

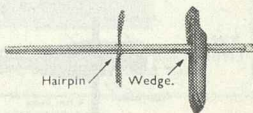


WEDGE LOCK ADAPTOR (For Steel Forms)



Special steel form adaptor for use with 5/16" dia. Wedge Lock Inner Rods.

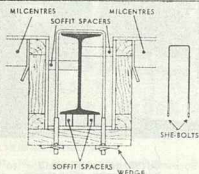
SHE BOLT/WEDGE COMBINATION



WILLIAMS

BEAM HANGERS

5/16" WEDGE-LOCK BEAM HANGERS



One of the most versatile units in its field, 5/16" diameter bright drawn wire bent to suit each beam, two small Wedge-Lock She-Bolts are attached and Wedges used to secure soffit. Failure load of assembly, 4,000 lbs. and we recommend maximum working load should not exceed two-thirds this figure. Beam Hanger provides unequalled erection, dismantling times and full safety working conditions. Disconnection is clear of the concrete surface and use may be made of the embedded screw threads for false ceilings, catwalks, etc. She-Bolts and Wedges available for sale or rental.



PRESSED STEEL WEDGE



3/8" BEAM HANGERS

"U" TYPE

A heavy-duty "U" Bolt Beam Hanger with an assembly failure load of approximately 9,000 lbs. we recommend a maximum working load not exceeding two-thirds of this figure. "U" Bolts to suit any sized beam are available at short notice. Beam Hanger She-Bolts — sale only.



BOTTOM FLANGE

A light Hanger, working loads are adequate for most conditions. Failure load is 3,000 lbs.—recommended working load, 1,000 lbs. Assembled in soffit before positioning. Spacer Strip ensures correct engagement. Beam Hanger She-Bolt — sale item only.



HI-CHAIR

This Hanger has been designed for flat deck or exposed beam construction. Equally versatile on steel or concrete beams. Cheapest solution for bridge-deck forming. Failure load of the assembly is 9,000 lbs.—recommended working load, 3,000 lbs. Beam Hanger She-Bolt — sale only.



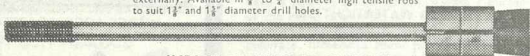
BEAM HANGER SHE-BOLT

WILLIAMS

ROCK BOLTS

SWEDGE SETTING ROCK ANCHOR

Aluminium shell with malleable iron cone set by thrust tube externally. Available in $\frac{3}{4}$ " to $\frac{3}{2}$ " diameter high tensile rods to suit $1\frac{1}{2}$ " and $1\frac{3}{4}$ " diameter drill holes.



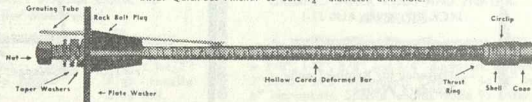
IMPACT SETTING ROCK BOLT

The malleable iron shell and cone is retained by the thrust ring during setting operation. Available in $\frac{1}{2}$ " to $\frac{3}{4}$ " rod sizes to suit $1\frac{1}{2}$ " and $1\frac{3}{4}$ " diameter drill holes.



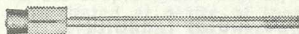
HOLLOW CORED GROUTABLE ROCK BOLT

Available in either 1" diameter plain or deformed hollow cored bar to suit $1\frac{1}{2}$ " drill hole diameter. Also available with B.J.B. Quick-Set Anchor to suit $1\frac{1}{2}$ " diameter drill hole.



TYPE THREE

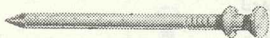
ROCK ANCHORS AND CONSTRUCTION ACCESSORIES



ROCK ANCHOR ROD — High Tensile:
Dias. 5/16", 3/8", 1/2", 5/8", 3/4". Lengths
up to 15 ft. Max. thread length 6".



**ROCK ANCHOR ALLOY
SHELL AND CONE** tapped 5/16",
3/8", 1/2", 5/8", 3/4". Develops full
strength of Williams' high tensile
rods when driven in hard rock. For
hole dias. 1-1/4", 1-3/8" and 1-5/8".



DUPLEX NAIL for temporary nailing
of formwork. Sizes: 2" x 11 Ga.; 2-1/2" x 10
Ga.; 3" x 9 Ga.; 3-1/2" x 8 Ga.; 4" x 6 Ga.

REINFORCEMENT SUPPORTS



WIRE BAR CHAIRS

Support heights
from 3/4" to 12".

ROD COUPLING for 5/16",
3/8", 1/2", 5/8", 3/4" dia.
rods.



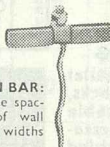
PLASMIL PLASTIC CHAIRS

From 3/4" to 2".



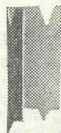
**HICKEY ROD
SPLICER** for 3/8",
1/2", 5/8" dia. rods.

FORM ALIGN BAR:
Ensures accurate spac-
ing at foot of wall
forms. For wall widths
3" to 12".



SOFFIT SPACER

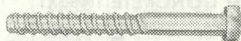
For
accurately
spacing forms
around beams
and columns.
Lengths —
1" to 9" in 1/4"
rises



THE MILLS HELICAL ANCHOR BOLT

The **Mills Helical Anchor Bolt** is used widely for temporary anchorage of steel tunnel travelling forms where the concrete is poured first in the invert, or in the form of kerbs and sufficient time elapses to allow concrete strengths to age satisfactorily.

This Anchor does not replace the use of the Pigtail Anchor in cantilever or tiedown work in green concrete.

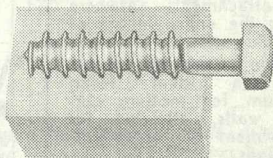


"Mills" Anchor Bolt



"Mills" Screw Anchor

For 3/4" and 1-1/4" Bolts



For all Williams tie recommendations we offer a comprehensive free service in planning and quantity figuring of your requirements. Please forward the plans with project layout to the address of your nearest Branch.

ROCK BOLTS TO SUIT ANY STRATA



UNISTRUT

All purpose metal framing

Unistrut is designed as a single all-purpose structural framing system suitable for a wide variety of uses.

The Unistrut Nut and Unistrut fittings have been designed with the idea of standardizing the connections between the various parts of the skeleton and providing the means of easily attaching objects to it.

UNISTRUT RACKING

Unistrut is ideal for pallet and general storage racks, bar stock racks, cable and coil racks, and mezzanine floors, with the added advantage of being able to dismantle and re-erect on new sites.

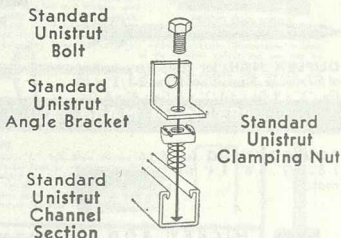
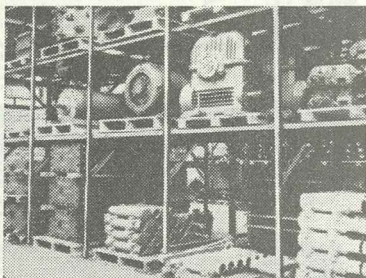
CONCRETE INSERTS

The Unistrut Concrete Insert is a new concept in concrete fixing with all of the advantages of the Unistrut system. The continuous slot permits making attachments anywhere along the entire length of the channel.

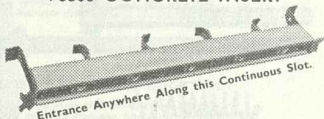
Unistrut Concrete Inserts are an ideal fixing medium for modern curtain walls, allowing for adjustment in three dimensions.

In average good concrete the recommended loading per foot run is 1,500 lb. with a safety factor of three.

BASIC COMPONENTS



P3300 CONCRETE INSERT



Two types of End Caps.
Type "A" End Cap, P-3380 illustrated, is used where anchoring on ends is not necessary. Type "B" Anchor End Cap, P-3703, has anchor pierced and flange slotted for nailing to form and for quick centring of inserts.



UNISTRUT CHANNEL SECTIONS—ENGINEERING DATA

BEAM LOADS.—Allowable uniformly distributed loads are listed for various simple spans—that is, beam on two supports. If load is concentrated at centre of span, multiply load from table by 0.5 and deflection by 0.8. The open face of the channel section is facing downwards.

COLUMN LOADS.—Column loadings are allowable axial loads for the unsupported heights listed. If loads are eccentric, loads should be reduced according to standard practice.

BEAM AND COLUMN DATA

Beam Span or Column unsupported height	Section No.	Uniform Load at 22,000 P.S.I. Stress	Deflection at 22,200 P.S.I. Stress	Maximum loading of Column	Beam Span or Column unsupported height	Section No.	Uniform Load at 22,000 P.S.I. Stress	Deflection at 22,200 P.S.I. Stress	Maximum loading of Column
18"	P1000	2,250	.03	10,250	60"	P1000	675	.34	6,000
	P2000	1,350	.03	5,750		P2000	405	.37	3,000
	P3300	785	.05	6,050		P3300	230	.55	1,370
	P4000	550	.06	4,900		P4000	160	.69	2,100
24"	P1000	1,700	.06	10,000	72"	P1000	570	.50	5,200
	P2000	1,000	.06	5,500		P2000	340	.54	2,400
	P3300	580	.09	5,050		P3300	190	.79	975
	P4000	415	.11	4,600		P4000	135	1.00	—
30"	P1000	1,350	.09	9,300	84"	P1000	485	.68	4,500
	P2000	810	.09	5,100		P2000	285	.71	2,000
	P3300	465	.14	4,100		P3300	170	1.07	750
	P4000	335	.18	4,000		P4000	—	—	—
36"	P1000	1,150	.13	9,000	96"	P1000	425	.89	4,000
	P2000	675	.13	4,800		P2000	250	.93	1,500
	P3300	390	.20	3,250		P3300	145	1.42	—
	P4000	280	.26	3,400		P4000	—	—	—
42"	P1000	970	.17	8,000	120"	P1000	335	1.35	3,000
	P2000	585	.18	4,100		P2000	200	1.43	800
	P3300	330	.27	2,550		P3300	—	—	—
	P4000	235	.35	3,000		P4000	—	—	—
48"	P1000	855	.22	7,000		—	—	—	—
	P2000	510	.24	3,700		—	—	—	—
	P3300	300	.36	2,050		—	—	—	—
	P4000	215	.47	2,800		—	—	—	—

Strength of P1010 and P4010 nuts used in P1000 and P3300 channels:

Resistance to slip 1,200 lbs. per bolt

Pull-out strength 2,000 lbs. per bolt

Strength of P1010 and P4010 nuts used in P2000 and P4000 channels:

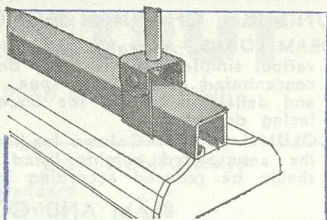
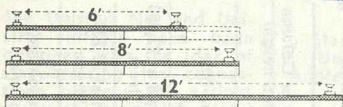
Resistance to slip 1,000 lbs. per bolt

Pull-out strength 1,000 lbs. per bolt

All figures shown at a safety factor of 3.

UNISTRUT ELECTRICAL TRUNKING

Strong, rigid Unistrut Channel allows longer spans and fewer hangers than any other system. It is easily erected, rust-proof, and any type of fluorescent fixture may be attached.



Use P4000 Unistrut—deflection $\frac{1}{4}$ "

Use P2000 Unistrut—deflection $\frac{1}{4}$ "

Use P1000 Unistrut—deflection $\frac{1}{4}$ "

NOTE.—Fixtures intermittently spaced 2' 0" apart deflection approximately 65% of above table. Fixtures intermittently spaced 4' 0" apart deflection approximately 55% of above table.

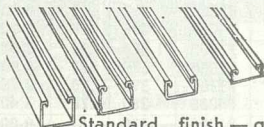
UNISTRUT PIPE AND CABLE SUPPORTS

Racked with standard Unistrut channel and concrete inserts, service installations can be easily and quickly erected without drilling, grouting or welding, allowing for new services to be added at any time.



WIDE SELECTION OF CHANNELS

P1000, P2000, P3000 and P4000. Standard lengths: 10' and 20'.
 P1000—1" x 1" x 12 gauge
 P2000—1" x 1" x 16 gauge
 P3300—1" x 1" x 12 gauge
 P4000—1" x 1 3/16" x 16 gauge



Standard finish — grey enamel — hot dipped galvanized.

UNISTRUT NUTS AND BOLTS

Only Unistrut has these spring-held Clamping Nuts, which tie together both sides of the channel to form a box section at points of connection for greater load strength. Standard finish—electro-zinc plated.



A.—P1010 Standard Nut for P1000 and P2000 channels.
 B.—P4010 Standard Nut for P3300 and P4000 channels.
 C.—Standard Bolt $\frac{1}{2}$ " x $\frac{15}{16}$ ".

AGENCY DIVISION

Australian Representatives for the following Overseas and Australian Companies and their products:—

GUEST KEEN & NETTLEFOLDS (SOUTH WALES) LTD.—

Rounds, squares and flats in carbon and most alloy steel qualities. Channels and angles. Reinforcing bars and high tensile deformed bars. Hot and cold rolled strip and electro-galvanized strip. Specialists in all grades of cold heading rods and wire. Hard and mild drawn bright wire in special shapes and rounds. Wire nails.

EXORS OF JAMES MILLS LTD.—

Bright ledloy and non-leaded free-cutting steel bars. Bright ledloy and non-leaded carbon and alloy steel bars. Hot rolled carbon and alloy steel bars. Special bright shapes. Hurcol wheel and flange lubricators. Mills railway track fastenings. Mabellini portable rail grinders.

BAYLISS JONES & BAYLISS LTD.—

Link stilt-yielding props for mines. Railway track fastenings. Rock bolts.

CABLE STREET MILLS LTD.—

Hot rolled steel bars in carbon and alloy grades from electrically-melted billets.

SOMMERSET WIRE CO. LTD.—

Stabilised pre-stressed wire and strand. Patented spring steel wires.

UNITED NON-FERROUS LTD.—

Wire, rods and strip in various non-ferrous materials.

USKSID ENGINEERING CO. LTD.—

Electric winders. Capstans and haulage gear. Heavy equipment for the mining industry.

BRYMBO STEEL WORKS LTD.—

Electrically-melted carbon and alloy grade steels in blooms and billets.

HAWKSLEY PACIFIC CO. LTD.—

Aluminium anodized doors, windows and insect screens.

A.R.O. MACHINERY CO. LTD.—

Air and water-cooled portable spot-welding guns and timers.

NETTLEFOLDS PTY. LTD. SUNSHINE VICTORIA

THE GUARANTEE

OF QUALITY



NETTLEFOLDS-PARKER-KALON (N.P.K.) CASE-HARDENED SELF-TAPPING SCREWS

Case-hardened Self-tapping Screws are used for joining and making fastenings to metal sheets and other metal parts. These screws eliminate the need for tapping holes. They tap their own threads as they are driven in.

THREAD TYPES

HEAD TYPES

 <p>Z</p>	<p>For joining and making fastenings to metal sheets from 28 gauge (.016) up to 6 gauge (.198).</p>	<p>C'sunk Head</p>	
 <p>A</p>	<p>For assembling light metal sheets up to 18 gauge (.050).</p>	<p>Raised Head</p>	
 <p>U</p>	<p>Hardened metallic drive screw for making permanent fastenings to iron, brass and aluminium castings, steel, plastics, etc.</p>	<p>Round Head</p>	
		<p>Mush. Head</p>	
		<p>Hex. Head</p>	
		<p>Binding Head</p>	
		<p>Phillips Recessed Head</p>	

NOTE.— For drill hole sizes, see page 129.

HOLE SIZES

FOR NETTLEFOLDS-P.K.
SELF-TAPPING SCREWS

TYPE "Z" N.P.K. SCREWS

Dia. of Screw	Steel Sheet Gauge	Dia. of Hole	Drill Size
No. 2 .088"	28-26	.063	No. 52
	24	.067	51
	22	.070	50
	20-18	.073	49
	16	.076	48
No. 4 .114"	28-26	.086	44
	24	.089	43
	22-20	.093	42
	18	.096	41
	16	.099	39
No. 6 .139"	14	.101	38
	28-26	.104	37
	24-22	.106	36
	20	.110	35
	18	.111	34
No. 7 .154"	16	.116	32
	14	.120	31
	12	.128	30
	26-20	.116	32
	18	.120	31
No. 8 .166"	16	.128	30
	14	.136	29
	12	.140	28
	10-1/8	.149	25
	10-1/8	.152	24
No. 10 .189"	26-18	.144	27
	16	.152	24
	14	.157	22
	12	.161	20
	10-1/8	.169	18
No. 12 .215"	8	.173	17
	24-22-20	.166	19
	18	.169	18
	16	.177	16
	14	.182	14
No. 14 .246"	12	.185	13
	10-1/8	.196	9
	8	.201	7
	14	.204	6
	12	.209	4
	10-1/8	.228	1
	8-6-3/16	.234	15/64

TYPE "A" N.P.K. SCREWS

Dia. of Screw	Steel Sheet Gauge	Dia. of Hole	Drill Size
No. 4 .114"	28-26	.086	No. 44
	24-22	.093	42
	20	.098	40
No. 6 .141"	28-26-24	.099	39
	22	.101	38
	20	.106	36
No. 7 .158"	28-26	.104	37
	24	.110	35
	22	.113	33
	20	.116	32
	18	.120	31
No. 8 .168"	26-24	.113	33
	22	.116	32
	20	.120	31
	18	.128	30
No. 10 .194"	26-24-22	.128	30
	20	.136	29
	18	.149	25
No. 12 .221"	24	.147	26
	22	.149	25
	20	.152	24
	18	.157	22
No. 14 .254"	24	.180	15
	22	.189	12
	20	.191	11
	18	.196	9

TYPE "U" N.P.K. SCREWS

Dia. of Screw		Dia. of Hole	Drill Size
No. 00	.060"	.052	No. 55
0	.075"	.067	51
2	.100"	.086	44
4	.116"	.104	37
6	.140"	.120	31
7	.154"	.136	29
8	.167"	.144	27
10	.182"	.161	20
12	.212"	.191	11
14	.242"	.221	2

NOTE.—The recommended hole sizes for all types may be varied slightly if necessary. For hard material, use larger drill. For soft material, use smaller drill.

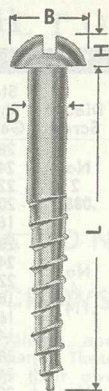
Galv. Cone-head Roofing Screws

ASSURE
PERMANENT
ROOF FIXINGS

Dia. of Head "B" = twice diameter of Shank "D".
Depth of Head "H" = .7 of the dia. of Shank "D".

APPROXIMATE NUMBER PER CWT.

Length	Screw Gauge					
	10 (.192)		12 (.220)		14 (.248)	
"L"	Gross	Doz.	Gross	Doz.	Gross	Doz.
1½	62	11	48	11	—	—
1¾	—	—	43	1	31	2
2	—	—	39	5	29	2
2¼	—	—	34	—	27	—
2½	—	—	30	9	24	4
3	—	—	—	—	20	3
3½	—	—	—	—	17	—
4	—	—	—	—	15	6



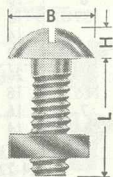
Galvanized Mushroom-head Bolts and Nuts

HEAD DIMENSIONS:

Dia. of Head "B" = 2.25 dia. of Shank "D".
Depth of Head "H" = ¾ of dia. of Shank "D".

NUT DIMENSIONS:

Whit. Thread	3/16"	7/32"	1/4"	9/32"	5/16"
Across Flats	3/8"	7/16"	1/2"	1/2"	9/16"
Thickness	.112"	.131"	.150"	.150"	.169"



Galv. Tank Rivets and Washers

RIVETS:

Packed in ½ cwt. bags.

Number of gross per cwt.:

Sizes 5/16" x 3/16" = 157 gross 9 doz. per cwt.

Sizes: 3/8" x 3/16" = 141 gross 9 doz. per cwt.



WASHER DIMENSIONS:

(Weights shown are approx. weights per gross)

"D"	"H"	Gauge	Weight
11/16"	3/16"	16	.95 lb.
13/16"	1/4"	16	1.35 "
3/4"	9/32"	16	1.08 "
13/16"	5/16"	16	1.22 "



BOLTS AND NUTS

Nettlefolds Pty. Ltd. can now supply a comprehensive range of Bolts and Nuts, as follows:—

BLACK CUP HEAD BOLTS AND NUTS (TO ASB 108)—

(CUP HEAD, SQUARE NECK, SQUARE NUT)—

RANGE: From 3/16" B.S.W. x 3/4" long to 3/4" B.S.W. x 24" long.

BLACK HEXAGON HEAD BOLTS AND NUTS (TO ASB 100)—

(HEX. HEAD, ROUND SHANK, HEX. NUT)—

RANGE: From 1/4" B.S.W. x 3/4" long to 1" B.S.W. x 24" long.

BLACK HEXAGON HEAD SET SCREWS (TO ASB 100)—

RANGE: From 1/4" B.S.W. x 1/2" long to 1" B.S.W. x 6" long.

BLACK HEXAGON HEAD COACH SCREWS—

Range: From 1/4" x 1-1/2" long to 3/4" x 9" long.

50/55 TON HIGH TENSILE HEXAGON HEAD BOLTS AND NUTS—

SET SCREWS (TO B.S. 1768) U.N.C.; U.N.F. THREADS—

Range: From 1/4" x 3/4" long to 1/2" x 4" long.

All of the above can be supplied in any required finish, including Hot Dipped Galvanizing and non-standard products are available subject to economic manufacturing quantities.

NETTLEFOLDS PTY. LTD.

HAVE IN STOCK A SCREW, BOLT OR NUT
FOR EVERY PURPOSE

IF YOU HAVE A FASTENING PROBLEM,
GET IN TOUCH WITH

NETTLEFOLDS PTY. LTD.

VICTORIA:

Ballarat Road,
Sunshine
MM 1261

N.S.W.:

252 Johnston Street,
Annandale
82-0751

QUEENSLAND:

26-32 Perry Street,
Brisbane
2-7378

SOUTH AUSTRALIA:

3 Government Road, Croydon
Adelaide
46-3091

WESTERN AUSTRALIA:

284 Aberdeen Street,
Perth
28-4239

REAPER RIVETS

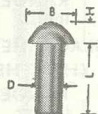
ROUND AND COUNTERSUNK HEAD

HEAD DIMENSIONS:

Round Head.—Diameter of Head "B" = 1.5 of diameter of Shank "D". Depth of Head "H" = .55 of diameter of Shank "D". "L" = Length.

APPROXIMATE NUMBER OF RIVETS PER POUND

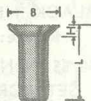
Length	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	1 $\frac{1}{4}$ "
No. 5 (.212")	171	154	137	120	103	86	52
No. 6 (.192")	186	169	152	135	118	101	67



Countersunk Head.—Diameter of Head "B" = 1.6 diameter of Shank "D". Depth of Head = .3 of diameter of Shank "D". Countersunk 90°. "L" = Length.

APPROXIMATE NUMBER OF RIVETS PER POUND

Length	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	1 $\frac{1}{4}$ "
No. 5 (.212")	201	184	167	150	133	116	82
No. 6 (.192")	216	199	182	164	148	131	97

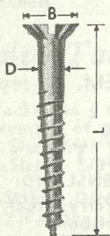


WOOD SCREWS

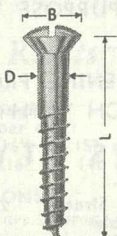
Nettlefold's Wood Screws are machine-turned to ensure perfect heads, concentricity of head with shank, freedom from burrs, and good appearance. Available in mild steel, brass, and other metals, and with Countersunk, Round, Raised or Special Heads.

HEAD TYPES AND DIMENSIONS

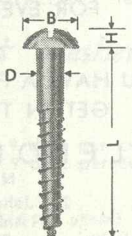
Countersunk Head



Raised Head



Round Head



Phillips Recessed Head



"B" = twice dia. of Shank "D". Included angle C'sink "A", 90°

"B" = twice dia. of Shank "D". Included angle C'sink "A", 90°

"B" = twice dia. of Shank "D". "H" = $\frac{3}{4}$ of dia. "D".

Raised, Round or Countersunk.

NOTE.—For decimal equivalents of screw gauges, see page 134.

MACHINE SCREWS

Stocked in steel and brass in Whitworth Threads (B.S. 450/1958) and B.A. Threads (B.S. 57/1951) in Countersunk, Round and Cheese Heads.

Heads and threads, or materials other than the above, can be supplied on demand.

DECIMAL EQUIVALENTS AND THREADS PER INCH

B.S.W. AND B.S.F. THREADS

UNIFIED THREADS

Dia.	Decimal Equiv.	Threads per in.		Dia.	Dec. Equiv.	Threads per in.	
		B.S.W.	B.S.F.			U.N.C.	U.N.F.
1/8"	.1250"	40	—	No. 2	.086"	56	64
5/32"	.1563"	32	—	" 4	.112"	40	48
3/16"	.1875"	24	32	" 6	.125"	32	40
1/4"	.2500"	20	26	" 8	.164"	32	36
5/16"	.3125"	18	22	" 10	.190"	24	32
3/8"	.3750"	16	20	" 12	.216"	24	28
7/16"	.4375"	14	18	1/4"	.250"	20	28
1/2"	.5000"	12	16	5/16"	.3125"	18	24
5/8"	.6250"	11	14	3/8"	.375"	16	24
3/4"	.7500"	10	12	7/16"	.4375"	14	20
				1/2"	.500"	13	20
				5/8"	.625"	11	18
				3/4"	.750"	10	16

B.A. THREAD

Dia.	Dec. Equiv.	T.P.I.	Dia.	Dec. Equiv.	T.P.I.
6 B.A.	.110	47.9	2 B.A.	.185	31.4
5 B.A.	.126	43.1	1 B.A.	.209	28.2
4 B.A.	.142	38.5	0 B.A.	.236	25.4
3 B.A.	.161	34.8			

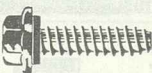
DECIMAL EQUIVALENTS

WOOD SCREW GAUGE, IMPERIAL STANDARD WIRE GAUGE,
AND FRACTIONS OF AN INCH

Screw Gauge (S.G.)	Imp. St. Wire Gauge	Fraction of an Inch	Equiv. in Decimal of Inch	Screw Gauge (S.G.)	Imp. St. Wire Gauge	Fraction of an Inch	Equiv. in Decimal of Inch
	30		.0124			3/16	.1875
	29		.0136	10	6		.192
	28		.0148			13/64	.203125
		1/64	.015625	11			.206
	27		.0164		5		.212
	26		.018			7/32	.21875
	25		.020	12			.220
	24		.022		4		.232
	23		.024	13			.234
	22		.028			15/64	.234375
		1/32	.03125	14			.248
	21		.032			1/4	.250
	20		.036		3		.252
	19		.040	15			.262
		3/64	.046875	16	2		.276
	18		.048			9/32	.28125
4/0			.054	17			.290
	17		.056		1		.300
3/0			.057	18			.304
2/0			.060			5/16	.3125
		1/16	.0625		0		.324
0			.063	20			.332
	16		.064			11/32	.34375
1			.066		2/0		.348
	15		.072	22			.360
		5/64	.078125		3/0		.372
2	14		.080			3/8	.375
	13		.092	24			.388
		3/32	.09375		4/0		.400
3			.094			13/32	.40625
	12		.104	26			.416
4			.108		5/0		.432
		7/64	.109375			7/16	.4375
	11		.116	28			.444
5			.122		6/0		.464
		1/8	.125			15/32	.46875
	10		.128	30			.472
6			.136	32	7/0	1/2	.500
		9/64	.140625	36			.556
	9		.144			9/16	.5625
7			.150				.612
		5/32	.15625	40			.625
	8		.160			5/8	.625
8			.164			11/16	.6875
		11/64	.171875			3/4	.750
	7		.176			13/16	.8125
9			.178			7/8	.875
						15/16	.9375

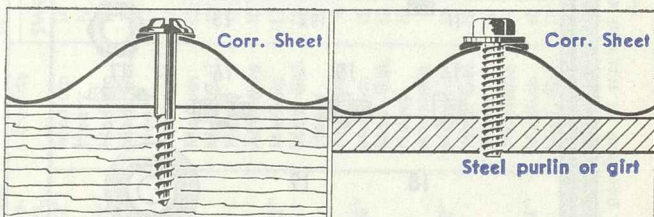
STEEL SHEET ROOF & WALL CLADDING

Combined Self Sealing Washer and Screw Fasteners

ITEM	DESCRIPTION
SIDE LAP FASTENERS (Nettlefolds Art. No. 9032) 	3/4" x 12 Slotted Pan Head Washer Collar Type 'A' Self Tapping Screw, complete with Neoprene washer attached. Bright Zinc plated.
VALLEY FASTENERS Steel Construction (Nettlefolds Art. No. 9028) 	1" x 1/4 Hexagon Head Washer Collar Type 'Z' Self Tapping Screws, complete with Neoprene washer attached. Bright zinc plated.
CREST FASTENERS Timber Construction (Nettlefolds Art. No. 9033) 	Slotted Pan Head Washer Collar Roofing Screw complete with Neoprene washer attached. Bright Zinc plated. <div style="text-align: right;"> — 1 3/4" x 12 — 2" x 12 — 2 1/4" x 12 — 2 1/2" x 12 </div>

PACKING.—Packed in lots of 100 or 1,000 screws.

CREST FASTENING



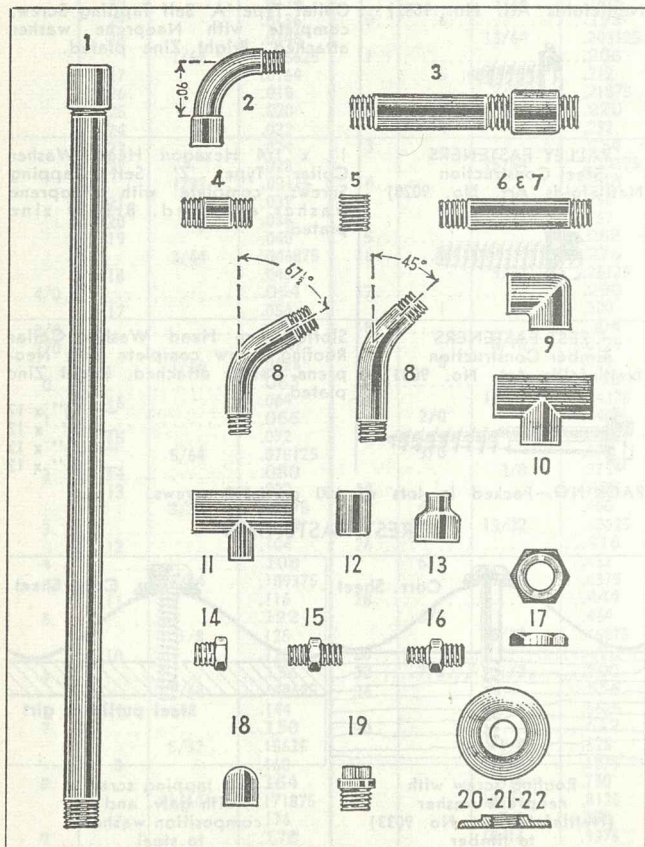
Roofing screw with
neoprene washer
(Nettlefolds Art. No. 9033)
to timber

Self tapping screw
with galv. and
composition washers
to steel

STEWARTS AND LLOYDS (DISTRIBUTORS) PTY. LTD.

(INCORPORATED IN VICTORIA)

S. & L. SCREWED AND SOCKETED STEEL TUBES AND FITTINGS



PIPE CHARACTERISTICS

Plain End and Screwed and Socketed Steel Tubes

Nom. Bore ins.	Outside Dia. ins.	Quality	Thickness		Ft. per ton		Quality	Thickness		Ft. per ton	
			SWG	In.	P/E	S & S		SWG	In.	P/E	S & S
1"	13/32"	Medium	14	0.080	8205	8146	Medium	10	0.128	923	911
		Heavy	12	0.104	6829	6787	Med. Gal.	10	0.128	895	885
1 1/4"	17/32"	Medium	13	0.092	5150	5114	Heavy	8	0.160	752	744
		Med. Gal.	13	0.092	4859	4828	Ammonia	5	0.212	585	—
		Heavy	11	0.116	4316	4291	Medium	9	0.144	653	644
		Ammonia	11	0.116	4316	—	Med. Gal.	9	0.144	636	627
3"	11/16"	Medium	13	0.092	3923	3895	Heavy	7	0.176	542	536
		Med. Gal.	13	0.092	3709	3685	Ammonia	5	0.212	458	—
		Heavy	11	0.116	3246	3228	Medium	9	0.144	511	503
		Ammonia	10	0.128	3006	—	Med. Gal.	9	0.144	498	490
1 1/2"	27/32"	Medium	12	0.104	2725	2705	Heavy	7	0.176	423	418
		Med. Gal.	12	0.104	2613	2595	Ammonia	4	0.232	328	—
		Heavy	10	0.128	2288	2274	Medium	8	0.160	393	385
		Ammonia	9	0.144	2082	—	Med. Gal.	8	0.160	384	376
2"	1-1/16"	Medium	12	0.104	2109	2094	Heavy	6	0.192	331	325
		Med. Gal.	12	0.104	2024	2009	Ammonia	4	0.232	277	—
		Heavy	10	0.128	1758	1747	Medium	8	0.160	341	335
		Ammonia	8	0.160	1456	—	Med. Gal.	8	0.160	330	324
1"	1-11/32"	Medium	10	0.128	1363	1354	Heavy	6	0.192	287	282
		Med. Gal.	10	0.128	1317	1309	Medium	7	0.176	276	270
		Heavy	8	0.160	1120	1114	Med. Gal.	7	0.176	267	261
		Ammonia	7	0.176	1032	—	Heavy	5	0.212	231	226
1 1/4"	1-11/16"	Medium	10	0.128	1062	1054	Medium	6	0.192	205	200
		Med. Gal.	10	0.128	1030	1023	Med. Gal.	6	0.192	200	195
		Heavy	8	0.160	867	862	Heavy	5	0.212	187	183
		Ammonia	6	0.192	738	—	Medium	6	0.192	173	168
							Med. Gal.	6	0.192	168	164
							Heavy	5	0.212	157	153

Weights per foot of screwed and socketed tubing are based on the overall length of tube plus socket, screwed to basic engagement.

STEEL TUBES AND FITTINGS

RANGE OF GALVANIZED AND UNGALVANIZED TYPES MANUFACTURED

	6"	5"	4"	3½"	3"	2½"	2"	1½"	1¼"	1"	¾"	½"	⅜"	¼"	⅛"	
TUBES																
1. Tubes (2' long and over)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
TUBULARS																
2. Bends (90°)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3. Longscrews	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
4. Barrel Nipples	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5. Plain Nipples	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6. Pieces not socketed (4"-11")	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7. Pieces not socketed (12"-23½")	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8. Springs not socketed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
OTHER FITTINGS																
9. Elbows	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
9a. Elbows, Reducing ..	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10. Tees	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
11. Tees, Reducing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12. Sockets	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13. Sockets, Reducing ..	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14. Bushes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
15. Hexagon Nipples ..	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16. Hex. Nipples, Red.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
17. Backnuts	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
18. Caps	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
19. Plugs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
20. Flanges, Table "D"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
21. Flanges, Table "E"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
22. Flanges, Table "H"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

MALLEABLE PIPE FITTINGS

1. Backnuts	6"	X X X X X X
2. Bends, M. & F. ...	5"	X
3. Bends, F. & F. ...	4"	X X X X X X X X X X X X X
4. Bends, M. & F. 45°	3½"	X
5. Bushes	3"	X X X X X X X X X X X X X X X X X X
6. Caps	2½"	X X X X X X X X X X X X X X X X X X
7. Crosses	2"	X X X X X X X X X X X X X X X X X X X X
8. Elbows, F. & F. ...	1½"	X X X X X X X X X X X X X X X X X X X X X
9. Elbows, M. & F. ..	1¼"	X X X X X X X X X X X X X X X X X X X
10. Elbows, Three-way	1"	X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
11. Elbows, M. & F. 45°	¾"	X X X X X X X X X X X X X X X X X X X X X
12. Elbows, F. & F. 45°	½"	X X X X X X X X X X X X X X X X X X X X X
13. Flanges	3/8"	X X X X X X X X X X X X X X X X
14. Flanges, Oval	¼"	X X X X X X X X
15. Hexagon Nipples	1/8"	X X X X X X X X
16. Hex. Nipples, Red.	1/16"	
17. Plugs		
18. Sockets		
19. Sockets, Reducing		
20. Tees		
20a. Tees, Reducing		
21. Tees, Four-way		
22. Unions, F.S.		
23. Unions, B.S.		
24. Unions, M. & F., B.S.		
25. Unions, Deflection 5°		

A.I.S. SPUN CAST IRON PIPE**SPIGOT AND SOCKET — 12-FEET LENGTHS**

Dia- meter	Wall Thickness	Weight of 12' length	Dia- meter	Wall Thickness	Weight of 12' length
4"	.250	148 lb.		.406	575 lb.
	.312	178 "		.531	729 "
	.344	193 "	12"	.375	640 "
(Gas)	.390	216 "		.469	780 "
6"	.281	249 "		.594	963 "
	.344	296 "	15"	.437	920 "
	.437	365 "		.531	1095 "
8"	.312	367 "		.656	1323 "
	.375	431 "	18"	.468	1194 "
	.500	554 "		.552	1379 "
9"	.344	447 "		.677	1660 "
	.406	516 "	20"	.500	1420 "
	.531	653 "		.593	1646 "
10"	.344	487 "		.718	1965 "

The above can be cement lined by A.I.S. if required.

COMPOSITION PIPE**LEAD PIPE**

Size Inside Dia.	Approx. Weight per yd.	Approx. length of Coils	Inside Dia.	Wt. per Yard	Length of Coils	Thickness of Wall
1"	3 lb.	165 feet	1"	3 lb.	45'	3/32"
5/16"	3 lb.	96 "	1"	7 "	45'	1/4"
3/8"	1 lb. 5 oz.	70 "	1"	9 "	45'	5/16"
1/2"	1 lb. 7 oz.	70 "	1"	5 "	45'	7/64"
5/8"	2 lb. 1 oz.	45 "	1"	9 "	45'	3/16"
3/4"	2 lb. 13 oz.	45 "	1"	11 "	45'	1/4"
7/8"	3 lb. 11 oz.	55 "	1"	6 "	45'	1/8"
			1"	9 "	45'	3/16"
			1 1/4"	8 "	45'	1/8"
			1 1/4"	12 "	45'	3/16"
			1 1/2"	17 "	45'	1/4"
			1 1/2"	16 "	45'	1/4"
			2"	16 "	45'	3/16"
			2"	20 "	45'	5/32"
			2"	28 "	45'	1/4"

LEAD SOIL PIPE

Inside Dia.	Lengths	Approx. Wt. per length
1 1/4"	10'	18 lb.
1 1/2"	10'	21 "
2"	10'	30 "
2 1/2"	12'	39 "
3"	10'	58 "
3 1/2"	12'	69 "
4"	10'	78 "
4 1/2"	12'	90 "

And up to 6" dia. x 3/8" wall
if required.

A.R.C. FABRIC

SPECIFICATIONS OF STANDARD MESHES

A.S.A84 Ref. No.	Distance centre to centre of wires		Gauge of wires		Sectional area per foot width (sq. in.)	Nominal weight per sq. yd. (lb.)
	Main (in.)	Cross (in.)	Main S.W.G.	Cross S.W.G.		
301	3	8	4/0	2	.5027	18.11
302	3	8	3/0	2	.4348	16.04
303	3	8	2/0	3	.3805	13.92
304	3	8	1/0	3	.3298	12.37
305	3	8	1	3	.2828	10.93
306	3	12	2	2	.2393	9.14
307	3	12	3	3	.1996	7.63
308	3	12	4	4	.1691	6.46
309	3	12	5	5	.1412	5.40
310	3	12	6	6	.1158	4.42
312	3	12	8	8	.0804	3.07
314	3	12	10	10	.0515	1.97
601	6	6	1	1	.1414*	8.65
602	6	6	2	2	.1197*	7.32
603	6	6	3	3	.0998*	6.10
604	6	6	4	4	.0845*	5.17
605	6	6	5	5	.0706*	4.32
606	6	6	6	6	.0579*	3.53
608	6	6	8	8	.0402*	2.46
610	6	6	10	10	.0257*	1.57
—	3	3	3	3	.1996*	12.20
—	3	3	5	5	.1412*	8.64

*In each direction.

A.R.C. FABRIC

STANDARD SHEETS
SIZES AND SHIPPING DIMENSIONS

A.S.A84 Ref. No.	Length of Standard Sheet (lb.)	Width of Standard Sheet	Contents of Standard Sheet (sq. yds.)	Weight of Standard Sheet (ft.)	Shipping Dimensions of 10 Sheets			
					Length (in.)	Width (in.)	Depth (in.)	Weight (lb.)
301	18	7' 0"	14	254	216	84	3 $\frac{3}{4}$	2535
302	18	7' 0"	14	225	216	84	3 $\frac{5}{8}$	2246
303	18	7' 0"	14	195	216	84	3 $\frac{1}{2}$	1949
304	18	7' 0"	14	173	216	84	3 $\frac{1}{4}$	1732
305	18	7' 0"	14	153	216	84	3	1530
306	18	7' 0"	14	128	216	84	3	1280
307	18	7' 0"	14	107	216	84	2 $\frac{3}{4}$	1068
308	18	7' 0"	14	90	216	84	2 $\frac{1}{2}$	904
309	18	7' 0"	14	76	216	84	2 $\frac{3}{8}$	756
310	18	7' 0"	14	62	216	84	2 $\frac{1}{4}$	619
312	Normally stocked in rolls only.							
314								
601	20	7' 6"	16 $\frac{2}{3}$	144	240	90	3 $\frac{3}{8}$	1440
602	20	7' 6"	16 $\frac{2}{3}$	122	240	90	3	1220
603	20	7' 6"	16 $\frac{2}{3}$	102	240	90	2 $\frac{3}{4}$	1020
604	20	7' 6"	16 $\frac{2}{3}$	86	240	90	2 $\frac{1}{2}$	860
605	20	7' 6"	16 $\frac{2}{3}$	72	240	90	2 $\frac{3}{8}$	720
606	20	7' 6"	16 $\frac{2}{3}$	59	240	90	2 $\frac{1}{4}$	590
608	20	7' 6"	16 $\frac{2}{3}$	41	240	90	1 $\frac{3}{4}$	410
610	Normally stocked in rolls only.							
—	10	7' 0"	7.78	95	120	84	2 $\frac{3}{4}$	950
—	10	7' 0"	7.78	67	120	84	2 $\frac{3}{8}$	670

A.R.C. FABRIC

Giving Strength equal to M.S. Rods for various Diameters and Spacings

Stresses: A.R.C. Fabric 30,000 p.s.i. M.S. Bar: 20,000 p.s.i.

A.S. A.84 Ref. No.	Spacing — Inches						
	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
301				5	7	10	13
302			4	6	8	11	15
303			5	7	10	13	17
304		3	5	8	11	15	
305		4	6	9	13	18	
306		4	7	10	15		
307		5	8	12			
308		6	9				
309	3	7	12				
310	4	8					
312	5	12					
314	9						
601	3	7	11				Equal Reinforcement at right angles
602	4	8	13				
603	4	9	16				
604	5	11	18				
605	6	$12\frac{1}{2}$					
606	9	15					
608	12						

GENERAL INSTRUCTIONS FOR PAINTING

To obtain the best possible results from paint it is essential that the surface is clean and firm, and that the necessary primer or sealer is applied to ensure durability and adhesion and prevent excessive absorption. Check the instructions on the container of each type of paint.

Ensure all surfaces are free from dirt, grease, oil, rust, and moisture, so that a finish resistant to peeling, cracking, blistering or discolouration is obtained.

Stir all materials thoroughly before use, a good plan being to decant the vehicle off the surface of the pigment, work up the pigment mass, and add the decanted liquid slowly while stirring. Where practicable, place the container upside down for as long as possible before opening.

Always allow ample drying time between successive coats.

When painting masonry, cement render, plaster and similar surfaces, allow to age for at least one month to ensure moisture and alkali content is reduced to safe, workable condition. Cement sealers are designed to form an alkali-resistant barrier, and to prevent excessive absorption.

Softwood requires an oil-based undercoat reduced with raw linseed oil. Hardwood requires a similar undercoat thinned with turpentine only.

Iron and steel should be primed with a red-lead or red oxide-zinc chromate primer or other recommended inhibitive metal primer.

The recommended procedures for painting the normal Lysaght galvanized steel sheet qualities are provided in Advisory Service Leaflet AI-18.1 obtainable on application to John Lysaght (Australia) Limited, Branch Offices.

In brief, new galvanized steel may be treated in any of four ways:—

- (i) Weathering which involves six to twelve months exterior exposure.
- (ii) The application of a two-pack etch primer.
- (iii) The application of proprietary solutions to produce a zinc phosphate coating under controlled conditions.
- (iv) The application of zinc dust — zinc oxide primer. For general purposes use 6 lbs. of zinc dust per gallon of oil based medium. For tanks increase the amount of zinc dust to 12 lbs.

Having provided a suitable base by one of the foregoing approved methods, good quality paints should be used as a finish coat. In the case of zinc dust — zinc oxide paint, if preferred, a second coat may be used as a finish coat.

In coastal and industrial areas and hot climates, the painting of end laps with an adherent paint system as in the foregoing is strongly recommended.

Zincanneal quality is in a separate class; it is primarily zinc alloy coating which receives a phosphate treatment during manufacture and is suitable for painting without priming.

HOW TO MAKE GOOD CONCRETE

PROPORTIONS.—Correct proportions of cement, aggregate, and water depend on nature of work for which concrete is intended, and character and condition of aggregate. Table of quantities for various classes of work is given below.

Class of Work	Proportions of nominal mix (volumes)	Materials required to make 10 cub. yds. of concrete			Yield of mixture per paper bag of cement (c. ft.)	Water in gals. per bag of cement
		Cement (bags)	Sand (c. yds.)	Metal or gravel (c. yds.)		
High structural strength concrete for thin reinforced walls, slender reinforced columns, fence posts, heavy-duty floors.	1:1½:3	76	4.2	8.5	3.55	4.7
Commonly adopted mixture for reinforced concrete beams and floor slabs, roads, footpaths, etc., silos, etc.	1:2:4	60	4.4	8.9	4.50	5.4
For strong foundations, lean-mix roads.	1:2½:5	49	4.5	9.1	5.50	6.1
Foundations for roads, machinery, buildings, etc., and for concrete in mass walls.	1:3:6	41	4.6	9.1	6.60	6.9
Watertight plaster coats for cellars, tanks, dairy walls, etc.	1:2	128	9.5	—	2.10	4.2
Surface rendering for two-course concrete paths.	1:2½	110	10.1	—	2.45	4.5
Mortar for wall plaster, rough-casting, and stucco.	1:3	96	10.6	—	2.80	4.9

Job proportioning may be by volume or weight; volumetric method is usual for small jobs. Water should be carefully measured, allowance being made for moisture content of sand.

CONCRETE (continued) MATERIALS

PORTLAND CEMENT.—Normal type suited to all normal work; High-Early Strength and Low-Heat for special applications only. Packing.—Paper bags hold 1 cu. ft. = 94 lb. nett.

Storage.—Must be dry; stack away from exterior walls, and in a manner to prevent air circulation through stack.

At time of use, cement should be free-flowing and free from lumps.

SAND OR FINE AGGREGATE.—Must be clean and free from earth, clay, humus, etc.; a coarse sand is best for concrete making, but particles should preferably be graded from coarse to fine. A sand containing silt and/or clay should be washed before use.

COARSE AGGREGATE.—May be gravel or crushed stone, graded from the largest particles down to the size of the largest sand grains to be used. Particles should be clean, hard, impervious and free from organic matter.

OTHER AGGREGATE.—(1) Crushed blast furnace slag may be an economic and satisfactory material. (2) Cinders and coke-breeze should be used only for unimportant work unless previous experience has shown material from the same source to be satisfactory. (3) Lightweight aggregate of the bloated clay or shale type is suitable for structural concretes with strengths up to 4000-5000 p.s.i. The concrete density varies from 90 to 105 p.c.f. (4) Exceptionally lightweight aggregate—vermiculite or perlite—can be used for concretes where no structural strength is required. It has excellent sound-absorbing and heat-resisting properties. It is suitable for use as a fire-proofing medium.

WATER.—Should be drinkable.

USES OF CONCRETE.—Information relating to concrete problems will be given upon request to the Cement and Concrete Association of Australia, 14 Spring Street, Sydney.

MIXING

Concrete should preferably be mixed in a concrete mixer, hand or power operated, or may be hand mixed.

Mixers, when used, should revolve at speeds recommended by makers, and a mixing time of $1\frac{1}{2}$ to 2 minutes after addition of all ingredients is recommended.

HAND MIXING is carried out as follows:—

Equipment.—Shovel, mixing board, watering can, measuring box.

Method.—(1) Sand measured and spread on mixing board.

(2) Cement spread over sand.

(3) Sand and cement turned over with shovels until thoroughly mixed and uniform colour throughout.

(4) Coarse aggregate measured, spread on top, and mixing process repeated until colour again uniform.

(5) Water added slowly in depression in centre and mixed as added until whole has a quaky, jelly-like consistency.

CONCRETE (continued) PLACING

- (1) When concrete is thoroughly mixed, place without delay; concrete made with ordinary Portland cement should be placed within half an hour of mixing in summer and three-quarters of an hour in winter.
- (2) Place with care, avoiding chuting and dumping, which causes segregation of coarse from fine material.
- (3) Place as near as possible to final position; working concrete along in forms causes segregation.
- (4) Work thoroughly in mass of concrete against forms to ensure good packing.
- (5) When placing against hardened concrete—
 - (a) Thoroughly wire-brush surface and wash to remove all loose particles.
 - (b) Apply layer of mortar of same composition as new concrete (but without coarse aggregate), and of plastic consistency, to surface—preferably brushing in.
 - (c) Immediately place fresh concrete.

CURING.—As soon as placed, protect concrete against drying out by shading. When hard enough to resist finger impressions, cover, and keep moist for at least one week.

WATERTIGHT CONCRETE.—Essential requirements for watertight concrete are as follows:—

- (1) Suitable design (to prevent cracking).
- (2) Sound, well-graded aggregates of low porosity.
- (3) Limited amount of mixing water.
- (4) Plastic, workable mixes.
- (5) Thorough mixing.
- (6) Proper placing and compacting.
- (7) Favourable curing conditions.

Waterproofing admixtures may provide additional insurance where low hydraulic heads only are to be resisted, but are not a substitute for good concrete.

COLOURED CONCRETE.—Colour pigments for use with cement must be—

- (1) Proof against lime, alkali, and action of direct sunlight.
- (2) Very finely ground, insoluble in water, and uniform in shade and quality.

The most suitable pigments are metallic oxides of a high degree of purity; low-grade pigments must be used in larger quantities, thereby reducing strength and quality of the concrete or mortar. A pure white is obtained only by use of white Portland cement with white sand, crushed marble, etc.

For economy, pigment and cement should be ground together; or, failing this, sieved together to a uniform colour throughout. A steel floating trowel gives a darker colour than a wooden float. Concrete cured in sunlight will be given a lighter colour than if cured in shade.

Coloured concrete is darker when wet than when dry. Trowelling on partly hardened surfaces causes colour blotches. Amount of pigment depends on a number of factors, and may vary from about 5 to 12 lb. per bag of cement.

CONCRETE (continued)

Use of the following pigments is recommended:—

Colour	Pigment
Red	Iron oxide.
Yellow	Iron oxide or hydroxide.
Brown	Iron oxide.
Black	Iron oxide or manganese dioxide. (Lamp black should NOT be used.)
Green	Chromium oxide.
Blue	Cobalt oxide.

Pigments may be mixed to give other effects as desired.

Coloured cements with white cement as a base are available.

FORMWORK.—The following points must be observed if a good concrete job is to be obtained at lowest cost.

- (1) Shuttering must be strong and rigid.
- (2) It must be designed for removal without excessive damage to concrete or timber.
- (3) It must be carefully made and erected to avoid gaps between boards, panels, etc., which may require filling with clay, putty, or other suitable material.
- (4) It must be treated to prevent concrete from adhering to it.
- (5) It must not be removed until concrete has sufficient strength; this period will be longer in cold than in warm weather.

REINFORCED CONCRETE.—Concrete is strong in compression, weak in tension; hence, when tensile stresses are to be carried, steel bars are used to reinforce the concrete. Determination of the amount and placing of the steel require expert knowledge, and are not matters for the layman; once determined, the steel must be accurately placed on the job.

PAVING AND RENDERING.—Materials required for 1,000 sq. ft. of surface:—

Paving thickness	Concrete mix					
	1:2:4			1:2½:5		
	Cement (bags)	Sand (c.ft.)	Metal (c.ft.)	Cement (bags)	Sand (c.ft.)	Metal (c.ft.)
2" (Light foot traffic)	38	75	150	31	77	154
3" (Normal footpath)	56	112	224	46	115	230
4" (Car drives, etc.)	76	150	298	62	154	308
6" (Heavy trucks, etc.)	112	224	448	92	230	460

Render thickness	1:2		1:2½		1:3	
	Cement (bags)	Sand (c.ft.)	Cement (bags)	Sand (c.ft.)	Cement (bags)	Sand (c.ft.)
1½"	20	40	17	43	15	44
1¼"	30	60	25	63	22	68
1"	40	80	34	85	30	88

BRICKS AND BRICKWORK

1,000 common bricks weigh about 4 tons.

Standard brick size = 9" x 4-5/16" x 3".

Standard measure = 1 rod = 16-1/2' x 16-1/2' x 13-1/2".

1 Rod = 272 super feet x 1-1/2 brick thickness.

= 408 " " x 1 " "

= 816 " " x 1/2 " "

= 306 cubic feet or 11-1/3 cubic yards.

QUANTITIES OF MATERIALS REQUIRED FOR ONE UNIT OF BRICKWORK

Unit Quantity	Bricks		Mortar: Lime or Cement Cu. Ft.	2:1 Cement Mortar	
	No.	Cu. Ft.		Cement	Sand
				Bags	Cu. Ft.
<u>1/4" Joints</u>					
1 Rod	3,703	260	48	23	46
1 Cu. Yd.	327	22.97	4.03	2	4
<u>3/8" Joints</u>				3:1 Cement Mortar	
1 Rod	3,429	241	65	23.2	70
1 Cu. Yd.	302	21.27	5.73	2.04	6.12

Weight of Brickwork.—In lime mortar, about 112 lb. per cu. ft.

In cement mortar, about 120 lb. per cu. ft.

Paving requires per sq. yd.—32 bricks on flat; 48 bricks on edge.

MORTAR FOR BRICKWORK:

- Cement mortar should be used where a high degree of impermeability is required, as in walls and piers below dampcourse, or where high strength is required, as in piers or walls carrying heavy loads. Usual proportions are 1 part cement to 3 parts sand, or 1 part cement to 4 parts sand by volume.
- Lime mortar is frequently used where strength is of less importance; it is more workable than cement mortar, resulting in a higher rate of bricklaying. Usual proportions are 3 to 4 parts of sand to 1 part of hydrated lime or lime putty by volume.
- Composition mortars consist of cement, hydrated lime, and sand, and are intermediate between cement and lime mortars in regard to strength and workability. Proportions used vary from a cement mortar with added lime equal to 10% of cement volume (to improve workability) to a lime mortar gauged with 10% cement immediately before use to improve robustness of the job; satisfactory proportions for normal brickwork are 1 part cement to 1 part hydrated lime or lime putty to 6 parts sand by volume.

LABOUR.—A good tradesman should lay, per 8-hour day, 600/700 bricks of 9" work in cement-struck joint; 700/1,000 bricks of 14" work in lime or compo. mortar; 500 bricks in selected face work.

BRICKWORK DIMENSIONS

N.S.W. STANDARDS

NOTES.— $\frac{1}{4}$ " should be added for bed under sills bearers, etc.
Openings are $\frac{1}{4}$ " longer than piers. Four courses equals 1'-1 $\frac{1}{2}$ ".

Courses or Bricks	Piers	Openings	Heights	Courses or Bricks	Piers	Openings	Heights
$\frac{1}{4}$	4-5/16"	5-1/16"		13	10' 1-1/2"	10' 2-1/4"	3' 7-7/8"
1	9"	9-3/4"	3-3/8"	13 $\frac{1}{2}$	10' 6-3/16"	10' 6-15/16"	
1 $\frac{1}{2}$	1' 1-11/16"	1' 2-7/16"		14	10' 10-7/8"	10' 11-5/8"	3' 11-1/4"
2	1' 6-3/8"	1' 7-1/8"	6-3/4"	14 $\frac{1}{2}$	11' 3-9/16"	11' 4-5/16"	
2 $\frac{1}{2}$	1' 11-1/8"	1' 11-7/8"		15	11' 8-1/4"	11' 9"	4 2-5/8"
3	2' 3-3/4"	2' 4-1/2"	10-1/8"	15 $\frac{1}{2}$	12' 0-5/16"	12' 1-11/16"	
3 $\frac{1}{2}$	2' 8-7/16"	2' 9-3/16"		16	12' 5-5/8"	12' 6-3/8"	4' 6"
4	3' 1-1/8"	3' 1-1/8"	1' 1-1/2"	16 $\frac{1}{2}$	12' 10-5/16"	12' 11-1/16"	
4 $\frac{1}{2}$	3' 5-13/16"	3' 6-9/16"		17	13' 3"	13' 3-3/4"	4' 9-3/8"
5	3' 10-1/2"	3' 11-1/4"	1' 4-7/8"	17 $\frac{1}{2}$	13' 7-11/16"	13' 8-7/16"	
5 $\frac{1}{2}$	4' 3-3/16"	4' 3-15/16"		18	14' 0-3/8"	14' 1-1/8"	5' 0-3/4"
6	4' 7-7/8"	4' 8-5/8"	1' 8-1/4"	18 $\frac{1}{2}$	14' 5-1/16"	14' 5-13/16"	
6 $\frac{1}{2}$	5' 0-7/16"	5' 0-13/16"		19	14' 9-3/4"	14' 10-1/2"	5' 4-1/8"
7	5' 5-1/4"	5' 6"	1' 11-5/8"	19 $\frac{1}{2}$	15' 2-7/16"	15' 3-3/16"	
7 $\frac{1}{2}$	5' 9-15/16"	5' 10-11/16"		20	15' 7"	15' 7-7/8"	5' 7-1/2"
8	6' 2-5/8"	6' 3-3/8"	2' 3"	20 $\frac{1}{2}$	15' 11-13/16"	16' 0-9/16"	
8 $\frac{1}{2}$	6' 7-5/16"	6' 8-1/16"		21	16' 4-1/2"	16' 5-1/4"	5' 10-7/8"
9	7' 0"	7' 0-3/4"	2' 6-3/8"	21 $\frac{1}{2}$	16' 9-3/16"	16' 9-15/16"	
9 $\frac{1}{2}$	7' 4-11/16"	7' 5-7/16"		22	17' 1-7/8"	17' 1-7/8"	6' 2-1/4"
10	7' 9-3/8"	7' 0-1/8"	2' 9-3/4"	22 $\frac{1}{2}$	17' 6-9/16"	17' 7-5/16"	
10 $\frac{1}{2}$	8' 1-15/16"	8' 2-11/16"		23	17' 11-1/4"	18' 0"	6' 5-5/8"
11	8' 6-3/4"	8' 7-1/2"	3' 1-1/8"	23 $\frac{1}{2}$	18' 3-13/16"	18' 4-9/16"	
11 $\frac{1}{2}$	8' 11-7/16"	9' 1-3/16"		24	18' 8-5/8"	18' 9-3/8"	6' 9"
12	9' 4-1/8"	9' 4-7/8"		24 $\frac{1}{2}$	19' 1-5/16"	19' 2-1/16"	
12 $\frac{1}{2}$	9' 8-3/16"	9' 8-15/16"		25		10' 6-3/4"	7' 0-3/8"

BRITISH WEIGHTS AND MEASURES

LENGTH

12 inches (ins.)	=	1 Foot (ft.)	4 Rods	} = 1 Chain
3 Feet	}	= 1 Yard (yd.)	22 Yards	
36 Inches			100 Links	
5½ Yards	}	= 1 Rod, pole, or perch	8 Furlongs	} = 1 Mile
16½ Feet			80 Chains	
40 Rods	=	1 Furlong	320 Rods	
			1760 Yards	

SQUARE

Square Inches	Square Feet	Square Yards	Square Rods	Square Chains	Acres	
144	1	—	—	—	—	1 sq. ft.
1,296	9	1	—	—	—	1 sq. yd.
39,204	272½	30½	1	—	—	1 sq. rod
627,264	4,356	484	16	1	—	1 sq. chain
6,272,640	43,560	4,840	160	10	1	1 acre
4,014,489,600	27,878,400	3,097,600	102,400	2,560	640	1 sq. mile

CUBIC

1 Cubic Ft.	=	1728 cubic ins.	1 Perch of stone	=	24½ cubic ft.
1 Cubic Yd.	=	27 cubic ft.	1 Bushel	=	1.284 cubic ft.
1 Cord Ft.	=	16 cubic ft.	1 Gall. of water	=	0.161 cubic ft.
1 Cord of wood	=	128 cubic ft.	1 Shipping ton	=	40 cubic ft.

AVOIRDUPOIS

16 Drams	=	1 Ounce (oz.)	=	437.5 Grains
16 Ounces	=	1 Pound (lb.)	=	7,000 Grains
14 Pounds	=	1 Stone		
2 Stone	=	1 Quarter	=	28 Pounds
4 Quarters	=	1 Hundredweight (cwt.)	=	112 Pounds
20 Cwts.	=	1 Ton	=	2,240 Pounds
100 Pounds	=	1 Hundredweight (cwt.) (U.S.A.)		
2,000 Pounds	=	1 Short Ton (U.S.A.)		

CAPACITY

4 Gills	=	1 Pint	4 Pecks	=	1 Bushel
2 Pints	=	1 Quart	8 Bushels	=	1 Quarter
4 Quarts	=	1 Gallon	5 Quarters	=	1 Load
2 Gallons	=	1 Peck	1 Bag	=	3 Bushels

APPROXIMATE EQUIVALENTS

1 Millimetre	=	1/25th of inch	1 Kilogramme	=	2½ lbs.
2½ Centimetres	=	1 inch	1,000 Kilogrammes	=	1 Ton
1 Metre	=	39½ inches	6½ Sq. Centimetres	=	1 Sq. Inch
1 Kilometre	=	5 Furlongs (⅕ m.)	1 Sq. Metre	=	10½ Sq. ft.

(See Conversion Table, page 153)

WEIGHTS OF VARIOUS MATERIALS

IN LBS. PER CUBIC FOOT

Alcohol, Commercial	52	Lime	64
Acid—Hydrochloric	75	Limestone and Marbles	168
Nitric	76	Malt	27
Sulphuric	115	Masonry of granite or	
Aluminium	162	limestone, well dressed	165
Apples	38	Masonry of mortar rubble	154
Asbestos	192	Masonry of dry rubble,	
Asphalt pavement	130	well scabbled	138
Ashes	40	Masonry of sandstone,	
Barley	38	well dressed	144
Beans, White	48	Milk	64
Beer	65	Mortar, hardened	103
Books in Library	30	Mud—dry, close	80-110
Bran	14	wet, fluid (mix)	120
Brass (Copper and Zinc)		Oil—Linseed	59
cast	504	Olive	57
Brass, rolled	524	Turpentine	54
Brick—pressed	150	Paper—Calendered, book	50
in cement mortar	120	Manila	59
interior	100	News	38
stone faced	140	Strawboard	33
Brickwork	112	Super-calendered	69
Cabbage	40	Paving stone	150
Cement	94	Peas	48
Chalk	156	Pianos (each)	400-500
Charcoal	30	Petroleum	55
Cheese	30	Potatoes	48
Clay—Potters', dry	119	Rice	35
Lump, loose	63	Rye	45
Clinker	86	Salt—Coarse	45
Coal—bituminous, solid	84	Table	49
bituminous, loose	49	Sand—well shaken	99-117
Coke	40	well set	120-140
Concrete	130	Sandstone	151
Copper	550	Shales	162
Cork	15	Silver	655
Cotton goods	25	Slate	175
Earth—loam, dry	76	Snow—Fresh	5.12
self-flowing mud	108	Wet	15.20
Eggs	68	Steel	490
Glass—window	157	Straw	19
Granite	170	Sugar	100
Gravel (see Sand)		Sulphur	125
Gypsum	142	Tar	63
Hay—baled	24	Tin—Cast	459
Ice	58	Turf	20-30
Iron—cast	450	Vinegar	68
wrought	480	Water	62.4
Lead	711	Water—Sea	64
Leather—sole, in piles	17	Wax—Bees'	59.3
		Wheat	50
		Zinc	437.5

GENERAL CONVERSION TABLE

Multiply by	To Convert	Into	
14.696	Atmospheres	Lb./sq. in.	.068
1013.3	"	Millibars	.000987
33.9	"	Feet of Water	.0295
.556	B.Th.Ü.	C.H.U.	1.8
778.2	"	Ft. lb.	.00129
3.929×10^{-4}	" hours	H.P. Hours	2,525.06
16.387	Cubic inches	Cubic Cms.	.061
28.316	Cubic feet	Litres	.0353
6.229	Cubic "	Gallons (Imp.)	.161
.765	Cubic yards	Cub. metres	1.308
50.802	Cwt.	Kilogrammes	.0197
.0175	Degrees	Radians	57.296
30.48	Feet	Centimetres	.0328
.138	Foot-lb.	K'grammetres	7.233
.323	Foot-tons	Tonne-metres	3
4.546	Gallons (Imp.)	Litres	.22
10	Gallons of water ...	Pounds	.1
1.201	Gallons (Imp.)	Gallons (U.S.A.) ...	.833
1.014	Horse-power	Force-de-cheval	.986
745.7	"	Watts	.00134
33,000	"	Ft. lb./min.	1/33,000
76.04	"	Kgm./sec.	.0131
2.54	Inches	Cms.	.3937
.0736	Inches of water ...	Inches of Mercury .	13.595
.738	Joules	Ft. lb.	1.356
1.152	Knots	Miles/hour	.868
70.307	Lb./sq. in.	Gm./sq. cm.	.0142
2.306	" "	Head of Water (ft.)	.434
.7	" "	" " (M.)	1.429
4.882	Lb./sq. ft.	Kgm./sq. metre	.205
16.019	Lb./cub. ft.	Kgm./cub. metre ...	.0624
.593	Lb./cub. yd.	" " " "	1.686
16,093	Miles	Mètres " "	.000621
88	Miles/Hour	Ft./min.	.0114
1.462	" "	Ft./sec.	.682
196.85	Mètres/Sec.	Ft./min.	.00508
1.152	Nautical miles	Statute Miles	.868
28.35	Ounces	Grammes	.0353
.454	Pounds (Avoir.)	Kilogrammes	2.205
.454	Pounds of Water ...	Litres	2.202
6.452	Square inches	Square cms.	.155
.093	Square feet	Square metres	10.764
.836	Square yards	" " " "	1.196
1.12	Tons	Short tons (U.S.A.) .	.893
1016	"	Kilogrammes	.000984
1.575	Tons/sq. in.	Kgm./sq. mm.	.625
44.26	Watts	Ft. lb./min.	.0227
.102	"	Kgm./sec.	9.807
.9144	Yards	Metres	1.094
	To Obtain	From	Multiply by above

ENGINEERING CONVERSION FACTORS

Multiply	By	To Obtain
Acres	4.04686 x 10 ⁻³	Square kilometres
Ares	1076.39	Square feet
Board feet	144 sq. in x 1 in.	Cubic inches
Board feet	.0833	Cubic feet
Centimetres	3.28083 x 10 ⁻²	Feet
Centimetres	.3937	Inches
Cubic centimetres	3.53147 x 10 ⁻⁵	Cubic feet
Cubic centimetres	6.102 x 10 ⁻²	Cubic inches
Cubic feet	2.8317 x 10 ⁻⁴	Cubic centimetres
Cubic feet	2.8317 x 10 ⁻²	Cubic metres
Cubic feet	6.22884	Gallons, British Imperial
Cubic feet	28.3158	Litres
Cubic feet	2.38095 x 10 ⁻²	Tons, British shipping
Cubic feet	.025	Tons, U.S. shipping
Cubic inches	16.38716	Cubic centimetres
Cubic metres	35.3147	Cubic feet
Cubic metres	1.30796	Cubic yards
Cubic yards	.764554	Cubic metres
Degrees angular	.0174533	Radians
Degrees Fah. (less 32°F).	.5556	Degrees Centigrade
Degrees Centigrade	1.8	Deg. Fah. (less 32°F.)
Foot pounds	.13826	Kilogram metres
Feet	30.48	Centimetres
Feet	.3048	Metres
Feet	304.8	Millimetres
Feet	1.64474 x 10 ⁻⁴	Miles, nautical
Gallons, British Imperial	.160538	Cubic feet
Gallons, British Imperial	1.20091	Gallons, U.S.
Gallons, British Imperial	4.54596	Litres
Gallons, U.S.	.832702	Gallons, British Imperial
Gallons, U.S.	3.78543	Litres
Grams, metric	2.20462 x 10 ⁻³	Pounds, Avoirdupois
Horse-power, metric	.98632	Horse-power, U.S.
Inches	2.54	Centimetres
Inches	2.54 x 10 ⁻²	Metres
Inches	25.4	Millimetres
Kilograms	2.20462	Pounds
Kilograms	9.84206 x 10 ⁻⁴	Long tons
Kilograms	1.10231 x 10 ⁻³	Short tons
Kgs. metres	7.233	Foot pounds
Kgs. per metre	.67169	Pounds per foot
Kgs. per sq. centimetre	14.2234	Pounds per square inch
Kgs. per sq. metre	.204817	Pounds per square foot
Kgs. per sq. metre	9.14362 x 10 ⁻⁵	Long tons per sq. foot
Kgs. per sq. millimetre	1422.34	Pounds per square inch
Kgs. per sq. millimetre	.634973	Long tons per sq. inch
Kgs. per cubic metre	6.2428 x 10 ⁻²	Pounds per cubic foot
Kilometres	.621 37	Miles, statute
Kilometres	.53961	Miles, Nautical
Litres	.219976	Gallons, British Imperial
Litres	.26417	Gallons, U.S.

ENGINEERING CONVERSION FACTORS

Multiply	By	To Obtain
Litres	3.53145×10^{-2}	Cubic feet
Metres	3.28083	Feet
Metres	39.37	Inches
Metres	1.09361	Yards
Miles, Statute	1.60935	Kilometres
Miles, Statute	.8684	Miles, nautical
Miles, Nautical	6080.204	Feet
Miles, Nautical	1.85325	Kilometres
Miles, Nautical	1.1516	Miles, statute
Millimetres	3.28083×10^{-3}	Feet
Millimetres	3.937×10^{-2}	Inches
Pounds, Avoirdupois ..	453.592	Grams, metric
Pounds, Avoirdupois ..	.453592	Kilograms
Pounds, Avoirdupois ..	4.464×10^{-4}	Tons, long
Pounds, Avoirdupois ..	4.53592×10^{-4}	Tons, metric
Pounds, per foot	1.48816	Kilograms per metre
Pounds, per square foot	4.88241	Kilograms per sq. metre
Pounds, per square inch	7.031×10^{-2}	Kgs. per sq. centimetre
Pounds, per square inch	7.031×10^{-4}	Kgs. per sq. millimetre
Pounds, per cubic foot	16.0184	Kgs. per cubic metre
Radians	57.29578	Degrees, angular
Square centimetres ..	.1550	Square inches
Square feet	9.29034×10^{-4}	Acres
Square feet	.092903	Square metres
Square inches	6.45163	Square centimetres
Square inches	645.163	Square millimetres
Square kilometres ..	247.105	Ares
Square kilometres ..	.3861	Square miles
Square metres	10.7639	Square feet
Square metres	1.19599	Square yards
Square miles	2.590	Square kilometres
Square millimetres ..	1.550×10^{-3}	Square inches
Square yards	.83613	Square metres
Tons, long	1016.05	Kilograms
Tons, long	2,240	Pounds
Tons, long	1,01605	Tons, metric
Tons, long	1.120	Tons, short
Tons, long, per sq. foot	1.09366×10^{-4}	Kilograms per sq. metre
Tons, long, per sq. inch	1.57494	Kgs. per sq. millimetre
Tons, metric	2204.62	Pounds
Tons, metric	.98421	Tons, long
Tons, metric	1.10231	Tons, short
Tons, short	907.185	Kilograms
Tons, short	.892857	Tons, long
Tons, short	.907185	Tons, metric
Tons, British shipping ..	42.00	Cubic feet
Tons, British shipping ..	.952381	Tons, U.S. shipping
Tons, U.S. shipping ..	40.00	Cubic feet
Tons, U.S. shipping ..	1.050	Tons, British shipping
Yards	.9144	Metres

GEOMETRY AND MENSURATION

CIRCLE.—Circumference = diameter $\times \frac{22}{7}$ (or 3.1416).

Area = diameter² $\times$ 0.7854.

Area of sector of circle = length of arc $\times$ half radius.

Area of segment of circle = area of sector, less area of triangle.

Side of square of area equal to circle = 0.8852 diameter.

Diameter of circle equal in area to square = 1.1284 side.

SPHERE.—Surface area = 3.1416 $\times$ diameter²

Volume = 0.5236 diameter³.

AREAS generally.

Square, rectangle, rhombus, or rhomboid = base $\times$ height.

Triangle = half base $\times$ perpendicular height.

Trapezoid = half sum of two parallel sides $\times$ height.

Area of any figure of four or more unequal sides is found by dividing it into triangles, finding areas of each, and adding together.

Regular polygon (inscribed circle) = half radius of circle $\times$ length of one side $\times$ number of sides.

Parabola = base $\times$ height $\times$ 2/3.

Ellipse = long axis $\times$ short axis $\times$ 0.7854.

SURFACES AND VOLUMES

CUBES.— a = length of one side, volume = a^3 , surface area = $6a^2$.

RECTANGULAR PRISM.—Volume = area of base $\times$ height = $bl \times h$.

Total surface area = $2(bl + lh + bh)$.

REGULAR PRISM.—Volume = $\frac{1}{2}n \times r \times a \times h$, where n = number of sides, r = radius of inscribed circle, a = length of side.

CYLINDER (Right Circular).—Volume = 0.7854 $\times$ diameter² $\times$ height
Lateral surface area, 3.1416 $\times$ diameter $\times$ height.

Total surface area = 3.1416 (diameter $\times$ height + diameter).

ANY PRISM OR CYLINDER.—Volume = $h \times$ area of base. Lateral surface area = length of cylinder $\times$ perimeter of normal sector.

REGULAR PYRAMID OR CONE.—Volume = $1/3$ (area of base $\times$ height). Lateral area of regular figure = half (perimeter of base $\times$ slant height).

ANY PYRAMID OR CONE.—Volume = $1/3$ (area of base $\times$ distance from vertex to plane of base).

FRUSTUM OF ANY PYRAMID OR CONE.—Volume = $h/3 (A_1 + A_2 + \sqrt{A_1 A_2})$, where A_1 and A_2 are the areas of bases made by parallel planes.

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	3	5	7	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	12	21	29	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	11	19	26	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	10	17	24	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	10	16	23	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	9	15	21	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	8	14	20	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	8	13	18	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	7	12	17	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	7	12	16	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	7	11	16	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	6	11	15	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	6	10	14	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	6	10	14	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	6	9	13	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	5	9	12	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	5	9	12	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	5	8	11	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	5	8	11	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	5	8	11	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	4	7	10	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	4	7	10	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	4	7	10	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	4	7	9	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	4	6	9	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	4	6	9	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	4	6	9	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	4	6	8	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	3	6	8	11
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	3	6	8	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	3	5	8	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	3	5	8	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	3	5	7	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	3	5	7	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	3	5	7	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	3	5	7	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	3	5	7	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	3	5	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	3	5	6	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	3	4	6	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	3	4	6	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	3	4	6	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	3	4	6	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	4	6	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	4	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	4	6	7

Difference 2 4 6 8 obtained by interpolation.

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	3	5	7	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	4	5	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	4	5	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	4	5	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	2	4	5	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	2	4	5	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	2	4	5	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	2	4	5	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	2	3	5	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	2	3	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	2	3	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	2	3	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	2	3	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	2	3	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	2	3	4	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	2	3	4	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	2	3	4	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	2	3	4	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	2	3	4	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	2	3	4	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	2	3	4	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	2	3	4	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	2	3	4	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	2	3	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	2	3	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	2	3	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	2	3	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	2	3	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	2	3	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	2	3	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	2	3	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	2	3	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	2	3	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	2	3	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	2	3	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	2	3	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	2	3	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	2	3	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	2	3	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	2	3	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	2	3	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	2	3	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	2	3	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	2	3	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	2	3	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	2	3	4

Common Logarithms = Hyperbolic Logarithms x 0.43429.

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	3	5	7	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	1	1	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	1	1	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	1	1	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	1	1	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	2	2	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	2	2	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	2	2	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	2	2	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	2	2	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	2	2	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	2	2	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	2	3	3
.20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	2	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	2	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	2	3	3
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	2	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	2	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	2	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	2	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	2	3	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	2	3	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	2	3	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	2	3	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	2	3	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	2	3	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	2	3	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	2	3	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	2	3	4	5
.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	2	3	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	2	3	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	2	3	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	3	4	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	2	3	4	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	2	3	4	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	2	3	4	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	2	3	4	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	2	3	4	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	2	3	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	2	3	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	2	3	5	6
.48	3020	3027	3031	3041	3048	3055	3062	3069	3076	3083	1	2	4	5	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	2	3	5	6

Difference 2 4 6 8 obtained by interpolation.

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	1	3	5	7	9
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	2	4	5	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	4	5	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	4	5	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	4	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	4	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	4	6	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	3	4	6	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	3	4	6	8
.58	3802	3811	3819	3828	3937	3846	3855	3864	3873	3882	1	3	4	6	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	3	5	6	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	3	5	6	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	3	5	7	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	3	5	7	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	3	5	7	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	3	5	7	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	3	5	7	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	3	5	7	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	3	5	8	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	3	6	8	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	3	6	8	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	4	6	8	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	4	6	8	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	4	6	9	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	4	6	9	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	4	6	9	12
.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	4	7	9	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	4	7	9	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	4	7	10	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	4	7	10	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	4	7	10	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	4	7	10	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	5	8	11	14
.82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	5	8	11	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	5	8	11	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	5	8	11	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	5	8	12	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	5	8	12	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7468	2	5	9	12	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	5	9	12	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	5	9	13	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	6	9	13	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	6	9	13	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	6	10	14	17
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	6	10	14	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	6	10	14	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	6	10	15	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	6	11	15	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	7	11	15	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	7	11	16	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	7	11	16	20

Difference 2 4 6 8 obtained by interpolation.

BEAM LOADING

System of Loading	Max. B.M.	Diagram	Shear Reactions	Max. Deflection
Uniformly loaded. Ends supported.	$M = \frac{WL}{8}$		$R_1 = \frac{W}{2}$ $R_2 = \frac{W}{2}$	$\frac{WL^3}{76.8EI}$
Uniformly loaded. Ends fixed.	$M_1 = \frac{WL}{12}$ $M_2 = \frac{WL}{24}$		$R_1 = \frac{W}{2}$ $R_2 = \frac{W}{2}$	$\frac{WL^3}{384EI}$
Uniformly loaded. One end fixed, other free.	$M = \frac{WL}{2}$		$R_1 = W$ $R_2 = 0$	$\frac{WL^3}{8EI}$
Load concentrated at centre. Ends supported.	$M = \frac{WL}{4}$		$R_1 = \frac{W}{2}$ $R_2 = \frac{W}{2}$	$\frac{WL^3}{48EI}$
Load concentrated at centre. Ends fixed.	$M_1 = \frac{WL}{8}$ $M_2 = \frac{WL}{8}$		$R_1 = \frac{W}{2}$ $R_2 = \frac{W}{2}$	$\frac{WL^3}{192EI}$
Load uniformly increasing to one end. Ends supported.	$M = \frac{2WL}{9\sqrt{3}}$		$R_1 = \frac{2W}{3}$ $R_2 = \frac{W}{3}$	$\frac{WL^3}{76.6EI}$

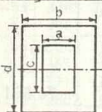
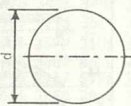
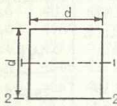
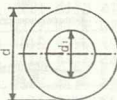
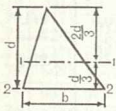
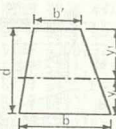
Properties of Sections

A = Area of Section.

I = Moment of Inertia.

R = Radius of Gyration.

Z = Modulus of Section.

 $A = bd - ac$ $I = \frac{bd^3 - ac^3}{12}$ $R = \sqrt{\frac{bd^3 - ac^3}{12(bd - ac)}}$	 $A = \frac{\pi d^2}{4} = 0.7854 d^2$ $I = \frac{\pi d^4}{64} = 0.0491 d^4$ $R = \frac{d}{4}$
 $A = d^2$ $I_1 = \frac{d^4}{12}$ $I_2 = \frac{d^4}{3}$ $R_1 = 0.2887 d$ $R_2 = 0.5774 d$	 $A = \frac{\pi(d^2 - d_1^2)}{4} = 0.7854(d^2 - d_1^2)$ $I = \frac{\pi(d^4 - d_1^4)}{64} = 0.0491(d^4 - d_1^4)$ $R = \frac{1}{4} \sqrt{d^2 + d_1^2}$
 $A = \frac{bd}{2}$ $I_1 = \frac{bd^3}{36}$ $I_2 = \frac{bd^3}{12}$ $R_1 = 0.236 d$ $R_2 = 0.408 d$	 $A = \frac{d}{2}(b + b')$ $y_1 = \frac{d(2b + b')}{3(b + b')}$ $y = \frac{d(b + 2b')}{3(b + b')}$ $I = \frac{d^3(b^2 + 4bb' + b'^2)}{36(b + b')}$ $R = \frac{d}{6(b + b')} \sqrt{2(b^2 + 4bb' + b'^2)}$

Corrugated Sheets

RECOMMENDED Support Spacing (Feet)	MAXIMUM DISTRIBUTED LOADS (lbs./sq. ft.) Blue Orb					Red Orb	
	18G	20G	22G	24G	26G	24G	26G
1	—	—	—	—	—	—	—
2	—	—	—	—	97	—	—
3	—	—	83.5	64.5	45	—	79
4	74.5	59	47	37	25.2	63	44.5
5	48.5	37.8	31	24	16	39.6	29.1
6	34	26.9	21.5	16.5	11.3	28	20.3
7	25.3	20	16.3	12.4	8.4	21	15.3
8	19.3	15.3	12.6	9.5	6.3	16.1	11.8
9	15.1	12.1	9.8	7.1	4.8	13	9

The usual span for 26G Red Orb is 3ft.

Squares, Cubes, Square Roots and Cube Roots

No.	Square	Cube	Sq. Root	Cube Root	No.	Square	Cube	Sq. Root	Cube Root
$\frac{1}{8}$	.015	.0019	.353	.5	$4\frac{1}{4}$	18.062	76.765	2.061	1.61
$\frac{1}{4}$	.062	.0156	.500	.620	$4\frac{1}{2}$	20.250	91.125	2.121	1.65
$\frac{3}{8}$	.140	.0527	.612	.721	$4\frac{3}{4}$	22.562	107.171	2.179	1.68
$\frac{1}{2}$	.250	.1250	.707	.793	5	25	125	2.236	1.71
$\frac{5}{8}$	.390	.244	.790	.855	$5\frac{1}{4}$	27.562	144.703	2.291	1.73
$\frac{3}{4}$	.562	.421	.866	.908	$5\frac{1}{2}$	30.250	166.375	2.345	1.76
$\frac{7}{8}$	.765	.670	.935	.956	$5\frac{3}{4}$	33.062	190.109	2.397	1.79
1	1	1	1.000	1	6	36	216	2.449	1.81
$1\frac{1}{8}$	1.265	1.423	1.060	1.04	$6\frac{1}{4}$	39.062	244.140	2.500	1.84
$1\frac{1}{4}$	1.562	1.953	1.118	1.07	$6\frac{1}{2}$	42.250	274.625	2.549	1.86
$1\frac{3}{8}$	1.890	2.599	1.172	1.11	$6\frac{3}{4}$	45.562	307.546	2.598	1.88
$1\frac{1}{2}$	2.250	3.375	1.224	1.14	7	49	343	2.645	1.91
$1\frac{5}{8}$	2.610	4.291	1.274	1.17	$7\frac{1}{4}$	52.562	381.078	2.692	1.93
$1\frac{3}{4}$	3.062	5.359	1.322	1.20	$7\frac{1}{2}$	56.250	421.875	2.738	1.95
$1\frac{7}{8}$	3.515	6.591	1.369	1.23	$7\frac{3}{4}$	60.062	465.484	2.783	1.97
2	4	8	1.414	1.26	8	64	512	2.828	2.
$2\frac{1}{8}$	4.515	9.595	1.457	1.28	$8\frac{1}{4}$	68.062	561.515	2.872	2.02
$2\frac{1}{4}$	5.062	11.390	1.500	1.30	$8\frac{1}{2}$	72.250	614.125	2.915	2.04
$2\frac{3}{8}$	5.640	13.396	1.541	1.33	$8\frac{3}{4}$	76.562	669.921	2.958	2.06
$2\frac{1}{2}$	6.250	15.625	1.581	1.35	9	81	729	3	2.08
$2\frac{5}{8}$	6.890	18.088	1.620	1.37	$9\frac{1}{4}$	85.562	791.453	3.041	2.09
$2\frac{3}{4}$	7.562	20.796	1.658	1.40	$9\frac{1}{2}$	90.25	857.375	3.082	2.11
$2\frac{7}{8}$	8.265	23.763	1.695	1.42	$9\frac{3}{4}$	95.062	926.859	3.122	2.13
3	9	27	1.732	1.44	10	100	1000	3.162	2.15
$3\frac{1}{8}$	9.765	30.517	1.767	1.46	$10\frac{1}{4}$	105.062	1076.89	3.201	2.17
$3\frac{1}{4}$	10.562	34.328	1.802	1.48	$10\frac{1}{2}$	110.250	1157.625	3.240	2.18
$3\frac{3}{8}$	11.390	38.443	1.837	1.50	$10\frac{3}{4}$	115.562	1242.296	3.278	2.20
$3\frac{1}{2}$	12.250	42.875	1.870	1.51	11	121	1331	3.316	2.22
$3\frac{5}{8}$	13.140	47.634	1.903	1.53	$11\frac{1}{4}$	126.562	1423.828	3.354	2.24
$3\frac{3}{4}$	14.062	52.734	1.936	1.55	$11\frac{1}{2}$	132.250	1520.875	3.391	2.25
$3\frac{7}{8}$	15.015	58.185	1.968	1.57	$11\frac{3}{4}$	138.062	1622.234	3.427	2.27
4	16	64	2	1.58	12	144	1728	3.464	2.29

TRIGONOMETRICAL RATIOS, ETC.

Angle		Chord	Sine	Tan- gent	Co- tan- gent	Co- sine			
Deg.	Rad								
0°	0	0	0	0	∞	1	1.414	1.5708	90°
.5	.0087	.009	.0087	.0087	114.6	1	1.408	1.5621	89.5
1	.0175	.017	.0175	.0175	57.2900	.9998	1.402	1.5533	89
1.5	.0262	.025	.0262	.0262	38.19	.9997	1.396	1.5446	88.5
2	.0349	.035	.0349	.0349	28.6363	.9994	1.389	1.5359	88
2.5	.0436	.044	.0436	.0437	22.90	.9990	1.383	1.5272	87.5
3	.0524	.052	.0523	.0524	19.0811	.9986	1.377	1.5184	87
3.5	.0611	.061	.0610	.0612	16.35	.9981	1.370	1.5097	86.5
4	.0698	.070	.0698	.0699	14.3006	.9976	1.364	1.5010	86
4.5	.0785	.079	.0785	.0787	12.71	.9969	1.358	1.4923	85.5
5	.0873	.087	.0872	.0875	11.4301	.9962	1.351	1.4835	85
5.5	.0960	.096	.0958	.0963	10.39	.9954	1.345	1.4748	84.5
6	.1047	.105	.1045	.1051	9.5144	.9945	1.338	1.4661	84
6.5	.1134	.113	.1132	.1139	8.7769	.9936	1.332	1.4573	83.5
7	.1222	.122	.1219	.1228	8.1443	.9925	1.325	1.4486	83
7.5	.1309	.131	.1305	.1317	7.5958	.9914	1.319	1.4399	82.5
8	.1396	.139	.1392	.1405	7.1154	.9903	1.312	1.4312	82
8.5	.1484	.148	.1478	.1495	6.6912	.9890	1.306	1.4224	81.5
9	.1571	.157	.1564	.1584	6.3138	.9877	1.299	1.4137	81
9.5	.1658	.166	.1650	.1673	5.9758	.9863	1.292	1.4050	80.5
10	.1745	.174	.1736	.1763	5.6713	.9848	1.286	1.3963	80
10.5	.1833	.183	.1822	.1853	5.3955	.9833	1.279	1.3875	79.5
11	.1920	.192	.1908	.1944	5.1446	.9816	1.272	1.3788	79
11.5	.2007	.200	.1994	.2035	4.9152	.9799	1.265	1.3701	78.5
12	.2094	.209	.2079	.2126	4.7046	.9781	1.259	1.3614	78
12.5	.2182	.218	.2164	.2217	4.5107	.9763	1.252	1.3526	77.5
13	.2269	.226	.2250	.2309	4.3315	.9744	1.245	1.3439	77
13.5	.2356	.235	.2334	.2401	4.1653	.9724	1.238	1.3352	76.5
14	.2443	.244	.2419	.2493	4.0108	.9703	1.231	1.3265	76
14.5	.2531	.252	.2504	.2586	3.8667	.9681	1.224	1.3177	75.5
15	.2618	.261	.2588	.2679	3.7321	.9659	1.217	1.3090	75
15.5	.2705	.270	.2672	.2773	3.6059	.9636	1.211	1.3003	74.5
16	.2793	.278	.2756	.2867	3.4874	.9613	1.204	1.2915	74
16.5	.2880	.287	.2840	.2962	3.3759	.9588	1.197	1.2828	73.5
17	.2967	.296	.2924	.3057	3.2709	.9563	1.190	1.2741	73
17.5	.3054	.304	.3007	.3153	3.1716	.9537	1.183	1.2654	72.5
18	.3142	.313	.3090	.3249	3.0777	.9511	1.176	1.2566	72
18.5	.3229	.322	.3173	.3346	2.9887	.9483	1.168	1.2479	71.5
19	.3316	.330	.3256	.3443	2.9042	.9455	1.161	1.2392	71
19.5	.3403	.339	.3338	.3541	2.8239	.9426	1.154	1.2305	70.5
20	.3491	.347	.3420	.3640	2.7475	.9397	1.147	1.2217	70
20.5	.3578	.356	.3502	.3739	2.6746	.9367	1.140	1.2130	69.5
21	.3665	.364	.3584	.3839	2.6051	.9336	1.133	1.2043	69
21.5	.3752	.373	.3665	.3939	2.5836	.9304	1.126	1.1956	68.5
22	.3840	.382	.3746	.4040	2.4751	.9272	1.118	1.1868	68
			Co- sine	Co- tan- gent	Tan- gent	Sine	Chord	Rad.	Deg.
									Angle

TRIGONOMETRICAL RATIOS, ETC.

Angle		Chord	Sine	Tan- gent	Co- tan- gent	Co- sine			
Deg.	Rad.								
22.5°	.3927	.390	.3827	.4142	2.4142	.9239	1.111	1.1781	67.5
23	.4014	.399	.3907	.4245	2.3559	.9205	1.104	1.1694	67
23.5	.4102	.407	.3987	.4348	2.2998	.9171	1.097	1.1606	66.5
24	.4189	.416	.4067	.4452	2.2460	.9135	1.089	1.1519	66
24.5	.4276	.424	.4147	.4557	2.1943	.9100	1.082	1.1432	65.5
25	.4363	.433	.4226	.4663	2.1445	.9063	1.075	1.1345	65
25.5	.4451	.441	.4305	.4770	2.0965	.9026	1.067	1.1257	64.5
26	.4538	.450	.4384	.4877	2.0503	.8988	1.060	1.1170	64
26.5	.4625	.458	.4462	.4986	2.0057	.8949	1.052	1.1083	63.5
27	.4712	.467	.4540	.5095	1.9626	.8910	1.045	1.0996	63
27.5	.4800	.475	.4617	.5206	1.9210	.8870	1.037	1.0908	62.5
28	.4887	.484	.4695	.5317	1.8807	.8829	1.030	1.0821	62
28.5	.4974	.492	.4772	.5430	1.8418	.8788	1.023	1.0734	61.5
29	.5061	.501	.4848	.5543	1.8040	.8746	1.015	1.0647	61
29.5	.5149	.509	.4924	.5658	1.7675	.8704	1.008	1.0559	60.5
30	.5236	.518	.5000	.5774	1.7321	.8660	1.000	1.0472	60
30.5	.5323	.526	.5075	.5890	1.6977	.8616	.993	1.0385	59.5
31	.5411	.534	.5150	.6009	1.6643	.8572	.985	1.0297	59
31.5	.5498	.543	.5225	.6128	1.6319	.8526	.977	1.0210	58.5
32	.5585	.551	.5299	.6249	1.6003	.8480	.970	1.0123	58
32.5	.5672	.560	.5373	.6371	1.5697	.8434	.962	1.0036	57.5
33	.5760	.568	.5446	.6494	1.5399	.8387	.954	.9948	57
33.5	.5847	.576	.5519	.6619	1.5108	.8339	.947	.9861	56.5
34	.5934	.585	.5592	.6745	1.4826	.8290	.939	.9774	56
34.5	.6021	.593	.5664	.6873	1.4550	.8241	.931	.9687	55.5
35	.6109	.601	.5736	.7002	1.4281	.8192	.923	.9599	55
35.5	.6196	.609	.5807	.7133	1.4019	.8141	.916	.9512	54.5
36	.6283	.618	.5878	.7265	1.3764	.8090	.908	.9425	54
36.5	.6370	.626	.5948	.7400	1.3514	.8039	.900	.9338	53.5
37	.6458	.635	.6018	.7536	1.3270	.7986	.892	.9250	53
37.5	.6545	.643	.6088	.7673	1.3032	.7934	.885	.9163	52.5
38	.6632	.651	.6157	.7813	1.2799	.7880	.877	.9076	52
38.5	.6720	.659	.6225	.7954	1.2572	.7826	.871	.8988	51.5
39	.6807	.668	.6293	.8098	1.2349	.7771	.861	.8901	51
39.5	.6894	.676	.6361	.8243	1.2131	.7716	.853	.8814	50.5
40	.6981	.684	.6428	.8391	1.1918	.7660	.845	.8727	50
40.5	.7069	.692	.6494	.8541	1.1708	.7604	.837	.8639	49.5
41	.7156	.700	.6561	.8693	1.1504	.7547	.829	.8552	49
41.5	.7243	.709	.6626	.8847	1.1308	.7490	.821	.8465	48.5
42	.7330	.717	.6691	.9004	1.1106	.7431	.813	.8378	48
42.5	.7418	.725	.6756	.9163	1.0913	.7373	.805	.8290	47.5
43	.7505	.733	.6820	.9325	1.0724	.7314	.796	.8203	47
43.5	.7592	.741	.6884	.9490	1.0538	.7254	.789	.8116	46.5
44	.7679	.749	.6947	.9657	1.0355	.7193	.781	.8029	46
44.5	.7767	.757	.7009	.9827	1.0176	.7133	.773	.7941	45.5
45	.7854	.765	.7071	1.0000	1.0000	.7071	.765	.7854	45
			Co- sine	Co- tan- gent	Tan- gent	Sine	Chord	Rad.	Deg.
									Angle

Temperature Conversion Table

FAHRENHEIT — CENTIGRADE

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
-459.4	-273	66	18.9	110	43.3	154	67.8	198	92.2
-50	-45.6	67	19.4	111	43.9	155	68.3	199	92.8
-40	-40	68	20	112	44.4	156	68.9	200	93.3
-30	-34.4	69	20.6	113	45	157	69.4	201	93.9
-20	-28.9	70	21.1	114	45.6	158	70	202	94.4
-10	-23.3	71	21.7	115	46.1	159	70.6	203	95
0	-17.8	72	22.2	116	46.7	160	71.1	204	95.6
10	-12.2	73	22.8	117	47.2	161	71.7	205	96.1
20	-6.7	74	23.3	118	47.8	162	72.2	206	96.7
30	-1.1	75	23.9	119	48.3	163	72.8	207	97.2
32	0	76	24.4	120	48.9	164	73.3	208	97.8
33	0.6	77	25	121	49.4	165	73.9	209	98.3
34	1.1	78	25.6	122	50	166	74.4	210	98.9
35	1.7	79	26.1	123	50.6	167	75	211	99.4
36	2.2	80	26.7	124	51.1	168	75.6	212	100
37	2.8	81	27.2	125	51.7	169	76.1		
38	3.3	82	27.8	126	52.2	170	76.7		
39	3.9	83	28.3	127	52.8	171	77.2		
40	4.4	84	28.9	128	53.3	172	77.8		
41	5	85	29.4	129	53.9	173	78.3		
42	5.6	86	30	130	54.4	174	78.9		
43	6.1	87	30.6	131	55	175	79.4		
44	6.7	88	31.1	132	55.6	176	80		
45	7.2	89	31.7	133	56.1	177	80.6		
46	7.8	90	32.2	134	56.7	178	81.1		
47	8.3	91	32.8	135	57.2	179	81.7		
48	8.9	92	33.3	136	57.8	180	82.2		
49	9.4	93	33.9	137	58.3	181	82.8		
50	10	94	34.4	138	58.9	182	83.3		
51	10.6	95	35	139	59.4	183	83.9		
52	11.1	96	35.6	140	60	184	84.4		
53	11.7	97	36.1	141	60.6	185	85		
54	12.2	98	36.7	142	61.1	186	85.6		
55	12.8	99	37.2	143	61.7	187	86.1		
56	13.3	100	37.8	144	62.2	188	86.7		
57	13.9	101	38.3	145	62.8	189	87.2		
58	14.4	102	38.9	146	63.3	190	87.8		
59	15	103	39.4	147	63.9	191	88.3		
60	15.6	104	40	148	64.4	192	88.9		
61	16.1	105	40.6	149	65	193	89.4		
62	16.7	106	41.1	150	65.6	194	90		
63	17.2	107	41.7	151	66.1	195	90.6		
64	17.8	108	42.2	152	66.7	196	91.1		
65	18.3	109	42.8	153	67.2	197	91.7		

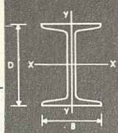
C. to F.
Multiply by 9, divide by 5, add 32.

F. to C.
Subtract 32, multiply by 5, divide by 9.

WEIGHTS OF STEEL PLATES

POUNDS PER LINEAL FOOT

Width Inches	Thickness in inches							
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2
12	2.55	5.10	7.65	10.20	12.75	15.30	17.85	20.40
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	32.73	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
26	5.53	11.05	16.58	22.10	27.63	33.15	38.68	44.20
28	5.95	11.90	17.85	23.80	29.75	35.70	41.65	47.60
30	6.38	12.75	19.13	25.50	31.88	38.25	44.63	51.00
32	6.80	13.60	20.40	27.20	34.00	40.80	47.60	54.40
34	7.23	14.45	21.68	28.90	36.13	43.35	50.58	57.80
36	7.65	15.30	22.95	30.60	38.25	45.90	53.55	61.20
38	8.08	16.15	24.23	32.30	40.38	48.45	56.53	64.60
40	8.50	17.00	25.50	34.00	42.50	51.00	59.50	68.00
42	8.93	17.85	26.78	35.70	44.63	53.55	62.48	71.40
44	9.35	18.70	28.05	37.40	46.75	56.10	65.45	74.80
46	9.78	19.55	29.33	39.10	48.88	58.65	68.43	78.20
48	10.20	20.40	30.60	40.80	51.00	61.20	71.40	81.60
50	10.6	21.3	31.9	42.5	53.1	63.8	74.40	85.0
52	11.1	22.1	33.2	44.2	55.3	66.3	77.4	88.4
54	11.5	23.0	34.4	45.9	57.4	68.9	80.3	91.8
56	11.9	23.8	35.7	47.6	59.5	71.4	83.3	95.2
58	12.3	24.7	37.0	49.3	61.6	74.0	86.3	98.6
60	12.8	25.5	38.3	51.0	63.8	76.5	89.3	102.0
62	13.2	26.4	39.5	52.7	65.9	79.1	92.2	105.4
64	13.6	27.2	40.8	54.4	68.0	81.6	95.2	108.8
66	14.0	28.1	42.1	56.1	70.1	84.2	98.2	112.2
68	14.5	28.9	43.4	57.8	72.3	86.7	101.2	115.6
70	14.9	29.8	44.6	59.5	74.4	89.3	104.1	119.0
72	15.3	30.6	45.9	61.2	76.5	91.8	107.1	122.4
74	15.7	31.5	47.2	62.9	78.6	94.4	110.1	125.8
76	16.2	32.3	48.5	64.6	80.8	96.9	113.1	129.2
78	16.6	33.2	49.7	66.3	82.9	99.5	116.0	132.6
80	17.0	34.0	51.0	68.0	85.0	102.0	119.0	136.0
82	17.4	34.9	52.3	69.7	87.1	104.6	122.0	139.4
84	17.9	35.7	53.6	71.4	89.3	107.1	125.0	142.8



Properties of Australian "I" Beams

Reference Marks	Size ins. D x B	Wgt. per ft.	Sect. Area ins. ²	Moment of Inertia in. ⁴		Elastic Moduli of section	
				About XX	About YY	About XX	About YY
	*24 x 7½	100	29.44	2605.04	64.30	217.09	17.00
ASB126	24 x 7½	95	27.94	2533.04	62.54	211.09	16.68
ASB125	22 x 7	75	22.06	1676.80	41.07	152.44	11.73
ASB124	20 x 6½	65	19.12	1226.17	32.56	126.62	10.02
ASB123	18 x 6	55	16.18	841.76	23.63	93.53	7.88
ASB121	16 x 6	50	14.71	618.09	22.47	77.26	7.49
ASB120	15 x 6	45	13.24	491.91	19.87	65.59	6.62
ASB119	14 x 5½	40	11.77	377.06	14.79	53.87	5.38
ASB118	13 x 5	35	10.30	283.51	10.81	43.62	4.33
ASB117	12 x 8	65	19.12	487.77	65.18	81.29	16.30
ASB116	12 x 5	30	8.83	206.93	8.77	34.49	3.51
ASB115	10 x 8	70	20.58	345.04	71.61	69.01	17.90
ASB114	10 x 8	55	16.18	288.69	54.74	57.74	13.69
ASB113	10 x 6	40	11.77	204.80	21.76	40.94	7.39
ASB112	10 x 4½	25	7.35	122.34	6.49	24.47	2.88
ASB111	9 x 7	50	14.71	208.13	40.17	46.25	11.48
ASB110	9 x 4	21	6.18	81.13	4.15	18.03	2.07
ASB109	8 x 6	35	10.30	115.06	19.54	28.76	6.51
ASB108	8 x 4	18	5.30	55.63	3.51	13.91	1.75
ASB107	7 x 3½	15	4.42	35.90	2.41	10.26	1.38
ASB106	6 x 5	25	7.35	45.16	9.88	15.05	3.95
ASB105	6 x 3	12	3.53	20.99	1.46	7.00	0.97
ASB104	5 x 2½	9	2.65	10.91	0.79	4.36	0.63
ASB103	4 x 3	10	2.94	7.79	1.33	3.89	0.88
ASB102	4 x 1½	5	1.47	3.66	0.19	1.83	0.21

* Nominal size — actual width is 7.9/16".

MAXIMUM ALLOWABLE EQUIVALENT STRESS, P_c in KIPS/SQ. IN. FOR B.S. 15 AND B.S. 2762

Application to combinations of bending and axial compression, axial tension, shear or bearing.

Form	Thickness	P_c
R.S.J.'s and Channels	All	32.5
Plates, bars and sections other than above	Up to and including ¾"	32.5
Plates etc. as above	Over ¾"	30.5
Allowable Bearing Stress p_b in Kips/sq. in.		
Plates, bars and sections	All	27.0
Allowable Maximum Shear Stress p_q in Kips/sq. in.		
Plates, sections and bars	All	15.5
Allowable Stresses p_t in Axial Tension in Kips/sq. in.		
R.S.J. and Channels	All	21.5
Plates, bars etc. other than above	Up to and including ¾"	21.5
	Over ¾"	20.0

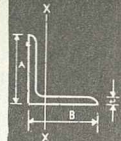
ROLLED STEEL "I" BEAMS AS GIRDERS

SAFE DISTRIBUTED LOAD IN TONS, ABOUT AXIS XX

Size Inches	Weight per ft. lb	SPAN IN FEET																Size Inches	
		4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	36	40	
24 x 7½	100	205.0	178.5	142.5	119.0	102.0	89.2	79.2	71.4	64.8	59.5	54.8	51.0	47.5	44.6	39.7	35.7	24 x 7½	
24 x 7½	95	182.0	175.0	140.0	117.0	100.0	87.6	78.0	70.2	63.3	58.5	54.0	50.2	46.8	43.9	39.1	35.1	24 x 7½	
24 x 7½	90		166.3	135.3	112.6	96.4	84.4	75.0	67.4	61.5	56.2	51.9	48.1	45.0	42.2	37.4	33.7	24 x 7½	
22 x 7	75	147.0	127.0	101.6	84.6	72.5	63.4	56.4	50.8	46.2	42.3	39.1	36.3	33.8	31.7	28.2	25.4	22 x 7	
20 x 6½	65	120.0	101.8	81.4	67.8	58.1	50.8	45.1	41.7	37.0	33.8	31.2	29.0	27.1	25.4	22.6	20.3	20 x 6½	
18 x 6	55	101.0	77.6	62.0	51.8	44.3	38.8	34.3	31.0	28.2	25.9	23.9	22.1	20.6	19.4	17.2	15.4	18 x 6	
16 x 8	75	102.4	101.1	81.0	67.4	57.8	50.5	44.9	40.4	36.8	33.5	31.1	28.9	27.0	25.2	22.5	20.3	16 x 8	
16 x 6	50	85.4	64.0	51.2	42.6	36.6	32.0	28.4	25.6	23.3	21.4	19.6	18.3	17.1	16.1	14.2	12.8	16 x 6	
15 x 6	45	72.5	54.4	43.5	36.2	31.1	27.1	24.1	21.6	19.9	18.1	16.7	15.6	14.4	13.5	12.1	10.8	15 x 6	
14 x 5½	40	69.1	59.3	44.6	35.6	29.7	25.5	22.3	19.8	17.8	16.2	14.8	13.7	12.7	11.8	11.1	9.8	14 x 5½	
13 x 5	35	60.6	48.1	36.2	29.0	24.0	20.6	18.0	16.1	14.4	13.1	12.0	11.1	10.3	9.7	9.0	8.0	13 x 5	
12 x 8	65		68.6	67.4	54.0	44.9	38.4	33.7	30.0	27.0	24.5	22.5	20.8	19.3	18.1	16.8	14.9	12 x 8	
12 x 5	30	52.7	38.1	28.5	22.9	19.1	16.3	14.3	12.7	11.5	10.3	9.6	8.8	8.1	7.6	7.1	6.3	5.7	
10 x 8	70	79.9	76.5	57.5	45.9	38.3	32.8	28.7	25.5	23.0	20.9	19.2	17.7	16.4	15.3	14.3		10 x 8	
10 x 8	55		53.2	47.9	38.3	31.8	27.2	23.9	21.3	19.2	17.4	15.9	14.7	13.6	12.7	11.9		10 x 8	
10 x 6	40	48.0	45.4	34.1	27.2	22.8	19.4	17.1	15.2	13.6	12.4	11.3	10.4	9.7	9.1	8.6		10 x 6	
10 x 4½	25	40.4	27.0	20.3	16.2	13.6	11.6	10.1	9.0	8.1	7.5	6.7	6.2	5.7	5.4	5.1		10 x 4½	
9 x 7	50		48.0	38.4	30.7	25.6	21.9	19.2	17.1	15.5	13.9	12.8	11.8	10.9	10.2			9 x 7	
9 x 4	21	29.9	19.9	14.9	12.0	10.0	8.5	7.5	6.6	6.0	5.4	5.0	4.6	4.2				9 x 4	
8 x 6	35	37.3	31.7	23.9	19.0	15.9	13.6	12.0	10.6	9.6	8.6	8.0	7.3	6.8				8 x 6	
8 x 4	18	23.0	15.4	11.6	9.2	7.7	6.6	5.7	5.1	4.6	4.2	3.9	3.5	3.2				8 x 4	
7 x 3½	15	17.1	11.3	8.5	6.8	5.7	4.9	4.2	3.7	3.4	3.1	2.9	2.6					7 x 3½	
6 x 5	25	24.9	16.7	12.4	10.0	8.4	7.1	6.1	5.6	5.0	4.5							6 x 5	
6 x 3	12	11.6	7.7	5.9	4.6	3.9	3.4	2.9	2.6	2.4								6 x 3	
5 x 2½	9	7.2	4.9	3.6	2.9	2.4	2.0	1.7										5 x 2½	
4 x 3	10	6.5	4.4	3.2	2.6	2.1	1.9	1.6										4 x 3	
4 x 1½	5	3.0	2.0	1.5	1.2	1.0	.9	.7										4 x 1½	

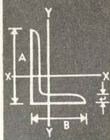
FIRM LINE REPRESENTS MAX. SPAN WITHOUT LATERAL SUPPORT

Equal Angles Properties



The tabulated values of section moduli for single angles, when used for the determination of bending stresses in angles, apply only to sections consisting of two angles back to back or toe to toe, for which twice the tabulated values are the section moduli.

Reference Number	Size A x B x t inches	Weight per ft. lb.	Seet. Area sq. in.	M. of I. about XX	Min. mod. of Sect. about XX	Reference Number	Size A x B x t inches	Weight per ft. lb.	Seet. Area sq. in.	M. of I. about XX	Min. mod. of Sect. about XX
ASEA 143	8 x 8 x 5/8	32.68	9.61	58.26	10.05		2 1/2 x 2 1/2 x 3/16	3.10	0.92	0.53	0.29
" 144	8 x 8 x 3/4	38.89	11.44	68.58	11.94	ASEA 121	2 1/2 x 2 1/2 x 1/4	4.04	1.19	0.88	0.38
" 145	8 x 8 x 7/8	45.00	13.24	78.44	13.77	" 122	2 1/2 x 2 1/2 x 5/16	4.98	1.46	0.83	0.47
" 146	8 x 8 x 1	51.01	15.00	87.85	15.55	" 123	2 1/2 x 2 1/2 x 3/8	5.90	1.73	0.96	0.55
ASEA 139	6 x 6 x 3/8	14.82	4.36	14.95	3.40	" 124	2 1/2 x 2 1/2 x 1/2	7.65	2.25	1.21	0.71
BSEA 113	6 x 6 x 7/16	17.19	5.05	17.22	3.95	ASEA 117	2 1/2 x 2 1/2 x 3/16	2.77	0.81	0.39	0.23
ASEA 140	6 x 6 x 1/2	19.55	5.75	19.48	4.49	" 118	2 1/2 x 2 1/2 x 1/4	3.61	1.06	0.49	0.30
BSEA 113	6 x 6 x 9/16	21.86	6.43	21.60	5.01	" 119	2 1/2 x 2 1/2 x 5/16	4.45	1.31	0.59	0.37
ASEA 141	6 x 6 x 5/8	24.17	7.11	23.73	5.54	" 120	2 1/2 x 2 1/2 x 3/8	5.26	1.55	0.69	0.44
" 142	6 x 6 x 3/4	28.69	8.44	27.74	6.54						
BSEA 113	6 x 6 x 7/8	33.04	9.72	31.40	7.50	ASEA 113	2 x 2 x 1/8	1.67	0.49	0.18	0.12
" 143	6 x 6 x 1	37.40	11.00	35.06	8.45	" 114	2 x 2 x 3/16	2.43	0.72	0.26	0.18
ASEA 135	5 x 5 x 5/16	10.30	3.03	7.20	1.97	" 115	2 x 2 x 1/4	3.19	0.94	0.34	0.29
" 136	5 x 5 x 3/8	12.28	3.61	8.53	2.35	" 116	2 x 2 x 5/16	3.92	1.15	0.41	0.29
" 137	5 x 5 x 1/2	16.16	4.75	11.04	3.08		2 x 2 x 3/8	4.62	1.36	0.47	0.34
" 138	5 x 5 x 5/8	19.93	5.86	13.37	3.78	ASEA 110	1 1/2 x 1 1/2 x 1/8	1.46	0.43	0.12	0.09
" 139	5 x 5 x 3/4	23.59	6.94	15.54	4.46	" 111	1 1/2 x 1 1/2 x 3/16	2.11	0.62	0.17	0.14
ASEA 132	4 x 4 x 5/16	8.17	2.40	3.61	1.24	" 112	1 1/2 x 1 1/2 x 1/4	2.76	0.81	0.22	0.18
" 133	4 x 4 x 3/8	9.72	2.86	4.26	1.48		1 1/2 x 1 1/2 x 5/16	3.39	1.00	0.26	0.22
" 134	4 x 4 x 1/2	12.75	3.75	5.46	1.93		1 1/2 x 1 1/2 x 3/8	4.02	1.18	0.31	0.26
BSEA 110	4 x 4 x 5/8	15.67	4.61	6.56	2.36	ASEA 107	1 1/2 x 1 1/2 x 1/8	1.23	0.36	0.07	0.07
ASEA 109	3 1/2 x 3 1/2 x 1/4	5.74	1.70	1.96	0.76	" 108	1 1/2 x 1 1/2 x 3/16	1.79	0.53	0.11	0.10
ASEA 129	3 x 3 x 5/16	7.11	2.09	2.38	0.94	" 109	1 1/2 x 1 1/2 x 1/4	2.34	0.69	0.13	0.13
" 130	3 x 3 x 3/8	8.45	2.48	2.80	1.12		1 1/2 x 1 1/2 x 5/16	2.85	0.84	0.16	0.16
" 131	3 x 3 x 1/2	11.05	3.25	3.57	1.46	ASEA 104	1 1/2 x 1 1/2 x 1/8	1.02	0.30	0.04	0.05
BSEA 109	3 1/2 x 3 1/2 x 5/8	13.55	3.98	4.27	1.77	" 105	1 1/2 x 1 1/2 x 3/16	1.48	0.43	0.06	0.07
						" 106	1 1/2 x 1 1/2 x 1/4	1.91	0.56	0.07	0.09
ASEA 125	3 x 3 x 3/16	3.73	1.10	0.93	0.42		1 1/2 x 1 1/2 x 5/16	2.34	0.69	0.09	0.11
" 126	3 x 3 x 1/4	4.89	1.44	1.20	0.55	ASEA 101	1 x 1 x 1/8	0.80	0.23	0.02	0.03
" 127	3 x 3 x 5/16	6.05	1.78	1.47	0.68	" 102	1 x 1 x 3/16	1.15	0.34	0.03	0.04
" 128	3 x 3 x 3/8	7.17	2.11	1.72	0.81	" 103	1 x 1 x 1/4	1.49	0.44	0.04	0.05
" 129	3 x 3 x 1/2	9.35	2.75	2.18	1.05						
" 130	3 x 3 x 5/8	11.42	3.36	2.59	1.27						



Unequal Angles Properties

The tabulated values of section moduli for single angles, when used for the determination of bending stresses in angles, apply only to sections consisting of two angles back to back or toe to toe, for which twice the tabulated values are the section moduli.

Reference Number	Size A x B x t inches	Wgt. per ft. lb.	Sect. Area inches	Min. mod. of Section		Reference Number	Size A x B x t inches	Wgt. per ft. lb.	Sect. Area inches	Min. mod. of Section	
				Abt. XX	Abt. YY					Abt. XX	Abt. YY
ASUA 124	6 1/2 x 4 1/2 x 3/8	13.54	3.98	3.82	1.95		4 x 3 x 1/4	5.75	1.69	0.98	0.58
125	6 1/2 x 4 1/2 x 1/2	17.84	5.25	5.03	2.56	BSUA 109	4 x 3 x 5/16	7.11	2.09	1.20	0.71
126	6 1/2 x 4 1/2 x 5/8	22.04	6.48	6.21	3.16	ASUA 114	4 x 3 x 3/8	8.45	2.48	1.42	0.84
127	6 1/2 x 4 1/2 x 3/4	26.13	7.69	7.33	3.72	BSUA 109	4 x 3 x 7/16	9.83	2.89	1.63	0.96
	6 x 4 x 3/8	12.28	3.61	3.23	1.54	ASUA 115	4 x 3 x 1/2	11.05	3.25	1.85	1.09
	6 x 4 x 1/2	16.16	4.75	4.25	2.02		4 x 3 x 5/8	13.55	3.98	2.26	1.33
	6 x 4 x 5/8	19.93	5.86	5.23	2.48	ASUA 111	3 1/2 x 3 x 1/4	5.32	1.56	0.74	0.56
	6 x 4 x 3/4	23.59	6.94	6.16	2.91	BSUA 107	3 1/2 x 3 x 5/16	6.58	1.93	0.92	0.69
	6 x 4 x 7/8	27.10	7.98	7.10	3.38	ASUA 112	3 1/2 x 3 x 3/8	7.81	2.30	1.10	0.83
	6 x 4 x 1	30.60	9.00	8.03	3.86	"	3 1/2 x 3 x 1/2	10.20	3.00	1.42	1.07
BSUA 116	6 x 3 1/2 x 5/16	09.32	2.74	2.65	1.00		3 1/2 x 3 x 5/8	12.49	3.67	1.73	1.30
ASUA 121	6 x 3 1/2 x 3/8	11.63	3.42	3.16	1.18		3 1/2 x 2 1/2 x 3/16	3.74	1.10	0.56	0.30
BSUA 116	6 x 3 1/2 x 7/16	13.54	3.99	3.65	1.36	ASUA 109	3 1/2 x 2 1/2 x 1/4	4.89	1.44	0.73	0.39
ASUA 122	6 x 3 1/2 x 1/2	15.30	4.50	4.15	1.54	BSUA 106	3 1/2 x 2 1/2 x 5/16	6.05	1.78	0.90	0.49
123	6 x 3 1/2 x 5/8	18.86	5.55	5.11	1.89	ASUA 110	3 1/2 x 2 1/2 x 3/8	7.17	2.11	1.07	0.58
	6 x 3 1/2 x 3/4	22.31	6.56	6.02	2.22		3 1/2 x 2 1/2 x 1/2	9.35	2.75	1.39	0.73
	6 x 3 x 3/8	11.00	3.24	3.07	0.87		3 x 2 1/2 x 3/16	3.40	1.00	0.42	0.30
	6 x 3 x 1/2	14.45	4.25	4.06	1.14	ASUA 107	3 x 2 1/2 x 1/4	4.46	1.31	0.54	0.39
	6 x 3 x 5/8	17.80	5.24	5.02	1.41	BSUA 105	3 x 2 1/2 x 5/16	5.51	1.62	0.67	0.48
	6 x 3 x 3/4	21.05	6.19	5.90	1.66	ASUA 108	3 x 2 1/2 x 3/8	6.54	1.92	0.79	0.56
ASUA 118	5 x 4 x 5/16	09.15	2.69	1.92	1.30		3 x 2 x 1/2	8.50	2.50	1.02	0.72
119	5 x 4 x 3/8	11.00	3.24	2.28	1.52	BSUA 104	3 x 2 x 3/16	3.03	0.90	0.41	0.19
120	5 x 4 x 1/2	14.45	4.25	2.99	1.98	ASUA 105	3 x 2 x 1/4	4.04	1.19	0.52	0.25
	5 x 4 x 5/8	17.80	5.24	3.67	2.43	BSUA 104	3 x 2 x 5/16	4.98	1.47	0.65	0.30
	5 x 4 x 3/4	21.05	6.19	4.35	2.88	ASUA 106	3 x 2 x 3/8	5.90	1.74	0.76	0.36
	5 x 3 x 1/4	6.60	1.94	1.48	0.59		3 x 2 x 1/2	7.65	2.25	0.99	0.46
BSUA 112	5 x 3 x 5/16	8.17	2.40	1.83	0.72		2 1/2 x 2 x 3/16	2.75	0.81	0.29	0.19
ASUA 116	5 x 3 x 3/8	9.72	2.86	2.18	0.85	ASUA 101	2 1/2 x 2 x 1/4	3.61	1.06	0.37	0.24
BSUA 112	5 x 3 x 7/16	11.30	3.33	2.52	0.98	ASUA 102	2 1/2 x 2 x 5/16	4.45	1.31	0.46	0.30
ASUA 117	5 x 3 x 1/2	12.75	3.75	2.86	1.11	ASUA 103	2 1/2 x 2 x 3/8	5.26	1.55	0.54	0.35
	5 x 3 x 5/8	15.67	4.61	3.50	1.36	ASUA 104					

WEIGHTS AND AREAS OF SQUARE AND ROUND STEEL BARS

Thickness or diam. in inches	Weight in lb. of Square bar one foot long	Weight in lb. of Round bar one foot long	Area of Square Bar in inches	Area of Round Bar in inches	Circumfer- ence of Round Bar in inches
3/16	.120	.094	.0352	.0276	.5891
1/4	.212	.167	.0625	.0491	.7854
5/16	.332	.261	.0977	.0767	.9818
3/8	.478	.376	.1406	.1104	1.1781
7/16	.651	.511	.1914	.1503	1.3745
1/2	.850	.668	.2500	.1963	1.5708
9/16	1.076	.845	.3164	.2485	1.7672
5/8	1.328	1.043	.3906	.3068	1.9635
11/16	1.607	1.262	.4727	.3712	2.1599
3/4	1.913	1.502	.5625	.4418	2.3562
13/16	2.245	1.763	.6602	.5185	2.5526
7/8	2.603	2.044	.7656	.6013	2.7489
15/16	2.988	2.347	.8789	.6903	2.9453
1	3.400	2.670	1.0000	.7854	3.1416
1 1/8	4.303	3.380	1.2656	.9940	3.5343
1 1/4	5.313	4.172	1.5625	1.2272	3.9270
1 1/2	6.428	5.049	1.8906	1.4849	4.3197
1 3/4	7.650	6.008	2.2500	1.7671	4.7124
2	8.978	7.051	2.6406	2.0739	5.1051
2 1/8	10.41	8.178	3.0625	2.4053	5.4978
2 1/4	11.95	9.388	3.5156	2.7612	5.8905
2 1/2	13.60	10.68	4.0000	3.1416	6.2832
2 3/4	15.35	12.06	4.5156	3.5466	6.6759
3	17.21	13.52	5.0625	3.9761	7.0686
3 1/8	19.18	15.06	5.6406	4.4301	7.4613
3 1/4	21.25	16.69	6.2500	4.9087	7.8540
3 1/2	23.43	18.40	6.8906	5.4119	8.2467
3 3/4	25.71	20.19	7.5625	5.9396	8.6394
4	28.10	22.07	8.2656	6.4918	9.0321
4 1/8	30.60	24.03	9.0000	7.0686	9.4248
4 1/4	35.92	28.21	10.563	8.2958	10.210
4 1/2	41.65	32.71	12.250	9.6211	10.996
4 3/4	47.82	37.55	14.063	11.045	11.781
5	54.40	42.73	16.000	12.566	12.566
5 1/8	61.41	48.24	18.063	14.186	13.352
5 1/4	68.85	54.07	20.250	15.904	14.137
5 1/2	76.71	60.25	22.563	17.721	14.923
5 3/4	85.00	66.76	25.000	19.635	15.708
6	102.9	80.78	30.250	23.758	17.279
6 1/2	122.4	96.13	36.000	28.274	18.850

One cubic foot of steel weighs 489.6 lb.

Areas and Circumferences of Circles in Inches

Dia. in ins.	Areas				Dia. in ins.	Circumferences			
	0 in.	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.		0 in.	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.
0	.0	.0490	.1963	.4417	0	.0	.7854	1.570	2.356
1	.7854	1.227	1.767	2.405	1	3.141	3.927	4.712	5.497
2	3.141	3.976	4.908	5.939	2	6.283	7.063	7.854	8.639
3	7.068	8.295	9.621	11.04	3	9.424	10.21	10.99	11.78
4	12.56	14.18	15.90	17.72	4	12.56	13.35	14.13	14.92
5	19.63	21.64	23.76	25.96	5	15.70	16.49	17.27	18.06
6	28.27	30.68	33.18	35.78	6	18.84	19.63	20.42	21.20
7	38.48	41.28	44.18	47.17	7	21.99	22.77	23.56	24.34
8	50.26	53.45	56.74	60.13	8	25.13	25.91	26.70	27.48
9	63.61	67.20	70.88	74.66	9	28.27	29.05	29.84	30.63
10	78.54	82.51	86.59	90.76	10	31.41	32.20	32.98	33.77
11	95.03	99.40	103.8	108.4	11	34.55	35.34	36.12	36.91
12	113.1	117.8	122.7	127.6	12	37.69	38.48	39.27	40.05
13	132.7	137.8	143.1	148.4	13	40.84	41.62	42.41	43.19
14	153.9	159.4	165.1	170.8	14	43.98	44.76	45.55	46.33
15	176.7	182.6	188.6	194.8	15	47.12	47.90	48.69	49.48
16	201.0	207.3	213.8	220.3	16	50.26	51.05	51.83	52.62
17	226.9	233.7	240.5	247.4	17	53.40	54.19	54.97	55.76
18	254.4	261.5	268.8	276.1	18	56.54	57.33	58.11	58.90
19	283.5	291.0	298.6	306.3	19	59.69	60.47	61.26	62.04
20	314.1	322.0	330.0	338.1	20	62.83	63.61	64.40	65.18
21	346.3	354.6	363.0	371.5	21	65.97	66.75	67.54	68.32
22	380.1	388.8	397.6	406.4	22	69.11	69.90	70.68	71.47
23	415.4	424.5	433.7	443.0	23	72.25	73.04	73.82	74.61
24	452.3	461.8	471.4	481.1	24	75.39	76.18	76.96	77.75
25	490.8	500.7	510.7	520.7	25	78.54	79.32	80.11	80.89
26	530.9	541.1	551.5	562.0	26	81.68	82.46	83.25	84.03
27	572.5	583.2	593.9	604.8	27	84.82	85.60	86.39	87.17
28	615.7	626.8	637.9	649.1	28	87.96	88.75	89.53	90.32
29	660.5	671.9	683.3	695.1	29	91.10	91.89	92.67	93.46
30	706.8	718.6	730.6	742.6	30	94.24	95.03	95.81	96.60
31	754.8	767.0	779.3	791.7	31	97.40	98.20	98.99	99.70
32	804.2	816.9	829.6	842.4	32	100.5	101.3	102.1	102.9
33	855.3	868.3	881.4	894.6	33	103.7	104.5	105.2	106.0
34	908.0	921.3	934.8	948.4	34	106.8	107.6	108.4	109.2
35	962.1	975.9	989.8	1003.8	35	110.0	110.7	111.5	112.3
36	1017.9	1032.1	1046.4	1060.7	36	113.1	113.8	114.6	115.5
37	1075.2	1089.8	1104.5	1119.2	37	116.2	117.0	117.8	118.6
38	1134.1	1149.3	1164.2	1179.3	38	119.4	120.2	121.0	121.7
39	1194.6	1210.0	1225.4	1241.0	39	122.5	123.3	124.1	124.8
40	1256.6	1272.4	1288.3	1304.2	40	125.7	126.4	127.2	128.0

WEIGHTS OF FLAT ROLLED STEEL

POUNDS PER LINEAL FOOT

Width inches	Thickness in Inches											
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
1	.053 .106 .159 .213	.106 .213 .319 .425	.159 .319 .478 .638	.213 .425 .638 .850	.27 .53 .80 1.06	.32 .64 .96 1.28	.37 .74 1.12 1.49	.43 .85 1.28 1.70	.48 .96 1.43 1.91	.53 1.06 1.59 2.13	.58 1.17 1.75 2.34	.64 1.28 1.91 2.55
2	.266 .319 .372 .425	.531 .638 .744 .850	.797 .956 1.116 1.275	1.063 1.275 1.488 1.700	1.33 1.59 1.86 2.13	1.59 1.91 2.23 2.55	1.86 2.23 2.60 2.98	2.13 2.55 2.98 3.40	2.39 2.87 3.35 3.83	2.66 3.19 3.72 4.25	2.92 3.51 4.09 4.68	3.19 3.83 4.46 5.10
3	.478 .531 .584 .638	.956 1.063 1.169 1.275	1.434 1.594 1.753 1.913	1.913 2.125 2.338 2.550	2.39 2.66 2.92 3.19	2.87 3.19 3.51 3.83	3.35 3.72 4.09 4.46	3.83 4.25 4.68 5.10	4.30 4.78 5.26 5.74	4.78 5.31 5.84 6.38	5.26 5.84 6.43 7.01	5.74 6.38 7.01 7.65
4	.691 .744 .797 .850	1.381 1.488 1.594 1.700	2.072 2.231 2.391 2.550	2.763 2.975 3.188 3.400	3.45 3.72 3.98 4.25	4.14 4.46 4.78 5.10	4.83 5.21 5.58 5.95	5.53 5.95 6.38 6.80	6.22 6.69 7.17 7.65	6.91 7.44 7.97 8.50	7.60 8.18 8.77 9.35	8.29 8.93 9.56 10.20
5	.903 .956 1.009 1.063	1.806 1.913 2.019 2.125	2.709 2.869 3.028 3.188	3.613 3.825 4.038 4.250	4.52 4.78 5.05 5.31	5.42 5.74 6.06 6.38	6.32 6.69 7.07 7.44	7.23 7.65 8.08 8.50	8.13 8.61 9.08 9.56	9.03 9.56 10.09 10.63	9.93 10.52 11.10 11.69	10.84 11.48 12.11 12.75
6	1.116 1.169 1.222 1.275	2.231 2.338 2.444 2.550	3.347 3.506 3.666 3.825	4.463 4.675 4.888 5.100	5.58 5.84 6.11 6.38	6.69 7.01 7.33 7.65	7.81 8.18 8.55 8.93	8.93 9.35 9.78 10.20	10.04 10.52 11.00 11.48	11.16 11.69 12.22 12.75	12.27 12.86 13.44 14.03	13.39 14.03 14.66 15.30
7	1.485 1.538 1.591 1.644	2.970 3.076 3.182 3.288	4.455 4.614 4.773 4.932	5.940 6.152 6.364 6.576	7.425 7.637 7.849 8.061	8.510 8.722 8.934 9.146	9.605 9.817 10.029 10.241	10.700 10.912 11.124 11.336	11.795 12.007 12.219 12.431	12.890 13.102 13.314 13.526	13.985 14.197 14.409 14.621	15.080 15.292 15.504 15.716
8	1.870 1.923 1.976 2.029	3.740 3.846 3.952 4.058	5.610 5.769 5.928 6.087	7.475 7.687 7.899 8.111	9.360 9.572 9.784 9.996	11.245 11.457 11.669 11.881	12.340 12.552 12.764 12.976	13.435 13.647 13.859 14.071	14.530 14.742 14.954 15.166	15.625 15.837 16.049 16.261	16.720 16.932 17.144 17.356	17.815 18.027 18.239 18.451
9	2.255 2.308 2.361 2.414	4.510 4.616 4.722 4.828	6.765 6.924 7.083 7.242	8.920 9.132 9.344 9.556	11.075 11.287 11.499 11.711	13.230 13.442 13.654 13.866	14.325 14.537 14.749 14.961	15.420 15.632 15.844 16.056	16.515 16.727 16.939 17.151	17.610 17.822 18.034 18.246	18.705 18.917 19.129 19.341	19.800 20.012 20.224 20.436
10	2.640 2.693 2.746 2.799	5.290 5.396 5.502 5.608	7.770 7.929 8.088 8.247	10.125 10.337 10.549 10.761	12.520 12.732 12.944 13.156	14.915 15.127 15.339 15.551	16.410 16.622 16.834 17.046	17.505 17.717 17.929 18.141	18.600 18.812 19.024 19.236	19.695 19.907 20.119 20.331	20.790 21.002 21.214 21.426	21.885 22.097 22.309 22.521

WEIGHTS OF STEEL WIRE

Diam. inches (app.)	Size I.S.W.G.	Decimal of an inch	Milli- metres	Sectional area in sq. in.	Appr. wt. in lb.	
					100 yds.	Mile
1/2	7/0	.500	12.7	.19635	200.11	3.522
15/32	6/0	.464	11.8	.16910	172.33	3,033
7/16	5/0	.432	11.0	.14657	149.37	2,629
13/32	4/0	.400	10.2	.12568	128.07	2,254
3/8	3/0	.372	9.4	.10869	110.80	1,950
11/32	2/0	.358	8.8	.09510	96.93	1,706
	1/0	.324	8.2	.08244	84.03	1,479
	1	.300	7.6	.07069	72.04	1,263
	2	.276	7.0	.05982	60.97	1,073
1/4	3	.252	6.4	.04987	50.85	805
	4	.232	5.9	.04227	43.07	753
	5	.212	5.4	.03530	35.97	633
3/16	6	.192	4.9	.02896	29.43	518
	7	.176	4.5	.02432	24.77	436
	8	.160	4.1	.02011	20.45	360
	9	.144	3.7	.01628	16.59	292
1/8	10	.128	3.3	.01287	13.12	231
	11	.116	3.0	.01057	10.80	190
	12	.104	2.6	.00850	8.63	152
3/32	13	.092	2.3	.00665	6.76	119
	14	.080	2.0	.00503	5.11	90
	15	.072	1.8	.00407	4.15	73
1/16	16	.064	1.6	.00322	3.29	58
	17	.056	1.4	.00246	2.50	44
3/64	18	.048	1.2	.00181	1.83	32.5
	19	.040	1.0	.00126	1.27	22.54
	20	.036	0.9	.00102	1.03	18.00
1/32	21	.032	0.8	.00080	0.819	14.42
	22	.028	0.7	.00062	0.628	11.04
	23	.024	0.6	.00045	0.461	8.11
3/128	24	.022	0.55	.00038	0.387	6.82
	25	.020	0.5	.00031	0.320	5.63
	26	.018	0.45	.00025	0.259	4.56
	27	.0164	0.4	.00021	0.215	3.79

STRENGTH OF STEEL WIRE ROPES

Commercial ropes are made in the following qualities, breaking strains being quoted as percentage of the 100-110-ton rope list.

Black Best Patent (80/90 tons sq. in)	80%
Galvanized Hawser (80/95 tons sq. in)	85%
Black Special Patent (90/100 tons sq. in)	90%
Special Plough (110/120 tons sq. in)	110%

Other special qualities are available in both black and galvanized wire for mining, aircraft work, etc. When ropes are fitted with an independent wire rope core (I.W.R.C.), add 10% to the weight of rope shown and 7½% to the list breaking strains.

FACTORS OF SAFETY

Cranes (Hook Hoist, Grab Hoist, Derrick Fall, and Boom Lines)	6
Service Winch or Block Ropes	6
Shovels and Excavating Equipment	5 to 6 min.
Derrick Crane Guys	5
Logging Skylines, Main Cableways	4
Logging Spar Tree Guys and Stack Guys	3 to 4 min.
Incline Haulages	6 to 8 min.

ORDERING OF WIRE ROPES

When in doubt, the following rope characteristics should be provided to the ropemaker, accompanied, if possible, by a simple line sketch of the rope rigging, showing the size of sheaves, drums, and type of attachments.

Description of Rope	Example
1. Dimensions:	
(a) Length	3,000 ft.
(b) Circumference or diameter	3½" circ.
2. Construction:	
Number of strands	6
Number of wires per strand	x 19
Arrangement of wires in each strand	9/9/1
Lay: Direction and type	R.H.O.L.
Core: Steel or hemp	Hemp
Kind of fabrication	Preformed
3. Grade:	
Quality of steel (acid or basic)	Basic
Tensile strength of wire	Best Plough or 100/110 t.s.i.
4. Lubrication:	
Petroleum jelly, graphite, etc.	Graphite
5. Service:	
Type of equipment on which rope is to be used	Caterpillar Logging Winch

POINTS IN ROPE USAGE

1. Where conditions are very abrasive, use the coarsest rope construction compatible with reasonable flexibility over the sheaves and drums used, and in plough steel or special plough steel wire. Such ropes should be preformed.
2. Where the rope can be anchored at both ends to prevent rotation of the load, Langs Laid ropes are more capable of withstanding increased wear and bending life than Ordinary Lay ropes. These ropes also should be preformed.
3. Use ropes fitted with an I.W.R.C. when they are subjected to heavy loading over small sheaves and drums.
4. When working conditions are corrosive or are not conducive to ready and regular maintenance, use galvanized wire ropes.
5. Always seize ropes before cutting.
6. To obtain maximum life from ropes they should be kept well lubricated from the time they are installed.

SHEAVES AND DRUMS

Small sheaves and drums with bad-fitting grooves are responsible for considerable rope abuse, and care should be taken to check and true-up sheave and drum grooving regularly.

The compactness of much modern rope-using equipment has resulted in the use of very small sheaves and drums, which produce heavy bending stresses and compression loads in the rope and, where possible, the sheave sizes shown below should be used. The "critical" sheave size is accepted by ropemakers as being that below which long economical rope life cannot be expected.

SHEAVE AND DRUM DIAMETERS (= dia. of rope)

Rope Constructions	Sheave diameter			Rope Constructions	Sheave diameter		
	Rec.	Min.	Crit.		Rec.	Min.	Crit.
6 x 7 (6/1)	70D	43D	27D	6 x 37 Seale	33D	22D	14D
6 x 9/9/1 Seale	52D	32D	20D	6 x 37 Filler	31D	21D	13D
6 x 19 Warr.	45D	30D	19D	6 x 41	31D	21D	13D
6 x 19 Filler	39D	26D	16D	8 x 9/9/1	39D	26D	16D
6 x 24 15/9/J	34D	23D	15D	6 x 7/3			
6 x 37				6 x Flattened	70D	43D	27D
18/12/6/1	28D	19D	12D	6 x 12/12/3			
				Flat Strand	45D	30D	19D

SHEAVE GROOVE SIZES

Rope dia. inches	Groove dia. Tolce.		Rope dia. inches	Groove dia Tolce.	
	min.	max.		min.	max.
$\frac{1}{4}$ to $\frac{5}{16}$	+1/64"	+1/32"	1-3/16 to $1\frac{1}{2}$	+1/16"	+1/8"
$\frac{3}{8}$ to $\frac{3}{4}$	+1/32"	+1/16"	1-9/16 to $2\frac{1}{4}$	+3/32"	+3/16"
13/16 to $1\frac{1}{8}$	+3/64"	+3/32"	2-5/16 & larger	+1/8"	+1/4"

Example: Groove diameter for 1" diameter rope should be 1-3/64" minimum and 1-3/32" maximum.

GALVANIZED WIRE NETTING

STANDARD QUALITY

RABBIT		SHEEP AND DOG		POULTRY	
Size	Weight per 100 yds., lb.	Size	Weight per 100 yds., lb.	Size	Weight per 100 yds., lb.
12 x 1 $\frac{1}{4}$ x 17	62	30 x 3 x 17	59	36 x $\frac{1}{2}$ x 22	110
36 x 1 $\frac{1}{4}$ x 17	162	36 x 3 x 17	65	36 x 1 x 20	88
42 x 1 $\frac{1}{4}$ x 17	183	36 x 3 x 16	89	36 x 2 x 19	61
12 x 1 $\frac{1}{2}$ x 17	54	30 x 4 x 17	47	72 x 2 x 19	115
36 x 1 $\frac{1}{2}$ x 17	140	36 x 4 x 17	54	—	—
42 x 1 $\frac{1}{2}$ x 17	160	36 x 4 x 16	73	—	—

DRIED FRUIT RACK AND FISH NETTING

36 x 2 x 17	106	60 x 2 x 17	166	36 x 2 x 16	136
48 x 2 x 17	126	72 x 2 x 17	190	72 x 2 x 16	253

NAILS

APPROXIMATE NUMBER PER LB.

Size	No. per lb.	Size	No. per lb.	Size	No. per lb.
1" x 16G	1080	2" x 11G	158	3" x 9G	67
1" x 15G	840	2" x 10G	120	3" x 8G	60
1" x 14G	723	2" x 9G	100	3" x 7G	48
1 $\frac{1}{2}$ " x 14G	460	2 $\frac{1}{2}$ " x 13G	200	3" x 6G	39
1 $\frac{1}{2}$ " x 13G	340	2 $\frac{1}{2}$ " x 12G	150	3 $\frac{1}{2}$ " x 8G	44
1 $\frac{1}{2}$ " x 12G	240	2 $\frac{1}{2}$ " x 11G	130	3 $\frac{1}{2}$ " x 7G	40
1" x 11G	206	2 $\frac{1}{2}$ " x 10G	100	4" x 7G	35
2" x 14G	280	2 $\frac{1}{2}$ " x 9G	80	4" x 6G	30
2" x 13G	230	2 $\frac{1}{2}$ " x 8G	65	5" x 5G	21
2" x 12G	190	3" x 10G	81	6" x 4G	13

FENCE AND BALING WIRES

LENGTH PER CWT. — BREAKING STRAIN

Gauge	Length per cwt. (yds.)	Approx. weight in lb. (per mile)	Approx. Breaking Strain in lb.	
			Fence Std. Galv.	Baling Self-coloured
8	564	360	1576	—
9	675	292	—	912
10	854	231	1008	—
12	1293	152	—	475
14	2186	90	—	281
		High Tensile		
12½ Std.	1500	135	850	—

QUANTITY OF WIRE PER MILE OF FENCING

No. of Wires	Gauge								
	8			10			12½ High-tensile		
	Cwt.	Qr.	Lb.	Cwt.	Qr.	Lb.	Cwt.	Qr.	Lb.
1	3	1	0	2	0	14	1	0	14
2	6	1	14	4	0	14	2	1	14
3	9	3	14	6	1	0	3	2	0
4	12	3	14	8	1	0	4	2	14
5	16	0	14	10	1	14	5	3	14
6	19	1	0	12	1	14	7	0	0

STEEL POSTS — "STAR" PATTERN

Spacings of Posts in feet	No. of Posts per mile	Approximate weight per mile					
		5' 6" lengths			6' 0" lengths		
		Cwt.	Qr.	Lb.	Cwt.	Qr.	Lb.
8	660	45	1	14	49	2	0
9	586	40	1	0	43	3	14
10	528	36	1	0	39	2	0
11	480	33	0	0	36	0	0
12	440	30	1	0	33	0	0
15	352	24	1	0	26	1	14
18	293	20	0	14	22	0	0

STRENGTH OF VARIOUS NON-FERROUS METALS & ALLOYS

Average values for strength based on test data from various testing laboratories. Data are lacking for values of strength in compression. In the absence of such data, a safe practice would be to consider the ultimate in compression as having a value equal to the elastic limit in tension.

Metal	Approximate Composition, per cent.	Weight lb. per cu. in.	Strength in Tension, lb./sq. in.	
			Elastic limit	Ultimate
Copper, cast	Copper, 100	0.310	8,000	25,000
Hard drawn		0.321	30,000	40,000
Zinc, cast	Zinc, 100	0.256	—	9,000
Rolled		0.260	4,000	24,000
Lead, Rolled	Lead, 100	0.411	800	*2,700
Lead alloy, cast ..	Lead, 95.5; anti-mony, 4.5	0.380	4,000	6,400
Nickel, rolled and annealed	Nickel, 100	0.340	12,000	70,000
Cold-rolled		0.340	70,000	165,000
Aluminium, cast ..	Aluminium, 100 ..	0.093	—	13,000
Rolled and annealed ..		0.097	8,500	14,000
Cold-rolled		0.097	20,000	30,000
Hard-drawn wire ..		0.097	30,000	40,000
Duralumin, rolled and heat-treated	Aluminium, 96; magnesium, 1.5; copper, 2.5	0.102	19,000	55,000
60-40 Brass, cast ..	Copper, 60; zinc, 40 ..	0.310	12,000	35,000
Rolled and annealed ..		0.310	16,000	60,000
Cold-drawn		0.310	43,000	96,000
Phosphor bronze, cast ..	Copper, 95; tin, 5; phosphorus, trace ..	0.320	16,000	32,000
Rolled and annealed ..		0.320	13,000	46,000
Cold-drawn		0.320	60,000	85,000
Aluminium-bronze, Cast	Copper, 90; aluminium, 10	0.270	25,000	60,000
Hot-rolled		0.270	30,000	70,000
Cold-drawn		0.270	80,000	90,000
Manganese-bronze, Cast	Copper, 60; zinc, 39; iron and manganese, 1	0.30	30,000	70,000
Rolled		0.30	45,000	70,000
Monel Metal, hot-rolled	Nickel, 67; copper, 28; iron, silicon, carbon and manganese, 5	0.32	48,000	88,000
Cold-rolled and annealed		0.32	60,000	110,000

* Under long-continued static load, lead will flow very slowly under stresses as low as 600 lb. per sq. in.

TINPLATE GAUGE TABLE

Weight lb. per base box	Equivalent Weight lb. per sq. ft.	Approximate thickness, in.	Old Symbol
60	0.2755	0.0066	—
65	0.2985	0.0072	—
70	0.3214	0.0077	—
75	0.3444	0.0083	—
80	0.3673	0.0088	—
85	0.3903	0.0094	—
90	0.4133	0.0099	—
95	0.4362	0.0105	—
100	0.4592	0.0110	1CL
107	0.4913	0.0118	1C
112	0.5143	0.0123	—
118	0.5418	0.0130	—
128	0.5878	0.0141	1XL
135	0.6199	0.0149	1X
139	0.6383	0.0153	DC
148	0.6796	0.0163	2XL
155	0.7117	0.0171	2X
168	0.7714	0.0185	3XL
175	0.8036	0.0193	3X
180	0.8265	0.0198	DX
188	0.8633	0.0207	4XL
195	0.8954	0.0215	4X
208	0.9551	0.0229	5XL
210	0.9643	0.0231	D2X
215	0.9872	0.0237	5X
228	1.9046	0.0251	6XL

*Standard size 28" x 20"—112 sheets per double box.

NOTE.—Tinplate is always supplied on a weight basis and not thickness (thickness figures are used as a guide only). Determine substance from single sheet weight as follows:—

$$\text{Substance (lb.)} = \frac{\text{Single Sheet Weight} \times 112}{\text{Ratio}}$$

$$\text{Ratio} = \frac{\text{Nominal Sheet Area (sq. in.)}}{280 \text{ (sq. ins.)}}$$

$$280 \text{ sq. ins.} = 14'' \times 20'' \text{ (basis sheet size).}$$

COPPER—SHEET AND STRIP

GENERAL.—1. Types available: High Conductivity, Commercial, De-oxidised, Arsenical.

2. Finishes available: Hard (Cold) Rolled; Semi, Medium or Half Hard (Cold) Rolled; Soft (Cold) Rolled; Hot (Soft) Rolled.

TRADE SIZES.—Sheets: 26G and heavier (48" x 14" sheathing), 4' x 2', 6' x 2', 6' x 2' 6", 6' x 3', 8' x 3', 6' x 4', 8' x 4', according to gauge.

Strip: .002" and heavier, 5/16" to 24" wide.

WEIGHT PER SQUARE FOOT.—It is customary to order copper sheets by the Imperial Standard Wire Gauge or by weight in pounds and ounces per square foot. A table showing the weight per square foot equivalents to the various gauge numbers, calculated on the assumption that one square foot of rolled copper, 1 inch in thickness, weighs 46½ lb., is detailed below.

I.S.W.G. No.	Decimal of inch	Wt. per sq. ft. in lb.	Equiv. per sq. ft. in lb.	I.S.W.G. No.	Decimal of inch	Wt. per sq. ft. in lb.	Equiv. per sq. ft. in oz.
7/0	.500	23.25	—	23	.024	1.116	18
6/0	.464	21.57	—	24	.022	1.023	16
5/0	.432	20.08	—	25	.020	.930	14
4/0	.400	18.60	—	26	.018	.837	13
3/0	.372	17.29	—	27	.0164	.762	12
2/0	.348	16.18	—	28	.0148	.688	11
0	.324	15.06	—	29	.0136	.632	—
1	.300	13.950	—	30	.0124	.576	9
2	.276	12.834	—	31	.0116	.539	—
3	.252	11.718	—	32	.0108	.502	8
4	.232	10.788	—	33	.0100	.465	—
5	.212	9.858	10	34	.0092	.427	—
6	.192	8.928	9	35	.0084	.390	—
7	.176	8.184	8	36	.0076	.353	—
8	.160	7.440	7½	37	.0068	.316	—
9	.144	6.696	—	38	.0060	.279	—
10	.128	5.952	6	39	.0052	.241	—
11	.116	5.394	—	40	.0048	.223	—
12	.104	4.836	5	41	.0044	.204	—
13	.092	4.278	4½	42	.0040	.186	—
14	.080	3.720	3¾	43	.0036	.167	—
15	.072	3.348	—	44	.0032	.149	—
16	.064	2.976	3	45	.0028	.130	—
17	.056	2.604	2½	46	.0024	.112	—
18	.048	2.232	2¼	47	.0020	.093	—
19	.040	1.860	2	48	.0016	.074	—
20	.036	1.674	1¾	49	.0012	.056	—
21	.032	1.488	1½	50	.0010	.047	—
22	.028	1.302	1½				

BRASS — SHEET AND STRIP

GENERAL.—1. Commercial Brass is made in three grades: 70/30 (Deep Drawing); 65/35; 63/37 (Basis Brass).

2. Finishes available: Soft (Cold) Rolled; Semi, Medium or Half Hard (Cold) Rolled; Hard (Cold) Rolled; Extra Hard (Strip only).

TRADE SIZES.—Sheets: 26 gauge and heavier—4' x 2', 6' x 2', 6' x 2' 6", 6' x 3'. Strip: .002" and heavier—5/16" to 15" wide (special manufacture).

WEIGHT PER SQUARE FOOT.—The weight per square foot of rolled brass varies slightly with the composition of the alloy. For the basis of all calculations, the figure used is that one square foot of rolled brass weighs 44½ lb. per square foot one inch in thickness.

I.S.W.G. No.	Decimal of an inch	Weight per sq. ft. in lb.	I.S.W.G. No.	Decimal of an inch	Weight per sq. ft. in lb.
7/0	.500	22.250	23	.024	1.068
6/0	.464	20.648	24	.022	.979
5/0	.432	19.224	25	.020	.890
4/0	.400	17.800	26	.018	.801
3/0	.372	16.540	27	.0164	.729
2/0	.348	15.486	28	.0148	.658
0	.324	14.418	29	.0136	.605
1	.300	13.350	30	.0124	.551
2	.276	12.282	31	.0116	.516
3	.252	11.214	32	.0108	.480
4	.232	10.324	33	.0100	.445
5	.212	9.434	34	.0092	.409
6	.192	8.544	35	.0084	.373
7	.176	7.832	36	.0076	.338
8	.160	7.120	37	.0068	.302
9	.144	6.408	38	.0060	.267
10	.128	5.696	39	.0052	.231
11	.116	5.162	40	.0048	.213
12	.104	4.628	41	.0044	.195
13	.092	4.094	42	.0040	.178
14	.080	3.560	43	.0036	.160
15	.072	3.204	44	.0032	.142
16	.064	2.848	45	.0028	.124
17	.056	2.492	46	.0024	.106
18	.048	2.136	47	.0020	.089
19	.040	1.780	48	.0016	.071
20	.036	1.602	49	.0012	.053
21	.032	1.424	50	.0010	.044
22	.028	1.246	—	—	—

OTHER COPPER ALLOYS ARE—Gilding Metal (four grades), 90/10, 88/12, 85/15, 80/20 (Sheet and Strip); Nickel Silver, 10% (Sheet and Strip), 15%, 18%, 20% (Strip only); Engraving Brass (free cutting), Sheet and Strip; Naval Brass (improved Muntz Metal), Sheets and Sheathing; Phosphor Bronze (Strip only).

ZINC AND ZINC SHEET

Zinc is manufactured in Australia, and is sold by the ton in the form of slabs weighing approximately 56 lb. each. Zinc can normally be obtained in the form of plates, sheets, and strip.

WEIGHT OF SHEET ZINC

Gauge	Approx. Thickness		Approx. weight per sq. ft.	Approx. weight of Sheets					
				6' x 3'		7' x 3'		8' x 3'	
	In.	Mm.	Lb. Oz. Drms.	Lb. Oz. Drms.	Lb. Oz. Drms.	Lb. Oz. Drms.	Lb. Oz. Drms.	Lb. Oz. Drms.	Lb. Oz. Drms.
3	.007	.171	0 3 15	4 6 14	5 2 11	5 14 8			
4	.008	.209	0 4 13	5 6 10	6 5 1	7 3 8			
5	.010	.247	0 5 11	6 6 6	7 7 7	8 8 8			
6	.011	.291	0 6 11	7 8 6	8 12 7	10 0 8			
7	.013	.337	0 7 12	8 11 8	10 2 12	12 10 0			
8	.015	.386	0 8 14	9 15 12	11 10 6	13 5 0			
9	.018	.450	0 10 5	11 9 10	13 8 9	15 7 8			
10	.020	.500	0 11 7	12 13 14	15 0 3	17 2 8			
12	.026	.660	0 15 2	17 0 4	19 13 10	22 11 0			
14	.032	.820	1 2 12	21 1 8	24 9 12	28 2 0			
16	.043	1.080	1 8 12	27 13 8	32 7 12	37 2 0			
18	.053	1.340	1 14 11	34 8 6	40 4 7	46 0 8			
20	.063	1.600	2 4 10	41 3 4	48 1 2	54 15 0			
22	.077	1.960	2 12 14	50 7 12	58 14 6	67 5 0			
24	.091	2.320	3 5 3	59 13 6	69 12 15	79 12 8			
26	.105	2.680	3 13 7	69 1 14	80 10 3	92 2 8			

PROCESS ENGRAVERS' ZINC

Process engravers' zinc is supplied in 40" x 20" plates, polished on one side, and in 8, 10, 12, 14 and 16 I.S.W.G. The following table gives weights of these standard sizes of plates.

40" x 20" x	8G	10G	12G	14G	16G
Weight of plate . . .	33 lb.	26½ lb.	22 lb.	16½ lb.	13 lb.
No. of Plates/Case . .	14	18	22	30	36

LEAD AND LEAD SHEET

WEIGHT PER SQUARE FOOT

Thick	Lb.	Thick	Lb.	Thick	Lb.
1/16"	3.7	7/16"	25.9	3/4"	44.7
1/8"	7.4	1/2"	29.5	13/16"	48.3
3/16"	11.1	9/16"	33.2	7/8"	51.0
1/4"	14.8	5/8"	36.9	15/16"	55.1
5/16"	18.5	11/16"	40.6	1"	59.4
3/8"	22.2				

STANDARD SIZES (20' and 30' lengths)

Sheet Lead.—Widths: 2' 6", 3', 3' 9", 5', 7' 6"; weights: 3 lb./sq. ft. and heavier.

Dampcourse.—Widths: 4½", 6", 9", 12", 14", 18"; weights: 2, 3, 4, 5 and 6 lb./sq. ft.

MONEL METAL AND NICKEL

WEIGHTS OF ROUNDS, SQUARES, AND HEXAGONS

Size in inches	Lb. per foot			Size in inches	Lb. per foot		
	Rounds	Squares	Hexs.		Rounds	Squares	Hexs.
7/32	.146	—	—	2	12.178	15.504	13.426
1/4	.190	—	.209	2 1/8	13.747	17.503	15.156
5/16	.297	.379	.327	2 1/4	15.411	19.622	16.991
3/8	.428	.545	.472	2 3/8	17.171	21.863	18.921
7/16	.583	.742	.643	2 1/2	19.027	24.225	20.977
1/2	.761	.969	.839	2 3/4	20.977	26.708	23.127
9/16	.963	1.226	1.062	2 7/8	23.022	29.312	25.382
5/8	1.189	1.514	1.311	3	25.162	32.038	27.741
11/16	1.439	1.832	1.586	3 1/8	27.399	34.884	30.207
3/4	1.712	2.180	1.887	3 1/4	32.155	40.940	35.451
13/16	2.010	2.559	2.216	3 1/2	37.291	47.481	41.113
7/8	2.331	2.968	2.570	3 3/4	42.810	54.506	47.198
15/16	2.766	3.407	2.940	4	48.706	62.016	53.698
1	3.044	3.876	3.356	4 1/4	54.985	70.010	60.621
1-1/16	3.436	4.376	3.778	4 1/2	61.644	78.489	67.963
1-1/8	3.853	4.906	4.248	4 3/4	68.714	87.452	75.757
1-3/16	4.293	5.466	4.733	5	76.105	96.900	83.906
1-1/4	4.756	6.056	5.243	5 1/4	83.908	106.832	92.509
1-5/16	5.244	6.677	5.782	5 1/2	92.086	117.249	101.525
1-3/8	5.756	7.328	6.346	5 3/4	100.648	128.150	110.964
1-7/16	6.291	8.009	6.934	6	109.590	139.536	120.823
1-1/2	6.849	8.721	7.551	6 1/8	118.916	151.406	131.105
1-9/16	7.432	9.463	8.194	6 1/4	128.617	163.761	141.800
1-5/8	8.039	10.235	8.863	6 3/4	138.703	176.600	152.910
1-11/16	8.669	11.038	9.558	7	149.168	189.924	164.458
1-3/4	9.321	11.870	10.276	7 1/8	160.009	203.733	176.410
1-13/16	10.001	12.733	11.026	7 1/4	171.238	218.025	188.790
1-7/8	10.702	13.627	11.799	7 3/4	182.843	232.802	201.584
1-15/16	11.428	14.550	12.599	8	194.827	248.064	214.797

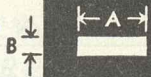
ALUMINIUM — Typical Properties

	Alloy & Temper	U.T.S. p.s.i.	Yield p.s.i.	Extn. % on 2"	Remarks
Sheet	2S-0	13,500	5,500	35	<p>Commercially pure aluminium. A general purpose work-hardening alloy having good corrosion resistance and excellent drawing and forming characteristics in the annealed condition.</p> <p>A work-hardening aluminium manganese alloy having characteristics similar to 2S but having slightly higher mechanical properties.</p> <p>A work-hardening aluminium magnesium alloy having good working and forming characteristics and moderate strength. Excellent uniform surface appearance after anodizing.</p> <p>A work-hardening aluminium magnesium alloy having good forming characteristics and intermediate strength. Good corrosion resistance.</p> <p>A medium-strength aluminium magnesium alloy with good corrosion resistance especially in marine atmospheres. Ductile in the soft condition but work-hardens rapidly. Good welding characteristics.</p>
	2S-H14	17,000	16,000	9	
	2S-H18	26,000	24,000	6	
	3003-0	16,000	6,000	30	
	3003-H14	22,000	21,000	8	
	3003-H18	29,000	27,000	4	
	5005-0	18,000	6,000	30	
	5005-H34	23,000	21,000	6	
	5005-H38	29,000	27,000	4	
	5050-0	21,000	8,000	24	
	5050-H34	28,000	24,000	8	
	5050-H38	32,000	29,000	6	
	M57S-0	29,000	14,500	23	
	M57S-H34	37,000	31,000	9	
	M57S-H38	43,000	38,000	7	
Extrusions	2S-F	13,000	5,500	38	<p>Commercially pure aluminium used in applications where strength and hardness is unimportant.</p> <p>An excellent architectural alloy combining both strength and good surface appearance after anodizing. Main alloying elements are magnesium and silicon. Two of the recognised structural alloys where strength is a primary factor. Both have good corrosion resistance and machining properties.</p> <p>An excellent free-machining alloy suitable for all forms of repetitive work.</p>
	50S-T4A	20,000	15,000	25	
	50S-T5	30,000	25,000	14	
	B51S-T6	45,000	39,000	12	
	65S-T6	45,000	39,000	12	
	28S-T3	51,000	33,500	11	
	28S-T6	55,000	40,000	12	
	2S-T8	56,000	42,000	10	

Extrusion Wt. = Cross Sect. Area x 1.176, lb./ft.

WEIGHT PER SQUARE FOOT — SHEET

Thickness		Weight p.s.f.	Thickness		Weight p.s.f.
I.S.W.G.	Inches		I.S.W.G.	Inches	
—	.500	7.042	12	.104	1.465
—	.4375	6.161	14	.080	1.127
—	.375	5.281	16	.064	0.9013
—	.3125	4.401	18	.048	0.6760
—	.250	3.521	19	.040	0.5633
—	.187	2.641	20	.036	0.5070
8	.160	2.253	22	.028	0.394
10	.128	1.803	24	.022	0.3098
—	.125	1.760	26	.018	0.2535



Extruded Flat Brass Sections

Dimensions, ins.		Est. Wght. per ft. in lb.	Dimensions, ins.		Est. Wght. per ft. in lb.	Dimensions, ins.		Est. Wght. per ft. in lb.
A	B		A	B		A	B	
3-3/4	3/4	10.268	1-1/2	1/16	.342	3/4	5/8	1.71
						3/4	1/2	1.368
3-9/16	.35	4.549	1-3/8	7/8	4.389	3/4	3/8	1.026
						3/4	5/16	.855
3-1/2	1/2	6.384	1-3/8	1/2	2.508	3/4	1/4	.684
			1-3/8	3/8	1.881	3/4	3/16	.513
3	3/4	8.216				3/4	1/8	.342
			1-3/8	3/16	.94	3/4	1/16	.171
3	1/4	2.736	1-3/8	1/8	.627			
						11/16	1/8	.314
2-13/16	.95	9.747	1-5/16	9/16	2.692			
						5/8	1/2	1.14
2-3/4	5/16	3.135				5/8	3/8	.855
			1-1/4		4.561			
			1-1/4	3/4	3.421			
2-1/2	3/8	3.42	1-1/4	5/8	2.85	5/8	1/4	.57
			1-1/4	1/2	2.281	5/8	3/16	.427
			1-1/4	3/8	1.71	5/8	1/8	.285
2-3/8	1/2	4.332	1-1/4	1/4	1.14			
			1-1/4	3/16	.855			
2-1/4	7/8	7.182	1-1/4	1/8	.57	9/16	5/16	.64
2-1/4	1/4	2.052	1-1/4	1/16	.285			
						1/2	3/8	.684
2-1/8	1/2	3.876	1-1/8	1/2	2.052	1/2	5/16	.570
			1-1/8	1/4	1.026	1/2	1/4	.456
2		7.296	1-1/8	7/32	.898	1/2	3/16	.342
			1-1/8	3/16	.77	1/2	1/8	.228
						1/2	1/16	.114
2	1/2	3.648						
2	7/16	3.192						
2	3/8	2.736	1	7/8	3.192	7/16	3/8	.599
			1	3/4	2.736			
2	1/4	1.824	1	5/8	2.28	3/8	5/16	.428
2	3/16	1.368	1	1/2	1.824	3/8	1/4	.342
2	1/8	.912	1	3/8	1.368	3/8	3/16	.256
						3/8	1/8	.171
1-3/4	1-1/8	7.182	1	1/4	.912	3/8	7/64	.149
1-3/4	1	6.384	1	3/16	.684	3/8	1/16	.085
			1	1/8	.456			
1-3/4	1/4	1.596	1	1/16	.228			
1-3/4	1/8	.798				11/32	17/64	.334
			7/8	3/4	2.394			
1-1/2	1-1/4	6.840	7/8	5/8	1.995	5/16	1/4	.285
1-1/2	1	5.472	7/8	1/2	1.596			
1-1/2	3/4	4.108				5/16	3/32	.107
1-1/2	1/2	2.736	7/8	1/8	.399	.285	5/64	.081
1-1/2	3/8	2.052				1/4	3/16	.171
1-1/2	1/4	1.368	13/16	1/2	1.482	1/4	1/8	.114
1-1/2	3/16	1.026				1/4	.075	.068
1-1/2	1/8	.684				3/16	1/8	.085

Brass and Copper — Rods and Bars

WEIGHT PER LINEAL FOOT — LB.

SQUARE			ROUND		
Side Inches	Brass	Copper	Dia. in inches	Brass	Copper
1/8	.057	.061	1/8	.045	.048
3/16	.128	.136	3/16	.101	.108
1/4	.228	.243	1/4	.179	.190
5/16	.357	.380	5/16	.280	.300
3/8	.513	.545	3/8	.403	.430
7/16	.699	.742	7/16	.549	.585
1/2	.913	.970	1/2	.717	.760
9/16	1.15	1.23	9/16	.91	.960
5/8	1.43	1.52	5/8	1.12	1.19
11/16	1.73	1.83	11/16	1.35	1.44
3/4	2.05	2.18	3/4	1.61	1.72
13/16	2.41	2.56	13/16	1.89	2.01
7/8	2.80	2.97	7/8	2.19	2.34
15/16	3.21	3.40	15/16	2.52	2.68
1	3.65	3.88	1	2.87	3.05
1-1/8	4.62	4.91	1-1/8	3.63	3.85
1-1/4	5.70	6.06	1-1/4	4.48	4.76
1-3/8	6.90	7.33	1-3/8	5.42	5.76
1-1/2	8.21	8.72	1-1/2	6.45	6.87
1-5/8	9.64	10.23	1-5/8	7.57	8.04
1-3/4	11.18	11.87	1-3/4	8.78	9.35
1-7/8	12.83	13.62	1-7/8	10.08	10.70
2	14.60	15.50	2	11.47	12.20
2-1/8	—	—	2-1/8	12.94	—
2-1/4	—	19.62	2-1/4	14.51	15.40
2-3/8	—	—	2-3/8	16.17	—
2-1/2	—	24.22	2-1/2	17.92	19.02

Whitworth Standard Hexagon Sizes

Associa- tion	Across flats min. to max.		Lb. per lin. ft.	Standard		Across flats min. to max.		Lb. per lin. ft.
				Whit.	Fine			
	ins.	ins.		ins.	ins.	ins.	ins.	
No. 3	.279	.282	.251	1/2	9/16	.915	.920	2.68
No. 2	.321	.324	.332	9/16	5/8	1.002	1.010	3.22
No. 1	.362	.365	.421	5/8	11/16	1.092	1.100	3.82
No. 0	.410	.413	.539	11/16	3/4	1.192	1.200	4.55
Standard				3/4	7/8	1.292	1.300	5.34
				7/8	1	1.468	1.480	6.92
Whit. Fine				1	1-1/8	1.658	1.670	8.81
				1-1/8	1-1/4	1.845	1.860	10.94
ins. ins.				1-1/4	1-3/8	2.035	2.050	13.29
				1-3/8	1-1/2	2.200	2.220	15.58
— 7/32				1-1/2	1-5/8	2.390	2.410	18.36
				1-5/8	1-3/4	2.555	2.580	21.03
1/4 5/16				1-3/4	2	2.735	2.760	24.07
				2	—	3.125	3.150	31.35
5/16 3/8								
3/8 7/16								
7/16 1/2								

NON-FERROUS WIRE

WEIGHT PER 100 FEET IN POUNDS

Thickness		Copper or Bronze	Brass or Muntz	Alumin- ium	Nickel Silver	Monel Metal or Nickel
Inches	I.S.W.G.					
0.5	7/0	76.0	71.9	22.93	74.1	76.1
0.372	3/0	42.0	39.8	12.17	41	42.76
0.324	0	32.0	30.2	7.63	31.1	31.9
0.276	2	23.3	21.9	7.00	22.6	23.16
0.252	3	19.3	18.3	5.83	18.8	19.20
0.232	4	16.4	15.5	4.96	15.9	16.37
0.192	6	11.15	10.6	3.4	10.9	11.18
0.160	8	7.80	7.36	2.35	7.58	7.77
0.128	10	5.07	4.71	1.53	4.85	4.98
0.104	12	3.30	3.11	0.99	3.20	3.28
0.080	14	1.94	1.84	0.66	1.9	1.93
0.064	16	1.24	1.18	0.377	1.21	1.25
0.048	18	0.70	0.663	0.212	0.682	0.695
0.036	20	0.395	0.373	0.119	0.384	0.387
0.028	22	0.238	0.226	0.072	0.232	0.238
0.022	24	0.148	0.139	0.044	0.143	0.147
0.018	26	0.098	0.0932	0.0297	0.096	0.098
0.0148	28	0.0663	0.0630	0.0201	0.0649	0.066
0.0124	30	0.0465	0.0442	0.0141	0.0455	0.046
0.0108	32	0.0353	0.0336	0.0108	0.0345	0.035
0.0092	24	0.0256	0.0243	0.0077	0.0250	0.025
0.0076	36	0.0175	0.0166	0.0053	0.0171	0.017

C.M.A. Cables—Single V.I.R., Braided and Compounded

Nominal area in sq. in.	No. and dia. of wires in ins.	Nominal o/all dia. in inches		Weight per 100 yds. in lb.		Rating Current SAA Wiring Rules in Amps.	Stand. Resist. (ohms) per 1000 yds. @ 60° F.
		660V	250V	660V	250V		
.0015	1/.044	.196	.142	7	5	8	15.79
.002	3/.029	.216	.164	8	6	10	12.36
.003	1/.064	.220	.166	10	7	15	7.463
.003	3/.036	.234	.184	11	8	15	8.019
.0045	7/.029	.255	.195	13	10	20	5.281
.007	7/.036	.278	.220	17	14	27	3.427
.010	7/.044	.304	.258	23	20	35	2.294
.0145	7/.052	.330	.288	29	27	45	1.643
.0225	7/.064	.368	.330	41	38	55	1.084
.03	19/.044	.396	.376	50	48	65	0.8468

Weight of Drawn Copper Bars

STANDARD RECTANGULAR SIZES

POUNDS PER LINEAL FOOT

Size ins.	Pounds	Size ins.	Pounds	Size ins.	Pounds
1 — x 16	.1206 .1507 .1809 .2110 .2412 .3014 .3617	1 1½ 1½ 1¾ 2 2¼ 2½ 2½ 3 — x 3 8 3½ 3½ 3¾ 4 4½ 4½ 4¾ 5	1.447 1.809 2.170 2.532 2.894 3.256 3.617 3.979 4.341 4.702 5.064 5.426 5.788 6.149 6.511 6.873 7.235	1 1½ 1½ 1¾ 2 2¼ 2½ 2½ 3 — x 3 4 3½ 3¾ 4 4½ 4½ 5 5½ 5½ 6	2.894 3.617 4.341 5.064 5.788 6.511 7.235 7.958 8.681 9.405 10.13 10.85 11.58 12.30 13.02 13.75 14.47 15.19 15.92 16.64 17.36
3 — x 16	.3617 .4522 .5426 .6330 .7235 .9043 1.085 1.266 1.447 1.628 1.809 1.989 2.170	1 1½ 1½ 1¾ 2 2¼ 2½ 2½ 3 1 3½ — x 3½ 2 3¾ 4 4½ 4½ 4¾ 5 5½ 5½ 6	1.929 2.412 2.894 3.376 3.858 4.341 4.823 5.305 5.788 6.270 6.752 7.235 7.717 8.199 8.681 9.164 9.646 10.13 10.61 11.09 11.58	1 1½ 1½ 1¾ 2 2¼ 2½ 2½ 3 1 3½ — x 3½ 2 3¾ 4 4½ 4½ 4¾ 5 5½ 5½ 6	3.858 4.823 5.788 6.752 7.717 8.681 9.646 10.61 11.58 12.54 13.50 14.47 15.43 16.40 17.36 18.33 18.29 20.26 21.22 22.19 23.15
4 — x 16	.4823 .6029 .7235 .8440 .9646 1.206 1.447 1.688 1.929 2.170 2.412 2.653 2.894	1 1½ 1½ 1¾ 2 2¼ 2½ 2½ 3 — x 3½ 2 3¾ 4 4½ 4½ 4¾ 5 5½ 5½ 6	11.58 12.54 13.50 14.47 15.43 16.40 17.36 18.33 18.29 20.26 21.22 22.19 23.15		

SOLID DRAWN COPPER TUBES

COMMERCIAL QUALITY

Standard sizes—weight in lb. per linear foot. Calculated on a basis of copper at .323 lb. per cubic inch.

To find the weight of tubes composed of the following metals, multiply the weights of the equivalent copper tubes by the constants shown:—60/40 brass, 0.942; 70/30 brass, 0.958; aluminium, 0.304.

Imperial Standard Wire Gauge	4	6	8	10	12	14	16	17	18	19	20	22
Dec. equiv. in inches	.232	.192	.160	.128	.104	.080	.064	.056	.048	.040	.036	.028
External diameter inch												
1/2	—	—	—	.58	.50	.41	.34	.30	.26	.22	.20	.16
9/16	—	—	—	—	—	.47	.39	—	.30	—	.23	.18
5/8	—	—	—	—	.66	.53	.44	.38	.34	.28	.26	.20
11/16	—	—	—	—	.74	.59	.48	—	.37	—	.28	.22
3/4	—	—	—	.97	.82	.65	.53	.47	.41	.34	.31	.25
13/16	—	—	—	1.06	.89	.71	.58	—	.45	—	.34	.27
7/8	—	—	—	1.16	.97	.77	.63	.55	.48	.40	.37	.29
15/16	—	—	—	1.25	1.05	.83	.68	—	.52	—	.39	.31
1	—	—	1.76	1.35	1.13	.89	.73	.63	.55	.46	.42	.33
1-1/32	—	—	—	—	—	.92	—	—	—	—	—	—
1-1/8	—	2.17	1.87	1.54	1.29	1.01	.82	.72	.63	.52	.48	.37
1-1/4	—	2.45	2.11	1.74	1.45	1.13	.92	.80	.70	.58	.53	.42
1-9/32	—	—	—	—	1.48	—	—	—	—	—	—	—
1-3/8	—	2.75	2.36	1.94	1.60	1.26	1.02	.89	.77	.64	.58	—
1-1/2	—	3.04	2.60	2.13	1.76	1.38	1.11	.97	.85	.70	.64	—
1-5/8	—	3.33	2.84	2.32	1.92	1.50	1.21	1.06	.92	.77	.69	—
1-3/4	—	3.62	3.08	2.52	2.08	1.61	1.31	1.14	.99	.83	.75	—
1-7/8	—	3.92	3.33	2.71	2.23	1.74	1.41	1.23	1.06	.89	.80	—
2	—	4.21	3.57	2.90	2.39	1.86	1.50	1.31	1.14	.95	.86	—
2-1/8	5.32	4.50	3.81	3.09	2.55	1.98	1.60	—	1.21	—	.92	—
2-1/4	5.67	4.79	4.05	3.29	2.71	2.10	1.70	1.48	1.28	1.07	.97	—
2-5/16	—	—	—	—	2.17	—	—	—	—	—	—	—
2-3/8	6.03	5.06	4.30	3.49	2.86	2.23	1.79	—	1.35	—	1.02	—
2-1/2	6.38	5.37	4.54	3.68	3.02	2.35	1.89	1.65	1.43	1.19	1.08	—
2-5/8	6.73	5.66	4.78	3.87	3.18	2.47	1.99	—	1.50	—	1.13	—
2-3/4	7.08	5.95	5.02	4.07	3.34	2.59	2.08	1.82	1.57	1.31	1.18	—
2-7/8	7.43	6.25	5.27	4.26	3.49	2.71	2.18	—	1.65	—	1.24	—
2-15/16	—	—	—	—	2.77	—	—	—	—	—	—	—
3	7.78	6.54	5.51	4.45	3.65	2.83	2.28	1.99	1.72	1.43	1.29	—
3-1/4	8.48	7.12	5.99	4.84	3.97	3.07	2.47	2.16	1.86	1.55	—	—
3-7/16	—	—	—	5.13	—	—	—	—	—	—	—	—
3-1/2	9.19	7.70	6.48	5.23	4.28	3.32	2.67	2.33	2.01	1.67	—	—
3-3/4	9.89	8.28	6.96	5.62	4.60	3.56	2.86	2.50	2.15	1.79	—	—
4	10.59	8.87	7.45	6.00	4.91	3.80	3.05	2.67	2.30	1.91	—	—
4-1/4	11.29	9.45	7.93	6.39	5.23	4.04	3.25	2.84	—	2.04	—	—
4-1/2	12.00	10.03	8.42	6.78	5.54	4.29	3.44	3.01	—	2.16	—	—
4-3/4	12.70	10.61	8.90	7.17	5.86	4.53	—	3.18	—	2.28	—	—
5	13.40	11.20	9.39	7.55	6.17	4.77	3.83	3.34	—	2.40	—	—
5-1/4	—	—	—	—	—	—	—	3.51	—	—	—	—
5-1/2	14.81	12.36	10.36	8.33	6.80	—	—	3.68	—	—	—	—
6	16.21	13.53	11.33	9.10	7.43	—	—	—	—	—	—	—

ELECTRICITY

FUNDAMENTAL UNITS:

The AMPERE is the unit in which electric current flow is measured.

The OHM is the unit in which resistance to the flow of an electric current is measured.

The VOLT is the unit of electric pressure. A pressure of 1 volt is required to force a current of 1 ampere through a resistance of 1 ohm.

WATT.—This is the unit of power or rate of doing work.

$$\text{Watts} = \text{Volts} \times \text{Amperes.}$$

KILOWATT HOUR.—For commercial purposes electrical energy is charged for in units of 1,000 watt hours, and is called the Board of Trade unit or kilowatt hour.

$$\text{KWh} = \frac{\text{Volts} \times \text{Amperes} \times \text{Hours}}{1,000} \quad \text{or} \quad \frac{\text{Watts} \times \text{Hours}}{1,000}$$

Example: To find the cost of burning three 60-watt lamps for five hours, assuming the cost per unit to be 6d.—

$$\text{Cost} = \frac{60 \times 3 \times 5 \times 6d.}{1,000} = 5.4d.$$

$$\text{HORSEPOWER} = \frac{\text{Watts}}{746} \qquad \text{Kilowatts} = \frac{\text{Watts}}{1,000}$$

The normal voltage for household appliances is 240; for 3-phase motors, etc., 415.

HINTS:

Do NOT take risks with electricity.

Do NOT use frayed or damaged cords or flexibles on portable appliances—THEY ARE DANGEROUS.

WATER is injurious to most electrical equipment.

DO NOT handle wet or damp metal-clad switchgear unless it is effectively EARTHED. If in doubt, have it inspected by a competent electrician, or cover the hand with a rubber glove, several thicknesses of dry cloth, or similar material before attempting to touch.

Portable appliances, unless double insulated, should be earthed by means of the appropriate type flex and plug to an earth plug socket.

A cable carrying electric current (amperes) greater than its capacity will develop excessive heat. This is injurious to insulation (except in special applications) and uneconomical.

The fuse is there for protection. ALWAYS use the correct wire sizes and material (usually copper) when replacing fuses. Over-size fuse wire is dangerous. Frequent blowing of a fuse justifies a check being made.

In all cases of electric shock, remove person from danger zone and apply artificial respiration until medical aid arrives.

Average District Rainfall Throughout Australia

(100 Points = 1 inch)

	DISTRICT	Annual fall, Points	DISTRICT	Annual fall, Points
N.S.W.	Western Far North West	829	Hunter	3463
	Western Lower Darling	967	Central Tablelands North	2310
	Western Upper Darling	1282	Central Tablelands South	3342
	Western S.W. Plains	1287	Central Western Slopes North	2285
	Central Western Plains South	1746	Central Western Slopes South	2193
	Central Western Plains North	1713	Metropolitan East	4190
	North-west Plains East	2181	Metropolitan West	3004
	North-west Plains West	1838	Illawarra	4340
	North-west Slopes North	2606	South Coast	3628
	North-west Slopes South	2428	Southern T'lands, Goulburn, Monaro	2495
	Northern Tablelands Western	3045	Southern Tablelands, Snowy Mts.	3338
	Northern Tablelands Eastern	3755	South-west Slopes South	3343
	North Coast Upper	5544	South-west Slopes North	2353
	North Coast Lower	5563	Riverina East	1846
	Manning	5350	Riverina West	1371
VIC.	Mallee North	1123	East Gippsland	3021
	Mallee South	1335	West Gippsland	3570
	North Wimmera	1578	East Central	3472
	South Wimmera	1892	West Central	2355
	Lower North	1655	North Central	2816
	Upper North	1951	Western Plains	2432
	Lower North-east	3038	West Coast	2929
TAS.	Upper North-east	4365		
	Northern	3776	Central Plateau	5055
	East Coast	3118	West Coast	9625
	Midland	2270	King Island	3330
	South-east	2772	Flinders Island	3010
S.A.	Derwent Valley	2824		
	North-west Interior	741	Central West	1688
	Far North Interior	613	Central East	2338
	Western	1304	Murray Valley	1219
	Upper North	1247	Murray Mallee	1183
	North-east	771	Upper South-east	1658
W.A.	Lower North	1665	Lower South-east	2550
	North Kimberley	3116		
	East Kimberley	1493	North Coastal	1590
	West Kimberley	2008	Central Coastal	3549
	De Grey	1181	South Coastal	3675
	Fortescue	995	Central North	1386
	West Gascoyne	845	Central South	1710
	East Gascoyne	953	Eucla	740
N.T.	Murchison	869	South-east	1037
			North-east	923
QLD.	Northern Rivers	4264	Northern Plateau	1232
	Peninsula North	5575	Upper West	1430
	Peninsula South	3605	Lower West	911
	Carpentaria Lower	2420	South Coast, Port Curtis	3640
	Carpentaria Upper	2404	South Coast, Moreton	4156
	North Coast, Barrow	6255	Darling Downs East	2599
	North Coast, Herbert	8412	Darling Downs West	2130
	Central Coast East	3694	Maranoa	2066
	Central Coast West	2254	Warrego	1621
	Central Highlands	2318	Far South West	1121
	Central Lowlands	1754		

Industry of the Population — Australia

CENSUSES OF 1954 AND 1961

(Exclusive of full-blood Aborigines)

Class of Industry	(Persons) 1954	(Persons) 1961
Primary Production	493,298	458,858
Mining and Quarrying	61,371	54,465
Manufacturing	1,027,331	1,140,363
Electricity, Gas, Water, Sanitary Services (Production, Supply and Maintenance)	73,650	94,274
Building and Construction	325,622	372,542
Transport, Storage and Communication	335,835	362,942
Finance and Property	94,213	141,142
Commerce	577,381	686,524
Public Authority and Defence Services	156,511	169,791
Community and Business Services (Including Professional Service)	294,837	410,143
Amusements, Hotels and Accommodation, Cafes, Personal Service	224,489	247,968
Other Industries or Industries Inadequately described or not stated ..	37,484	85,910
Total in Work Force	3,702,022	4,224,922
Persons not in work force	5,284,508	6,283,264
GRAND TOTAL	8,986,530	10,508,186

Government Railways Statistics, 1960-61

Government	Route Mileage	Gross Revenue £000	Working Expenses £000	Net Revenue £000
Commonwealth	2,252	6,036	4,629	1,407
N.S.W.	6,062	89,751	79,556	10,195
Victoria	4,291	42,987	41,627	1,360
Queensland	6,324	36,530	38,529	-1,999
South Australia	2,533	13,870	15,310	-1,440
Western Australia	4,123	16,317	17,147	- 830
Tasmania	517	2,732	3,545	- 813
TOTAL	26,102	208,223	200,343	7,880

NOTE.—Minus sign (–) denotes loss.

GAUGES OF GOVERNMENT RAILWAYS

5' 3"	5,931 miles	3' 6"	12,646 miles
4' 8½"	7,461 miles	Other	64 miles

Area and Population

State or Territory	Year of formation into separate Colony or Territory	Present Area in square miles	Estimated Population		
			1960 (Calculated)	1961 (Census)	1962 Calculated)
N.S.W. . . .	1786	309,432	3,832,453	3,917,013	3,973,539
Vic.	1851	87,884	2,857,389	2,930,113	2,974,843
Qld.	1859	667,000	1,495,927	1,518,828	1,527,405
S.A.	1834	380,070	945,320	969,340	985,077
W.A.	1829	975,920	722,080	736,629	750,046
Tas.	1825	26,215	343,910	350,340	358,520
N. Territ.	1863	523,620	25,573	27,095	27,107
A.C.T. . . .	1911	940	52,368	58,828	64,213
TOTAL . . .	—	297,081	10,275,020	10,508,186	10,660,750

NOTE.—The six States with their included Territories were Federated under the name "Commonwealth of Australia" on January 1, 1901.

Population and Vital Statistics

AUSTRALIA 1958-59-60

Heading		1958	1959	1960
Population at 31st December (000 omitted)	Total .	9,842	10,056	10,285
Births	Total .	235,532	228,627	237,835
Marriages	No. . .	76,996	75,436	76,462
Deaths	Total .	95,468	88,225	88,794
Deaths of Children under one year	Total .	4,560	4,889	4,643
Natural Increase		138,781	137,764	141,862
Rate of Natural Increase . .		14.09	13.69	13.80

RATES OF POSTAGE

AS FROM 1st OCTOBER, 1959

WITHIN AUSTRALIA

(Including Christmas Island, Cocos Island, Lord Howe Island, Norfolk Island, Nauru, and the Territory of Papua-New Guinea.)

Category	Rates of Postage	Maximum weight
LETTERS — Including Letter-cards and Postcards	5d. first oz., 3d. each additional oz. or part of oz.	—
OTHER ARTICLES — Including Business Papers, Printed Papers and Merchandise	5d. first 4 oz., 3d. each additional 4 oz. or part of 4 oz.	6½ lb. (single vol. printed matter 11 lb.), Patterns, Samples and Merchandise 1 lb.
NEWSPAPERS, PERIODICALS AND BOOKS — Registered at a G.P.O. for postal transmission as such	5d. each 8 oz. or part of 8 oz.	6½ lb. (single vol. 11 lb.).
Articles impressed for the use of the Blind	Free.	15 lb.

PARCELS POST — Maximum Weight 22 lbs.

Destination	Parcels Not Exceeding					
	2 lbs.	3 lbs.	7 lbs.	11 lbs.	16 lbs.	22 lbs.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Within 30 miles of office of posting .	2 0	2 6	4 0	5 0	6 6	8 0
Within the State, but beyond 30 miles .	2 6	3 0	5 0	7 6	10 0	12 6
Adjoining States (as defined in P.O. guide)	3 0	4 0	7 6	10 0	14 0	18 0
Elsewhere in Australia	4 0	6 0	10 0	14 0	20 0	26 0

NOTES:—

- (i) A.C.T., Lord Howe Island and Norfolk Island are regarded as being within New South Wales.
- (ii) Cocos (Keeling) Islands and Christmas Island are regarded as being within Western Australia.
- (iii) Territory of Papua-New Guinea is regarded as an adjoining State to Queensland.
- (iv) Nauru — See Section 8 Post Office Guide.

OVERSEAS

Category	British C'wealth (See list below)	Other Countries	Max. Weight
Letters and Letter Cards	5d. first oz., 3d. each additional oz. or part of oz.	8d. first oz., 5d. each additional oz. or part of oz.	4½ lb.
Postcards—Single ..	5d. each.	8d. each.	—
Reply ...	5d. each half.	8d. each half.	—
Commercial Papers .	5d. first 4 oz., 3d. each additional 4 oz. or part of 4 oz.	5d. first 2 oz., 3d. each additional 2 oz. or part of 2 oz. Min. charge 8d.	4½ lb.
Printed Papers	5d. first 4 oz., 3d. each additional 4 oz. or part of 4 oz.	5d. first 2 oz., 3d. each additional 2 oz. or part of 2 oz.	6½ lb. (Books 11 lb.)
Samples	5d. first 2 oz., 3d. each additional 2 oz. or part of 2 oz.	5d. first 2 oz., 3d. each additional 2 oz. or part of 2 oz.	1 lb.
Small Packets (available to certain countries only) ...	5d. for each 2 oz. or part of 2 oz. Minimum charge 2/-.	5d. for each 2 oz. or part of 2 oz. Minimum charge 2/-.	U.K. only 5 lb. 2 lb.
Newspapers, Periodicals and Books, registered at a G.P.O. for transmission as such ..	NEW ZEALAND AND FIJI ONLY 5d. each 8 oz. or part of 8 oz. Maximum weight 6½ lb.		

AUSTRALIAN AIR MAILS

All classes of postal articles (including parcels) are transmissible by air mail to places within the Commonwealth and its Territories. Enveloped mail not exceeding 10" x 5" x 3/16" in size, posted for delivery within Australia, will be carried by air, free of air mail fees, where air service is available and delivery would be expedited. For other articles, when an "AIR MAIL" envelope is not used, the departmental blue air mail label should be affixed to the top left-hand corner of the article; alternatively, the indication "BY AIR MAIL" may be written prominently in this position. Articles so endorsed, but posted too late for connection by air, will, if such would expedite delivery, be forwarded to their destination by surface mail, except where an article is endorsed "BY AIR MAIL ONLY," in which case it will be held for despatch by the next air mail.

The charges for the transmission of an article by air mail within the Commonwealth are (a) the postage according to the class to which the article belongs; and (b) an air mail fee of 3d. per ounce or portion thereof; e.g., 2-ounce letter, 6d. air mail fee, plus 8d. ordinary postage. Insufficiently prepaid air mail articles for any place within the Commonwealth or its Territories are forwarded by air, irrespective of the deficiency in postage, and surcharged double the amount of the deficiency.

OVERSEAS AIR MAILS

All classes of postal articles are transmissible. The transmission of small packets is restricted to countries which accept such articles in the ordinary post.

Full particulars concerning the conditions applying to the transmission of first and second class mail matter and parcels by air mail, together with details of charges, transit times, and necessary superscriptions, appear in the "Air Mail Schedule," a copy of which may be obtained free at any official Post Office. Alternatively, information may be obtained by telephoning B 040, extension 237.

MONEY ORDERS AND POSTAL NOTES

The Money Order system provides a safe and convenient means of sending money anywhere in Australia or abroad. Commission charged on orders payable in Australia is 1/3d. for each £5 or fraction of £5, and 9d. each additional £5 or fraction of £5. For orders payable in United Kingdom and foreign countries, the rate of commission is 6d. for each £1 or portion of £1 up to £6, with a minimum of 1/3d. POSTAL NOTES in denominations from 1/- to 20/- (poundage from 2d. to 6d.) are available for remitting small amounts within Australia, Papua-New Guinea, and Norfolk Island.

TELEGRAPH SERVICE

RATES WITHIN THE COMMONWEALTH

ORDINARY RATE TELEGRAMS.—Not exceeding 12 words (including address and signature):—

Within a 15-mile radius of the office of origin ..	2/9d.
Beyond a 15-mile radius	3/0d.
Additional word in each case	3d.

URGENT RATE TELEGRAMS.—Urgent rate telegrams are charged at double the ordinary rate, and are treated with the utmost expedition at all stages.

LETTERGRAMS.—24 words or portion thereof 2/0d.
Each additional word 1d.

RATES TO AND FROM COUNTRIES OVERSEAS

British Empire Destinations, excepting as indicated below.

RATES PER WORD:

Ordinary (minimum 7 words)	1/8d.
Letter Telegrams (minimum 22 words)	18/4d.
Each additional word	10d.
Social and Greeting Telegrams (minimum 11 words)	8/4d.
Each additional word	10d.

SOCIAL LETTER TELEGRAMS are accepted for transmission between places in the Commonwealth and Empire points overseas, with certain minor exceptions. Charges are 8/4 for a minimum of 11 words and 10d. each additional word.

Note.—The service indication "GLT" must appear before the address, but is not charged for.

TELEGRAMS TO AND FROM THE PACIFIC ISLANDS, ETC.—Telegrams may be exchanged between Australia and Islands in the Pacific Ocean such as Fiji, Caroline Island, Cook Islands, Friendly Islands, Gilbert and Ellice Islands, Lord Howe Island, New Caledonia, New Hebrides, Samoa, Society Islands, Solomon Islands, Union Island, Willis Island, New Guinea, Papua, and many other islands adjacent to those mentioned.

RADIO-TELEGRAMS.—Radio-telegrams to ships at sea may be lodged at any Telegraph Office, or telephone subscribers may utilise the phonogram facility to lodge these messages. The rates vary from 9d. to 1/4 per word.

CODE ADDRESSES.—A Code address for telegrams may be registered. For Commonwealth telegrams the charge is £5/-/- per annum; for international telegrams only, £1/10/- yearly, and for both Commonwealth and international telegrams, £5/-/-.

Particulars of a code address and relative full address may be published in a publication issued by Directories (Aust.) Ltd., 324 Pitt Street, Sydney.

RATES TO NEW ZEALAND.—Telegrams are accepted for transmission to places in New Zealand via cable.

Ordinary Rate (minimum 7 words)	6d. per word
Letter Telegram (minimum 22 words)	5/6d. " "
Each additional word	3d. " "
Social Letter Telegram (GLT):	
Minimum 10 words	2/6d. " "
Each additional word	3d. " "

Detailed information regarding overseas telegraph rates may be obtained promptly by calling the Cable Clerk at the G.P.O. Country residents should inquire at the local Post Office.

OTHER OVERSEAS COUNTRIES:

	Per word Min. 5 wds.	LT Min. 22 wds.	Each addl. wd.
Belgium, France, Germany, Italy, Norway, Sweden, Switzerland, Greece, U.S.S.R., Spain	2/6	27/6	1/3
Israel	1/8	18/4	10d.
U.S.A., Netherlands	2/-	22/-	1/-
Japan	3/6	38/6	1/9
South American countries	4/-	44/-	2/-
China, Egypt, Indonesia, Philippines	3/-	33/-	1/6

Refer Overseas Telecommunications Commission (Australia) for further particulars and rates for other destinations.



FIRST AID TO THE INJURED

The following notes on First Aid have been contributed by The St. John Ambulance Association, St. John House, 21 Macquarie Place, Sydney, recognised teachers of First Aid, and have been taken from The St. John Manual, "First Aid to the Injured."

In all cases of serious illness or accidents send for a Doctor or Ambulance notifying them clearly of the case to be treated and the location of the accident.

FIRST AID KIT.—It is recommended that every home be equipped with an adequate First Aid Kit and the suggested contents for each are:—Triangular Bandages; Gauze-roller Bandages — 1" to 2"; Safety Pins; Medicine Glass; Thermometer; Pair of Scissors; Pair of Small Forceps; Bottle of Antiseptic; Eye Bath; Salvolatile; Lint; Gauze; Cotton Wool.

It is suggested that sterile dressings be made by cutting lint and gauze into 2" x 2" squares, placing each in a clean rag (to be sewn up, hemmed and sterilised by baking in the oven for one hour).

SHOCK.—All cases of accident or sudden illness result in a condition known as shock, which must be treated primarily.

TREATMENT OF SHOCK.—Lie patient on the back, loosen clothing about the neck, chest and waist and ensure a free circulation of air. Keep the patient warm by covering with coats and blankets but do not overheat him. When able to swallow give strong tea or coffee with plenty of sugar or milk, as hot as he can drink.

UNCONSCIOUSNESS.—Ensure an abundant supply of fresh air and that the patient's air passages are not obstructed. If breathing has stopped or appears to be failing, commence Artificial Respiration. If breathing is NOT NOISY lay patient on his back with head and shoulders slightly raised and supported and turn head to one side. If breathing is NOISY (bubbling through secretions) turn the patient to the three-quarter prone position, supported with a pad in front of chest or the upper knee drawn up. Do not attempt to give food or fluids to unconscious patients. Do not leave the patient until he has been placed in the care of a responsible person.

HÆMORRHAGE (Bleeding)

Place patient in a suitable position, elevate bleeding part except in the case of fractured limb. Expose the wound, removing as little clothing as possible. Do not remove any clots already formed: remove any foreign body which is visible and easily picked out or

wiped off with a piece of clean dressing. Apply and maintain pressure, either direct or indirect. Apply a dressing pad and bandage. Immobilise the injured part. Direct pressure is applied with the thumb or fingers, with a pad if available, to the part of the wound from which there is blood coming. When a foreign body or broken bone is present in the wound, press alongside it and NOT over it. If the bleeding point is not readily visible grasp the whole wound and squeeze it tightly.

NECK.—Apply thumb of one hand on the Artery, pressing backwards against the spine, taking care to avoid the windpipe.

FACE.—Below the level of the eye.—Apply pressure on the wound from the outside of the cheek against the jawbone.

ARMPIT.—Place hard pad (size billiard ball) in the armpit. Apply centre of narrow bandage on the pad: cross bandage on shoulder. Pull the ends tight and tie under the opposite armpit.

UPPER ARM.—Apply pressure with fingers on the Artery by grasping the arm at its centre from behind and compress artery against bone.

FOREARM.—Pressure may be applied by the thumb placed on either side of the wound.

PALM OF HAND.—When foreign body or broken bone is not present, apply dressing and firm pad, making the patient grasp it. Bandage the hand.

FINGERS.—Apply small pad on wound and secure firmly with bandage.

THIGH.—Place thumbs, one on the other on the Pulsating Artery at the centre of the groin, grasping the thigh with hands. When wound occurs in the upper region on artery, keep the pressure up until the arrival of a Doctor. Each fresh assistant places his thumbs over those of his predecessor who slips his away and thus gushes of blood are prevented during the change.

LEG.—Front or Back. Apply pressure by fingers or pad if bleeding at the ankle and bandage firmly over the wound.

SOLE OF THE FOOT.—Apply pressure and firm pad over the bleeding point and maintain firm pressure by bandage. Support the foot in elevated position.

ANTISEPTIC.—In wounds and on the skin no antiseptics which burn or irritate should be used. When prepared antiseptics are not available normal saline solution (one teaspoonful of common salt to one pint of sterile water) should be used.

COLD COMPRESS.—Used to ease pain, lessen swelling, control internal bleeding. A clean handkerchief or piece of lint is soaked in cold water and applied to affected part: change frequently.

FRACTURES — Broken Bones — Signs and Symptoms

Pain at or near seat of fracture, loss of power in the limb, swelling about the seat of fracture, deformity of limb, unnatural mobility.

TREATMENT.—Attend to fracture on the spot. No attempt must be made to move the patient until the limb has been rendered immobile as practicable by splints or other means of restraint. Steady and support injured limb, placing it in as natural position as possible. Apply splints and bandages.

SPLINTS.—These may be improvised from walking sticks, umbrellas, broom-handles, rifles, folded coats, pieces of wood, etc. When splints are not available tie fractured limb to the body and, in all cases, a fractured lower limb should be bandaged to its fellow.

FRACTURED SKULL.—If breathing is not noisy.—Lay the patient on his back with his head and shoulders slightly raised and supported. Turn head to one side. Should there be bleeding from an ear, place the head so that the affected ear is on the lower side.

If breathing is noisy with Bubbling through secretion.—Lay casualty on his side in the three-quarter ($\frac{3}{4}$) prone position, i.e. half-way between side and face-down position. Support him in this position by a pad in front of the chest or draw up the upper knee. Make sure air passages are free from obstruction: make no attempt to arouse the patient. Urgent medical aid is essential.

LOWER JAW.—Warn patient not to speak and instruct him to lean forward. Place palm of your hand against the injured bone and press it gently against the upper jaw. Apply bandage under chin. Carry one end upwards over the top of the head and cross with the other hand above the ear. Carry the other end low down across the front of the forehead and the other end in the opposite direction around the back of the head. Tie off close above other ear.

COLLAR BONE.—Support the arm of the injured side. Place padding between the upper arm and chest, bandaging the upper arm on the injured side to the side of the chest with broad bandage, leaving forearm free. Support the upper limb on the injured side in a triangular bandage.

RIBS.—Simple fracture.—Apply two broad bandages around the chest, firmly enough to give support above and below the site of the pain. Tie the bandage slightly to the front of the uninjured side. Support the arm on the injured side in a sling.

RIBS.—Complicated fracture.—Do not apply bandages except where there is a sucking chest wound: this must be covered immediately. Lie patient down with head and shoulders raised and body inclined to the injured side.

FOREARM.—Apply well-padded splint to the front and back of forearm. Bandage firmly and support arm in arm-sling.

UPPER ARM.—When elbow can be bent without difficulty or increasing pain.—Bend the elbow and lay the injured limb against the chest with fingers just touching opposite shoulder. Pad well between limb and the chest. Fix in position with collar and cuff sling. Apply two broad bandages:—

1. The upper border level with the top of the shoulder.

2. The lower border level with the tip of the elbow.

Tie off both bandages on opposite side of the body.

UPPER ARM.—When elbow cannot be bent without difficulty or increasing pain.—Apply well-padded splint to front of the arm and forearm long enough to reach from just below the armpit to below the wrist. Secure with broad bandages one above the fracture, one below and one around the wrist.

THIGH.—This must always be regarded as serious due to the shock which accompanies the fracture. Apply well-padded splint between limbs. Tie foot and ankles together with Figure '8' bandage to include the splint. Apply well-padded splint to the outside of the body extending from just below the armpit to the foot. Secure with seven bandages.

KNEE CAP.—Lay casualty on back. Support head and shoulders, raise and support injured leg in comfortable position. Apply well-padded splint along back of the limb from buttock to heel, padding well in the natural hollow of the ankle. Secure limb by bandage.

LEG.—Place well-padded splint between the limbs and bring foot as nearly as possible into line without using force. Tie feet and ankles together with a Figure of '8' bandage and secure with four other bandages from below the thigh to the ankles.

CRUSHED FOOT.—When wound is present.—Carefully remove shoe and sock and treat the wound and apply padded splint to the sole of the foot. Bandage securely.

CRUSHED FOOT.—When wound is not present.—Do not remove shoe. Secure with Figure of '8' bandage. Raise and support the limb in comfortable position.

GENERAL

DISLOCATION.—Limbs.—Do not attempt to reduce the dislocation. Obtain medical aid urgently. Steady and support the limb in the most comfortable position.

LOWER JAW.—Remove any dentures. Support the lower jaw by a bandage tied over the top of the head.

SPRAINS.—Place limb in the most comfortable position and apply firm bandage. Keep it wet with cold water. In all doubtful cases treat as a fracture.

RUPTURE.—Hernia.—Lay casualty down. Raise and support head and shoulders; bend the knees and place pillow under them. Do not attempt to reduce swelling but seek medical assistance urgently.

FOREIGN BODY IN THE EYE.—If foreign body does not appear to be embedded remove it with corner of clean handkerchief, twirled up and moistened with clean water. If foreign body is imbedded do not attempt to remove. Instruct patient to close his eyelids. Apply soft pad of cotton wool and secure with bandage. Seek medical assistance urgently.

CORROSIVE ACID OR ALKALINE.—Instruct patient to blink his eyelid under water or flush the eye with copious supplies of water. Place soft pad of cotton wool over the eye and keep in position by a lightly applied bandage. Medical aid must be obtained urgently.

FOREIGN BODY IN EAR CHANNEL.—If an insect, fill the ear with olive or salad oil or a few drops of surgical spirit. The insect will then float and may be removed. Do not interfere with any other foreign bodies but seek medical assistance.

FOREIGN BODY IN NOSE.—Instruct patient to breathe through the mouth and not to interfere with the object. Insist that medical assistance is obtained.

HEAT STROKE.—Place patient in coolest position possible and remove clothing. Sprinkle with water or wrap in a wet towel or sheet and fan him. Care must be taken not to lower the temperature too far. When temperature is lowered (102°) wrap the patient in a dry sheet and continue to fan. If conscious, give plenty of cool salted water ($\frac{1}{2}$ teaspoon to 1 pint). Keep under observation.

APOPLEXY.—(Stroke).—Apply rules for unconscious persons.

FAINTING.—When a person feels faint get his head down quickly. If sitting, lower the head between the knees or lay him down with the head lower than the feet. Loosen tight clothing and ensure there is plenty of fresh air.

BITES.—Snake and Venomous Spiders.—Immediately place constrictive bandage on limb between the wound and heart. Incise the wound freely and squeeze out blood. Release the constrictive bandage after 15 minutes and re-apply.

ARTIFICIAL RESPIRATION.—Every person should make a point of receiving instruction in the latest methods. In cases of Asphyxia every moment counts. Never delay one second before applying Artificial Respiration.

ORAL RESUSCITATION (Mouth-to-Mouth).—Clear mouth of any obstruction to breathing. Quickly place patient on his back with folded coat or other material under his shoulders so that the head falls well back. It is essential to ensure a free passage of air. Kneel alongside of patient's head and keep it in full face-up position. Press down on the forehead with the upper hand so as to tilt the head back as far as possible.

Seal patient's nose by squeezing the nostrils between the fore and middle fingers of the same hand. Take a full breath, open your mouth wide and place the lips over the patient's mouth. In the case of young children, cover the nose and mouth. Breathe strongly into the patient's lungs sufficiently to see that the chest expands. Lift and turn the head away from the patient's mouth and listen for his breaths coming out. Repeat this process as rapidly as possible for a total of ten breaths, thereafter, repeat inflations every three or four seconds, using fairly deep breaths. The breaths should be less strong for a child and still less for a baby. Full instructions in this method together with the Holger Nielsen and Sylvester Methods should be obtained.

POISONS

In all cases of poisoning send for medical aid at once. Keep for examination any poison remaining in bottle or any container which may help to identify the poison and any vomited matter. If patient is unconscious place him in the prone position with head to one side and place on a pillow. If breathing is feeble or unduly slow start Artificial Respiration at once. When the poison has been swallowed and casualty is conscious make him vomit by tickling the back of throat with a spoon or two fingers. If this fails give him an emetic — two tablespoons of salt to a tumbler of water — preferably lukewarm. **DO NOT INDUCE VOMITING** if patient is unconscious or when the lips and mouth are burnt.

Neutralise the poison by an antidote. **FOR AN ACID**, give chalk or milk of magnesia. **FOR AN ALKALINE**, give plenty of water or, if possible, two tablespoons of vinegar, orange, lemon or lime juice to one pint of water.

CARBOLIC ACID AND LYSOL POISONING.—Do not make casualty vomit. Give two tablespoons Epsom Salts in one pint of water or in a teacup of medicinal paraffin.

ARSENIC.—Found in Weedkillers, Rat Poisons, Sheep Dips.—Make the casualty vomit. Give soothing drinks (milk, barley water, raw eggs or flour beaten up with water).

ASPIRIN.—Make the casualty vomit. Give water in which two teaspoons bicarbonate soda to one pint of water have been added; strong tea or coffee.

CARBON MONOXIDE.—Gas Stoves or Exhaust Fumes.—Apply Artificial Respiration.

LEAD.—In some Paints and Hair Dyes.—Make the casualty vomit. Give one dessertspoon of Epsom Salts with a cup of water.

PHOSPHORUS.—Some Rat Poisons.—Make the casualty vomit. Give copious drinks of water. Never give oils.

STRYCHNINE.—Some Vermin Killers.—Make the casualty vomit unless spasms have begun. Keep very quiet. If breathing stops apply Artificial Respiration.

KEROSENE, PETROL, TURPENTINE.—Do not cause vomiting. Give milk.

The above are brief notes only on First Aid. It is strongly recommended that classes in First Aid and Home Nursing be attended so as to give members of a household a thorough knowledge of how to render First Aid in case of accident and the care of sick persons in the home. Branches of The St. John Ambulance Association are in existence at Ambulance Stations in all country towns. Enquiries are welcomed by the Head Office of the Association, 21 Macquarie Place, Sydney.

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