

RSL-20

5.6/Ren



heavy duty  
**steel**  
**gratings**

# other Reliance products

## ALUMINUM GRATINGS

Reliance Steel Products Company offers a complete line of Aluminum Gratings for walkways, trenches and industrial flooring. Refer to our catalog in Sweet's: **Architectural File 5.6/ReL** • **Industrial Construction File 5.6/ReL** • **Plant Engineering File 5.6/ReL** • **Engineering File 5.6/Re**

## BRIDGE FLOORING

A design and specification manual on Reliance Bridge Flooring for A.A.S.H.T.O. loads up to H-20—open steel, concrete filled and orthotropic—including side walks, construction and installation details is in Sweet's: **Architectural File, 5.6/Reo** •

for orders, inquiries or the nearest  
Reliance representative,  
please call . . .



anywhere  
in the  
continental  
United States\*  
(800) 245-4262

\*in Pennsylvania call Reliance at (412) 751-1000



## Reliance

STEEL PRODUCTS COMPANY

### HARRISBURG PLANT

P.O. Box 272  
Main & Nissley Streets  
Middletown, Pennsylvania 17057  
Phone: (717) 944-7646

### PITTSBURGH GENERAL SALES OFFICE & PLANT

3700 Walnut Street  
McKeesport, Pennsylvania 15134  
Phone: (412) 461-3616  
(412) 751-1000

### TUSCALOOSA PLANT

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Zip No. 35453  
Phone: (205) 553-3111

### NEW YORK SALES OFFICE

271 Harmon Avenue  
P.O. Box 1118  
Fort Lee, New Jersey 07024  
Phone: (201) 224-9206

### ST. LOUIS SALES OFFICE

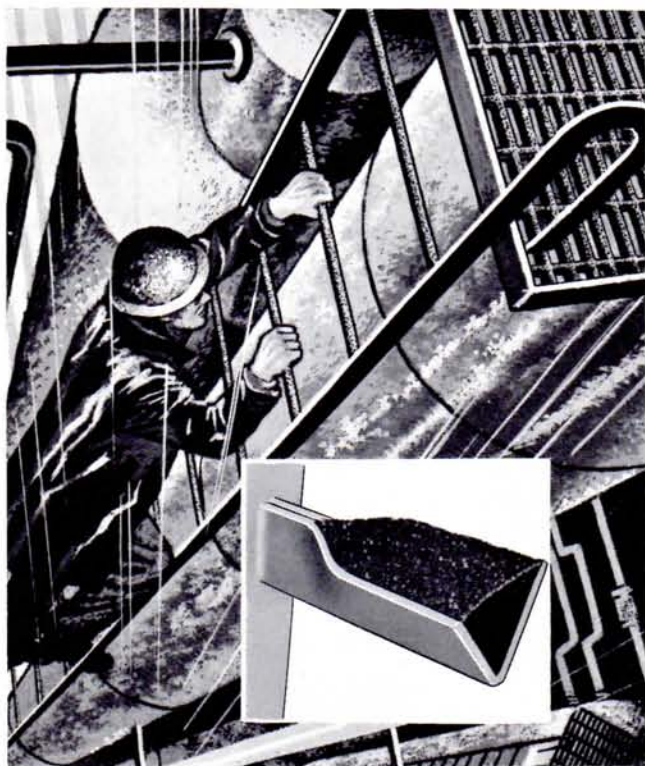
Route #1 Box 170-A  
Edwardsville, Ill. 62025  
Phone: (618) 656-5231

### CHICAGO SALES OFFICE

747 Madison Ave.  
Oak Park, Ill. 60302  
Phone: (312) 383-3534

## abrasive surfaced non-skid fail-safe ladder rungs

op/overall product, in place



Meets OSHA requirements  
Fixed Ladders paragraph  
1910.27  
Dec. 13, 1977.

### LR-100 Steel or Aluminum

Welded to stringers — new construction or replacement.  
In ordering, specify overall length.

1 ¼ x 1 ¼ x ¼ STEEL ANGLE or 1 ½ x 1 ½ x ¼ ALUMINUM ANGLE

### LR-200 Steel or Aluminum

Cast in recessed concrete wall for dams and locks. In ordering, specify overall length — minimum of 3" embedment in concrete is recommended.

1 ¼ x 1 ¼ x ¼ STEEL ANGLE or 1 ½ x 1 ½ x ¼ ALUMINUM ANGLE

### LR-300 Steel or Aluminum

Bolted or welded to stringers — new construction or replacement. In ordering, specify overall length.

1 ¼ x 1 ¼ x ¼ STEEL ANGLE or 1 ½ x 1 ½ x ¼ ALUMINUM ANGLE

### Relgrit —

A mixture of epoxy and silica sand with great metal adhesive qualities providing traction even when covered with oil.

### Anchor pins —

Pins act as physical anchors for the epoxy slurry, along with Relgrit's own metal adhesiveness create a "double lock" preventing Relgrit from working loose in ladder rung treads.



### Fail-Safe design

The Reliance Ladder rung design features slotted end plates that physically lock the rung when bolted to the stringer. In addition, each rung is welded to the end plates. When rung and end plate are attached to the ladder stringer, the physical lock and weld combination provide the utmost in safety.



op/overall product, in place

## Reliance stair treads

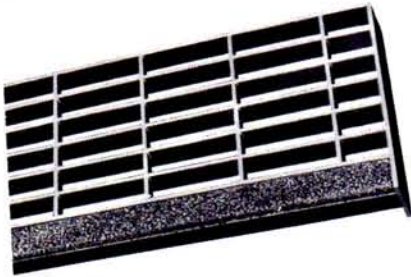
Reliance steel stair treads provide an aesthetically pleasing appearance, while being functional in design. Because of hazards associated with stairway areas, Relgrit, non-skid surface is recommended.



checker plate nosing



abrasive metal or relgrit nosing



Available in:  
Grating Type 1R4-1U2-1RR4, etc. with Bearing Bars  $1\frac{1}{8}$ " Ctr. to Ctr.

Tread Width	No. of Bearing Bars	A
5"	4	2 $\frac{1}{2}$ "
6 $\frac{1}{16}$ "	5	
7 $\frac{3}{8}$ "	6	4 $\frac{1}{2}$ "
8 $\frac{1}{16}$ "	7	
9 $\frac{3}{4}$ "	8	
10 $\frac{1}{2}$ "	9	7"
12 $\frac{1}{8}$ "	10	

Maximum Length of Tread	2'6"	3'6"	4'6"	5'6"	6'0"
Bearing Bar Size	$\frac{3}{4}$ "x $\frac{3}{16}$ "	1"x $\frac{3}{16}$ "	1 $\frac{1}{4}$ "x $\frac{3}{16}$ "	1 $\frac{1}{2}$ "x $\frac{3}{16}$ "	1 $\frac{3}{4}$ "x $\frac{3}{16}$ "
Dimension B		1 $\frac{3}{4}$ "			2 $\frac{1}{4}$ "
Dimension C		2 $\frac{1}{2}$ "			3"

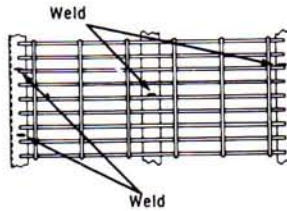
### how to specify an order

Treads shall be Reliance Steel Products Company's Electro-pressure welded steel 36" long by 10-1 $\frac{5}{16}$ " wide. Nosing checkerplate; type 1R4; size 1 $\frac{1}{4}$ " x  $\frac{3}{16}$ " bearing bars on 1 $\frac{3}{16}$ " centers and cross bars at 4" centers. Wearing surface of bearing bars shall be Plain. Wearing surface of cross bars Plain. Finish Galvanized.

ai/assembly, installation

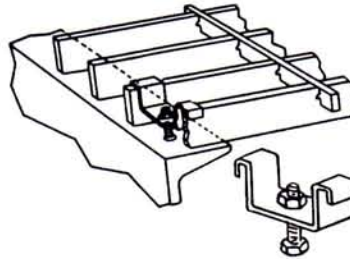
## approved fasteners

One of the most important, but often overlooked details in a grating installation is the method of fastening. Steel grating panels require at least two positive fasteners over each support or welding to the support.



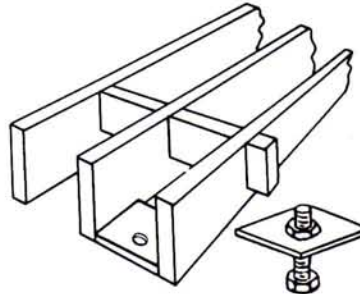
1. Welding the grating to supports. The preferred method of attaching the grating panel to the support is by welding. The only objection to this procedure is that in order to remove the grating, it is necessary to break the weld. However, most large floor areas do not require removability.

### 2. RF-14



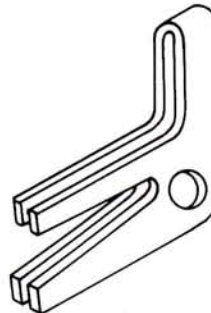
The RF-14, saddle clip fastener, connects two bearing bars of Type IR4 grating to the support. The clip has a  $\frac{5}{16}$ " dia. hole to accept a  $\frac{1}{4}$ " bolt or welded stud (bolt or stud by others). Note: Cannot be used with heavy duty grating unless specially designed.

### 3. Plate Fastener



The plate fastener, generally used with heavy duty grating, comes with a  $\frac{7}{16}$ " hole to accept a  $\frac{3}{8}$ " bolt (bolt by others). The plate thickness is the same size as the bearing bar thickness and comes welded to the sides of the bearing bars.

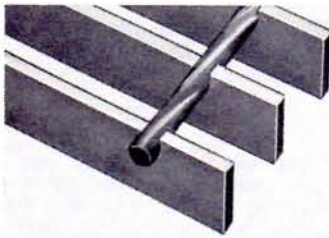
### 4. RF-9



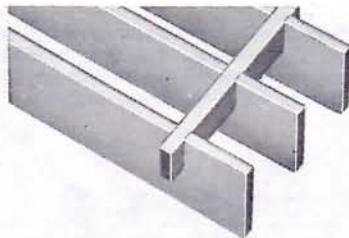
The RF-9 friction clip fastener connects one bearing bar to the support. The clip, which relies on frictional resistance for effectiveness, is not recommended in areas where vibration or high incidence of loading occurs. This could loosen the clip and impair the performance of the grid. This clip is not recommended for use with heavy duty grating.

Note: Positive methods of anchoring are an integral part of a functional grating system. For particular projects where fastening methods are in question, please contact our engineering department for additional information.

cp/components, parts



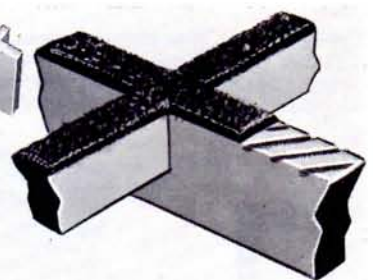
Standard 1/4" twisted ardox cross bar grating.



1/2" deep rectangular cross bar grating.



"U" type rectangular cross bar grating.



ABRASIVE EMBEDDED IN KNURLED GROOVES

weights per square foot

Bearing Bars, Inches	Type IR2	Type 3/4R4	Type 3/4R2	Type 1/2R4	Type 1/2R2	Type IU2	Type 1 1/16U2	Type 1/4R4	Type 1/4R2
3/4 x 3/16	6.2	7.1	7.7	9.1	9.8	6.9	8.6	13.9	14.6
1 x 1/8	5.6	6.4	7.0	8.1	8.8	7.3	8.8	12.4	13.6
1 x 3/16	7.9	9.2	9.8	12.1	13.1	9.6	11.8	18.5	19.5
1 x 1/4	10.5	12.3	13.1	16.2	17.5	11.8	N/A	24.7	25.9
1 1/4 x 1/8	6.8	7.8	8.4	10.2	11.2	8.5	10.3	15.6	16.5
1 1/4 x 3/16	9.5	11.4	12.0	14.9	15.9	11.2	14.0	22.9	25.8
1 1/4 x 1/4	12.7	15.2	16.0	19.9	21.2	14.0	N/A	30.4	31.7
1 1/2 x 1/8	7.9	9.2	9.8	12.1	13.1	9.6	11.8	18.5	19.5
1 1/2 x 3/16	11.2	13.5	14.1	17.7	18.7	12.9	16.3	27.3	28.2
1 1/2 x 1/4	15.0	18.1	19.0	23.6	24.9	16.3	N/A	36.5	37.8
1 3/4 x 3/16	13.3	15.9	16.8	20.5	21.5	14.6	18.5	31.8	32.7
1 3/4 x 1/4	17.2	21.0	21.9	27.4	28.7	18.5	N/A	42.3	43.5
2 x 3/16	15.0	18.1	19.0	23.8	25.3	17.7	22.2	36.6	38.1
2 x 1/4	19.4	23.8	24.7	31.6	33.5	23.6	N/A	48.7	50.6
2 1/4 x 3/16	16.7	20.2	21.1	26.5	27.9	19.3	24.3	40.8	42.2
2 1/4 x 1/4	21.6	26.7	27.6	35.3	37.2	24.4	N/A	54.4	56.4
2 1/2 x 3/16	18.3	22.9	23.3	29.3	30.7	21.0	26.6	45.2	46.6
2 1/2 x 1/4	23.9	29.6	30.5	39.1	41.0	26.6	N/A	60.5	62.4

N/A... NOT AVAILABLE

true crossbar alignment gratings

FOR AESTHETIC PURPOSES, WHEN TRUE ALIGNMENT OF CROSS BARS IS REQUIRED, SPECIFICATIONS SHOULD STATE: SLOT BEARING BARS FOR RECTANGULAR CROSS BARS PRIOR TO ELECTRO-PRESSURE WELDING.

INDUSTRIAL GRATINGS SPECIFICATIONS

how to specify or order  
**STANDARD TWISTED CROSS BAR GRATING**  
 Grating shall be Reliance Steel Products Company's Electro-Pressure Welded construction, Type IR4, with 1 1/2 x 3/16" bearing bars spaced at 1 3/16" centers and 1/4" twisted cross bars spaced at 4" centers. Wearing surface of bearing bars shall be plain and wearing surface of cross bars plain. Grating shall be painted one shop coat of Red Oxide (or hot dip galvanized) after fabrication.

how to specify or order  
**RECTANGULAR CROSSBAR GRATING**  
 Grating shall be Reliance Steel Products Company's Electro-Pressure Welded construction, Type IR2, with 1 x 3/16" bearing bars spaced at 1 3/16" centers and 1/2" x 3/16" cross bars spaced at 2" centers. Wearing surface of bearing bars shall be Serrated and wearing surface of cross bars Serrated. Grating shall be painted one shop coat of Red Oxide (or hot dip galvanized) after fabrication.

how to specify or order  
**RELGRIT ABRASIVE SURFACED GRATING**  
 Grating shall be Reliance Steel Products Company's Electro-Pressure Welded construction, Type 1/2RR4, with 2 x 3/16" bearing bars spaced at 1 1/16" centers and 1/2" x 3/16" cross bars spaced 4" centers. Wearing surface of bearing bars shall be Relgrit and wearing surface of cross bars Relgrit. Grating shall be painted one shop coat of Red Oxide (or hot dip galvanized) after fabrication.

how to specify or order  
**RADIAL GRATING**  
 Grating shall be Reliance Steel Products Company's Electro-Pressure Welded construction, Type 1C4, with 1 x 3/16" bearing bars spaced at 1-3/16" centers (on centerline of walkway) and 1/2" x 3/16" cross bars spaced 4" centers. Wearing surface of bearing bars shall be plain and wearing surface of cross bars knurled. Grating shall be painted with one shop coat of Red Oxide (or hot dip galvanized) after fabrication.



# Reliance walkway grating steel... carbon & stainless

op/overall product, in place

## ELECTRO-PRESSURE WELDED

Bearing Bar Size 1 3/16" c/c	Weight per Sq. Ft.	Span	U	D	2'0"		2'6"		3'0"		3'6"		4'0"		4'6"		5'0"		5'6"		6'0"				
					U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	
3/4x3/8	5.6	3'8"	U	.581	.372	.258	.190	.145	.115																
			D	.096	.150	.216	.294	.382	.485																
			C	.581	.465	.387	.332	.290	.258																
1x1/8	5.0	4'3"	U	.686	.439	.305	.224	.172	.136	.110	.091														
			D	.072	.112	.162	.220	.289	.365	.451	.545	.646													
			C	.686	.549	.458	.392	.343	.305	.274	.250	.229													
1x3/8	7.3	4'11"	U	.1030	.659	.458	.336	.257	.203	.165	.136	.114													
			D	.072	.112	.162	.220	.289	.365	.451	.545	.646													
			C	.1030	.824	.686	.588	.515	.458	.412	.374	.343													
1x1/4	9.7	5'5"	U	.1374	.879	.611	.448	.343	.271	.219	.181	.152													
			D	.072	.113	.162	.220	.288	.364	.450	.544	.648													
			C	.1374	1.099	.916	.785	.687	.611	.549	.499	.458													
1 1/4x1/8	6.1	5'4"	U	.1072	.686	.477	.350	.268	.212	.172	.142	.119	.102	.088											
			D	.058	.090	.130	.176	.230	.292	.360	.435	.516	.607	.704											
			C	.1072	.858	.715	.613	.536	.477	.429	.390	.358	.330	.306											
1 1/4x3/8	8.9	5'7"	U	.1610	1.031	.716	.526	.403	.318	.258	.213	.179	.152	.131											
			D	.058	.090	.130	.176	.230	.292	.360	.435	.516	.607	.704											
			C	.1610	1.288	.1074	.920	.805	.716	.644	.586	.537	.496	.466											
1 1/4x1/4	11.9	6'1"	U	.2148	1.374	.954	.701	.537	.424	.343	.284	.238	.203	.175											
			D	.057	.090	.129	.176	.230	.291	.360	.435	.518	.608	.705											
			C	.2148	1.718	1.432	1.227	1.074	.954	.859	.781	.716	.601	.613											
1 1/2x1/8	7.3	5'10"	U	.1544	.988	.686	.504	.386	.305	.247	.204	.172	.146	.126	.096	.76									
			D	.048	.075	.108	.147	.192	.243	.300	.363	.432	.587	.765	.967										
			C	.1544	1.236	1.030	.882	.772	.686	.618	.562	.515	.475	.441	.386	.343									
1 1/2x3/8	10.5	6'8"	U	.2320	1.485	1.031	.758	.580	.458	.371	.307	.258	.220	.189	.145	.114									
			D	.048	.075	.108	.147	.192	.243	.300	.363	.432	.506	.587	.765	.967									
			C	.2320	1.856	1.547	1.326	1.160	1.031	.928	.844	.773	.714	.663	.650	.616	.516								
1 1/2x1/4	14.1	7'4"	U	.3093	1.980	1.374	1.010	.773	.611	.495	.409	.343	.292	.252	.193	.152									
			D	.048	.075	.108	.147	.192	.243	.300	.363	.432	.507	.588	.768	.972									
			C	.3093	2.475	2.062	1.767	1.546	1.375	1.237	1.125	1.031	.951	.883	.773	.687	.613								
1 3/4x3/8	12.5	7'10"	U	.3158	2.021	1.404	1.031	.790	.624	.505	.418	.351	.299	.258	.197	.156									
			D	.041	.064	.093	.126	.165	.208	.257	.312	.370	.435	.505	.587	.677	.777								
			C	.3158	2.526	2.105	1.805	1.579	1.404	1.263	1.148	1.053	.972	.902	.790	.702	.667								
1 3/4x1/4	16.3	8'7"	U	.4210	2.694	1.871	1.374	1.052	.831	.673	.556	.467	.398	.343	.263	.207									
			D	.041	.064	.092	.126	.164	.208	.257	.311	.370	.434	.504	.588	.683									
			C	.4210	3.368	2.807	2.406	2.105	1.871	1.684	1.531	1.403	1.295	1.203	1.052	.935	.866								
2x3/8	14.1	8'11"	U	.4125	2.640	1.833	1.347	1.031	.815	.660	.545	.458	.390	.337	.258	.204									
			D	.036	.056	.081	.110	.144	.182	.225	.272	.324	.380	.441	.516	.604	.704								
			C	.4125	3.300	2.750	2.357	2.062	1.833	1.650	1.500	1.375	1.269	1.178	1.031	.917	.833								
2x1/4	18.5	9'10"	U	.5499	3.519	2.444	1.795	1.374	1.086	.879	.727	.611	.520	.448	.343	.271									
			D	.036	.056	.081	.110	.144	.182	.225	.272	.324	.380	.440	.516	.604	.704								
			C	.5499	4.399	3.666	3.142	2.749	2.444	2.199	1.999	1.833	1.692	1.571	1.374	1.222	.966								
2 1/4x3/8	15.8	10'0"	U	.5221	3.341	2.340	1.704	1.305	1.031	.835	.690	.580	.494	.426	.326	.258									
			D	.032	.050	.072	.098	.128	.162	.200	.242	.288	.338	.392	.452	.518	.594								
			C	.5221	4.176	3.480	2.983	2.610	2.320	2.088	1.898	1.740	1.606	1.492	1.305	1.160	.966								
2 1/4x1/4	20.7	11'0"	U	.6960	4.454	3.093	2.272	1.740	1.374	1.113	.920	.773	.659	.568	.435	.343									
			D	.032	.050	.072	.098	.128	.162	.200	.242	.288	.338	.392	.452	.518	.594								
			C	.6960	5.568	4.640	3.977	3.480	3.093	2.784	2.531	2.320	2.141	1.988	1.740	1.546	.966								
2 1/2x3/8	17.4	11'2"	U	.6445	4.125	2.864	2.104	1.611	1.273	1.031	.852	.716	.610	.526	.409	.318									
			D	.029	.045	.065	.088	.115	.146	.180	.218	.259	.304	.353	.461	.583									
			C	.6445	5.156	4.297	3.683	3.222	2.864	2.578	2.344	2.148	1.983	1.841	1.611	1.432	.966								
2 1/2x1/4	23.0	12'3"	U	.8593	5.499	3.819	2.806	2.148	1.697	1.374	1.136	.954	.813	.701	.537	.424									
			D	.028	.045	.064	.088	.115	.145	.180	.217	.259	.304	.352	.460	.583									
			C	.8593	6.874	5.729	4.910	4.296	3.819	3.437	3.124	2.864	2.644	2.455	2.148	1.909	.966								

Recommended maximum span for 1/4" deflection under concentrated load (C) of 300# at midspan on 6' or less, 400# on over 6'

U=safe uniform load, lb/sq. ft.  
D=deflection in inches  
C=safe concentrated load, lb/ft of grating width, at mid-span

NOTE: 1/4" is recommended as the maximum deflection consistent with pedestrian comfort, but can be exceeded for other loading conditions at the discretion of the engineer.

CAUTION: Sidewalks and trench covers in cities and shopping centers are frequently subjected to loads such as light delivery trucks, automobiles, snow plows, etc. For such loads see Reliance Heavy Duty Steel Grating on pages 14-17.

CONVERSION FACTORS: For gratings with other than 1 3/16" bearing bar spacing, or for different design stresses, proportionate conversion factors apply. For information on other types of grating, consult the manufacturer.

### To obtain equivalent loads

On Type	Multiply by
1R4-1R2-1U2	1.000
3/4R4-3/4R2	1.289
1/2R4-1/2R2	1.667
1/4R4-1/4R2	2.619

**Basis of Design for Grating**

**AASHTO LOADINGS H-10, H-15 & H-20**

- Wheel load—H-10 = 8,000 lbs.  
H-15 = 12,000 lbs.  
H-20 = 16,000 lbs.
- Impact factor—30%.
- Method of load distribution:  
Each wheel distributed over a width of 15" plus 2 times the distance center to center of bearing bars and over a length on each bar equal to 10" for H-10, 15" for H-15, and 20" for H-20.
- Maximum allowable stress in accordance with AASHTO specifications for highway bridges, 1973 edition.
- Modulus of elasticity = 29,000,000 psi.
- Simple span.
- Maximum deflection = 1/400 span.



**H-10 LOADING**

Vehicles such as fork lifts, trucks cranes with pneumatic tires, light trucks, and loaded dollies fall into this category. Use the H-10 loading chart for factory and warehouse applications.

**H-15 LOADING**

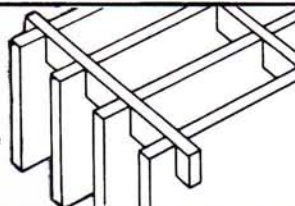
Industrial truck cranes with pneumatic tires, heavy fork lifts, dump trucks, and high lifts fall into this category. Use the H15 loading chart where usual highway loading and heavy industrial loads are encountered.

**H-20 LOADING**

Heavy trucks such as concrete mixers, warehouse trucks and tractor trailers fall into this category. Use the H-20 loading chart where heavy highway loading is encountered.

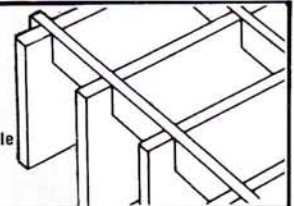
**Bearing Bars 1 7/8" c/c**  
**Cross Bars 4" c/c**

Cross bar spacing 2" c/c also available



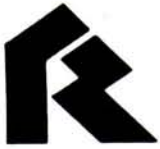
**Bearing Bars 2 3/8" c/c**  
**Cross Bars 4" c/c**

Cross bar spacing 2" c/c also available



CLEAR SPAN			Catalog Number	Weight lbs/sq. ft.	Sec. Mod. Per ft. of Width	Bearing Bar Sizes	CLEAR SPAN			Catalog Number	Weight lbs/sq. ft.	Sec. Mod. Per ft. of Width
H 10	H 15	H 20					H 10	H 15	H 20			
2'7"	2'1"	1'11"	H2-12B	18.50	2.400	3 x 1/4" 5/8" 3/4" 1/2"	2'3"	1'10"	1'9"	H3-12B	15.31	1.894
3'3"	2'6"	2'3"	H2-12C	22.66	3.004		2'9"	2'2"	2'0"	H3-12C	18.67	2.370
3'10"	2'11"	2'7"	H2-12D	28.62	3.600		3'4"	2'7"	2'3"	H3-12D	22.03	2.842
4'6"	3'4"	2'10"	H2-12E	31.87	4.199		3'10"	2'11"	2'6"	H3-12E	26.30	3.315
							4'4"	3'3"	2'10"	H3-12F	29.66	3.789
3'4"	2'7"	2'4"	H2-14B	21.92	3.266	3 1/2 x 1/4" 5/8" 3/8" 1/2"	2'11"	2'3"	2'1"	H3-14B	18.20	2.578
4'3"	3'2"	2'9"	H2-14C	26.73	4.089		3'6"	2'9"	2'5"	H3-14C	22.08	3.228
5'1"	3'9"	3'2"	H2-14D	31.54	4.899		4'4"	3'3"	2'10"	H3-14D	25.97	3.867
6'0"	4'4"	3'7"	H2-14E	37.71	5.716		5'1"	3'8"	3'2"	H3-14E	31.19	4.512
							5'9"	4'2"	3'6"	H3-14F	35.08	5.157
4'3"	3'2"	2'9"	H2-16B	24.65	4.266	4 x 1/4" 5/8" 3/8" 1/2"	3'8"	2'9"	2'5"	H3-16B	20.40	3.368
5'5"	4'0"	3'4"	H2-16C	30.18	5.342		4'7"	3'5"	2'11"	H3-16C	24.86	4.217
6'7"	4'9"	3'11"	H2-16D	35.70	6.400		5'6"	4'1"	3'5"	H3-16D	29.33	5.053
7'3"	5'5"	4'5"	H2-16E	42.52	7.466		6'6"	4'8"	3'10"	H3-16E	35.08	5.894
							7'1"	5'3"	4'4"	H3-16F	39.54	6.736
5'4"	3'11"	3'3"	H2-18B	27.45	5.399	4 1/2 x 1/4" 5/8" 3/8" 1/2"	4'6"	3'4"	2'10"	H3-18B	22.66	4.263
6'9"	4'10"	4'0"	H2-18C	33.62	6.760		5'9"	4'2"	3'5"	H3-18C	27.65	5.337
7'6"	5'10"	4'9"	H2-18D	39.86	8.099		6'10"	4'11"	4'1"	H3-18D	32.69	6.394
*8'1"	6'9"	5'5"	H2-18E	47.33	9.449		7'6"	5'5"	4'8"	H3-18E	38.96	7.460
							*7'10"	6'6"	5'3"	H3-18F	44.00	8.526
6'5"	4'8"	3'10"	H2-20B	30.18	6.666	5 x 1/4" 5/8" 3/8" 1/2"	5'5"	4'0"	3'4"	H3-20B	24.86	5.263
7'7"	5'9"	4'9"	H2-20C	37.07	8.346		6'10"	5'0"	4'1"	H3-20C	30.43	6.589
8'6"	6'10"	5'8"	H2-20D	44.02	10.000		7'8"	5'11"	4'10"	H3-20D	36.05	7.894
*9'0"	7'6"	6'6"	H2-20E	52.20	11.666		8'5"	6'10"	5'7"	H3-20E	42.90	9.210
							*8'9"	7'4"	6'3"	H3-20F	48.47	10.526
7'3"	5'6"	4'6"	H2-22B	32.97	8.066	5 1/2 x 1/4" 5/8" 3/8" 1/2"	6'6"	4'8"	3'11"	H3-22B	27.12	6.367
8'5"	6'10"	5'7"	H2-22C	40.51	10.099		7'7"	5'11"	4'10"	H3-22C	33.21	7.973
*9'4"	7'7"	6'8"	H2-22D	48.12	12.099		8'6"	6'11"	5'8"	H3-22D	39.35	9.551
*9'11"	8'4"	7'2"	H2-22E	57.01	14.116		9'3"	7'6"	6'7"	H3-22E	46.79	11.144
							*9'9"	8'2"	7'1"	H3-22F	52.93	12.736
8'0"	6'5"	5'2"	H2-24B	35.70	9.600	6 x 1/4" 5/8" 3/8" 1/2" 5/8"	7'3"	5'5"	4'5"	H3-24B	29.33	7.579
9'4"	7'6"	6'6"	H2-24C	44.02	12.019		8'5"	6'10"	5'7"	H3-24C	36.05	9.488
*10'4"	8'4"	7'3"	H2-24D	52.28	14.400		9'6"	7'7"	6'7"	H3-24D	42.71	11.368
*11'0"	9'3"	7'11"	H2-24E	61.89	16.800		*10'3"	8'3"	7'2"	H3-24E	50.72	13.263
							*10'10"	9'0"	7'8"	H3-24F	57.39	15.157
							*11'9"	*10'1"	8'8"	H3-24G	71.04	18.947
9'8"	7'8"	6'8"	H2-28B	44.62	13.067	7 x 1/4" 5/8" 3/8" 1/2" 5/8"	8'8"	7'0"	5'9"	H3-28B	35.62	10.315
11'5"	8'11"	7'8"	H2-28C	55.12	16.359		10'2"	8'0"	6'11"	H3-28C	44.62	12.915
*12'6"	10'1"	8'7"	H2-28D	65.62	19.600		*11'7"	9'0"	7'7"	H3-28D	52.22	15.473
*13'5"	11'2"	9'5"	H2-28E	77.64	22.866		*12'4"	9'11"	8'5"	H3-28E	62.25	18.052
							*13'0"	10'11"	9'1"	H3-28F	70.22	20.631
							*14'4"	*12'1"	10'7"	H3-28G	86.61	25.789

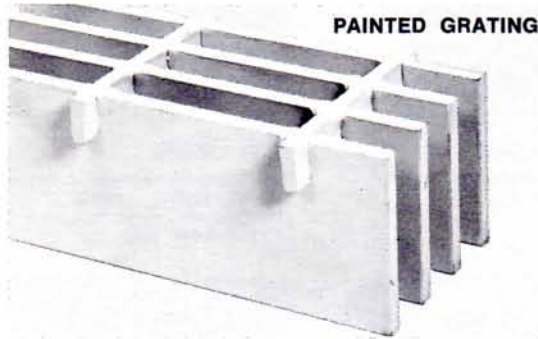
\*Span limited to allowable maximum deflection of 1/400 of span.



# Reliance heavy duty steel grating

loading of 1, 2, 5 ton  
H10, H15, H20

op/overall product in place



PAINTED GRATING

Reliance heavy duty gratings, 3" and over in depth, are normally supplied with rectangular cross bars. See "Cross Bar Chart" on page 7. When high load concentrations, bottom cross bars may be added for additional load distribution.

## HEAVY DUTY GRATING WITH BOTTOM CROSS BARS

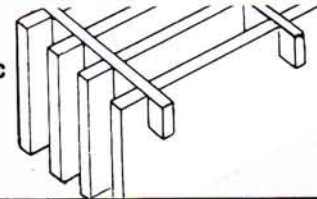
Heavy Duty Grating shall be Reliance Steel Products Company construction, Catalog No. H2-16D, with 4 x 3/8" bearing bars spaced at 1 7/8" centers with 1 x 5/16" cross bars at 4" centers, and 1/2" round bottom cross bars at 4" centers. Heavy duty grating shall be painted with one shop coat of T-727 Red Oxide Primer after fabrication. Note: Bearing bars less than 3" use 3/8" bottom cross bar.

### how to specify:

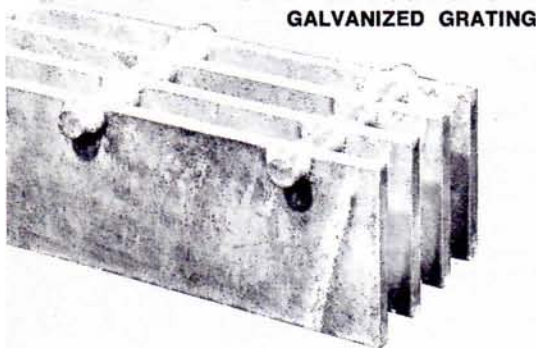
#### HEAVY DUTY PAINTED GRATING

Heavy Duty Grating shall be Reliance Steel Products Company construction, Catalog No. H2-16D, with 4 x 3/8" bearing bars spaced at 1 7/8" centers and 1 x 5/16" cross bars at 4" centers. Weight per sq. ft. 35.7#. Section modulus per foot of width 6.400, capable of carrying a H20 load on a 3'11" maximum clear span. Heavy duty grating shall be painted with one shop coat of T-727 Red Oxide Primer after fabrication.

Bearing Bar Sizes		Cross Bar Sizes		CLEAR SPAN			Catalog Number	Weight lbs/sq. ft.	Sec. Mod. Per ft. of Width
				H 10	H 15	H 20			
3 x	1/4"	3/4 x	1/4"	3'2"	2'6"	2'3"	H1-12B H1-12C H1-12D	24.86	3.273
	3/8"		1/4"	4'4"	3'1"	2'8"		30.60	4.098
	1/2"		3/8"	4'11"	3'7"	3'1"		36.44	4.910
	5/8"		1/2"						
3 1/2 x	1/4"	1 x	1/4"	4'3"	3'2"	2'9"	H1-14B H1-14C H1-14D	29.32	4.455
	3/8"		1/4"	5'5"	4'0"	3'4"		36.02	5.578
	1/2"		3/8"	*6'4"	4'8"	3'11"		42.71	6.682
	5/8"		1/2"						
4 x	1/4"	1 x	1/4"	5'5"	4'0"	3'4"	H1-16B H1-16C H1-16D	33.15	5.820
	3/8"		1/4"	6'10"	5'0"	4'1"		40.80	7.286
	1/2"		3/8"	*7'5"	6'0"	4'10"		48.45	8.730
	5/8"		1/2"						
4 1/2 x	1/4"	1 x	1/4"	6'9"	4'10"	4'0"	H1-18B H1-18C H1-18D	36.97	7.365
	3/8"		1/4"	7'9"	6'1"	4'11"		45.57	9.221
	1/2"		3/8"	*8'4"	7'0"	5'10"		54.19	11.047
	5/8"		1/2"						
5 x	1/4"	1 x	1/4"	7'6"	5'10"	4'9"	H1-20B H1-20C H1-20D	40.80	9.093
	3/8"		1/4"	8'9"	7'1"	5'11"		50.36	11.385
	1/2"		3/8"	*9'4"	7'10"	6'10"		59.92	13.640
	5/8"		1/2"						
5 1/2 x	1/4"	1 x	1/4"	8'5"	6'10"	5'7"	H1-22B H1-22C H1-22D	44.62	11.002
	3/8"		1/4"	*9'8"	7'10"	6'10"		55.14	13.775
	1/2"		3/8"	*10'4"	8'9"	7'6"		65.66	16.504
	5/8"		1/2"						
6 x	1/4"	1 1/4 x	1/4"	9'4"	7'5"	6'5"	H1-24B H1-24C H1-24D	48.45	13.095
	3/8"		1/4"	*10'8"	8'7"	7'5"		59.92	16.394
	1/2"		3/8"	*11'6"	9'9"	8'3"		71.40	19.642
	5/8"		1/2"						
7 x	1/4"	1 1/4 x	1/4"	11'5"	8'10"	7'7"	H1-28B H1-28C H1-28D	56.73	17.823
	3/8"		1/4"	*12'10"	10'5"	8'10"		70.12	22.315
	1/2"		3/8"	*13'11"	11'9"	9'11"		83.51	26.735
	5/8"		1/2"						



Bearing Bars 1 3/8" c/c  
Cross Bars 4" c/c  
Cross bar spacing 2"  
c/c also available



GALVANIZED GRATING

When grating is used in corrosive atmospheres, a galvanized finish is often recommended. For this construction, a round cross bar should be used. (see cross bar chart on page 7). Round cross bars provide a tight permanent seal against corrosion.

### how to specify:

#### HEAVY DUTY GALVANIZED GRATING

Heavy Duty Grating shall be Reliance Steel Products Company construction Catalog No. H3-20C, with 5 x 5/16" bearing bars spaced at 2 3/8" centers and 1/2" dia. round cross bars at 4" centers. Weight per sq. ft. 31.95#. Section modulus per foot of width 6.589, capable of carrying a H 15 load on a 5'0" maximum clear span. Heavy Duty Grating shall be hot dip galvanized in accordance with ASTM A-123 after fabrication.

NOTE: Add 5% to the weight per sq. ft. shown to cover weight of galvanizing.

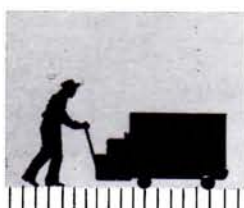
NOTE: Distance between C/C supports = clear span + 1/2 flange width of supports.



### Basis of Design for Grating

#### 1 TON, 2 TON AND 5 TON LOADS

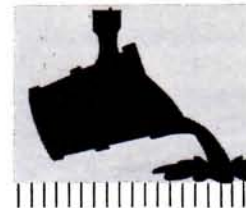
- Total load = dead weight of vehicle plus weight of load carried.
- 80% of total load carried on one axle.
- Wheel load = 1/2 of the axle load.
- Impact factor—30%
- Method of load distribution:  
Each wheel distributed over a width of 1" per ton of total load plus 2 times the distance center to center of bearing bars and over a length on each bar equal to 1" per ton of total load.
- Maximum allowable stress = 20,000 psi.
- Modulus of elasticity = 29,000,000 psi.
- Simple span.
- Maximum deflection = 1/400 span.



**1-TON LOADING**  
Hand trucks, compact automobiles.



**2-TON LOADING**  
Heavy automobiles, 1-ton fork lifts.



**5-TON LOADING**  
Industrial working areas—painting, casting, forging, assembly, etc., 2-ton fork lifts or 5-ton ladle carrier.



**H-10 LOADING**  
For fork lifts, truck cranes with pneumatic tires and light trucks. Use the H-10 loading chart.



**H-15 LOADING**  
Industrial truck cranes with pneumatic tires, heavy fork lifts, dump trucks, and high lifts. Use the H-15 loading chart.



**H-20 LOADING**  
Heavy trucks such as concrete mixers, warehouse trucks and tractor trailers. Use the H-20 loading chart.

		Bearing Bars 2 3/8" c/c Cross Bars 4" c/c Cross bar spacing 2" c/c also available												
		CLEAR SPAN												
H 15	H 20	Catalog Number	Weight lbs./sq. ft.	Sec. Mod. Per ft. of Width	Bearing Bar Sizes	1 Ton	2 Ton	5 Ton	H 10	H 15	H 20	Catalog Number	Weight lbs./sq. ft.	Sec. Mod. Per ft. of Width
		H2-4B H2-4C H2-4D	6.8 8.5 10.1	.266 .333 .400	1 x 1/4" 3/16" 3/8"	0'8" 0'10" 1'0"						H3-4B H3-4C H3-4D	5.5 6.6 7.7	.210 .263 .315
0'11" 1'0"	0'11" 1'0"	H2-5B H2-5C H2-5D	8.5 10.4 12.2	.416 .521 .624	1 1/4 x 1/4" 3/16" 3/8"	1'1" 1'4" 1'7"	0'8" 1'0" 1'0"		0'11" 0'11" 0'11"			H3-5B H3-5C H3-5D	6.6 7.8 9.4	.328 .411 .492
0'11" 1'1" 1'2"	0'11" 1'1" 1'2"	H2-6B H2-6C H2-6D	10.1 12.2 14.5	.599 .750 .899	1 1/2 x 1/4" 3/16" 3/8"	1'6" 1'11" 2'3"	0'11" 1'2" 1'5"		0'10" 1'0" 1'2"	0'10" 1'0" 1'1"	0'10" 1'0" 1'1"	H3-6B H3-6C H3-6D	7.7 9.4 10.6	.473 .592 .709
1'1" 1'3" 1'5"	1'1" 1'3" 1'5"	H2-7B H2-7C H2-7D	11.5 14.1 16.7	.816 1.021 1.224	1 3/4 x 1/4" 3/16" 3/8"	2'1" 2'7" 3'1"	1'3" 1'7" 1'10"	0'10" 1'1" 1'3"	1'0" 1'3" 1'5"	1'0" 1'2" 1'3"	1'0" 1'2" 1'3"	H3-7B H3-7C H3-7D	8.8 10.8 12.7	.644 .806 .966
1'3" 1'6" 1'8"	1'3" 1'5" 1'7"	H2-8B H2-8C H2-8D	13.3 16.2 19.2	1.066 1.335 1.600	2 x 1/4" 3/16" 3/8"	2'8" 3'4" 4'1"	1'8" 2'0" 2'5"	1'1" 1'4" 1'6"	1'3" 1'6" 1'8"	1'2" 1'4" 1'6"	1'2" 1'4" 1'5"	H3-8B H3-8C H3-8D	10.2 12.4 14.5	.842 1.054 1.263
1'5" 1'8" 1'11"	1'5" 1'8" 1'10"	H2-9B H2-9C H2-9D	14.8 18.1 21.5	1.349 1.689 2.024	2 1/4 x 1/4" 3/16" 3/8"	3'5" 4'3" *4'8"	2'1" 2'7" 3'1"	1'4" 1'7" 1'11"	1'5" 1'6" 2'0"	1'4" 1'6" 1'8"	1'4" 1'6" 1'8"	H3-9B H3-9C H3-9D	11.3 13.8 16.4	1.065 1.333 1.598
1'8" 1'11" 2'3"	1'7" 1'10" 2'0"	H2-10B H2-10C H2-10D	16.3 20.1 23.7	1.666 2.086 2.499	2 1/2 x 1/4" 3/16" 3/8"	4'2" *5'0" *5'5"	2'6" 3'2" 3'9"	1'7" 1'11" 2'4"	1'8" 2'1" 2'5"	1'6" 1'9" 1'11"	1'5" 1'8" 1'10"	H3-10B H3-10C H3-10D	12.4 15.2 18.0	1.315 1.647 1.973

ould be banded and fastened in place.

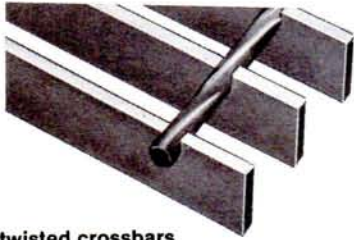
NOTE: Distance between c/c supports = clear span + 1/2 flange width of supports.



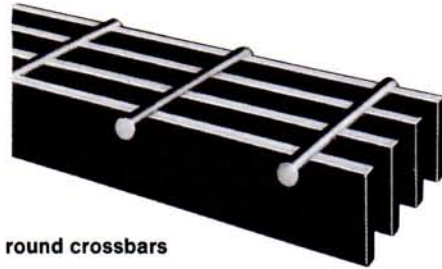
# Reliance heavy duty steel grating

loading of 1, 2, 5 ton  
H10, H15, H20

op/overall product in place



twisted crossbars



round crossbars

## Heavy Duty Grating Less Than 3" In Depth

Reliance heavy duty grating with twisted crossbars are normally used for grating 1" to 2½" in depth. The standard cross bar spacing is 4" c/c. However, for smaller openings or short span trenches 2" c/c is also available. See cross bar chart page 7 for proper cross bar selection for the span tables shown below.

### how to specify (paint finish)

Heavy Duty Grating shall be Reliance Steel Products Company construction, Catalog No. HI-6C, with 1½" x 5/16" bearing bars spaced at 1¾" centers and 5/16" ardox crossbars at 4" centers. Weight per square foot 15.12 lbs. Capable of carrying a 5 ton load on a 1'1" maximum clear span. Heavy Duty Grating shall be painted with one shop coat of T-727 Red Oxide Primer after fabrication.

### how to specify (galvanized finish)

Heavy Duty Grating shall be Reliance Steel Products Company construction, Catalog No. H3-9D, with 2¼" x 3/8" bearing bars spaced at 2¾" centers and 3/8" round cross bars at 4" centers. Weight per sq. ft. 16.4#. Capable of carrying a 5 ton load on a 1'11" maximum clear span. Heavy Duty Grating shall be hot dipped galvanized in accordance with ASTM-A-123 after fabrication.

Loading Table for Maximum Safe Spans		Bearing Bars 1 3/8" c/c Cross Bars 4" c/c Cross bar spacing 2" c/c also available							Bearing Bars 1 7/8" c/c Cross Bars 4" c/c Cross bar spacing 2" c/c also available						
Bearing Bar Sizes	Cross Bar Round or Twisted Square	CLEAR SPAN						Catalog Number	Weight lbs/sq. ft.	Sec. Mod. Per ft. of Width	Bearing Bar Sizes	CLEAR SPAN			
		1 Ton	2 Ton	5 Ton	H 10	H 15	H 20					1 Ton	2 Ton	5 Ton	H 10
1 x	1/4"	0'9"	0'7"	0'6"				H1-4B	8.43	.363	1 x	0'8"	0'6"		
	5/16"	0'11"	0'8"	0'7"			H1-4C	10.34	.455	0'10"		0'7"			
	3/8"	1'2"	0'9"	0'8"	0'11"	0'11"	0'11"	H1-4D	12.60	.545		1'1"	0'8"		
1 1/4 x	1/4"	1'2"	0'10"	0'8"	0'11"	0'11"	0'11"	H1-5B	10.34	.567	1 1/4 x	1'1"	0'9"		
	5/16"	1'6"	1'0"	0'10"	1'1"	1'0"	1'0"	H1-5C	12.72	.711		1'4"	0'10"		0'11"
	3/8"	1'9"	1'2"	0'11"	1'2"	1'2"	1'2"	H1-5D	15.47	.851		1'8"	1'0"		1'0"
1 1/2 x	1/4"	1'8"	1'1"	0'11"	1'1"	1'1"	1'1"	H1-6B	12.25	.817	1 1/2 x	1'7"	1'0"	0'9"	1'0"
	5/16"	2'1"	1'5"	1'1"	1'4"	1'3"	1'3"	H1-6C	15.12	1.024		1'11"	1'3"	0'11"	1'1"
	3/8"	2'6"	1'8"	1'3"	1'6"	1'4"	1'4"	H1-6D	18.34	1.226		2'5"	1'6"	1'1"	1'3"
1 3/4 x	1/4"	2'3"	1'6"	1'2"	1'4"	1'3"	1'3"	H1-7B	14.17	1.113	1 3/4 x	2'2"	1'4"	1'0"	1'2"
	5/16"	2'10"	1'10"	1'4"	1'8"	1'5"	1'5"	H1-7C	17.51	1.393		2'8"	1'8"	1'2"	1'5"
	3/8"	*3'4"	2'5"	1'7"	1'11"	1'8"	1'7"	H1-7D	21.20	1.670		3'3"	2'0"	1'4"	1'7"
2 x	1/4"	3'0"	1'11"	1'5"	1'8"	1'5"	1'5"	H1-8B	16.08	1.455	2 x	2'10"	1'9"	1'3"	1'5"
	5/16"	3'8"	2'5"	1'9"	1'9"	1'9"	1'8"	H1-8C	19.90	1.821		3'6"	2'2"	1'6"	1'8"
	3/8"	*4'1"	2'10"	2'0"	2'5"	1'11"	1'10"	H1-8D	24.07	2.182		4'3"	2'7"	1'9"	1'11"
2 1/4 x	1/4"	3'9"	2'5"	1'9"	2'0"	1'8"	1'7"	H1-9B	17.99	1.840	2 1/4 x	3'7"	2'3"	1'6"	1'8"
	5/16"	*4'6"	3'0"	2'1"	2'6"	2'0"	1'11"	H1-9C	22.30	2.340		*4'4"	2'9"	1'10"	2'0"
	3/8"	*4'10"	3'7"	2'6"	2'11"	2'4"	2'1"	H1-9D	26.94	2.761		*4'9"	3'3"	2'2"	2'4"
2 1/2 x	1/4"	4'7"	3'0"	2'1"	2'4"	1'11"	1'10"	H1-10B	19.90	2.272	2 1/2 x	4'5"	2'8"	1'9"	1'11"
	5/16"	*5'2"	3'8"	2'7"	3'0"	2'4"	2'1"	H1-10C	24.68	2.845		*5'1"	3'4"	2'2"	2'4"
	3/8"	*5'7"	4'5"	3'0"	3'6"	2'9"	2'5"	H1-10D	29.81	3.409		*5'7"	4'1"	2'7"	2'10"

\*Span limited to allowable maximum deflection of 1/400 of span.

NOTE: Heavy duty used in trenches

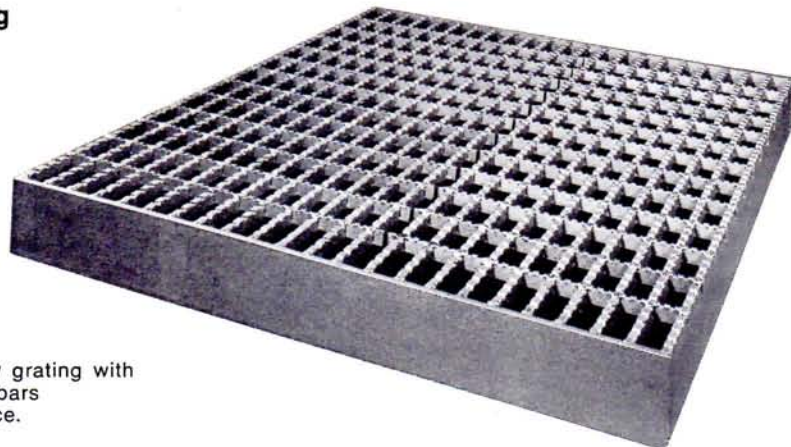
## RECOMMENDED CROSS BARS FOR HEAVY DUTY GRATING

With 40 years of experience in heavy duty grating fabrication, Reliance recommends the use of the cross bars shown in the chart for maximum grating durability. The cross bars in the column under paint finish are Reliance's standard cross bars for a particular bearing bar size and spacing. It is sug-

gested that these cross bars be used whenever possible to maximize economy and grating durability. In the cross bar chart, round cross bars are recommended for use when galvanized finish is required. Round cross bars provide a tight permanent seal against corrosion.

Bearing Bar Size	BB @ 1 3/8 c/c		BB @ 1 7/8 c/c		BB @ 2 3/8 c/c	
	Paint	Galv.	Paint	Galv.	Paint	Galv.
1x1/4 thru 2 1/2x1/4	5/16 ardox	5/16 ardox	5/16 ardox	5/16 ardox	5/16 ardox	5/16 ardox
1x5/16 thru 2 1/2x5/16	5/16 ardox	3/8 φ	5/16 ardox	3/8 φ	5/16 ardox	3/8 φ
1x3/8 thru 2 1/2x3/8	5/16 ardox	3/8 φ	5/16 ardox	3/8 φ	5/16 ardox	3/8 φ
3x1/4	3/4x1/4	1/2 φ	3/4x1/4	1/2 φ	3/4x1/4	1/2 φ
3x5/16	3/4x1/4	1/2 φ	3/4x1/4	1/2 φ	3/4x1/4	1/2 φ
3x3/8	3/4x5/16	1/2 φ	3/4x5/16	1/2 φ	3/4x5/16	1/2 φ
3x7/16			3/4x5/16	1/2 φ	3/4x5/16	1/2 φ
3x1/2					3/4x3/8	5/8 φ
3 1/2x1/4 or 5/16 thru 5 1/2x1/4 or 5/16	1x1/4	5/8 φ	1x1/4	5/8 φ	1x1/4	5/8 φ
3 1/2x3/8 thru 5 1/2x3/8	1x5/16	5/8 φ	1x5/16	5/8 φ	1x5/16	5/8 φ
3 1/2x7/16 thru 5 1/2x7/16			1x5/16	5/8 φ	1x5/16	5/8 φ
3 1/2x1/2 thru 5 1/2x1/2					1x3/8	5/8 φ
6x1/4 or 5/16	1 1/4x1/4	5/8 φ	1 1/4x1/4	5/8 φ	1 1/4x1/4	5/8 φ
6x3/8	1 1/4x5/16	5/8 φ	1 1/4x5/16	5/8 φ	1 1/4x5/16	5/8 φ
6x7/16			1 1/4x5/16	5/8 φ	1 1/4x5/16	5/8 φ
6x1/2					1 1/4x3/8	5/8 φ
6x5/8					1 1/4x3/8	5/8 φ
7x1/4 or 5/16	1 1/4x1/4	5/8 φ	1 1/4x1/4	5/8 φ	1 1/4x1/4	5/8 φ
7x3/8	1 1/4x5/16	5/8 φ	1 1/4x5/16	5/8 φ	1 1/4x5/16	5/8 φ
7x7/16			1 1/4x5/16	5/8 φ	1 1/4x5/16	5/8 φ
7x1/2					1 1/4x3/8	5/8 φ
7x5/8					1 1/4x3/8	5/8 φ

### Heavy Duty Serrated Grating



Specify serrated heavy-duty grating with rectangular serrated cross bars for maximum skid resistance.



# Reliance heavy duty steel grating

op/overall product, in place

The design of heavy duty steel grating is guided by current AASHTO specifications. Reliance heavy duty gratings are all electro-pressure welded construction. Heavy duty gratings have a wide range of uses including trench gratings, industrial floors, loading docks and highway inlets. Heavy duty grating can be furnished serrated.

In the design and application of heavy duty grating, engineers should always give careful consideration to the cross bar used. (See chart opposite page for Reliance recommended standards.) The cross bar is the load distributing member. Use of insufficient or light cross bar members can lead to failure of the grid system even though the main bars were properly selected for the span and load. Heavy duty gratings are available in three standard spacings. Reliance has fabricated heavy duty gratings with bearing bars as close together as 1/4". For special designs and/or proposals for heavy duty grating, please contact our engineering department.

## ENGINEERING ANALYSIS

ANALYSIS: LOAD H20, SPAN 4'-6"  
FROM SPAN CHART PAGE 11, SELECT H3-20D  
SM/ft = 7,894 in<sup>3</sup>; BARS/ft = 1/2/2.375 = 5  
Therefore SM/BAR = 7,894/5 = 1.5788 in<sup>3</sup>

### BASIS OF DESIGN

WHEEL LOAD =  $W_{t.l.} = 16,000$  lbs  
IMPACT FACTOR = 30% OF  $W_{t.l.} = 4,800$  lbs  
TOTAL DESIGN LOAD = 20,800 lbs  
WITH OF LOAD DISTRIBUTION  
 $W_R = 15'' + 2 \times \text{DISTANCE C/C OF BEARING BARS}$   
 $W_R = 15 + (2)(2.375) = 19.75$  INCHES  
LENGTH OF DISTRIBUTION FROM AASHTO  
 $d = 20''$

### NO. OF BEARING BARS ACTIVE

$$N = \frac{W_R}{S} = \frac{19.75}{2.375} = 8.32$$

### LOAD PER BAR

$$P = \frac{WT}{N} = \frac{20800}{8.32} = 2500 \text{ lbs}$$

### MAXIMUM BENDING MOMENT

$$M = P \left( \frac{l}{4} - \frac{d}{8} \right) = 2500 \left( \frac{54}{4} - \frac{20}{8} \right)$$

$$M = 27,500 \text{ in-lbs/BAR}$$

### MAXIMUM STRESS

$$f_{MAX} = \frac{M}{SM} = \frac{27500}{1.5788} = 17,418$$

17,418 < 20,000 PSI FOR A36

### MAXIMUM DEFLECTION

$$\Delta = \frac{P}{96EI} \left( 2l^3 - d^2l + \frac{d^3}{4} \right)$$

$$\Delta = 0.068''$$

$$\text{RATIO} = \frac{l}{\Delta} = \frac{1}{.068} = \frac{54}{.794}$$

1/794 < 1/400 OF THE SPAN  
DESIGN IS SATISFACTORY

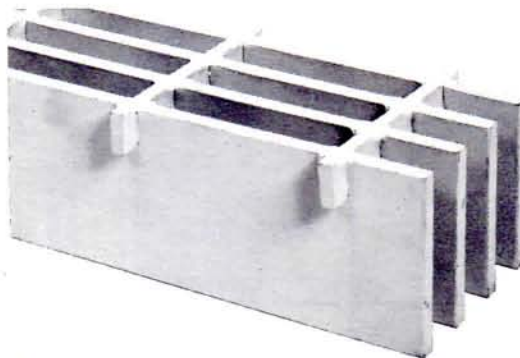
**CROSSBARS CAN  
BE FURNISHED AT  
2" ON CENTERS  
WHEN SPECIFIED**

## selecting the material

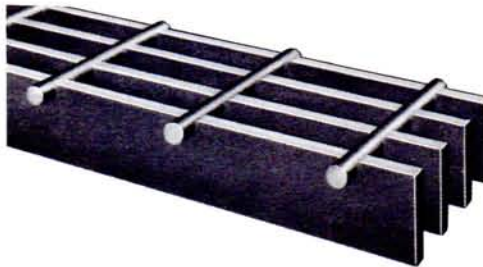
The following materials can be manufactured into most heavy duty and walkway grating styles.

Stainless Steel..... Types 304, 316 and 316L  
Carbon Steel..... A36, A570 Grade D, A569, and mild steel grades  
Low Alloy..... A588, A242, A606 Type 4, A441, A572 Grade 50  
Nickel Steel..... Incoloy 800  
Manganese..... 11 - 14% Manganese Steel

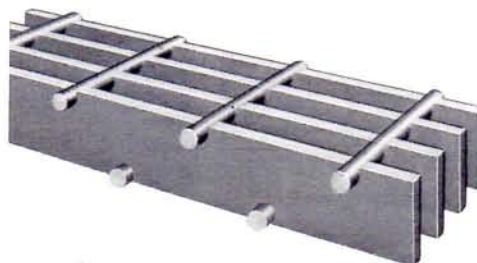
## selecting the cross bar for Reliance heavy duty grating



Rectangular cross bars are used where the traffic is heavy and where the grating is subject to abuse as in a typical industrial situation.



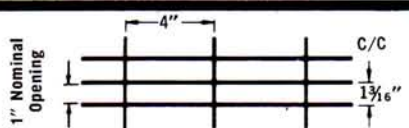
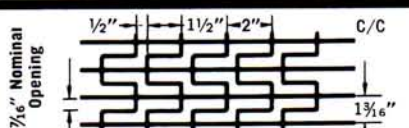
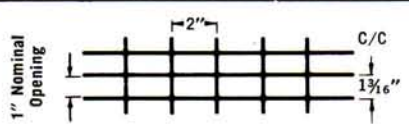
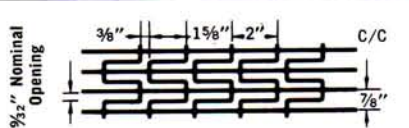
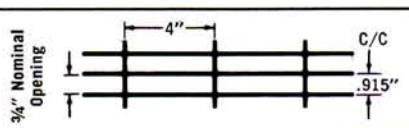
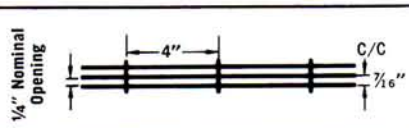
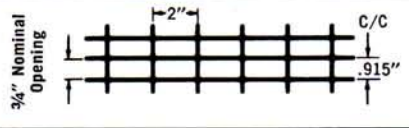
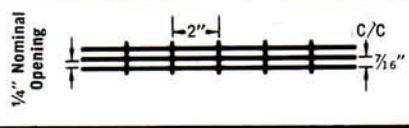
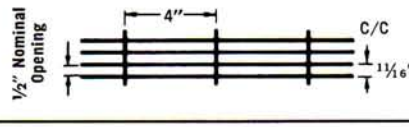
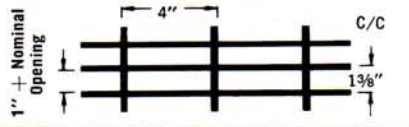
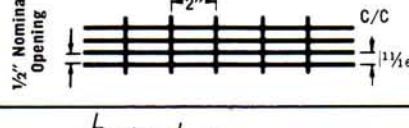

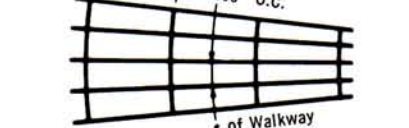

Round or twisted (ardox) cross bars are used where traffic is generally light and the grating is subject to occasional full design load.

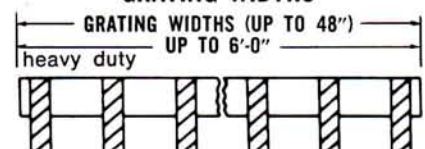


Heavy duty grating with bottom cross bars increase the transverse stiffness and load distribution of the grating panel. This is frequently necessary on longer spans.

**selecting the pattern**

Consideration should be given to:  
 1. type, size and frequency of load; 2. danger of objects falling through the walkway and 3. heat, light and air transmission requirements.

GRATING PATTERN	RELIANCE DESIGNATION	RELIANCE RELGRIT ANTI-SKID DESIGNATION	GRATING PATTERN	RELIANCE DESIGNATION	RELIANCE RELGRIT ANTI-SKID DESIGNATION
	1R4	1RR4		1U2	1UR2
	1R2	1RR2		1 1/16 U2	1 1/16 UR2
	3/4R4	3/4RR4		1/4R4	1/4RR4
	3/4R2	3/4RR2		1/4R2	1/4RR2
	1/2R4	1/2RR4		H1	HEAVY DUTY SPACINGS
	1/2R2	1/2RR2		H2	HEAVY DUTY SPACINGS
	1C4	1CR4		H3	HEAVY DUTY SPACINGS

STANDARD GRATING PANEL DIMENSIONS								
GRATING LENGTH STOCK GRATING PANELS ARE 20'-0" OR 24'-0" LONG—OTHER LENGTHS ON APPLICATION	WALKWAY				HEAVY DUTY			
	IR4 IR2	3/4R4 3/4R2	1/2R4 1/2R2	1/4R4 1/4R2	Barring Bar Thickness	H1	H2	H3
GRATING WIDTHS GRATING WIDTHS (UP TO 48") heavy duty UP TO 6'-0"	24 1/8"	24 3/8"	23 3/16"	11 3/16"	1/4"	3'-7 5/8"	4'-11 1/8"	6'-0 1/4"
	21 BB	27 BB	35 BB	27 BB		32 BB	32 BB	31 BB
	30 1/16"	29 7/8"	23 3/16"	11 3/16"	5/16"	2'-10 1/16"	3'-10 1/16"	4'-10 1/16"
	26 BB	33 BB	35 BB	27 BB		25 BB	25 BB	25 BB
	36"	36 1/16"	23 3/16"	11 3/16"	3/8"	2'-0 3/8"	2'-8 7/8"	3'-5 3/8"
31 BB	40 BB	35 BB	27 BB	18 BB		18 BB	18 BB	

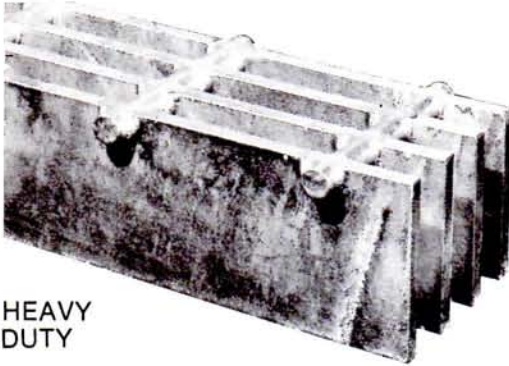


# Reliance steel grating

cp/components, parts

## selecting the type

In order to select the proper type of heavy duty grating, the engineer or architect must determine the maximum opening allowable for the grating, type and frequency of the load and the atmosphere in which the grating is being used.



HEAVY DUTY

Safe load tables on pages 8, 9, 10, 11 and 12 provide a description and recommendation for most industrial grating requirements.

## walkway



Safe load tables on page 12 are established in accordance with the recommendation of NAAMM and RRG-661-C. Since pedestrians are the principal users of walkway grating, the opening between the bars determines the selection.



Steel walkway gratings are furnished with three types of cross bars, shown at the left. The top is the standard design with ardox cross bars. The center picture shows the grating with rectangular cross bars and the third picture shows the U-type rectangular cross bar.



The rectangular cross bar provides more strength in the transverse direction and thus the load is distributed more efficiently. When the grating is properly fastened to its supports the rectangular cross bars will prevent rocking or bowing of the grating panel. WHEN THE AESTHETIC REQUIREMENT OF THE INSTALLATION DICTATES ACCURATE ALIGNMENT OF CROSS BARS, EXCEEDING THE TOLERANCES ESTABLISHED BY NAAMM, SPECS SHOULD CALL FOR RECTANGULAR CROSS BARS PRESSURE WELDED TO PRE-PUNCHED BEARING BARS.

## selecting the surface

The proper surface selection is of major importance for a successful grating installation. Since gratings are the interface between pedestrian and the structure, attention should be given to the surface provided. The following are the surfaces available.



Plain bearing bars and rectangular plain cross bars Available in carbon steel and stainless steel as electro-pressure welded grating—both walkway and heavy duty.



Plain bearing bars and twisted cross bars Available in carbon steel as electro-pressure welded grating—both walkway and heavy duty.



Serrated bearing bars and serrated or plain cross bars Available in carbon steel or stainless steel as electro-pressure welded grating. Note: Heavy duty grating serrations are rectangular.



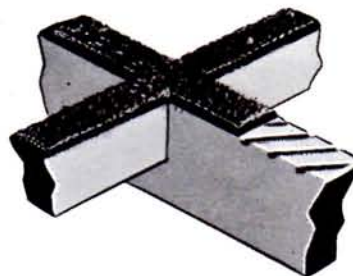
Serrated bearing bars and twisted cross bars Available in carbon steel as electro-pressure welded grating. Note: Heavy duty grating serrations are rectangular.



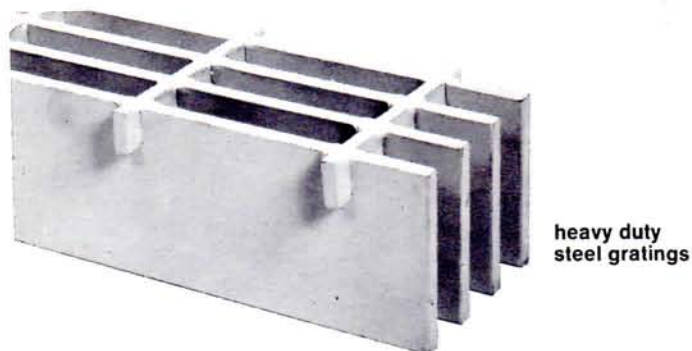
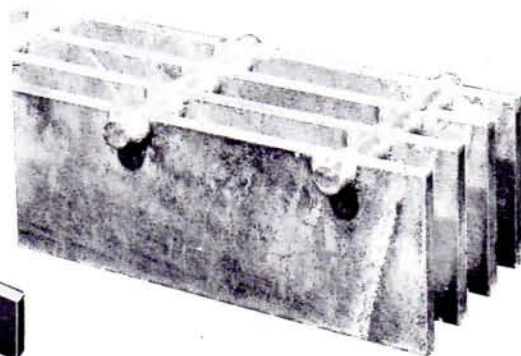
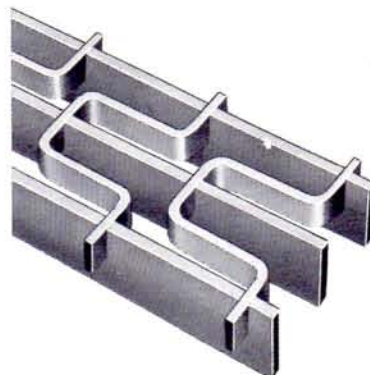
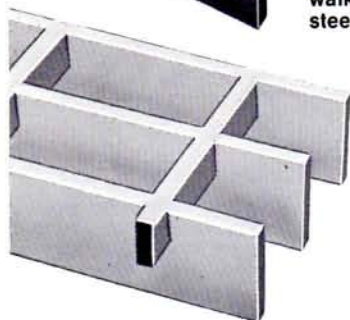
Knurled bearing bars and knurled cross bars Available in carbon steel and stainless steel as electro-pressure welded grating.

## Relgrit

Most surfaces lose their effectiveness as traffic wears down the sharp corners. RELGRIT, however, retains its skid resistance. RELGRIT grating can be oil coated with relatively small reduction in the coefficient of friction, whereas plain, serrated, and knurled types become hazardous. RELGRIT grating assures safe footing under most adverse conditions. When walking on RELGRIT, leg muscles relax, allowing one to walk with comfort.



pp/product presentation

heavy duty  
steel gratingswalkway  
steel gratingssteel  
ladder rungs

ts/technical support

**engineering assistance**

With over 40 years of experience Reliance engineers can provide valuable assistance in the design of a project. No job is too big, too small or too complicated. We appreciate the opportunity to work with the architects and engineers in the early planning stages. At that time we can furnish estimates for budget purposes. To serve you more quickly and efficiently, Reliance maintains engineering staffs at McKeesport, Pa. (telephone no. 412/751-1000) and Tuscaloosa, Ala. (telephone no. 205/553-3111).

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**material**

Reliance specializes in manufacturing gratings in STAINLESS STEEL, NICKEL STEEL and MANGANESE STEEL. See page 6 for further information.

**for Reliance  
Aluminum Gratings see  
catalog, RSL-20A**

**for Reliance  
Bridge Flooring see  
catalog, RSL-18B**

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other Reliance catalogs •  
in Sweet's Catalog Files . . .  
Aluminum Gratings E-SUM 5.6/Re  
Steel Gratings E-SUM 5.6/Rem  
Aluminum Gratings  
ICRX, ICR, GB, ECOMP. 5/6/Rel  
Bridge Flooring GB 5.6 Reo

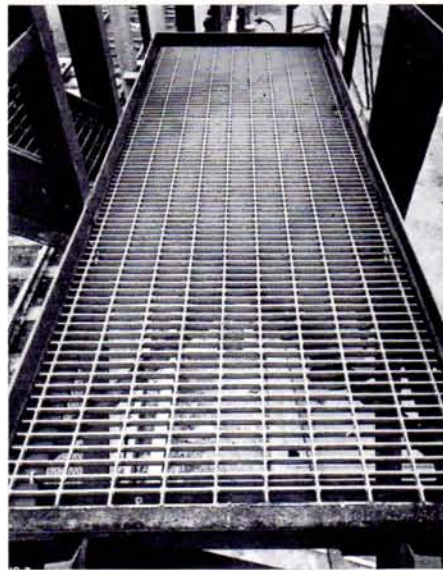
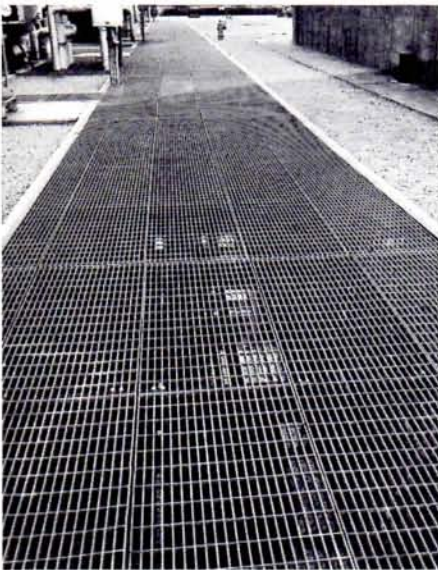
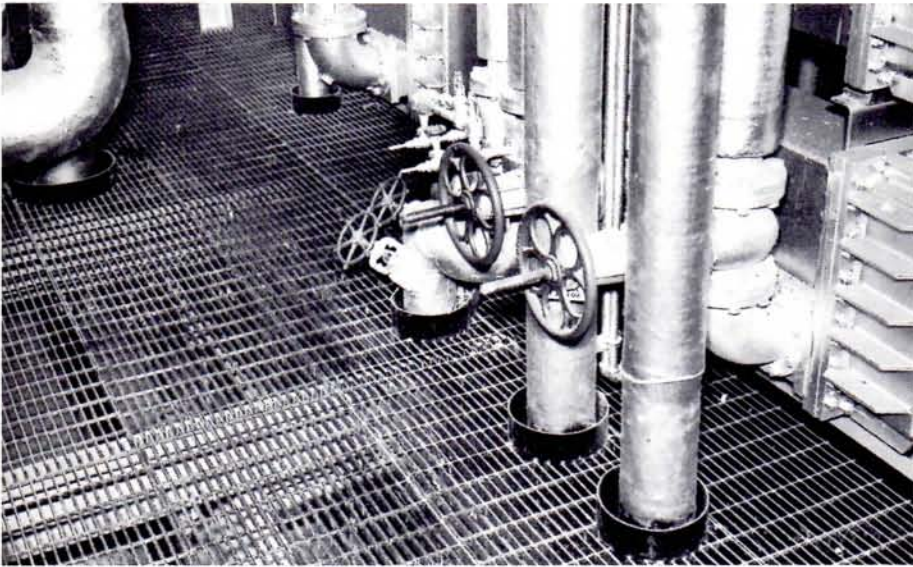
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## Reliance steel grating

dt/document

This catalog provides engineers and architects with the necessary information to select the proper steel gratings and stair treads for a project. Formulas used in the design of heavy duty gratings to carry H-10, H-15 and H-20 loads are established by AASHTO (American Association of State Highway and Transportation Officials) Specs 1973, Art. 1.2.5. and comply with the standards of National Association of Architectural Metal Manufacturers. Walkway gratings and heavy duty gratings meet the standards set by OSHA (Occupational Safety and Health Act of 1975).



mr/manufacturer

Reliance Steel Products Co. has accumulated 40 years of experience in the fabrication of steel walkway gratings and treads and heavy duty industrial gratings. Recommendations as to details and type of grating are made on the basis of their past performance.

ua/uses, applications

Each year steel grating has found an increased market throughout the world. Automotive, steel, petroleum, coal, chemical and electric power industries all use large quantities of steel grating.

cs/coatings, surfacings

Since gratings are at the interface between pedestrian and the structure, attention should be given to the surface provided. Spacing between longitudinal and transverse bars affect the walking, comfort, light and heat transmission through the walkway. A wide selection of patterns is available as shown on page 5.

Relgrit surfacing is widely used wherever safe footing is important. Relgrit should be considered for use on stair treads, platforms, and frequently used aisles and areas around machinery. For heavy duty applications, where skidding or slipping is a problem, the heavy duty grid can be furnished with a serrated surface to increase the frictional coefficient in these areas.

