

LIONWELD MEISER (L.L.C.)



LIONWELD MEISER (L.L.C.)

P. O. Box: 233, Dubai - U.A.E.
Tel: +971 4 33 93 474, Fax: +971 4 33 93 444
E-mail: info@lionweldmeiser.ae

LIONWELD MEISER (L.L.C.)
provide a purpose built facility in Dubai
dedicated for the manufacture of Access
Engineering products.

Products include:
Manufacture of Grating Panels
Stair Treads
Handrail system
Cage Ladders
Panel clips
Heavy duty "Safe Grate" trench grating

COMPANY PRESENTATION



Founded by the late Yousuf Baker in 1947, the DUTCO Group of Companies is one of the oldest business organizations in the United Arab Emirates and has a long and distinguished history. Activities include amongst others large-scale civil engineering work, mechanical and electrical engineering, pipeline engineering, shipping and freight services, trading and luxury hotel operation. Since the beginning, DUTCO has been single mindedly focused on quality, safety and professionalism. All member companies and divisions confirm to the highest standards of industry practice.



MEISER

Founded in 1956 by Edmund Meiser, MEISER has become the leading company in grating production in Europe, employing over 1.200 people and comprising 15 companies.

>>Made in Germany<< is one of the priority ambitions of the German family-owned company, including the quality, accuracy and the reliability of their products and services. MEISER has its own galvanising, slitting plants and shaping lines, thus ensuring the highest standards of performance and flexibility. With these plants MEISER is in a position to offer customers high quality products such as gratings, profile planking and stairways in the shortest available time.

TWO GIANTS FOR ONE GOAL

Effective January 1st 2006, DUTCO has sold 49% of its metal access systems business, LIONWELD KENNEDY MIDDLE EAST L.L.C., to the MEISER Group, the No.1 company in Europe in this field. In acknowledgement of the new partner the name of the company has been changed to

LIONWELD MEISER (L.L.C.) (>>LML<<)

The joint owners of LML are particularly excited about the prospects to expand the size of the business, which will continue to be based at the DUTCO Complex in Jebel Ali, and offer the many product lines in which MEISER is already an industry leader. Given the proven quality of the participants, the partners are confident that LIONWELD MEISER grating will be acknowledged by trade specialists to be one of the best products of its kind in the world. It's a fair prediction, we feel, and part of the reason is undoubtedly the committed work of our planning department and our reliable delivery dates. We are proud to support customer and to help creative architects and civil engineers to manage sophisticated questions of design, engineering and know-how.



LIONWELD MEISER (L.L.C.)

LIONWELD MEISER (L.L.C.) OFFER:

- Full 'In-House' Design and CAD facilities.
- Specialist purpose built grating manufacturing and fabrication facilities.
- Full project management for design & fabrication.
- High speed turnround
- A customer care service which is possibly the best in the industry.



Quality Control and high levels of services are the fundamentals upon which Lionweld Meiser (L.L.C.) has earned its reputation as a market leader.

Lionweld Meiser (L.L.C.)'s customer led quality policy does not just simply state "Getting it right FIRST time"... But "getting it right ON time".

Lionweld Meiser (L.L.C.) investment in people, plant and equipment as well as in-depth knowledge and expertise underwrites our ability and commitment to achieving total customer satisfaction.



THE PRODUCTS WE MANUFACTURE

OPEN STEEL RECTANGULAR GRATING

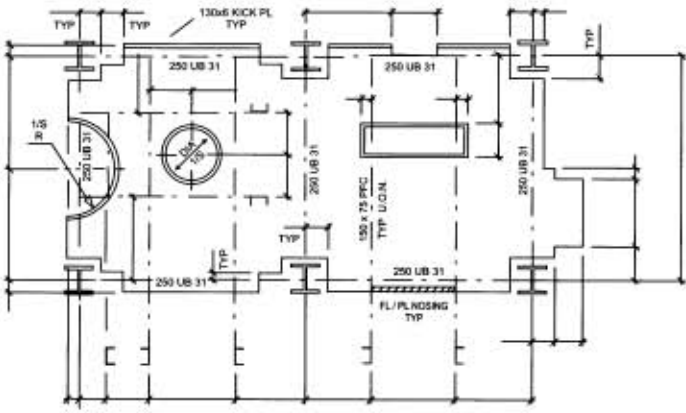
This type of flooring is constructed from a series of flat load bearing bars, either 3 mm or 5 mm thick at 30,41,34,17 and 20.5mm centres to which transverse bar sections are electro-forge welded into the top surface. The 'N' range has 30mm centres and the 'W' has 41mm centres, the 'E' has 34mm centres, the 'D' has 17mm centres and the 'G' has 20.5mm centres.

Standard 1m x 6m Panels

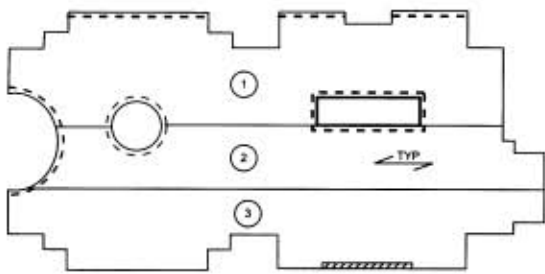
Lionweld manufactures grating, ranging from 20 mm deep to 50mm deep, in standard panels nominally 1m wide x 6m long.

These standard panels can be supplied direct to the customer or can be cut and shaped by Lionweld to suit the customer's individual requirements.

INFORMATION REQUIRED FROM THE CLIENT



GRATING LAYOUT FROM LML



NOTE: WE MAKE MAXIMUM USE OF LONG LOAD BAR

THE SERVICE WE OFFER



SITE SURVEYS

The company will undertake site surveys and advise the customer of the most practical and economical way of solving a particular problem. Fully qualified engineers will compute all the necessary details and prepare working drawings for fabrication.

TECHNICAL ASSISTANCE ...WHERE EXPERIENCE COUNTS!

The company's technical department is always available to provide customers with assistance in the selection of the most suitable products to use on any installation. It is however essential that the customer supplies basic details of all maximum loading types whether point loads, uniformly distributed loads or wheel loads.

FINISHES

Lionweld products can be supplied self color or galvanized.

The company has its reputable hot dip galvanizing suppliers thereby offering an efficient and complete service.

QUALITY CONTROL... THE BEST!

All Lionweld products are carefully inspected at each stage of manufacture to ensure they confirm to the high quality control standards operated by the company. Products are manufactured in excess of British Standards, a guarantee of top quality itself.

AFTER SALES SERVICES...

The company believes that the completion of a contract should not mean the end of contract. If required, our technical representatives will visit a site to inspect the installation to ensure that all specifications and safety criteria have been met.

BRITISH STANDARD ON LOADING

British Standard, BS 4592 Part One: 1987 covering loading for pedestrian traffic on steel flooring, has just been published. There are now three loading categories; light, medium and heavy duty, which cover one person access, regular two-way traffic and high density traffic.

GRATING

TERMINOLOGY

A. Load Bearing Bar

A load-bearing member spanning between supports.

B. End Plate

A plate fixed to a stair or ladder tread for attaching to the stringer.

C. Transverse Bar

A member fixed right angles to the load-bearing bars to provide lateral restraint.

D. Curb Angle

A member fixed to concrete or supporting steelworks at the perimeter of a flooring area.

E. Pitch

The distance centre-to-centre of load-bearing bars or centres between points of lateral support to load-bearing bars.

F. Kicking Plate (Toe Plate)

A flat bar around the edge of a flooring panel and projecting above the top of the load-bearing bars.

G. Length (Direction of Span)

A overall dimension of a flooring panel parallel with the load-bearing bars.

H. Net Area

The actual area of flooring excluding cut-out areas.

Gross Area

The total area of flooring including cut-out areas.

I. Width

The overall dimension of a flooring panel measured at right angles to the load-bearing bars.

J. Cut-out

An area of flooring removed to permit pipes, columns, etc., to pass through or to clear obstructions.

K. Curved Shaping

The part of a cut-out which is curved.

L. Straight Shaping

The part of a cut-out which is straight.

M. Binding Bar

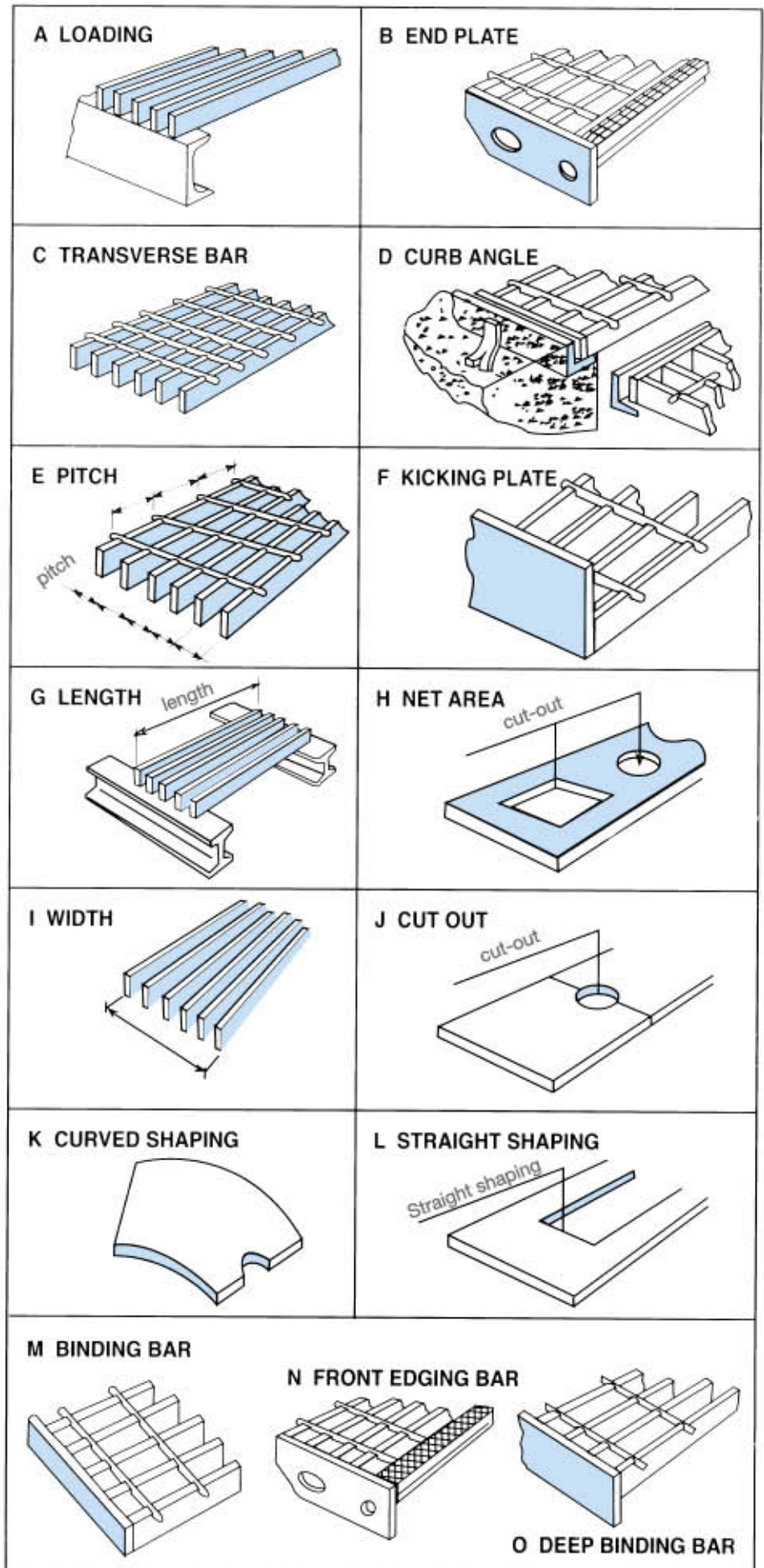
A bar or section fixed to the edges of a flooring panel flush with the top of the load-bearing bar.

N. Front Edging Bar/Support Bar

A member attached to the front of a stair tread or to a flooring panel.

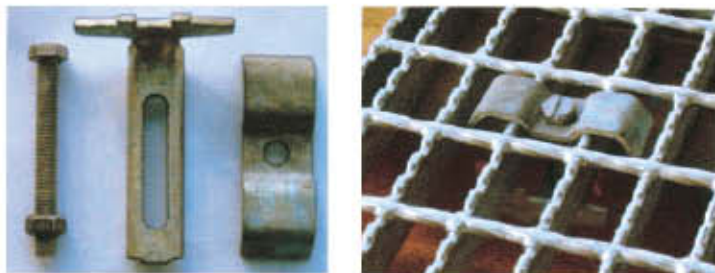
O. Deep Binding Bar

A bar or section fixed to the edges of a flooring panel and projecting below the underside.

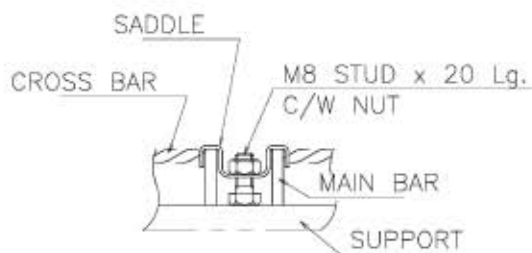


FLOORING-FIXING DETAILS

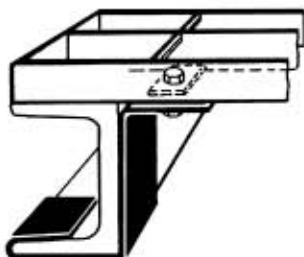
TYPE 5 SADDLE CLIP FOR GRATING ONLY



WELDED TYPE CLIP FOR FIRE PROOFED SUPPORT



EXTENDED CLIP



INSTALLATION PROCEDURE FOR TYPE 5 FIXING CLIPS

Type 5 fixing clip comes in three components, the top, bottom saddle and the bolt and nut. Lionweld delivers fixing clips in loose condition for assembly at site. Following are the procedures in installing the Type 5 clips:

1. Identify the location points from the grating panels where clips are to be installed. It is recommended to use minimum for (4) sets of fixing clips per panel. Refer to the attached sketch showing the ideal location of clips.
2. From the first selected point, put the bottom saddle underneath the grating panel, the ribs to be on the grating side and the slotted hole area to be underneath the support.
3. While holding the bottom saddle, position the nut into the groove of the bottom saddle.
4. Insert the bolt with the bolt head facing the installer into the top saddle hole and screw the nut by hand into the nut positioned at the groove of the bottom saddle.
5. Use screw driver and socket wrench to fully tighten the bolt to the required torque of 5 ft-lb (min.) to 10 ft-lb (max). As with all fixing clips, it is essential, before tightening fixing screws, to ensure that the gratings is in full contact with the top surface of the supporting steel.
6. Repeat the same procedure for the remaining three (3) points.

Saddle Clip for Grating Only

Pressed steel top saddle 8 mm diameter bolt 10 mm longer than grating depth. Clip can fit over two bars and to secure adjoining panels together.

For grating 40 mm deep and over add an extra 10 mm to bolt length.

Extended Clip

As Angle Clip but for use with reversed channels.

Type E1 for 102 x 51 mm Channel

Type E2 for 127 x 64 mm Channel

Type E3 for 152 x 76 mm Channel

Type E4 for 178 x 75 mm Channel

Type E5 for 203 x 76 mm Channel

Type E6 for 229 x 76 mm Channel

Special E for above 229 x 76 Channel

Special L for above 152 Vertical Leg.

Note : Angle and extended clips are usually supplied with top clips.



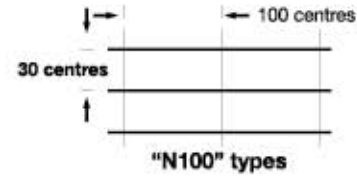
OPEN BAR GRATING

SAFE WORKING LOADS & DEFLECTION TABLES

Lionweld standard open bar grating comprises of a series of parallel flat load bearing bars stood on end equispaced with either indented round or square twisted bars resistance welded into the top surface of the load bearing bars primarily to keep them upright.

LOADING CONSIDERED		
a =	3.0	kN/m ²
b =	5.0	kN/m ²
c =	7.5	kN/m ²

"N" TYPE GRATING with load bearing bars @ 30 mm centres Cross bars @ 100 mm on centres



Max Clear Span for Pedestrian Load (mm)	Def (mm)	Bearing Bar (mm)	MAXIMUM UNIFORMLY DISTRIBUTED LOAD IN kN/m ² AND MAXIMUM DEFLECTION IN mm @ INDIVIDUAL CLEAR SPANS SHOWN IN mm.													S.C.F.		Approx. Fin. Wt. kg/m ²		
			UNITS	300	450	600	750	900	1000	1200	1350	1500	1650	1800	1950	2000	U.D.L.		D	
a	1526	7.63	25 x 3	kN/m ²	171.67	76.30	103.68	25.25	14.61	10.65	6.16	4.33	3.16	2.37	1.83	1.44	1.33	0.88	1.04	25.21
b	1287	6.43		D (mm)	0.65	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1124	5.62																		
a	1831	9.15	30 x 3	kN/m ²	247.20	109.87	61.80	39.55	25.25	18.41	10.65	7.48	5.45	4.10	3.16	2.48	2.30	0.90	1.03	29.65
b	1544	7.72		D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1349	6.74																		
a	2101	10.00	35 x 3	kN/m ²	336.47	149.54	84.12	53.83	37.39	29.23	16.92	11.88	8.86	6.51	5.01	3.94	3.65	0.92	1.03	34.09
b	1801	9.01		D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1574	7.87																		
a	2322	10.00	40 x 3	kN/m ²	439.47	195.32	109.87	70.31	48.83	39.55	25.25	17.73	12.93	9.71	7.48	5.88	5.45	0.93	1.03	38.53
b	2044	10.00		D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1799	8.99																		
a	1447	7.24	20 x 5	kN/m ²	183.11	81.38	42.08	21.55	12.47	9.09	5.26	3.69	2.69	2.02	1.56	1.23	1.14	0.86	1.05	32.61
b	1220	6.10		D (mm)	0.82	1.84	3.00	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1066	5.33																		
a	1809	9.04	25 x 5	kN/m ²	286.11	127.16	71.53	42.08	24.35	17.75	10.27	7.22	5.26	3.95	3.04	2.39	2.22	0.88	1.04	40.02
b	1526	7.63		D (mm)	0.65	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1333	6.66																		
a	2127	10.00	30 x 5	kN/m ²	412.00	183.11	103.00	65.92	42.08	30.88	17.75	12.47	9.09	6.83	5.26	4.14	3.83	0.90	1.03	47.42
b	1831	9.15		D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1599	8.00																		
a	2232	10.00	32 x 5	kN/m ²	468.76	208.34	117.19	75.00	51.07	37.23	21.55	15.13	11.03	8.29	6.38	5.02	4.65	0.91	1.03	50.38
b	1953	9.76		D (mm)	0.51	1.15	2.04	3.19	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1706	8.53																		
a	2387	10.00	35 x 5	kN/m ²	560.78	249.23	140.19	89.72	62.31	48.72	28.19	19.80	14.43	10.84	8.35	6.57	6.09	0.92	1.03	54.82
b	2101	10.00		D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1866	9.33																		
a	2539	10.00	38 x 5	kN/m ²	661.03	293.79	165.26	105.76	73.45	59.49	36.08	25.34	18.47	13.88	10.69	8.41	7.79	0.92	1.03	59.27
b	2235	10.00		D (mm)	0.43	0.97	1.72	2.68	3.86	4.77	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2019	10.00																		
a	2639	10.00	40 x 5	kN/m ²	732.44	325.53	183.11	117.19	81.38	65.92	42.08	29.56	21.55	16.19	12.47	9.81	9.09	0.93	1.03	62.23
b	2322	10.00		D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2098	10.00																		
a	3119	10.00	50 x 5	kN/m ²	1144.44	508.64	286.11	183.11	127.16	103.00	71.53	56.52	42.08	31.62	24.35	19.15	17.75	0.94	1.02	77.04
b	2745	10.00		D (mm)	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00			
c	2481	10.00																		

S.C.F. is the serrated factor by which the safe loads and deflections must be multiplied to obtain those for the equivalent overall load bearing bar depth with serrated top surface.

NOMINAL O/A DIMENSION OF BARS (in mm)

No. of Bars	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
5mm Load Bars	95	125	155	185	215	245	275	305	335	365	395	425	455	485	515	545

No. of Bars	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
5mm Load Bars	575	605	635	665	695	725	755	785	815	845	875	905	935	965	995

- NOTE :**
- For 3mm load bars subtract 2mm from widths
 - Width dimensions can vary due to manufacturing process. Refer to the Manufacturing Tolerances
 - Maximum length (LB span) available for this mesh opening is 6000mm

Standard width.

Unit weights given in the above are for cross bar spacing of 100mm. Add 0.56 kg/s.m. to get weight of gratings with fixing clips. For other available cross bar spacings, add the following values:

Cross Bar Spacing (mm)	Add'l Unit Wt. (kg/s.m.)
76	0.95
50	2.99
38	4.89



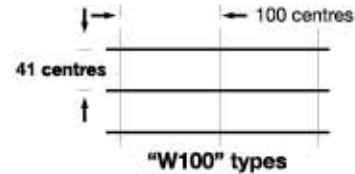
OPEN BAR GRATING

SAFE WORKING LOADS & DEFLECTION TABLES

Safe uniformly distributed loads (U.D.L.) in kilonewtons per square metre on simply supported panels with deflections (D) in mm. Based on a maximum permissible stress of 180 N/mm² which allows for a safety factor of 1.6

Note: for pedestrian traffic there are three loading categories which are (a) light duty, (b) Normal duty and (c) heavy duty. These categories are described as (a) access limited to one person only, (b) regular two way traffic and (c) high density traffic. BS4592, Part One: 1987.

"W" TYPE GRATING with load bearing bars @ 41 mm centres Cross bars @ 100 mm centres



Max Clear Span for Pedestrian Load (mm)	Def (mm)	Bearing Bar (mm)	MAXIMUM UNIFORMLY DISTRIBUTED LOAD IN kN/m ² AND MAXIMUM DEFLECTION IN mm @ INDIVIDUAL CLEAR SPANS SHOWN IN mm.																S.C.F.		Approx. Fin. Wt. kg/m ²
			UNITS	300	450	600	750	900	1000	1200	1350	1500	1650	1800	1950	2000	U.D.L.	D			
a	1380	6.90	25 x 3	kN/m ²	126.95	56.42	31.74	18.67	10.81	7.88	4.56	3.20	2.33	1.75	1.35	1.06	0.98	0.88	1.04	19.66	
b	1164	5.82		D (mm)	0.65	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1017	5.08																			
a	1656	8.28	30 x 3	kN/m ²	182.81	81.25	46.70	29.25	18.67	13.61	7.88	5.53	4.03	3.03	2.33	1.84	1.70	0.90	1.03	22.99	
b	1396	6.98		D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1220	6.10																			
a	1931	9.66	35 x 3	kN/m ²	248.82	110.59	62.21	39.81	27.65	21.62	12.51	8.79	6.40	4.81	3.71	2.92	2.70	0.92	1.03	26.32	
b	1629	8.15		D (mm)	0.41	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1423	7.12																			
a	2154	10.00	40 x 3	kN/m ²	346.66	154.07	86.67	55.47	37.77	27.53	15.93	11.19	8.16	6.13	4.72	3.71	3.44	0.91	1.03	38.54	
b	1766	8.63		D (mm)	0.51	1.15	2.04	3.19	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1543	7.71																			
a	2214	10.00	30 x 5	kN/m ²	414.71	184.31	103.68	66.35	46.08	36.03	20.85	14.64	10.67	8.02	6.18	4.86	4.50	0.92	1.03	41.88	
b	1931	9.66		D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1687	8.44																			
a	2355	10.00	38 x 5	kN/m ²	488.85	217.27	122.21	78.22	54.32	44.00	26.88	18.74	13.66	10.26	7.91	6.22	5.76	0.92	1.03	45.21	
b	2072	10.00		D (mm)	0.43	0.97	1.72	2.68	3.86	4.77	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1832	9.16																			
a	2447	10.00	40 x 5	kN/m ²	541.66	240.74	136.41	86.67	60.18	48.75	31.12	21.86	15.93	11.97	9.22	7.25	6.72	0.93	1.03	47.43	
b	2154	10.00		D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00				
c	1928	9.64																			
a	2893	10.00	50 x 5	kN/m ²	846.34	376.15	211.59	135.41	94.04	76.17	52.90	41.79	31.12	23.38	18.01	14.17	13.13	0.94	1.02	58.54	
b	2546	10.00		D (mm)	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00				
c	2301	10.00																			

S.C.F. is the serrated factor by which the safe loads and deflections must be multiplied to obtain those for the equivalent overall load bearing bar depth with serrated top surface.

NOMINAL O/A DIMENSION OF BARS (in mm)

No. of Bars	4	5	6	7	8	9	10	11	12	13	14
5mm Load Bars	128	169	210	251	292	333	374	415	456	497	538

No. of Bars	15	16	17	18	19	20	21	22	23	24	25
5mm Load Bars	579	620	661	702	743	784	825	866	907	948	989

- NOTE :**
- For 3mm load bars subtract 2mm from widths
 - Width dimensions can vary due to manufacturing process. Refer to the Manufacturing Tolerances
 - Maximum length (LB span) available for this mesh opening is 6000mm

Standard width.

Unit weights given in the above are for cross bar spacing of 100mm. Add 0.56 kg/s.m. to get weight of gratings with fixing clips. For other available cross bar spacings, add the following values:

Cross Bar Spacing (mm)	Add'l Unit WL (kg/s.m.)
76	0.95
50	2.99
38	4.89



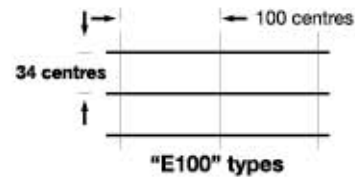
OPEN BAR GRATING

SAFE WORKING LOADS & DEFLECTION TABLES

Safe uniformly distributed loads (U.D.L.) in kilonewtons per square metre on simply supported panels with deflections (D) in mm. Based on a maximum permissible stress of 180 N/mm² which allows for a safety factor of 1.6

Note: for pedestrian traffic there are three loading categories which are (a) light duty, (b) Normal duty and (c) heavy duty. These categories are described as (a) access limited to one person only, (b) regular two way traffic and (c) high density traffic. BS4592, Part One: 1987.

"E" TYPE GRATING with load bearing bars @ 34 mm centres Cross bars @ 100 mm centres



Max Clear Span for Pedestrian Load (mm)	Def (mm)	Bearing Bar (mm)	MAXIMUM UNIFORMLY DISTRIBUTED LOAD IN kN/m ² AND MAXIMUM DEFLECTION IN mm @ INDIVIDUAL CLEAR SPANS SHOWN IN mm.													S.C.F.		Approx. Fin. Wt. kg/m ²	
			UNITS	300	450	600	750	900	1000	1200	1350	1500	1650	1800	1950	2000	U.D.L.		D
a	1465	7.33	kN/m ²	152.06	67.58	38.01	22.37	12.94	9.44	5.46	3.84	2.80	2.10	1.62	1.27	1.18	0.88	1.04	22.74
b	1236	6.18	D (mm)	0.85	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1080	5.40	kN/m ²	218.98	97.32	54.74	35.03	22.37	16.30	9.44	6.63	4.83	3.63	2.80	2.20	2.04			
a	1758	8.79	kN/m ²	298.04	132.46	74.51	47.69	33.12	25.89	14.98	10.52	7.67	5.76	4.44	3.49	3.24	0.90	1.03	26.69
b	1483	7.41	D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1295	6.48	kN/m ²	389.27	173.01	97.32	62.28	43.25	35.03	22.37	15.71	11.45	8.60	6.63	5.21	4.83			
a	2038	10.00	kN/m ²	496.73	220.77	124.16	79.48	55.19	43.15	24.97	17.54	12.79	9.61	7.40	5.82	5.39	0.92	1.03	30.64
b	1730	8.65	D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1511	7.56	kN/m ²	648.78	288.35	162.20	103.81	72.09	58.39	37.28	26.18	19.09	14.34	11.04	8.69	8.05			
a	2253	10.00	kN/m ²	848.78	388.35	216.40	138.41	96.18	72.09	45.33	31.96	22.45	16.38	12.29	9.47	8.90	0.93	1.03	34.59
b	1977	9.89	D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1727	8.64	kN/m ²	1013.73	450.54	253.43	162.20	112.64	91.24	63.36	50.06	37.28	28.01	21.57	16.97	15.73			
a	1390	6.95	kN/m ²	162.20	72.09	37.28	19.09	11.04	8.05	4.66	3.27	2.39	1.79	1.38	1.09	1.01	0.86	1.05	29.32
b	1172	5.86	D (mm)	0.82	1.84	3.00	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1024	5.12	kN/m ²	253.43	112.64	63.36	37.28	21.57	15.73	9.10	6.39	4.66	3.50	2.70	2.12	1.97			
a	1737	8.69	kN/m ²	364.94	162.20	91.24	58.39	37.28	27.17	15.73	11.04	8.05	6.06	4.66	3.66	3.40	0.90	1.03	42.49
b	1465	7.33	D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1280	6.40	kN/m ²	415.22	184.54	103.81	66.44	45.24	32.98	19.09	13.40	9.77	7.34	5.65	4.45	4.12			
a	2063	10.00	kN/m ²	496.73	220.77	124.16	79.48	55.19	43.15	24.97	17.54	12.79	9.61	7.40	5.82	5.39	0.91	1.03	45.12
b	1758	8.79	D (mm)	0.51	1.15	2.04	3.19	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1536	7.68	kN/m ²	648.78	288.35	162.20	103.81	72.09	58.39	37.28	26.18	19.09	14.34	11.04	8.69	8.05			
a	2165	10.00	kN/m ²	848.78	388.35	216.40	138.41	96.18	72.09	45.33	31.96	22.45	16.38	12.29	9.47	8.90	0.92	1.03	49.07
b	1875	9.38	D (mm)	0.43	0.97	1.72	2.68	3.86	4.77	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1638	8.19	kN/m ²	1013.73	450.54	253.43	162.20	112.64	91.24	63.36	50.06	37.28	28.01	21.57	16.97	15.73			
a	2316	10.00	kN/m ²	1013.73	450.54	253.43	162.20	112.64	91.24	63.36	50.06	37.28	28.01	21.57	16.97	15.73	0.93	1.03	55.65
b	2038	10.00	D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1792	8.96	kN/m ²	1213.73	540.54	303.43	192.20	132.64	101.24	73.36	58.06	43.28	33.01	25.57	20.97	19.73			
a	2463	10.00	kN/m ²	1213.73	540.54	303.43	192.20	132.64	101.24	73.36	58.06	43.28	33.01	25.57	20.97	19.73	0.94	1.02	68.81
b	2253	10.00	D (mm)	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00			
c	2036	10.00	kN/m ²	1513.73	690.54	393.43	252.20	162.64	121.24	83.36	65.06	49.28	37.01	28.57	22.97	21.73			

S.C.F. is the serrated factor by which the safe loads and deflections must be multiplied to obtain those for the equivalent overall load bearing bar depth with serrated top surface.

NOMINAL O/A DIMENSION OF BARS (in mm)

No. of Bars	4	5	6	7	8	9	10	11	12	13	14	15	16	17
5mm Load Bars	107	141	175	209	243	277	311	345	379	413	447	481	515	549

No. of Bars	18	19	20	21	22	23	24	25	26	27	28	29	30
5mm Load Bars	583	617	651	685	719	753	787	821	855	889	923	957	991

- NOTE :**
- For 3mm load bars subtract 2mm from widths
 - Width dimensions can vary due to manufacturing process. Refer to the Manufacturing Tolerances
 - Maximum length (LB span) available for this mesh opening is 6000mm

Standard width

Unit weights given in the above are for cross bar spacing of 100mm. Add 0.56 kg/s.m. to get weight of gratings with fixing clips. For other available cross bar spacings, add the following values:

Cross Bar Spacing (mm)	Add'l Unit Wt. (kg/s.m.)
76	0.95
50	2.99
38	4.89



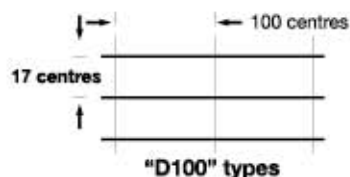
OPEN BAR GRATING

SAFE WORKING LOADS & DEFLECTION TABLES

Safe uniformly distributed loads (U.D.L.) in kilonewtons per square metre on simply supported panels with deflections (D) in mm. Based on a maximum permissible stress of 180 N/mm² which allows for a safety factor of 1.6

Note: for pedestrian traffic there are three loading categories which are (a) light duty, (b) Normal duty and (c) heavy duty. These categories are described as (a) access limited to one person only, (b) regular two way traffic and (c) high density traffic. BS4592, Part One: 1987.

"D" TYPE GRATING with load bearing bars @ 17 mm centres Cross bars @ 100 mm centres



Max Clear Span for Pedestrian Load (mm)	Def (mm)	Bearing Bar (mm)	MAXIMUM UNIFORMLY DISTRIBUTED LOAD IN kN/m ² AND MAXIMUM DEFLECTION IN mm @ INDIVIDUAL CLEAR SPANS SHOWN IN mm.													S.C.F.		Approx. Fin. Wt. kg/m ²		
			UNITS	300	450	600	750	900	1000	1200	1350	1500	1650	1800	1950	2000	U.D.L.		D	
a	1836	9.18	25 x 3	kN/m ²	299.12	132.94	74.78	44.00	25.46	18.58	10.74	7.54	5.50	4.13	3.18	2.50	2.32	0.88	1.04	41.24
b	1548	7.74		D (mm)	0.65	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1353	6.76		kN/m ²	430.73	191.44	107.68	68.92	44.00	32.07	18.58	13.04	9.50	7.14	5.50	4.33	4.01			
a	2150	10.00	30 x 3	kN/m ²	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00	0.90	1.03	48.89
b	1858	9.29		D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1623	8.12		kN/m ²	586.27	260.56	146.57	93.80	65.14	50.93	29.47	20.70	15.09	11.34	8.73	6.87	6.37			
a	2414	10.00	35 x 3	kN/m ²	765.74	340.33	191.44	122.52	85.08	68.92	44.00	30.90	22.53	16.92	13.04	10.25	9.50	0.92	1.03	56.54
b	2125	10.00		D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1894	9.47		kN/m ²	816.79	363.02	204.20	130.69	88.99	64.87	37.54	26.37	19.22	14.44	11.12	8.75	8.11			
a	2668	10.00	40 x 3	kN/m ²	977.12	434.27	244.28	156.34	108.57	84.88	49.12	34.50	25.15	18.90	14.56	11.45	10.61	0.92	1.03	92.23
b	2348	10.00		D (mm)	0.43	0.97	1.72	2.86	3.86	4.77	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2122	10.00		kN/m ²	1151.80	511.91	287.95	184.29	127.98	103.66	62.87	44.15	32.19	24.18	18.63	14.65	13.58			
a	1741	8.71	20 x 5	kN/m ²	1276.24	567.22	319.06	204.20	141.80	114.86	73.33	51.50	37.54	28.21	21.73	17.09	15.84	0.93	1.03	104.98
b	1469	7.34		D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1283	6.41		kN/m ²	1994.12	886.27	498.53	319.06	221.57	179.47	124.63	88.47	73.33	55.09	42.43	33.38	30.93			
a	2131	10.00	25 x 5	kN/m ²	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00	0.94	1.02	130.47
b	1836	9.18		D (mm)	0.51	1.15	2.04	3.19	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1604	8.02		kN/m ²	1276.24	567.22	319.06	204.20	141.80	114.86	73.33	51.50	37.54	28.21	21.73	17.09	15.84			
a	2443	10.00	30 x 5	kN/m ²	1994.12	886.27	498.53	319.06	221.57	179.47	124.63	88.47	73.33	55.09	42.43	33.38	30.93	0.90	1.03	79.46
b	2150	10.00		D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1924	9.62		kN/m ²	816.79	363.02	204.20	130.69	88.99	64.87	37.54	26.37	19.22	14.44	11.12	8.75	8.11			
a	2564	10.00	32 x 5	kN/m ²	977.12	434.27	244.28	156.34	108.57	84.88	49.12	34.50	25.15	18.90	14.56	11.45	10.61	0.91	1.03	84.58
b	2257	10.00		D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2039	10.00		kN/m ²	1151.80	511.91	287.95	184.29	127.98	103.66	62.87	44.15	32.19	24.18	18.63	14.65	13.58			
a	2743	10.00	35 x 5	kN/m ²	1276.24	567.22	319.06	204.20	141.80	114.86	73.33	51.50	37.54	28.21	21.73	17.09	15.84	0.92	1.03	99.86
b	2414	10.00		D (mm)	0.43	0.97	1.72	2.86	3.86	4.77	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2181	10.00		kN/m ²	1994.12	886.27	498.53	319.06	221.57	179.47	124.63	88.47	73.33	55.09	42.43	33.38	30.93			
a	2917	10.00	38 x 5	kN/m ²	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00	0.93	1.03	104.98
b	2567	10.00		D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2320	10.00		kN/m ²	1994.12	886.27	498.53	319.06	221.57	179.47	124.63	88.47	73.33	55.09	42.43	33.38	30.93			
a	3032	10.00	40 x 5	kN/m ²	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00	0.94	1.02	130.47
b	2668	10.00		D (mm)	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00			
c	2411	10.00		kN/m ²	1994.12	886.27	498.53	319.06	221.57	179.47	124.63	88.47	73.33	55.09	42.43	33.38	30.93			
a	3584	10.00	50 x 5	kN/m ²	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00	0.94	1.02	130.47
b	3154	10.00		D (mm)	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00			
c	2850	10.00		kN/m ²	1994.12	886.27	498.53	319.06	221.57	179.47	124.63	88.47	73.33	55.09	42.43	33.38	30.93			

S.C.F. is the serrated factor by which the safe loads and deflections must be multiplied to obtain those for the equivalent overall load bearing bar depth with serrated top surface.

NOMINAL O/A DIMENSION OF BARS (in mm)

No. of Bars	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
5mm Load Bars	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294	311
No. of Bars	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
5mm Load Bars	328	345	362	379	396	413	430	447	464	481	498	515	532	549	566	

- NOTE :**
- For 3mm load bars subtract 2mm from widths
 - Width dimensions can vary due to manufacturing process. Refer to the Manufacturing Tolerances
 - Maximum length (LB span) available for this mesh opening is 3000mm

Standard width.

Unit weights given in the above are for cross bar spacing of 100mm. Add 0.56 kg/s.m. to get weight of gratings with fixing clips. For other available cross bar spacings, add the following values:

Cross Bar Spacing (mm)	Add'l Unit Wt. (kg/s.m.)
76	0.95
60	2.99
38	4.89



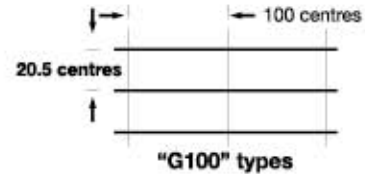
OPEN BAR GRATING

SAFE WORKING LOADS & DEFLECTION TABLES

“G” TYPE GRATING with load bearing bars @ 20.5 mm centres Cross bars @ 100 mm centres

Safe uniformly distributed loads (U.D.L.) in kilonewtons per square metre on simply supported panels with deflections (D) in mm. Based on a maximum permissible stress of 180 N/mm² which allows for a safety factor of 1.6

Note: for pedestrian traffic there are three loading categories which are (a) light duty, (b) Normal duty and (c) heavy duty. These categories are described as (a) access limited to one person only, (b) regular two way traffic and (c) high density traffic. BS4592, Part One: 1987.



Max Clear Span for Pedestrian Load (mm)	Def (mm)	Bearing Bar (mm)	MAXIMUM UNIFORMLY DISTRIBUTED LOAD IN kN/m ² AND MAXIMUM DEFLECTION IN mm @ INDIVIDUAL CLEAR SPANS SHOWN IN mm.														S.C.F.		Approx. Fin. Wt. kg/m ²
			UNITS	300	450	600	750	900	1000	1200	1350	1500	1650	1800	1950	2000	U.D.L.	D	
a	1727	8.63	kN/m ²	248.90	110.62	62.23	36.61	21.19	15.44	8.94	6.28	4.58	3.44	2.65	2.08	1.93	0.88	1.04	35.07
b	1456	7.28	D (mm)	0.65	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1272	6.36																	
a	2054	10.00	kN/m ²	358.42	159.30	89.60	57.35	36.61	26.69	15.44	10.85	7.91	5.94	4.58	3.80	3.34	0.90	1.03	41.49
b	1748	8.74	D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1527	7.63																	
a	2306	10.00	kN/m ²	467.85	216.82	121.96	78.06	54.21	42.38	24.53	17.23	12.56	9.43	7.27	5.72	5.30	0.92	1.03	47.90
b	2029	10.00	D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1781	8.91																	
a	2548	10.00	kN/m ²	637.19	283.20	159.30	101.95	70.80	57.35	36.61	25.71	18.74	14.08	10.85	8.53	7.91	0.93	1.03	54.32
b	2243	10.00	D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2027	10.00																	
a	1638	8.19	kN/m ²	265.50	118.00	61.02	31.24	18.08	13.18	7.63	5.36	3.91	2.93	2.26	1.78	1.65	0.86	1.05	45.77
b	1381	6.91	D (mm)	0.82	1.84	3.00	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1207	6.03																	
a	2035	10.00	kN/m ²	414.84	184.37	103.71	61.02	35.31	25.74	14.90	10.46	7.63	5.73	4.41	3.47	3.22	0.88	1.04	56.46
b	1727	8.63	D (mm)	0.65	1.47	2.61	3.75	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1508	7.54																	
a	2334	10.00	kN/m ²	597.37	265.50	149.34	95.58	61.02	44.48	25.74	18.08	13.18	9.90	7.63	6.00	5.56	0.90	1.03	67.15
b	2054	10.00	D (mm)	0.54	1.22	2.18	3.40	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1810	9.05																	
a	2449	10.00	kN/m ²	679.67	302.08	169.92	108.75	74.05	53.98	31.24	21.94	16.00	12.02	9.26	7.28	6.75	0.91	1.03	71.43
b	2156	10.00	D (mm)	0.51	1.15	2.04	3.19	4.50	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	1931	9.65																	
a	2620	10.00	kN/m ²	813.08	361.37	203.27	130.09	90.34	70.63	40.88	28.71	20.93	15.72	12.11	9.53	8.63	0.92	1.03	77.84
b	2306	10.00	D (mm)	0.47	1.05	1.86	2.91	4.20	5.00	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2083	10.00																	
a	2786	10.00	kN/m ²	958.44	425.97	239.61	153.35	106.49	86.26	52.31	36.74	26.78	20.12	15.50	12.19	11.30	0.92	1.03	84.26
b	2452	10.00	D (mm)	0.43	0.97	1.72	2.68	3.86	4.77	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2216	10.00																	
a	2896	10.00	kN/m ²	1061.98	471.99	265.50	169.92	118.00	95.58	61.02	42.85	31.24	23.47	18.08	14.22	13.18	0.93	1.03	88.54
b	2548	10.00	D (mm)	0.41	0.92	1.63	2.55	3.67	4.53	6.00	6.75	7.50	8.25	9.00	9.75	10.00			
c	2303	10.00																	
a	3423	10.00	kN/m ²	1659.35	737.49	414.84	265.50	184.37	149.34	103.71	81.94	61.02	45.84	35.31	27.77	25.74	0.94	1.02	109.92
b	3013	10.00	D (mm)	0.33	0.73	1.31	2.04	2.94	3.63	5.22	6.61	7.50	8.25	9.00	9.75	10.00			
c	2722	10.00																	

S.C.F. is the serrated factor by which the safe loads and deflections must be multiplied to obtain those for the equivalent overall load bearing bar depth with serrated top surface.

NOMINAL O/A DIMENSION OF BARS (in mm)

No. of Bars	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
5mm Load Bars	66.5	87	107.5	128	148.5	169	189.5	210	230.5	251	271.5	292	312.5	333	353.5	374

No. of Bars	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
5mm Load Bars	394.5	415	435.5	456	476.5	497	517.5	538	558.5	579	599.5	620	640.5	661	681.5

- NOTE :
- For 3mm load bars subtract 2mm from widths
 - Width dimensions can vary due to manufacturing process. Refer to the Manufacturing Tolerances
 - Maximum length (LB span) available for this mesh opening is 3000mm

Standard width.

Unit weights given in the above are for cross bar spacing of 100mm. Add 0.56 kg/s.m. to get weight of gratings with fixing clips. For other available cross bar spacings, add the following values:

Cross Bar Spacing (mm)	Add'l Unit Wt. (kg/s.m.)
76	0.95
60	2.99
38	4.89



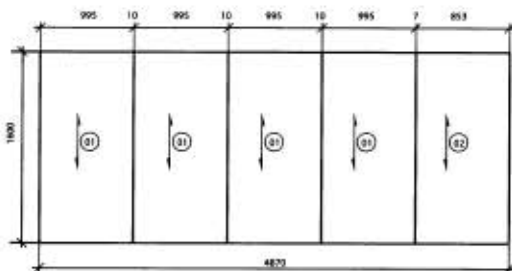
OPEN BAR GRATING

ORDERING INFORMATION

- * Nominate the grating type required by reference to previous page of this brochure.
- * Specify whether the grating is to be binded or just cut to size.
- * Non-standard welding on binding bars must be noted.
- * Nominate the number of panels required and provide dimensions for width and length of each panel.
- * Where large floor areas are required provide drawing of area to be covered showing:
 - (A) All dimensions.
 - (B) Load bar direction.
 - (C) Section size and location of support steel.
 - (D) Location and size of cut-outs and removable areas.
 - (E) Location of kick flats, nosings and splices at penetrations.
- * Specify the type of treatment required.
- * Where fasteners are needed, clients to indicate the type to fastening required.
- * For treads nominate the type required (select from the range on pages 15 & 16 and specify grating type, quantity, dimensions, treatment and snipe on end flat (if required on bolted tread).

ORDERING EXAMPLE

Supply 325N100 plain grating binded, galvanized.
One area - 4870 x 1600 span.



Example using standard stock width of 995.

Lionweld will supply the above platform made in standard stock width panels plus a narrow width panel cut to nearest load bar multiple. The balance allows for gaps between panels. **Gaps are normally 10 mm but vary to suit the specific case.**

EXAMPLE OF ORDERING

- * Safegrid 255N100 grating, bound, plain galvanized.
12/995 x 3135 (Load Bar) or span.

Safegrid treads RGL (ex 255N100) plain galvanized
7/245 x 800 LB span.

Safegrid 325W50 serrated grating unbound, self colour/black
17/925 x 5300 LB span.

Safegrid 325W50 serrated grating bound - welded both sides
every second load bar, galvanized.
40/1005 x 700 LB span.

Supply safegrid 403N100 galvanized grating including
fasteners as shown on drawing provided.

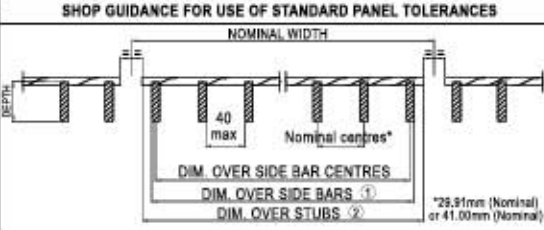

NOTE

Cross Bars are intentionally not aligned after panel
are laid out to enhance the anti-slip property of gratings.


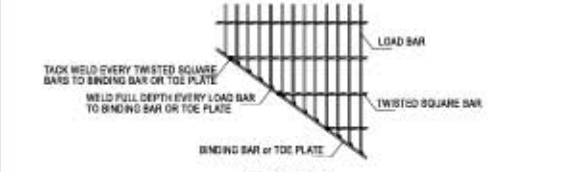
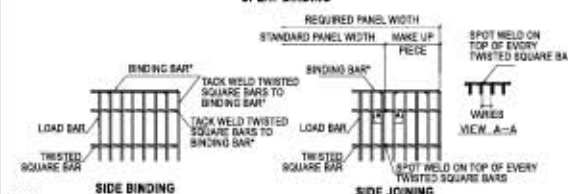
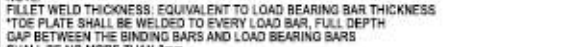
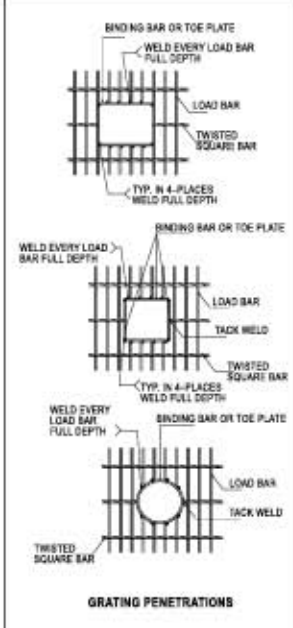
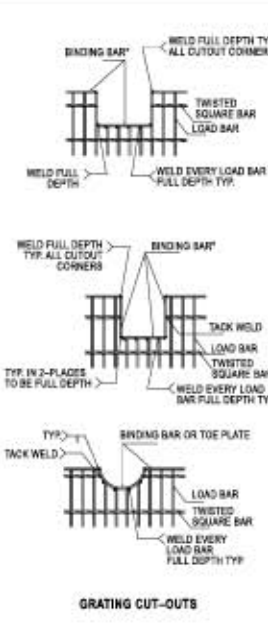


OPEN BAR GRATING

MANUFACTURING TOLERANCE

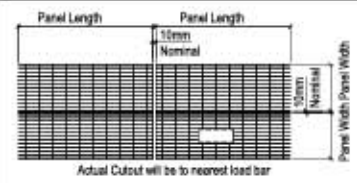
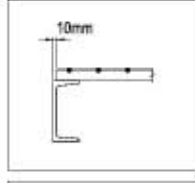
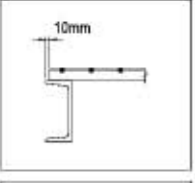
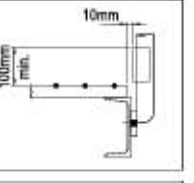
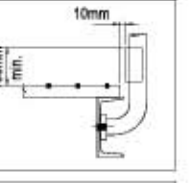
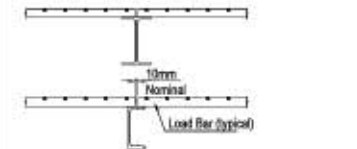
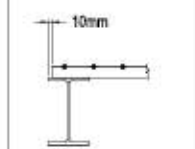
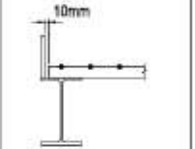
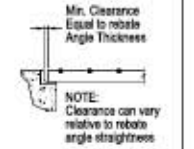
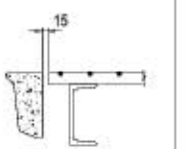
SHOP GUIDANCE FOR USE OF STANDARD PANEL TOLERANCES	SPECIFICATION FOR OPEN BAR GRATING—INDUSTRIAL RECTANGULAR PATTERN
 <p style="text-align: center;">NOMINAL WIDTH</p> <p style="text-align: center;">DEPTH</p> <p style="text-align: center;">40 max</p> <p style="text-align: center;">Nominal centres*</p> <p style="text-align: center;">DIM. OVER SIDE BAR CENTRES</p> <p style="text-align: center;">DIM. OVER SIDE BARS (1)</p> <p style="text-align: center;">DIM. OVER STUBS (2)</p> <p style="text-align: right;">*28.91mm (Nominal) or 41.00mm (Nominal)</p>	<p style="text-align: center;">Manufactured to the recommendations of BS4592-Pl. 1:1995</p> <p style="text-align: center;">PANEL LENGTH (SPAN) AFTER ALLOWING FOR END CLEARANCE (+5.5)</p> <p style="text-align: center;">UNBOND LENGTH (PANEL SPAN MINUS BINDING BAR) THICKNESS +0.2</p> <p style="text-align: center;">Twisted Square Bar</p> <p style="text-align: center;">Binding bar</p> <p style="text-align: center;">Load bearing bar</p> <p style="text-align: center;">Start IF & WHEN REQUIRED ONLY</p> <p style="text-align: center;">100 OR 50 CRS (TYPICAL 25mm)</p> <p style="text-align: center;">The length of each diagonal to differ by no more than 5mm.</p>  <p style="text-align: center;">6mm. NOMINAL SQUARE TWISTED BAR (Actual min. size=5.4mm ±0.2mm) (TWISTS PER BAR ARE TO BE UNIFORM) NUMBER OF TWISTS PER 300mm OF LENGTH=15 No. ±2 MATERIAL: MILD STEEL GRADE BS EN 10025 S275 JR.</p>
<p>"N" TYPE GRATING</p> <p>1. Dimension over bars: 3mm bars Minimum width = 988mm Maximum width = 993mm</p> <p>5mm bars Minimum width = 990mm Maximum width = 995mm</p> <p>2. Dimension over stubs: 3mm bars Minimum width = 993mm Maximum width = 999mm</p> <p>5mm bars Minimum width = 995mm Maximum width = 999mm</p>	
<p>"W" TYPE GRATING</p> <p>1. Dimension over bars: 3mm bars Minimum width = 982mm Maximum width = 987mm</p> <p>5mm bars Minimum width = 984mm Maximum width = 989mm</p> <p>2. Dimension over stubs: 3mm bars Minimum width = 987mm Maximum width = 993mm</p> <p>5mm bars Minimum width = 989mm Maximum width = 993mm</p>	

STANDARD WELDING

 <p style="text-align: center;">END BINDING</p>	 <p style="text-align: center;">SPRAY BINDING</p>	 <p style="text-align: center;">SIDE BINDING</p>	 <p style="text-align: center;">SIDE JOINING</p>	 <p style="text-align: center;">GRATING PENETRATIONS</p>	 <p style="text-align: center;">GRATING CUT-OUTS</p>
--	--	---	---	--	---

NOTE: FILLET WELD THICKNESS: EQUIVALENT TO LOAD BEARING BAR THICKNESS
*TOE PLATE SHALL BE WELDED TO EVERY LOAD BAR, FULL DEPTH
GAP BETWEEN THE BINDING BARS AND LOAD BEARING BARS SHALL BE NO MORE THAN 3mm.

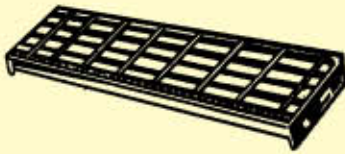
INSTALLATION CLEARANCES

 <p style="text-align: center;">Panel Length</p> <p style="text-align: center;">10mm Nominal</p> <p style="text-align: center;">Panel Width</p> <p style="text-align: center;">10mm Nominal</p> <p style="text-align: center;">Actual Cutout will be to nearest load bar</p>	 <p style="text-align: center;">10mm</p>	 <p style="text-align: center;">10mm</p>	 <p style="text-align: center;">10mm</p> <p style="text-align: center;">100mm min.</p>	 <p style="text-align: center;">10mm</p> <p style="text-align: center;">100mm min.</p>
 <p style="text-align: center;">10mm Nominal</p> <p style="text-align: center;">Load Bar (typical)</p>	 <p style="text-align: center;">10mm</p>	 <p style="text-align: center;">10mm</p>	 <p style="text-align: center;">Min. Clearance Equal to rebate Angle Thickness</p> <p style="text-align: center;">NOTE: Clearance can vary relative to rebate angle straightness</p>	 <p style="text-align: center;">15</p>

STAIR TREADS

GRATING STAIR TREADS

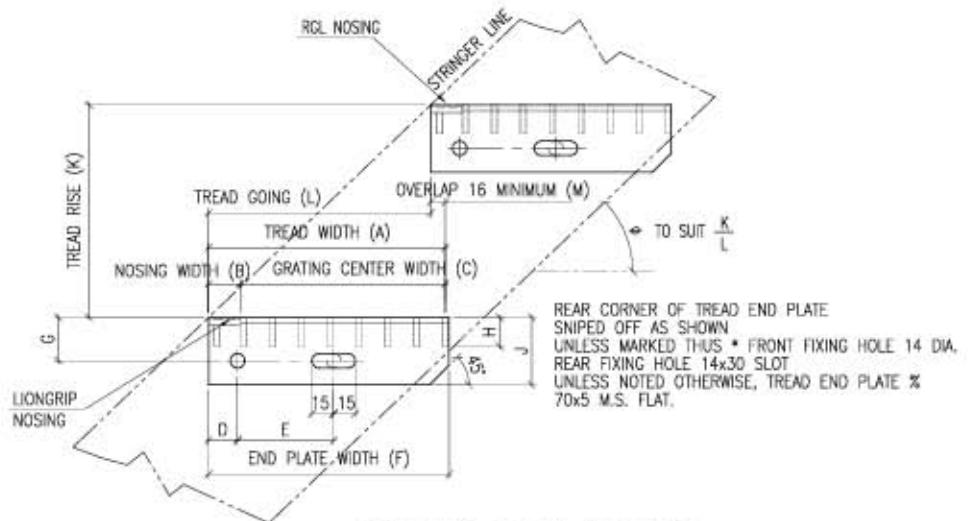
RGL
(Rectangular Liongrip)



C.E.
(Chequer Economy)



C.L.
(Chequer Longrip)



GRATING STAIR TREADS

RECOMMENDED WIDTHS (Based on 5mm load bars) (A or F)

N TYPE	130	160	190	220	250	280	310
W TYPE	122	163	204		245	286	327

LOAD BEARING BAR SIZE AND MAXIMUM LENGTH

LOAD BAR SIZE	20X3	20X5	25X3	25X5	30X5
N TYPE	665	841	944	1095	1311
W TYPE	597	732	846	1004	1228

Stairtreads are designed for a simply supported condition when having a single concentrated imposed load of 1.5 kN spread over an area of 150 mm x 150 mm placed at the centre of the front edge of a tread.

The maximum recommended deflections is 1/200th of the effective span or 6 mm whichever is the lesser. (For plate sizes and drilling details see above and opposite)



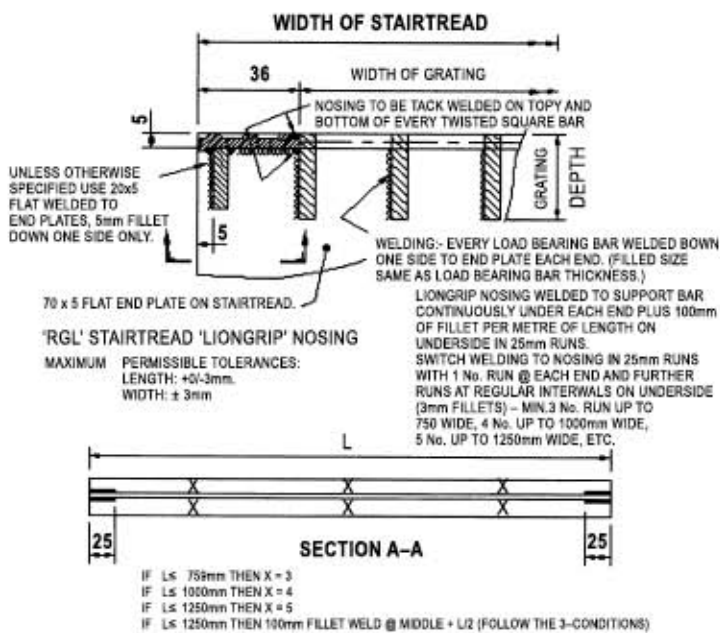
GRATING STAIR TREADS

STAIR TREADS

Nosing Width (B) = 35 mm

DRILLING DETAILS

Dim A/F	122-130	160-163	190-204	220	240-250	280-286	310-327
Dim D	30	30	30	30	30	30	30
Dim E	40	75	100	100	100	125	175
Dim G	50	50	50	50	50	50	50
Dim J	70	70	70	70	70	70	70



NOSING

LIONGRIP NOSING; Mild steel pyramid treaded plate with front edge lip



HANDRAILS

SOLID & TUBULAR HANDRAIL STANDARD TYPES

The two most popular system of handrailing comprise of solid forged standards with 25mm nominal bore medium quality rail, or 28 mm outside diameter solid rail, where conditions are extremely corrosive. Other systems can be provided to suit individual customer preferences. Tubular handrail standards, obviously lighter than solid ones, have similar load carrying capabilities but are not recommended in highly corrosive conditions.

Heavy duty welded frames, used mainly on offshore installations, comprise of tubular posts, knee and handrail. These are welded into complete panels of convenient sizes which can be either welded or bolted into position to provide a strong, stable barrier. Where a section of handrail need to be removable a double run of chain can be supplied to attach between two walls or handrail standards. The ends would be supplied with "S" hooks or spring loaded snap connectors for attaching either permanently or temporarily to eyes fixed into either the wall or handrail standard.

Angle Handrail standards and loose toeplates can be supplied upon request for fixing to all type of handrail standard. "U" bolts or special toeplate clips from m.s. flat are provided for fixing.

Solid handrails standards can be supplied with ball centres to suit customers' requirements but, unless specifically requested, Lionweld's standard centres are 420, 450, 500, 533 and 550.

One, two or three balls standards can be forged others can be specially fabricated upon request.

Solid standards can be supplied having 32 mm dia. shanks with 60 mm dia ball, 38 mm dia. shanks with 60 mm dia. ball, 38 mm dia. shanks with 70 mm dia. or 75 mm dia. ball. 60 mm dia. balls are used when the drilling in them is no greater than the outside diameter of 25 mm N.B. tube. For rail with an outside diameter no greater than 40 mm N.B. tube a 70 mm dia. ball is used.

For tubular standards, balls are holed to suit 25 mm and 32 N.B. tube. The size of tube for shanks depends on the pitch required and loading specified. Tubular handrailing uses Liongrip dowels for 25 N.B. internal connections and expanding dowels for 32 N.B. rail.

Solid handrailing is joined together on site by welding prepared ends. A Liongrip Dimpling tool can be purchased or hired for fixing 25 N.B. rail, other methods of fixing include tapered pin, grub or set screw joints.

Handrailing can be supplied in straight lengths for fabrication or in a fabricated pieces market for erection by the customer's own personnel.

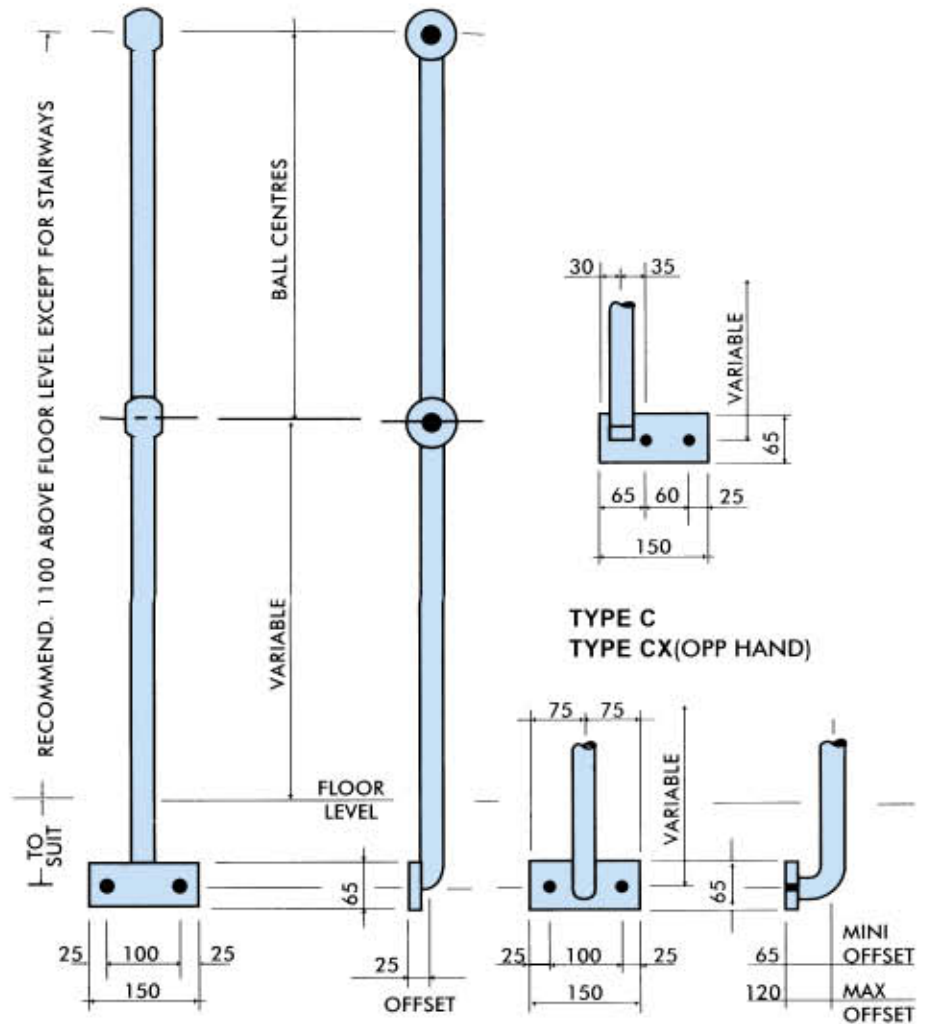
Handrail standards subject to a heavy duty loading are recommended to have 3 or 4 number M20 fixings in either triangular round or square bases.

Unless noted otherwise all handrail standard feet are 15 mm thick. When handrail is not terminated with return bends, the ends are usually blanked off with either dimpled solid or plastic caps.

Spring loaded self closing safety gates can be supplied for openings at the top of cat ladders.

Further details are available upon request.

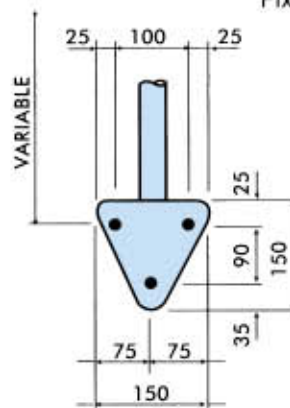
Side palm standards drilled at an angle are to be stipulated L.H. side going up or R.H. side going up when handrail is required at both sides of stairways.



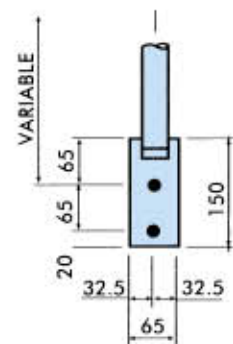
TYPE A
(single ball 'A' type standards are called 'R'type)

TYPE B

Note: 25mm standard offset for type A, AR, C, F, O, P, and R.
Type B offset variable within the limits shown.
Fixing bolts M 16



TYPE F

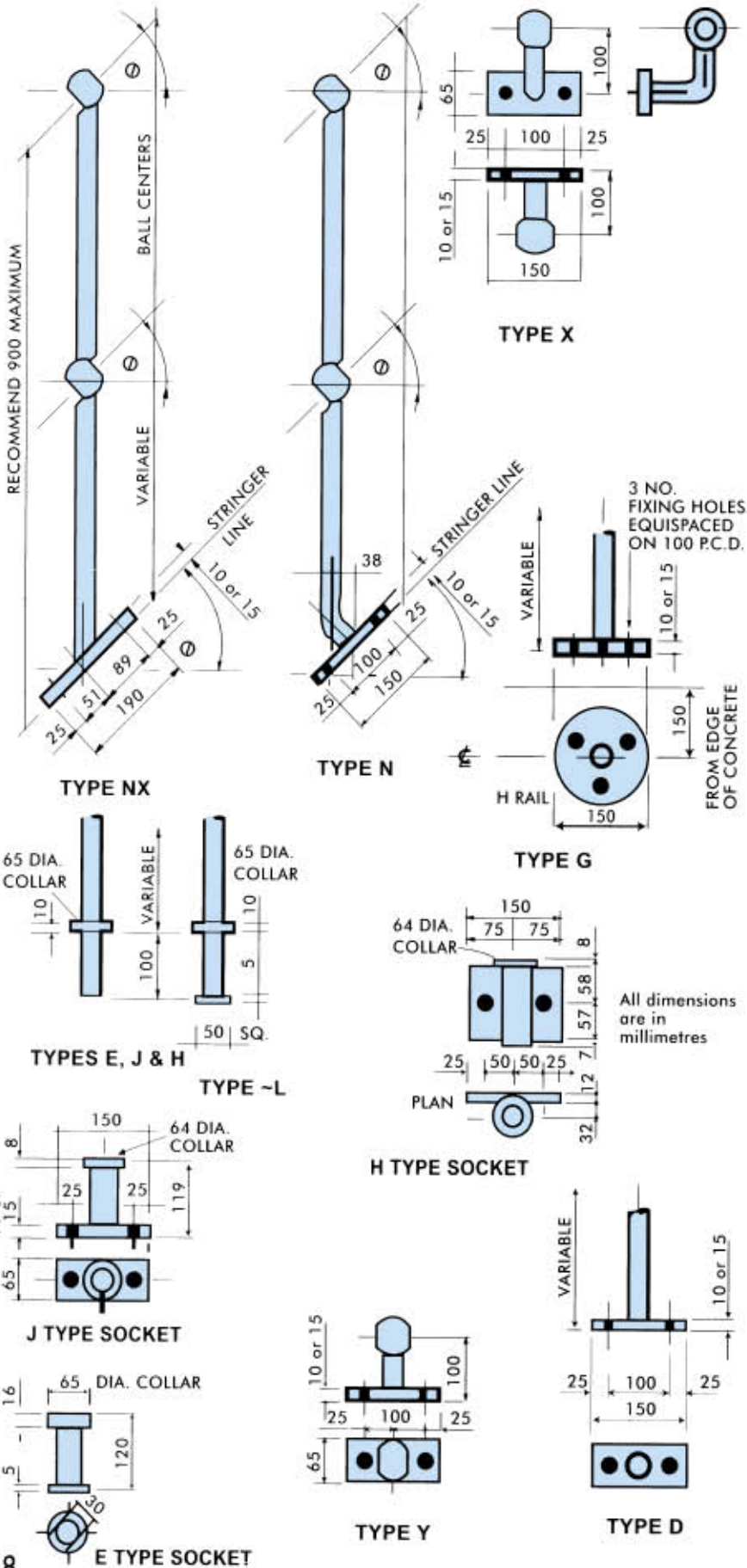


**TYPE O
TYPE P**
(raked balls)

SOLID & TUBULAR HANDRAIL STANDARD TYPES

HANDRAIL

Stairway standards may be drilled at any angle up to a maximum of 45°. Any angles in excess of 45° are not recommended as this weakens the shank.



STANDARD HANDRILL SECTIONS

LOADING

British Standard Code of Practice BS 6399

1. A light duty loading of 220 N/m (Light access stairs, gangways and the like not more than 600 mm wide).
2. A medium duty loading of 360 N/m (Light access stairs gangways and the like more than 600 mm side, stairways, landings, balconies, private and domestic).
3. A heavy duty loading of 740 N/m (All other stairways, landing and balconies and all parapets and handrails to roof). This greater loading should also be observed when there is any possibility of the hand rail being leant on by a crowd of people using the stair or gangway as an observation platform.

LOADING CLASS	NOMINAL BALL DIA	SHANK SIZE	MAXIMUM PITCH	SOLID OR TUBULAR	RAIL SIZE	GRUB SCREW SIZE
1	70	25 N.B. (M)	1480	T	25 N.B. (M)	A
1	70	32 N.B. (M)	1800	T	25 N.B. (M)	A
1	60	32 O.D.	1800	S	25 NB. (M)	C
1	60	38 O.D.	1800	S	25 N.B. (M)	C
1	70	38 O.D.	1800	S	32 N.B. (M)	C
2	70	25 N.B. (M)	900	T	25 N.B. (M)	A
2	60	32 O.D.	1222	S	25 N.B. (M)	C
2	70	32 N.B. (M)	1550	T	25 N.B. (M)	A
2	70	32 N.B. (H)	1750	T	25 N.B. (M)	A
2	60	38 O.D.	1800	S	25 N.B. (M)	C
2	70	38 O.D.	1800	S	32 N.B. (M)	C
3	80	32 N.B. (M)	750	T	32 N.B. (M)	B
3	80	32 N.B. (H)	850	T	32 N.B. (M)	B
3	80	40 N.B. (M)	970	T	32 N.B. (M)	B
3	60	38 O.D.	1092	S	25 N.B. (M)	C
3	70	38 O.D.	1092	S	32 N.B. (M)	C
3	80	40 N.B. (H)	1150	T	32 N.B. (M)	B

M Denotes medium quality tube and 'H' denotes heavy quality tube.

A Denotes M6 x 16 zinc plated cone pointed socket set screws.

B Denotes M6 x 20 zinc plated cone pointed socket set screws.

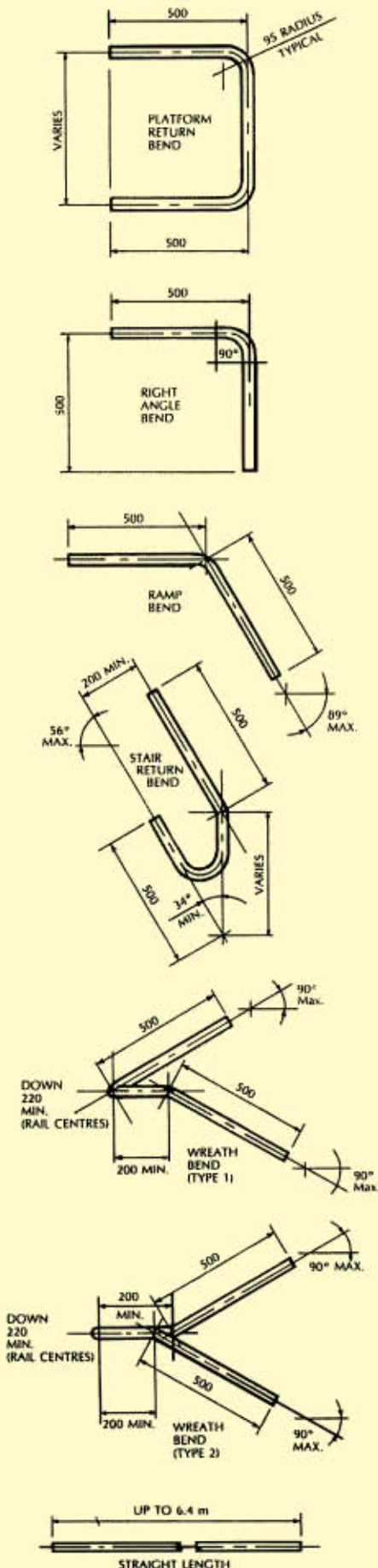
C Denotes M10 x 16 zinc plated cone pointed socket set screws.

(Socket set screws or grub screws only fitted to balls of one standard per run where there is possibility of rail movement, unless noted otherwise.)

HANDRAILING

25 nominal bore medium quality tube more than adequately covers light, medium and heavy loadings. 20 N.B., 32 N.B. and 40 N.B. tubing can also be supplied with fittings to suit if required. In extremely corrosive conditions, railing is usually supplied from solid round instead of tubing.

Heavy duty barriers or welded frames as shown below can be fabricated from almost any size circular or rectangular hollow sections to suit individual needs.



LOADING

FITTINGS FOR TUBULAR HANDRAIL

HANDRAILING

Maximum UDL (kN/m) and Max. Point Load (kN) applied horizontally against handrailing and mid pitch of standards.

STANDARD PITCH mm	25 O/D SOLID		25 O/D SOLID		20 N/B (M)		25 N/B (M)		32 N/B (M)		40 N/B (M)	
	U.D.L	P.L.	U.D.L	P.L.	U.D.L	P.L.	U.D.L	P.L.	U.D.L	P.L.	U.D.L	P.L.
800	3.164	1.265	4.445	1.778	2.363	0.945	4.614	1.846	7.702	3.080	10.247	4.099
900	2.500	1.124	3.512	1.580	1.867	0.840	3.646	1.641	6.085	2.738	8.096	3.643
1000	2.025	1.012	2.845	1.422	1.512	0.756	2.953	1.477	4.929	2.464	6.558	3.279
1100	1.674	0.920	2.351	1.293	1.250	0.687	2.441	1.343	4.074	2.240	5.420	2.981
1200	1.406	0.843	1.976	1.185	1.050	0.630	2.051	1.231	3.423	2.053	4.554	2.733
1300	1.198	0.779	1.683	1.094	0.895	0.582	1.747	1.136	2.917	1.895	3.881	2.522
1400	1.033	0.723	1.452	1.016	0.771	0.540	1.507	1.055	2.515	1.760	3.346	2.342
1500	0.900	0.675	1.264	0.948	0.672	0.504	1.312	0.985	2.191	1.643	2.915	2.186
1600	0.791	0.633	1.111	0.889	0.591	0.473	1.154	0.923	1.925	1.540	2.562	2.049
1700	0.701	0.595	0.984	0.837	0.523	0.445	1.022	0.869	1.706	1.449	2.269	1.929
1800	0.625	0.562	0.878	0.790	0.467	0.420	0.911	0.821	1.521	1.369	2.024	1.822

Solid and tubular handrails standards

Maximum recommended point loads (W) imposed upon top ball of handrail standard at right angles to shank with deflections (δ) shown at those loads.

Note: Where highlighted, point loads have been reduced to ensure that the deflection does not exceed 1/60th of the height*

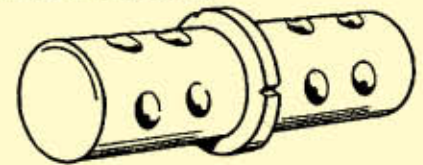
HEIGHT	700 mm		800 mm		900 mm		1000 mm		1100 mm		1200 mm	
	W (kN)	δ (mm)	W (kN)	δ (mm)	W (kN)	δ (mm)	W (kN)	δ (mm)	W (kN)	δ (mm)	W (kN)	δ (mm)
32 O/D	0.759	8.15	0.664	10.64	0.590	13.47	0.531	16.63	0.440*	18.34	0.370*	20.01
38 O/D	1.270	6.86	1.111	8.96	0.988	11.34	0.889	14.00	0.808	16.93	0.735*	20.00
25 (M)	0.527	7.62	0.461	9.94	0.410	12.59	0.369	15.55	0.327*	18.34	0.275*	20.02
32 (M)	0.880	6.07	0.770	7.93	0.684	10.03	0.616	12.40	0.560	15.00	0.513	17.84
32 (H)									0.632	14.38	0.579	17.10
40 (M)									0.719	12.72	0.659	15.14
40 (H)									0.851	12.70	0.780	15.12
32 O/D	11.60 mm		13.30 mm		15.00 mm		16.67 mm		18.33 mm		20.00 mm	

Handrails are designed as simply supported beams between two adjacent handrail standards using a working stress of 165 N/mm² for mild steel to BS. 4360 Grade 43A.

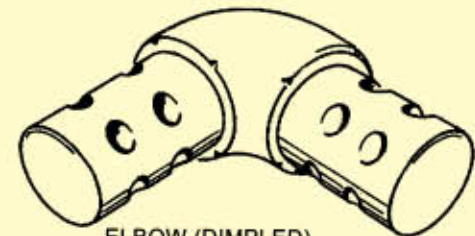
Joints in handrailing are preferred no more than 150 mm away from a handrail standard to help maintain rigidity.



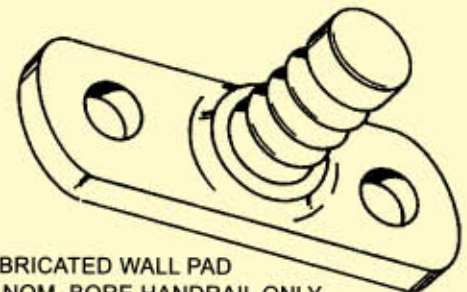
Fittings are usually supplied loose for connecting on site and to enable any adjustments to be made prior to final connection if necessary



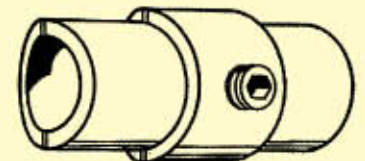
STRAIGHT (DIMPLED) CONNECTOR
25 NOM. BORE HANDRAIL ONLY



ELBOW (DIMPLED)
25 NOM. BORE HANDRAIL ONLY



FABRICATED WALL PAD
25 NOM. BORE HANDRAIL ONLY
(FABRICATED END PLATE ONLY
FOR 32 NOM. BORE)



EXPANDING STRAIGHT CONNECTOR
FOR 25 & 32 NOM BORE HANDRAIL

LIONGRIP DIMPLING TOOL

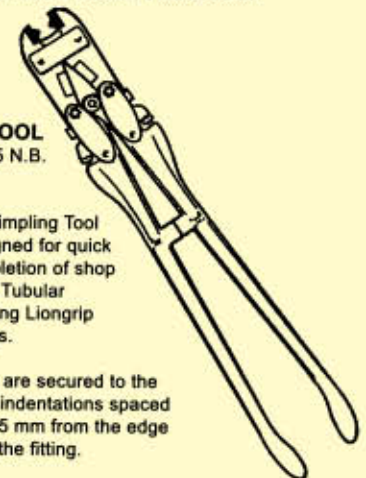
(for use with 25 N.B. tube only)

The Liongrip Dimpling Tool has been designed for quick and easy completion of shop or site joints in Tubular Handrailing using Liongrip patented fittings.

Liongrip Fittings are secured to the tube by former indentations spaced 12.5 mm and 25 mm from the edge of the collar of the fitting.

Two indentations are formed in one operation using the Dimpling Tool.

The gap between the points of the jaws should be set at 0.95 inches (24.2mm) when the handles are fully closed. This is the minimum setting.



LOADS

For slow moving wheel loads and taking into account an Impact Factor it is generally accepted that deflections in excess of B.S. recommendations for Pedestrian loading are a sub-ordinate consideration provided that the loadings imposed do not allow the maximum permitted stress to be exceeded.

PNEUMATIC

Representing a Uniformly Distributed load over part of the clear span.

The worst cases being :

- Wheel at mid span.
- Travelling along loadbearing bars when the tread width 'X' is less than or equal to the tread length 'L'.
- When the load is applied to the least number of loadbearing bars possible.
- When the load is applied over double wheels, which effectively increases the tread width, to more than the tread length, and with the wheels travelling across the load bearing bars as shown below, in this case the bearing are represented by overall width 'L' by tread length 'X'.

I.F. = Impact Factor = 1.25
 F = Safe working stress = 165000 kN/m²
 Fmax = Maximum permitted working stress = F x 1.1 = 181500 kN/m²
 M max = Maximum bending moment (when W includes I.F.) = $\frac{WS}{4} - \frac{W}{8}$ (kNm)
 I = Moment of inertia per tread = $\frac{BD^3}{12}$
 12 x n. (m⁴) [n = no. of bars carrying load = $\frac{X}{p}$]
 F.actual = $\frac{My}{I}$ kN/m² [y = D/2 & M includes I.F.]
 σ = Actual deflection = $\frac{5wx^3}{192EI} (s-l-2)$ (m)
 W = Total load (kN) excluding I.F.
 S = Clear span (m)
 E = Young's Modulus of Elasticity = 2.0684x10⁸ kN/m²

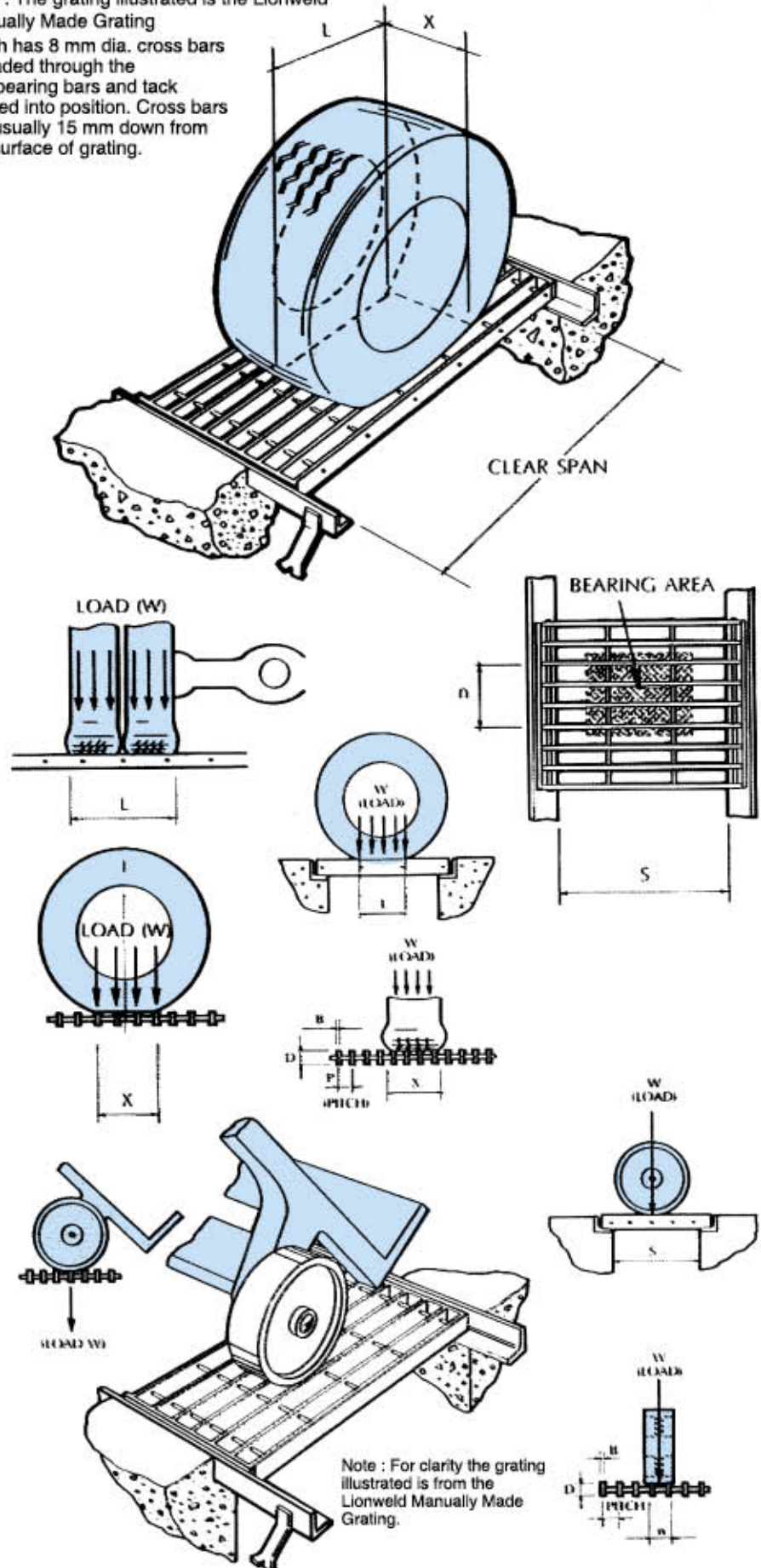
SOLID

Representing a point load over one or more loadbearing bars, depending on width of wheel. The worst case being when moving across the loadbearing bars, at mid span.

I.F. = Impact Factor = 1.25
 F = Safe working stress = 165000 kN/m²
 Fmax = Maximum permitted working stress = 181500 kN/m² = F x 1.1
 M max = Maximum bending moment (when W includes I.F.) = $\frac{WS}{4}$ (kNm)
 W = Total load (kN) excluding I.F.
 S = Clear span (m)
 F.actual = Stress produced by load + I.F. = $\frac{My}{I}$ (kN/m²)
 y = Extreme fibre distance = $\frac{D}{2}$ (m)
 E = Young's Modulus of Elasticity = 2.0684x10⁸ kN/m²
 I = Moment of inertia per tread = $\frac{BD^3}{12}$ (m⁴)
 B = Load bearing bar breadth (m)
 D = Loading bearing bar depth (m)
 σ = Actual deflection = $\frac{WS^3}{48EI}$ (m)
 n = Number of load bearing bars actually loaded.
 (use 1 x n for l¹ when calculating 'o' and 'F. actual')

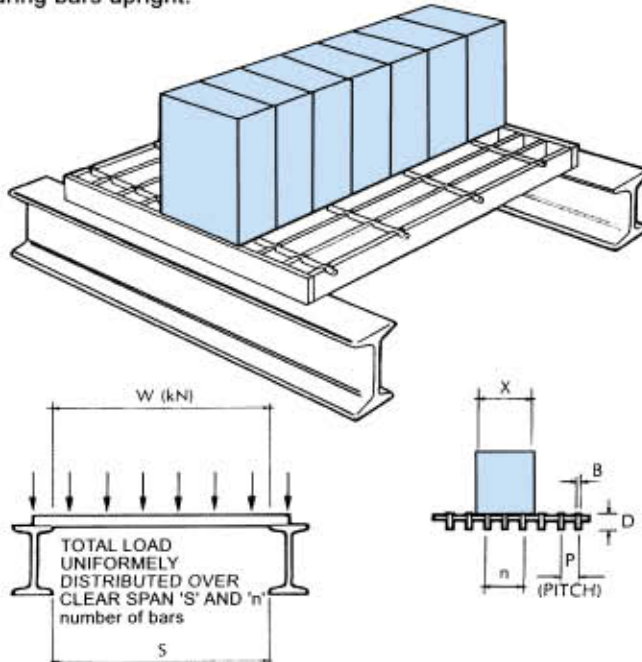
WHEEL LOADS

Note : The grating illustrated is the Lionweld Manually Made Grating which has 8 mm dia. cross bars threaded through the loadbearing bars and tack welded into position. Cross bars are usually 15 mm down from top surface of grating.



UNIFORMLY DISTRIBUTED

Note : The grating illustrated is from the Lionweld Rectangular Pattern Industrial Grating range. This comprises of loadbearing bars stood on end at 30 mm (Narrow) or 41 mm (Wide) centres with either indented round or twisted square bar resistance welded into the top surface at either 50 mm or 100 mm centres to hold the loadbearing bars upright.



The main function of transverse bars in rectangular grating is to hold the load-bearing bars upright and at common centres. They not only provide a very small percentage increase in the load carrying capabilities of the loadbearing bar but also provide lateral restraint and transfer of loading to other unloaded areas. However in view of the number of variables involved this small percentage contribution has been ignored and for calculation purposes only the worst possible case is taken as by considering the load bearing bars only.

When using diamond mesh flooring however the corrugated bars make significant a contribution to the load carrying capability of the load bearing bars to take them into consideration but the worst case would be when the panel width is no more than the load width and therefore calculations are based upon the worst case.

The total load 'W' in kN uniformly distributed over the clear span in kN/m for width 'X' in kN/m² shall not produce a deflection in excess of 1/200th of the clear span or 10 mm whichever is the lesser, providing that the maximum permitted working stress for mild steel is not exceeded.

Where the maximum permitted stress or the maximum permitted deflection is exceeded, the Uniformly Distribution Load must be reduced proportionately.

F_{max} = Maximum permitted working stress = 165000 (kN/m²)

M_{max} = Maximum bending moment (when W

includes I.F.) = $\frac{WS}{8}$ (kNm)

W = Total load (kN)

S = Clear span (m)

F_{actual} = Stress produced by load = $\frac{My}{I \text{ per m width}}$ (kN/m²)

y = Extreme fibre distance = $\frac{D}{2}$ (m)

I = Moment of inertia per tread = $\frac{BD^3}{12} xn(m^4)$

n = Number of loadbearing bars per m width

B = Load bearing bar breadth (m)

D = Loading bearing bar depth (m)

o = Actual deflection = $\frac{5WS^3}{384 E (I \text{ per m width})}$ (m)

E = Young's Modulus of Elasticity = 2.0684 x 10⁸ kN/m²



MAJOR PROJECT LIST (2004-2008)



Permissible tolerances

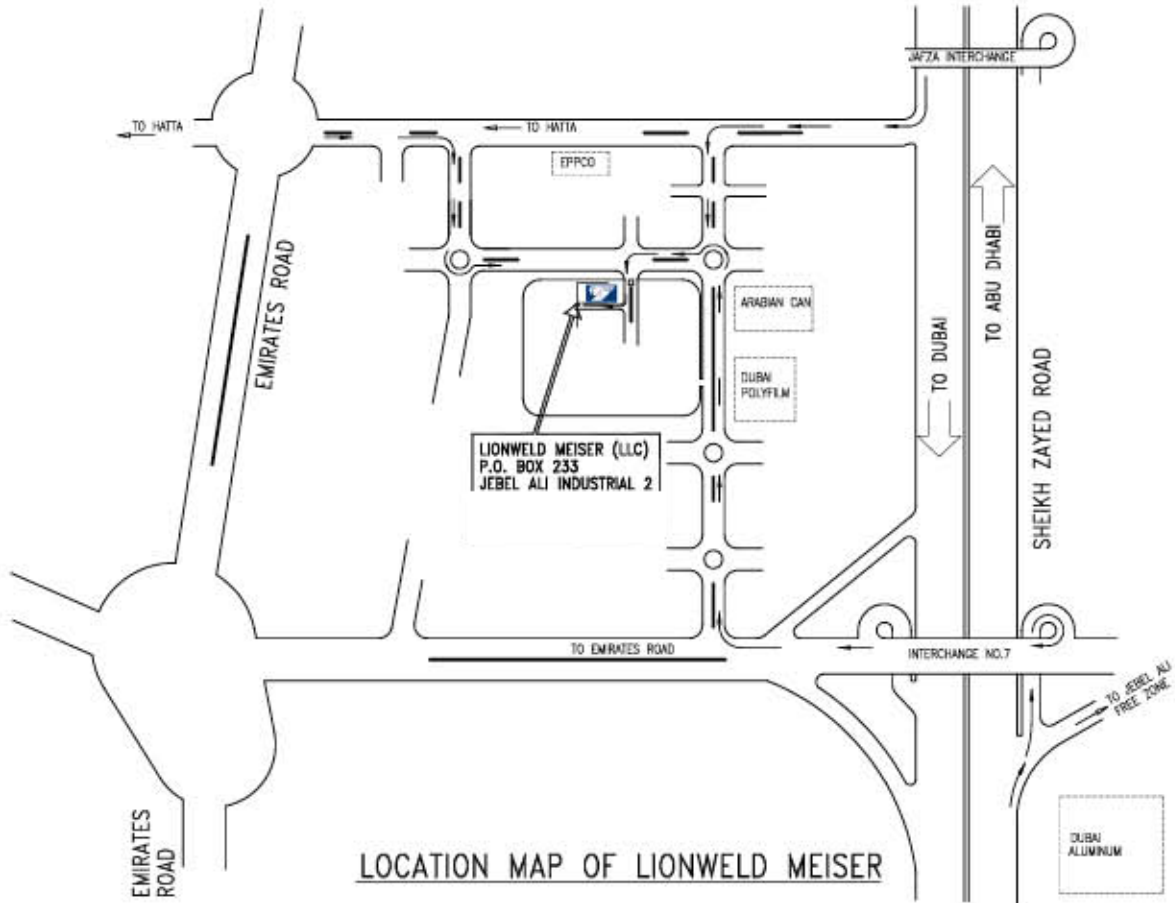
The maximum permissible deviations from work sizes of gratings shall be as shown in table 1.

Location	Tolerance in mm	
Length of grating	+0	
	-5	
Width of grating	+0	
	-5	
Depth of loadbearing bar:		
	upto and including 25mm	+1.0
		-0.5
	over 25 mm up to 50 mm	+1.5
		-0.75
	over 50 mm up to 100 mm	+2.0
		-1.0
Thickness of loadbearing bar:		
	over 100 mm up to 150 mm	+2.0
		-1.5
up to 10 mm		
		± 0.4
	over 10 mm up to 15 mm	± 0.5

Where the function of binding bars excludes load transfer, they shall be at least secured to the nearest loadbearing bar at every 180 mm pitch.

Where the binding bars are loadbearing, they shall be secured to every loadbearing bar. If welded, the fillet weld leg length shall at least be equivalent to the thickness of the loadbearing bar, throughout the depth of the binding bar and one side of the loadbearing bar.

PROJECT	CLIENT	CONTRACTOR
1st/2nd LNG Trains, Qatar Gas	Chiyoda Corporation	Wm Hare Ltd
Onshore Gas - Habshan	NATCO	Cleveland Bridge ME (Pvt) Ltd
Olefins Project	Petrokemya	Hidada Ltd
Bab-Oil Project	ADNOC	William Hare Ltd
3rd LNG Train, Qatar Gas	Chiyoda Corporation	William Hare Ltd
Jebel Ali 'G' Power Station	Dubai Electric Co.	Cleveland Bridge ME (Pvt) Ltd
Aquaba Thermal Power Station	Jordan Electricity	Consolidated Contractors Int. Co. (SAL)
PTA IBN Rushid Project - Yanbu, Saudi		Consolidated Contractor Co. WLL
ADMA-OPCO UMM SHAF - Arab 'D'	ADMA-OPCO	NPCC
Falco Project - Pot Walkway & Stairs	Dubai Aluminum Co.	Lamprell
Aluminum Smelter UAE		
AZ-ZOUR South Distillation Plant - Kuwait	Mitsubishi Corporation	Mitsubishi
SHAYBAH	Saudi Aramco	Consolidated Contractors Int.
Julaymah	JGC	William Hare Ltd
Ras Laffan	JGC	William Hare Ltd
Raysul Cement		Larsen & Toubro Oman
Sabiya Power Station - Kuwait	Min. of Electricity & Water	Cleveland Bridge ME (Pvt) Ltd
Al Zour South Distillation Plant - Kuwait	Min. of Electricity & Water	Cleveland Bridge ME (Pvt) Ltd
Al Razi IV Methanol Plant	Saudi Methanol Co. Ltd	Mitsubishi Chemical Engineering Co. Ltd
Gas Lift Platforms	ADMA-OPCO	NPCC
Yanpet Polyethylene	ARAMCO	Zamil Steel
Uthmaniya Gas Project	ARAMCO	Al Suwaidi Engineering
Syria Petroleum	Al Furat Petroleum	Al Furat Petroleum
QGPC Offshore	Qatar Petroleum	Mechanical Engineering
Dubai Aluminum	Dubai	Cleveland Bridge ME (Pvt) Ltd
Suez Cement 3 Line	Suez Cement Co.	Arascom
QGD Phase II	Abu Dhabi National Oil	National Steel Fabricators
Hawhiya Gas Lift	ARAMCO	Zamil Steel
Gasco III	ADNOC	Archirodon
G27 & G28	KNPC	Kharafi
Sharjah Klin No. 2	Sharjah Cement Plant	Contech
Lakshmi Offshore	Lakshmi	McDermott
Q-Chem	Technip	Cleveland Bridge ME (Pvt) Ltd
NGL-4	Snamprogetti/Hyundai	Arabian International Company
Sharjah Cement Plant		IHI
Al Ghurair Oil Mill	Gulf Import & Export Co.	Headline Engineering
Haradh Gas Project	ARAMCO	Zamil Steel
Haradh Gas Project	ARAMCO	AIC
Soroosh/Nowrooz	Shell	National Petroleum Construction Company
Petrokemya	TOYO Engineering	Zamil Steel
Petrokemya	TOYO Engineering	AIC
Ras Tanura	Snamprogetti	Zamil Steel
JUEG	TOYO Engineering	Zamil Steel
JUPC	CHIYODA/FLUOR DANIEL	Zamil Steel
QATIF-GOSP	Snamprogetti	Zamil Steel
KESTREL - DUBAL	K-Home Engineering	Headline Engineering
Takreer - Unleaded Gasoline	Technip	Zamil Steel/Galadari/Al Jaber Grinaker
Sohar Refinery	JGC	William Hare Ltd
Jebel Ali 'L' Power Station	DEWA	William Hare Ltd / Toshiba / IHI
Al Khaleej Gas	Snamprogetti/Technip	Zamil Steel
GTL	Technip	Zamil Steel
Alba Line 5 Expansion	Bechtel	Zamil Steel
North East Bab	Technip	Arabian International Company
Habshan Capacity Enhancement	GASCO	Hare UAE
Ethylene Glycol Plant - Yanbu	SABIC	Zamil Steel
Dolphin Energy	JGC	Zamil Steel
Dolphin Energy	JGC	Arabian International Company
OL2K Ethylene	Technip	Galadari Engineering
Cargo Mega Terminal - Dubai	Dubai Civil Aviation	Siemens Middle East
Qatar Gas II Development Project	Chiyoda Technip JV	Al Khalifa & Partners
Qatar Gas II Development Project	Chiyoda Technip JV	Zamil Steel
QCS - Qatar Gas 3 & 4 Project	Chiyoda Technip JV	Al Khalifa & Partners
QCS - Qatar Gas 3 & 4 Project	Chiyoda Technip JV	Zamil Steel
QCS - Qatar Gas 3 & 4 Project	Chiyoda Technip JV	William Hare UAE
QCS - Qatar Gas 3 & 4 Project	Chiyoda Technip JV	Arabian International Company
Ras Gas Project	Chiyoda Technip JV	Tiger Steel Engineering
Khursaniyah Gas Plant	Bechtel Technip JV	Zamil Steel/AIC
IBN Zahr Project	Samsung	Al Khalifa & Partners
Shoiba Power Plant	Siemens	Arabian International Company
Khurais	Snamprogetti	Zamil Steel
Borouge	Tecnimont/Linde	Zamil Steel/AIC
Habshan	GASCO	Zamil/Hare UAE
Saudi Kayan	SNC Lavalin/Daelim	Zamil/Hare UK/AK&Partners



LIONWELD MEISER (L.L.C.)

ليونويد مايزر (ش.ذ.م.م.)



Building - 2
Jebel Ali Industrial Area
P.O. Box: 233, Dubai - U.A.E.
Tel: + 971 4 33 93 474
Fax: +971 4 33 93 444
Email: info@lionweldmeiser.ae



Certificate No. 218160