

LYSAGHT'S REFEREE

A HANDBOOK OF
USEFUL INFORMATION

18TH
EDITION



With the Compliments of
JOHN LYSAGHT (AUSTRALIA) PTY. LTD.

LYSAGHT'S



REFEREE

18th EDITION

JOHN LYSAGHT (AUSTRALIA) PTY. LTD.

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33 Macquarie Place
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70-84 Clarendon Street
Box No. 2776Y, Elizabeth St. P.O.

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BRISBANE

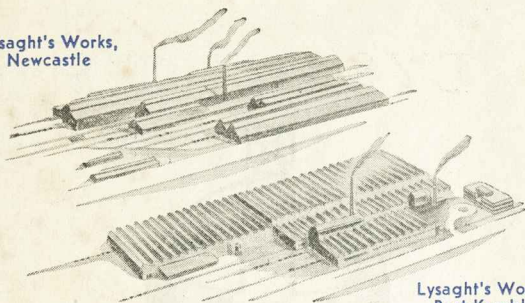
Griffith House,
307-311 Queen Street
Box No. 251D, G.P.O.

ADELAIDE

Royal Insurance Building,
13 Grenfell Street
Box No. 125B, G.P.O.

Telegraphic Address:
"GALVANIZED"

Lysaght's Works,
Newcastle



Lysaght's Works,
Port Kembla

FOREWORD

For many years Lysaght's 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. War and post-war conditions, however, have prevented its publication since 1939, so it is with special pride that John Lysaght (Aust.) Pty. Ltd. presents this completely revised and up-to-date eighteenth 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) PTY. LTD.

GALVANIZED IRON

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 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 Iron, 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's Orb brand Corrugated Galvanized Iron. First introduced in England in 1857, and manufactured in Australia since 1921, Corrugated Galvanized Iron 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 builder and plumber is Lysaght's Queen's Head brand Galvanized Iron, now universally accepted as being the finest flat galvanized steel sheet for working-up purposes available to the trade.

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 produced in both flat and corrugated forms.

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 temperatures of 600°C. It can be stove enamelled without damaging the protective surface in any way.

SOLDERING.—Zincanneal is quite satisfactory for soldered joints, but it is generally found to require more care than ordinary galvanized sheet. If it is remembered that Zincanneal has a much greater resistance to corrosion than has galvanized iron, it will be appreciated that this corrosion-resistance applies also to soldering fluxes. The first consideration, therefore, is to use a very active flux, such as raw spirits, or, as many plumbers prefer, 50% killed spirits, 50% raw spirits. Equally good results have been obtained with 60/40 and 50/50 solders, though some plumbers report a preference for 60/40.

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 temperatures 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.

JOHN LYSAGHT (AUST.) PTY. LTD.

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 in 26 gauge.

LYSAGHT

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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.

LYSAGHT

AUSTRALIA

RED Z.A.— This quality has the Zincanneal coating applied to an especially hard steel base, providing great rigidity and strength for structural applications such as roofing, walling, and fencing, where these properties are of major importance. Red Zincanneal is not suitable for curving.

LYSAGHT
ZINCANNEAL
AUSTRALIA

BLUE Z.A.— This quality has the Zincanneal coating applied to a high quality ductile steel base, and may be curved with ease.

LYSAGHT
ZINCANNEAL
AUSTRALIA

U.B. GALVANIZED SHEETS.—U.B. or Unbranded Galvanized sheets may contain small uncoated areas, corners off, and broken sides. Appearance defects such as rough and lumpy coatings, dark dry areas, or salt stains may be included. Such sheets carry the brand:—



ZINCANNEAL SECONDS.—Zincanneal Seconds may contain small uncoated areas, corners off, or broken sides. Defects may be included, such as rough and lumpy coatings, salt stains, bright patches, yellow stains, black stains, and tree marks. Such sheets carry the brand:—

Z.A.
SECONDS

WASTE.—Complete sheets which are too badly damaged for grading into U.B. or Seconds are packed together as Waste. Any one package of Waste consists of defective sheets of approximately the same gauge, size and coating, with all defects including large uncoated areas, corner and end faults, broken sides, and holes. Pinched, crinkled and cobbled sheets are also included.

PACKING

All sheets are packed in cases or bundles weighing approximately 10 cwt.

GALVANIZED CORRUGATED:

All Red Orb sheets are packed in 10 cwt. bundles.

26G Blue Orb sheets are packed in cases (both 3" and 1" corrugations).

Other Blue Orb gauges are packed in cases (if timber is available).

All U.B. material and Waste sheets are packed in bundles.

ZINCANNEAL CORRUGATED:

Prime sheets are packed in cases.

Seconds are packed in cases.

Waste is packed in 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 year of manufacture has been incorporated in the Maltese Cross of the Orb brand, and in the outlining circle of the UB brand.



The day and number of the month of manufacture are stamped to the left and right of the Orb brand respectively.

Sheets are branded on one side only, with the exception of 24G Blue Orb (which is used mainly for tankmaking). On the reverse side to the normal brand is a star device 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.

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

ZINCANNEAL SHEETS.—Zincanneal sheets, in addition to the inspector's number, carry a processing draft number, which incorporates the date of manufacture.

PACKING.—The packer's initials are stamped on the side of the case, and a large packer's slip giving the packer's name and the date of packing is enclosed in all cases.

CASE AND BUNDLE MARKINGS

Corrugated Sheet—Galvanized and Zincanneal

To facilitate identification, information is stencilled on cases and bundles, in black ink in general, but in red ink for Red qualities of sheet.

Clips are of the same material as contained in the case or bundle.

The initials of the packer are stencilled on the sides of all cases.

CORRUGATED GALVANIZED IRON:

Red Orb.—One clip is marked with the number and weight of sheets. The other clip on the same side of the bundle is marked R.O. and shows the gauge number (usually 26G).

U.B. (Red).—Marked similarly to Red Orb, except the mark U.B. replaces R.O.

Waste (Red).—One clip is marked W and with the gauge. The other clip on the same side of the bundle is marked with the weight.

Blue Orb.—When in cases the following symbols are stencilled on one end of the case, with the number and weight of the sheets—



26G (1" corr.) 26G (3" corr.) 24G 22G 20G and 18G

the size, number and weight of sheets is marked on the other end of the case.

U.B. (Blue).—The following code of colour clips is used on one side of the bundle:—

26G	Plain Clips
24G	Yellow Clips
22G and heavier	Blue Clips

On the other side of the bundle one clip is marked U.B. with the gauge. The other clip is marked with the number and weight of the sheets.

Waste.—In Waste quality, Blue and Red varieties may be mixed. The following code of colour clips is used on one side of the bundle:—

26G	Red and Black Clips
24G	Green Clips
22G and heavier	Blue Clips

On the other side of the bundle one clip is marked W with the gauge. The other clip is marked with the weight of sheets.

CORRUGATED ZINCANNEAL:

Corrugated Firsts are marked ZINCANNEAL, with the number and weight of sheets on one end of the case. The other end is marked with the size, number and weight of sheets.

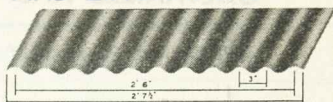
Corrugated Seconds are marked similarly to Firsts except that the mark Zincanneal is followed by a 2.

Corrugated Waste.—One clip is marked ZINCANNEAL W with the gauge. The other clip is marked with the weight of the bundle. For Red Waste, the clips on the opposite side are painted red.

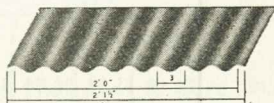
JOHN LYSAGHT (AUST.) PTY. LTD.

STANDARD CORRUGATED SHEETS GALVANIZED AND ZINCANNEAL

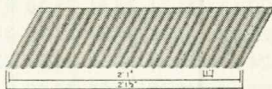
10-3" corrugations
16G-26G 5-12ft. lengths



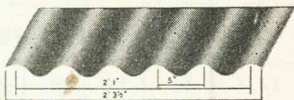
8-3" corrugations
16G-26G 5-12ft. lengths



25-1" corrugations
26G only 5-10ft. lengths



5-5" corrugations
14G-20G 5-12ft. lengths



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 $\frac{3}{4}$ " , 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.

1"—The standard 1-inch corrugation sheet, produced in 26G only, is 25 corrugations wide, $\frac{1}{4}$ " deep. This sheet is most popular for linings, awnings, ceilings, showers, or sheds and country halls, and is gaining an increased popularity as division walls in large country stores.

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.

8-3in. CORRUGATED STEEL SHEET GALVANIZED AND ZINCANNEAL

APPROXIMATE WEIGHT PER SHEET—LBS.

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	26.18	31.36	36.54	41.73	46.91	52.09	57.27	62.45
20	21.21	25.41	29.60	33.80	38.00	42.20	46.40	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	30.39	33.14
26	9.37	11.23	13.08	14.94	16.79	18.64	20.49	22.36

COUNT OF SHEETS PER HALF-TON CASE

18	43	36	31	27	24	22	20	18
20	53	45	38	34	30	27	25	23
22	66	55	48	42	37	33	30	28
24	84	70	60	52	47	42	38	35
26	120	100	85	75	66	60	54	50

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

18	767	778	787	793	798	802	805	808
20	946	961	971	979	985	990	994	997
22	1168	1186	1199	1209	1216	1222	1227	1231
24	1445	1467	1483	1495	1504	1511	1517	1522
26	2142	2174	2198	2215	2229	2241	2250	2256

NOTE.—Following long-established British practice, 26 gauge Galvanized Iron, both corrugated and plain, manufactured in Australia, is lighter than true 26 gauge. It has provided an adequate and economical sheet which has been universally accepted for many years.

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10-3in. CORRUGATED STEEL SHEET GALVANIZED AND ZINCANNEAL

APPROXIMATE WEIGHT PER SHEET—LBS.

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
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	41.86	46.02	50.18
24	17.01	20.38	23.74	27.11	30.48	33.84	37.21	40.58
26	11.47	13.74	16.01	18.28	20.55	22.82	25.09	27.36

COUNT OF SHEETS PER HALF-TON CASE

18	35	29	25	22	20	18	16	14
20	43	36	31	27	24	22	20	18
22	53	44	38	34	30	27	25	23
24	68	57	49	43	38	34	31	29
26	97	81	69	61	54	49	44	41

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

18	788	800	808	815	820	824	827	830
20	972	987	998	1006	1012	1017	1021	1024
22	1200	1219	1232	1242	1249	1255	1260	1265
24	1484	1507	1524	1536	1545	1553	1559	1564
26	2202	2235	2259	2277	2292	2303	2312	2320

NOTE.—Following long-established British practice, 26 gauge Galvanized Iron, both corrugated and plain, manufactured in Australia, is lighter than true 26 gauge. It has provided an adequate and economical sheet which has been universally accepted for many years.

GALVANIZED FLAT SHEETS

QUEEN'S HEAD.—Prime sheets of Lysaght galvanized flat steel sheets are branded with the well-known Queen's Head brand. These quality flat sheets are the most uniform and reliable plain galvanized sheets on the market.

EXPLANATORY NOTES ON MARKINGS OF FLAT SHEETS.

—For the information of users, and to facilitate means of identifying life of galvanized sheets, the year of manufacture is incorporated in the rectangular frame of the Queen's Head brand, the figures being located at the base of the Queen's neck. Figures on either side of the brand show the day and month of manufacture. Sheets are branded on one side only, and sheets manufactured at Port Kembla Works have the letter "K" shown in all brands. Between the brand and the end of the sheet is stamped the identification number of the inspector who passed the sheet. The packer's initials are stamped on the side of the case, and the packer's slip, giving the packer's name and date of packing, is enclosed in all cases. Should you find it necessary to make a complaint, please endeavour to quote packer's initials, inspector's number, year of manufacture, and any other details that might assist us to investigate and remedy your complaint. Whereas the letters in the corners of the rectangular frame at one time used to be L.N.W.L., referring to Lysaght's Newcastle Works Ltd., these now read L.W.P.L., meaning Lysaght's Works Pty. Ltd.

PACKING.—Sheets are packed in cases or bundles weighing approximately 10 cwt.

Queen's Head: 16G and heavier are packed in bundles.
Lighter than 16G is packed in cases.

U.B.: 16G and heavier are packed in bundles.
Lighter than 16G is packed in cases.

Waste: 16G and heavier are packed in bundles.
Lighter than 16G is packed in cases.

LYSAGHT



**QUEEN'S HEAD
AUSTRALIA**

ZINCANNEAL FLAT SHEET

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

Z.A. R.L.—This quality is especially suited to, and enjoys increasing popularity for flashings, gutters, downpipes, capping, vents, duct work, and formed work generally, where a perfectly flat sheet is not required.

LYSAGHT
ZINCANNEAL
AUSTRALIA
R.L.

Z.A. PANEL QUALITY.—

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.

LYSAGHT
ZINCANNEAL
AUSTRALIA
PANEL QUALITY

SECONDS.—In the production of prime sheets certain sheets are rejected for imperfections of surface or dimensions into Seconds R.L., or Seconds Panel Quality.

Zincanneal Seconds may contain small uncoated areas, corners off, or broken sides. Extensive appearance defects may be included, such as rough and lumpy coatings, bright patches, yellow stains, black stains, and tree marks.

Z.A.
SECONDS

R.L.

Z.A.
SECONDS

PANEL QUALITY

WASTE.—Complete sheets which are too badly damaged for grading into Seconds are packed as Waste.

Any one package of Waste consists of defective sheets of approximately the same gauge and size, with all defects, including large uncoated areas, corners off, and faults, broken sides, and holes. Pinched, crinkled and cobbled sheets are also included.

PACKING.—All grades are packed in cases weighing approximately 10 cwt.

CASE AND BUNDLE MARKINGS

Flat Sheet—Galvanized and Zincanneal

GALVANIZED

QUEEN'S HEAD.—When in cases the following symbols are stencilled on one end of the case with the number and weight of the sheets:

30

30G



28G



26G



24G



26G and heavier

The size, number and weight of sheets is marked on the other end of the case.

When in bundles the number and weight of sheets is stencilled on a tally in the side of the bundle, and another tally is marked with the quality, Q.H. and size.

All bundles 22G and heavier have blue clips.

14G and heavier are not branded, the tally being marked Q.H.N.B.

U.B.—When in cases, one end is marked U.B., with the number and weight of sheets. The other end is marked with the size, number, and weight of sheets. The clips are painted red.

When in bundles, the markings are similar to those of Queen's Head bundles, the mark Q.H. being replaced by U.B.

WASTE.—When in cases, one end is marked W and the gauge. Both ends are marked with the weight of sheets. Clips are painted red. When in bundles the markings are similar to those of Queen's Head bundles, the mark Q.H. being replaced by W., and the only dimension shown is the gauge.

TIGHT-COATED FLATS.—When in cases one end is marked T.C.N.B., with the number and weight of sheets. The other end is marked with the size, number, and weight of sheets. When in bundles, the markings are similar to those of Queen's Head bundles, the mark Q.H. being replaced by T.C.N.B.

SPECIAL SHEETS.—Certain special sheets are produced by Lysaght's for restricted use. C30 C.A. is a special springy sheet. The sheets are not branded, but the cases are marked C30 C.A. N.B.

ZINCANNEAL

PANEL QUALITY.—Cases of prime sheets are marked ZINCANNEAL PANEL, with the number and weight of sheets on one end of the case. The other end is marked with size, number and weight of sheets.

PANEL SECONDS AND WASTE are marked similarly to Firsts, except that the mark ZINCANNEAL PANEL is followed by 2 or W. The clips are painted red.

R.L. FIRSTS, SECONDS, AND WASTE.—As for Panel, except the mark R.L. replaces PANEL.

FLAT SHEETS GALVANIZED AND ZINCANNEAL

		Approximate Weight Per Sheet in lbs.				Count of Sheets Per Half-ton Case			
	Gauge	Width				Width			
		24"	30"	36"	48"	24"	30"	36"	48"
6 FEET LENGTHS	14	39.62	49.48	59.33	79.04	29	23	19	15
	16	31.68	39.56	47.44	63.20	36	29	24	18
	18	25.23	31.50	37.77	50.32	45	36	30	23
	20	20.26	25.30	30.34	40.42	56	45	37	28
	22	16.28	20.33	24.37	32.47	69	56	46	35
	24	13.06	16.30	19.55	26.04	86	69	59	44
	26	8.80	11.01	13.20	17.59	124	99	84	62
8 FEET LENGTHS	14	52.72	65.83	78.94	105.16	22	17	15	11
	16	42.15	52.63	63.12	84.08	27	22	18	14
	18	33.56	41.91	50.26	66.95	34	27	23	17
	20	26.96	33.66	40.37	53.78	42	34	28	21
	22	21.66	27.04	32.43	43.20	52	42	35	26
	24	17.37	21.69	26.01	34.65	65	53	44	33
	26	11.73	14.65	17.57	23.40	92	74	63	46

NOTE.—Following long-established British practice, 26 gauge Galvanized Iron, both corrugated and plain, manufactured in Australia, is lighter than true 26g. It has provided an adequate and economical sheet which has been universally accepted for many years.

TERNE PLATE

GENERAL.—Terne Plate or Tin-lead coated sheets are produced mainly for canister makers, where a tin-lead lining is essential.

SIZES.—While a variety of sizes are manufactured from time to time to customers' particular specifications, the only sizes regularly processed are 8' x 30" x 28G and 8' x 36" x 26G.

WEIGHT PER SQ. FT. OF SHEET:

28G	0.6581 lbs.
26G	0.8207 lbs.

STOCK SIZE SHEETS:

Size and Gauge	Weight of Sheet in lbs.	Number of Sheets per $\frac{1}{2}$ -ton Case
8' x 30" x 28G	13.304	85
8' x 36" x 26G	19.894	57

PACKING.—All Terne Plate, Prime Sheets (or Firsts), Seconds and Waste are packed in cases.

CASE MARKINGS.—To facilitate identification information is stencilled on cases.

Prime Sheets (or Firsts) are marked TERNE PLATE with the number and weight of sheets on one end of the case. The other end is marked with the number and weight of the sheets.

Seconds are marked similarly to prime sheets, except that the mark TERNE PLATE is followed by 2. The clips are painted red.

Waste cases are marked TERNE PLATE W, with the gauge and weight of sheets on one end of the case. The other end is marked with the gauge and weight, clips being painted red.

ROOFING TERNES.—Roofing Ternes were a product of the war years, when zinc was unavailable for civil purposes. These corrugated lead-coated steel sheets are no longer being produced.

BLACK STEEL SHEETS

The extraordinary progress that has been made in the use of BLACK STEEL SHEETS to so many and varied of our present-day requirements has only been possible by the scientific production of special quality sheets for particular purposes.

Sunstar Grades are used for all normal working-up purposes.

Lycor Deep Drawing sheets are used for pressings and enamelling.

Motor body and enamelling sheets with superior finishes are used for specialised work.

Carbon Steels for increased strength, resistance to wear and fine cutting edges.

Electrical sheets for laminations in transformer and motor construction.

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.

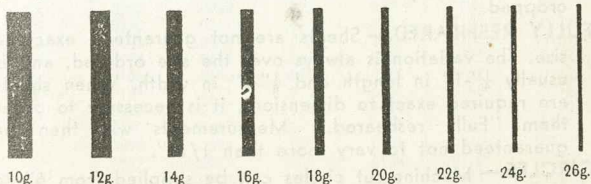


Illustration showing the approximate thickness of sheets according to the Birmingham Gauge.

GAUGE TABLE

Gauge	Thickness		lbs. per sq. ft.	Gauge	Thickness		lbs. per sq. ft.
	Inches	Mms.			Inches	Mms.	
8	.1570	3.988	6.41	20	.0392	.996	1.60
9	.1398	3.551	5.70	21	.0349	.886	1.42
10	.1250	3.175	5.10	22	.0312	.794	1.27
11	.1113	2.827	4.54	23	.0278	.707	1.13
12	.0991	2.517	4.04	24	.0247	.629	1.01
13	.0882	2.240	3.60	25	.0220	.560	.90
14	.0785	1.994	3.20	26	.0196	.498	.80
15	.0699	1.775	2.85	27	.0174	.443	.71
16	.0625	1.587	2.55	28	.0156	.396	.64
17	.0556	1.412	2.27	29	.0139	.353	.57
18	.0495	1.257	2.02	30	.0123	.312	.50
19	.0440	1.118	1.80				

GAUGE TOLERANCES

Tolerances are permitted by the trade in Black Sheets:—

GAUGE	Up and Down	Total	GAUGE	Up and Down	Total
3/16" to 13 ..	.008	.016	19 to 22	.003	.006
14 and 15 ..	.006	.012	23 and		
16 to 18	.004	.008	thinner	.002	.004

SPECIAL PROCESSING

CROPPING.— Sheets that have been flattened by hydraulic stretching have a slight indented mark across each end about $1\frac{1}{2}$ " from the edge. In all cases where it is essential for these grip marks to be cut off, but not necessary for the sheets to be resheared, the sheets should be ordered cropped.

FULLY RESHEARED.— Sheets are not guaranteed exact to size. The variation is always over the size ordered, and is usually $\frac{1}{4}$ "-1" in length and $\frac{1}{8}$ "- $\frac{1}{4}$ " in width. When sheets are required exact to dimensions, it is necessary to order them "Fully resheared." Measurements will then be guaranteed not to vary more than 1/16".

CIRCLES.— Machine-cut circles can be supplied from 6" to 42" dia. in any gauge from 10G-30G and up to 48" dia. in 10G-20G.

BLACK STEEL SHEET

Comparison of Sheet and Wire Gauges

Gauge Name	Birmingham Gauge (B.G.)	U.S. 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	.4063	.454	.400	.3938	.4600
3/0	.5000	.3750	.425	.372	.3625	.4096
2/0	.4452	.3438	.380	.348	.3310	.3648
0	.3964	.3125	.340	.324	.3065	.3249
1	.3532	.2813	.300	.300	.2830	.2893
2	.3147	.2656	.284	.276	.2625	.2576
3	.2804	.2500	.259	.252	.2437	.2294
4	.2500	.2344	.238	.232	.2253	.2043
5	.2225	.2188	.220	.212	.2070	.1819
6	.1981	.2031	.203	.192	.1920	.1620
7	.1764	.1875	.180	.176	.1770	.1443
8	.1570	.1719	.165	.160	.1620	.1285
9	.1398	.1563	.148	.144	.1483	.1144
10	.1250	.1406	.134	.128	.1350	.1019
11	.1113	.1250	.120	.116	.1205	.0907
12	.0991	.1094	.109	.104	.1055	.0808
13	.0882	.0938	.095	.092	.0915	.0720
14	.0785	.0781	.083	.080	.0800	.0641
15	.0699	.0703	.072	.072	.0720	.0571
16	.0625	.0625	.065	.064	.0625	.0508
17	.0556	.0563	.058	.056	.0540	.0453
18	.0495	.0500	.049	.048	.0475	.0403
19	.0440	.0438	.042	.040	.0410	.0359
20	.0392	.0375	.035	.036	.0348	.0320
21	.0349	.0344	.032	.032	.0317	.0285
22	.0312	.0313	.028	.028	.0286	.0253
23	.0278	.0281	.025	.024	.0258	.0226
24	.0247	.0250	.022	.022	.0230	.0201
25	.0220	.0219	.020	.020	.0204	.0179
26	.0196	.0188	.018	.018	.0181	.0159
27	.0174	.0172	.016	.0164	.0173	.0142
28	.0156	.0156	.014	.0148	.0162	.0126
29	.0139	.0141	.013	.0136	.0150	.0113
30	.0123	.0125	.012	.0124	.0140	.0100
31	.0110	.0109	.010	.0116	.0132	.00893
32	.0098	.0094	.009	.0108	.0128	.00795
33	.0087	.0086	.008	.0100	.0118	.00708
34	.0077	.0078	.007	.0092	.0104	.00630
35	.0069	.0070	.005	.0084	.0095	.00561
36	.0061	.0063	.004	.0076	.0090	.00500

BLACK STEEL SHEETS STOCK SIZES

	Gauge	APPROXIMATE WEIGHT PER SHEET—LBS.			COUNT OF SHEETS PER HALF TON		
		Width			Width		
		24"	30"	36"	24"	30"	36"
6-FOOT LENGTHS	10	62.1	77.5	92.9	18	14	12
	12	49.3	61.8	73.7	23	18	15
	14	39.1	48.8	58.5	29	23	19
	16	31.0	38.7	46.5	36	29	24
	18	24.6	30.8	36.9	45	36	30
	20	19.5	24.4	29.3	57	46	38
	22	15.5	19.4	23.2	72	58	48
	24	12.3	15.4	18.4	91	73	61
	26	9.8	12.2	14.6	115	92	77
	28	7.8	9.7	11.6	144	116	96
	30	6.2	7.7	9.2	182	146	121
7-FOOT LENGTHS	10	72.3	90.3	108.3	15	12	10
	12	57.4	71.7	85.9	20	16	13
	14	45.6	56.9	68.2	25	20	16
	16	36.2	45.1	54.1	31	25	21
	18	28.7	35.0	43.0	39	31	26
	20	22.8	28.4	34.1	49	39	33
	22	18.1	22.6	27.0	62	50	41
	24	14.3	17.9	21.5	78	63	52
	26	11.4	14.2	17.0	98	79	66
	28	9.0	11.3	13.5	124	99	83
	30	7.2	9.0	10.7	156	125	104
8-FOOT LENGTHS	10	82.6	103.1	123.6	14	11	9
	12	65.5	81.8	98.1	17	14	11
	14	52.0	64.9	77.9	22	17	14
	16	41.3	51.5	61.8	27	22	18
	18	32.8	40.9	49.1	34	27	23
	20	26.0	32.5	38.9	43	34	29
	22	20.6	25.8	30.9	54	43	36
	24	16.4	20.5	24.5	68	55	46
	26	13.0	16.2	19.5	86	69	58
	28	10.3	12.9	15.5	109	87	72
	30	8.2	10.2	12.3	137	110	91

QUALITIES OF BLACK SHEET

SUNSTAR.—Sunstar, the standard sheet in use for a wide range of purposes, is manufactured in three types.

SUNSTAR

C.R.C.A.

AUSTRALIA

This is the standard quality C.R.C.A. sheet, and covers the greater part of the demand for a versatile general purpose material for a wide range of applications. If specified,

Sunstar can be provided with a "Pickle Finish" surface.

SUNSTAR

D.O.

AUSTRALIA

Sunstar D.O. is for special requirements where a surface reasonably free from scale is desirable in addition to the well-known properties of Sunstar C.R.C.A.

SUNSTAR

H.R.

AUSTRALIA

Sunstar H.R. is a quality provided in the heavier gauges only, and is particularly suitable for applications such as light structural work, where a finer grained, slightly

stiffer sheet which retains the ductile properties of Sunstar C.R.C.A. is desired. If specified this quality can be provided with a "Pickle Finish" surface.

SOUTHERN CROSS.—This blued sheet is designed to meet the demand for a material combining the well-known physical properties of SUNSTAR C.R.C.A.

SOUTHERN

CROSS

AUSTRALIA

sheets with a surface suitable for fine finishes. The uniform and tightly adherent oxide film affords considerable protection, and is an excellent base for the application of decorative finishes.

COMMON BLACK.—Sheets which are rejected from the above grades for surface imperfections, split edges, or faulty dimensions, are sold as "COMMON BLACK."

"BLACK WASTE SHEETS."—The general defects encountered in this quality are tears or splits, generally on the edges, surface imperfections such as scale, and small holes. Waste is classified "Sorted" and "Unsorted." In both types all material in any one bundle is of approximately the same gauge. Bundles of sorted Waste are made up of sheets approximately of the same length and width. Unsorted Waste consists of material varying greatly in length and width. Pieces may be as small as 12 inches square.

SPECIAL QUALITIES OF BLACK SHEET

LYCO DEEP DRAWING SHEETS

GENERAL.—Lyco D.D. sheets are rolled from steel very low in impurities and most suitable for severe mechanical working and for enamelling. Care is taken during all stages of the processing to ensure that the final properties of the sheets will conform to the rigid demands imposed by deep drawing and enamelling operations.

ANNEALING.—Should trouble be experienced with failures in drawing and pressing of Lyco D.D. sheets, then inter-stage annealing is recommended. This will relieve the stresses set up in previous operations, so that the material will withstand further pressing or drawing. The most satisfactory annealing temperatures are between 650°C. and 700°C. , or between 870°C. and 950°C. The range $700\text{--}870^{\circ}\text{C.}$ must be avoided to prevent the steel failing in subsequent processing.

CARBON STEELS

QUALITIES.—For sheet steel with high tensile strength or increased hardenability and abrasion-resistance a higher carbon content is needed than is found in the ordinary quality black sheet. This carbon content varies with the purpose for which the steel sheet is needed, and gives rise to the standard carbon qualities.

C30 is a higher tensile sheet used mainly for structural work.

C65 is for shovels, plough discs, and miscellaneous hard-wearing or cutting edges.

C80 is a superior quality carbon steel sheet used for circular and straight saws or other high grade cutting edges.

HEAT TREATMENT.—For C65 and C80, oil quenching is recommended from a temperature of about 820°C. This may be followed by a tempering treatment to obtain the desired hardness. Tempering time for these qualities (9 gauge to 16 gauge) is about 15 to 20 minutes at the tempering temperature.

ELECTRICAL SHEET

GENERAL.—The steel core components of motors, alternators, and transformers are made up of high quality special sheet steel laminations. The stringency of laboratory tests, inspection and supervision carried out by a staff of trained metallurgists ensure that Lysaght's Electrical Steels compare favourably with similar sheets produced abroad. Various qualities are made for various purposes, and full details will be provided on application to this Company.

The STALLOY types are used for transformer work and other applications where low electrical losses are essential. MEDIUM RESISTANCE and SPECIAL LOHYS are used for high-efficiency motors of all types, large motor generators, small transformers, and reactors.

ELECTRICAL SHEET DATA

QUALITY	Lohys	Special Lohys	Medium Resistance	48 Quality	Stalloy	Special Stalloy
Approx. Silicon Content %.	.2	.75	1.5	3.5	4.0	4.0
Density gms./cm.	7.82	7.80	7.75	7.55	7.55	7.55
Yield Tons/sq. in.	10	13	20	26	30	32
Ultimate Tons/sq. in.	17	20	25	31	36	36
Elongation % on 2 ins. ...	25	20	15	7	5	3
Temp. Coefficient per 100°C.	.394	.214	.165	—	.092	—
Resistivity (Microhms/cm.) .	14	20	30	50	55	55

Guaranteed max. Watts Loss per Pound. 50 Cycles. B=10,000	Thickness						
	.014" 29g.	—	—	—	.69	.63	.59
	.018" 27g.	1.51	1.23	—	—	—	—
	.020" 26g.	—	—	1.14	.81	.74	—

Multiply Watts Loss per Pound by 2.20 to give Watts Loss per Kilogramme.

NOTE.—All grades of Electrical Steel Sheets are provided in either of two surface finishes, viz., plain or insulated. "Plain" means that the sheet carries on both sides a thin layer of oxide scale, providing moderate insulation. "Insulated" refers to the special insulating coating applied one side only of each sheet.

PACKING OF BLACK STEEL SHEET

Black sheets are packed in envelopes, bundles, or cases.

STEEL ENVELOPES.— Envelopes are made of black steel sheet, which, in addition to protecting the contents can be used for working-up purposes when empty. These generally contain approximately 10 cwt. of sheets, but can be made for 1-ton lots if desired.

BUNDLES.— 10 cwt. bundles are a convenient method of packing sheets of the heavier gauges. One-ton or two-ton packages may be provided if desired.

CASES.— Skeleton cases can be supplied, at an extra cost.

METHOD OF PACKING:

Item	Customers in N.S.W.	Customers outside N.S.W.
Envelopes	22G and lighter	16G and lighter
Bundles	20G and heavier	14G and heavier

No charge is made for packing, but the gross weight is charged in each instance.

COLOUR-CODE FOR BLACK SHEET

To facilitate identification, envelopes of black sheet have vertical coloured stripes placed on the sides.

Quality	Red	Quality	Yellow
Sunstar	I	Common (No colour)	—
Sunstar D.O.	II	Waste (" ")	—
Pickled Sunstar	III	High Carbon—C30 . . .	I
	White	C55 . . .	II
Southern Cross	I	C65 . . .	III
Lycos	II	C80 . . .	IIII
Lycos D.D.	III	C115 . . .	IIII

Quality	Red	White	Blue
Electrical—Lohys			I
Special Lohys			II
Medium Resistance			III
42		I	I
41		II	I
48		I	II
Stalloy	I		I
Special Stalloy	II		I
E. Special Stalloy	I		II
Super Stalloy	II		II

A green stripe indicates Insulined Electrical Sheet.

BRIGHT STEEL SHEETS

Bright steel sheets are made in a range of grades and qualities to meet all the diversified needs of industry. The sheets are graded according to their surface finish characteristics, and for each grade there may be one, two or three qualities identical in surface appearance but differing in their physical properties.

Sheets are graded by name and the qualities are indicated by a letter, the letters used being "R," "O," and "X."

"R" quality sheets are suitable for flat work or simple bending.

"O" quality sheets are used for shallow drawing or stamping.

"X" quality sheets should be chosen for all deep drawing or spinning operations.

The grade names used for the description of sheets are as follows:—

SUPERFIN.—Superfin sheets are fully cold reduced and combine the highest degree of surface finish with exceptional extra deep drawing properties.

Superfin sheets should be used in any of the many applications calling for sheets in which either or both of the outstanding qualities of remarkable ductility or excellence of surface are of prime importance. Superfin sheets can be supplied in 18 gauge to 20 gauge, and are available only as Superfin "X."

PLANISHED.—Planished sheets are cold rolled sheets intended primarily for outer panels of motor cars, refrigerators, or other exterior panels where good surface is important and where the panels are finished with synthetic enamel or sprayed lacquer coatings. Planished sheets are made in "X" and "R" qualities, and are available in all gauges from 10 gauge to 20 gauge inclusive.

SATIN.—Satin sheets are good quality hot rolled sheets, fully pickled but not cold rolled, which are suitable for a very wide range of applications. They are used for interior panels in motor bodies, domestic holloware, stoves, dairy equipment, steel furniture, radios, etc. Satin sheets are made in "R," "O" and "X" qualities, and are rolled in all gauges from 9 gauge to 20 gauge inclusive.

MATT PICKLED.—Matt Pickled sheets are a hot rolled single pickled commodity grade for use where surface is relatively unimportant. They are made in "R" quality only, and can be supplied in all gauges from 8 gauge to 20 gauge inclusive.

TACK PLATE.—Sheets of this quality are specially processed to meet the requirements of the tack-making trade, and have no application outside the field of tack manufacture.

ENAMEL.—Enamel grade sheets, as their name implies, are specially processed to meet the exacting requirements of the porcelain enamelling operation. The bars used for this grade are commercially pure iron, containing less than 0.15% total impurities, and this purity, together with careful processing, gives sheets which show remarkable rigidity and freedom from distortion at vitreous enamelling temperatures.

JOHN LYSAGHT (AUST.) PTY. LTD.

Enamel sheets are processed for "R," "O" and "X" qualities, and rolled in all gauges from 10 to 20 inclusive.

OILING OF SHEETS.—Unless the customer specifies otherwise all sheets other than Enamel grade are supplied oiled. Where sheets are to be used for vitreous enamelling or tinning the customer is advised to order the sheets unoiled, as this will simplify the cleaning prior to final coating.

PACKING.—Bright Steel Sheets are packed either in crates or bundles, crates being used for all sheets despatched by sea. In each instance the sheets are completely enclosed in Sisalkraft wrapping to protect them as far as possible from the effects of rain or other water damage.

Our standard crates contain two tons of steel sheets, although one-ton crates can be ordered at extra charge. Bundles also are available in two-ton and one-ton packs.

ORDERING OF SHEETS.—When sheets are ordered, the purpose for which they are required should be stated on the order; this enables a check to be made and advice given to the customer if it is thought that a wrong grade has been ordered to meet his requirements. Sheets should always be ordered by decimal thickness, and not by gauge number, but whenever possible it is desirable that the customer should confine his requirements to those thicknesses which correspond with the Birmingham Gauge Numbers.

Decimal thicknesses should be given to the third decimal place only, since this represents the limit of accuracy to which sheets can be gauged commercially.

GAUGE TOLERANCES.—Sheets are subject to the undermentioned tolerances applied equally plus and minus from the ordered thickness:—

Ordered Thickness, Inch	Permissible Variations Ordered Thickness, Inch
Under .2500 to .2200 incl.	.015
Under .2200 to .1900 incl.	.014
Under .1900 to .1600 incl.	.013
Under .1600 to .1400 incl.	.012
Under .1400 to .1200 incl.	.011
Under .1200 to .1000 incl.	.010
Under .1000 to .0800 incl.	.009
Under .0800 to .0700 incl.	.008
Under .0700 to .0600 incl.	.007
Under .0600 to .0500 incl.	.006
Under .0500 to .0400 incl.	.005
Under .0400 to .0300 incl.	.004
Under .0300 to .0200 incl.	.003
Under .0200	.002

PRICE
PER
SHEET8 x 3" CORRUGATIONS
GALVANIZED & ZINCANNEAL

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

Price per Ton	106 Sheets 5ft.	90 Sheets 6ft.	76 Sheets 7ft.	68 Sheets 8ft.	60 Sheets 9ft.	54 Sheets 10ft.	50 Sheets 11ft.	46 Sheets 12ft.
£37	7/-	8/2½	9/9	10/10½	12/4	13/8½	14/9½	16/1
£37/10/-	7/1	8/4	9/10½	11/0½	12/6	13/10½	15/-	16/3½
£38	7/2	8/5½	10/-	11/2	12/8	14/1	15/2½	16/6
£38/10/-	7/3	8/6½	10/1½	11/4	12/10	14/3	15/5	16/9
£39	7/4½	8/8	10/3	11/6	13/-	14/5½	15/7	16/11½
£39/10/-	7/5½	8/9½	10/4½	11/7½	13/2	14/7½	15/9½	17/2
£40	7/6½	8/11	10/6	11/9	13/4	14/10	16/-	17/4½
£40/10/-	7/7½	9/-	10/7½	11/11	13/6	15/-	16/2½	17/7½
£41	7/9	9/1½	10/9½	12/1	13/8	15/2	16/5	17/10
£41/10/-	7/10	9/2½	10/11	12/2½	13/10	15/4½	16/7	18/0½
£42	7/11	9/4	11/0½	12/4	14/-	15/6½	16/9½	18/3
£42/10/-	8/-	9/5½	11/2	12/6	14/2	15/9	17/-	18/6
£43	8/1½	9/6½	11/4	12/8	14/4	15/11	17/2½	18/8½
£43/10/-	8/2½	9/8	11/5½	12/9½	14/6	16/1	17/5	18/11
£44	8/3½	9/9½	11/7	12/11½	14/8	16/3½	17/7	19/1½
£44/10/-	8/5	9/10½	11/8½	13/1	14/10	16/6	17/9½	19/4
£45	8/6	10/-	11/10	13/3	15/-	16/8	18/-	19/7
£45/10/-	8/7	10/1½	11/11½	13/4½	15/2	16/10	18/2½	19/9½
£46	8/8	10/2½	12/1	13/6½	15/4	17/0½	18/5	20/-

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COST PER SHEET

Price per Ton	132 Sheets 5ft.	110 Sheets 6ft.	96 Sheets 7ft.	84 Sheets 8ft.	74 Sheets 9ft.	66 Sheets 10ft.	60 Sheets 11ft.	56 Sheets 12ft.
£37	5/7	6/8½	7/8½	8/9½	10/-	11/2½	12/4	13/2½
£37/10/-	5/8	6/10	1/9½	8/11	10/1½	11/4½	12/6	13/4½
£38	5/9	6/11	7/11	9/0½	10/3	11/6	12/8	13/7
£38/10/-	5/10	7/-	8/-	9/2	10/5	11/8	12/10	13/9
£39	5/11	7/1	8/1½	9/3½	10/6½	11/10	13/-	13/11
£39/10/-	6/-	7/2½	8/3	9/5	10/8	11/11½	13/2	14/1½
£40	6/1	7/3½	8/4	9/6½	10/9½	12/1½	13/4	14/3½
£40/10/-	6/1½	7/4½	8/5	9/7½	10/11½	12/3½	13/6	14/5½
£41	6/2½	7/5½	8/6½	9/9	11/1	12/5	13/8	14/7½
£41/10/-	6/3½	7/6½	8/8	9/10½	11/2½	12/7	13/10	14/10
£42	6/4	7/7½	8/9	10/-	11/4½	12/8½	14/-	15/-
£42/10/-	6/5½	7/9	8/10½	10/1½	11/6	12/10½	14/2	15/2
£43	6/6	7/10	8/11½	10/3	11/7½	13/0½	14/4	15/4½
£43/10/-	6/7	7/11	9/1	10/4½	11/9	13/2	14/6	15/6½
£44	6/8	8/-	9/2	10/5½	11/10½	13/4	14/8	15/8½
£44/10/-	6/9	8/1	9/3	10/7	12/0½	13/6	14/10	15/10½
£45	6/10	8/2	9/4½	10/8½	12/2	13/7½	15/-	16/1
£45/10/-	6/10½	8/3½	9/5½	10/10	12/3½	13/9½	15/2	16/3
£46	6/11½	8/4½	9/7	10/11½	12/5	13/11	15/4	16/5

Gauge

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THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET8 x 3" CORRUGATIONS
GALVANIZED & ZINCANNEAL

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

24	Price per Ton	168 Sheets 5ft.	140 Sheets 6ft.	120 Sheets 7ft.	104 Sheets 8ft.	94 Sheets 9ft.	84 Sheets 10ft.	76 Sheets 11ft.	70 Sheets 12ft.
£33	3/11	4/8½	5/6	6/4	7/-	7/10	8/8	9/5	
£33/10/-	4/-	4/9½	5/7	6/5	7/1½	8/-	8/10	9/7	
£34	4/0½	4/10	5/8	6/6½	7/3	8/1	8/11½	9/8½	
£34/10/-	4/1	4/11	5/9	6/7½	7/4	8/2½	9/1	9/10	
£35	4/2	5/-	5/10	6/9	7/5½	8/4	9/2½	10/-	
£35/10/-	4/3	5/1	5/11	6/10	7/6½	8/5½	9/4	10/2	
£36	4/3½	5/2	6/-	6/11	7/8	8/7	9/5½	10/3½	
£36/10/-	4/4	5/2½	6/1	7/-	7/9	8/8	9/7	10/5	
£37	4/5	5/3½	6/2	7/1	7/10½	8/10	9/9	10/7	
£37/10/-	4/5½	5/4	6/3	7/2½	8/-	8/11	9/10½	10/8½	
£38	4/6	5/5	6/4	7/3½	8/1	9/0½	10/-	10/10	
£38/10/-	4/7	5/6	6/5	7/5	8/2	9/2	10/1½	11/-	
£39	4/8	5/7	6/6	7/6	8/3½	9/3½	10/3	11/2	
£39/10/-	4/8½	5/8	6/7	7/7	8/5	9/5	10/5	11/3½	
£40	4/9	5/8½	6/8	7/8	8/6	9/6½	10/6½	11/5	
£40/10/-	4/10	5/9½	6/9	7/9½	8/7½	9/8	10/8	11/7	
£41	4/10½	5/10	6/10	7/10½	8/9	9/9	10/9½	11/8½	
£41/10/-	4/11	5/11	6/11	7/11½	8/10	9/10½	10/11	11/10	
£42	5/-	6/-	7/-	8/1	8/11½	10/-	11/0½	12/-	
£42/10/-	5/1	6/1	7/1	8/2	9/0½	10/1½	11/2	12/2	
£43	5/1½	6/1½	7/2	8/3	9/2	10/3	11/4	12/3½	
£43/10/-	5/2	6/2½	7/3	8/4½	9/3	10/4	11/5½	12/5	
£44	5/3	6/3½	7/4	8/5½	9/4½	10/5½	11/7	12/7	
£44/10/-	5/3½	6/4	7/5	8/6½	9/5½	10/7	11/8½	12/8½	
£45	5/4	6/5	7/6	8/8	9/7	10/8½	11/10	12/10	
£45/10/-	5/5	6/6	7/7	8/9	9/8	10/10	12/-	13/-	
£46	5/6	6/7	7/8	8/10	9/9½	10/11½	12/1	13/2	
£46/10/-	5/6½	6/8	7/9	8/11	9/11	11/1	12/3	13/3½	
£47	5/7	6/8½	7/10	9/0½	10/-	11/2	12/4½	13/5	
£47/10/-	5/8	6/9½	7/11	9/1½	10/1	11/3½	12/6	13/7	
£48	5/8½	6/10½	8/-	9/3	10/2½	11/5	12/7½	13/8½	
£48/10/-	5/9	6/11	8/1	9/4	10/4	11/6½	12/9	13/10	
£49	5/10	7/-	8/2	9/5	10/5	11/8	12/11	14/-	
£49/10/-	5/11	7/1	8/3	9/6	10/6½	11/9½	13/0½	14/2	
£50	5/11½	7/1½	8/4	9/7	10/8	11/11	13/2	14/3½	
£50/10/-	6/-	7/2½	8/5	9/8½	10/9	12/-	13/3½	14/5	
£51	6/1	7/3½	8/6	9/10	10/10	12/2	13/5	14/7	
£51/10/-	6/1½	7/4	8/7	9/11	10/11½	12/3	13/6½	14/8½	
£52	6/2	7/5	8/8	10/-	11/1	12/4½	13/8	14/10	
£52/10/-	6/3	7/6	8/9	10/1	11/2	12/6	13/10	15/-	
£53	6/4	7/7	8/10	10/2	11/3½	12/7½	13/11½	15/2	
£53/10/-	6/4½	7/8	8/11	10/3½	11/5	12/9	14/1	15/3½	
£54	6/5	7/8½	9/-	10/5	11/6	12/10½	14/2½	15/5	
£54/10/-	6/6	7/9½	9/1	10/6	11/7	13/-	14/4	15/7	
£55	6/6½	7/10½	9/2	10/7	11/8½	13/1	14/5½	15/8½	

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET8 x 3" CORRUGATIONS
GALVANIZED & ZINCANNEALAPPROX. PRICES PER SHEET BASED ON GIVEN RATES PER TON Gauge

Price per Ton	240 Sheets 5ft.	200 Sheets 6ft.	170 Sheets 7ft.	150 Sheets 8ft.	132 Sheets 9ft.	120 Sheets 10ft.	108 Sheets 11ft.	100 Sheets 12ft.
£33	2/9	3/3½	3/10½	4/5	5/-	5/6	6/1½	6/7
£33/10/-	2/9½	3/4	3/11	4/5½	5/1	5/7	6/2½	6/8½
£34	2/10	3/5	4/-	4/6½	5/2	5/8	6/3½	6/9½
£34/10/-	2/10½	3/5½	4/1	4/7	5/2½	5/9	6/4½	6/11
£35	2/11	3/6	4/1½	4/8	5/3½	5/10	6/6	7/-
£35/10/-	2/11½	3/6½	4/2	4/8½	5/4½	5/11	6/7	7/1
£36	3/-	3/7	4/3	4/9½	5/5½	6/-	6/8	7/2½
£36/10/-	3/0½	3/8	4/3½	4/10½	5/6½	6/1	6/9	7/3½
£37	3/1	3/8½	4/4	4/11	5/7½	6/2	6/10	7/5
£37/10/-	3/1½	3/9	4/5	5/-	5/8	6/3	6/11	7/6
£38	3/2	3/9½	4/5½	5/1	5/9	6/4	7/0½	7/7
£38/10/-	3/2½	3/10	4/6½	5/1½	5/10	6/5	7/1½	7/8½
£39	3/3	3/11	4/7	5/2½	5/11	6/6	7/3	7/10
£39/10/-	3/3½	3/11½	4/8	5/3	6/-	6/7	7/4	7/11
£40	3/4	4/-	4/8½	5/4	6/1	6/8	7/5	8/-
£40/10/-	3/4½	4/0½	4/9	5/5	6/2	6/9	7/6	8/1
£41	3/5	4/1	4/10	5/5½	6/2½	6/10	7/7	8/2½
£41/10/-	3/5½	4/2	4/10½	5/6½	6/3½	6/11	7/8	8/4
£42	3/6	4/2½	4/11½	5/7	6/4½	7/-	7/9	8/5
£42/10/-	3/6½	4/3	5/-	5/8	6/5	7/1	7/10½	8/6
£43	3/7	4/3½	5/1	5/9	6/6	7/2	7/11½	8/7
£43/10/-	3/7½	4/4	5/1½	5/9½	6/7	7/3	8/0½	8/8½
£44	3/8	4/5	5/2	5/10½	6/8	7/4	8/2	8/10
£44/10/-	3/8½	4/5½	5/3	5/11	6/9	7/5	8/3	8/11
£45	3/9	4/6	5/3½	6/-	6/10	7/6	8/4	9/-
£45/10/-	3/9½	4/6½	5/4	6/1	6/11	7/7	8/5	9/1
£46	3/10	4/7	5/5	6/1½	6/11½	7/8	8/6	9/2½
£46/10/-	3/10½	4/8	5/5½	6/2½	7/0½	7/9	8/7	9/4
£47	3/11	4/8½	5/6	6/3	7/1½	7/10	8/8½	9/5
£47/10/-	3/11½	4/9	5/7	6/4	7/2½	7/11	8/9½	9/6
£48	4/-	4/9½	5/8	6/5	7/3	8/-	8/10½	9/7
£48/10/-	4/0½	4/10	5/8½	6/5½	7/4	8/1	9/-	9/8½
£49	4/1	4/11	5/9	6/6½	7/5	8/2	9/1	9/10
£49/10/-	4/1½	4/11½	5/10	6/7	7/6	8/3	9/2	9/11
£50	4/2	5/-	5/10½	6/8	7/7	8/4	9/3	10/-
£50/10/-	4/2½	5/0½	5/11	6/8½	7/8	8/5	9/4	10/1
£51	4/3	5/1	6/-	6/9½	7/9	8/6	9/5½	10/2½
£51/10/-	4/3½	5/2	6/0½	6/10½	7/9½	8/7	9/6½	10/4
£52	4/4	5/2½	6/1½	6/11	7/10½	8/8	9/7½	10/5
£52/10/-	4/4½	5/3	6/2	7/-	7/11½	8/9	9/8½	10/6
£53	4/5	5/3½	6/3	7/1	8/0½	8/10	9/10	10/7
£53/10/-	4/5½	5/4	6/3½	7/1½	8/1	8/11	9/11	10/8½
£54	4/6	5/5	6/4	7/2½	8/2	9/-	10/-	10/10
£54/10/-	4/6½	5/5½	6/5	7/3	8/3	9/1	10/1	10/11
£55	4/7	5/6	6/5½	7/4	8/4	9/2	10/2	11/-

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COST PER SHEET

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PRICE
PER
SHEET**10 x 3" CORRUGATIONS**
GALVANIZED & ZINCANNEAL

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

20	Price per Ton	86 Sheets 5ft.	72 Sheets 6ft.	62 Sheets 7ft.	54 Sheets 8ft.	48 Sheets 9ft.	44 Sheets 10ft.	40 Sheets 11ft.	36 Sheets 12ft.
£37		8/7	10/3½	11/11	13/8½	15/5	16/10	18/6	20/6½
£37/10/-		8/8½	10/5	12/1	13/10½	15/7½	17/0½	18/9	20/10
£38		8/10	10/6½	12/3	14/1	15/10	17/3½	19/-	21/1½
£38/10/-		8/11½	10/8½	12/5	14/3	16/0½	17/6	19/3	21/4½
£39		9/1	10/10	12/7	14/5½	16/3	17/8½	19/6	21/8
£39/10/-		9/2	10/11½	12/9	14/7½	16/5½	17/11½	19/9	21/11½
£40		9/3½	11/1	12/11	14/10	16/8	18/2	20/-	22/2½
£40/10/-		9/5	11/3	13/1	15/-	16/10½	18/5	20/3	22/6
£41		9/6½	11/4½	13/2½	15/2	17/1	18/7½	20/6	22/9½
£41/10/-		9/8	11/6	13/4½	15/4½	17/3½	18/10½	20/9	23/0½
£42		9/9	11/8	13/6½	15/6½	17/6	19/1	21/-	23/4
£42/10/-		9/10½	11/9½	13/8½	15/9	17/8½	19/4	21/3	23/7½
£43		10/-	11/11½	13/10½	15/11	17/11	19/6½	21/6	23/10½
£43/10/-		10/1½	12/1	14/0½	16/1½	18/1½	19/9	21/9	24/2
£44		10/3	12/3	14/2½	16/3½	18/4	20/-	22/-	24/0½
£44/10/-		10/4	12/4½	14/4	16/6	18/6½	20/3	22/3	24/8½
£45		10/5½	12/6	14/6	16/8	18/9	20/5½	22/6	25/-
£45/10/-		10/7	12/7½	14/8	16/10	18/11½	20/8	22/9	25/3½
£46		10/8½	12/9½	14/10	17/0½	19/2	20/11	23/-	25/6½

22	Price per Ton	106 Sheets 5ft.	88 Sheets 6ft.	76 Sheets 7ft.	68 Sheets 8ft.	60 Sheets 9ft.	54 Sheets 10ft.	50 Sheets 11ft.	46 Sheets 12ft.
£37		7/-	8/5	9/9	10/10½	12/4	13/8½	14/9½	16/1
£37/10/-		7/1	8/6	9/10½	11/0½	12/6	13/10½	15/-	16/3½
£38		7/2	8/7½	10/-	11/2	12/8	14/1	15/2½	16/6
£38/10/-		7/3	8/9	10/1½	11/4	12/10	14/3	15/5	16/9
£39		7/4½	8/10½	10/3	11/6	13/-	14/5½	15/7	16/11½
£39/10/-		7/5½	8/11½	10/4½	11/7½	13/2	14/7½	15/9½	17/2
£40		7/6½	9/1	10/6	11/9	13/4	14/10	16/-	17/4½
£40/10/-		7/7½	9/2½	10/7½	11/11	13/6	15/-	16/2½	17/7½
£41		7/9	9/4	10/9½	12/1	13/8	15/2	16/5	17/10
£41/10/-		7/10	9/5	10/11	12/2½	13/10	15/4½	16/7	18/0½
£42		7/11	9/6½	11/0½	12/4	14/-	15/6½	16/9½	18/3
£42/10/-		8/-	9/8	11/2	12/6	14/2	15/9	17/-	18/6
£43		8/1½	9/9½	11/4	12/8	14/4	15/11	17/2½	18/8½
£43/10/-		8/2½	9/10½	11/5½	12/9½	14/6	16/1	17/5	18/11
£44		8/3½	10/-	11/7	12/11½	14/8	16/3½	17/7	19/1½
£44/10/-		8/5	10/1	11/8½	13/1	14/10	16/6	17/9½	19/4
£45		8/6	10/2½	11/10	13/3	15/-	16/8	18/-	19/7
£45/10/-		8/7	10/4	11/11½	13/4½	15/2	16/10	18/2½	19/9½
£46		8/8	10/5½	12/1	13/6½	15/4	17/0½	18/5	20/-

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PRICE
PER
SHEET10 x 3" CORRUGATIONS
GALVANIZED & ZINCANNEAL

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

Price per Ton	136 Sheets 5ft.	114 Sheets 6ft.	98 Sheets 7ft.	86 Sheets 8ft.	76 Sheets 9ft.	68 Sheets 10ft.	62 Sheets 11ft.	58 Sheets 12ft.
£33	4/10	5/9½	6/9	7/8	8/8	9/8½	10/8	11/4½
£33/10/-	4/11	5/10½	6/10	7/9½	8/10	9/10	10/10	11/6½
£34	5/-	5/11½	6/11½	7/11	8/11½	10/-	11/-	11/8½
£34/10/-	5/1	6/0½	7/0½	8/-	9/1	10/2	11/1½	11/11
£35	5/2	6/2	7/2	8/1½	9/2½	10/3½	11/3½	12/1
£35/10/-	5/2½	6/3	7/3	8/3	9/4	10/5½	11/5½	12/3
£36	5/3½	6/4	7/4	8/4½	9/6	10/7	11/7	12/5
£36/10/-	5/4½	6/5	7/5½	8/6	9/7	10/9	11/9	12/7
£37	5/5	6/6	7/6½	8/7	9/9	10/10½	11/11	12/9
£37/10/-	5/6	6/7	7/8	8/8½	9/10½	11/-	12/1	12/11
£38	5/7	6/8	7/9	8/10	10/-	11/2	12/3	13/1
£38/10/-	5/8	6/9	7/10	8/11½	10/1½	11/4	12/5	13/3
£39	5/9	6/10	7/11½	9/1	10/3	11/5½	12/7	13/5½
£39/10/-	5/10	6/11	8/1	9/2	10/5	11/7½	12/9	13/7½
£40	5/10½	7/-	8/2	9/3½	10/6½	11/9	12/11	13/9½
£40/10/-	5/11½	7/1	8/3	9/5	10/8	11/11	13/1	13/11½
£41	6/0½	7/2	8/4½	9/6½	10/9½	12/1	13/3	14/1½
£41/10/-	6/1	7/3½	8/5½	9/8	10/11	12/2½	13/4½	14/3½
£42	6/2	7/4½	8/7	9/9	11/0½	12/4	13/6½	14/6
£42/10/-	6/3	7/5½	8/8	9/10½	11/2	12/6	13/8½	14/8
£43	6/4	7/6½	8/9½	10/-	11/4	12/8	13/10½	14/10
£43/10/-	6/5	7/7½	8/10½	10/1½	11/5½	12/9½	14/0½	15/-
£44	6/6	7/8½	9/-	10/3	11/7	12/11	14/2	15/2
£44/10/-	6/6½	7/10	9/1	10/4	11/8½	13/1	14/4	15/4
£45	6/7½	7/11	9/2	10/5½	11/10	13/3	14/6	15/6
£45/10/-	6/8	8/-	9/3½	10/7	12/-	13/4½	14/8	15/8
£46	6/9	8/1	9/4½	10/8½	12/1	13/6	14/10	15/10½
£46/10/-	6/10	8/2	9/6	10/10	12/3	13/8	15/-	16/0½
£47	6/11	8/3	9/7	10/11	12/4½	13/10	15/2	16/2½
£47/10/-	7/-	8/4	9/8	11/0½	12/6	14/-	15/4	16/4½
£48	7/1	8/5	9/9½	11/2	12/7½	14/1½	15/6	16/6½
£48/10/-	7/1½	8/6	9/11	11/3½	12/9	14/3	15/8	16/8½
£49	7/2½	8/7	10/-	11/5	12/11	14/5	15/10	16/11
£49/10/-	7/3½	8/8	10/1	11/6	13/0½	14/6½	15/11½	17/1
£50	7/4	8/9	10/2½	11/7½	13/2	14/8½	16/1½	17/3
£50/10/-	7/5	8/10½	10/4	11/9	13/3½	14/10	16/3½	17/5
£51	7/6	8/11½	10/5	11/10½	13/5	15/-	16/5½	17/7
£51/10/-	7/7	9/0½	10/6	12/-	13/6½	15/2	16/7½	17/9
£52	7/8	9/1½	10/7½	12/1	13/8	15/3½	16/9	17/11
£52/10/-	7/9	9/2½	10/8½	12/2½	13/10	15/5½	16/11	18/1
£53	7/9½	9/3½	10/10	12/4	13/11½	15/7	17/1	18/3
£53/10/-	7/10½	9/4½	10/11	12/5½	14/1	15/9	17/3	18/5½
£54	7/11	9/6	11/-	12/6½	14/2½	15/10½	17/5	18/7½
£54/10/-	8/-	9/7	11/1½	12/8	14/4	16/0½	17/7	18/9½
£55	8/1	9/8	11/3	12/9½	14/6	16/2	17/9	18/11½

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COST PER SHEET

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

10 x 3" CORRUGATIONS

GALVANIZED & ZINCANNEAL

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

26

Price per Ton	194 Sheets 5ft.	162 Sheets 6ft.	138 Sheets 7ft.	122 Sheets 8ft.	108 Sheets 9ft.	98 Sheets 10ft.	88 Sheets 11ft.	82 Sheets 12ft.
£33	3/5	4/1	4/9½	5/5	6/1	6/9	7/6	8/0½
£33/10/-	3/5½	4/1½	4/10	5/6	6/2	6/10	7/7½	8/2
£34	3/6	4/2	4/11	5/7	6/3½	6/11	7/9	8/3½
£34/10/-	3/7	4/3	5/-	5/8	6/5	7/0½	7/10	8/5
£35	3/7½	4/4	5/1	5/9	6/6	7/2	7/11½	8/6½
£35/10/-	3/8	4/4½	5/2	5/10	6/7	7/3	8/1	8/8
£36	3/8½	4/5½	5/2½	5/11	6/8	7/4	8/2	8/9½
£36/10/-	3/9	4/6	5/3	6/-	6/9	7/5	8/3½	8/11
£37	3/10	4/7	5/4	6/1	6/10	7/6½	8/5	9/-
£37/10/-	3/10½	4/7½	5/5	6/2	6/11½	7/8	8/6	9/2
£38	3/11	4/8	5/6	6/3	7/0½	7/9	8/7½	9/3
£38/10/-	3/11½	4/9	5/7	6/4	7/1½	7/10	8/9	9/4½
£39	4/-	4/10	5/8	6/5	7/3	7/11½	8/10½	9/6
£39/10/-	4/1	4/10½	5/8½	6/6	7/4	8/1	8/11½	9/7½
£40	4/1½	4/11	5/9½	6/7	7/5	8/2	9/1	9/9
£40/10/-	4/2	5/-	5/10½	6/8	7/6	8/3	9/2½	9/10½
£41	4/2½	5/0½	5/11½	6/9	7/7	8/4½	9/4	10/-
£41/10/-	4/3	5/1½	6/-	6/10	7/8	8/5½	9/5	10/1½
£42	4/4	5/2	6/1	6/11	7/9½	8/7	9/6½	10/3
£42/10/-	4/4½	5/3	6/2	7/-	7/10½	8/8	9/8	10/4½
£43	4/5	5/3½	6/3	7/1	7/11½	8/9	9/9	10/6
£43/10/-	4/6	5/4½	6/3½	7/1½	8/1	8/10½	9/10½	10/7½
£44	4/6½	5/5	6/4½	7/2½	8/2	9/-	10/-	10/9
£44/10/-	4/7	5/6	6/5½	7/3½	8/3	9/1	10/1½	10/10
£45	4/7½	5/6½	6/6	7/4½	8/4	9/2	10/2½	10/11½
£45/10/-	4/8	5/7½	6/7	7/5½	8/5	9/3½	10/4	11/1
£46	4/9	5/8	6/8	7/6½	8/6	9/4½	10/5½	11/2½
£46/10/-	4/9½	5/9	6/9	7/7½	8/7	9/6	10/7	11/4
£47	4/10	5/9½	6/9½	7/8½	8/8½	9/7	10/8	11/5½
£47/10/-	4/11	5/10½	6/10½	7/9½	8/9½	9/8½	10/9½	11/7
£48	4/11½	5/11	6/11½	7/10½	8/10½	9/9½	10/11	11/8½
£48/10/-	5/-	6/-	7/0½	7/11½	9/-	9/11	11/-	11/10
£49	5/0½	6/0½	7/1	8/-	9/1	10/-	11/1½	11/11½
£49/10/-	5/1	6/1	7/2	8/1½	9/2	10/1	11/3	12/1
£50	5/2	6/2	7/3	8/2½	9/3	10/2½	11/4½	12/2½
£50/10/-	5/2½	6/3	7/4	8/3½	9/4	10/3½	11/5½	12/4
£51	5/3	6/3½	7/5	8/4½	9/5½	10/5	11/7	12/5½
£51/10/-	5/4	6/4	7/5½	8/5	9/6½	10/6	11/8½	12/7
£52	5/4½	6/5	7/6½	8/6	9/7½	10/7½	11/10	12/8
£52/10/-	5/5	6/6	7/7½	8/7	9/8½	10/8½	11/11	12/9½
£53	5/5½	6/6½	7/8	8/8	9/10	10/10	12/0½	12/11
£53/10/-	5/6	6/7	7/9	8/9	9/11	10/11	12/2	13/0½
£54	5/6½	6/8	7/10	8/10	10/-	11/-	12/3	13/2
£54/10/-	5/7½	6/8½	7/11	8/11	10/1	11/1½	12/4½	13/3½
£55	5/8	6/9½	7/11½	9/-	10/2	11/3	12/6	13/5

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

FLAT GALVANIZED & ZINC ANNEAL

Gauge

APPROX. PRICE PER SHEET BASED ON GIVEN RATES PER TON

20

COST PER SHEET

Price per Ton	6' Lengths				8' Lengths			
	112 Sheets 24"	90 Sheets 30"	74 Sheets 36"	56 Sheets 48"	84 Sheets 24"	68 Sheets 30"	56 Sheets 36"	42 Sheets 48"
£34/10/-	6/2	7/8	9/4	12/4	8/2½	10/2	12/4	16/5
£35	6/3	7/9½	9/5½	12/6	8/4	10/3½	12/6	16/8
£35/10/-	6/4	7/10½	9/7	12/8	8/5½	10/5½	12/8	16/11
£36	6/5	8/-	9/9	12/10	8/7	10/7	12/10½	17/2
£36/10/-	6/6	8/1½	9/10½	13/0½	8/8	10/9	13/0½	17/4½
£37	6/7	8/3	10/-	13/2½	8/9½	10/10½	13/2½	17/7½
£37/10/-	6/8½	8/4	10/1½	13/5	8/11	11/0½	13/5	17/10½
£38	6/9½	8/5	10/3	13/7	9/0½	11/2	13/7	18/1
£38/10/-	6/10½	8/6½	10/5	13/9	9/2	11/4	13/9	18/4
£39	6/11½	8/8	10/6½	13/11	9/3½	11/6	13/11	18/7
£39/10/-	7/0½	8/9½	10/8	14/1	9/5	11/7½	14/1	18/10
£40	7/2	8/10½	10/10	14/3½	9/6½	11/9	14/3½	19/0½
£40/10/-	7/3	9/-	10/11½	14/5½	9/8	11/11	14/5½	19/3½
£41	7/4	9/1½	11/1	14/8	9/9	12/1	14/8	19/6½
£41/10/-	7/5	9/3	11/2½	14/10	9/10½	12/2½	14/10	19/9
£42	7/6	9/4	11/4	15/-	10/-	12/4	15/-	20/-
£42/10/-	7/7	9/5½	11/6	15/2	10/1½	12/6	15/2	20/3
£43	7/8	9/6½	11/7½	15/4	10/3	12/8	15/4½	20/6
£43/10/-	7/9	9/8	11/9	15/6½	10/4½	12/9½	15/6½	20/8½
£44	7/10	9/9	11/10½	15/8½	10/6	12/11	15/8½	20/11½
£44/10/-	7/11½	9/10½	12/0½	15/11	10/7	13/1	15/11	21/2½
£45	8/0½	10/-	12/2	16/1	10/8½	13/3	16/1	21/5
£45/10/-	8/1½	10/1½	12/3½	16/3	10/10	13/4½	16/3	21/8
£46	8/2½	10/3	12/5	16/5	10/11½	13/6½	16/5	21/11
£46/10/-	8/4	10/4	12/7	16/7	11/1	13/8	16/7	22/2
£47	8/5	10/5	12/8½	16/9½	11/2	13/10	16/9½	22/4½
£47/10/-	8/6	10/6½	12/10	16/11½	11/3½	14/-	16/11½	22/7½
£48	8/7	10/8	12/11½	17/2	11/5	14/1½	17/2	22/10½
£48/10/-	8/8	10/9½	13/1	17/4	11/6½	14/3	17/4	23/1
£49	8/9	10/10½	13/3	17/6	11/8	14/5	17/6	23/4
£49/10/-	8/10	11/-	13/4½	17/8	11/9½	14/7	17/8	23/7
£50	8/11	11/1½	13/6	17/10½	11/11	14/8½	17/10½	23/10
£50/10/-	9/-	11/3	13/8	18/0½	12/-	14/10	18/0½	24/0½
£51	9/1	11/4	13/9½	18/2½	12/1½	15/-	18/2½	24/3½
£51/10/-	9/2½	11/5½	13/11	18/5	12/3	15/2	18/5	24/6
£52	9/3½	11/6½	14/1	18/7	12/4½	15/3½	18/7	24/9
£52/10/-	9/4½	11/8	14/2	18/9	12/6	15/5½	18/9	25/-
£53	9/5½	11/9½	14/4	18/11	12/7½	15/7	18/11	25/3
£53/10/-	9/6½	11/10½	14/5½	19/1	12/9	15/9	19/1	25/6
£54	9/8	12/-	14/7	19/3½	12/10½	15/10½	19/3½	25/8½
£54/10/-	9/9	12/1½	14/9	19/5½	13/-	16/0½	19/5½	25/11½
£55	9/10	12/3	14/10½	19/8	13/1	16/2	19/8	26/2½

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

FLAT

GALVANIZED &
ZINCANNEAL

APPROX. PRICE PER SHEET BASED ON GIVEN RATES PER TON

Gauge 22	Price per Ton	6' Lengths				8' Lengths			
		138 Sheets 24"	112 Sheets 30"	92 Sheets 36"	70 Sheets 48"	104 Sheets 24"	84 Sheets 30"	70 Sheets 36"	52 Sheets 48"
£34/10/-	5/-	6/2	7/6	9/10½	6/7½	8/2½	9/10½	13/3	
£35	5/1	6/3	7/7½	10/-	6/9	8/4	10/-	13/5½	
£35/10/-	5/2	6/4	7/8½	10/2	6/10	8/5½	10/2	13/8	
£36	5/2½	6/5	7/10	10/3½	6/11	8/7	10/3½	13/10	
£36/10/-	5/3½	6/6	7/11	10/5	7/-	8/8½	10/5	14/0½	
£37	5/4½	6/7	8/0½	10/7	7/1½	8/10	10/7	14/3	
£37/10/-	5/5	6/8½	8/2	10/8½	7/2½	8/11	10/8½	14/5	
£38	5/6	6/9½	8/3	10/10½	7/4	9/0½	10/10	14/7½	
£38/10/-	5/7	6/10½	8/4½	11/-	7/5	9/2	11/-	14/9½	
£39	5/8	6/11½	8/6	11/2	7/6	9/3½	11/2	15/-	
£39/10/-	5/9	7/0½	8/7	11/3½	7/7	9/5	11/3½	15/2	
£40	5/9½	7/2	8/8½	11/5	7/8½	9/6	11/5	15/4½	
£40/10/-	5/10½	7/3	8/10	11/7	7/9½	9/7½	11/7	15/7	
£41	5/11½	7/4	8/11	11/8½	7/10½	9/9	11/8½	15/9	
£41/10/-	6/-	7/5	9/-	11/10	8/-	9/10½	11/10	15/11½	
£42	6/1	7/6	9/1½	12/-	8/1	10/-	12/-	16/2	
£42/10/-	6/2	7/7	9/3	12/2	8/2	10/1½	12/2	16/4	
£43	6/3	7/8	9/4	12/3½	8/3	10/3	12/3½	16/6½	
£43/10/-	6/4	7/9	9/5½	12/5	8/4½	10/4½	12/5	16/9	
£44	6/4½	7/10	9/7	12/7	8/5½	10/6	12/7	16/11	
£44/10/-	6/5½	7/11½	9/8	12/8½	8/7	10/7	12/8½	17/1½	
£45	6/6½	8/0½	9/9½	12/10	8/8	10/8½	12/10	17/4	
£45/10/-	6/7	8/1½	9/11	13/-	8/9	10/10	13/-	17/6	
£46	6/8	8/2½	10/-	13/2	8/10	10/11½	13/2	17/8½	
£46/10/-	6/9	8/4	10/1½	13/3½	8/11	11/1	13/3½	17/10½	
£47	6/10	8/5	10/2½	13/5	9/0½	11/2	13/5	18/1	
£47/10/-	6/10½	8/6	10/4	13/7	9/1½	11/3½	13/7	18/3	
£48	6/11½	8/7	10/5	13/8½	9/3	11/5	13/8½	18/5½	
£48/10/-	7/-	8/8	10/6½	13/10½	9/4	11/6½	13/10	18/8	
£49	7/1	8/9	10/8	14/-	9/5	11/8	14/-	18/10	
£49/10/-	7/3	8/10	10/9	14/2	9/6	11/9½	14/2	19/0½	
£50	7/3	8/11	10/10½	14/3½	9/7½	11/11	14/3½	19/3	
£50/10/-	7/4	9/-	11/-	14/5	9/8½	12/-	14/5	19/5	
£51	7/4½	9/1	11/1	14/7	9/10	12/2	14/7	19/7½	
£51/10/-	7/5½	9/2½	11/2½	14/8½	9/11	12/3	14/8½	19/10	
£52	7/6½	9/3½	11/3½	14/10	10/-	12/4½	14/10	20/-	
£52/10/-	7/7½	9/4½	11/5	15/-	10/1	12/6	15/-	20/2½	
£53	7/8	9/5½	11/6	15/2	10/2½	12/7½	15/2	20/4½	
£53/10/-	7/9	9/6½	11/7½	15/3½	10/3½	12/9	15/3½	20/7	
£54	7/10	9/8	11/9	15/5	10/4½	12/10	15/5	20/9	
£54/10/-	7/11	9/9	11/10	15/7	10/6	12/11½	15/7	20/11½	
£55	8/-	9/10	11/11½	15/8½	10/7	13/1	15/8½	21/2	

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEETFLAT GALVANIZED &
ZINC ANNEAL

Gauge

APPROX. PRICE PER SHEET BASED ON GIVEN RATES PER TON

24

Price per Ton	6' Lengths				8' Lengths			
	172 Sheets 24"	138 Sheets 30"	118 Sheets 36"	88 Sheets 48"	130 Sheets 24"	106 Sheets 30"	88 Sheets 36"	66 Sheets 48"
£34/10/-	4/-	5/-	5/10	7/10	5/4	6/6	7/10	10/5½
£35	4/1	5/1	5/11	7/11½	5/4½	6/7½	7/11½	10/7½
£35/10/-	4/1½	5/2	6/-	8/1	5/5½	6/8½	8/1	10/9
£36	4/2	5/2½	6/1	8/2	5/6½	6/9½	8/2	10/11
£36/10/-	4/3	5/3½	6/2	8/3½	5/7½	6/10½	8/3½	11/1
£37	4/3½	5/4½	6/3	8/5	5/8½	7/-	8/5	11/2½
£37/10/-	4/4½	5/5	6/4	8/6	5/9	7/1	8/6½	11/4½
£38	4/5	5/6	6/5½	8/7½	5/10	7/2	8/7½	11/6
£38/10/-	4/6	5/7	6/6½	8/9	5/11	7/3	8/9	11/8
£39	4/6½	5/8	6/7½	8/10½	6/-	7/4	8/10½	11/10
£39/10/-	4/7	5/9	6/8½	9/-	6/1	7/5½	9/-	11/11½
£40	4/8	5/9½	6/9½	9/1	6/2	7/6½	9/1	12/1½
£40/10/-	4/8½	5/10½	6/10½	9/2½	6/3	7/8	9/2½	12/3
£41	4/9	5/11	6/11½	9/4	6/4	7/9	9/4	12/5
£41/10/-	4/10	6/-	7/0½	9/5	6/4½	7/10	9/5	12/7
£42	4/10½	6/1	7/1½	9/6½	6/5½	7/11	9/6½	12/9
£42/10/-	4/11	6/2	7/2½	9/8	6/6½	8/-	9/8	12/10½
£43	5/-	6/3	7/3½	9/9½	6/7½	8/1½	9/9½	13/0½
£43/10/-	5/1	6/4	7/4½	9/10½	6/8	8/2½	9/11	13/2
£44	5/1½	6/4½	7/5½	10/-	6/9	8/3½	10/-	13/4
£44/10/-	5/2	6/5½	7/6½	10/1½	6/10	8/5	10/1½	13/6
£45	5/3	6/6	7/7½	10/3	6/11	8/6	10/3	13/7½
£45/10/-	5/3½	6/7	7/8½	10/4	7/-	8/7	10/4	13/9½
£46	5/4	6/8	7/10	10/5½	7/1	8/8	10/5½	13/11
£46/10/-	5/5	6/9	7/11	10/7	7/2	8/9	10/7	14/1
£47	5/6	6/10	8/-	10/8	7/3	8/10½	10/8	14/3
£47/10/-	5/6½	6/10½	8/1	10/9½	7/3½	8/11½	10/9½	14/4½
£48	5/7	6/11½	8/2	10/11	7/4½	9/1	10/11	14/6½
£48/10/-	5/7½	7/-	8/3	11/-	7/5½	9/2	11/-	14/8½
£49	5/8½	7/1	8/4	11/1½	7/6½	9/3	11/1½	14/10
£49/10/-	5/9	7/2	8/5	11/3	7/7½	9/4	11/3	15/-
£50	5/10	7/3	8/6	11/4½	7/8½	9/5	11/4½	15/2
£50/10/-	5/10½	7/4	8/7	11/6	7/9	9/6½	11/5½	15/3½
£51	5/11	7/4½	8/8	11/7	7/10	9/7½	11/7	15/5½
£51/10/-	6/-	7/5½	8/9	11/8½	7/11	9/8½	11/8½	15/7
£52	6/0½	7/6½	8/10	11/10	8/-	9/10	11/10	15/9
£52/10/-	6/1	7/7½	8/11	11/11	8/1	9/11	11/11	15/11
£53	6/2	7/8	9/-	12/0½	8/2	10/-	12/0½	16/1
£53/10/-	6/2½	7/9	9/1	12/2	8/3	10/1	12/2	16/2½
£54	6/3	7/10	9/2	12/3	8/4	10/2	12/3½	16/4½
£54/10/-	6/4	7/11	9/3	12/5	8/4½	10/3½	12/4½	16/6
£55	6/5	8/-	9/4	12/6	8/5½	10/4½	12/6	16/8

COST PER SHEET

THIS TABLE IS NOT A PRICE LIST

PRICE
PER
SHEET

FLAT

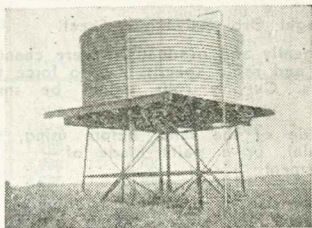
GALVANIZED &
ZINCANNEAL

APPROX. PRICE PER SHEET BASED ON GIVEN RATES PER TON

Gauge 26	Price per Ton	6' Lengths				8' Lengths			
		248 Sheets 24"	198 Sheets 30"	168 Sheets 36"	124 Sheets 48"	184 Sheets 24"	148 Sheets 30"	126 Sheets 36"	92 Sheets 48"
£34/10/-		2/9½	3/5½	4/1	5/7	3/9	4/8	5/6	7/6
£35		2/10	3/6½	4/2	5/8	3/9½	4/9	5/6½	7/7
£35/10/-		2/10½	3/7	4/2½	5/9	3/10½	4/9½	5/7½	7/8½
£36		2/11	3/7½	4/3½	5/10	3/11	4/10½	5/8½	7/10
£36/10/-		2/11½	3/8	4/4	5/10½	3/11½	4/11	5/9½	7/11
£37		3/-	3/8½	4/5	5/11½	4/-	5/-	5/10½	8/0½
£37/10/-		3/0½	3/9½	4/5½	6/0½	4/1	5/1	5/11½	8/2
£38		3/1	3/10	4/6	6/1½	4/1½	5/1½	6/-	8/3
£38/10/-		3/1½	3/10½	4/7	6/2½	4/2	5/2½	6/1	8/4½
£39		3/2	3/11	4/7½	6/3½	4/3	5/3	6/2	8/6
£39/10/-		3/2½	4/-	4/8½	6/4½	4/3½	5/4	6/3	8/7
£40		3/3	4/0½	4/9	6/5½	4/4	5/5	6/4	8/8
£40/10/-		3/3½	4/1	4/10	6/6½	4/5	5/6	6/5	8/9½
£41		3/4	4/2	4/10½	6/7½	4/5½	5/6½	6/6	8/11
£41/10/-		3/4½	4/2½	4/11½	6/8	4/6	5/7½	6/7	9/-
£42		3/5	4/3	5/-	6/9	4/7	5/8	6/8	9/1½
£42/10/-		3/5½	4/3½	5/1	6/10	4/7½	5/9	6/9	9/3
£43		3/6	4/4	5/1½	6/11	4/8	5/10	6/10	9/4
£43/10/-		3/6	4/4½	5/2	7/-	4/9	5/10½	6/11	9/5½
£44		3/6½	4/5½	5/3	7/1	4/9½	5/11½	7/-	9/7
£44/10/-		3/7	4/6	5/3½	7/2	4/10	6/-	7/1	9/8
£45		3/7½	4/6½	5/4	7/3	4/11	6/1	7/2	9/9½
£45/10/-		3/8	4/7	5/5	7/4	4/11½	6/2	7/3	9/11
£46		3/8½	4/8	5/5½	7/5	5/-	6/2½	7/3½	10/-
£46/10/-		3/9	4/8½	5/6½	7/6	5/1	6/3½	7/4½	10/1½
£47		3/9½	4/9	5/7	7/7	5/1½	6/4	7/5½	10/2½
£47/10/-		3/10	4/9½	5/8	7/8	5/2	6/5	7/6½	10/4
£48		3/10½	4/10	5/8½	7/9	5/2½	6/6	7/7½	10/5
£48/10/-		3/11	4/10½	5/9	7/10	5/3	6/6½	7/8½	10/6½
£49		3/11½	4/11½	5/10	7/11	5/4	6/7½	7/9	10/8
£49/10/-		4/-	5/-	5/11	8/-	5/4½	6/8	7/10	10/9
£50		4/0½	5/0½	5/11½	8/1	5/5	6/9	7/11	10/10½
£50/10/-		4/1	5/1	6/-	8/2	5/6	6/10	8/-	11/-
£51		4/1½	5/2	6/1	8/2½	5/6½	6/11	8/1	11/1
£51/10/-		4/2	5/2½	6/1½	8/3½	5/7	6/11½	8/2	11/2½
£52		4/2½	5/3	6/2	8/4½	5/8	7/-	8/3	11/3½
£52/10/-		4/3	5/3½	6/3	8/5½	5/8½	7/1	8/4	11/5
£53		4/3½	5/4	6/4	8/6½	5/9	7/2	8/5	11/6½
£53/10/-		4/4	5/4½	6/4½	8/7½	5/10	7/3	8/6	11/7½
£54		4/4	5/5½	6/5	8/8½	5/10½	7/3½	8/7	11/9
£54/10/-		4/4½	5/6	6/6	8/9½	5/11	7/4½	8/8	11/10
£55		4/5	5/6½	6/6½	8/10½	6/-	7/5	8/9	11/11½

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LYSAGHT ORB CORRUGATED STEEL SHEETS FOR TANKMAKING



In Australia to-day, many millions of gallons of water are safely stored in tanks made from Lysaght's Orb Corrugated Galvanized Iron. Ranging in size from the familiar 500-gallon householder tank to giants capable of holding 80,000 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's Orb Galvanized Iron 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 either of the following rules:—

A. $\frac{\pi}{4} \times (\text{diameter})^2 \times \text{height} \times 6\frac{1}{4}$.

B. Multiply circumference by itself and by half the height — $C^2 \times h/2$.

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

Example.—Diameter 6ft., height 6ft.

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

CORRUGATED GALVANIZED IRON TANKS RECOMMENDATIONS

1. Use only Lysaght 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. Coat the inside of the tank, before using, with zinc dust/zinc oxide paint, or a paint made of:—
 - 2½ lb. of cement
 - 1 pint of boiled linseed oil
 - 1 oz. of gold size or ¼ pint of terebine.Keep the mixture well stirred during use. Milk and cement mixture to the consistency of whitewash is a very good substitute.
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 (Aust.) Pty. Ltd., 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 iron, send a sample of about two pints to the nearest office of John Lysaght (Aust.) Pty. Ltd., 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").

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	12,400	10,300	12,400
	8	7,200	9,200	10,900	13,400	16,200
6' or Two 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 Three 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

Corr. Galv. Iron 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' 9"	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' 3"	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.

MISCELLANEOUS DATA

1 Cubic foot of distilled water at 62°F. weighs 62.321 lb.

1 Gallon of pure water contains 277.274 cubic inches.

For all practical purposes:

1 Gallon of water weighs 10 lb.

1 Cubic foot of water weighs 62.5 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.

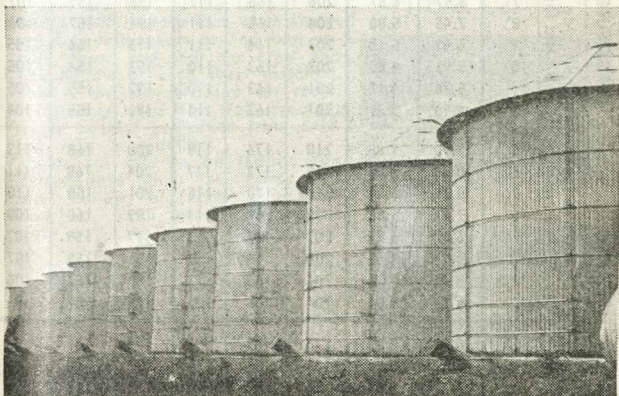
1 Bushel of wheat weighs approximately 60 lb.

1 Bushel of oats weighs 40 lb.

400 cubic feet of chaff weigh 1 ton.

GRAIN SILOS

Lysaght Corrugated Galvanized Iron and Zincanneal sheets are used extensively for Grain Silos.



TANKS

Detailed information on this subject can be obtained by applying for the LYSAGHT SILO PAMPHLET.

Write to the appropriate Branch Office or Box 196, G.P.O., Sydney.

Quantity of Corrugated Sheet per 100 sq. ft. of Area

		Length of Sheet	No. of sheets per 100 sq. ft.		Weight of sheets required per 100 sq. ft. of area in lb.					
					8x3" corr. sheet			10x3" corr. sheet		
			8 x 3"	10 x 3"	22G	24G	26G	22G	24G	26G
ROOFING	1½ corr. side lap 6" end lap	5'	11.43	9.02	196	159	107	190	153	103
		6'	9.41	7.43	194	157	106	187	151	102
		7'	8.00	6.32	192	155	105	185	150	101
		8'	6.96	5.49	190	154	104	184	149	100
		9'	6.15	4.86	189	153	103	183	148	100
		10'	5.52	4.51	189	153	103	182	147	99
		11'	5.00	3.95	188	152	102	182	147	99
		12'	4.57	3.61	188	152	102	181	146	99
	2 corr. side lap 6" end lap	5'	12.25	9.52	211	170	115	201	162	109
		6'	10.08	7.84	208	168	113	198	160	108
		7'	8.57	6.67	206	166	112	196	159	107
		8'	7.45	5.80	204	165	111	194	157	106
		9'	6.59	5.13	203	164	111	193	156	105
		10'	5.91	4.60	202	163	110	193	156	105
		11'	5.36	4.17	201	163	110	192	155	105
		12'	4.90	3.81	201	162	110	191	155	104
	2 corr. side lap 9" end lap	5'	12.70	9.88	218	176	119	208	168	113
		6'	10.39	8.08	214	173	117	204	165	111
		7'	8.79	6.84	211	170	115	201	158	110
		8'	7.62	5.92	209	169	114	199	160	108
		9'	6.72	5.23	207	167	113	197	159	107
		10'	6.01	4.68	205	166	112	196	158	107
		11'	5.44	4.23	204	165	111	195	157	106
		12'	4.97	3.86	204	165	111	194	157	106
SIDE WALLING AND VERTICAL SHEETING	1 corrugation side lap 4" end lap	5'	10.34	8.27	178	144	97	174	141	95
		6'	8.57	6.86	176	143	96	173	140	94
		7'	7.32	5.85	176	142	96	172	139	94
		8'	6.38	5.11	175	141	95	171	139	93
		9'	5.66	4.53	174	141	95	171	138	93
		10'	5.09	4.07	174	140	95	170	138	93
		11'	4.62	3.69	173	140	94	170	137	93
		12'	4.23	3.38	173	140	94	170	137	92

FIXING OF CORRUGATED SHEETS GALVANIZED IRON OR ZINCANNEAL

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

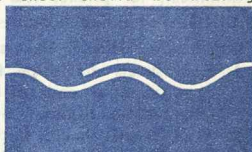
As is well known, corrugated sheet steel is produced in three pitches of corrugations, 5", 3", and 1", sometimes referred to as ripple iron. 3" pitch is that in most common use, and is produced in two widths, 8 x 3" corrugations and 10 x 3" corrugations.

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.

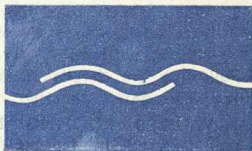
SIDE LAPS.—Sheets are said to be lapped one corrugation when both sheets are laid the right way up, and, as illustrated, the crest of one sheet fits over the crest of the other sheet. This lap is used for covering walls, or for roofs in dry areas.

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 Corrug. Side Lap



2 Corrug. 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 any roof pitch. Though a slope greater than $\frac{1}{4}$ is preferred in snow country, for most Australian conditions slopes $\frac{1}{4}$ 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' 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.

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 lengths 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.

A corrugated iron roof will last longer if the ends and side laps of sheets are painted, before fixing, with zinc dust, red oxide, or any good quality roofing paint. These points of contact are where corrosion may begin.

Zincanneal sheeted roofs may be painted immediately on erection, but unless using zinc dust paints, galvanized iron roofs should not be painted until the sheet has weathered—say six (6) months after erecting.

The development of metallic zinc dust paints has made possible the painting of new galvanized sheets without weathering or priming. The ingredients are obtained from leading manufacturers, and the paint has a covering capacity of 420 sq. ft. per gallon if sprayed, and 445 sq. ft. if brushed.

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.

Standard Ridge Capping should be of 24G Queens Head Galvanized Iron or Zincanneal 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.

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 Zincanneal flat sheet, and is applied to the roof in a similar manner as Standard Ridge Capping.

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.

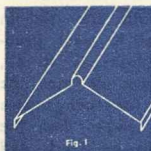


Fig. 1

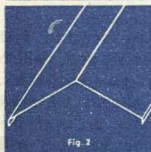


Fig. 2

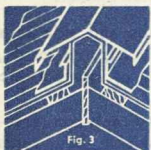


Fig. 3



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 SPR13-1931, 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.

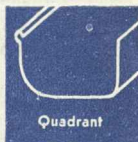
Brackets can be fixed:—

- To fascia boards with galvanized nails.
- To rafters with galvanized nails.
- 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.



DOWNPIPES

GENERAL.—Downpipes are formed from 24G Queen's Head Galvanized or Zincanneal 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 Zincanneal 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 iron 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.

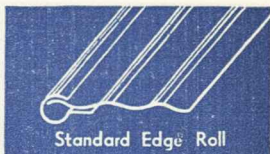
When buildings are erected on the boundary of a street alignment, the lower length of downpipe should be of cast iron, and chased into the outside face of the building for a minimum length of 6 feet.

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

Finishes — Edge Rolls — Barge Boards

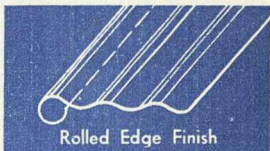
STANDARD EDGE ROLL:

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.



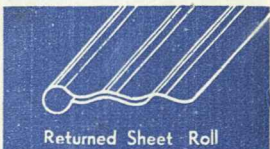
ROLLED EDGE FINISH:

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.



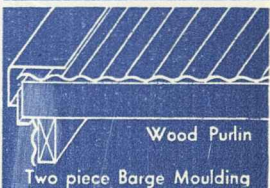
RETURNED SHEET ROLL:

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 two-piece barge moulding formed from 24 gauge flat sheet as illustrated.



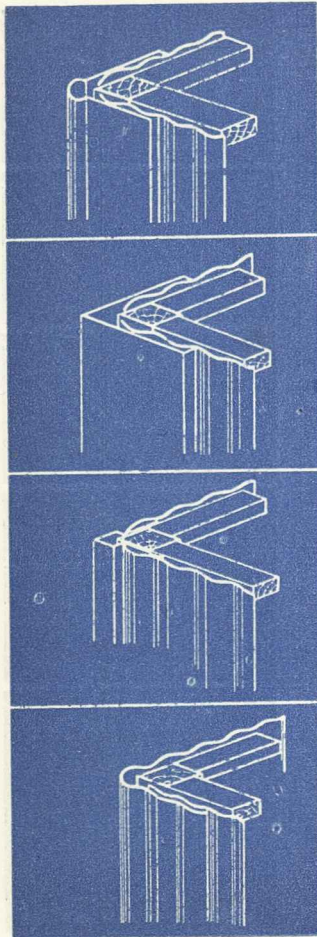
COMBINED EAVES GUTTER AND FASCIA:

The combined eaves gutter and fascia shall be of 24G Queen's Head Galvanized Iron or Zinc-anneal.

The latticed ventilating eaves soffit can be formed from 1" wide strips of 26G Queen's Head, interlaced and riveted or soldered at certain joints.



STANDARD CORNER FINISHES



Walls of Corrugated Galvanized Iron or Zincanneal fixed vertically may be finished at the corners in a variety of ways, as shown in the illustrations.

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 Queen's Head or Zincanneal R.L. 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 TIMBERS (A.S. No. O-56—1948)

RAFTERS FOR SHEET ROOFS—SINGLE SPAN

Cross-sectional Dimensions—Inches

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

ROOF TIMBERS (A.S. No. O-56—1948)

PURLINS FOR SHEET ROOFS—SINGLE SPAN

Spacing in.	Span ft.	Cross-sectional Dimensions—Inches				
		Groups A & B		Group C		Group D
		Standard Grade	Common Grade	Standard Grade	Common Grade	Standard Grade
30	10	4 x 2	5 x 1½	5 x 1½	5 x 2	5 x 1½
	11	5 x 1½	5 x 2	5 x 2	6 x 2	6 x 2
	12	5 x 2	5 x 2	6 x 2	6 x 2	6 x 2
	13	6 x 2	6 x 2	6 x 2	6 x 3	6 x 3
	14	6 x 2	6 x 2	6 x 3	6 x 3	7 x 3
	15	6 x 3	6 x 3	7 x 3	6 x 3	7 x 3
	16	7 x 3	6 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
36	10	5 x 1½	5 x 2	5 x 1½	6 x 2	5 x 2
	11	5 x 1½	5 x 2	6 x 2	6 x 2	6 x 2
	12	6 x 2	6 x 2	6 x 2	6 x 2	6 x 2
	13	6 x 2	6 x 2	6 x 3	6 x 3	6 x 3
	14	6 x 3	6 x 3	7 x 3	6 x 3	7 x 3
	15	7 x 3	6 x 3	7 x 3	—	7 x 3
	16	7 x 3	6 x 3	8 x 3	—	8 x 3
	17	8 x 3	—	8 x 3	—	9 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
42	10	5 x 1½	5 x 2	5 x 2	6 x 2	6 x 2
	11	5 x 2	6 x 2	6 x 2	6 x 2	6 x 2
	12	6 x 2	6 x 2	6 x 2	6 x 3	6 x 3
	13	6 x 2	6 x 3	6 x 3	6 x 3	7 x 3
	14	6 x 3	6 x 3	7 x 3	—	7 x 3
	15	7 x 3	6 x 3	7 x 3	—	8 x 3
	16	7 x 3	—	8 x 3	—	8 x 3
	17	8 x 3	—	8 x 3	—	9 x 3
	18	8 x 3	—	9 x 3	—	9 x 3
	19	9 x 3	—	10 x 3	—	10 x 3
	20	9 x 3	—	10 x 3	—	10 x 3
48	10	5 x 2	6 x 2	5 x 2	6 x 2	6 x 2
	11	5 x 2	6 x 2	6 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 3	6 x 3	6 x 3	—	7 x 3
	14	6 x 3	6 x 3	7 x 3	—	7 x 3
	15	7 x 3	—	8 x 3	—	8 x 3
	16	8 x 3	—	8 x 3	—	8 x 3
	17	8 x 3	—	9 x 3	—	9 x 3
	18	9 x 3	—	9 x 3	—	10 x 3
	19	9 x 3	—	10 x 3	—	10 x 3
	20	10 x 3	—	10 x 3	—	11 x 3

WINDOW GLASS

Window Glass is manufactured in various types, viz., Sheet (clear), Figured Rolled (obscured—patterned), Wire Reinforced, and Heat Absorbing Glass.

SHEET:

Clear Sheet Glass is obtainable in 16 oz., 21 oz., 26 oz., and 32 oz., packed in original cases containing 100, 200, and 300 sq. feet, dependent on the size, or in sheets or cut to size from glass merchants and stores.

The thicknesses of sheet glass used for glazing is dependent on the area or size of the square required. 16 oz. and 21 oz. are the thicknesses mainly used for the glazing of homes.

Approximate weight per 100 sq. ft. original cases:—

16 oz.	21 oz.	26 oz.	32 oz.
1 cwt. 1 qr.	1 cwt. 2 qrs.	1 cwt. 3 qrs.	2 cwt. 0 qrs.

Fire-polished Plate (heavy drawn glass) is manufactured in 3/16" and 1/4" thicknesses, packed in original sheets in cases containing approximately 600 sq. ft., obtainable in sheets or cut to size with or without edge treatment from glass merchants.

Used for larger glazing, table tops and furniture covering, show-cases, display, etc.

Original cases weigh approximately 8-9 cwt.

FIGURED ROLLED GLASS.—Figured Rolled Glass, which is normally of 1/8" thickness, is manufactured in a multiplicity of pleasing patterns suitable for all glazing where light and privacy is desired, the pattern used depending on the amount of privacy required.

Original cases contain approximately 420 sq. ft., in sizes 72" and 90" long x 24" and 48" wide, and 108" long x 24" wide.

Original cases weigh approximately 8-9 cwt.

The following is a list of the various patterns of Figured Rolled Glass manufactured in Australia:—

Kosciusko	Glacier	Small Pyramid	Waverley
Coogee	Pyramid	Double Rolled	Small Waverley
Spotswood	Pinhead Morocco	Cathedral	Eustom

Rough Cast and Modern Fluted in 3/16" thicknesses are used in the glazing of larger openings, for full panel doors, etc., and for movable louvres. These two patterns are packed 360 sq. ft. per case in sizes as for 1/8" Figured Rolled.

Weight per original case approximately 9-10 cwt.

Crysta-line (newest pattern of local manufacture) is a combination of Rough Cast with 1/4" wide semi-transparent lines spaced at 1 1/8" intervals. Crysta-line and Modern Fluted are used for accentuating the horizontal or vertical lines in almost all types of glazing.

Crysta-line is manufactured in 1/8", 3/16" and 1/4" thicknesses, and is available in the sizes as for 1/8" Figured Rolled. 1/8" and 3/16" are packed as previously set out, and 1/4" approximately 250 sq. ft. per case.

Weight per original case approximately 9-10 cwt.

Wired Cast is a $\frac{1}{4}$ " rough cast patterned glass with a 1" hexagonal mesh wire embedded in the centre. This is used for glazing saw-tooth roofs and factories generally, fire-resistant panels, light areas, etc., and is manufactured in 72", 84", 96" and 108" lengths x 24" and 48" widths, and is packed in cases containing approximately 250 sq. ft. per case.

Weight per original case is approximately 10 cwt.

COLDLITE:

Coldlite Anti-Actinic Heat-absorbing Glass is of a bluish-green tint, and is especially manufactured for glazing the northern and western elevations of almost every type of building, particularly factories, stores, warehouses, etc., where it is desired to reduce the amount of heat transmitted through the glass and also glare.

Coldlite absorbs up to 85% of the infra-red (heat) rays of the sun whilst transmitting approximately 60% of the light. This means that the temperature in buildings glazed with Coldlite is reduced by as much as 10 to 12 degrees.

Tests to ascertain the transmission of the infra-red rays were carried out by Sydney University on specimens of Coldlite and window glass of the same thickness, which gave the following results:—

Coldlite	$\frac{1}{8}$ "	transmits	29%	of the	infra-red.
"	$\frac{1}{4}$ "	"	15%	"	"
Window Glass	$\frac{1}{8}$ "	"	86%	"	"
"	$\frac{1}{4}$ "	"	83%	"	"

Coldlite is used extensively in movable louvres on northern and western elevations.

Coldlite is manufactured in $\frac{1}{8}$ ", $\frac{3}{16}$ " and $\frac{1}{4}$ " thicknesses, and in sizes and packed the same as previously indicated for the various thicknesses of Figured Rolled (excluding Wired Cast).

Light transmission of some of the Sheet and Figured Rolled Glasses is as follows:—

Clear Sheet, 21 oz.	..	..	..	..	91%
Clear Sheet, 26 oz.	..	..	..	..	91%
Figured Rolled:					
Waverley	..	..	..	..	88%
Pinhead Morocco	..	..	..	..	88%
Spotswood	..	..	..	..	86%
Double Rolled Cathedral	..	..	..	..	88%
Rough Cast, $\frac{3}{16}$ "	..	..	..	..	87%
Wired Cast	..	..	..	..	79%

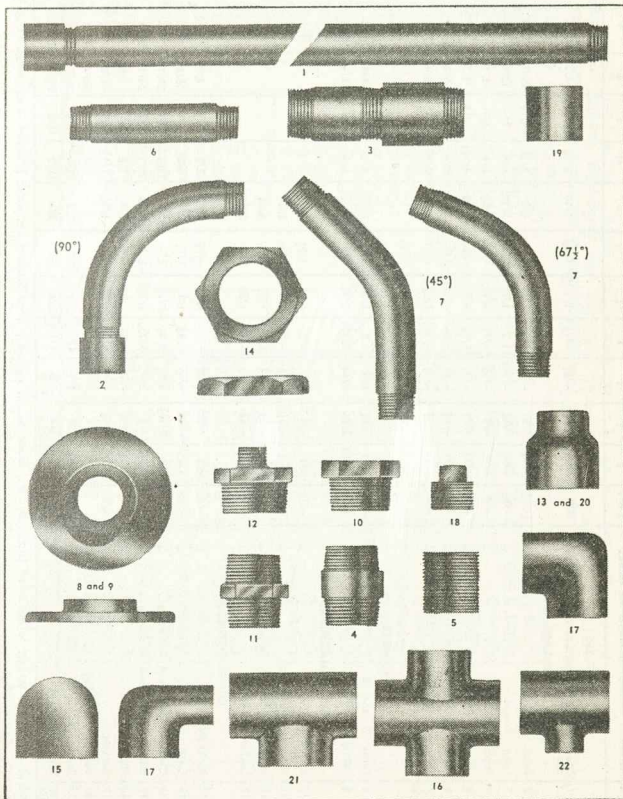
Whilst the above list of weights and patterns of glass is not complete, it will give some indication as to the amount of light transmitted through Sheet Glass, Figured Rolled Glass, and Wired Cast Glass.

STEWARTS & LLOYDS (AUSTRALIA) PTY. LTD.

STEWARTS & LLOYDS (AUSTRALIA) PTY. LTD.

(INCORPORATED IN VICTORIA)

S. & L. SCREWED AND SOCKETED STEEL TUBES AND FITTINGS



BUILDING DATA

PRICE LIST

S. & L. Steel Tubes and Fittings for Gas, Water, and Steam

No.	Nominal Internal Diameter in Inches	1/4	1/2	3/4	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6
TUBES													
1	Tubes (2' long and over) .. per foot	-/4	-/4	-/5	-/6	-/8	-/9	1/1	1/4	1/10	2/10	3/3	4/5
TUBULARS													
2	Bends (90°) each	-/6	-/7	-/9	-/11	1/4	2/2	2/7	4/3	9/10	2/10	14/10	25/7
3	Long Screws "	-/6	-/7	-/8	-/10	1/2	1/7	2/1	2/10	5/4	7/1	12/4	14/1
4	Nipples, Barrel "	-/4	-/4	-/5	-/5	-/7	-/10	1/1	1/5	2/6	3/4	6/1	7/2
5	Nipples, Plain "	-/12	-/12	-/21	-/21	-/3	-/5	-/6	-/10	1/10	2/11	4/7	5/7
6	Pieces, not socketed, 4'-11" "	-/4	-/4	-/5	-/6	-/8	-/11	1/3	1/8	3/10	5/4	6/2	10/4
7	Pieces, not socketed (22 1/2°) (45°) "	-/4	-/5	-/5	-/7	-/11	1/7	1/11	3/3	7/10	12/1	20/4	27/1
FLANGES													
8	Table D and E "	-/9	-/11	1/0	1/3	1/5	1/10	2/1	2/10	4/3	7/2	8/5	9/8
9	Table H "	1/8	1/10	2/2	2/6	2/10	3/9	4/4	5/11	8/6	14/5	17/1	19/7
SOLID MACHINED													
10	Bushes "	-/21	-/3	-/4	-/6	-/8	-/11	1/2	2/2				
11	Nipples, Hexagon "	-/3	-/3	-/5	-/7	-/9	1/4	1/8	2/6				
12	Nipples, Hexagon, Reducing "	-/6	-/6	-/7	-/11	1/1	1/9	2/5	3/6				
13	Sockets, Reducing "	-/3	-/4	-/5	-/7	-/10	1/2	1/6	2/3				
OTHER FITTINGS													
14	Backnuts "	-/2	-/2	-/3	-/3	-/5	-/6	-/8	1/2	2/5	3/9	4/9	5/10
15	Caps "	-/3	-/3	-/5	-/6	-/8	1/1	1/4	2/2	4/8	6/5	10/6	11/4
16	Crosses, Plain and Reducing "	2/4	2/6	2/11	3/5	4/4	5/10	7/1	11/2	23/5	42/7	59/7	71/1
17	Elbows, Plain and Reducing "	-/10	-/11	1/2	1/4	1/7	2/3	2/9	4/10	10/9	15/10	24/11	30/4
18	Plugs "	-/3	-/3	-/4	-/5	-/6	-/8	-/10	1/4	2/8	5/1	7/5	10/7
19	Sockets "	-/3	-/3	-/4	-/5	-/6	-/8	-/11	1/3	2/7	3/7	5/3	6/4
20	Sockets, Reducing "	-/3	-/3	-/4	-/5	-/6	-/8	-/11	1/3	2/7	3/7	5/3	6/4
21	Tees "	1/1	1/2	1/4	1/8	1/11	2/8	3/3	5/9	13/1	19/6	29/5	34/8
22	Tees, Reducing "	1/1	1/2	1/4	1/8	1/11	2/8	3/3	5/9	13/1	19/6	29/5	34/8

NOTE.—Prices are subject to the Retail Discounts, etc., shown on our current printed Discount List which is issued in conjunction with this Price List.

PIPE CHARACTERISTICS

Plain End and Screwed and Socketed Pipes

Nom. Bore ins.	Outside Dia. ins.	Quality	Thickness		Ft. per ton		Nom. Bore ins.	Outside Dia. ins.	Quality	Thickness		Ft. per ton	
			SWG	In.	P/E	S & S				SWG	In.	P/E	S & S
$\frac{1}{8}$ "	13/32"	Class B ...	14	0.080	8202	8146	$\frac{1}{2}$ "	1.29/32"	Class B ...	8	0.160	750	745
		Class B Gal.	14	0.080	7859	7840			Class B Gal.	8	0.160	728	724
		Class C ...	12	0.104	6830	6788			Class C ...	6	0.192	636	634
		Class B ...	14	0.080	5728	5684			Ammonia ...	5	0.212	583	—
$\frac{1}{4}$ "	17/32"	Class B Gal.	14	0.080	5346	5309	2"	2.3/8"	Class B ...	8	0.160	590	586
		Class C ...	12	0.104	4648	4616			Class B Gal.	8	0.160	575	571
		Ammonia ...	11	0.116	4291	—			Class C ...	6	0.192	499	497
		Class B ...	13	0.092	3909	3883			Ammonia ...	5	0.212	456	—
$\frac{3}{8}$ "	11/16"	Class B Gal.	13	0.092	3703	3684	2½"	3"	Class B ...	7	0.176	423	417
		Class C ...	11	0.110	3232	3219			Class B Gal.	7	0.176	413	408
		Ammonia ...	10	0.128	2991	—			Class C ...	5	0.212	355	352
		Class B ...	12	0.104	2715	2702			Ammonia ...	4	0.232	327	—
$\frac{1}{2}$ "	27/32"	Class B Gal.	12	0.104	2601	2592	3"	3.1/2"	Class B ...	7	0.176	359	354
		Class C ...	10	0.128	2281	2274			Class B Gal.	7	0.176	351	346
		Ammonia ...	9	0.144	2074	—			Class C ...	5	0.212	301	298
		Class B ...	11	0.116	1910	1900			Ammonia ...	4	0.232	277	—
$\frac{3}{4}$ "	1.1/16"	Class B Gal.	11	0.116	1835	1826	3½"	4"	Class B ...	7	0.176	312	308
		Class C ...	9	0.144	1585	1580			Class B Gal.	7	0.176	302	299
		Ammonia ...	8	0.160	1437	—			Class C ...	5	0.212	262	260
		Class B ...	10	0.128	1357	1350			Class B ...	7	0.176	276	272
1"	1.11/32"	Class B Gal.	10	0.128	1313	1306	4"	4.1/2"	Class B Gal.	7	0.176	267	264
		Class C ...	8	0.160	1115	1111			Class C ...	5	0.212	231	228
		Ammonia ...	7	0.176	1028	—			Class B ...	7	0.176	224	220
		Class B ...	9	0.144	950	945			Class B Gal.	7	0.176	217	213
1¼"	1.11/16"	Class B Gal.	9	0.144	922	918	6"	5.1/2"	Class C ...	5	0.212	187	184
		Class C ...	7	0.176	794	791			Class B ...	7	0.176	188	184
		Ammonia ...	6	0.192	736	—			Class B Gal.	7	0.176	183	179
		Class B ...	8	0.160	736	—			Class C ...	5	0.212	157	155

Weights per foot of screwed and socketed tubing are based on the overall length of tube plus socket, screwed to basic engagement, and for the following lengths of tube:—
 $\frac{1}{8}$ " and $\frac{1}{4}$ " 15' overall; $\frac{3}{8}$ " 19' overall; $\frac{1}{2}$ " to 6", 21' 6" overall.

A.I.S. SPUN CAST IRON PIPE

SPIGOT AND SOCKET—12-FOOT LENGTHS

Dia- meter	Wall Thickness	Weight of 12' length	Diameter ins.	Wall Thickness	Weight of 12' length
4"	.250	148 lb.	12	.406	575 lb.
	.312	178 "		.531	729 "
	.344	193 "		.375	640 "
(Gas) 6"	.390	216 "	15	.469	780 "
	.281	249 "		.594	963 "
	.344	296 "		.437	920 "
8"	.437	365 "	18	.531	1095 "
	.312	367 "		.656	1323 "
	.375	431 "		.468	1194 "
9"	.500	554 "	20	.552	1379 "
	.344	447 "		.677	1660 "
	.406	516 "		.500	1420 "
10"	.531	653 "		.593	1646 "
	.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	1/2"	3 lb.	45'	3/32"
5/16"	3 lb.	96 "	1/2"	7 "	45'	1/4"
3/8"	11b. 5oz.	70 "	1/2"	9 "	45'	5/16"
1/2"	11b. 7oz.	70 "	3/4"	5 "	45'	7/64"
5/8"	2lb. 1oz.	45 "	3/4"	9 "	45'	3/16"
3/4"	2lb. 13oz.	45 "	3/4"	11 "	45'	1/4"
7/8"	3lb. 11oz.	55 "	1"	6 "	45'	1/8"
1"			1"	9 "	45'	3/16"

LEAD SOIL PIPE

Inside Dia.	Lengths	Approx. Wt. per length	Inside Dia.	Lengths	Approx. Wt. per length
1 1/4"	10'	18 lb.	1 1/4"	8 "	45'
1 1/2"	10'	21 "	1 1/4"	12 "	45'
2"	10'	30 "	1 1/2"	17 "	45'
2"	12'	39 "	1 1/2"	16 "	45'
3"	10'	58 "	2"	16 "	45'
3"	12'	69 "	2"	20 "	45'
4"	10'	78 "	2"	28 "	45'
4"	12'	90 "			

And up to 6" dia. x 3/8" wall if required.

General Instructions for Painting

To attain the best possible results in painting it is firstly essential that the surface be effectively cleaned and then primed to provide the necessary uniform and non-absorbent surface for the finishing coats.

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.

When painting masonry surfaces, allow the surface to age for at least one month to ensure the cement is free from moisture and its alkaline reactivity reduced to a safe workable condition.

Apply a priming coat of a suitable cement sealer to seal the porosity of the surface and act as a barrier to prevent discolouration of the finish by alkali before applying the finishing materials. For soft, porous wooden surfaces, prime firstly with white lead primer reduced with raw linseed oil in the directed proportions. For hardwood surfaces use a white lead primer reduced with pure turpentine. For metal surfaces prime with a red lead primer reduced with pure turpentine if required. For new galvanized iron surfaces prime firstly with a galvanized iron primer. Galvanized iron that has aged for at least six months may be painted by the direct application of the finishing coats.

Always allow the priming coat to dry out thoroughly before application of the finish is commenced.

When applying the finishing colours allow the first application to dry out thoroughly before the commencement of the second. Two thin coats are more effective than one heavy coat.

Always use clean brushes and equipment, and after the completion of a painting job clean the equipment by thoroughly washing in the specified reducing agent of the paint material used.

COVERING CAPACITIES OF FIRST QUALITY PAINTS

Type or Product	Square feet per gallon
Exterior House Paint	800
Oil Wall Finish (Matt finish)	600
Cold Water Paint	800-1,000 sq. yds. per cwt.
Kalsomine	200-400 per 5lb. packet
Cement Sealer	359-450
Galvanized Iron Primer	900
Roof Paint	800
Aluminium Paint	900
Flat Oil Stain	800
Oil Varnish Stain	800
Varnishes	900

ZINC DUST-ZINC OXIDE PAINT.—For painting sheet laps and roofs.

Zinc Dust	6 lb.	Raw Linseed Oil	1 gallon
Zinc Oxide Paint	12 „	Liquid Driers	$\frac{3}{4}$ pint

N.B.—Zinc Oxide Paste is 82% zinc oxide and 18% raw linseed oil.

BRICKS AND BRICKWORK

1,000 common bricks weigh about $3\frac{1}{2}$ tons.

Standard brick size = $9'' \times 4\frac{1}{2}'' \times 3''$.

Standard measure = 1 rod = $16\frac{1}{2}' \times 16\frac{1}{2}' \times 13\frac{1}{2}''$.

1 Rod = 272 super feet $\times 1\frac{1}{2}$ brick thickness.

= 408

= 816

= 306

cubic feet or $11\frac{1}{3}$ 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>$\frac{1}{4}$" Joints</u>					
1 Rod	3,703	260	48	23	46
1 Cu. Yd.	327	22.97	4.03	2	4
<u>$\frac{3}{8}$" Joints</u>					
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.—^{and} should be added for bed under sills bearers, etc.
 Openings are ^{also} longer than piers. Four courses equals 1'-1½".

Courses or Bricks	Piers	Openings	Heights	Courses or Bricks	Piers	Openings	Heights
1½	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"	13½	10' 6-3/16"	10' 6-15/16"	
1½	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"	14½	11' 3-9/16"	11' 4-5/16"	
2½	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"	15½	12' 0-5/16"	12' 1-11/16"	
3½	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"	16½	12' 10-5/16"	12' 11-1/16"	
4½	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"	17½	13' 7-11/16"	13' 8-7/16"	
5½	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"	18½	14' 5-1/16"	14' 5-13/16"	
6½	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"	19½	15' 2-7/16"	15' 3-3/16"	
7½	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"	20½	15' 11-13/16"	16' 0-9/16"	
8½	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"	21½	16' 9-3/16"	16' 9-15/16"	
9½	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"	22½	17' 6-9/16"	17' 7-5/16"	
10½	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"	23½	18' 3-13/16"	18' 4-9/16"	
11½	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"		24½	19' 1-5/16"	19' 2-1/16"	
12½	9' 8-3/16"	9' 8-15/16"		25	19' 6-3/4"	19' 6-3/4"	7' 0-3/8"

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 2-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. Lumps which cannot easily be broken up may be screened out and the cement used for unimportant work.

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 and impervious.

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.

WATER.—Should be drinkable.

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 about 20 r.p.m., 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.

Regard first batch as trial batch, and correct as follows:—

(1) If mix is too harsh, increase sand and decrease coarse aggregate.

(2) If mix is oversanded, decrease sand and increase coarse aggregate.

(3) If mix is too wet, increase both sand and coarse aggregate.

(4) If mix is too stiff, decrease both sand and coarse aggregate.

Do NOT attempt to improve workability by adding more water, as poor quality concrete will result.

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 give 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.

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	149	31	77	153
3" (Normal footpath)	56	112	224	46	115	230
4" (Car drives, etc.)	75	149	298	62	154	307
6" (Heavy trucks, etc.)	112	224	447	92	230	459

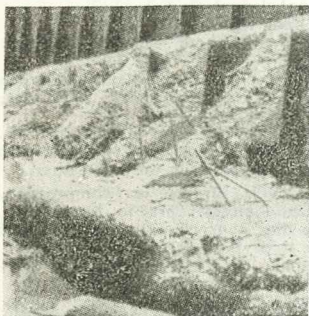
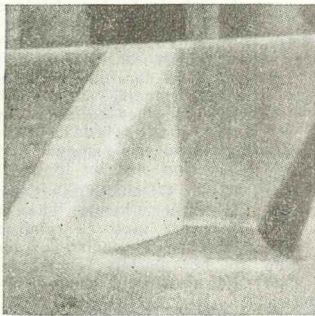
Render Thickness	1:2		1:2½		1:3	
	Cement (bags)	Sand (c. ft.)	Cement (bags)	Sand (c. ft.)	Cement (bags)	Sand (c. ft.)
1"	20	40	17	43	15	44
½"	30	60	25	63	22	68
¾"	40	79	34	84	30	89

USES OF CONCRETE.—Detailed information on all uses of cement and concrete is available on application to the Cement and Concrete Association of Australia, 14 Spring Street, Sydney.

FACTS EVERY CONTRACTOR SHOULD KNOW
ABOUT

GUNITE

FOR
REPAIR—REINFORCEMENT—PROTECTION



BEFORE AFTER
GUNITE REPAIRS TO SEAWALL

WHAT IT IS.— GUNITE is the registered trade name of an aggregate and cement mixture SHOT into place by the CEMENT-GUN process. This process results in a surface of unparalleled density and strength.

WHAT IT DOES.— GUNITE is produced by uniting dry aggregate and cement under air pressure at the nozzle of the CEMENT-GUN, where the correct quantity of water is added and the resultant mix projected into place at high velocity. Cement deposited in this way dries quickly, can be built up to considerable thickness without slumping, and becomes integral with the surface encased. It is widely used throughout England and America to give structural strength and protection to a wide variety of engineering and architectural projects.

SPECIFICATIONS.—ADHESION: Experiments and actual use have proved that GUNITE is actually stronger than the brick, stone, or concrete against which it is applied. **DENSITY:** Tests of reservoirs and similar structures lined with GUNITE prove that unequalled density and imperviousness to water are obtainable by the CEMENT-GUN process. $\frac{5}{8}$ " to $1\frac{1}{2}$ " GUNITE slabs, for example, showed no signs of leakage when tested at 700 feet to 1600 feet head for several hours. **STRENGTH:** The CEMENT-GUN process of applying GUNITE results in a material having a proven ultimate compressive strength of 6,000 lb. per sq. in. **EXPANSION:** The expansion of GUNITE is almost identical with that of low carbon steel, which accounts for its flexibility and almost entire absence of "cracking."

SUGGESTED USES.—GUNITE presents the quickest, most economical and most efficient means of effecting repairs to concrete structures of all types—particularly where a thick layer of material is required on vertical or overhead surfaces—the encasement and protection of steel against fire, abrasives, corrosion, etc., the reconstruction and lining of chimney stacks and bunkers, the lining of tunnels, canals, pipe lines, sewers, reservoirs, and tanks, the grouting of stone embankments, retaining walls and the like, the protection of piles, the construction of swimming pools, and the placing of refractory materials.

Based on the experience of associate Cement-Gun Companies in England and America, a staff of operators has been specially trained for CEMENT-GUN work in Australia. The services of the Company's engineers are always freely available for consultation, and contract estimates will be submitted on application.

CEMENT-GUN
PTY. LTD.

Contractors for GUNITE; Selling Agents for the
CEMENT-GUN

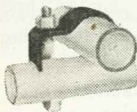
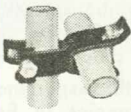
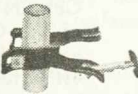
33 MACQUARIE PLACE, SYDNEY, N.S.W.

MILLS

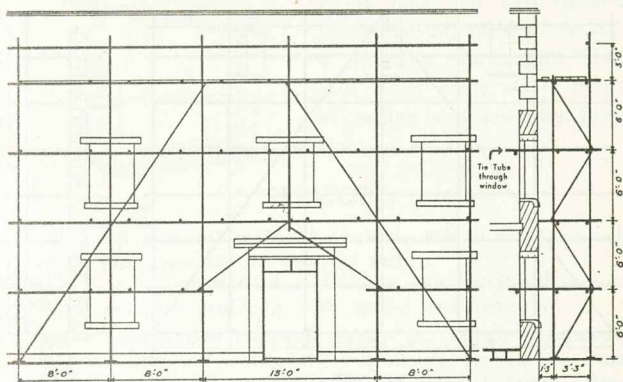
STEEL

SCAFFOLDS

Mills Patent Fittings are made from hardened and tempered spring steel, with galvanized nuts and bolts. They are subject to severe tests before leaving the works, and are proved capable of carrying loads far in excess of normal practice.

	<p>90° CLIP: Standard load-bearing fitting, crossing tubes at right angles.</p>		<p>SWIVEL CLIP: Used on braces and similar members.</p>
<p>END-TO-END COUPLER: For butting tubes together.</p>		<p>PUT LOG CLIP: For light connections at right angles where there is no load.</p>	
	<p>BASE PLATE: Used at the base of columns to distribute the load.</p>		<p>BLADE-ENDED PUT LOG TUBE: For bricklayers' scaffolds.</p>

INDEPENDENT SCAFFOLD

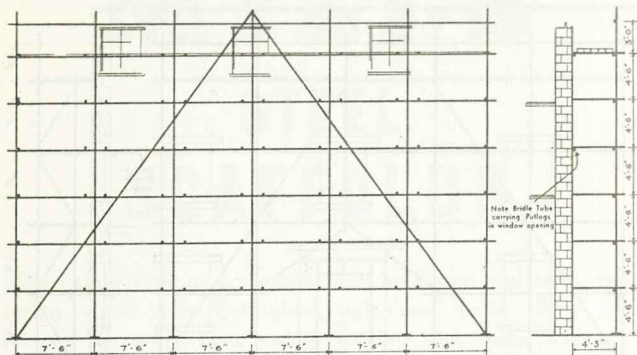


Sometimes called the double scaffold, since it incorporates two rows of uprights or standards, and is not dependent on the building itself in any way as a factor in the carrying of loads. For normal work the standards are placed in pairs 3' 3" apart (to provide a platform the width of four 9" scaffold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

INTERNAL SCAFFOLD

Such a scaffold may be used for access to the ceiling 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

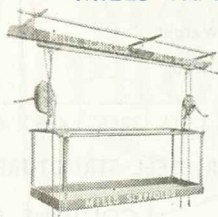


Sometimes called the single scaffold, as against the independent or double scaffold. In this construction, one end of the putlog is fixed between the courses of brickwork, the other end to the standard by 90° clip or else to the ledger by putlog clip. For normal work the standards are placed at intervals 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 UNITS

While steel scaffolding still retains the original use of any scaffolding, i.e., the provision of platforms or stages to give access to buildings or other structures above ground level, the variety of structures that can be erected with tube and Mills fittings is endless. Towers, mobile units, storage tanks, seating banks, grandstands, fun fair units, factory and farm buildings, loading stages, workshops, garages, jetties, and footbridges are only some of these special units.

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.

SERVICE

"Mills" will hire out material ex-stock, and if required will erect a job anywhere at shortest notice.

"Mills'" teams of trained scaffolders can handle the most difficult erection problems with speed and precision.

Literature illustrating the wide range of "Mills" equipment, with price lists and estimates, is available on request from MILLS SCAFFOLDS at any office of John Lysaght (Australia) Pty. Ltd.

ESTIMATING DATA

Approximate Quantities of Tube and Fittings required per 100 sq. feet of Wall Area to be Covered by Scaffolding

INDEPENDENT SCAFFOLDS

PUTLOG SCAFFOLDS

Width of bays	Height of Lifts			
	6' 0"		4' 6"	
	Tube	Fittings	Tube	Fittings
7' 6"	61'	11	72'	13
7' 0"	63'	12	74'	14
6' 0"	68'	13	79'	15

Width of bays	Height of Lifts							
	6' 6"		6' 0"		5' 0"		4' 6"	
	Tube	Fittings	Tube	Fittings	Tube	Fittings	Tube	Fittings
10' 0"	74'	14	77'	15	—	—	—	—
9' 0"	77'	15	80'	16	—	—	—	—
8' 0"	82'	17	86'	18	—	—	—	—
7' 6"	87'	18	92'	19	105'	23	112'	25
7' 0"	90'	19	95'	20	107'	24	115'	27
6' 0"	98'	21	104'	23	117'	28	125'	31
5' 0"	108'	25	115'	27	—	—	—	—

MILLS STEEL SCAFFOLDS

PARTICULARS OF STANDARD STEEL SCAFFOLD TUBE

Trade Name	Gauge	Thickness 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 lb.	Safe Dis-tributed Load evenly distributed lb.	Safe Concentrated Load at end of Cantilever lb.	Safe Dis-tributed Load on Cantilever lb.
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

Unsup-ported 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 limit of safety for general use.

Safe Load on "Mills" 90° or Swivel Clip, 2,800 lb.

MARSDEN PRODUCTS



Marsden Products Pty. Ltd. has established a reputation for quality in the manufacture of cane knives, cutting edges of all descriptions, hand tools, and circular saw plates. Their various products are made from the highest quality Australian Carbon Steels heat-treated under the supervision of the Lysaght Research Organisation.

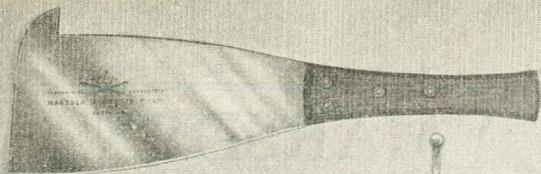
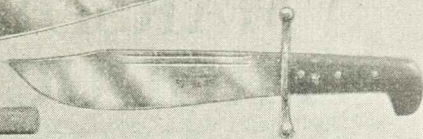
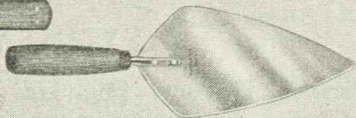
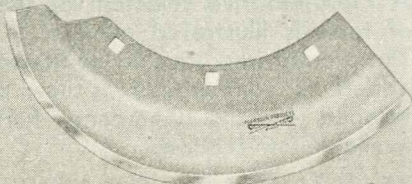
- CANE KNIVES
- COPRA KNIVES
- OYSTER KNIVES
- BUSH KNIVES
- MACHETTES
- BOOT KNIVES
- TROWELS
- PAINT SCRAPERS
- PLANE BLADES
- CHAFFCUTTER BLADES
- SPANNERS
- PANEL SAWS
- CIRCULAR SAW PLATES

A representative selection of the Marsden range of tools is illustrated overleaf.

The present imposing list of Marsden tools is being added to continuously as new products are developed by the Company. Further details are available on request.

MARSDEN PRODUCTS PTY. LTD.

33 MACQUARIE PLACE, SYDNEY



LYSAGHT ADVISORY SERVICES

In addition to the manufacture of high grade steel sheets to meet every conceivable building and manufacturing need, John Lysaght (Australia) Pty. Ltd. has established a number of Advisory Service Departments whose extensive technical skill and knowledge is gladly placed at the disposal of every user of the Company's products. These departments are fully staffed and equipped to advise on all technical problems arising out of the use of sheet steel for manufacturing purposes, and also to help the farmer and builder use corrugated galvanized iron building sheets to best advantage by supplying him with a comprehensive selection of data sheets covering a wide range of building projects.

The Service Department is located at the Company's head office, 33 Macquarie Place, Sydney, N.S.W., and technical representatives are maintained in all capital cities. Field representatives of this department are also available in certain country areas for "on the spot" consultations. Large laboratory staffs exist at each of the three N.S.W. works which, operating through a Central Controlling and Research Section, continually explore all avenues of obtaining superior quality steel sheets and investigate every manufacturing problem connected with the use of the Company's products.

If you are faced with specific problems associated with the use of sheet steel, do not hesitate to contact the Lysaght office nearest you, who will see that your request for help or information receives prompt attention.

(I) TECHNICAL SERVICE

It has frequently been found that an explanation of the exact technical nature of the various qualities of steel sheet produced by John Lysaght (Australia) Pty. Ltd. has resulted in a customer re-organising his manufacturing processes to utilise a different quality, sheet with a resultant increase in both efficiency and economy.

It is possible that similar results may follow a review of your basic requirements, and inquiries are cordially invited from all manufacturers—particularly those employing Lysaght Black Steel Sheets—on the best black sheets for working-up purposes, the best sheets for deep-drawing work, the best carbon steel for structural members and cutting edges, the best electrical steel for motor and transformer work, etc.

(2) COUNTRY SERVICE

Comprehensive service facilities are also available to the man on the land through the Lysaght Country Service. This department is responsible for the publication of a number of valuable data sheets and informative booklets designed to provide all the information necessary to construct the most suitable and most modern types of barns, dairies, silos, stables, etc. The full set of booklets includes the following:—

- Miscellaneous Farm Buildings.
- Silos.
- Shearing Sheds.
- Dairies.
- Poultry Sheds.
- Tanks and Tank Stands.
- Piggeries.

To secure any or all of these publications write to the Service Department, John Lysaght (Australia) Pty. Ltd., 33 Macquarie Place, Sydney, N.S.W., or contact the Lysaght office in your State.

(3) BUILDING SERVICE

Recent developments in methods of construction and materials have greatly influenced the design and construction of buildings generally. The ready adaption of zinc-coated sheets to an infinite number of constructional finishes, for example, has led to a wide increase in the demand for sheet steel. For the convenience of users, therefore, John Lysaght (Australia) Pty. Ltd. has instituted an Architectural Advisory Staff which has collated all relevant information under this heading. This information is readily available to all engaged in the building industry.

Problems also arise in new and improved methods of fixing and erection—particularly to new types of building materials—and the staff of this department is continually employed in practical research, the findings of which are always available to the interested inquirer. This department has contributed to much of the building data contained in the pages of the "Referee," and has recently published "Lysaght Building Information," a publication of considerable value to builders. To secure your copy, write to the Service Department, 33 Macquarie Place, Sydney, N.S.W.

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

NOTE.—For drill hole sizes see page 78.

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"	24-22-20	.116	32
	18	.128	30
	16	.136	29
	14	.140	28
	12	.149	25
No. 12 .215"	10-1/8	.152	24
	26-18	.144	27
	16	.152	24
	14	.157	22
	12	.161	20
No. 14 .246"	10-1/8	.169	18
	8	.173	17
	24-22-20	.166	19
	18	.169	18
	16	.177	16
No. 16 .271"	14	.182	14
	12	.185	13
	10-1/8	.196	9
	8	.201	7
	14	.204	6
No. 18 .296"	12	.209	4
	10-1/8	.228	1
	8-6-3/16	.234	15/64
	14	.241	3
	12	.244	2

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

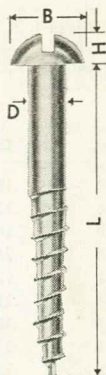
ASSURE
PERMANENT
ROOF FIXINGS

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

Available from all Merchants in 7 lb. packets
and 1 cwt. cases.



Galvanized Mushroom-head Bolts and Nuts

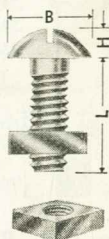
HEAD DIMENSIONS

Dia. of Head "B" = 2.25 dia. of Shank "D".
Depth of Head "H" = 3/4 of dia. of Shank "D".

Available in 1-gross packets.

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 7 lb. packets and 1/2 cwt. bags.
Number of gross per cwt.:

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

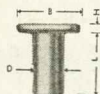
Sizes: 3/8" x 3/16" = 141 gross 9 doz. per cwt.

WASHER DIMENSIONS

(Weights shown are approx. weights per gross)

"D"	"H"	Gge.	Wgt.
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 "





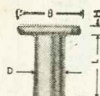
MILD
STEEL

COOPERS' RIVETS

Available in sizes No. 4 to 28.
In $\frac{1}{2}$ cwt. bags.

DIMENSIONS AND WEIGHTS

No.	"D"	"B"	"H"	"L"	Weight per approx. 1,000
4	.192	.384	.050	.290	4 lb.
6	.220	.440	.060	.320	6 "
8	.248	.496	.065	.385	8 "
10	.262	.524	.075	.405	10 "
12	.276	.552	.075	.455	12 "
14	.290	.580	.080	.470	14 "
16	.304	.608	.080	.500	16 "
18	.318	.636	.080	.520	18 "
20	.332	.664	.080	.550	20 "
22	.332	.664	.085	.575	22 "
24	.346	.692	.090	.570	24 "
26	.346	.692	.090	.635	26 "
28	.360	.720	.100	.640	28 "



MILD
STEEL

TINMEN'S RIVETS

Tinned or Black.
Available in sizes No. 4 to 20, in $\frac{1}{2}$ cwt. bags.

DIMENSIONS AND WEIGHTS

No.	"D"	"B"	"H"	"L"	Weight per approx. 1,000
4	.094	.188	.023	.180	10 oz.
6	.108	.216	.027	.199	14 "
8	.122	.244	.030	.230	1 $\frac{1}{4}$ lb.
9	.136	.272	.034	.246	1 $\frac{1}{2}$ "
10	.150	.300	.037	.271	2 "
11	.150	.300	.037	.297	2 $\frac{1}{2}$ "
12	.164	.328	.041	.319	3 "
13	.187	.374	.047	.338	4 "
14	.206	.412	.051	.359	5 "
16	.218	.436	.055	.445	7 "
18	.250	.500	.062	.502	10 "
20	.276	.552	.069	.563	14 "

REAPER RIVETS ROUND AND COUNTERSUNK HEAD

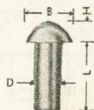
Available in sizes No. 5 and No. 6 Wire Gauge, $\frac{3}{8}$ " to $1\frac{1}{4}$ " long, in 7 lb. packets and $\frac{1}{2}$ cwt. bags.

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" equals 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 of diameter of Shank "D". Depth of Head "H" = .3 of diameter of Shank "D". Countersunk 90°.

"L" equals 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

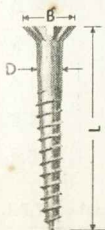


WOOD SCREWS

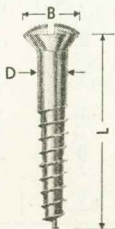
Nettlefold's Wood Screws are machine-turned to ensure perfect heads, concentricity of head with shank, freedom from burrs, and good appearance. Available in mild steel, brass, and other metals, and with Countersunk, Round, Raised or Special Heads.

HEAD TYPES AND DIMENSIONS

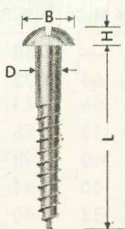
Countersunk Head



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".

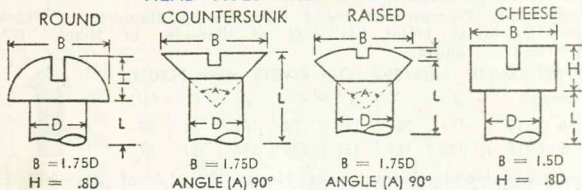
Raised Round or Countersunk

NOTE.—For decimal equivalents of screw gauges, see page 83.

MACHINE SCREWS

Obtainable in Mild Steel, Brass, or other metals, in Whitworth, B.S.F., B.A., and S.A.E. Threads.

HEAD TYPES AND DIMENSIONS



DECIMAL EQUIVALENTS AND THREADS PER INCH

Whitworth	Decimal	T.P.I.	B.A.	Decimal	T.P.I.
1/8"	.1250	40	10	.067	72.6
5/32"	.1563	32	9	.075	65.1
3/16"	.1875	24	8	.087	59.1
1/4"	.2500	20	7	.098	52.9
5/16"	.3125	18	6	.110	47.9
3/8"	.3750	16	5	.126	43.0
1/2"	.5000	12	4	.142	38.5
			3	.161	34.8
			2	.185	31.4
			1	.209	28.2
			0	.236	25.4
			B.S.F.	Decimal	T.P.I.
			1/4"	.2500	26
			5/16"	.3125	22
			3/8"	.3750	20

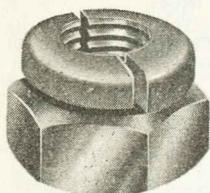
S.A.E.	Decimal	T.P.I.	
		A.N.C.	A.N.F.
0	.060	—	80
1	.073	64	72
2	.086	56	64
3	.099	48	56
4	.112	40	48
5	.125	40	44
6	.138	32	40
8	.164	32	36
10	.190	24	32
12	.216	24	28
1/4"	.250	20	28

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
			.063	20			.332
0	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	40			.612
		5/32	.15625			5/8	.625
	8		.160			11/16	.6875
8			.164			3/4	.750
		11/64	.171875			13/16	.8125
	7		.176			7/8	.875
9			.178			15/16	.9375

AEROTIGHT SELF-LOCKING NUTS



Designed for use on:—

Steel Buildings
Farm and all types of
machinery
Automobiles
Aircraft
Earth-moving Equipment
and in all cases where vibration
causes the ordinary type of nut
to work loose and fall off.

The nut is an all-metal one-piece nut, and is not dependent on any form of auxiliary fastening device. The self-retaining feature of the nut is obtained by frictional grip created between the threads of the bolt and nut.

Fit G.K.N. Aerotight Lock Nuts whenever VIBRATION is encountered, and solve this problem once and for all.

NETTLEFOLDS STOCKS include:—

Sheet Metal Screws and Drive Screws, Roofing Screws
Mushroom-head Bolts and Nuts, Tank Rivets and Washers
Tinmen's Rivets, Copper Rivets and Washers, Coopers' Rivets

M.S. Rivets, all types of heads

Metal Thread Screws

Wood Screws, Slotted and Recessed Heads

Screwdrivers and Bits for Phillips Recessed Screws

Cotter Pins, Gate Hooks, Cup Hooks,

Screw Eyes, Screw Hooks

Cycle Spoke Nipples and Washers

Sporting Spikes

Pressed Nuts, Strip Nuts and Cages, etc.

NETTLEFOLDS BRIGHT BOLT AND NUT DIVISION
manufacture

Bright Steel Machine Bolts and Nuts, Set Screws,
Bright Steel Nuts

NETTLEFOLDS PTY. LTD., 189 Botany Rd., Waterloo, N.S.W.

NETTLEFOLDS PTY. LTD.

BALLARAT ROAD, SUNSHINE, W.20, VICTORIA

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		320 Rods	
		1760 Yards	

NAUTICAL

6 Feet	= 1 Fathom	6080 Feet	= 1 Nautical Mile
120 Fathoms	= 1 Cable length	3 Nautical Miles	= 1 League
20 Leagues	= 1 Degree of Latitude	= 60 Nautical Miles	
360 Degrees	= The earth's circumference	= 21,600 Nautical Miles	

SQUARE

Square Inches	Square Feet	Square Yards	Square Rods	Square Roods	Acres	
144	1	—	—	—	—	1 Sq. Ft.
1,296	9	1	—	—	—	1 Sq. Yd.
39,204	272¼	30¼	1	—	—	1 Sq. Rod
1,568,160	10,890	1,210	40	1	—	1 Rood
6,272,640	43,560	4,840	160	4	1	1 Acre
4,014,489,600	27,878,400	3,097,600	102,400	2,560	640	1 Sq. Mile

CUBIC

Cubic Inches	Cubic Feet	Cord Feet	Cord	Perch	
1,728	1	—	—	—	1 Cu. Foot
46,656	27	—	—	—	1 Cu. Yard
27,648	16	1	—	—	1 Cord Foot
221,184	128	8	1	—	1 Cord of Wood
42,768	24¾	—	—	1	1 Perch of Stone
69,120	40	—	—	—	1 Ton Ship Cargo

CAPACITY

4 Gills	= 1 Pint	4 Pecks	= 1 Bushel
2 Pint	= 1 Quart	8 Bushels	= 1 Quarter
4 Quarts	= 1 Gallon	5 Quarters	= 1 Load
2 Gallons	= 1 Peck		

TROY

24 Grains	= 1 Pennyweight (dwt.)	12 Ounces	= 1 Pound
20 Pennyweights	= 1 Ounce		

APOTHECARY

20 Grains (gr.)	= 1 Scruple	8 Drams	= 1 Ounce
3 Scruples	= 1 Dram	12 Ounces	= 1 Pound

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.)

TIME

60 Seconds	=	1 Minute	28 Days	=	1 Lunar month
60 Minutes	=	1 Hour	52 Weeks	=	1 Year
24 Hours	=	1 Day	12 Cal. Mths.	=	1 Year
7 Days	=	1 Week	365 Days	=	1 Year
1 Leap Year = 366 Days, and occurs every fourth year. The year number is divisible by 4.					
1 Tropical Year = 365 Days, 5 Hrs., 48 Mins., 46 Secs.					
1 Sidereal Day = 23 Hrs., 56 Mins., 4 Secs.					

MISCELLANEOUS

100 Mils	=	1 Inch	196 lbs.	=	1 Barrel of flour
12 Lines	=	1 Inch	200 lbs.	=	1 Barrel beef, pork or fish
2 $\frac{1}{4}$ Inches	=	1 Nail	56 lbs.	=	1 Firkin of butter
3 Inches	=	1 Palm	14 lbs.	=	1 Stone, avoirdupois
4 Inches	=	1 Hand	21 $\frac{1}{2}$ Stone	=	1 Pig of iron
9 Inches	=	1 Span	8 Pigs	=	1 Fother
18 Inches	=	1 Cubit	28 lbs. of wool	=	1 Tod
3 Feet	=	1 Common pace	2 Weyes (364lb.)	=	1 Sack wool
12 Units	=	1 Dozen	12 Sacks (4,368lb.)	=	1 Last
12 Dozens	=	1 Gross	English shipping	=	40 Cubic ft. ton
12 Gross	=	1 Great Gross	Register Ton	=	100 Cubic ft.
20 Things	=	1 Score			

METRIC SYSTEM

LENGTH

10 Millimetres	=	1 Centimetre	10 Metres	=	1 Decametre
10 Centimetres	=	1 Decimetre	10 Decametres	=	1 Hectometre
10 Decimetres	=	1 Metre	10 Hectometres	=	1 Kilometre

SQUARE

100 Sq. mms.	=	1 Sq. cm.	100 Sq. Dm.	=	1 Sq. Hm.
100 Sq. cms.	=	1 Sq. dm.	10,000 Sq. m.	=	1 Hectare
100 Sq. dms.	=	1 Sq. m.	100 Sq. Hm.	=	1 Sq. Km.
100 Sq. m.	=	1 Sq. Dm.			

APPROXIMATE EQUIVALENTS

1 Millimetre	=	1/25th of inch	1 Kilogramme	=	2 $\frac{1}{2}$ lbs.
2 $\frac{1}{2}$ Centimetres	=	1 Inch	1,000 Kilogrammes	=	1 Ton
1 Metre	=	39 $\frac{3}{8}$ Inches	6 $\frac{1}{2}$ sq. Centimetres	=	1 Sq. inch
1 Kilometre	=	5 Furlongs ($\frac{5}{8}$ m.)	1 sq. Metre	=	10 $\frac{1}{4}$ sq. ft.

(See Conversion Table, page 87)

GENERAL CONVERSION TABLE

Multiply by	To convert	To	
2.54	Inches	Centimetres	.3937
30.48	Feet	"	.0328
.914	Yards	Metres	1.094
1,609.3	Miles	"	.000621
1,853.27	Nautical Miles	"	.000539
6.45	Square inches	Sq. cms.	.155
.093	Square feet	Sq. Metres	10.764
.836	Square yards	"	1.196
16.39	Cubic inches	Cubic cms.	.061
28.3	Cubic feet	Litres	.0353
6.24	"	Gallons	.1602
.765	Cubic yards	Cub. Metres	1.308
.3732	Pounds (Troy)	Kilogrammes	2.68
31.10	Ounces (Troy)	Grammes	.03216
.4536	Pounds (Avoir.)	Kilogrammes	2.2045
700	"	Grains (Troy)	.000143
28.35	Ounces (Avoir.)	Grammes	.0352
.065	Grains	"	15.38
50.8	Cwt.	Kilogrammes	.01968
1,016.0	Tons	"	.000984
4.546	Gallons	Litres	.22
10	Gallons of water	Pounds	.1
.454	Pounds of water	Litres	.2202
70.3	Lb. per sq. in.	Gm./sq. cm.	.0142
2.3	"	Head of water (ft.)	.434
0.7	"	" (M.)	1.4285
.068	"	Atmospheres	14.7
1.575	Tons per sq. in.	Kgm./sq. mm.	.635
4.883	Lb. per sq. ft.	Kgm./sq. metre	.205
.593	Lb. per cub. yd.	Kgm./cub. metre	1.686
16.02	Lb. per cub. ft.	"	.0624
.0998	Lb. per gallon	Kgm./litre	10.02
.138	Foot-lb.	K'grammetres	7.23
.33	Foot-tons	Tonne-metres	3
1.014	Horse-power	Force de cheval	.9861
746	"	Watts	.00134
22,000	"	Ft.-lb./min.	—
76	"	Kg.-m./sec.	.0131
44	Watts	Ft.-lb./min.	.0227
0.1	"	Kg.-m./sec.	10
0.252	Heat units	Calories	3.97
14.7	Atmospheres	Lb./sq. in.	.068
0.90	German candles	English candles	1.1111
9.55	Carcels	Candles	.1047
.737	Joules	Ft.-lb.	1.357
88	Miles/hour	Ft./min.	.01134
197	Metres/sec.	"	.00508
1.8	C.H.U.	B.Th.U.	.5555
0.208	Centipoise	Lb. force sec./sq. ft.	4.8
	To obtain	From	Multiply by above

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 (circumscribe 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 + diameter²).

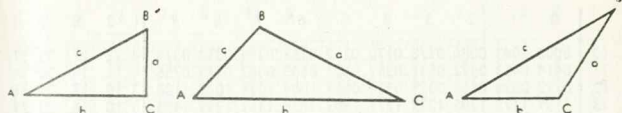
ANY PRISM OR CYLINDER.—Volume = $h \times$ area of base. Lateral surface area = length of cylinder $\times$ perimeter of normal sector.

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.

Solution of Plane Triangles by Trigonometry

**RIGHT TRIANGLES** where C is 90° —fig. 1.

$$c^2 = a^2 + b^2$$

$$\sin A = \cos B = \frac{a}{c}$$

$$\cos A = \sin B = \frac{b}{c}$$

$$\tan A = \cot B = \frac{a}{b}$$

OBLIQUE TRIANGLES: $A + B + C = 180^\circ$ —fig. 2 or 3.

Law of Sines:

$$1. \frac{a}{\sin A} = \frac{b}{\sin B}$$

$$2. \frac{a}{\sin A} = \frac{c}{\sin C}$$

$$3. \frac{b}{\sin B} = \frac{c}{\sin C}$$

Law of Cosines:

$$4. a^2 = b^2 + c^2 - 2bc \cos A.$$

$$12. \cos \frac{C}{2} = \sqrt{\frac{s(s-c)}{ab}}$$

$$5. b^2 = a^2 + c^2 - 2ac \cos B.$$

$$6. c^2 = a^2 + b^2 - 2ab \cos C.$$

$$13. \tan \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$$

$$7. \sin \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}$$

$$14. \tan \frac{B}{2} = \sqrt{\frac{(s-a)(s-c)}{s(s-b)}}$$

$$8. \sin \frac{B}{2} = \sqrt{\frac{(s-c)(s-a)}{ca}}$$

$$15. \tan \frac{C}{2} = \sqrt{\frac{(s-a)(s-b)}{s(s-c)}}$$

$$9. \sin \frac{C}{2} = \sqrt{\frac{(s-a)(s-b)}{ab}}$$

$$16. \frac{a+b}{a-b} = \frac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)}$$

$$10. \cos \frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}}$$

$$17. \frac{b+c}{b-c} = \frac{\tan \frac{1}{2}(B+C)}{\tan \frac{1}{2}(B-C)}$$

$$11. \cos \frac{B}{2} = \sqrt{\frac{s(s-b)}{ac}}$$

$$18. \frac{a+c}{a-c} = \frac{\tan \frac{1}{2}(A+C)}{\tan \frac{1}{2}(A-C)}$$

In formulæ (7) to (15) $a + b + c = 2s$. The area is represented by K .

$$2K = bc \sin A = ac \sin B = ab \sin C, K = \sqrt{s(s-a)(s-b)(s-c)}$$

$$2K = \frac{a^2 \sin B \sin C}{\sin A} = \frac{b^2 \sin A \sin C}{\sin B} = \frac{c^2 \sin A \sin B}{\sin C}$$

To solve an oblique triangle, select those formulæ which contain the known parts and one of the unknown parts.

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	7780	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.

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

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	.629	$4\frac{1}{2}$	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

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	153.0	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	99.79
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

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	-23.9	70	21.1	114	45.6	158	70	202	94.4
-10	-28.3	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		

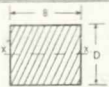
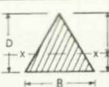
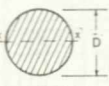
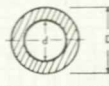
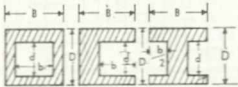
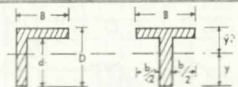
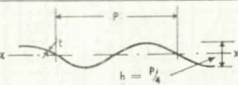
C. to F.
Multiply by 9, divide by 5, add 32.

F. to C.
Subtract 32, multiply by 5, divide by 9.

Properties of Sections

I = Moment of Inertia.

Z = Modulus of Section.

	$I_{xx} = \frac{B D^3}{12}$ $Z_{xx'} = \frac{B D^2}{6}$		$I_{xx} = \frac{B D^3}{36}$ $Z_{xx} = \frac{B D^2}{24}$
	$I = \frac{\pi D^4}{64} = .049 D^4$ $Z = \frac{\pi D^3}{32} = .078 D^3$		$I_{xx} = \frac{\pi (D^4 - d^4)}{64}$ $Z_{xx} = \frac{\pi (D^4 - d^4)}{32 D}$
	$I_{xx} = \frac{(B D^3 - b d^3)}{12}$ $Z_{xx} = \frac{(B D^3 - b d^3)}{6 D}$		
	$A = B D - b d$ $y = \frac{B D^2 - b d^2}{2 A}$ $I_{xx} = \frac{B D^3 - b d^3}{3} - A y^2$		
	$A = \text{Area}$ $y = D - y$ $Z = I/y$ $\text{For one pitch } P \text{ where } h = \frac{P}{4}$ $I = \frac{P^3 t}{106}$ $Z = \frac{P^2 t}{13.2}$		

Strength of Corrugated Sheets

In calculations involving corrugated Galvanized or Zincanneal sheets, use the values of thickness for uncoated sheet as given by the Birmingham Gauge Table, with the exception of 26G. For 26G—thickness is .0162.

t = Thickness of sheet in inches.

P = Pitch of corrugations, e.g., 5", 3", 1".

S = Safe pressure lb. per sq. inch distributed load.

L = Unsupported length of sheet in inches, simply supported beam.

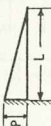
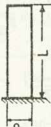
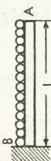
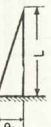
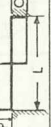
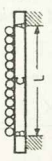
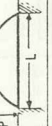
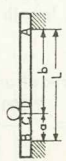
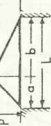
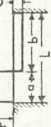
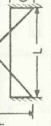
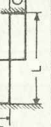
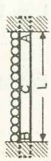
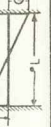
$$S = 9,000 \text{ Pt}/L^2.$$

Example: 3" corrugations, 22G sheet—t = 1/32", P = 3".

$$S = \frac{9,000 \times 3}{32 \times L^2} = \frac{845}{L^2} \text{ lb./sq. in.}$$

26G Red Orb sheets have the same strength as 24G Blue Orb.

BEAM LOADING

Method of Loading	Location of Maximum		Bending Moment		Shearing Forces		Maximum Deflection
	Bending	Deflection	Maximum	Diagram	Maximum	Diagram	
	B	A	$P = WL$		$P = W$		$\frac{WL^3}{3EI}$
	B	A	$P = \frac{WL}{2}$		$P = W$		$\frac{WL^3}{8EI}$
	C	C	$P = \frac{WL}{4}$		$P = \frac{W}{2}$ $Q = \frac{W}{2}$		$\frac{WL^3}{48EI}$
	C	C	$P = \frac{WL}{8}$		$P = \frac{W}{2}$ $Q = \frac{W}{2}$		$\frac{5WL^3}{384EI}$
	C	D not max. at C	$P = \frac{Wab}{L}$		$P = \frac{Wb}{L}$ $Q = \frac{W_0}{L}$		$\frac{W_0ab}{9EI} \sqrt{\frac{b(2L-b)}{3}}$
	at A and C	C	$P = \frac{WL}{4}$ $Q = \frac{WL}{8}$		$P = \frac{W}{2}$ $Q = \frac{W}{2}$		$\frac{WL^3}{192EI}$
	A or B	C	$P = \frac{WL}{8}$ $Q = \frac{WL}{12}$		$P = \frac{W}{2}$ $Q = \frac{W}{2}$		$\frac{WL^3}{384EI}$

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
1 1/2	.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
2 1/2	.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
3 1/2	.691 .741 .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
4 1/2	.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 10.07 10.63	9.93 10.52 11.10 11.69	10.84 11.48 12.11 12.75
5 1/2	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 4.838 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
6 1/2												

STEEL DATA

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

WEIGHTS OF STEEL PLATES

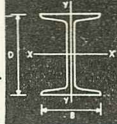
POUNDS PER LINEAL FOOT

Width Ins.	Thickness in Inches							
	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
12	22.95	25.50	28.05	30.60	33.15	35.70	38.25	40.80
13	24.86	27.63	30.4	33.2	35.9	38.7	41.4	44.2
14	26.78	29.75	32.7	35.7	38.7	41.7	44.6	47.6
15	28.69	31.88	35.1	38.3	41.4	44.6	47.8	51.0
16	30.60	34.00	37.4	40.8	44.2	47.6	51.0	54.4
17	32.51	36.13	39.7	43.4	47.0	50.6	54.2	57.8
18	34.43	38.25	42.1	45.9	49.7	53.6	57.4	61.2
19	36.34	40.38	44.4	48.5	52.5	56.5	60.6	64.6
20	38.25	42.50	46.8	51.0	55.3	59.5	63.8	68.0
21	40.16	44.63	49.1	53.6	58.0	62.5	66.9	71.4
22	42.08	46.75	51.4	56.1	60.8	65.5	70.1	74.8
23	43.99	48.88	53.8	58.7	63.5	68.4	73.3	78.2
24	45.90	51.00	56.1	61.2	66.3	71.4	76.5	81.6
26	49.73	55.25	60.8	66.3	71.8	77.4	82.9	88.4
28	53.55	59.50	65.5	71.4	77.4	83.3	89.3	95.2
30	57.38	63.75	70.1	76.5	82.9	89.3	95.6	102.0
32	61.20	68.00	74.8	81.6	88.4	95.2	102.0	108.8
34	65.03	72.25	79.5	86.7	93.9	101.2	108.4	115.6
36	68.85	76.50	84.2	91.8	99.5	107.1	114.8	122.4
38	72.68	80.75	88.8	96.9	105.0	113.1	121.1	129.2
40	76.50	85.00	93.5	102.0	110.5	119.0	127.5	136.0
42	80.33	89.25	98.2	107.1	116.0	125.0	133.9	142.8
44	84.15	93.50	102.9	112.2	121.6	130.9	140.3	149.6
46	87.98	97.75	107.5	117.3	127.1	136.9	146.6	156.4
48	91.80	102.0	112.2	122.4	132.6	142.8	153.0	163.2
50	95.6	106.3	116.9	127.5	138.1	148.8	159.4	170.0
52	99.5	110.5	121.6	132.6	143.7	154.7	165.8	176.8
54	103.3	114.8	126.2	137.7	149.2	160.7	172.1	183.6
56	107.1	119.0	130.9	142.8	154.7	166.6	178.5	190.4
58	110.9	123.3	135.6	147.9	160.2	172.6	184.9	197.2
60	114.8	127.5	140.3	153.0	165.8	178.5	191.3	204.0
62	118.6	131.8	144.9	158.1	171.3	184.5	197.6	210.8
64	122.4	136.0	149.6	163.2	176.8	190.4	204.0	217.6
66	126.2	140.3	154.3	168.3	182.3	196.4	210.4	224.4
68	130.1	144.5	159.0	173.4	187.9	202.3	216.8	231.2
70	133.9	148.8	163.6	178.5	193.4	208.3	223.1	238.0
72	137.7	153.0	168.3	183.6	198.9	214.2	229.5	244.8
74	141.5	157.3	173.0	188.7	204.4	220.2	235.9	251.6
76	145.4	161.5	177.7	193.8	210.0	226.1	242.3	258.4
78	149.2	165.8	182.3	198.9	215.5	232.1	248.6	265.2
80	153.0	170.0	187.0	204.0	221.0	238.0	255.0	272.0
82	156.8	174.3	191.7	209.1	226.5	244.0	261.4	278.8
84	160.7	178.5	196.4	214.2	232.1	249.9	267.8	285.6

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
1 7/8	8.978	7.051	2.6406	2.0739	5.1051
2	10.41	8.178	3.0625	2.4053	5.4978
2 1/8	11.95	9.388	3.5156	2.7612	5.8905
2 1/4	13.60	10.68	4.0000	3.1416	6.2832
2 1/2	15.35	12.06	4.5156	3.5466	6.6759
2 3/4	17.21	13.52	5.0625	3.9761	7.0686
2 7/8	19.18	15.06	5.6406	4.4301	7.4613
3	21.25	16.69	6.2500	4.9087	7.8540
3 1/8	23.43	18.40	6.8906	5.4119	8.2467
3 1/4	25.71	20.19	7.5625	5.9396	8.6394
3 1/2	28.10	22.07	8.2656	6.4918	9.0321
3 3/4	30.60	24.03	9.0000	7.0686	9.4248
4	35.92	28.21	10.563	8.2958	10.210
4 1/8	41.65	32.71	12.250	9.6211	10.996
4 1/4	47.82	37.55	14.063	11.045	11.781
4 1/2	54.40	42.73	16.000	12.566	12.566
4 3/4	61.41	48.24	18.063	14.186	13.352
5	68.85	54.07	20.250	15.904	14.137
5 1/8	76.71	60.25	22.563	17.721	14.923
5 1/4	85.00	66.76	25.000	19.635	15.708
5 1/2	102.9	80.78	30.250	23.758	17.279
6	122.4	96.13	36.000	28.274	18.850

One cubic foot of steel weighs 489.6 lb.



AUSTRALIAN STANDARD "I" BEAMS PROPERTIES

Reference Marks	Size ins. D x B	Wgt. per ft. lb.	Sect. Area sq. in.	Moment of Inertia		Modulus of Section	
				About XX	About YY	About XX	About YY
	24 x 7½	100	29.4	2581	63.55	215.1	16.68
ASB24	24 x 7½	95	27.9	2533	62.54	211.1	16.68
NBSB18	24 x 7½	90	26.5	2443	60.44	203.6	16.12
ASB22	22 x 7	75	22.1	1677	41.07	152.4	11.73
ASB21	20 x 6½	65	19.1	1226	32.56	122.6	10.02
ASB20	18 x 6	55	16.2	842	23.64	93.5	7.88
ASB19	16 x 8	75	22.1	973	68.30	121.7	17.08
ASB18	16 x 6	50	14.7	618	22.47	77.3	7.49
ASB17	15 x 6	45	13.2	492	19.87	65.6	6.62
ASB16	14 x 5½	40	11.8	377	14.79	53.9	5.38
ASB15	13 x 5	35	10.3	283	10.82	43.6	4.33
ASB14	12 x 8	65	19.1	488	65.18	81.3	16.30
ASB13	12 x 5	30	8.8	207	8.77	34.5	3.51
ASB12a	10 x 8	70	20.6	345	71.61	69.0	17.90
ASB12	10 x 8	55	16.2	289	54.74	57.7	13.69
ASB11	10 x 6	40	11.8	205	21.76	41.0	7.25
ASB10	10 x 4½	25	7.4	122	6.49	24.5	2.88
NBSHB5	9 x 7	50	14.7	208	40.17	46.3	11.48
ASB9	9 x 4	21	6.2	81	4.15	18.0	2.07
ASB8	8 x 6	35	10.3	115	19.54	28.8	6.51
ASB7	8 x 4	18	5.30	55.6	3.506	13.91	1.753
ASB6	7 x 3½	15	4.42	35.9	2.408	10.26	1.376
ASB5	6 x 5	25	7.35	45.2	9.876	15.05	3.951
ASB4	6 x 3	12	3.53	20.99	1.461	7.00	.974
NBSB4	5 x 2½	9	2.65	10.91	.789	4.36	.631
ASB2	4 x 3	10	2.94	7.79	1.326	3.89	.884
NBSB2	4 x 1¾	5	1.47	3.66	.186	1.80	.210
	3 x 2½	5.7	1.69	2.55	.418	1.70	.358

STEEL DATA

ALLOWABLE STRESSES IN STEEL

Allowable Stress, lbs./sq. in.	Tensile	Bending	Shearing	Bearing
Structural Steel ..	18,000	18,000	12,000	—
Shop Rivets and Pins ..	9,000	—	13,500	24,000
Field Rivets and Pins ..	—	—	12,000	20,000
Cast Iron ..	2,500	3,000	1,500	12,000

Compressive Strength:

$$S = 18,000 - \frac{70L}{R}, \text{ max. value of } S = 16,000 \text{ lb./sq. in.}$$

Lysaght Steel Sheets	Sunstar	Deep Drawing	C30	C60, C80
Ultimate Tensile tons/sq. in. ..	20-25	20-22	30-40	50-60
Yield Point ..	14-18	12-14	20-28	30-40
% Elongation on 2 inches ..	20-25	36-44	10-15	10-15

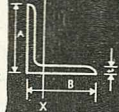
ROLLED STEEL "I" BEAMS AS GIRDERS

SAFE DISTRIBUTED LOAD IN TONS, ABOUT AXIS XX

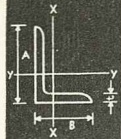
Size Ins.		SPAN IN FEET.																Size Ins.	
		4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	36	40	
24 x 7½*	100	165.0	143.6	114.7	95.6	81.9	71.7	63.7	57.4	52.1	47.8	44.1	41.0	38.2	35.8	31.9	28.7	24 x 7½*	
24 x 7½	95	146.6	141.0	112.8	94.0	80.6	70.5	62.7	56.4	51.3	47.0	43.4	40.3	37.6	35.3	31.4	28.2	24 x 7½	
24 x 7½	90		133.8	108.9	90.5	77.5	67.8	60.3	54.3	49.4	45.2	41.7	38.7	36.2	33.9	30.1	27.1	24 x 7½	
22 x 7	75	118.0	102.0	81.6	68.0	58.3	51.0	45.3	40.8	37.1	34.0	31.4	29.2	27.2	25.5	22.7	20.4	22 x 7	
20 x 6½	65	96.4	81.7	65.4	54.5	46.7	40.8	36.3	32.7	29.7	27.2	25.1	23.3	21.8	20.4	18.2	16.3	20 x 6½	
18 x 6	55	81.0	62.4	49.9	41.6	35.6	31.2	27.6	24.9	22.7	20.8	19.2	17.8	16.6	15.6	13.8	12.4	18 x 6	
16 x 8†	75		82.4	81.3	65.1	54.2	46.5	40.6	36.1	32.5	29.6	27.1	25.0	23.2	21.7	20.3	18.1	16 x 8†	
16 x 6	50	68.6	68.7	51.5	41.2	34.3	29.4	25.7	22.8	20.6	18.7	17.2	15.8	14.7	13.7	12.9	11.4	10.3	
15 x 6	45	61.0	58.4	43.7	35.0	29.1	25.0	21.8	19.4	17.4	16.0	14.5	13.4	12.5	11.6	10.9	9.7	8.7	
14 x 5½	40	55.6	47.7	35.9	28.6	23.9	20.5	17.9	15.9	14.3	13.0	11.9	11.0	10.2	9.5	8.9	7.9	7.1	
13 x 5	35	48.8	38.7	29.1	23.3	19.3	16.6	14.5	12.9	11.6	10.5	9.6	8.9	8.3	7.8	7.2	6.4	5.8	
12 x 8	65	55.2	54.2	43.4	36.1	30.9	27.1	24.1	21.7	19.7	18.1	16.7	15.5	14.6	13.5	12.0	10.9	12 x 8	
12 x 5	30	42.4	30.6	22.9	18.4	15.3	13.1	11.5	10.2	9.2	8.3	7.7	7.1	6.5	6.1	5.7	5.1	4.6	
10 x 8	70	64.2	61.5	46.2	36.9	30.8	26.4	23.1	20.5	18.5	15.8	15.4	14.2	13.2	12.3	11.5	10.8	10 x 8	
10 x 8	55	42.8	42.8	38.5	30.8	25.6	21.9	19.2	17.1	15.4	14.0	12.8	11.8	10.9	10.2	9.6	10 x 8	10 x 8	
10 x 6	40	38.6	36.5	27.4	21.9	18.3	15.6	13.7	12.2	10.9	10.0	9.1	8.4	7.8	7.3	6.9	10 x 6	10 x 6	
10 x 4½	25	32.5	21.7	16.3	13.0	10.9	9.3	8.1	7.2	6.5	6.0	5.4	5.0	4.6	4.3	4.1	10 x 4½	10 x 4½	
9 x 7	50	38.6	38.6	30.9	24.7	20.6	17.6	15.4	13.7	12.4	11.2	10.3	9.5	8.8	8.2		9 x 7	9 x 7	
9 x 4	21	24.0	16.0	12.0	9.6	8.0	6.8	6.0	5.3	4.8	4.3	4.0	3.7	3.4			9 x 4	9 x 4	
8 x 6	35	30.0	25.5	19.2	15.3	12.8	10.9	9.6	8.5	7.7	6.9	6.4	5.9	5.5			8 x 6	8 x 6	
8 x 4	18	18.5	12.4	9.3	7.4	6.2	5.3	4.6	4.1	3.7	3.4	3.1	2.8	2.6			8 x 4	8 x 4	
7 x 3½	15	13.7	9.1	6.8	5.5	4.6	3.9	3.4	3.0	2.7	2.5	2.3	2.1				7 x 3½	7 x 3½	
6 x 5	25	20.0	13.4	10.0	8.0	6.7	5.7	5.0	4.5	4.0	3.6						6 x 5	6 x 5	
6 x 3	12	9.3	6.2	4.7	3.7	3.1	2.7	2.3	2.1	1.9							6 x 3	6 x 3	
5 x 2½	9	5.8	3.9	2.9	2.3	1.9	1.6	1.4									5 x 2½	5 x 2½	
4 x 3	10	5.2	3.5	2.6	2.1	1.7	1.5	1.3									4 x 3	4 x 3	
4 x 1½	5	2.4	1.6	1.2	1.0	.8	.7	.6									4 x 1½	4 x 1½	

*Nominal size. Width about 7½in. †Not at present available.
Girders to have usual side supports as in building work.

Equal Angles Properties



Reference Marks	Size A x B x t inches	Weight per ft. lb.	Sect. Area sq. in.	M. of I. about XX	Modulus of Sect. about XX	Reference Marks	Size A x B x t inches	Weight per ft. lb.	Sect. Area sq. in.	M. of I. about XX	Modulus of Sect. about XX
ASEA 18	8 x 8 x 5/8	32.68	9.61	58.26	10.05	ASEA 8	2 1/2 x 2 1/2 x 3/16	3.10	0.92	0.53	0.27
" 18	8 x 8 x 3/4	38.89	11.44	68.58	11.94	" 4	2 1/2 x 2 1/2 x 1/4	4.04	1.19	0.68	0.38
" 18	8 x 8 x 7/8	45.00	13.24	78.44	13.77	" 4	2 1/2 x 2 1/2 x 5/16	4.98	1.46	0.83	0.47
" 18	8 x 8 x 1	51.01	15.00	87.85	15.55	" 5	2 1/2 x 2 1/2 x 3/8	5.90	1.73	0.96	0.55
" 18	8 x 8 x 1	51.01	15.00	87.85	15.55	" 5	2 1/2 x 2 1/2 x 1/2	7.65	2.25	1.21	0.71
ASEA 18	6 x 6 x 3/8	14.82	4.36	14.95	3.40	ASEA 5	2 1/2 x 2 1/2 x 3/16	2.77	0.81	0.39	0.23
" 14	6 x 6 x 7/16	17.19	5.05	17.22	3.95	ASEA 7	2 1/2 x 2 1/2 x 1/4	3.61	1.06	0.49	0.30
" 15	6 x 6 x 1/2	19.55	5.75	19.48	4.49	NBSEA 7	2 1/2 x 2 1/2 x 5/16	4.45	1.31	0.59	0.37
" 15	6 x 6 x 9/16	21.86	6.43	21.60	5.01	" 7	2 1/2 x 2 1/2 x 3/8	5.26	1.55	0.69	0.44
" 16	6 x 6 x 5/8	24.17	7.11	23.73	5.54	" 7	2 1/2 x 2 1/2 x 3/8	5.26	1.55	0.69	0.44
" 17	6 x 6 x 3/4	28.69	8.44	27.74	6.54	" 7	2 1/2 x 2 1/2 x 3/8	5.26	1.55	0.69	0.44
" 17	6 x 6 x 7/8	33.04	9.72	31.40	7.50	NBSEA 7	2 x 2 x 1/8	1.67	0.49	0.18	0.12
" 17	6 x 6 x 1	37.40	11.00	35.06	8.45	" 7	2 x 2 x 3/16	2.43	0.72	0.26	0.18
ASEA 17	5 x 5 x 5/16	10.30	3.03	7.20	1.97	ASEA 3	2 x 2 x 1/4	3.19	0.94	0.34	0.24
" 17	5 x 5 x 3/8	12.28	3.61	8.53	2.35	" 3	2 x 2 x 5/16	3.92	1.15	0.41	0.29
" 13	5 x 5 x 1/2	16.16	4.75	11.04	3.08	" 3	2 x 2 x 3/8	4.62	1.36	0.47	0.34
" 14	5 x 5 x 5/8	19.93	5.86	13.37	3.78	" 3	2 x 2 x 3/8	4.62	1.36	0.47	0.34
" 14	5 x 5 x 3/4	23.59	6.94	15.54	4.46	ASEA 3	1 1/2 x 1 1/2 x 1/8	1.46	0.43	0.12	0.09
ASEA 14	4 x 4 x 5/16	8.17	2.40	3.61	1.24	NBSEA 5	1 1/2 x 1 1/2 x 3/16	2.11	0.62	0.17	0.14
" 11	4 x 4 x 3/8	9.72	2.86	4.26	1.48	" 5	1 1/2 x 1 1/2 x 1/4	2.76	0.81	0.22	0.18
" 12	4 x 4 x 1/2	12.75	3.75	5.46	1.93	" 5	1 1/2 x 1 1/2 x 5/16	3.39	1.00	0.26	0.22
" 12	4 x 4 x 5/8	15.67	4.61	6.56	2.36	" 5	1 1/2 x 1 1/2 x 3/8	4.02	1.18	0.31	0.26
ASEA 12	3 1/2 x 3 1/2 x 1/4	5.74	1.70	1.96	0.76	NBSEA 5	1 1/2 x 1 1/2 x 1/8	1.23	0.36	0.07	0.07
" 12	3 1/2 x 3 1/2 x 5/16	7.11	2.09	2.38	0.94	" 5	1 1/2 x 1 1/2 x 3/16	1.79	0.53	0.11	0.10
" 9	3 1/2 x 3 1/2 x 3/8	8.45	2.48	2.80	1.12	ASEA 2	1 1/2 x 1 1/2 x 1/4	2.34	0.69	0.13	0.13
" 10	3 1/2 x 3 1/2 x 1/2	11.05	3.25	3.57	1.46	" 2	1 1/2 x 1 1/2 x 5/16	2.85	0.84	0.16	0.16
" 10	3 1/2 x 3 1/2 x 5/8	13.55	3.98	4.27	1.77	" 2	1 1/2 x 1 1/2 x 5/16	2.85	0.84	0.16	0.16
ASEA 10	3 x 3 x 3/16	3.73	1.10	0.93	0.42	NBSEA 3	1 1/2 x 1 1/2 x 1/8	1.02	0.30	0.04	0.05
" 6	3 x 3 x 1/4	4.89	1.44	1.20	0.55	" 3	1 1/2 x 1 1/2 x 3/16	1.48	0.43	0.06	0.07
" 6	3 x 3 x 5/16	6.05	1.78	1.47	0.68	" 3	1 1/2 x 1 1/2 x 1/4	1.91	0.56	0.07	0.09
" 7	3 x 3 x 3/8	7.17	2.11	1.72	0.81	" 3	1 1/2 x 1 1/2 x 5/16	2.34	0.69	0.09	0.11
" 8	3 x 3 x 1/2	9.35	2.75	2.18	1.05	ASEA 1	1 x 1 x 1/8	0.80	0.23	0.02	0.03
" 8	3 x 3 x 5/8	11.42	3.36	2.59	1.27	" 1	1 x 1 x 3/16	1.15	0.34	0.03	0.04
" 8	3 x 3 x 5/8	11.42	3.36	2.59	1.27	" 1	1 x 1 x 1/4	1.49	0.44	0.04	0.05



JOHN LYSAGHT (AUST.) PTY. LTD.

Unequal Angles Properties

Reference Marks	Size A x B x t inches	Wgt. per ft. lb.	Sect. Area inches	Mod. of Section		Reference Marks	Size A x B x t inches	Wgt. per ft. lb.	Sect. Area inches	Mod. of Section	
				Abt. XX	Abt. YY					Abt. XX	Abt. YY
ASUA 14 ASUA 15	6 x 4 1/2 x 3/8	13.54	3.98	3.82	1.95	ASUA 6	4 x 3 x 1/4	5.75	1.69	0.98	0.58
	6 x 4 1/2 x 1/2	17.84	5.25	5.03	2.56		4 x 3 x 5/16	7.11	2.09	1.20	0.71
	6 x 4 1/2 x 5/8	22.04	6.48	6.21	3.16		4 x 3 x 3/8	8.45	2.48	1.42	0.84
	6 x 4 1/2 x 3/4	26.13	7.69	7.33	3.72		4 x 3 x 7/16	9.83	2.89	1.63	0.96
ASUA 14 ASUA 15	6 x 4 x 3/8	12.28	3.61	3.23	1.54	ASUA 7	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		3 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		3 x 3 x 5/16	6.58	1.93	0.92	0.69
ASUA 11 ASUA 12 ASUA 13	6 x 4 x 7/8	27.10	7.98	7.10	3.38	ASUA 5a	3 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 x 3 x 1/2	10.20	3.00	1.42	1.07
	6 x 3 1/2 x 5/16	9.32	2.74	2.65	1.00		3 x 3 x 5/8	12.49	3.67	1.73	1.30
	6 x 3 x 3/8	11.63	3.42	3.16	1.18		3 x 2 x 3/16	3.74	1.10	0.56	0.30
ASUA 12 ASUA 13	6 x 3 x 1/2	14.45	4.25	3.65	1.36	ASUA 4	3 x 2 x 1/4	4.89	1.44	0.73	0.39
	6 x 3 x 5/8	17.80	5.24	4.15	1.54		3 x 2 x 5/16	6.05	1.78	0.90	0.49
	6 x 3 x 3/4	21.05	6.19	5.11	1.89		3 x 2 x 3/8	7.17	2.11	1.07	0.58
	5 x 4 x 5/16	9.15	2.69	6.02	2.22		3 x 2 x 1/2	9.35	2.75	1.39	0.73
NBSUA 12	5 x 4 x 3/8	11.00	3.24	3.07	0.87	ASUA 2	3 x 2 x 3/16	3.40	1.00	0.42	0.30
	5 x 4 x 1/2	14.45	4.25	4.06	1.14		3 x 2 x 1/4	4.46	1.31	0.54	0.39
	5 x 4 x 5/8	17.80	5.24	5.02	1.41		3 x 2 x 5/16	5.51	1.62	0.67	0.48
	5 x 4 x 3/4	21.05	6.19	5.90	1.66		3 x 2 x 3/8	6.54	1.92	0.79	0.56
ASUA 8 ASUA 9	5 x 4 x 5/16	9.15	2.69	1.92	1.30	ASUA 3	3 x 2 x 1/2	8.50	2.50	1.02	0.72
	5 x 4 x 3/8	11.00	3.24	2.28	1.52		3 x 2 x 3/16	3.08	0.90	0.41	0.19
	5 x 4 x 1/2	14.45	4.25	2.99	1.98		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		3 x 2 x 5/16	4.98	1.47	0.65	0.30
ASUA 8 ASUA 9	5 x 4 x 3/4	21.05	6.19	4.35	2.88	NBSUA 4	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
	5 x 3 x 5/16	8.17	2.40	1.83	0.72		2 x 2 x 3/16	2.75	0.81	0.29	0.19
	5 x 3 x 3/8	9.72	2.86	2.18	0.85		2 x 2 x 1/4	3.61	1.06	0.37	0.24
ASUA 8 ASUA 9	5 x 3 x 7/16	11.30	3.33	2.52	0.98	ASUA	2 x 2 x 5/16	4.45	1.31	0.46	0.30
	5 x 3 x 1/2	12.75	3.75	2.86	1.11		2 x 2 x 3/8	5.26	1.55	0.54	0.35
ASUA 9	5 x 3 x 5/8	15.67	4.61	3.50	1.36						

CORDAGE—Manila and N.Z. Flax Rope

Size circum- ference	Length Per Coil	Weight per Coil			Weight per 100ft.			Approximate Breaking Strain	
		Cwts.	Qrs.	Lb.	Cwts.	Qrs.	Lb.	Tons	Cwts.
$\frac{1}{2}$	180	—	—	12	—	—	$1\frac{1}{2}$	—	3
$\frac{3}{4}$	180	—	—	20	—	—	$2\frac{1}{2}$	—	7
1	125	—	1	4	—	—	$3\frac{1}{2}$	—	10
$1\frac{1}{4}$	125	—	1	20	—	—	5	—	12
$1\frac{1}{2}$	125	—	2	4	—	—	7	—	18
$1\frac{3}{4}$	125	—	2	10	—	—	8	1	5
2	125	—	3	2	—	—	12	1	10
$2\frac{1}{4}$	120	—	3	25	—	—	14	2	—
$2\frac{1}{2}$	120	1	—	17	—	—	17	2	10
$2\frac{3}{4}$	120	1	1	16	—	—	20	3	—
3	120	1	2	25	—	—	26	3	10
$3\frac{1}{4}$	120	1	3	20	—	1	—	—	—
$3\frac{1}{2}$	120	2	1	—	—	1	6	4	10
$3\frac{3}{4}$	120	2	2	10	—	1	11	—	—
4	120	3	—	10	—	1	16	6	—
$4\frac{1}{4}$	120	3	1	14	—	1	20	—	—
$4\frac{1}{2}$	120	3	2	18	—	1	27	8	—
$4\frac{3}{4}$	120	4	—	18	—	2	10	—	—
5	120	4	3	10	—	2	14	9	10
$5\frac{1}{2}$	115	5	2	5	—	3	7	12	—
6	115	7	—	—	—	3	21	14	—
$6\frac{1}{2}$	115	7	3	5	1	—	10	16	10
7	115	9	2	—	1	1	—	18	10
$7\frac{1}{2}$	115	10	3	14	1	2	9	—	—
8	115	12	—	—	1	2	27	—	—
9	115	15	1	—	2	—	24	30	—

Coir Rope

Size, inches Circumference	Length per Coil Fathoms	Weight per Coil			Weight per 100ft.		
		Cwts.	Qrs.	Lb.	Cwts.	Qrs.	Lb.
$\frac{1}{2}$	150	—	—	6	—	—	$3\frac{1}{2}$
$\frac{3}{4}$	150	—	—	7	—	—	$1\frac{1}{2}$
1	150	—	—	19	—	—	$2\frac{1}{2}$
$1\frac{1}{4}$	150	—	—	25	—	—	$3\frac{1}{4}$
$1\frac{1}{2}$	150	—	1	2	—	—	4
$1\frac{3}{4}$	125	—	1	9	—	—	$5\frac{1}{2}$
2	120	—	1	15	—	—	$6\frac{1}{4}$
$2\frac{1}{4}$	120	—	2	5	—	—	$8\frac{1}{2}$
$2\frac{1}{2}$	120	—	2	9	—	—	9
$2\frac{3}{4}$	120	—	3	3	—	—	12
3	120	—	3	24	—	—	15
$3\frac{1}{2}$	120	1	—	25	—	—	19
4	120	1	3	4	—	1	—
$4\frac{1}{2}$	120	2	—	25	—	1	6
5	120	2	2	12	—	1	12
6	115	3	3	3	—	2	5

STEEL WIRE (25 tons per sq. in.)

S.W.G. No.	Approx. length of 1 cwt. Yds.	Weight of 1 Mile lb.	Approx. Breaking Load lb.	S.W.G. No.	Approx. length of 1 cwt. Yds.	Weight of 1 Mile lb.	Approx. Breaking Load lb.
7/0	56	3,522	10,995	13	1,653	119	373
6/0	65	3,033	9,469	14	2,186	90	281
5/0	75	2,629	8,208	15	2,699	73	227
4/0	87	2,254	7,035	16	3,416	58	180
3/0	101	1,950	6,086	17	4,462	44	138
2/0	115	1,706	5,326	18	6,073	32.5	101
0	133	1,479	4,616	19	8,745	22.54	70
1	155	1,268	3,958	20	10,796	18.25	57
2	183	1,073	3,350	21	13,663	14.42	45
3	220	895	2,792	22	17,846	11.04	34.4
4	260	758	2,366	23	24,290	8.11	25.2
5	311	633	1,977	24	28,908	6.82	21.2
6	380	518	1,621	25	34,978	5.63	17.6
7	452	436	1,362	26	43,184	4.56	14.2
8	546	360	1,125	27	52,021	3.79	11.8
9	675	292	911	28	63,877	3.09	9.6
10	854	231	720	29	75,646	2.61	8.1
11	1,040	190	592	30	90,996	2.17	6.8
12	1,293	152	475	—	—	—	—

STEEL WIRE ROPES

Rope Sizes		Weight in lb. per 100 ft.				Breaking Strains in tons			
Circ. in ins.	Dia. in ins.	6 x 7 Semi-Flex-ible	6 x 19 Flex-ible	6 x 24 Extra Flex-ible	6 x 37 Spec. Extra Flex-ible	6 x 7 Semi-Flex-ible	6 x 19 Flex-ible	6 x 24 Extra Flex-ible	6 x 37 Special Extra Flex-ible
1	5/16	19	18	16	18	4.2	3.4	3.0	3.5
1 1/4	—	27	25	24	25	6.2	5.2	5.0	4.8
1 1/2	—	40	36	33	36	9.0	7.4	7.0	7.1
1 3/8	1/2	47	43	39	43	10.5	9.0	8.1	8.4
1 3/4	9/16	54	50	47	50	12.3	10.1	9.3	9.9
2	5/8	72	66	60	66	16.2	13.7	12.7	13.2
2 1/4	—	87	84	78	84	20.0	17.2	15.8	17.0
2 1/2	13/16	107	102	95	102	24.8	21.1	20.1	20.1
2 3/4	7/8	132	123	113	123	30.7	25.3	23.9	24.7
3	15/16	154	154	134	145	36.0	31.9	28.1	29.8
3 1/8	1	168	168	148	159	38.7	33.9	30.3	32.4
3 1/2	1 1/8	217	217	188	198	49.3	43.8	38.7	39.7
3 3/4	—	247	247	213	230	56.7	49.9	43.9	46.0
4	—	275	275	239	263	63.6	56.3	50.9	52.9
4 1/2	—	350	350	312	333	81.0	71.8	63.2	65.9
4 3/4	1 1/2	392	392	344	369	90.4	79.5	71.6	74.1
5	—	—	420	378	409	—	87.6	78.7	82.6
5 1/2	1 3/4	—	523	450	493	—	106.7	93.8	98.8
6	—	—	626	527	590	—	127.7	112.3	119.0

STRENGTH OF STEEL WIRE ROPES

The table on page 108 shows the breaking strains of plough steel 100/110 tons per sq. inch. Commercial ropes are also 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 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

ROPE RECOMMENDATIONS

ROPE TERMS USED

RHOL or OL—Right Hand Ordinary Lay.

RHLL or LL—Right Hand Langs Lay.

LHL—Left Hand Lay (as for drilling).

LLTL—Langs Lay Preformed.

IWRC—Independent Wire Rope Core.

B.100—Basic Plough Steel (100/110).

A.110—Acid Sp. Plough Steel (110/120).

GB.90—Galvanized Basic Steel (80/95).

		Diameter (inches)	Construction	Steel	Lay	Remarks
LOGGING ROPE	TRACTOR WINCH	1/2-1	6 x 9/9/1	B.100	RHOL	P + IWRC) For heavy duty
		1-1½	6 x 10/5/5/1	B.100	RHOL	P + IWRC) A.110
	YARD WINCH	1/2-3/4	6 x 9/9/1	B.100	RHOL	
	 CIRC.	1½-2	6 x 24	GB.90	RHOL	
	LOG CARRIAGE	1/2-5/8	6 x 9/9/1	B.100	LLTL	
			6 x 10/5/5/1			
		3/4-1	6 x 19 F.W.	B.100	LLTL	
EARTH-MOVING EQUIPMENT	BULLDOZERS, ROOTERS ..	1/2-3/4	6 x 19 Warr.	B.100	LLTL	IWRC
	SCRAPER CARRYALLS ..	13/16-7/8	6 x 19 F.W.	B.100	LLTL	with IWRC
	POWER SHOVELS	1/2-3/4	6 x 9/9/1	A.110	RHOL	P + IWRC
	MAIN HOIST AND	7/8-1	6 x 19 F.W.	A.110	LLTL	IWRC
	BOOM ROPES	1½ and upwards	5 x 41	A.110	LLTL	IWRC
	BOOM GUY ROPES	1-1½	6 x 19 Warr.	B.100	RHOL	with IWRC) For heavy duty
	TRIP ROPES	1-1½ C.	8 x 19	B.100	RHOL	A.110
			6 x 19 or 6 x 24	GB.90	RHOL	Preformed
	CROWD AND RETRACT) ROPES	3/4-1	6 x 37 Seale	A.110	LLTL	with IWRC
		1/2-5/8	6 x 19 Warr.	B.100	LLTL	with IWRC
	DRAGLINE ROPES	5/8-1½	6 x 9/9/1	A.110	LLTL	IWRC
		1½ and upwards	6 x 10/5/5/1	A.110	LLTL	IWRC
GENERAL ERECTION ROPE	CONTRACTORS' WINCHES (LIGHTLY LOADED)	1-2 cir.	6 x 19	GB.90	RHOL	
			6 x 24	GB.90	RHOL	
	DERRICK CRANES	1/2-3/4	6 x 19 or 6 x 24	GB.90	RHOL	
		3/4-1	6 x 37 Seale		RHOL	Preformed
	WINCHES WITH SMALL DRUMS AND BAD LEADS	1/2-7/8	6 x 9/9/1	B.100	RHOL	
			6 x 10/5/5/1	B.100	RHOL	
CRANE ROPE	SMALL ELECTRIC) HOISTS	5/8-7/8 cir.	6 x 19	GB.90	RHOL	
		1-1½ cir.	8 x 19	GB.90	RHOL	or B.100
	WORKSHOP CRANES	1½-2½ cir.	6 x 26 Warriflex	B.100	RHOL	For small drums and sheaves
			6 x 24	GB.90	RHOL	
	HEAVY CRANES	2½ cir. and upwards	6 x 37 (18/12/6/1)	B.100	RHOL	
	WHERE CONDITIONS ARE ABRASIVE USE		6 x 37 (15/15/6/1)		Seale RHOL	Preformed
	TRANSPORTER CRANES AND GRABS	3/4-1 dia.	6 x 19 Filler Wire	B.100	RHOL	Preformed
DRILLING ROPE	DRILLING	9/16-3/4	6 x 19 Warr.	B.100	LHL	For water bores
			6 x 24	GB.90	LHL	
	CABLE DRILLING	5/8-3/4	6 x 9/9/1	B.100	LHL	
		3/4-7/8	6 x 10/5/5/1	B.100	LHL	
		7/8-1	6 x 19 Warr.	B.100	LHL	
	ROTARY DRILLING	7/8-1	6 x 9/9/1	B.100	RHL	with IWRC
	SAND LINES	5/16-13/32	6 x 7	B.100	RHOL	Preformed
				GB.90	RHOL	Preformed
		13/32-3/4	6 x 9/9/1	B.100	RHOL	Preformed
				GB.90	RHOL	Preformed
	CASING LINES	3/4-1	6 x 19 Warr.	B.100	RHOL	Preformed

P + I W R C = Preformed and Independent Wire Rope Core.

Warr. = Warrington.

C. or Cir. = Circumference.

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 (D = dia. of rope)

Rope Constructions	Sheave diameter			Rope Constructions	Sheave diameter		
	Rec.	Min.	Crit.		Rec.	Min.	Crit.
6 x 7 (6/1)	72D	42D	28D	6 x 37 Seale	30D	19D	14D
6 x 9/9/1 Seale	54D	34D	22D	6 x 37 Filler }	27D	18D	14D
6 x 19 Warr.	48D	27D	20D	6 x 41 }			
6 x 19 Filler	45D	24D	18D	8 x 9/9/1	36D	22D	16D
6 x 19 (12/6/1)	45D	24D	18D	6 x 7/3			
6 x 24 (15/9/J)	36D	22D	16D	Flattened	72D	42D	28D
6 x 37				6 x 12/12/3			
(18/12/6/1)	30D	19D	14D	Flat. Strand	48D	32D	21D

SHEAVE GROOVE SIZES

Rope Dia. inches	Groove dia. Tolce.		Rope Dia. inches	Groove dia. Tolce.	
	min.	max.		min.	max.
1/4 to 5/16	+1/64"	+1/32"	1-3/16 to 1 1/2	+1/16"	+1/8"
3/8 to 1/2	+1/32"	+1/16"	1-9/16 to 2 1/4	+3/32"	+3/16"
13/16 to 1 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.

SAFE WORKING LOADS

WIRE ROPE SLINGS

Circumference of Rope in inches	Approx. dia. of Rope in inches	SINGLE ROPE			Strands and Wires			Strands and Wires			Strands and Wires			Strands and Wires		
		6/19	6/24	6/37	6/19	6/24	6/37	6/19	6/24	6/37	6/19	6/24	6/37	6/19	6/24	6/37
1	5/16	0-9½	0-8	0-8½	0-18	0-15½	0-16½	0-16	0-13½	0-15	0-13	0-11½	0-12½	0-13	0-11½	0-12½
1	3/8	0-14½	0-13½	0-13	1-7½	1-5½	1-5	1-4½	1-3	1-2½	1-0½	0-18½	0-18½	1-0½	0-18½	0-18½
1	1/2	1-0	0-19	0-19½	1-18½	1-16½	1-17½	1-14½	1-12½	1-13½	1-8½	1-6½	1-7½	1-8½	1-6½	1-7½
1	9/16	1-7	1-5	1-15½	2-12	2-8½	2-11½	2-6½	2-3½	2-6½	1-18	1-15½	1-17½	1-18	1-15½	1-17½
2	5/8	1-17	2-2	2-6	3-11	3-6	3-9	3-4	2-19	3-2	2-12	2-8	2-10	2-12	2-8	2-10
2	3/4	2-6	2-14	2-14	4-9	4-2	4-9	4-0	3-14	4-0	3-5	3-0	3-5	4-0	3-0	3-5
2	13/16	2-16	3-4	3-6	5-8	5-5	5-4	4-18	4-14	4-13	4-0	3-17	3-16	4-0	3-17	3-16
2	7/8	3-8	3-15	4-0	6-12	6-4	6-8	5-18	5-11	5-15	4-16	4-11	4-14	4-16	4-11	4-14
3	1	4-3	4-11	4-11	8-6	7-6	7-15	7-9	6-11	7-18	6-1	5-7	5-13	6-1	5-7	5-13
3	1-1/16	5-0	5-4	5-7	9-13	8-16	8-16	8-13	7-17	7-18	7-1	6-8	6-9	7-1	6-8	6-9
3	1-1/8	5-18	5-18	6-4	11-8	10-1	10-7	10-5	9-0	9-6	8-7	7-7	7-12	8-7	7-7	7-12
3	1-3/16	6-14	6-17	7-2	13-0	11-8	12-0	11-13	10-5	10-15	9-10	8-7	8-16	9-10	8-7	8-16
4	1-1/4	7-12	7-13	8-2	14-13	13-5	13-15	13-3	11-18	12-7	10-15	9-14	10-2	10-15	9-14	10-2
4	1-3/8	8-10	8-10	9-18	16-9	14-16	15-13	14-15	13-5	14-1	12-1	10-17	11-9	12-1	10-17	11-9
4	1-7/16	9-13	9-13	10-18	18-14	16-10	17-4	16-15	14-15	15-8	13-14	12-1	12-12	13-14	12-1	12-12
4	1-1/2	10-14	10-13	11-0	20-14	18-13	19-6	18-11	16-14	17-6	15-3	13-13	14-3	15-3	13-13	14-3
5	1-5/8	11-16	10-12	11-3	22-16	20-9	21-11	20-9	18-7	19-6	16-14	15-0	15-15	16-14	15-0	15-15
5	1-11/16	13-3	11-12	12-7	25-9	22-8	23-17	22-17	20-2	21-8	18-13	16-8	17-10	18-13	16-8	17-10
5	1-3/4	14-8	12-12	13-6	27-16	24-8	25-14	24-19	21-17	23-1	20-7	17-17	18-16	20-7	17-17	18-16
5	1-13/16	15-13	14-0	14-13	30-4	27-1	28-6	27-2	24-5	25-7	22-2	19-16	20-14	22-2	19-16	20-14
6	1-7/8	17-4	15-3	16-1	33-5	29-6	31-0	29-16	26-5	27-16	24-7	21-9	22-14	24-7	21-9	22-14

Breaking strength of wire, 80/90 tons per sq. in. Ratio of safety, or ratio of minimum dead pull to guaranteed breaking strength of rope = 6.

SAFE WORKING LOADS

BEST B.B.B. SHORT LINK
IRON CHAIN — CWTs.

Dia.	When used straight	30° angle	45° angle	60° angle
1/4	5 1/2	3 3/4	4	4 1/2
1/2	11	5 1/2	7 3/4	9
3/4	21	11	15	18
1	36	18	25	30 1/2
1 1/4	49	24 1/2	34 3/4	42
1 1/2	67	32	46 1/2	57 1/2
1 3/4	85	42	59	72
2	107	53 1/2	75	91
2 1/4	134	67	94	114
2 1/2	170	89	112	139
2 3/4	214	116	160	188

This table gives a safe load of
1/6 of actual breaking load.
Factor of Safety = 6.

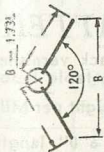
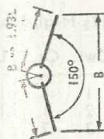
MANILA ROPE

Cir.	Dia.	When used str.	30° angle	45° angle	60° angle
1	1½	1.6	1.0	1.2	1.4
2	2½	2.75	1.5	2.0	2.4
2½	3½	4.5	2.25	2.6	3.2
3	4½	5.5	3.0	4.0	4.5
3½	5½	7.8	5.1	6.0	7.0
4	6½	9.1	6.8	7.1	8.1
4½	7½	12.25	7.75	9.75	11.0
5	8½	14.0	8.5	10.75	12.0
5½	9½	19.6	12.0	15.0	17.0
6	10½	28.5	17.5	22.5	25.5
6½	11½	33.5	20.5	26.5	30.5
7	12½	48.5	30.0	37.0	42.5
7½	13½	68.0	41.0	52.0	60.0

This table gives a factor of
safety of 8.

STEEL DATA

WIRE ROPE SLINGS



Approximate dia. of Rope in inches	Strands and Wires			Strands and Wires		
	6/19	6/24	6/37	6/19	6/24	6/37
5/16	0-9½	0-8	0-8½	0-4½	0-4	0-4½
3/8	0-14½	0-13½	0-13	0-7½	0-6½	0-6½
1/2	1-0	0-19	0-19½	0-10½	0-9½	0-10
9/16	1-7	1-5	1-6½	0-14	0-13	0-13½
5/8	1-17	1-14½	1-15½	0-19	0-17½	0-18½
3/4	2-6	2-2	2-6	1-4	1-2	1-3½
13/16	2-16	2-14	2-14	1-9½	1-8	1-8
7/8	3-8	3-4	3-6	1-15½	1-13	1-14½
1	4-3	3-15	4-0	2-4	1-19	2-1
1-1/16	5-0	4-11	4-11	2-12	2-7	2-7
1-1/8	5-18	5-4	5-7	3-1	2-12	2-15
1-3/16	6-14	5-18	6-4	3-10	3-1	3-4
1-1/4	7-12	6-17	7-2	3-18	3-11	3-14
1-3/8	8-10	7-13	8-2	4-8	3-19	4-4
1-7/16	9-13	8-10	8-18	5-0	4-8	5-3
1-1/2	10-14	9-13	10-0	5-11	5-0	5-15
1-5/8	11-16	10-12	11-3	6-2	5-9	6-8
1-11/16	13-3	11-12	12-7	6-16	6-0	6-17
1-3/4	14-8	12-12	13-6	7-9	6-10	7-11
1-13/16	15-13	14-0	14-13	8-2	7-5	8-6
1-7/8	17-4	15-3	16-1	8-18	7-16	8-6

FENCE AND BALING WIRES

LENGTH PER CWT.—BREAKING STRAIN

	Gauge	Length per cwt. (yards)	Approx. wt. in lb. (per mile)	Approx. Breaking Strain in lb.	
				FENCE Std. galv.	BALING Self-coloured
Standard Types	6	380	518	2269	—
	8	546	360	1576	—
	9	675	292	1276	912
	10	854	231	1008	—
	12	1293	152	666	475
	14	2186	90	394	281
High-tensile Types	12½	1500	135	1250—"Tyeasy"	Patented
	12½	1500	135	850—Standard	
	14	2186	90	850—"Tyeasy"	Patented
	14	2186	90	700—Standard	

QUANTITY OF WIRE PER MILE OF FENCING

Gauge	8			10			12½ High-tensile		
No. of Wires	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	2	2	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

Provided in standard lengths 5' 6" and 5' 0", black varnished.
Number and approximate weight per mile as in the table below.

Spacings of Posts in feet	Number 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

BARBED WIRE

Pattern	Gauge	Cwt. reels	Length reels		Weight per mile	Breaking Strain
		Yards	Lb. per reel	Reels per mile		
Iowa	12	460	—	—	429	1140
	12½	—	95	4	380	—
	14	670	100	3	294	675
Waukegan	12½	620	—	—	318	1020
	14	880	—	—	229	650
	14 L.D.	930	106	2	212	650

L.D. = Long Distance.

GALVANIZED WIRE NETTING

STANDARD QUALITY

RABBIT

SHEEP & DOG

POULTRY

Size	Wt. per 100 yds. lb.	Size	Wt. per 100 yds. lb.	Size	Wt. per 100 yds. lb.
12 x 1½ x 17	63	30 x 3 x 17	59	36 x ½ x 22	110
36 x 1½ x 17	165	36 x 3 x 17	67	36 x 1 x 20	86
42 x 1½ x 17	183	36 x 3 x 16	89	36 x 2 x 19	60
12 x 1½ x 17	55	30 x 4 x 17	48	72 x 2 x 19	114
36 x 1½ x 17	138	36 x 4 x 17	57	36 x 2 x 18	72
42 x 1½ x 17	160	36 x 4 x 16	73	72 x 2 x 18	140
12 x 1½ x 18	46	<h3>DRIED FRUIT RACK & FISH NETTING</h3>			
36 x 1½ x 18	118				
42 x 1½ x 18	135				
12 x 1½ x 18	40				
36 x 1½ x 18	104				
42 x 1½ x 18	121	36 x 2 x 17	106	72 x 2 x 17	190
		48 x 2 x 17	138	36 x 2 x 16	136
		60 x 2 x 17	158	72 x 2 x 16	252

NAILS

APPROXIMATE NUMBER PER LB.

Size	Nails per lb.	Size	Nails per lb.	Size	Nails 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
1½" x 14G	460	2½" x 13G	200	3" x 6G	39
1½" x 13G	340	2½" x 12G	150	3½" x 8G	44
1½" x 12G	240	2½" x 11G	130	3½" x 7G	40
1½" x 11G	206	2½" x 10G	100	4" x 7G	35
2" x 14G	280	2½" x 9G	80	4" x 6G	30
2" x 13G	230	2½" x 8G	65	5" x 5G	21
2" x 12G	190	3" x 10G	81	6" x 4G	13

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	Ulti- mate
Copper, cast	Copper, 100	0.310	8,000	25,000
Hard drawn		0.321	30,000	40,000
Zinc, cast	Zinc, 100	0.253	—	9,000
Rolled		0.253	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;	0.320	16,000	32,000
Rolled and annealed	phosphorus, trace	0.320	13,000	46,000
Cold-drawn		0.320	60,000	85,000
Aluminium-bronze, Cast	Copper, 90; alu- minium, 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,	0.30	30,000	70,000
Rolled	39; iron and manganese, 1 ..	0.30	45,000	70,000
Monel Metal, hot- rolled	Nickel, 67; copper,	0.32	48,000	88,000
Cold-rolled and annealed	28; iron, silicon, carbon and man- ganese, 5	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.

NON-FERROUS SHEET METALS

WEIGHTS IN POUNDS PER SQUARE FOOT

Thickness		Copper or Bronze	Brass or Muntz	Alu- minium	Nickel Silver	Monel Metal or Nickel
Inches	I.S.W.G.					
0.508	7/0	23	21.7	7.03	22.6	23.00
0.372	3/0	17.165	16.3	5.29	16.8	17.112
0.324	0	14.95	14.39	4.61	14.7	14.904
0.276	2	12.834	12.282	3.92	12.5	13.996
0.252	3	11.718	11.214	3.58	11.4	11.592
0.232	4	10.788	10.324	3.29	10.5	10.672
0.192	6	8.928	8.544	2.72	8.69	8.742
0.160	8	7.440	7.120	2.27	7.24	7.360
0.128	10	5.952	5.696	1.82	5.79	5.888
0.104	12	4.836	4.628	1.48	4.7	4.784
0.080	14	3.720	3.560	1.14	3.62	3.68
0.064	16	2.976	2.848	0.911	2.90	2.944
0.048	18	2.232	2.136	0.682	2.17	2.208
0.036	20	1.674	1.602	0.511	1.63	1.656
0.028	22	1.302	1.246	0.398	1.27	1.288
0.022	24	1.023	0.979	0.313	0.996	1.012
0.018	26	0.837	0.801	0.256	0.815	0.828
0.0148	28	0.688	0.658	0.210	0.670	0.6808
0.0124	30	0.576	0.551	0.176	0.561	0.5704
0.0108	32	0.502	0.480	0.154	0.489	0.4968
0.0092	34	0.427	0.409	0.131	0.453	0.4232
0.0076	36	0.353	0.338	0.108	0.344	0.3496

Thickness in inches	Cast Iron lb.	Steel lb.	Copper lb.	Brass lb.	Lead lb.	Zinc lb.	Alu- minium lb.
1/16	2.344	2.552	2.891	2.734	3.708	2.344	0.879
1/8	4.687	5.104	5.781	5.469	7.417	4.687	1.758
3/16	7.031	7.656	8.672	8.303	11.125	7.031	2.637
1/4	9.375	10.208	11.563	10.938	14.833	9.375	3.515
5/16	11.719	12.760	14.453	13.672	18.542	11.719	4.394
3/8	14.062	15.312	17.344	16.406	22.250	14.062	5.273
7/16	16.406	17.865	20.234	19.141	25.958	16.406	6.152
1/2	18.750	20.417	23.125	21.875	29.667	18.750	7.03
9/16	21.094	22.969	26.016	24.609	33.375	21.094	7.909
5/8	23.437	25.521	28.906	27.344	37.083	23.437	8.788
11/16	25.781	28.073	31.797	30.078	40.792	25.781	9.667
3/4	28.125	30.625	34.688	32.813	44.500	28.125	10.545
13/16	30.469	33.177	37.578	35.547	48.208	30.469	11.425
7/8	32.812	35.729	40.469	38.281	51.917	32.812	12.303
15/16	35.156	38.281	43.359	41.016	55.625	35.156	13.182
1	37.500	40.833	46.250	43.750	59.333	37.500	14.06

TINPLATE—Standard Weights and Sizes

Birming- ham Gauge	Substance		Size		No. Per Box	Net wgt. Per Box		Gross wgt. Per Box	
	lb.	m/m.	ins.	m/m.		lb.	kilos	lb.	kilos
35.7	55	.160	20x14	355x508	112	55	25	60	27
35.0	60	.175	"	"	"	60	27	65	30
34.2	65	.191	"	"	"	65	30	70	32
33.7	70	.203	"	"	"	70	32	75	34
33.1	75	.218	"	"	"	75	34	80	36
32.5	80	.234	"	"	"	80	36	85	39
32.0	85	.249	"	"	"	85	39	90	41
31.6	90	.262	"	"	"	90	41	95	43
31.1	95	.277	"	"	"	95	43	100	45
30.6	100	.290	"	"	"	100	45	105	47
29.91C	108	.315	"	"	"	108	49	113	51
28.01X	136	.397	"	"	"	136	62	141	64
26.81XX	156	.454	"	"	"	156	71	161	73
25.81XXX	176	.511	"	"	"	176	80	181	82
24.8XXXX	196	.574	"	"	"	196	89	201	91
35.7	55	.160	28x20	710x510	"	110	50	120	54
35.0	60	.175	"	"	"	120	54	130	59
34.2	65	.191	"	"	"	130	60	140	64
33.7	70	.203	"	"	"	140	64	150	68
33.1	75	.218	"	"	"	150	68	160	72
32.5	80	.234	"	"	"	160	72	170	78
32.0	85	.249	"	"	"	170	78	180	82
31.6	90	.262	"	"	"	180	82	190	86
31.1	95	.277	"	"	"	190	86	200	90
30.6	100	.290	"	"	"	200	90	210	96
29.91C	108	.315	"	"	"	216	98	226	103
28.01X	136	.397	"	"	56	136	62	146	66
26.81XX	156	.454	"	"	"	156	71	166	75
25.81XXX	176	.511	"	"	"	176	80	186	84
24.8XXXX	196	.574	"	"	"	196	89	206	94
33.9	68	.198	30x21	760x530	112	153	70	165	75
33.0	76	.221	"	"	"	171	78	183	83
32.3	83	.241	"	"	"	184	84	196	89
31.0	96	.279	"	"	"	214	97	226	102
29.91C	108	.315	"	"	"	243	110	255	116
28.01X	136	.397	"	"	56	153	70	165	75
26.81XX	156	.454	"	"	"	176	80	188	85
25.81XXX	177	.511	"	"	"	198	90	210	95
24.8XXXX	195/6	.574	"	"	"	220	100	232	105
31.8	87	.254	18½x14	355x476	124	90	41	96	44
31.5	91	.264	"	"	"	95	43	101	46
31.0	96/97	.279	"	"	"	100	45	106	48
30.11C	106	.310	"	"	"	110	50	116	53
28.01X	135	.394	"	"	"	140	64	146	67
31.6	89½	.262	20x10	254x508	225	128	58	134	61
30.6	100	.290	"	"	"	143	65	149	68
31.1	95	.277	"	"	"	136	62	142	65
29.01XL	121	.353	"	"	"	174	79	180	82
28.01X	136	.397	"	"	"	195	89	201	92
29.91C	108	.315	"	"	"	156	71	163	74

COPPER SHEET

GENERAL.—Copper sheets are marketed in four different finishes:

Hard Cold Rolled Medium, Semi or Half Hard Rolled
Soft Cold Rolled Hot Rolled (Soft)

TRADE SIZES.—32 I.S.W.G. (8 ounces) and heavier sheathing, 4' x 1' 2", 4' x 2', 6' x 2', 6' x 2' 6", and 6' x 3'; 27 I.S.W.G. (12 ounces) and heavier, 6' x 4' and 8' x 4'; 19 I.S.W.G. (2 lb.) and heavier, 8' x 5'.

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. & dec. of lb.	Generally accept. equiv. per sq. ft. in lb.	I.S.W.G. No.	Decimal of inch	Wt. per sq. ft. in lb. & dec. of lb.	Generally accept. 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	.428	—
6	.192	8.928	9	35	.0084	.391	—
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	.242	—
11	.116	5.394	—	40	.0048	.223	—
12	.104	4.836	5	41	.0044	.205	—
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	1¼				

BRASS SHEET (Muntz Metal)

GENERAL.—Brass sheets are marketed in three different finishes:
 Hard (Cold) Rolled
 Soft (Cold) Rolled
 Semi, Medium, or Half Hard (Cold) Rolled.

TRADE SIZES.—30 I.S.W.G. ($8\frac{1}{2}$ ounces per square foot) and heavier, 4' x 2', 6' x 2', 6' x 2' 6", and 6' x 3'.

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 $44\frac{1}{2}$ 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	..	..	..

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 No. I.S.W.G.	Approx. Thick- ness		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.	Lb.	Oz.	Lb.	Oz.
3	.007	.171	0	3	15	4	6	5	2	5	14
4	.008	.209	0	4	13	5	6	6	5	7	3
5	.010	.247	0	5	11	6	6	7	7	8	8
6	.011	.291	0	6	11	7	8	8	12	10	0
7	.013	.337	0	7	12	8	11	10	2	12	10
8	.015	.386	0	8	14	9	15	11	10	13	5
9	.018	.450	0	10	5	11	9	13	8	15	7
10	.020	.500	0	11	7	12	13	15	0	17	2
12	.026	.660	0	15	2	17	0	19	13	22	11
14	.032	.820	1	2	12	21	1	24	9	28	2
16	.043	1.080	1	8	12	27	13	32	7	37	2
18	.053	1.340	1	14	11	34	8	40	4	46	0
20	.063	1.600	2	4	10	41	3	48	1	54	15
22	.077	1.960	2	12	14	50	7	58	14	67	5
24	.091	2.320	3	5	3	59	13	69	12	79	12
26	.105	2.680	3	13	7	69	1	80	10	92	2

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	2¼	13.747	17.503	15.156
5/16	.297	.379	.327	2½	15.411	19.622	16.991
3/8	.428	.545	.472	2¾	17.171	21.863	18.921
7/16	.583	.742	.643	2½	19.027	24.225	20.977
1/2	.761	.969	.839	2⅝	20.977	26.708	23.127
9/16	.963	1.226	1.062	2¾	23.022	29.312	25.382
5/8	1.189	1.514	1.311	2⅞	25.162	32.038	27.741
11/16	1.439	1.832	1.586	3	27.399	34.884	30.207
3/4	1.712	2.180	1.887	3¼	32.155	40.940	35.451
13/16	2.010	2.559	2.216	3½	37.291	47.481	41.113
7/8	2.331	2.968	2.570	3¾	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	4¼	54.985	70.010	60.621
1-1/16	3.436	4.376	3.778	4½	61.644	78.489	67.963
1-1/8	3.853	4.906	4.248	4¾	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	5¼	83.908	106.832	92.509
1-5/16	5.244	6.677	5.782	5½	92.086	117.249	101.525
1-3/8	5.756	7.328	6.346	5¾	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	6½	118.916	151.406	131.105
1-9/16	7.432	9.463	8.194	6¾	128.617	163.761	141.800
1-5/8	8.039	10.235	8.863	6¾	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	7¼	160.009	203.733	176.410
1-13/16	10.001	12.733	11.026	7½	171.238	218.025	188.790
1-7/8	10.702	13.627	11.799	7¾	182.843	232.802	201.584
1-15/16	11.428	14.550	12.599	8	194.827	248.064	214.797

ALUMINIUM

Quality of Sheet	Ult. T.S. lb./sq. in.	Elongation % on 2"	Description
AA 2S-O	12,000	35	{ Commercially pure aluminium, used where strength not important.
AA 2S-½H	17,000	9	
AA 3S-O	15,500	35	{ Aluminium alloyed with manganese, used where medium strength is required with formability and resistance to corrosion.
AA 3S-½H	21,000	8	
AA 3S-H	30,000	4	
AA M57S-O	26,500	24	{ Aluminium alloyed with magnesium and manganese, used where high strength and corrosion resistance are required.
AA M57S-½H	34,500	9	
AA M57S-H	39,000	7	
Extrusions			
AA 2S-E	12,000	20	{ Commercially pure aluminium — strength unimportant.
AA 50S-QA	27,000	16	{ Aluminium alloyed with silicon and manganese, medium strength.
AA 51S-QA	40,000	10	{ Aluminium alloyed with silicon and manganese, high strength.

WEIGHT PER SQUARE FOOT

I.S.W.G.	Decimals of an inch	Weight per sq. ft. lb.	I.S.W.G.	Decimals of an inch	Weight per sq. ft. lb.
—	.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

WEIGHT OF ROUNDS AND RECTANGLES IN AA 2S-E

Rnds. dia. ins.	Wt. lb./ft.	Rects. size ins.	Wt. lb./ft.	Rects. size ins.	Wt. lb./ft.	Structural Sections	Wt. lb./ft.
1/4	.058	1 x 1/8	.074	1 x 3/8	.440	1 x 1 x 1/8 angle	.283
3/8	.130	1 x 1/4	.147	1 x 1/2	.588	1½ x 1½ x 3/16	.63
1/2	.231	1 x 1/8	.110	1½ x 1/8	.220	2 x 2 x 1/4	1.12
5/8	.360	1 x 1/4	.220	1½ x 3/16	.331	3 x 3 x 3/8	2.5
3/4	.520	1 x 1/2	.440	1½ x 1/4	.441	3 x 1½ channel	1.84
7/8	.706	1 x 1/8	.147	1½ x 3/8	.662	4 x 2	2.52
1	.924	1 x 3/16	.220	2 x 1/4	.588	7 x 3	5.00
1-1/2	2.075	1 x 1/4	.294	2 x 3/8	.880	9 x 3	6.18

NOTE—Weight of AA 3S = AA 2S × 1.01; AA 20S = AA 2S-E × 1.00; AA M57S = AA 2S × 0.985; AA 51S = AA 2S-E × .99.



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
3-9/16	.35	4.549	1-3/8	7/8	4.389	3/4	1/2	1.368
3-1/2	1/2	6.384	1-3/8	1/2	2.508	3/4	3/8	1.026
3	3/4	8.216	1-3/8	3/8	1.881	3/4	5/16	.855
3	1/4	2.736	1-3/8	3/16	.94	3/4	1/4	.684
2-13/16	.95	9.747	1-3/8	1/8	.627	3/4	3/16	.513
2-3/4	5/16	3.135	1-5/16	9/16	2.692	3/4	1/8	.342
2-1/2	3/8	3.42	1-1/4	1	4.561	3/4	1/16	.171
2-3/8	1/2	4.332	1-1/4	3/4	3.421	11/16	1/8	.314
2-1/4	7/8	7.182	1-1/4	5/8	2.85	5/8	1/2	1.14
2-1/4	1/4	2.052	1-1/4	1/2	2.281	5/8	3/8	.855
2-1/8	1/2	3.876	1-1/4	3/8	1.71	5/8	1/4	.57
2	1	7.296	1-1/4	1/4	1.14	5/8	3/16	.427
2	1/2	3.648	1-1/4	3/16	.855	5/8	1/8	.285
2	7/16	3.192	1-1/4	1/8	.57	9/16	5/16	.64
2	3/8	2.736	1-1/4	1/16	.285	1/2	3/8	.684
2	1/4	1.824	1-1/8	1/2	2.052	1/2	5/16	.570
2	3/16	1.368	1-1/8	1/4	1.026	1/2	1/4	.456
2	1/8	.912	1-1/8	7/32	.898	1/2	3/16	.342
1-3/4	1-1/8	7.182	1-1/8	3/16	.77	1/2	1/8	.228
1-3/4	1	6.384	1	7/8	3.192	1/2	1/16	.114
1-3/4	1/4	1.596	1	3/4	2.736	7/16	3/8	.599
1-3/4	1/8	.798	1	5/8	2.28	3/8	5/16	.428
1-1/2	1-1/4	6.840	1	1/2	1.824	3/8	1/4	.342
1-1/2	1	5.472	1	3/8	1.368	3/8	3/16	.256
1-1/2	3/4	4.108	1	1/4	.912	3/8	1/8	.171
1-1/2	1/2	2.736	1	3/16	.684	3/8	7/64	.149
1-1/2	3/8	2.052	1	1/8	.456	3/8	1/16	.085
1-1/2	1/4	1.368	1	1/16	.228	11/32	17/64	.334
1-1/2	3/16	1.026	7/8	3/4	2.394	5/16	1/4	.285
1-1/2	1/8	.684	7/8	5/8	1.995	5/16	3/32	.107
			7/8	1/2	1.596	5/16	5/64	.081
						5/16	3/16	.171
						5/16	1/8	.114
						5/16	.075	.068
						5/16	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	.06	1/8	.045	.047
3/16	.128	.135	3/16	.101	.106
1/4	.228	.240	1/4	.179	.189
5/16	.357	.376	5/16	.280	.294
3/8	.513	.541	3/8	.403	.424
7/16	.699	.736	7/16	.549	.578
1/2	.913	.962	1/2	.717	.755
9/16	1.15	1.21	9/16	.91	.955
5/8	1.43	1.51	5/8	1.12	1.18
11/16	1.73	1.82	11/16	1.35	1.43
3/4	2.05	2.16	3/4	1.61	1.70
13/16	2.41	2.54	13/16	1.89	1.99
7/8	2.80	2.95	7/8	2.19	2.31
15/16	3.21	3.38	15/16	2.52	2.65
1	3.65	3.85	1	2.87	3.02
1-1/8	4.62	4.87	1-1/8	3.63	3.83
1-1/4	5.70	6.01	1-1/4	4.48	4.73
1-3/8	6.90	7.27	1-3/8	5.42	5.72
1-1/2	8.21	8.65	1-1/2	6.45	6.80
1-5/8	9.64	10.16	1-5/8	7.57	7.99
1-3/4	11.18	11.78	1-3/4	8.78	9.26
1-7/8	12.83	13.52	1-7/8	10.08	10.63
2	14.60	15.39	2	11.47	12.10
2-1/8	—	—	2-1/8	12.94	13.66
2-1/4	—	—	2-1/4	14.51	15.31
2-3/8	—	—	2-3/8	16.17	17.06
2-1/2	—	—	2-1/2	17.92	18.90

NON-FERROUS METALS

Whitworth Standard Hexagon Sizes

Association	Across flats min. to max.		Lb. per lin. ft.	Standard		Across flats min. to max.		Lb. per lin. ft.
	ins.	ins.		Whit.	Fine	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.				1	1-1/8	1.658	1.670	8.81
				1-1/8	1-1/4	1.845	1.860	10.94
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
1/4	5/16	.520	.525	1-1/2	1-5/8	2.390	2.410	18.36
5/16	3/8	.595	.600	1-5/8	1-3/4	2.555	2.580	21.03
3/8	7/16	.705	.710	1-3/4	2	2.735	2.760	24.07
7/16	1/2	.815	.820	2		3.125	3.150	31.35

Weight of Drawn Copper Bars

STANDARD RECTANGULAR SIZES

POUNDS PER LINEAL FOOT

Size ins.	Pounds	Size ins.	Pounds	Size ins.	Pounds
1 — x 16	1.206 1.507 1.809 2.110 2.412 3.014 3.617	1 1 1/4 1 1/2 1 3/4 2 2 1/4 2 1/2	1.447 1.809 2.170 2.532 2.894 3.256 3.617	1 1 1/4 1 1/2 1 3/4 2 2 1/4 2 1/2	2.894 3.617 4.341 5.064 5.788 6.511 7.235
1 — x 8	2.412 3.014 3.617 4.220 4.823 6.029 7.235 8.440 9.646 1.085 1.206 1.326 1.447	3 — x 8 3 1/4 3 1/2 3 3/4 4 4 1/4 4 1/2 4 3/4 5	3.979 4.341 4.702 5.064 5.426 5.788 6.149 6.511 6.873 7.235	3 — x 3 1/2 4 4 1/2 4 1/2 4 3/4 5 5 1/4 5 1/2 5 3/4 6	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	3.617 4.522 5.426 6.330 7.235 9.043 1.085 1.266 1.447 1.628 1.809 1.989 2.170	1 1 1/4 1 1/2 1 3/4 2 2 1/4 2 1/2 2 3/4 3 — x 3 1/4 2 3 1/2 3 3/4 4 4 1/4 4 1/2 4 3/4 5 5 1/4 5 1/2 5 3/4 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 1 1/4 1 1/2 1 3/4 2 2 1/4 2 1/2 2 3/4 3 3 1/4 3 1/2 3 3/4 4 4 1/4 4 1/2 4 3/4 5 5 1/4 5 1/2 5 3/4 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 19.29 20.26 21.22 22.19 23.15
1 — x 4	4.823 6.029 7.235 8.440 9.646 1.206 1.447 1.688 1.929 2.170 2.412 2.653 2.894	1 1 1/4 1 1/2 1 3/4 2 2 1/4 2 1/2 2 3/4 3		1 — x 3 1/2	

WEIGHT OF COPPER TUBES

LB. PER LINEAL FOOT (Outside Measurement)

Calculated on Basis of Copper at 560 lb. per cubic foot

IMPERIAL STANDARD WIRE GAUGE THICKNESS

Diameter inches	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
.192		.176	.160	.144	.128	.116	.104	.092	.080	.072	.064	.056	.048	.040	.036
1	—	—	—	—	—	—	—	—	—	0.16	0.15	0.13	0.12	0.10	0.09
1	—	—	—	—	—	—	—	—	—	0.38	0.34	0.30	0.26	0.22	0.20
1	1.89	1.77	1.64	1.50	1.37	1.25	0.83	0.46	0.41	0.59	0.54	0.48	0.42	0.35	0.32
1	2.50	2.32	2.12	1.96	1.76	1.61	1.45	1.02	0.90	0.82	0.74	0.66	0.57	0.48	0.43
1	3.10	2.86	2.62	2.40	2.16	1.97	1.78	1.58	1.39	1.27	1.14	1.00	0.86	0.72	—
1	3.66	3.40	3.12	2.84	2.55	2.33	2.11	1.89	1.66	1.46	1.32	1.16	1.00	—	—
2	4.22	3.92	3.58	3.26	2.92	2.68	2.42	2.15	1.87	1.70	1.52	1.33	1.15	—	—
2	4.82	4.46	4.10	3.70	3.33	3.03	2.75	2.43	2.12	1.92	1.70	1.50	1.30	—	—
2	5.40	5.00	4.58	4.16	3.71	3.38	3.05	2.71	2.36	2.13	1.90	1.66	—	—	—
2	6.00	5.53	5.06	4.59	4.10	3.74	3.37	3.00	2.62	2.37	2.10	1.85	—	—	—
2	6.65	6.10	5.57	5.04	4.50	4.10	3.70	3.27	2.86	2.59	2.30	2.02	—	—	—
3	7.20	6.64	6.05	5.50	4.88	4.44	4.10	3.55	3.12	2.80	2.50	—	—	—	—
3	7.80	7.16	6.54	5.90	5.31	4.81	4.33	3.83	3.35	3.00	2.68	—	—	—	—
3	8.40	7.74	7.04	6.37	5.69	5.17	4.65	4.12	3.60	3.25	2.90	—	—	—	—
4	9.00	8.28	7.56	6.73	6.09	5.53	4.97	4.40	3.84	3.44	3.07	—	—	—	—
4	9.50	8.62	8.00	7.20	6.46	5.85	5.28	4.65	4.10	3.70	—	—	—	—	—
4	10.10	9.30	8.47	7.65	6.82	6.20	5.58	4.93	4.32	3.90	—	—	—	—	—
4	10.70	9.88	8.97	8.10	7.20	6.56	5.90	5.22	4.57	4.10	—	—	—	—	—
5	11.25	10.37	9.45	8.53	7.62	6.90	6.20	5.50	4.80	4.38	—	—	—	—	—
5	11.83	10.90	9.93	8.96	8.00	7.25	6.52	5.80	5.05	4.50	—	—	—	—	—
5	12.50	11.50	10.50	9.45	8.40	7.65	6.85	6.10	5.33	—	—	—	—	—	—
5	13.00	12.00	10.93	9.88	8.78	8.10	7.20	6.35	5.54	—	—	—	—	—	—
6	13.65	12.50	11.40	10.30	9.20	8.40	7.50	6.65	5.80	—	—	—	—	—	—

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, 0.96; 70/30 brass, 0.97; aluminium, 0.303.

NON-FERROUS METALS

NON-FERROUS WIRE

WEIGHT PER 100 FEET IN POUNDS

Thickness Inches	I.S.W.G.	Copper or Bronze	Brass or Muntz	Alumin- ium	Nickel Silver	Monel Metal or Nickel
0.5	7/0	75.7	71.9	22.93	74.1	76.1
0.372	3/0	41.9	39.8	12.77	41	42.76
0.324	0	31.8	30.2	7.63	31.1	31.9
0.276	2	23.1	21.9	7.00	22.6	23.16
0.252	3	19.2	18.3	5.83	18.8	19.20
0.232	4	16.3	15.5	4.96	15.9	16.37
0.192	6	11.2	10.6	3.4	10.9	11.18
0.160	8	7.75	7.36	2.35	7.58	7.77
0.128	10	4.96	4.71	1.53	4.85	4.98
0.104	12	3.27	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	0.698	0.663	0.212	0.682	0.695
0.036	20	0.392	0.373	0.119	0.384	0.387
0.028	22	0.237	0.226	0.072	0.232	0.238
0.022	24	0.146	0.139	0.044	0.143	0.147
0.018	26	0.0981	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	34	0.0256	0.0243	0.0077	0.0250	0.025
0.0076	36	0.0175	0.0166	0.0053	0.0171	0.017

Standard Hard-drawn Copper Wire

Standard Nominal Area Sq. in.	Calculated Area Sq. in.	Diam- eter Inches	Weight per 1000 yds. Lbs.	Resist. per 1000 yds. at 20° C.	Breaking Load of Con- ductor Lbs.
0.001811	0.00180956	0.048	20.93	13.898	120
0.003217	0.00321699	0.064	37.20	7.820	213
0.005027	0.00502655	0.080	58.12	5.004	330
0.005411	0.00541062	0.083	62.57	4.649	354
0.006648	0.00664761	0.092	76.86	3.783	434
0.006793	0.00679292	0.093	78.56	3.705	442
0.007391	0.00738982	0.097	85.46	3.404	480
0.008012	0.00801185	0.101	92.63	3.138	520
0.008332	0.00833230	0.103	96.32	3.020	540
0.00850	0.00849487	0.104	98.22	2.959	550
0.00933	0.00933132	0.109	107.9	2.694	602
0.01057	0.01056832	0.116	122.2	2.378	676
0.01094	0.01093590	0.118	126.51	2.299	698
0.01208	0.01207628	0.124	139.6	2.081	769

Standard Stranded Copper Conductors

Stranded Conductors	Nominal Area in sq. in.	Diameter in Inches	Weight per 1000 yds. Lbs.	Breaking Load of Conductor Lbs.	Std. Rest. (ohms) per 1000 yds. at 60°F.
7/.048	.0125	.144	149	766	1.984
7/.064	.0225	.192	265	1372	1.116
7/.080	.035	.240	414	2125	0.7143
7/.097	.050	.291	609	3104	0.4860
7/.104	.060	.312	699	3542	0.4225
7/.118	.075	.354	901	4521	0.3282
19/.083	.100	.415	1211	6020	0.2449
19/.092	.125	.460	1488	7421	0.1993
19/.101	.150	.505	1793	8892	0.1654
19/.109	.175	.545	2089	10294	0.1419
19/.116	.200	.580	2366	11559	0.1253
19/.124	.225	.620	2703	13150	0.1096
37/.093	.250	.651	2963	14650	0.1003
37/.103	.300	.721	3635	17810	0.08175
37/.118	.400	.826	4772	23376	0.06224
61/.103	.500	.927	5994	29370	0.04959
91/.093	.600	1.023	7290	36030	0.04079
91/.103	.750	1.133	8942	43820	0.03325
127/.103	1.000	1.339	12481	61150	0.02383

C.M.A. Cables—Single V.I.R., Taped, Braided and Compounded

250 Volt up to 19/.064, 660 Volt from 19/.072 and larger.

No. and Size of Wires Inch	Nominal Area Sq. in.	Overall Dia. Inches	Weight per 1,000 yds. Lbs.	Maximum Current I.E.E. Rules Amps.	Std. Resistance (ohms) per 1000 yds. at 60°F.
1/.044	.0015	.149	56	7	16.42
3/.029	.0020	.172	72	10	12.85
3/.036	.0030	.194	93	15	8.260
7/.029	.0047	.205	114	20	5.493
7/.036	.0070	.235	161	35	3.530
7/.044	.0100	.266	215	50	2.363
7/.052	.0145	.297	283	55	1.692
7/.064	.0225	.342	399	70	1.117
19/.044	.0300	.377	502	85	0.8721
19/.052	.0400	.428	684	100	0.6244
19/.064	.0600	.503	988	130	0.4122
19/.072	.075	.575	1,227	160	0.3257
19/.083	.100	.645	1,596	200	0.2451
37/.064	.120	.690	1,820	220	0.2118
37/.072	.150	.756	2,260	250	0.1673
37/.083	.200	.864	2,930	300	0.1259

ELECTRICITY

FUNDAMENTAL UNITS:

The AMPERE is the unit in which electric current strength 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.

$$\text{K.W.H.} = \frac{\text{Volts} \times \text{Amperes} \times \text{Hours}}{1,000} \quad \text{or} \quad \frac{\text{Watts} \times \text{Hours}}{1,000}$$

Example: To find the cost of burning three 60 watt lamps for five hours, assuming the cost per unit to be 6d.—

$$\text{Cost} = \frac{60 \times 3 \times 5 \times 6d.}{1,000} = 5.4d.$$

$$\text{HORSEPOWER} = \frac{\text{Watts}}{746}$$

$$\text{Kilowatts} = \frac{\text{Watts}}{1,000}$$

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.

A cable carrying electric current (amperes) greater than its capacity will develop 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.

In all cases of electric shock remove person from danger zone and apply artificial respiration until medical aid arrives.

Average District Rainfall Throughout Australia

PERIOD 1910 TO 1940 (100 Points = 1 Inch)

	DISTRICT	Annual fall, points	DISTRICT	Annual fall, points
N.S.W.	Trans-Darling North	829	Hunter	3463
	Trans-Darling South	967	Cudgegong	2310
	Cis-Darling North	1282	Central Plateau	3342
	Cis-Darling South	1287	Warrumbungles Highlands	2285
	Upper Bogan	1746	Warrumbungles Lowlands	2193
	Lower Macquarie	1713	Sydney	4170
	West Gwydir	1838	Nepean	3004
	East Gwydir	2181	Illawarra	4246
	Nandewars	2606	South Coast	3628
	Liverpool Plains	2428	Upper Murrumbidgee	2579
	West New England	3045	Snowy Mountains	3338
	East New England	4019	Jugiong	3337
	Clarence	5544	Tumut	2327
	Orara	5563	East Riverina	1846
	Manning	5350	West Riverina	1371
VIC.	Mallee North	1123	East Gippsland	3021
	Mallee South	1335	West Gippsland	3570
	Wimmera North	1572	West Central	2355
	Wimmera South	1892	East Central	3572
	Lower North	1655	North Central	2706
	Upper North	1951	Volcanic Plains	2432
	Lower North-East	3038	West Coast	2929
	Upper North-East	4369		
TAS.	Northern	3934	Central Plateau	3692
	East Coast	3026	West Coast—	
	Midland	2106	Mountain Region	8709
	South-Eastern	2893	King Island	3569
	Derwent	2625	Flinders Island	2959
S.A.	North-West Interior	765	Central West	1740
	Far North Interior	639	Central East	2376
	Western	1303	Murray Valley	1299
	Upper North	1283	South-East—Upper	1437
	North-East	775	South-East—Lower	2613
	Lower North	1721		
W.A.	North Kimberley	2664	S.W. Central Coast	3452
	East Kimberley	1966	S.W. South Coast	3535
	West Kimberley	2066	S.W. Central North	1372
	De Grey	1294	S.W. Central South	1700
	Fortescue	921	Eucla	869
	West Gascoyne	869	South-East	1007
	East Gascoyne	924	North-East	980
	S.W. North Coast	1582		
N.T.	Northern Rivers	4339	Northern Plateau	1287
QLD.	Peninsula North	5791	Upper Western	1427
	Peninsula South	3727	Lower Western	1172
	Carpentaria—Lower	2569	Port Curtis	3736
	Carpentaria—Upper	2493	Moreton	4770
	Barron	6729	East Darling Downs	2736
	Herbert	7541	West Darling Downs	2191
	East Central Coast	9023	Maranoa	2257
	West Central Coast	2469	Warrego	1714
	Central Highlands	2450	Far South-West	1297
	Central Lowlands	1857		

Table of Distances between Ports FREMANTLE TO BURKETOWN

[illegible]

Table of Distances between Airports IN AIR MILES

Perth	335	Kalgoorlie	731	396	Forrest	1075	740	344	Ceduna	1415	1080	684	340	Adelaide	1616	1281	885	541	201	Mildura	1820	1485	1089	745	405	289	Melbourne	2111	1776	1380	1036	696	580	291	Launceston	2201	1866	1470	1126	786	670	381	90	Hobart	2132	1797	1401	1057	717	432	312	603	693	Canberra	2170	1835	1439	1095	755	543	460	751	841	148	Sydney	1671	1336	940	596	256	201	448	739	829	633	744	Broken Hill	2641	2306	1910	1566	1226	1014	931	1222	1312	619	471	1215	Brisbane	2965	2630	2234	1890	1550	1338	1255	1546	1636	943	795	1539	324	Rockhampton	3348	3013	2617	2273	1933	1721	1638	1929	2019	1326	1178	1952	707	383	Townsville	3525	3190	2794	2450	2110	1898	1815	2106	2196	1503	1355	2099	884	560	177	Cairns	3865	3530	3134	2790	2450	2238	2155	2446	2536	1843	1695	2439	1224	900	517	340	Normanton
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AREA AND POPULATION

State or Territory	Year of formation into separate Colony or Territory	Present Area in square miles	Population, 1947		
			Male	Female	Persons
N.S.W. . .	1786	309,432	1,492,827	1,492,637	2,985,464
Vic. . . .	1851	87,884	1,014,508	1,040,744	2,055,252
Qld. . . .	1859	670,500	567,539	538,730	1,106,269
S.A. . . .	1834	380,070	320,220	325,996	646,216
W.A. . . .	1829	975,920	258,303	244,428	502,731
Tas. . . .	1825	26,215	129,285	127,832	257,117
N. Ter. . .	1863	523,620	7,379	3,487	10,866
F.C.T. . .	1911	940	9,092	7,813	16,905
TOTAL . .	—	2,974,581	3,799,153	3,781,667	7,580,820

NOTE.—The six States with their included Territories were Federated under the name "Commonwealth of Australia" on the 1st January, 1901.

POPULATION & VITAL STATISTICS

AUSTRALIA, 1921 TO 1946

Heading		1921	1931	1946
Population at 31st December				
(,000 omitted)	Males . .	2,799	3,332	3,799
	Females .	2,711	3,220	3,781
	Total . .	5,510	6,552	7,580
Births	Males . .	70,039	61,021	
	Females .	66,159	57,488	
	Total . .	136,198	118,509	176,379
	Rate . . .	25.0	18.2	23.6
Marriages	No. . . .	46,869	38,882	74,496
	Rate . . .	8.6	6.0	10.6
Deaths	Males . .	30,652	31,796	
	Females .	23,424	24,764	
	Total . .	54,076	56,560	74,661
	Rate . . .	9.9	8.70	10.0
Deaths of children under one year	Males . .	5,111	2,889	
	Females .	3,841	2,103	
	Total . .	8,952	4,994	5,116
	Rate . . .	65.7	42.1	29.0
Natural Increase		82,122	61,949	
Rate of Natural Increase . .		15.05	9.53	

NOTE.—In the case of Births, Marriages, and Deaths, the "Rate" is the number per 1,000 of mean population; in the case of Deaths of Children under one year, it is the number per 1,000 births.

*Occupation of the Population—Australia***CENSUS OF 1921, 1933 AND 1947**

(Exclusive of Full-blood Aboriginals)

Class of Occupation	Census 1921	Census 1933	Census 1947
Fishing and Trapping	10,752	14,611	16,393
Agricultural and Pastoral, etc.	481,355	547,787	459,502
Forestry	30,280	26,133	22,124
Mining, etc.	66,766	68,520	54,391
Industrial—			
Manufacturing	445,574	511,511	799,215
Building	95,274	107,446	232,433
Roads, Earthworks, etc.	137,106	217,656	—
Other	39,852	29,558	30,585
TOTAL INDUSTRIAL	717,806	866,171	1,062,233
Transport and Communication	207,737	223,893	295,567
Commerce, etc.	330,678	451,172	479,230
Public Administration, etc.	215,229	232,212	348,811
Entertainment, etc.	17,830	24,250	225,566
Domestic Service	209,814	242,378	No entry
No Industry, etc.	61,414	195,430	232,534
Pensioners }	3,086,073	263,064	4,382,927
Dependants }		3,474,218	
TOTAL	5,435,734	6,629,839	7,579,358

Government Railways Statistics, 1946-47

Government	Mileage	Gross Revenue	Working Expenses	Net Revenue
		£000	£000	£000
Commonwealth	2,201	1,100	1,259	-159
N.S.W.	6,128	29,287	24,290	4,997
Victoria	4,748	13,576	12,953	623
Queensland	6,566	10,621	9,899	722
South Australia	2,547	4,622	5,069	-447
Western Australia	4,348	4,046	4,424	-378
Tasmania	642	884	1,126	-242
TOTAL	27,180	£64,136	£59,020	£5,116

GAUGES OF GOVERNMENT RAILWAYS

5' 3"	6,114 miles	3' 6"	13,612 miles
4' 8½"	7,310 miles	Other	144 miles

POSTAGE RATES WITHIN THE COMMONWEALTH

(Including Lord Howe Island, Norfolk Island, Papua, New Guinea, New Ireland, New Hanover, Admiralty, Nauru, Bougainville, Buka.)

Classification	Rate of Postage	Maximum Weight
First Class Mail—		
Letters and Letter Cards	2½d. first oz., 2d. each add. oz.	—
Post Cards	2d. each	
Second Class Mail—		
Commercial Papers	1½d. per 2 oz. or part thereof	5 lb.
Printed Matter (comprising printed papers, circulars, catalogues, books, periodicals, newspapers, NOT registered at a G.P.O.) ...	1½d. per 4 oz. or part thereof	5 lb.
Patterns, Samples, Merchandise ..	1½d. per 2 oz. or part thereof	1 lb.
Third Class Mail—		
Books, periodicals, newspapers (registered at a G.P.O.)	1½d. per 6 oz. or part thereof	5 lb.

Fourth Class Mail—Parcel Post:

Scale Destination	1 lb.	2 lb.	3 lb.	4-5 lb.	6-8 lb.	9-11 lb.
1. Within 30 miles of office of posting	6d.	9d.	1/-	1/3	1/6	1/9
2. Within N.S.W. beyond 30 miles (including Norfolk Island and Lord Howe Island)	9d.	1/-	1/3	1/6	2/-	2/9
3. Queensland, Victoria, and Tasmania	1/-	1/6	2/-	2/6	3/6	5/-
4. S. Aust., W. Aust., N.T.	1/3	2/-	2/9	3/6	5/-	7/3

	1-3 lb.	4-7 lb.	8-11 lb.
Papua, New Guinea, New Britain, New Ireland, New Hanover, Admiralty, Bougainville, Buka	1/2	2/11	4/11
Max. weights of parcels within the Commonwealth and beyond, 11 lb.			

POSTAGE RATES

BEYOND THE COMMONWEALTH

Classification	N.Z. and Islands and Fiji	To places within the British Empire	Foreign Countries	Maximum Weights
Letters and Letter Cards	2½d. first oz. 2d. ea. add. oz.	2½d. first oz. 2d. ea. add. oz.	3½d. first oz. 2d. ea. add. oz.	4½ lb.
Post Cards	2d. each	2d. each	2d. each	
Commercial Papers ...	1½d. per 2 oz.	3d. 1st 4 oz. 1½d. ea. add. 2 oz.	3½d. 1st 4 oz. 1½d. ea. add. 2 oz.	4½ lb.
Printed Matter ...	1½d. per 4 oz.	1½d. per 4 oz.	2d. 1st 2 oz. 1½d. ea. add. 2 oz.	6½ lb. Single vols. to 11 lb.
Samples	1½d. per 2 oz.	1½d. per 2 oz.	2d. 1st 2 oz. 1½d. ea. add. 2 oz.	1 lb. U.K. only 5 lb.
Merchandise.	1½d. per 2 oz.	No rate	No rate	1 lb.
Small Packets to certain countries only		8d. 1st 8 oz. 2d. ea. add. 2 oz.	8d. 1st 8 oz. 2d. ea. add. 2 oz.	2 lb. must be unsealed
Newspapers	1½d. per 6 oz. (U.K., Eire included)	1½d. per 4 oz.	2d. per 2 oz. 1½d. ea. add. 2 oz.	6½ lb.

AIR MAIL RATES

BEYOND THE COMMONWEALTH

Country of Address	Letters, etc., per ½ oz. s. d.	Post-cards s. d.
Commonwealth of Australia, Papua, New Guinea, Norfolk Island	All classes of articles except parcels:—ordinary postage rates plus 3d. per ½ oz. Air Mail Fee	
New Zealand	1st ½ oz. 5½d. ea. add. ½ oz. 5d.	3½
United Kingdom, Europe, Africa ..	1 6	9
Malaya, Netherlands East Indies	9	5
Burma, Ceylon, Hong Kong, India, Pakistan, Siam	1 0	6
China, Japan, Philippines, Russia ...	1 6	9
Canada, U.S.A.	1 6	9
Central America, West Indies	1 10	11
South America	2 3	1 2

Parcel Post beyond Australia, enquire at any Post Office regarding Rates of Postage and Customs Declarations.

AIRLETTERS.— A lightweight airletter service is available to most overseas countries. The special forms used are obtainable at Post Offices. Price 7d., inclusive of postage.

MONEY ORDERS & 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 6d. for each £5 or fraction of £5. For orders payable in most overseas countries the rate of commission is 4d. for each £1 or portion of £1 up to £6, and 3d. for each additional £1, with a minimum of 9d. A limit of £8 sterling, £10 Australian, per week is imposed on money orders issued on sterling countries, and £4 sterling, £5 Australian, per month on money orders issued on non-sterling countries. Postal Notes in denominations from 1/- to 20/- (poundage from 1d. to 3d.) 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 14 words (including address and signature):

Within a 15-mile radius of the office of origin	1/3d.
Beyond a 15-mile radius	1/6d.
Additional word in each case	1d.

Urgent Rate Telegrams.— Urgent rate telegrams are charged at double the ordinary rate, and are treated with the utmost expedition at all stages.

Lettergrams. — 30 words or portion thereof	1/6d.
Each additional word	½d.

Rates to and from Countries Overseas

BRITISH EMPIRE DESTINATIONS, excepting as indicated below:

Rates Per Word:

Ordinary	1/3d.
Code (CDE) (with minimum of five words)	10d.
Deferred (with minimum of five words)	7½d.
Daily Letter Telegrams	5d.
(Minimum charge as for 25 words	10/5d.)

Social Letter Telegrams are accepted for transmission between places in the Commonwealth and Empire points overseas with certain minor exceptions. Charges are 5/- for a minimum of 13 words and 5d. for each additional word.

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 6d. to 11d. per word.

CODE ADDRESSES.—A code address for telegrams may be registered. For Commonwealth telegrams the charge is £2/2/- per annum; for international telegrams only, 10/6d. yearly; and for both Commonwealth and international telegrams, £2/2/-. Particulars of a code address and relative full address may be published in the Post Office Guide on payment of a fee of 2/6 per annum.

RATES TO NEW ZEALAND.—Telegrams are accepted for transmission to places in New Zealand via cable.

Ordinary rate 4½d. per word

CDE (5-letter code—minimum charge as for

5 words) 2.7d. per word

Night Letter Telegram (NLT)—

Minimum 25 words 3/9d.

Each additional word 2d.

Social Letter Telegram (GLT)—

Minimum 13 words 2/-

Each additional word 2d.

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.

ANALYSES OF FERTILIZERS

FERTILIZER	CONTENT	REMARKS
Superphosphate	22% Phosphoric Acid	Most important fertilizer in Australia—used for wheat and other cereals for grain, top-dressing of pasture land, sowing of all crops—is the main ingredient of most mixed fertilizers.
Sulphate of Ammonia	21% Nitrogen	The most common and popular nitrogenous fertilizer—encourages leaf and green growth—very rapid in action—useful for giving a quick flush growth to pastures—valuable for green vegetables as cabbages, lettuce, silver beet, and other leaf types—used extensively in sugar cane production, by orchardists, particularly citrus growers, and for rice crops.
Nitrate of Soda	10% Nitrogen	Acts similarly to sulphate of ammonia—imported from overseas—an excellent nitrogenous fertilizer for use as a side dressing to vegetables.
Sulphate of Potash	48% Potash	A rich potassic fertilizer—mainly used in mixtures—encourages sugar production in vine fruits.
Muriate of Potash	60% Potash	Similar in action to sulphate of potash.
Blood, bone, and offal	16% Phosphoric Acid 5.25% Nitrogen	A popular organic fertilizer containing phosphoric acid and nitrogen, favoured by vegetable growers and gardeners.
Bone dust	22% Phosphoric Acid 3.5% Nitrogen	Contains phosphoric acid and nitrogen—mainly used by market gardeners.
Dried blood	12% Nitrogen	An organic manure rich in nitrogen, used by market gardeners.

THE STORY OF LYSAGHT'S

The story of Lysaght's is one of continual expansion. The first Lysaght plant, for example, was opened in Newcastle in 1921, when it became obvious that England could no longer supply the enormous quantities of galvanized iron and sheet steel necessary for the development of a young country standing on the threshold of industrialisation. This first plant consisted of two manual rolling mills and one galvanizing pot.

Progress was rapid, however, and by 1930 no less than sixteen manual mills were in operation, together with additional galvanizing units combining to produce a total of 80,000 tons of steel sheets per annum. But even this was not enough to meet the steadily rising demand, and in 1934 an entirely new type of mechanised rolling mill was introduced.

This was followed in 1936 by yet another mechanised rolling mill, bringing potential production to the record figure of 125,000 tons of sheets per year. In the same year the Company purchased from Australian Iron and Steel Ltd. their Port Kembla mechanised rolling mill and galvanizing plant, with a capacity of 25,000 tons of sheets annually. This plant was later transferred to its present site and expanded to increase its output to 60,000 tons of sheets per annum.

Further evidence of Lysaght's continual upward growth was given in 1947, when the Company absorbed the works of the Commonwealth Rolling Mills at Port Kembla. This plant produces approximately 36,000 tons of high grade motor body, deep drawing and enamelling sheets per annum. Thus, at the present time, the three Lysaght works combine to produce more than 256,000 tons of sheets per year, including 114,000 tons of Galvanized Iron, Zinc-anneal, and Terne Plate—a truly remarkable record, and one which clearly indicates the Company's determination to keep in step with Australia's demands for steel sheets in an ever-increasing range of grades and qualities.

Apart from providing much of the raw materials upon which so many Australian industries depend, the Lysaght organisation also make a valuable direct contribution to the national welfare by making huge purchases from allied industries. The three plants, for example, consume 300,000 tons of Australian steel per annum, 100,000 tons of Australian coal, 10,000 tons of Australian acids, and 11,000 tons of Australian zinc. They also provide direct employment for 4,000 workers.

THE FIRST STEP—ROLLING

The production of iron sheets in England by rolling dates back to the 18th century, and it is to the original manual rolling mills of Staffordshire and South Wales that Britain owes her reputation as a leader in this particular field.

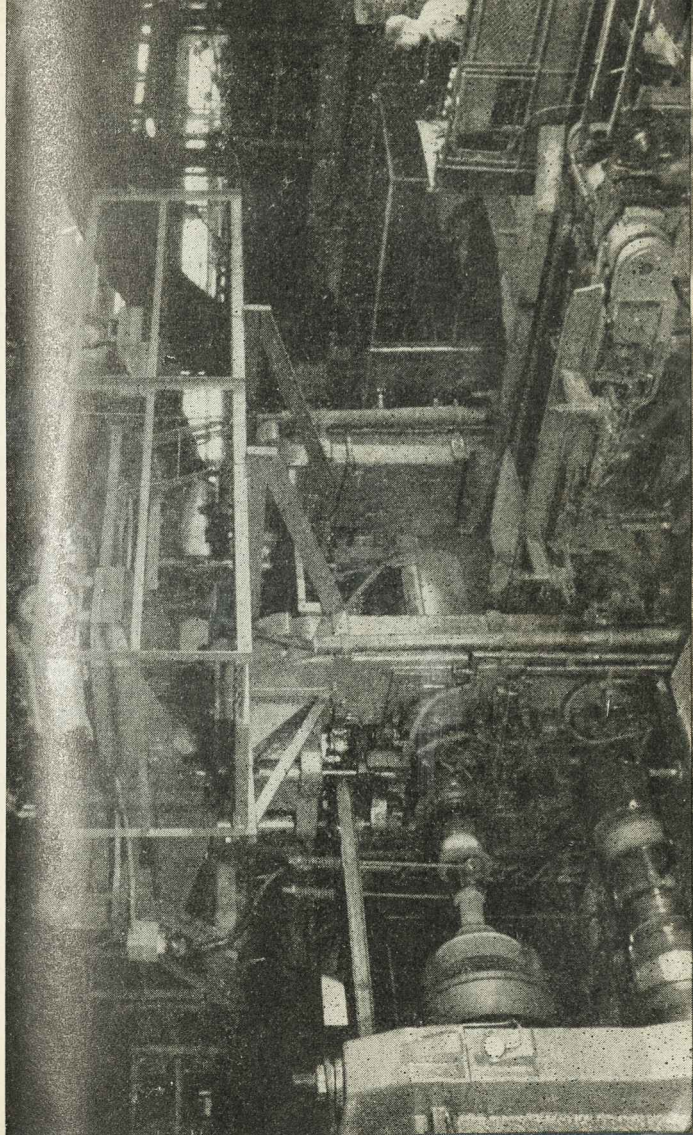
Since those days, however, not only has quality been greatly improved, but the number of different grades of steel sheet has been increased extensively to meet the widespread demands of to-day. To keep in step with these advances, it has been necessary to make drastic changes in both equipment and technique.

All modern plants engaged in the rolling of steel sheets, for example, are now mechanically operated, and known as 2-high, 3-high, 4-high or "cluster" mills, according to the number of rolls mounted in the housings. Each type has its own particular application, and may be used singly or in a group arranged one stand after the other, which is then known as a tandem mill.

The illustration on the opposite page is of a 3-high mechanically operated mill at Lysaght's Newcastle Works. This mill is capable of producing about 1,000 tons of semi-finished sheets per week. Steel is supplied to it in the form of sheet bar which is 12" wide, approximately 30' long, and varies in thickness depending upon the length and gauge of the finished sheet. The bar is cut into lengths equivalent to the width of the sheet and heated in gas-fired continuous bar furnaces. The hot bar is then fed sideways into the rolling mill, which means that the rolling direction is at right angles to the length of the bar.

In a 3-high mill such as that illustrated, mechanically operated tables feed the bar (later the sheet) backwards and forwards between the rolls. First between the bottom and centre rolls and then back between the centre and top pair. At each pass the sheet becomes longer and thinner, the process being continued until the required gauge is reached.

Single pieces are only reduced to $\frac{1}{8}$ " thickness. To obtain thinner sheets, two or three pieces are placed on top of each other to form a "pack," which is reheated and rolled further. For light gauge sheets the "pack" is doubled over on itself to form four or six thicknesses, and the rolling continued.



THE ANNEALING PROCESS

After rolling, steel sheets are hard and stiff, with pronounced directional properties which are undesirable, and in order to soften them they are annealed by taking them up to a temperature of 600°C. or more and slowly cooling. Each distinctive steel quality must be treated differently during this process, some requiring higher temperatures or longer soaking times than others. In all cases the temperature at which annealing is carried out is accurately controlled in order to ensure uniformity.

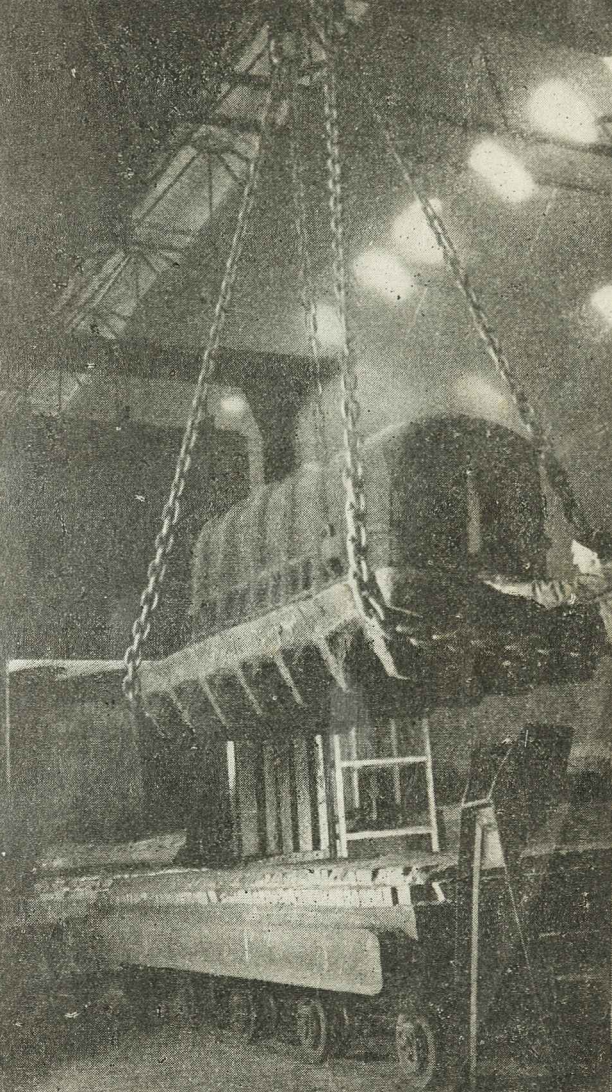
The illustration on page 145 shows a typical annealing "charge" being removed from the furnace at one of the Lysaght works. The charge consists of a large cast steel dish on which are stacked several tons of sheets. A large heat-resistant steel cover is placed over the stack, and a sand seal made to exclude air.

The whole "charge" is lifted by an overhead crane and placed in front of an open furnace and then pushed inside by means of special tackle. Having been heated to the specified temperature for the required time, the charge is withdrawn and allowed to cool slowly before unpacking and inspecting.

Not all furnaces, however, are built on the pattern of the coal-fired furnace illustrated. Furnaces can also be gas-fired, or built for annealing on mass-production lines as in the Wincott Continuous Furnace at the Newcastle Works. Such furnaces are built long enough to contain a number of fire-bricked platform cars, each carrying one complete charge of sheets.

After annealing, a proportion of the sheets pass through the "pickle" yards for treatment before galvanizing, zincannealing, or terne coating, but a large percentage is packed without any added coating ready for sale as Black Iron. Black Iron is the general term for all sheets that carry no surface coating.

In addition to rigid temperature controls during annealing, certain special Black Sheets such as Electrical Sheets and Lyco D.D. are fully sampled, the samples from each draft undergoing comprehensive physical and metallographic examination approximating the severest conditions met with in manufacturing process.



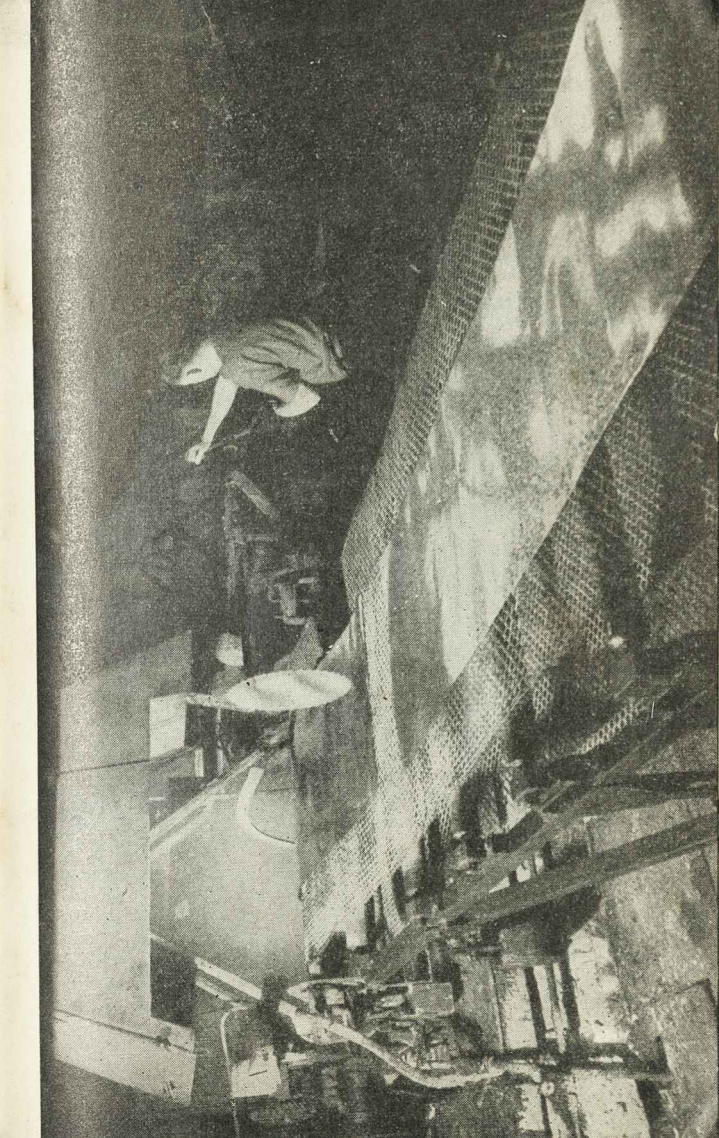
APPLYING THE PROTECTIVE COATING

The term "galvanizing" means the application of a coating of zinc to steel to provide a protective layer. Galvanizing, and in particular hot galvanizing, as carried out at Lysaght's, is the most widely used metallic preventive measure against rust. In order to coat a sheet with zinc, the steel surface must be quite clean and free from "scale" which is formed during rolling and annealing. This scale removal is accomplished by "pickling," which is the immersion of the sheets in a hot acid bath.

The illustration on page 147 shows one of many coating "pots" in use at both Newcastle and Port Kembla. Such pots can be used for galvanizing, zincannealing, orterne coating, and are constructed of heavy steel plate. In the case of Galvanized and Zincannealed sheets the pots are filled with molten zinc, to which small quantities of tin and lead are added. Inside each pot rests a frame carrying guides and three pairs of electrically driven steel rolls, which propel each sheet through the molten zinc.

The sheets are taken by tongs from a storage bath, dipped in acid to remove any final traces of rust or oxidation, and passed through revolving rubber rolls to remove any excess acid. These rolls also serve to drive the sheet through guides to the first pair of rolls in the pot. The sheet passes through a bath of molten flux before entering the zinc, where it picks up its metal coating. Steel guides under the surface of the zinc direct the sheet into the nip of a pair of exit rolls running half immersed in the molten zinc. The coating weight can be controlled by the level of the metal in the bath and by the pressure applied to the exit rolls. This coating weight conforms to the standard set down by the Standards Association of Australia. On leaving the pot the sheets are carried by a special mesh cooling conveyor to the inspector's table.

Lysaght's have also developed a type of coating known as Zincanneal, in which the zinc is alloyed with the iron by controlled heat treatment to the normally coated sheet. This alloy coating has many of the properties of a normal galvanized coating, but provides a better bond with paint, is more heat-resistant, and has given improved corrosion resistance.



THE FINAL STEP — CORRUGATING AND FINISHING

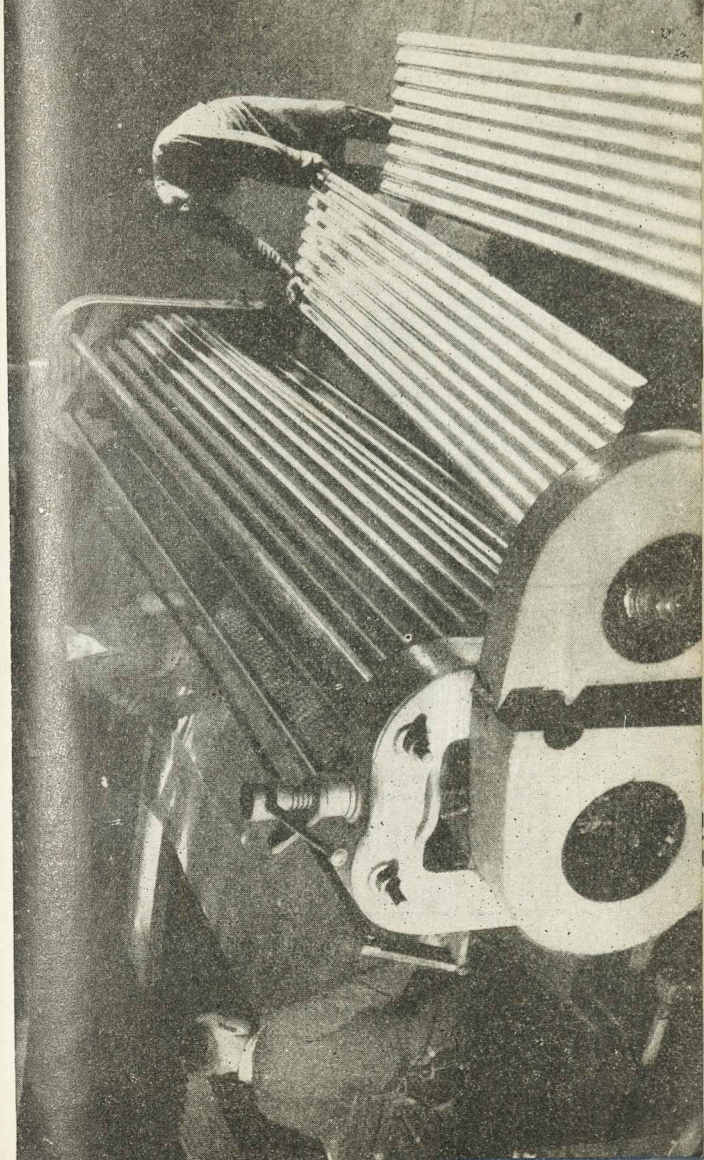
After careful inspection and grading, Lysaght Galvanized and Zincanneal sheets are branded with the familiar "Orb," "Queen's Head," or "Zincanneal" trade mark. Loads of sheets are placed alongside the branding machine, where a rubber wheel picks up one sheet at a time and sends it through a special machine where the appropriate brand is applied. The sheets are then automatically stacked.

Corrugating is applied to roofing sheets and sheets for tank-making according to the desired corrugation, i.e., 3" for most purposes, 1" for decorative ripple iron, and 5" for special purpose heavy sheets. Stacks of branded sheets are lifted by overhead travelling cranes and placed in front of the corrugating machines. Two operators then place bundles of sheets on an automatic feeding table, which moves forward and allows the sheets to be engaged by the corrugators.

Corrugators are of two types, the rotary type as illustrated on page 149, or the stamper pattern. Both are in use at the Lysaght Works. "Red Orb" and "Blue Orb" sheets are corrugated on the rotary type machines to form the standard 3" corrugations, while the stamper is used exclusively for making 5" corrugations in special heavy gauge sheets. After stamping the sheets are ready for delivery to the packing department.

Packing is a closely supervised operation, and the packer carefully counts and weighs sheets in lots of approximately 10 cwts. At the same time the sheets are given a further inspection for damage which may have occurred since the previous inspection. They are then packed into cases or bundles which are given the appropriate markings and stacked ready for despatch.

In review, the story of Lysaght's is a record of which the management and staff are equally proud. It is proof of the Company's determination to "grow up" with Australia, and an assurance that, as new processes, techniques and equipment are developed, they will be readily adapted to improve both the quantity and quality of steel sheets available to the manufacturer, builder, and man on the land.



JOHN LYSAGHT (AUST.) PTY. LTD.

	JANUARY	FEBRUARY	MARCH	APRIL
S	1 8 15 22 29	.. 5 12 19 26	.. 5 12 19 26	30 2 9 16 23
M	2 9 16 23 30	.. 6 13 20 27	.. 6 13 20 27	.. 3 10 17 24
T	3 10 17 24 31	.. 7 14 21 28	.. 7 14 21 28	.. 4 11 18 25
W	4 11 18 25 ..	1 8 15 22 ..	1 8 15 22 29	.. 5 12 19 26
T	5 12 19 26 ..	2 9 16 23 ..	2 9 16 23 30	.. 6 13 20 27
F	6 13 20 27 ..	3 10 17 24 ..	3 10 17 24 31	.. 7 14 21 28
S	7 14 21 28 ..	4 11 18 25 ..	4 11 18 25 ..	1 8 15 22 29

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F	5 12 19 26 ..	2 9 16 23 30	.. 7 14 21 28	4 11 18 25 ..
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T	.. 5 12 19 26	3 10 17 24 31	.. 7 14 21 28	.. 5 12 19 26
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FIRST AID TO THE INJURED

The following notes of First Aid have been contributed by The St. John Ambulance Association, of St. John House, 21 Macquarie Place, Sydney, the recognised teachers of First Aid, and have been taken from the St. John Manual, "First Aid to the Injured."

In all cases of illness or accident first send for a doctor or ambulance, notifying them clearly of the case to be treated and location of the accident.

FIRST AID KIT.—It is recommended that every home be equipped with an adequate First Aid Kit, the suggested contents for which are:—

Dressings: Bandages 1" and 2", broad bandage, cotton wool, lint, sling, gauze. Suggest cutting lint and gauze into 2" x 2" strips, placing each in a clean rag (to be sewn up) and sterilise by baking in the oven one hour.

Iodine (tincture).

Castor Oil.

Soda Bicarb.

Condy's Crystals.

Sal volatile.

SHOCK.—All cases of accident or sudden illness result in a condition known as Shock, which must be treated primarily.

TREATMENT OF SHOCK.—Lay patient on his back, loosen clothing about the neck, chest, and waist, and ensure a free circulation of air. Keep patient warm by covering with coats and blankets, but do not overheat the patient. When able to swallow give strong tea or coffee with plenty of sugar, or milk as hot as can be drunk.

Haemorrhage (Bleeding)—General Rules for Treatment

Place patient in suitable position. Elevate bleeding part except in the case of broken limb. Expose wound, removing only whatever clothing is necessary. Remove any visible and easily removed foreign bodies. All others are left severely alone. When bleeding has stopped keep the patient warm. Give plenty of fluids, especially warm tea or water with sugar if available.

SCALP.—Apply small firm pad on the wound, securing it by a narrow bandage.

NECK.—Apply thumb of one hand on the artery, pressing backwards against the spine, taking care to avoid windpipe.

FACE.—Below the level of the eye. Apply direct pressure on the wound from the outside of the cheek against the jawbone.

ARMPIT.—Place hard pad (size of billiard ball) in the armpit. Apply centre of narrow bandage on the pad, cross the 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 the artery against the bone.

FOREARM.—Pressure may be applied by the thumb placed on either of the pulsating arteries (according to the side of the arm the wound occurs).

PALM OF HAND.—When foreign or broken bone is not present, apply dressing and firm pad, making the patient grasp it. Bandage 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 upper region of artery keep the pressure up until the arrival of 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 on pulsating arteries on front (below knee) and back (halfway down leg) of leg if haemorrhage occurs there.

SOLE OF FOOT.—Apply dressing and firm pad over the bleeding point, and maintain firm pressure by bandaging. Support foot in an elevated position.

ANTISEPTICS.—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. If sterilised dressings are not available, sterilise the fingers, cut piece of clean gauze, lint, or boracic lint to required size and apply to wound. Dressing should be covered with cotton wool and kept in place with bandage.

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.

HOT COMPRESS.—Used to ease pain. Piece of flannel or lint soaked in very hot water and wrung dry and shaken to expel steam and applied to affected part.

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 spot. No attempt must be made to move patient until limb has been rendered immovable 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, or other similar objects. 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.—Apply ice or cold water to head continuously, keeping patient absolutely quiet in a darkened room. Promote warmth to lower part of the body by applying hot water bottles to the sides of the abdomen and lower limbs.

LOWER JAW.—Place palm of hand below injured bone and press it gently against the upper jaw, applying bandage under the chin, carrying both ends upward and tying above the head.

COLLAR BONE.—Place pad about 2" thick in armpit. Place arm in sling; secure injured limb firmly to the side by broad bandage passed round elbow and trunk.

RIBS.—Apply two broad bandages or strong towel folded about 8" wide firmly round the chest, securing with three or four safety pins on side opposite to the injury.

FOREARM.—Apply splints on the front and back of forearm from elbow to fingers, unless there is a wound at the site of injury. Bandage above fracture and around the wrist. Place arm in sling.

UPPER ARM.—Near shoulder: Apply broad bandage with upper border level with top of shoulder; pass it around the limb and body and tie on opposite side under armpit.
Middle of shaft: Apply splints from shoulder to elbow in front and back and outer side of arm. Secure splints by bandages above and below fracture.

HAND.—Apply carefully padded splint to front of hand and secure by bandage.

THIGH.—Apply bandage around ankles and feet; place splint along injured side from armpit to beyond the foot; secure with bandages.

LEG.—Apply splints on outer and inner side of leg and secure by bandages. When no splints are available, tie feet, ankles, knees, and thighs together.

CRUSHED FOOT.—Apply carefully padded splint to sole of foot from heel to toes and secure with bandages.

General

DISLOCATION OF JOINTS.—Steady and support limb in most comfortable position. Apply cold compresses to relieve pain. Do not attempt to reduce dislocation.

SPRAINS.—Apply firm bandage; wet the bandage with cold water and keep it wet.

STRAINS.—Support the injured part and apply hot compresses.

RUPTURE (HERNIA).—Lay patient down, raise and support head and shoulders; bend the knees and place pillow under them. Apply ice or cold compress to affected part. Make no attempt to reduce swelling.

BURNS AND SCALDS.—Do not remove clothes and do not break away any blisters. Saturate area with warm alkaline solution (1 dessertspoonful baking soda to 1 pint warm water) or warm saline solution (1 teaspoonful common salt to 1 pint warm water). Cover area with lint, gauze, or linen soaked in similar solution. Bandage firmly in position. Give large quantities of warm, weak, sweet tea.

FOREIGN BODY IN EYEBALL.—Do not attempt to remove. Drop medicinal paraffin or castor oil on eyeball after pulling down lower lid. Close the lids, apply soft pad of cotton wool and secure by bandage.

QUICKLIME OR OTHER CORROSIVE ALKALI IN EYE.—Bathe the eye with solution of vinegar and cold water (1 part in 4) and treat as for the foreign body. If vinegar is not available, wash freely with cold water.

CORROSIVE ACID IN THE EYE.—Bathe the eye with solution of baking soda (1 dessertspoonful in pint of cold water) and treat as for foreign body.

FOREIGN BODY IN EAR CHANNEL.—Fill ear with olive oil, when insect will float and may be removed. Do not probe or syringe the ear.

FOREIGN BODY IN NOSE.—Instruct patient to breathe through the mouth. Seek medical aid at once.

SUNSTROKE.—Sponge body with cold water continuously. Apply ice bags to head and spine; fan vigorously. Give Epsom or Glauber Salts (1 tablespoon to tumbler of water). Place patient in cool spot.

APOPLEXY (STROKE).—Apply ice or cold water to head continuously; apply hot water bottles to lower limbs and feet. If face flushed, raise head, loosen clothing.

FAINTING.—Sprinkle face with hot and cold water alternately; apply warmth to pit of stomach and over the heart. Loosen all clothing, give air.

BITES—Snake Bite, Spider Bite.—Immediately arrest circulation in limb by means of constriction on limb between the wound and the heart on the upper arm or thigh (as the case may be). Release constriction after 20 minutes, immediately replacing it. Give hot drinks, such as strong coffee, tea, or milk. Encourage bleeding by scarifying puncture marks. If available, rub condy's crystals.

Poisons

EMETIC.—To make patient vomit:—

1. Mustard powder—a tablespoonful in a tumblerful ($\frac{1}{2}$ pint) of lukewarm water, or
2. Salt—two tablespoonfuls in a tumblerful ($\frac{1}{2}$ pint) of lukewarm water.

POISONS.—Except when lips and mouth are burned, promptly give an EMETIC.

When lips and mouth are burned DO NOT give an emetic, but give the following antidotes:—

If an acid is known to be the poison, give one of the following alkalis:—Lime-water in large quantities or 1 tablespoonful of whitening, chalk, or magnesia in $\frac{1}{2}$ pint of water, repeated frequently, or carb. soda.

If an alkali is known to be the poison, give one of the following acids:—Vinegar or lemon juice or lime juice, each diluted with an equal quantity of water, by the tumblerful.

If these antidotes are not readily available, or if it is not known whether the corrosive poison is an acid or alkali, give copious draughts of cold water or of milk.

CARBOLIC ACID (PHENOL) AND LYSOL POISONS.—Give $\frac{1}{2}$ pint of medicinal paraffin or Epsom or Glauber Salts, 1 tablespoonful in tumbler of milk or water.

IODINE POISON.—Before the emetic give starch and water freely or thin cornflour or arrowroot.

PHOSPHORUS.—Give Epsom or Glauber Salts, 1 tablespoonful in a tumblerful of water. Oil or fat in any form must not be given.

ALCOHOL.—Promote warmth of the body, ensure rest and shelter; adopt general rules which apply; give hot strong coffee.

STRYCHNINE (Contained in many vermin killers).—Between the convulsions give an emetic and perform artificial respiration. Adopt the general rules which apply.

PRUSSIC ACID AND CYANIDE OF POTASSIUM.—Not a moment should be lost in carrying out treatment. Apply artificial respiration even if breathing has not ceased. If patient can swallow, give freely brandy, whisky, or sal volatile diluted with an equal quantity of water. Dash cold water on head and spine continuously. Adopt the general rules which apply.

Artificial Respiration for Mild Asphyxiation, Electric Shock, Drowning, etc.

SCHAFER'S METHOD.—At once place the patient face downwards with arms extended above the head and head turned to one side so as to keep the nose and mouth away from the ground. Do not waste time loosening clothing; no pad is to be placed under the patient, nor need the tongue be drawn out. Kneel at one side of the patient, facing his head and sitting on your heels. Place your hands on the small of the patient's back, their lower edges just clearing the top of the pelvis, the wrists nearly touching, the thumbs as near each other as possible without strain, and the fingers passing over the loins on either side and pointing towards the ground. Bending your body from the knees and somewhat straightening the hip joints, swing slowly forward, keeping your arms quite straight and rigid. Swing your body slowly backwards to its first position. Alternate these movements by a rhythmic swaying forwards and backwards of your body from the knee joints, twelve times a minute. Rhythm is—pressure two seconds and relaxation three seconds. When natural breathing begins, regulate the movements of artificial respiration to correspond with it, and promote circulation by rubbing the limbs vigorously towards the heart and applying warmth. Artificial respiration must be continued perseveringly until respiration is restored or until a doctor pronounces life to be extinct.

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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