PMWI

Aluminum & Steel GRATING







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PMWI HISTORY

PMWI has been serving the Fabricated Metals Market since 1983*...We are the Largest Manufacturer of Miscellaneous Metals for Wastewater and Water Treatment Facilities on the East Coast...and now PMWI has it's own lines of Aluminum Grating and Heavy Duty Welded Steel Grating Available.*

Pleasant Mount Welding, Inc. was established in 1983 to serve the fabricated metals market. After a short period, we realized that the metal fabrication industry seemed to have a poor reputation for service. Customers received late deliveries, workmanship was inconsistent, and there were customer service issues. PMWI made a commitment to be different. Our primary goal is to focus on **"what our customers expect"**.

In 1994 PMWI relocated to a 40,000 SQFT building in Carbondale, PA. Our commitment to excellence has fostered tremendous growth, and in 2007 we purchased a second 80,000 SQFT manufacturing facility within minutes of our main headquarters. This building located on 8th Ave is our certified AISC fabrication facility. A third building located directly across from our corporate building houses our Environmental Division and our most recently acquired 43,000 SQFT Atlas Street facility is home to our Grating Division.

Pleasant Mount Welding, Inc. manufacturing and design personnel have almost 40 years of experience supplying lintels, weir plates, embedded angles, bar racks, grating, pipe supports, ladders and numerous other fabrications. The Design and Engineering team utilizes cutting edge software in order to produce accurate and easy to follow shop drawings. Their goal is to get approved shop drawings on the first submittal. We follow **YOUR** schedule when creating submittals. PMWI also has licensed Professional Engineers on staff to help meet any of your structural design needs. Our many years of experience in metals fabrication will benefit you on all your projects.

QUALITY: The associates at PMWI do their very best to maintain high quality standards in every aspect of the company. We take great pride in producing error free shop drawings and quality fabricated products.

DELIVERIES: PMWI is dedicated to making sure that your deliveries are on time. We strive to make sure that you meet all your contract deadlines.

CUSTOMER SERVICE: Our Customers are our first priority. We are in business to serve you and your needs. We will do everything possible to make sure that you are satisfied with our service and the quality of our products.

COSTS: By focusing on quality, deliveries, and customer service, we help save you money. Quality will increase your jobsite productivity, on-time deliveries will ensure you meet your contract deadlines, and customer service will solve your problems - you will increase your bottom line profitability.



Main Office - 45 Dundaff Street, Carbondale, PA 18407



AISC Facility - 24 8th Avenue, Carbondale, PA 18407

The manufacturing operations for PMWI are performed in all four of our facilities. Each location is equipped with a complete line of modern equipment and technology.

PMWI fabricates metals according to all major codes including AISC standards, AWS welding codes and ASME welding codes. Our grating products are fabricated in accordance with NAAMM standards and follow grating industry standard practices. Specialized manufacturing software is used to organize and manage all of our manufacturing operations.

When it comes to fabricating aluminum, stainless steel and carbon steel products, PMWI has the necessary experience you can rely on to help meet your specific application needs.

PMWI manufacturing capabilities include shearing, sawing, plate bending, plate rolling, pipe bending, punching, drilling, TIG or MIG welding and shot blasting. PMWI can also handle all of your coating requirements, painting, galvanizing, anodizing or powder coat finishes.



8th Avenue Mfg Facility



52 Dundaff Environmental Div.



Atlas Street Grating Division

BENEFITS OF ALUMINUM

Aluminum* has a unique set of properties*...that make it one of the most useful engineering & construction materials available today.

Aluminum is the most abundant metallic element and one of earth's greatest natural resources. It's light weight, high strength-to-weight ratio, and excellent corrosion resistance under most environmental conditions makes it the top choice for manufacturing metal bar grating.

Unlike other types of grating materials, aluminum can be recycled, making it an environmentally friendly choice. Aluminum is also a very durable material that provides many years of service without showing signs of wear or decay. Aluminum can be easily cleaned and maintained and does not absorb bacteria sustaining particles. This makes it a perfect solution for sanitary processing operations. Aluminum is also a very resilient material that will deflect under loads and then spring back to it's original shape.

This special set of features and benefits make aluminum grating the go-to-solution for many specialized applications such as: sewage and wastewater treatment facilities, chemical processing plants, pulp and paper industry, and many other manufacturing and industrial applications. Aluminum grating also has a very aesthetically pleasing appearance that makes it a very practical and cost effective solution for many architectural and commercial applications including fencing, building facades, vent grilles, ceiling tiles, and entranceways.



Aluminum is your "Lightweight Grating Solution"

- **Aluminum** has a High Strength-to-Weight Ratio
- **Aluminum** has Excellent Corrosion Resistance
- **Aluminum** can be Easily Recycled
- **Aluminum** can be Easily Modified for Fit-Up in the Field.
- **Aluminum** has an Attractive Appearance
- **Aluminum** is Lightweight
- **Aluminum** is Non-Toxic
- **Aluminum** is Durable
- **Aluminum** is Resilient

ALUMINUM GRATING PRODUCTS

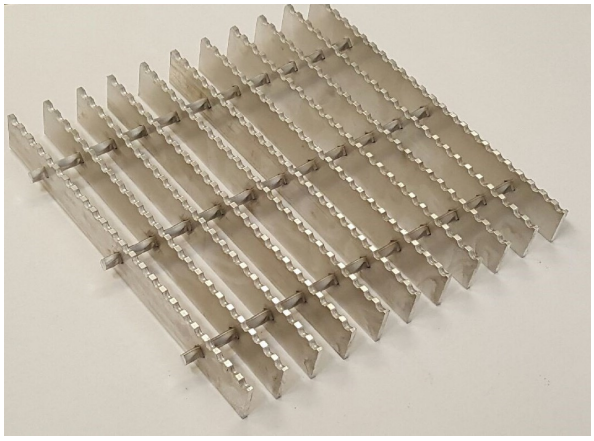
Pleasant Mount Welding offers several types of aluminum grating and stair treads: Swage Locked I-Bar and Rectangular Bar, Pressure Locked Aluminum Dove Tail, and Extruded Aluminum Plank. Aluminum Bar and Plank grating provides smoother lines and an attractive appearance compared to typical welded grating. Corrosion resistant aluminum bar and plank grating has many applications due to its light weight and high strength-to-weight ratio. It is ideally suited for use in corrosive and harsh environments making it the perfect choice for walkways and platforms in wastewater/water treatment facilities, refineries, chemical processing plants, pump stations, and a host of many other industrial and commercial applications. Aluminum grating is durable and provides many years of maintenance free service. Aluminum grating also has the advantages of being non-toxic and is easily recycled. It is available in standard mill finish or anodized finishes and offers various forms of slip resistance.



Aluminum Swage Locked I-Bar Grating

SI Series

Swage Locked I-Bar Grating is one of our most popular grating products and provides strength equal to rectangular bar grating of equal depth, but at a lighter weight and lower cost. This is a type of pressure locked grating made by permanently attaching the crossbars to the bearing bars using a pressure applied swaging process. The I-bar shaped bearing bars come in 7 different grating depths ranging from 1" to $2^{1}/_{2}$". Swage locked I-bar grating is offered in either a $1^{3}/_{16}$" spacing (19-spacing) or $^{15}/_{16}$" spacing (15-spacing). Crossbars are available on 4" and 2" centers. The I-Bar bearing bar flanges incorporate a striated surface for slip resistance and ***SlipNot*** slip resistant coating is also available.

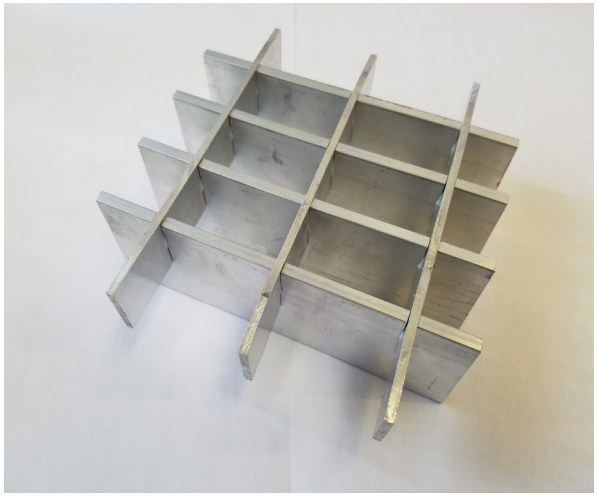


Aluminum Swage Locked Rectangular Bar Grating

SR Series

Swage Locked Rectangular Bar Grating is the most widely used pressure locked type of aluminum grating. It is made by locking the crossbars to the rectangular bearing bars using a pressure applied swaging process. The bearing bars have 7 different depths ranging from 1" to $2^{1}/_{2}$". Swage-locked rectangular bar grating is offered in a $1^{3}/_{16}$" spacing (19-spacing) or $^{15}/_{16}$" spacing (15-spacing). Crossbars are available on 4" and 2" centers. The rectangular bearing bars are available as a solid plain rectangular bar or with a serrated surface for slip resistance. ***SlipNot*** slip resistant coating is also available for non-serrated solid rectangular bar grating.

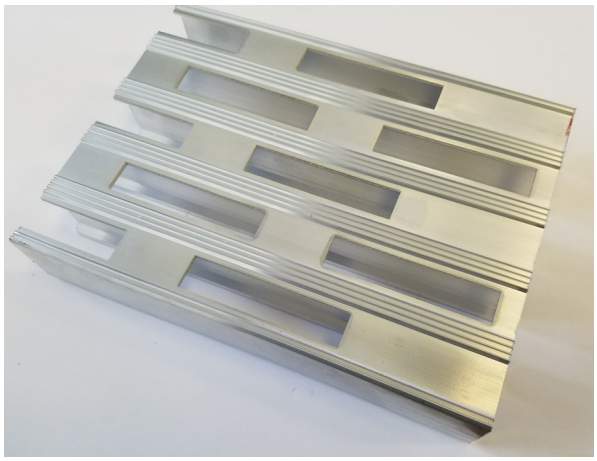
ALUMINUM GRATING PRODUCTS



Aluminum Dovetail Grating

ADT Series

Aluminum Dovetail Grating is a type of pressure locked bar grating that offers a rectangular crossbar that is flush with the top of the rectangular bearing bars. This style of grating offers a smooth clean appearance. Both bearing bars and crossbars are precision slotted and assembled in an egg-crate overlapping configuration and hydraulically pressed together to form a tightly locked rigid grating panel. Dovetail bearing bars are offered in a $1^{3}/_{16}$" spacing (19-spacing) and ***$^{15}/_{16}$" spacing (15-spacing) is coming soon***. Crossbars are available on 4" and 2" centers. Available in 7 grating depths ranging from 1" to $2\ ^{1}/_{2}$". Dovetail grating is a popular choice of Architects because of the aesthetically appealing appearance. The bearing bars come as plain solid or serrated and may be coated with a ***Slip-Not*** skid resistant coating if required.

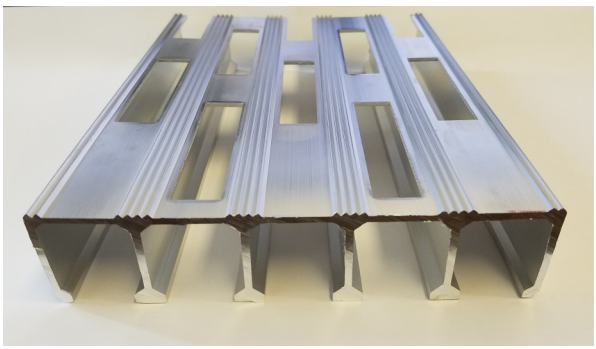


Aluminum Plank Grating

PLK Series

Aluminum Heavy Duty Plank is a structurally sound and attractive alternative to regular bar grating. Made from extruded aluminum, plank grating is available in 6" wide sections in 20'-0" lengths. PMWI has a built in chamfer on the bottom side of the plank that allows planks to easily weld together to form required panel sizes. Aluminum Plank is relatively maintenance free and has no parts to work loose. The plank surface can be provided unpunched or in a variety of punch patterns to allow passage of air, light, heat or moisture. ***A diagonal punch pattern that meets the ADA requirements for wheelchair accessibility will be available in the near future***. The plank web top surface offers a flush walking surface for maximum foot contact and comfort. It is a great alternative to applications requiring open grating with attached plate on the top surface. Plank grating is available in 8 grating depths ranging from $^{3}/_{4}$" to $2\ ^{1}/_{2}$".

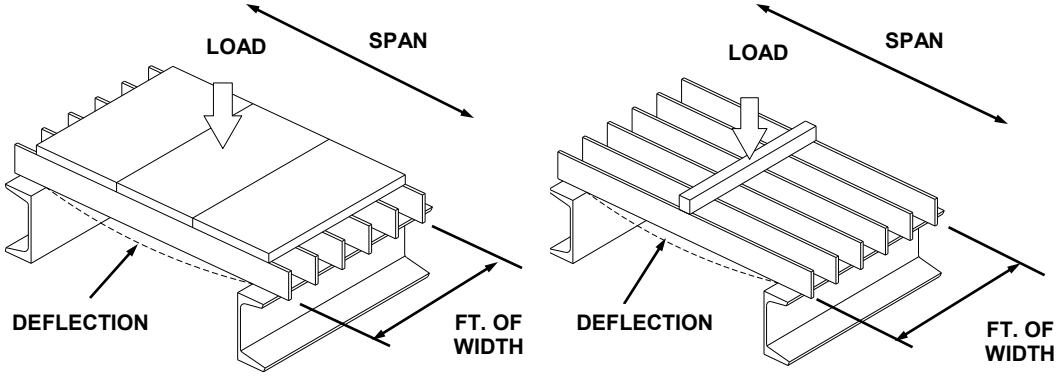




ALUMINUM DESIGN CRITERIA

The tables of safe loads and deflection that follow have been calculated using the following design parameters:

U = Uniform Load - lbs/ft^2
C = Concentrated Load - lbs/ft of grating width
D = Deflection - inches
I = Moment of Inertia - in^4/ft of grating width
S = Section Modulus - in^3/ft of grating width
L = Simple Clear Span - feet
E = Modulus of Elasticity (10,000,000 psi)
F = Allowable Bending Stress (12,000 psi)
M = Bending Moment



	Uniform Load	Concentrated Load
Determine M:	$M = \frac{FS}{12}$	$M = \frac{FS}{12}$
Determine U or C:	$U = \frac{8M}{L^2}$	$C = \frac{4M}{L}$
Check D*:	$D = \frac{5UL(L \times 12)^3}{384EI}$	$D = \frac{C(L \times 12)^3}{48\ EI}$

*** Deflection shall be limited to $^1/_4$" under 100 lbs. uniform load for safe pedestrian comfort.**

NOTE: The design of aluminum grating for pedestrian loads is deflection limited as opposed to strength limited. Although aluminum alloy 6061-T6 is stronger than 6063-T6, the Modulus of Elasticity for both alloys is the same: 10,000,000 psi. Therefore equal loads will produce the same deflection assuming that the yield strength is not exceeded.

Aluminum grating is recommended for use with pedestrian traffic and for light, rubber pneumatic tired rolling traffic (carts, dollies and hand trucks).
For other rolling loads (forklifts, cars, trucks, etc.) Heavy Duty Steel Grating is recommended.

Technical information provided herein is intended only for evaluation by technically qualified persons, with any use thereof to be at their own discretion and risk. Such information is reliable when evaluated in proper manner under conditions described herein. Pleasant Mount Welding, Inc. shall have no responsibility or liability for results obtained or damages resulting from improper evaluation or use.

ALUMINUM I-BAR

SI SERIES

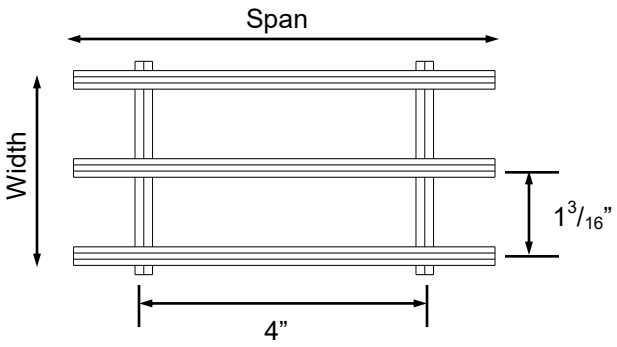
The Aluminum I-Bar SI Series style of grating offers a very popular and economically priced alternative to regular rectangular bar grating. The extruded I-Bar sections have the same load carrying capacity as rectangular bar grating but is approximately 30% less weight per square foot. The striations located on top and bottom flanges of the I-Bar sections provide a built-in means of slip resistance without the additional cost of serrations that are associated with rectangular bar grating. An optional ***Slip-Not*** coating can also be applied to the I-Bar sections to obtain an even greater slip resistance coefficient.



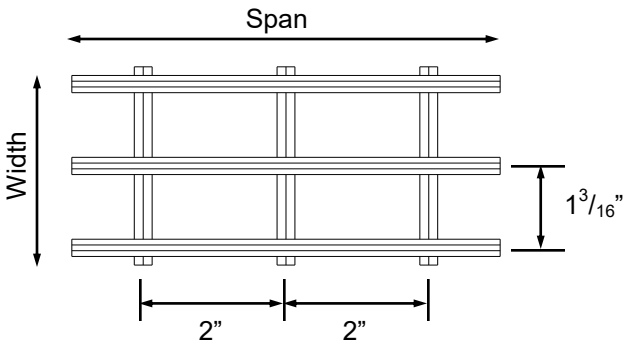
ALUMINUM PROFILES

I-BAR PROFILES - SI SERIES

19-SI-4

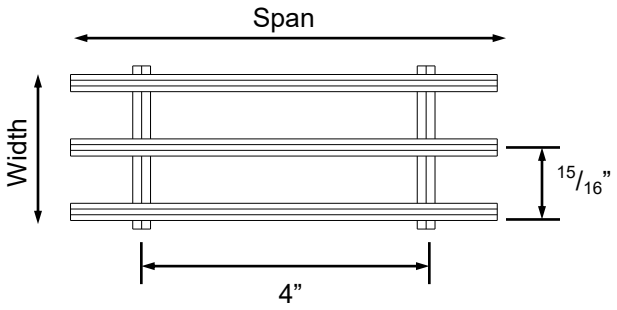


19-SI-2

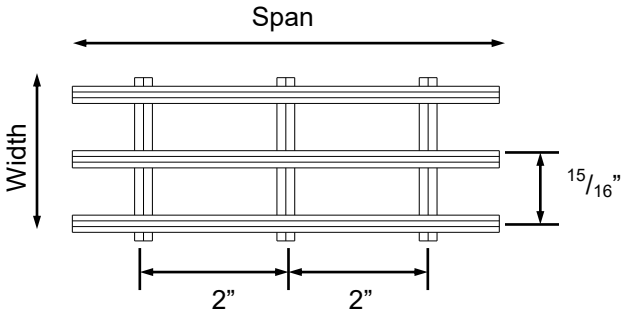


% Open Area	
4" cc	80%
2" cc	77%

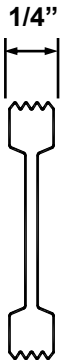
15-SI-4



15-SI-2



% Open Area	
4" cc	76%
2" cc	73%



End View

The I-Bar SI Series offers an economically priced alternative to rectangular bar grating. Extruded I-bar sections have the same load carrying capacity with less weight per square foot compared to rectangular bars. The striated top and bottom flanges provide a built-in slip resistance without the added cost of serrating.

***Note:** The .031" striations top and bottom flanges are in addition to the standard grating depth. For example, a 1" I-bar section has an overall depth of 1.062"*

I-BAR SWAGE LOCKED

LOAD & DEFLECTION TABLE

19-SI-4 & 19-SI-2

Bearing Bar Size	Ped. Span inches	Approx. Weight lbs/sqft	Sec. Prop. S_x* (in^3) / I_x* (in^4)		Clear Span (Direction of Bearing Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
1" x 1/4"	44	1.99	0.316	U	632	404	281	206	158							
				Du	0.144	0.225	0.324	0.441	0.576							
			0.158	C	632	505	421	361	316							
				Dc	0.115	0.180	0.259	0.353	0.461							
1-1/4" x 1/4"	52	2.34	0.493	U	987	632	439	322	247	195						
				Du	0.115	0.180	0.259	0.353	0.461	0.583						
			0.308	C	987	789	658	564	493	439						
				Dc	0.092	0.144	0.207	0.282	0.368	0.467						
1-1/2" x 1/4"	59	2.70	0.711	U	1421	909	632	464	355	281	227					
				Du	0.096	0.150	0.216	0.294	0.384	0.487	0.599					
			0.533	C	1421	1137	947	812	711	632	568					
				Dc	0.077	0.120	0.173	0.235	0.307	0.389	0.480					
1-3/4" x 1/4"	66	3.06	0.967	U	1934	1238	860	632	484	382	309	256	215			
				Du	0.082	0.129	0.185	0.252	0.329	0.417	0.514	0.623	0.741			
			0.846	C	1934	1547	1289	1105	967	860	774	703	645			
				Dc	0.066	0.103	0.148	0.202	0.263	0.333	0.412	0.498	0.593			
2" x 1/4"	73	3.43	1.263	U	2526	1617	1123	825	632	499	404	334	281	239		
				Du	0.072	0.113	0.162	0.221	0.288	0.364	0.450	0.544	0.649	0.760		
			1.263	C	2526	2021	1684	1444	1263	1123	1011	919	842	777		
				Dc	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608		
2-1/4" x 1/4"	80	3.75	1.599	U	3197	2046	1421	1044	799	632	512	423	355	303	261	
				Du	0.064	0.100	0.144	0.196	0.256	0.324	0.400	0.484	0.576	0.677	0.784	
			1.798	C	3197	2558	2132	1827	1599	1421	1279	1163	1066	984	914	
				Dc	0.051	0.080	0.115	0.157	0.205	0.259	0.320	0.387	0.461	0.541	0.628	
2-1/2" x 1/4"	87	4.15	1.974	U	3947	2526	1754	1289	987	780	632	522	439	374	322	247
				Du	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.519	0.609	0.705	0.923
			2.467	C	3947	3158	2632	2256	1974	1754	1579	1435	1316	1215	1128	987
				Dc	0.046	0.072	0.104	0.141	0.184	0.233	0.288	0.348	0.415	0.487	0.565	0.737

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Loads and deflections shown are theoretical and based on static loading.

* Based on 10.105 bars/ft of grating width. Bearing bar spacing of 1-3/16" c.c. Add 0.3 lbs/sqft for 19-SI-2.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. This can be exceeded for other types of loads with the Engineer's approval.

Finish: Mill finish unless otherwise specified.

Panel Width Chart (in.) - 19-SI-4 & 19-SI-2

Dimensions are Out-to-Out of Bearing Bar Flanges**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Flange	$1\frac{7}{16}$	$2\frac{5}{8}$	$3\frac{13}{16}$	5	$6\frac{3}{16}$	$7\frac{3}{8}$	$8\frac{9}{16}$	$9\frac{3}{4}$	$10\frac{15}{16}$	$12\frac{1}{8}$	$13\frac{5}{16}$	$14\frac{1}{2}$	$15\frac{11}{16}$	$16\frac{7}{8}$	$18\frac{1}{16}$
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1/4" Flange	$19\frac{1}{4}$	$20\frac{7}{16}$	$21\frac{5}{8}$	$22\frac{13}{16}$	24	$25\frac{3}{16}$	$26\frac{3}{8}$	$27\frac{9}{16}$	$28\frac{3}{4}$	$29\frac{15}{16}$	$31\frac{1}{8}$	$32\frac{5}{16}$	$33\frac{1}{2}$	$34\frac{11}{16}$	$35\frac{7}{8}$

** Add 1/4" for extended crossbars. Bearing Bar flange width is 1/4" top and bottom. Standard panel width indicated in "maroon".

I-BAR SWAGE LOCKED

LOAD & DEFLECTION TABLE

15-SI-4 & 15-SI-2

Bearing Bar Size	Ped. Span inches	Approx. Weight lbs/sqft	Sec. Prop. S_x* (in^3) / I_x* (in^4)		Clear Span (Direction of Bearing Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
1" x 1/4"	46	2.42	0.400	U	800	512	356	261	200							
				Du	0.144	0.225	0.324	0.441	0.576							
			0.200	C	800	640	533	457	400							
				Dc	0.115	0.180	0.259	0.353	0.461							
1-1/4" x 1/4"	55	2.87	0.625	U	1250	800	556	408	313	247	200					
				Du	0.115	0.180	0.259	0.353	0.461	0.583	0.720					
			0.391	C	1250	1000	833	714	625	556	500					
				Dc	0.092	0.144	0.207	0.282	0.368	0.467	0.576					
1-1/2" x 1/4"	63	3.33	0.900	U	1800	1152	800	588	450	356	288	238				
				Du	0.096	0.150	0.216	0.294	0.384	0.487	0.599	0.726				
			0.675	C	1800	1440	1200	1029	900	800	720	655				
				Dc	0.077	0.120	0.173	0.235	0.307	0.389	0.480	0.581				
1-3/4" x 1/4"	70	3.78	1.225	U	2450	1568	1089	800	613	484	392	324	272			
				Du	0.082	0.129	0.185	0.252	0.329	0.417	0.514	0.623	0.741			
			1.072	C	2450	1960	1633	1400	1225	1089	980	891	817			
				Dc	0.066	0.103	0.148	0.202	0.263	0.333	0.412	0.498	0.593			
2" x 1/4"	78	4.25	1.600	U	3200	2048	1422	1045	800	632	512	423	356	303	261	
				Du	0.072	0.113	0.162	0.221	0.288	0.364	0.450	0.544	0.649	0.760	0.881	
			1.600	C	3200	2560	2133	1829	1600	1422	1280	1164	1067	985	914	
				Dc	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608	0.705	
2-1/4" x 1/4"	85	4.66	2.025	U	4050	2592	1800	1322	1013	800	648	536	450	383	331	253
				Du	0.064	0.100	0.144	0.196	0.256	0.324	0.400	0.484	0.576	0.676	0.784	1.023
			2.278	C	4050	3240	2700	2314	2025	1800	1620	1473	1350	1246	1157	1013
				Dc	0.051	0.080	0.115	0.157	0.205	0.259	0.320	0.387	0.461	0.541	0.628	0.820
2-1/2" x 1/4"	92	5.16	2.500	U	5000	3200	2222	1633	1250	988	800	661	556	473	408	313
				Du	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.519	0.609	0.705	0.923
			3.125	C	5000	4000	3333	2857	2500	2222	2000	1818	1667	1538	1429	1250
				Dc	0.046	0.072	0.104	0.141	0.184	0.233	0.288	0.348	0.415	0.487	0.565	0.737

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Loads and deflections shown are theoretical and based on static loading.

* Based on 12.8 bars/ft of grating width. Bearing bar spacing of 15/16" c.c. Add 0.3 lbs/sqft for 15-SI-2.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. This can be exceeded for other types of loads with the Engineer's approval.

Finish: Mill finish unless otherwise specified.

Panel Width Chart (in.) - 15-SI-4 & 15-SI-2

Dimensions are Out-to-Out of Bearing Bar Flanges**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Flange	$1^{3}/_{16}$	$2^{1}/_{8}$	$3^{1}/_{16}$	4	$4^{15}/_{16}$	$5^{7}/_{8}$	$6^{13}/_{16}$	$7^{3}/_{4}$	$8^{11}/_{16}$	$9^{5}/_{8}$	$10^{9}/_{16}$	$11^{1}/_{2}$	$12^{7}/_{16}$	$13^{3}/_{8}$	$14^{5}/_{16}$
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1/4" Flange	$15^{1}/_{4}$	$16^{3}/_{16}$	$17^{1}/_{8}$	$18^{1}/_{16}$	19	$19^{15}/_{16}$	$20^{7}/_{8}$	$21^{13}/_{16}$	$22^{3}/_{4}$	$23^{11}/_{16}$	$24^{5}/_{8}$	$25^{9}/_{16}$	$26^{1}/_{2}$	$27^{7}/_{16}$	$28^{3}/_{8}$
No. of Bars	32	33	34	35	36	37	38	39							
1/4" Flange	$29^{5}/_{16}$	$30^{1}/_{4}$	$31^{3}/_{16}$	$32^{1}/_{8}$	$33^{1}/_{16}$	34	$34^{15}/_{16}$	$35^{7}/_{8}$							

** Add 1/4" for extended crossbars. Bearing Bar flange width is 1/4" top and bottom. Standard panel width indicated in "maroon".

Model Specification: 19-SI-4 Aluminum I-Bar Gratings

September 15, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "19-SI-4 Aluminum I-Bar Swage Lock Grating." This model specification may also be edited and revised for 19-SI-2, 15-SI-4 or 15-SI-2 I-Bar Swage Lock Gratings. Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, light-duty aluminum bar gratings.

B. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM B221: Aluminum Extruded Bars and Shapes.

C. ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 10 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Aluminum I-Bar Swage Lock Grating type **19-SI-4**. Square cross bars are assembled through diamond shaped holes in I-shaped bearing bars, which are then permanently locked in place by a swaging process.

1. Bearing Bar Spacing: **1-3/16"** on center.
2. Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Bearing Bar Thickness: **1/4" at top to provide 15/16"** space between bars.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Bearing Bars: **Striated or SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Fabricate cutouts in grating sections for penetrations as indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings. Trim band ends (and cuts in grating) with bars of the same thickness and nominal depth and material as bearing bars (as shown on drawings). Weld banding flush with the top surface of grating. Include fabrication required for attachment system shown on drawing plans, or as recommended by manufacturer.

C. **Design Criteria:**

1. **Loading:** Grating products shall be designed and manufactured to meet live load conditions of **100 lbs / SQFT with a maximum deflection of 1/4"** for the clear spans shown on the drawings. Bearing bar depth shall be as shown on contract drawings, or as recommended by the manufacturer to meet loading requirements, clear span conditions and maximum deflections specified.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

D. **Materials:** Bearing bars and banding are aluminum 6063-T6 and aluminum cross bars are type 6063-T1.

E. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

F. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 C.2 above.

G. **Finish:** Gratings shall be **Mill finish or A-41 Clear Anodized.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system.

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

C. Protection of Aluminum from Dissimilar Materials:

1. Where aluminum surfaces come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with one coat of bituminous paint, powder coat paint, or other approved insulating material.

2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint, powder coat paint, or other approved insulating material.

3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

ALUMINUM RECTANGULAR BAR

SR SERIES

The most widely used type of aluminum pressure locked grating is the Swage Locked Rectangular Bar SR Series. The aluminum crossbars are assembled through punched diamond shaped openings in the flat rectangular bearing bars and locked in place by our hydraulic swaging process.

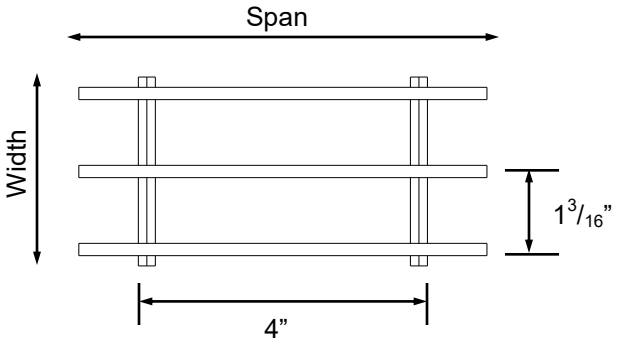
The SR Series provides an aesthetically clean look with sharp lines and a recessed crossbar that allows grating panels to be formed without any need for welding. This grating is often used for architectural applications. Slip resistant coatings are available as well as serrated bearing bar surface.



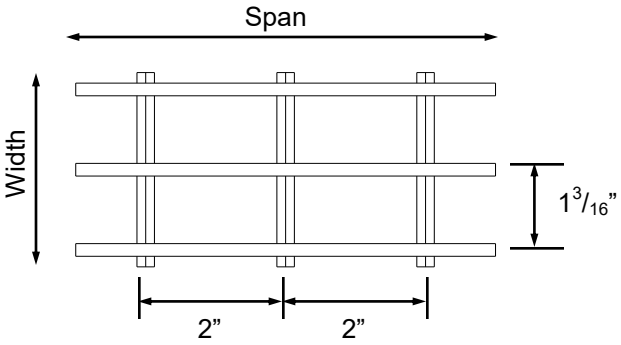
ALUMINUM PROFILES

RECTANGULAR BAR PROFILES - SR SERIES

19-SR-4

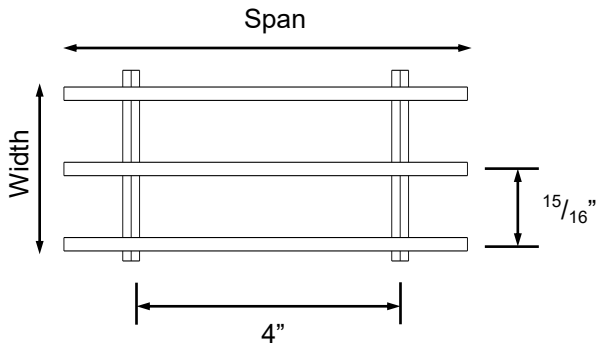


19-SR-2

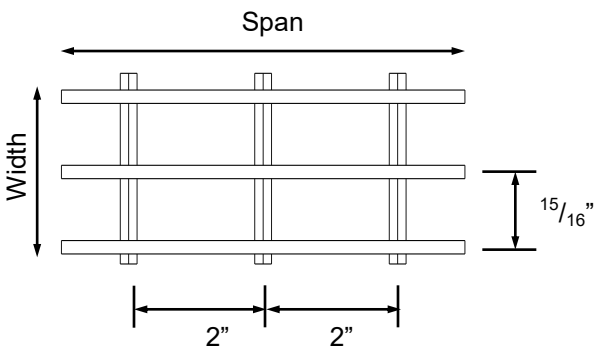


% Open Area	
4" cc	85%
2" cc	81%

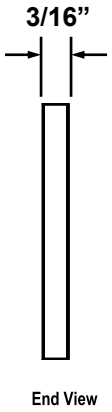
15-SR-4



15-SR-2



% Open Area	
4" cc	76%
2" cc	73%



End View

The Aluminum Rectangular Bar SR Series offers an alternative to the I-Bar style of grating. The rectangular bearing bars have the same load carrying capacity as the I-Bar series, however the weight per square foot of grating will be greater. The rectangular bearing bars are offered either as a plain surface or can be serrated to provide slip resistance. When a serrated surface is required, the depth of the grating required for a specified load shall be 1/4" deeper than that shown in the load tables of this manual.

RECT BAR SWAGE LOCKED

LOAD & DEFLECTION TABLE

19-SR-4 & 19-SR-2

Bearing Bar Size	Ped. Span inches	Approx. Weight lbs/sqft	Sec. Prop. S_x* (in^3) / I_x* (in^4)		Clear Span (Direction of Bearing Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
1" x 3/16"	44	2.46	0.316	U	632	404	281	206	158							
				Du	0.144	0.225	0.324	0.441	0.576							
			0.158	C	632	505	421	361	316							
				Dc	0.115	0.180	0.259	0.353	0.461							
1-1/4" x 3/16"	52	3.01	0.493	U	987	632	439	322	247	195						
				Du	0.115	0.180	0.259	0.353	0.461	0.583						
			0.308	C	987	789	658	564	493	439						
				Dc	0.092	0.144	0.207	0.282	0.369	0.467						
1-1/2" x 3/16"	59	3.56	0.711	U	1421	909	632	464	355	281	227					
				Du	0.096	0.150	0.216	0.294	0.384	0.486	0.600					
			0.533	C	1421	1137	947	812	711	632	568					
				Dc	0.077	0.120	0.173	0.235	0.307	0.389	0.480					
1-3/4" x 3/16"	66	4.12	0.967	U	1934	1238	860	632	484	382	309	256	215			
				Du	0.082	0.129	0.185	0.252	0.329	0.417	0.514	0.622	0.741			
			0.846	C	1934	1547	1289	1105	967	860	774	703	645			
				Dc	0.066	0.103	0.148	0.202	0.263	0.333	0.411	0.498	0.592			
2" x 3/16"	73	4.68	1.263	U	2526	1617	1123	825	632	499	404	334	281	239		
				Du	0.072	0.113	0.162	0.221	0.288	0.365	0.450	0.545	0.648	0.761		
			1.263	C	2526	2021	1684	1444	1263	1123	1011	919	842	777		
				Dc	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608		
2-1/4" x 3/16"	80	5.24	1.599	U	3197	2046	1421	1044	799	632	512	423	355	303	261	
				Du	0.064	0.100	0.144	0.196	0.256	0.324	0.400	0.484	0.576	0.676	0.784	
			1.798	C	3197	2558	2132	1827	1599	1421	1279	1163	1066	984	914	
				Dc	0.051	0.080	0.115	0.157	0.205	0.259	0.320	0.387	0.461	0.541	0.627	
2-1/2" x 3/16"	87	5.79	1.974	U	3947	2526	1754	1289	987	780	632	522	439	374	322	247
				Du	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608	0.706	0.922
			2.467	C	3947	3158	2632	2256	1974	1754	1579	1435	1316	1215	1128	987
				Dc	0.046	0.072	0.104	0.141	0.184	0.233	0.288	0.348	0.415	0.487	0.564	0.737

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft grating width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Loads and deflections shown are theoretical and based on static loading.

* Based on 10.105 bars/ft of grating width. Bearing bar spacing of 1-3/16" c.c. Add 0.3 lbs/sqft for 19-SR-2.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. This can be exceeded for other types of loads with the Engineer's approval.

Serrated Bars: For serrated grating, the depth of grating required for a specified load is 1/4" deeper than that shown in table.

Finish: Mill finish unless otherwise specified.

Panel Width Chart (in.) - 19-SR-4 & 19-SR-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/16" Flange	$1^{3}/_{8}$	$2^{9}/_{16}$	$3^{3}/_{4}$	$4^{15}/_{16}$	$6^{1}/_{8}$	$7^{5}/_{16}$	$8^{1}/_{2}$	$9^{11}/_{16}$	$10^{7}/_{8}$	$12^{1}/_{16}$	$13^{1}/_{4}$	$14^{7}/_{16}$	$15^{5}/_{8}$	$16^{13}/_{16}$	18
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
3/16" Flange	$19^{3}/_{16}$	$20^{3}/_{8}$	$21^{9}/_{16}$	$22^{3}/_{4}$	$22^{15}/_{16}$	$25^{1}/_{8}$	$26^{5}/_{16}$	$27^{1}/_{2}$	$28^{11}/_{16}$	$29^{7}/_{8}$	$31^{1}/_{16}$	$32^{1}/_{4}$	$33^{7}/_{16}$	$34^{5}/_{8}$	$35^{13}/_{16}$

** Add 1/4" for extended crossbars. Standard panel width indicated in "maroon".

RECT BAR SWAGE LOCKED

LOAD & DEFLECTION TABLE

15-SR-4 & 15-SR-2

Bearing Bar Size	Ped. Span inches	Approx. Weight lbs/sqft	Sec. Prop. S_x* (in^3) / I_x* (in^4)		Clear Span (Direction of Bearing Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
1" x 3/16"	46	3.06	0.400	U	800	512	356	261	200							
				Du	0.144	0.225	0.324	0.441	0.576							
			0.200	C	800	640	533	457	400							
				Dc	0.115	0.180	0.259	0.353	0.461							
1-1/4" x 3/16"	55	3.75	0.625	U	1250	800	556	408	313	247	200					
				Du	0.115	0.180	0.259	0.353	0.461	0.583	0.720					
			0.391	C	1250	1000	833	714	625	556	500					
				Dc	0.092	0.144	0.207	0.282	0.368	0.467	0.576					
1-1/2" x 3/16"	63	4.45	0.900	U	1800	1152	800	588	450	356	288	238				
				Du	0.096	0.150	0.216	0.294	0.384	0.487	0.599	0.726				
			0.675	C	1800	1440	1200	1029	900	800	720	655				
				Dc	0.077	0.120	0.173	0.235	0.307	0.389	0.480	0.581				
1-3/4" x 3/16"	70	5.16	1.225	U	2450	1568	1089	800	613	484	392	324	272			
				Du	0.082	0.129	0.185	0.252	0.329	0.417	0.514	0.623	0.741			
			1.072	C	2450	1960	1633	1400	1225	1089	980	891	817			
				Dc	0.066	0.103	0.148	0.202	0.263	0.333	0.412	0.498	0.593			
2" x 3/16"	78	5.87	1.600	U	3200	2048	1422	1045	800	632	512	423	356	303	261	
				Du	0.072	0.113	0.162	0.221	0.288	0.364	0.450	0.544	0.649	0.760	0.881	
			1.600	C	3200	2560	2133	1829	1600	1422	1280	1164	1067	985	914	
				Dc	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608	0.705	
2-1/4" x 3/16"	85	6.57	2.025	U	4050	2592	1800	1322	1013	800	648	536	450	383	331	253
				Du	0.064	0.100	0.144	0.196	0.256	0.324	0.400	0.484	0.576	0.676	0.784	1.023
			2.278	C	4050	3240	2700	2314	2025	1800	1620	1473	1350	1246	1157	1013
				Dc	0.051	0.080	0.115	0.157	0.205	0.259	0.320	0.387	0.461	0.541	0.628	0.820
2-1/2" x 3/16"	92	7.27	2.500	U	5000	3200	2222	1633	1250	988	800	661	556	473	408	313
				Du	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.519	0.609	0.705	0.923
			3.125	C	5000	4000	3333	2857	2500	2222	2000	1818	1667	1538	1429	1250
				Dc	0.046	0.072	0.104	0.141	0.184	0.233	0.288	0.348	0.415	0.487	0.565	0.737

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Finish: Mill finish unless otherwise specified.

Loads and deflections shown are theoretical and based on static loading.

* Based on 12.8 bars/ft of grating width. Bearing bar spacing of 15/16" c.c. Add 0.3 lbs/sqft for 15-SR-2.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. This can be exceeded for other types of loads with the Engineer's approval.

Serrated Bars: For serrated grating, the depth of grating required for a specified load is 1/4" deeper than that shown in table.

Panel Width Chart (in.) - 15-SR-4 & 15-SR-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/16" Flange	$1^{1}/_{8}$	$2^{1}/_{16}$	3	$3^{15}/_{16}$	$4^{7}/_{8}$	$5^{13}/_{16}$	$6^{3}/_{4}$	$7^{11}/_{16}$	$8^{5}/_{8}$	$9^{9}/_{16}$	$10^{1}/_{2}$	$11^{7}/_{16}$	$12^{3}/_{8}$	$13^{5}/_{16}$	$14^{1}/_{4}$
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
3/16" Flange	$15^{3}/_{16}$	$16^{1}/_{8}$	$17^{1}/_{16}$	18	$18^{15}/_{16}$	$19^{7}/_{8}$	$20^{13}/_{16}$	$21^{3}/_{4}$	$22^{11}/_{16}$	$23^{5}/_{8}$	$24^{9}/_{16}$	$25^{1}/_{2}$	$26^{7}/_{16}$	$27^{3}/_{8}$	$28^{5}/_{16}$
No. of Bars	32	33	34	35	36	37	38	39							
3/16" Flange	$29^{1}/_{4}$	$30^{3}/_{16}$	$31^{1}/_{8}$	$32^{1}/_{16}$	33	$33^{15}/_{16}$	$34^{7}/_{8}$	$35^{13}/_{16}$							

** Add 1/4" for extended crossbars. Standard panel width indicated in "maroon".

Model Specification: 19-SR-4 Aluminum Rectangular Bar Gratings

September 15, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "19-SR-4 Aluminum Rectangular Bar Swage Lock Grating." This model specification may also be edited and revised for 19-SR-2, 15-SR-4 or 15-SR-2 Aluminum Rectangular Bar Swage Lock Gratings. Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, light-duty aluminum bar gratings.

B. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM B221: Aluminum Extruded Bars and Shapes.

C. ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 10 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Aluminum Rectangular Bar Swage Lock Grating type **19-SR-4**. Square cross bars are assembled through diamond shaped holes in rectangular bearing bars, which are then permanently locked in place by a swaging process.

1. Bearing Bar Spacing: **1-3/16"** on center.
2. Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Bearing Bar Thickness: **3/16" to provide 1"** space between bars.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Bearing Bars: **Plain | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Fabricate cutouts in grating sections for penetrations as indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings. Trim band ends (and cuts in grating) with bars of the same thickness, nominal depth and material as bearing bars (as shown on drawings). Weld banding flush with the top surface of grating. Include fabrication required for attachment system shown on drawing plans, or as recommended by manufacturer.

C. **Design Criteria:**

1. **Loading:** Grating products shall be designed and manufactured to meet live load conditions of **100 lbs / SQFT with a maximum deflection of 1/4"** for the clear spans shown on the drawings. Bearing bar depth shall be as shown on contract drawings, or as recommended by the manufacturer to meet loading requirements, clear span conditions and maximum deflections specified.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

D. **Materials:** Bearing bars and banding are aluminum 6063-T6 and aluminum cross bars are type 6063-T1.

E. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

F. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 C.2 above.

G. **Finish:** Gratings shall be **Mill finish or A-41 Clear Anodized.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system.

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

C. Protection of Aluminum from Dissimilar Materials:

1. Where aluminum surfaces come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with one coat of bituminous paint, powder coat paint, or other approved insulating material.

2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint, powder coat paint, or other approved insulating material.

3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

ALUMINUM DOVETAIL

ADT SERIES

Aluminum Dovetail ADT Series grating is a traditional design pressure locked grating that has a flush top rectangular crossbar. Both bearing bars and crossbars are precision slotted, assembled in an egg-crate configuration and hydraulically pressed together to form a rigidly locked grating panel.

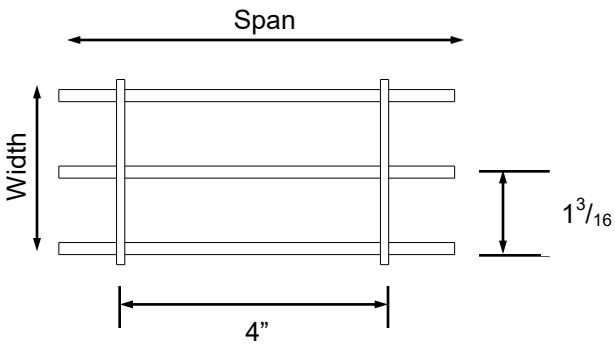
Aluminum Dovetail ADT Series grating is a very popular choice of Architects due to it's smooth, clean lines and aesthetic eye appeal. Serrated bearing bars are available for this type of grating and a ***Slip-Not*** coating may be applied to non-serrated plain bearing bars for increased slip resistance.



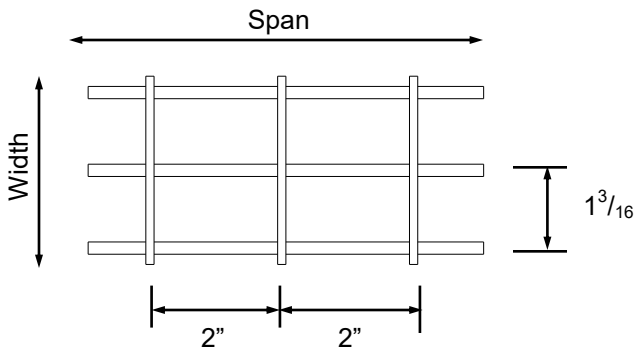
ALUMINUM PROFILES

ALUMINUM DOVETAIL PROFILES - ADT SERIES

19-ADT-4



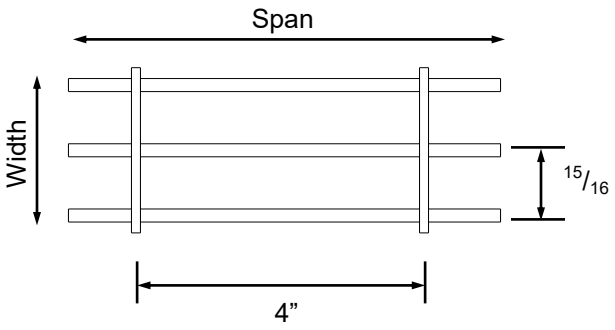
19-ADT-2



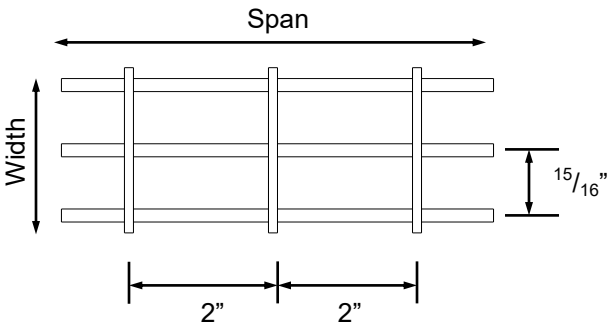
% Open Area	
4” cc	81%
2” cc	79%

**** 15-ADT Series (Coming Soon)***

15-ADT-4



15-ADT-2



% Open Area	
4” cc	77%
2” cc	75%

ALUMINUM DOVETAIL

LOAD & DEFLECTION TABLE

19-ADT-4 & 19-ADT-2

Bearing Bar Size	Ped. Span inches	Approx. Weight lbs/sqft	Sec. Prop. S_x* (in^3) / I_x* (in^4)		Clear Span (Direction of Bearing Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
1" x 3/16"	44	2.46	0.316	U	632	404	281	206	158							
				Du	0.144	0.225	0.324	0.441	0.576							
			0.158	C	632	505	421	361	316							
				Dc	0.115	0.180	0.259	0.353	0.461							
1-1/4" x 3/16"	52	3.01	0.493	U	987	632	439	322	247	195						
				Du	0.115	0.180	0.259	0.353	0.461	0.583						
			0.308	C	987	789	658	564	493	439						
				Dc	0.092	0.144	0.207	0.282	0.369	0.467						
1-1/2" x 3/16"	59	3.56	0.711	U	1421	909	632	464	355	281	227					
				Du	0.096	0.150	0.216	0.294	0.384	0.486	0.600					
			0.533	C	1421	1137	947	812	711	632	568					
				Dc	0.077	0.120	0.173	0.235	0.307	0.389	0.480					
1-3/4" x 3/16"	66	4.12	0.967	U	1934	1238	860	632	484	382	309	256	215			
				Du	0.082	0.129	0.185	0.252	0.329	0.417	0.514	0.622	0.741			
			0.846	C	1934	1547	1289	1105	967	860	774	703	645			
				Dc	0.066	0.103	0.148	0.202	0.263	0.333	0.411	0.498	0.592			
2" x 3/16"	73	4.68	1.263	U	2526	1617	1123	825	632	499	404	334	281	239		
				Du	0.072	0.113	0.162	0.221	0.288	0.365	0.450	0.545	0.648	0.761		
			1.263	C	2526	2021	1684	1444	1263	1123	1011	919	842	777		
				Dc	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608		
2-1/4" x 3/16"	80	5.24	1.599	U	3197	2046	1421	1044	799	632	512	423	355	303	261	
				Du	0.064	0.100	0.144	0.196	0.256	0.324	0.400	0.484	0.576	0.676	0.784	
			1.798	C	3197	2558	2132	1827	1599	1421	1279	1163	1066	984	914	
				Dc	0.051	0.080	0.115	0.157	0.205	0.259	0.320	0.387	0.461	0.541	0.627	
2-1/2" x 3/16"	87	5.79	1.974	U	3947	2526	1754	1289	987	780	632	522	439	374	322	247
				Du	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608	0.706	0.922
			2.467	C	3947	3158	2632	2256	1974	1754	1579	1435	1316	1215	1128	987
				Dc	0.046	0.072	0.104	0.141	0.184	0.233	0.288	0.348	0.415	0.487	0.564	0.737

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft grating width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Loads and deflections shown are theoretical and based on static loading.

* Based on 10.105 bars/ft of grating width. Bearing bar spacing of 1-3/16" c.c. Add 0.3 lbs/sqft for 19-ADT-2.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. This can be exceeded for other types of loads with the Engineer's approval.

Serrated Bars: For serrated grating, the depth of grating required for a specified load is 1/4" deeper than that shown in table.

Finish: Mill finish unless otherwise specified.

Panel Width Chart (in.) - 19-ADT-4 & 19-ADT-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/16" Flange	$1\frac{3}{8}$	$2\frac{9}{16}$	$3\frac{3}{4}$	$4\frac{15}{16}$	$6\frac{1}{8}$	$7\frac{5}{16}$	$8\frac{1}{2}$	$9\frac{11}{16}$	$10\frac{7}{8}$	$12\frac{1}{16}$	$13\frac{1}{4}$	$14\frac{7}{16}$	$15\frac{5}{8}$	$16\frac{13}{16}$	18
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
3/16" Flange	$19\frac{3}{16}$	$20\frac{3}{8}$	$21\frac{9}{16}$	$22\frac{3}{4}$	$22\frac{15}{16}$	$25\frac{1}{8}$	$26\frac{5}{16}$	$27\frac{1}{2}$	$28\frac{11}{16}$	$29\frac{7}{8}$	$31\frac{1}{16}$	$32\frac{1}{4}$	$33\frac{7}{16}$	$34\frac{5}{8}$	$35\frac{13}{16}$

** Add 1/4" for extended crossbars. Standard panel width indicated in "maroon".

ALUMINUM DOVETAIL

LOAD & DEFLECTION TABLE *** 15-ADT Series (Coming Soon)* 15-ADT-4 & 15-ADT-2

Bearing Bar Size	Ped. Span inches	Approx. Weight lbs/sqft	Sec. Prop. S_x* (in^3) / I_x* (in^4)		Clear Span (Direction of Bearing Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
1" x 3/16"	46	3.06	0.400	U	800	512	356	261	200							
				Du	0.144	0.225	0.324	0.441	0.576							
			0.200	C	800	640	533	457	400							
				Dc	0.115	0.180	0.259	0.353	0.461							
1-1/4" x 3/16"	55	3.75	0.625	U	1250	800	556	408	313	247	200					
				Du	0.115	0.180	0.259	0.353	0.461	0.583	0.720					
			0.391	C	1250	1000	833	714	625	556	500					
				Dc	0.092	0.144	0.207	0.282	0.368	0.467	0.576					
1-1/2" x 3/16"	63	4.45	0.900	U	1800	1152	800	588	450	356	288	238				
				Du	0.096	0.150	0.216	0.294	0.384	0.487	0.599	0.726				
			0.675	C	1800	1440	1200	1029	900	800	720	655				
				Dc	0.077	0.120	0.173	0.235	0.307	0.389	0.480	0.581				
1-3/4" x 3/16"	70	5.16	1.225	U	2450	1568	1089	800	613	484	392	324	272			
				Du	0.082	0.129	0.185	0.252	0.329	0.417	0.514	0.623	0.741			
			1.072	C	2450	1960	1633	1400	1225	1089	980	891	817			
				Dc	0.066	0.103	0.148	0.202	0.263	0.333	0.412	0.498	0.593			
2" x 3/16"	78	5.87	1.600	U	3200	2048	1422	1045	800	632	512	423	356	303	261	
				Du	0.072	0.113	0.162	0.221	0.288	0.364	0.450	0.544	0.649	0.760	0.881	
			1.600	C	3200	2560	2133	1829	1600	1422	1280	1164	1067	985	914	
				Dc	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.518	0.608	0.705	
2-1/4" x 3/16"	85	6.57	2.025	U	4050	2592	1800	1322	1013	800	648	536	450	383	331	253
				Du	0.064	0.100	0.144	0.196	0.256	0.324	0.400	0.484	0.576	0.676	0.784	1.023
			2.278	C	4050	3240	2700	2314	2025	1800	1620	1473	1350	1246	1157	1013
				Dc	0.051	0.080	0.115	0.157	0.205	0.259	0.320	0.387	0.461	0.541	0.628	0.820
2-1/2" x 3/16"	92	7.27	2.500	U	5000	3200	2222	1633	1250	988	800	661	556	473	408	313
				Du	0.058	0.090	0.130	0.176	0.230	0.292	0.360	0.436	0.519	0.609	0.705	0.923
			3.125	C	5000	4000	3333	2857	2500	2222	2000	1818	1667	1538	1429	1250
				Dc	0.046	0.072	0.104	0.141	0.184	0.233	0.288	0.348	0.415	0.487	0.565	0.737

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Finish: Mill finish unless otherwise specified.

Loads and deflections shown are theoretical and based on static loading.

* Based on 12.8 bars/ft of grating width. Bearing bar spacing of 15/16" c.c. Add 0.3 lbs/sqft for 15-ADT-2.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. This can be exceeded for other types of loads with the Engineer's approval.

Serrated Bars: For serrated grating, the depth of grating required for a specified load is 1/4" deeper than that shown in table.

Panel Width Chart (in.) - 15-ADT-4 & 15-ADT-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/16" Flange	$1^1/_8$	$2^1/_{16}$	3	$3^{15}/_{16}$	$4^7/_8$	$5^{13}/_{16}$	$6^3/_4$	$7^{11}/_{16}$	$8^5/_8$	$9^9/_{16}$	$10^1/_2$	$11^7/_{16}$	$12^3/_8$	$13^5/_{16}$	$14^1/_4$
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
3/16" Flange	$15^3/_{16}$	$16^1/_8$	$17^1/_{16}$	18	$18^{15}/_{16}$	$19^7/_8$	$20^{13}/_{16}$	$21^3/_4$	$22^{11}/_{16}$	$23^5/_8$	$24^9/_{16}$	$25^1/_2$	$26^7/_{16}$	$27^3/_8$	$28^5/_{16}$
No. of Bars	32	33	34	35	36	37	38	39							
3/16" Flange	$29^1/_4$	$30^3/_{16}$	$31^1/_8$	$32^1/_{16}$	33	$33^{15}/_{16}$	$34^7/_8$	$35^{13}/_{16}$							

** Add 1/4" for extended crossbars. Standard panel width indicated in "maroon".

Model Specification: 19-ADT-4 Aluminum Dovetail Gratings

September 15, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "19-ADT-4 Aluminum Dovetail Pressure Lock Grating." This model specification may also be edited and revised for 19-ADT-2, 15-ADT-4 or 15-ADT-2 Aluminum Dovetail Pressure Lock Gratings. Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, light-duty aluminum bar gratings.

B. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM B221: Aluminum Extruded Bars and Shapes.

C. ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 10 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Aluminum Dovetail Pressure Lock Grating type **19-ADT-4**. Rectangular bearing bars are slotted to receive slotted rectangular cross bars, which are assembled in egg-crate fashion and hydraulically pressed to permanently lock the bars in place.

1. Bearing Bar Spacing: **1-3/16"** on center.
2. Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Bearing Bar Thickness: **3/16" to provide 1"** space between bars.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Bearing Bars: **Plain | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Fabricate cutouts in grating sections for penetrations as indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings. Trim band ends (and cuts in grating) with bars of the same thickness, nominal depth and material as bearing bars (as shown on drawings). Weld banding flush with the top surface of grating. Include fabrication required for attachment system shown on drawing plans, or as recommended by manufacturer.

C. **Design Criteria:**

1. **Loading:** Grating products shall be designed and manufactured to meet live load conditions of **100 lbs / SQFT with a maximum deflection of 1/4"** for the clear spans shown on the drawings. Bearing bar depth shall be as shown on contract drawings, or as recommended by the manufacturer to meet loading requirements, clear span conditions and maximum deflections specified.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

D. **Materials:** Bearing bars and banding are aluminum 6063-T6 and aluminum cross bars are type 6063-T52.

E. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

F. **Top Surface:** When required, SlipNOT® Slip Resistance Coating will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 C.2 above.

G. **Finish:** Gratings shall be **Mill finish or A-41 Clear Anodized.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system.

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

C. Protection of Aluminum from Dissimilar Materials:

1. Where aluminum surfaces come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with one coat of bituminous paint, powder coat paint, or other approved insulating material.

2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint, powder coat paint, or other approved insulating material.

3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

ALUMINUM PLANK

PLK SERIES

Aluminum Heavy Duty Plank (PLK Series) grating is an alternative to typical bar grating. Aluminum plank grating offers a structurally sound and attractive look. Made from extruded aluminum 6063-T6 material, plank grating will provide many years of maintenance free use and has no parts to work loose. The plank surface can be provided unpunched or with a rectangular punch pattern. ***Diagonal ADA punch patterns for wheelchair accessibility is coming soon***.

The plank structure of interconnecting webs provide for maximum foot contact and comfort. Plank is a good alternative for applications requiring open grating with plate attached to the top grating surface. Plank is the perfect choice for wastewater treatment plants to help reduce odors associated with these facilities. Plank grating is also ideal for other applications including entranceways, walkways, bridges, trails, stadiums, marinas, decks, docks and more.

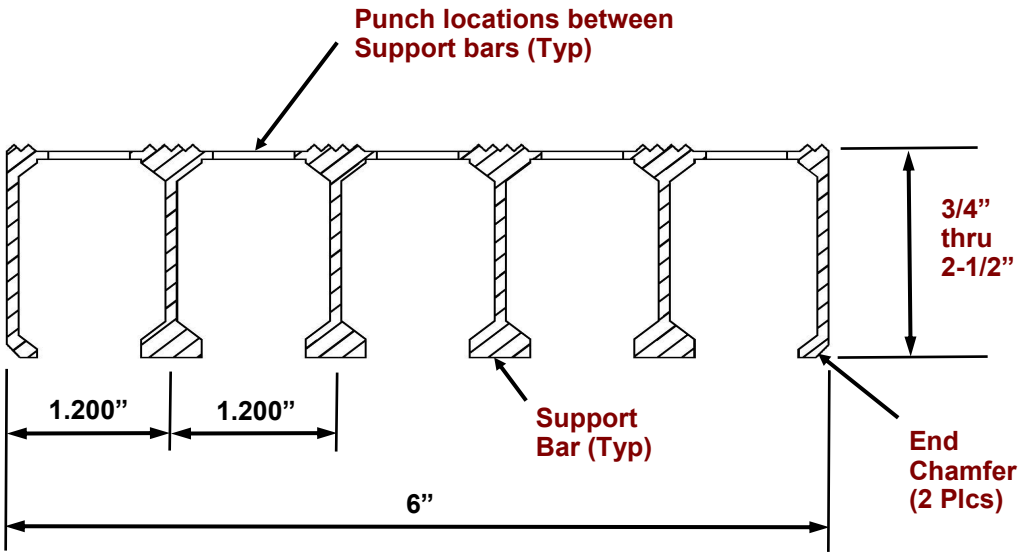


Pleasant Mount Welding, Inc. * 45 Dundaff Street, Carbondale, PA 18407 * Phone 570-282-6164 * www.pmwi.net

ALUMINUM PLANK

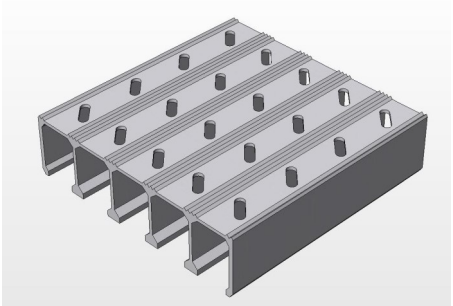
PLANK SECTION AVAILABILITY

Aluminum Plank is only available in our Heavy Duty Plank cross sectional design shown below. The Heavy Duty line of plank grating (PLK Series) is used primarily for water and waste treatment markets and the marine industry but has many benefits that make it an ideal choice for many other applications requiring a structurally sound and relatively maintenance free grating product.



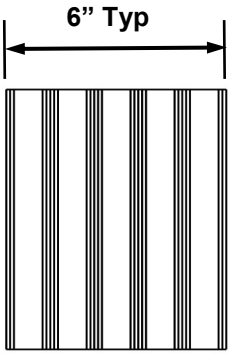
PUNCH PATTERN GUIDE

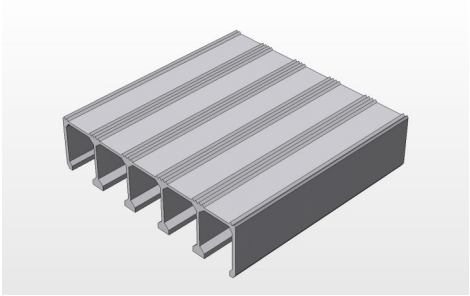
Aluminum plank is available unpunched or in various punch patterns. Rectangular punched openings are used most often in the water and waste treatment industries and in marine applications. All plank grating comes with built-in striations at each support bar location and the punched patterns are positioned between each of the support bars on the top surface of the plank. All of PMWI's ***Diagonal Punched Patterns**** as well as our unpunched plank meet ADA specifications for high heel and wheelchair traffic.



*Diagonal ADA Punched Plank Grating **(Coming Soon)*

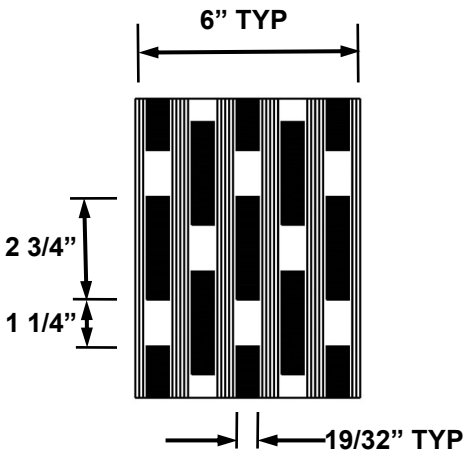
UNPUNCHED

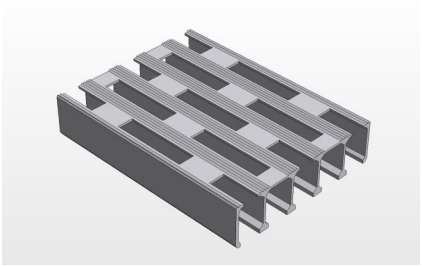




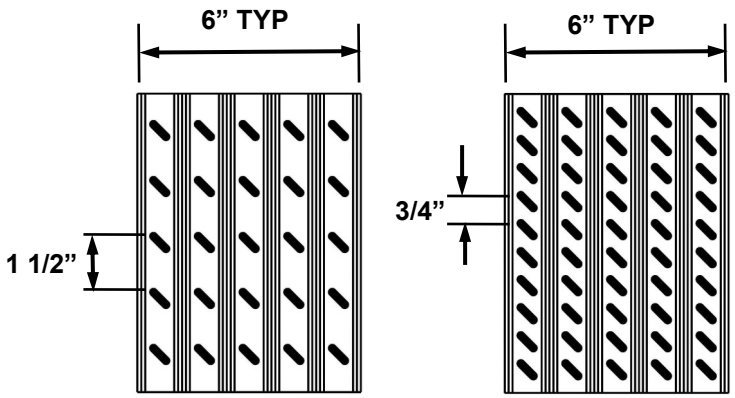
ALUMINUM PLANK

RECTANGULAR PUNCHED

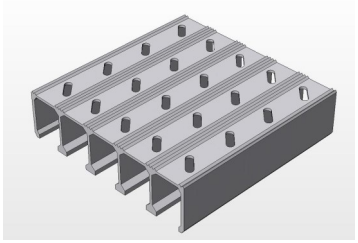


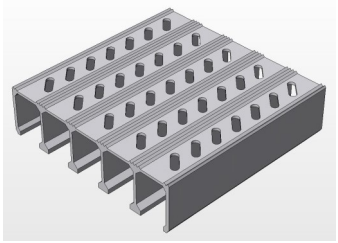


DIAGONAL (ADA) PUNCHED **(Coming Soon)



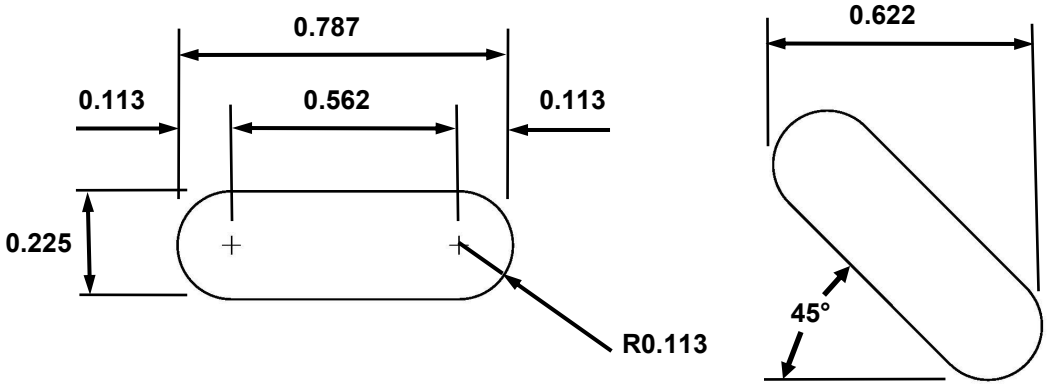
*ALPlank 8** *ALPlank 15**





* *Number indicates % open area*

DIAGONAL PUNCH DIMENSIONS **(Coming Soon)



Grating height based on load and clear span requirements

ALUMINUM PLANK

PLANK FABRICATION

Aluminum plank grating (PLK Series) is available in 24'-0" lengths for customer fabrication, or as fabricated by Pleasant Mount Welding according to customer plans and specifications.

Individual 6" wide plank sections may be banded together to form standard panel widths for ease of handling and installation. When the width of the total grating "run" (number of continuous series of panels) does not result in a total measurement evenly divisible by the 6" wide plank sections, the last panel can be fabricated from several whole sections and a partial section according to the Panel Width Chart shown below. In order to meet flatness tolerances, fabricated panels must always be end banded, and should not exceed a maximum 36" width.

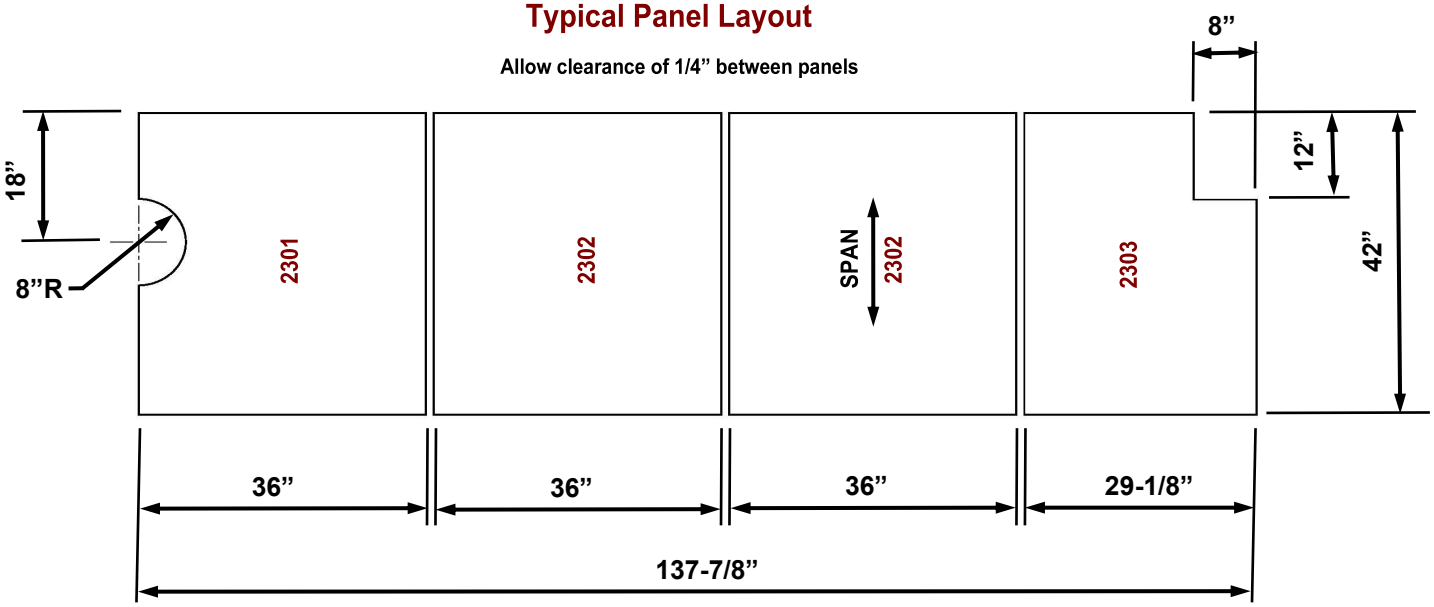
The two arrows on a typical panel layout arrangement drawing designates the span direction of the grating which runs perpendicular to the supporting members. Identical panels shall have the same mark numbers. Cutouts and banding are priced separately according to quantity and size required.

Aluminum Plank - Panel Width Chart (in.)

	1-1/2	2-11/16	3-7/8	5-1/8
6	7-1/2	8-11/16	9-7/8	11-1/8
12	13-1/2	14-11/16	15-7/8	17-1/8
18	19-1/2	20-11/16	21-7/8	23-1/8
24	25-1/2	26-11/16	27-7/8	29-1/8
30	31-1/2	32-11/16	33-7/8	35-1/8
36				

Typical Panel Layout

Allow clearance of 1/4" between panels



NOTE: Panels made from 6" sections and partial sections are banded on the ends only. Side bands are typically not furnished, unless specified by the customer.

ALUMINUM PLANK

% Open Area	
Rectangular Punched	34%

% Open Area	
Diagonal ALPlk8	8%
Diagonal ALPlk15	15%

*** Coming Soon*

LOAD & DEFLECTION TABLE

* Based on Rect Punched plank.

HEAVY DUTY PLANK (PLK SERIES)

Plank Size Inches	Ped. Span Inches	Sec. Prop. S_x* (in^3) / I_x* (in^4)	Approx. Weight lbs/sqft Non Punched	Approx. Weight lbs/sqft Rect Punched		Clear Span (Direction of Support Bars) 2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
3/4	39	0.224	2.2	1.8	U	447	286	198	146	111	88	71					
					Du	0.153	0.238	0.342	0.467	0.606	0.770	0.946					
		0.105			C	447	358	298	255	223	198	179					
					Dc	0.122	0.191	0.275	0.373	0.487	0.616	0.764					
1	48	0.412	2.6	2.2	U	822	526	365	268	205	162	131	108	91			
					Du	0.122	0.190	0.273	0.372	0.485	0.614	0.756	0.913	1.090			
		0.243			C	822	658	548	470	411	365	329	299	274			
					Dc	0.097	0.152	0.219	0.298	0.389	0.492	0.608	0.735	0.875			
1-1/4	57	0.704	3.2	2.8	U	1408	901	626	459	352	278	225	186	156	133	114	88
					Du	0.103	0.161	0.232	0.316	0.413	0.522	0.644	0.780	0.926	1.088	1.254	1.651
		0.491			C	1408	1126	939	805	704	626	563	512	469	433	402	352
					Dc	0.083	0.129	0.186	0.253	0.330	0.418	0.516	0.624	0.743	0.872	1.011	1.321
1-1/2	66	1.083	3.8	3.4	U	2165	1386	962	707	541	427	346	286	240	205	176	135
					Du	0.090	0.140	0.202	0.275	0.359	0.453	0.560	0.678	0.805	0.948	1.094	1.432
		0.869			C	2165	1732	1443	1237	1082	962	866	787	721	666	618	541
					Dc	0.072	0.112	0.161	0.220	0.287	0.363	0.448	0.542	0.645	0.758	0.878	1.148
1-3/4	74	1.479	4.4	4.0	U	2956	1892	1314	965	739	584	473	391	328	279	241	184
					Du	0.078	0.122	0.175	0.239	0.312	0.395	0.487	0.590	0.701	0.821	0.954	1.243
		1.365			C	2956	2365	1971	1689	1478	1314	1182	1075	985	909	844	739
					Dc	0.062	0.097	0.140	0.191	0.250	0.316	0.390	0.472	0.561	0.659	0.764	0.998
2	83	1.989	4.9	4.5	U	3979	2546	1768	1299	994	785	636	526	442	376	324	248
					Du	0.069	0.108	0.155	0.211	0.276	0.349	0.431	0.522	0.621	0.728	0.844	1.102
		2.074			C	3979	3183	2652	2273	1989	1768	1591	1446	1326	1224	1136	994
					Dc	0.055	0.086	0.124	0.169	0.221	0.280	0.345	0.418	0.497	0.584	0.676	0.883
2-1/4	91	2.591	5.5	5.0	U	5223	3342	2321	1705	1305	1031	835	690	580	494	426	326
					Du	0.063	0.098	0.141	0.191	0.250	0.316	0.390	0.472	0.562	0.660	0.765	0.999
		3.008			C	5223	4178	3482	2984	2611	2321	2089	1899	1741	1607	1492	1305
					Dc	0.050	0.078	0.113	0.153	0.200	0.253	0.313	0.378	0.450	0.528	0.613	0.800
2-1/2	97	3.028	5.9	5.5	U	6080	3891	2702	1985	1520	1201	972	804	675	575	496	380
					Du	0.056	0.088	0.127	0.172	0.225	0.285	0.352	0.426	0.506	0.594	0.689	0.901
		3.888			C	6080	4864	4053	3474	3040	2702	2432	2211	2026	1871	1737	1520
					Dc	0.045	0.070	0.101	0.138	0.180	0.228	0.282	0.341	0.405	0.476	0.552	0.721

U = Safe uniform load (psf)
C = Safe concentrated load (lbs/ft width)
D = Deflection (inches)
E = Modulus of Elasticity, 10,000,000 psi
F = Allowable Fiber Stress, 12,000 psi
Material: ASTM B221, 6063-T6

Loads and deflections shown in this table are theoretical and based on static loading.

Finish: Mill finish unless otherwise specified.

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf. This can be exceeded for other types of loads with the Engineer's approval.

Model Specification:
Aluminum Plank (PLK Series) - Unpunched Gratings

September 16, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "Aluminum Plank (PLK Series) – Unpunched Grating." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, custom-designed aluminum plank gratings.

B. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM B221: Aluminum Extruded Bars and Shapes.

C. ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 10 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Aluminum Plank Grating (PLK Series) - **Unpunched**. Six-inch wide extruded aluminum plank, with support bars spaced **1.2**" on center. Fabricated with banding into panels of standard width to fill area shown on drawings.

1. Plank Depth: based on loading requirements and clear span.
2. Top Surface of Plank: **Striated or SlipNOT® Slip Resistance Coating.**

B. **Fabrication:** Fabricate cutouts in grating sections for penetrations as indicated. Arrange cutouts to permit grating removal without disturbing items penetrating plank. Trim band ends (and cuts in the plank) with banding bars of 1/8" minimum thickness, that are the same nominal depth and material as the plank section. Weld banding flush with the top surface of grating. Include fabrication required for attachment system shown on drawing plans, or as recommended by manufacturer.

C. **Design Criteria:**

1. **Loading:** Grating products shall be designed and manufactured to meet live load conditions of **100 lbs / SQFT with a maximum deflection of 1/4"** for the clear spans shown on the drawings. Bearing bar depth shall be as shown on contract drawings, or as recommended by the manufacturer to meet loading requirements, clear span conditions and maximum deflections specified.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

D. **Materials:** Aluminum plank and banding are aluminum type 6063-T6.

E. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

F. **Top Surface:** When required, SlipNOT® Slip Resistance Coating will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 C.2 above.

G. **Finish:** Gratings shall be **Mill finish or A-41 Clear Anodized.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system.

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

C. Protection of Aluminum from Dissimilar Materials:

1. Where aluminum surfaces come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with one coat of bituminous paint, powder coat paint, or other approved insulating material.

2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint, powder coat paint, or other approved insulating material.

3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

Model Specification:
Aluminum Plank (PLK Series) – Rectangular Punched Gratings

September 16, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "Aluminum Plank (PLK Series) – Rectangular Punched Grating." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

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B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 10 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

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2.1 Source Requirements:

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2.3 Manufactured Units:

A. **Description:** Aluminum Plank Grating (PLK Series) – **Rectangular Punched**. Six-inch wide extruded aluminum plank, with support bars spaced **1.2"** on center. Fabricated with banding into panels of standard width to fill area shown on drawings.

1. Plank Depth: based on loading requirements and clear span.
2. Top Surface of Plank: **Striated or SlipNOT® Slip Resistance Coating.**
3. Punch Pattern: Rectangular 19/32" x 2-3/4" holes staggered and spaced 4" on center along the span; spaced 1.2" on center between support bars. Punched holes shall have Plain Pattern.

B. **Fabrication:** Fabricate cutouts in grating sections for penetrations as indicated. Arrange cutouts to permit grating removal without disturbing items penetrating plank. Trim band ends (and cuts in the plank) with banding bars of 1/8" minimum thickness, that are the same nominal depth and material as the plank section. Weld banding flush with the top surface of grating. Include fabrication required for attachment system shown on drawing plans, or as recommended by manufacturer.

C. **Design Criteria:**

1. **Loading:** Grating products shall be designed and manufactured to meet live load conditions of **100 lbs / SQFT with a maximum deflection of 1/4"** for the clear spans shown on the drawings. Bearing bar depth shall be as shown on contract drawings, or as recommended by the manufacturer to meet loading requirements, clear span conditions and maximum deflections specified.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

D. **Materials:** Aluminum plank and banding are aluminum type 6063-T6.

E. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 531-17: Metal Bar Grating Manual.

F. **Top Surface:** When required, SlipNOT® Slip Resistance Coating will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 C.2 above.

G. **Finish:** Gratings shall be **Mill finish or A-41 Clear Anodized.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system.

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

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2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint, powder coat paint, or other approved insulating material.

3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

ALUMINUM STAIR TREADS

Many grating platform and walkway applications require stairways to access the various elevations that are associated with most construction projects. PMWI offers aluminum stair treads in all of our aluminum grating styles to match our grating products: Swage Locked I-Bar (SI Series), Swage Locked Rectangular Bar (SR Series), Pressure Locked Aluminum Dovetail (ADT Series), and Aluminum Heavy Duty Plank (PLK Series).



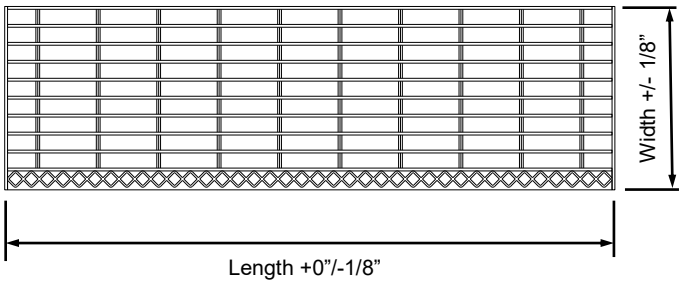
The SR Series and ADT Series stair treads may be ordered with a plain or serrated surface while the SI Series stair treads have a striated surface similar to the I-Bar grating profile. Aluminum Plank stair treads come unpunched or may be punched in one of several of our available punch patterns including “American with Disabilities Act” (ADA) options.

Nosings for aluminum stair treads include standard extruded Grooved Nosing with a striated surface similar to the I-bar grating or an optional cast Abrasive Nosing is available. Additionally, a slip resistant coating can be applied to improve the overall slip resistance of the stair tread.

Carrier end plates are provided with a hole and slot for attachment to stair stringers (Note: mounting bolts for mounting to stringers not furnished with treads).

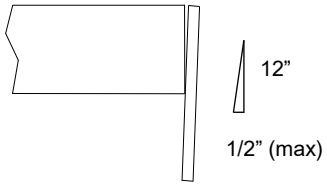


STAIR TREAD TOLERANCES



Overall Dimensional Tolerances

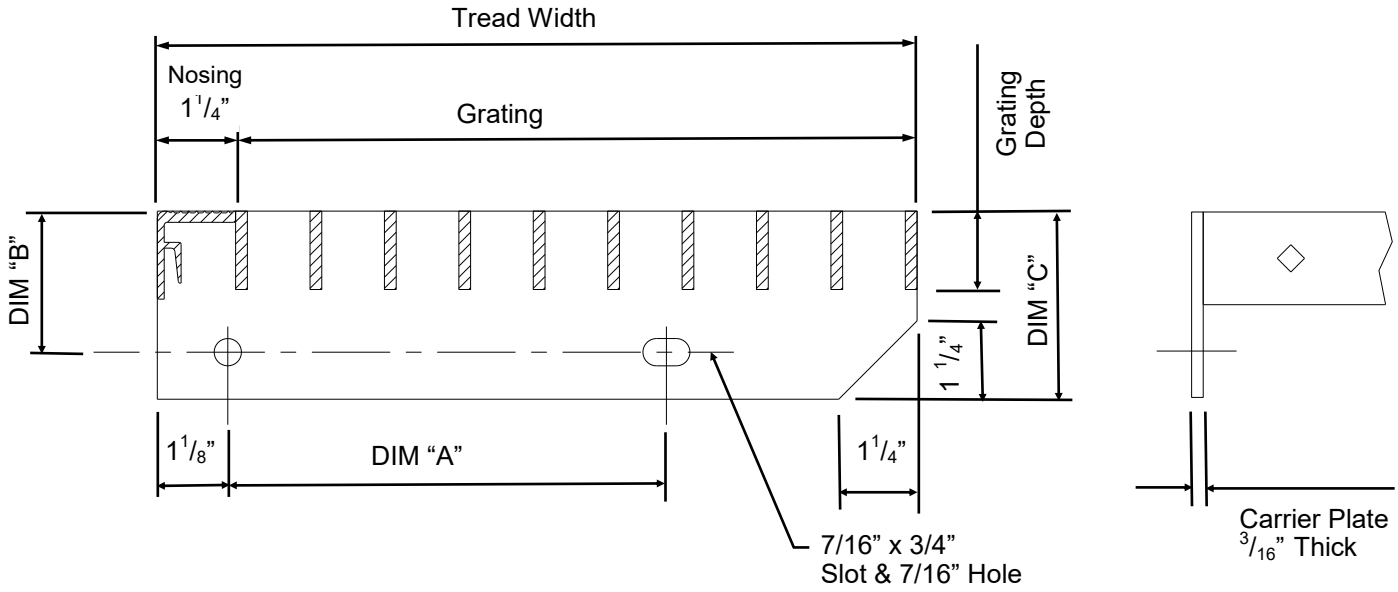
Note: Length of Stair Tread is distance Between outer faces of Carrier Plates



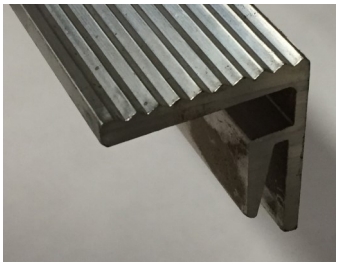
Carrier Plate Lean

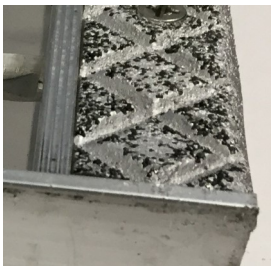
ALUMINUM STAIR TREADS

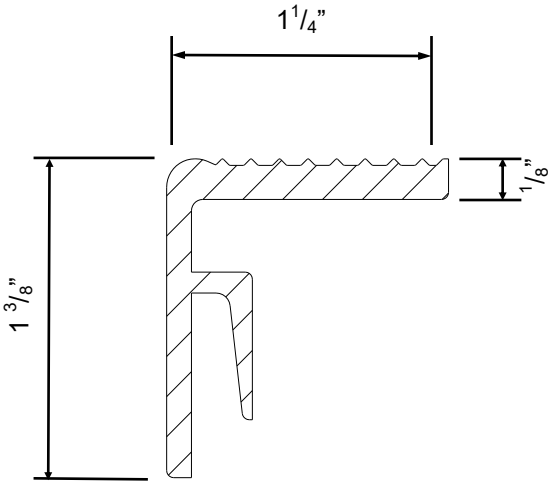
ALUMINUM STAIR TREAD DETAILS



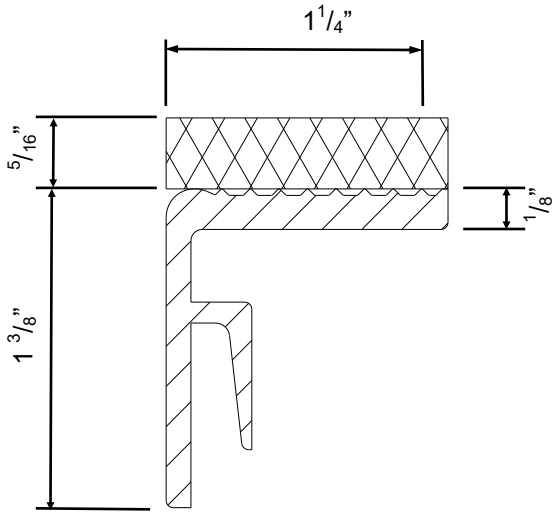
Treads with Carrier Plates







Grooved



Cast Aluminum Abrasive

Nosing Details

ALUMINUM STAIR TREADS

Standard Tread Widths[1]

No. of Bearing Bars	Width (includes nosing)			DIM "A"
	SR & ADT Series	SI Series	Plank Series	
5	6-3/16"	6-1/4"	6-3/8"	2-1/2"
6	7-3/8"	7-7/16"	7-1/4"	4-1/2"
7	8-9/16"	8-5/8"	8-3/4"	4-1/2"
8	9-3/4"	9-13/16"	9-15/16"	7"
9	10-15/16"	11"	11-1/8"	7"
10	12-1/8"	12-3/16"	12-3/8"	7"

Carrier Plate Dimensions

Grating Depth	DIM "B"	DIM "C"
1"	2-1/4"	3"
1-1/4"	2-1/4"	3"
1-1/2"	2-1/4"	3"
1-3/4"	2-1/4"	3"
2"	3-1/4"	4"
2-1/4"	3-1/4"	4"
2-1/2"	3-1/4"	4"

Max Plank Tread Length[2]

Grating Depth	Plank Grating
1"	30"
1-1/4"	36"
1-1/2"	44"
1-3/4"	53"
2"	63"
2-1/4"	66"
2-1/2"	70"

Maximum Tread Length[2] (inches) *** 15-ADT Series Coming Soon*

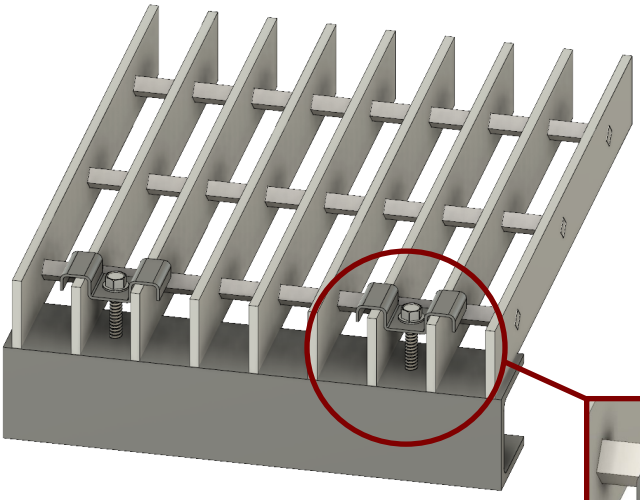
Bar Size (inches)	SR & ADT Series Plain Surface		SR & ADT Series Serrated Surface		SI Series Striated Surface	
	19 1-3/16" c.c.	15 15/16" c.c.	19 1-3/16" c.c.	15 15/16" c.c.	19 1-3/16" c.c.	15 15/16" c.c.
1 x 3/16	28	30	26	27		
1 x 1/4					28	30
1-1/4 x 3/16	34	37	31	33		
1-1/4 x 1/4					34	37
1-1/2 x 3/16	42	46	38	42		
1-1/2 x 1/4					42	46
1-3/4 x 3/16	51	56	46	51		
1-3/4 x 1/4					51	56
2 x 3/16	61	66	56	61		
2 x 1/4					61	66
2-1/4 x 3/16	66	66	66	66		
2-1/4 x 1/4					66	66
2-1/2 x 3/16	66	70	66	66		
2-1/2 x 1/4					66	70

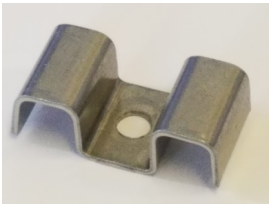
1. Table of widths based on 3/16" thick Rectangular Bearing bars (1/4" I-bars) and standard 1-3/16" center-to-center bearing bar spacing.
2. Maximum tread length based on 300 lb. concentrated load on front 5" of tread at center of tread length and maximum deflection D=1/240 of length. Design treads exceeding 66" length for 300 lb. concentrated loads at 1/3 points.

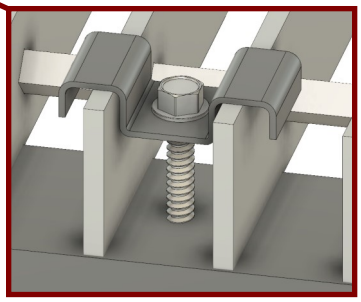
GRATING ANCHORS

Saddle Clip

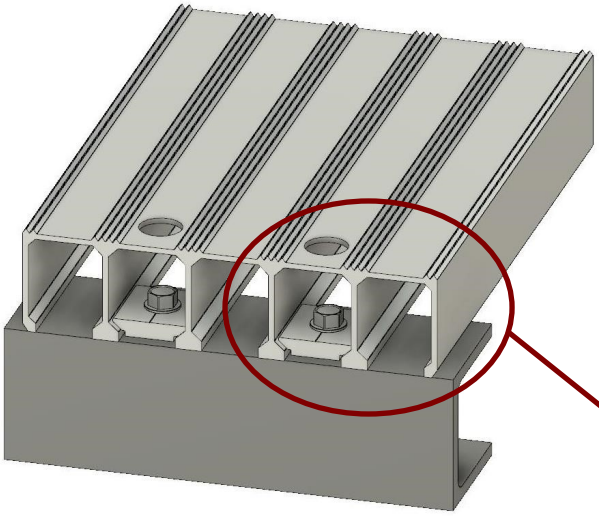
A bent-clip type fastener for removable bar grating panels. Clips fit over two adjacent bearing bars and can be secured to the substrate using standard TEK screws. Recessed design allows fastener heads to remain below grating surface. Made from stainless steel and available in both 15-spacing and 19-spacing sizes. Saddle clips are compatible with I-Bar, Dovetail, and Rectangular Bar grating types.





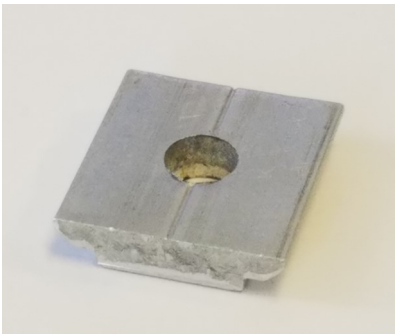


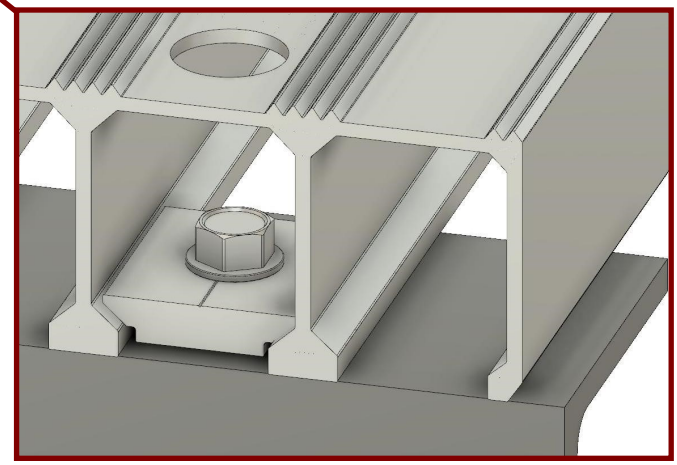
Note: Crossbars may need to be snipped in field to facilitate placement of saddle clips at support locations.



Plank Lug

A plank lug is sized to fit between the bottom flanges of plank grating and is an ideal method for anchoring plank grating. Plank lugs may be tack welded in place and can be secured to the substrate using standard TEK screws. Made from aluminum and fits all depths of plank grating. Plank lugs may also be used with 19-spacing I-Bar. 5/8" diameter holes are required in plank decking to access plank lug fasteners.



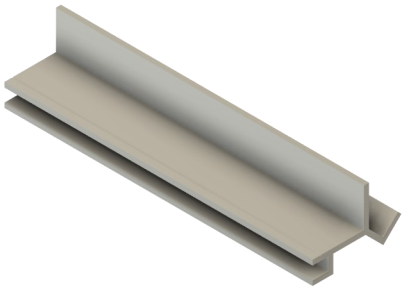


Note: Tack welding of grating in the field (by others) is an alternative method for anchoring all permanently installed grating.

GRATING ANGLE FRAME

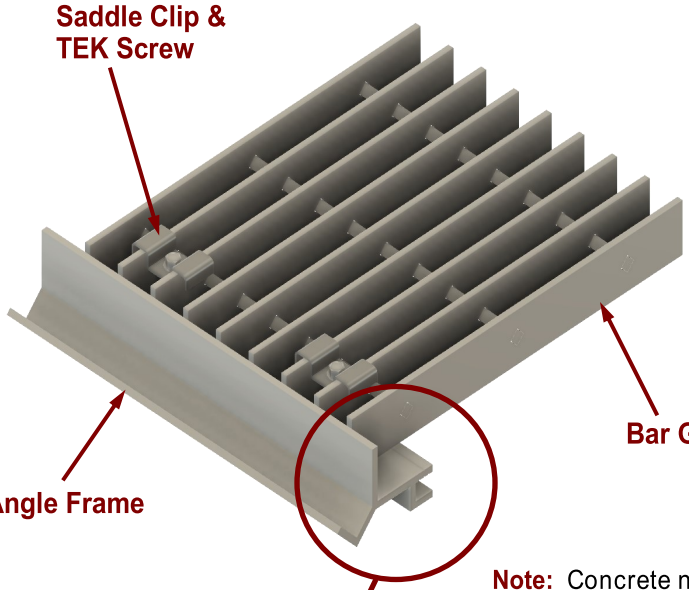
Aluminum Grating Angle Frame Embed

Pleasant Mount Welding offers an extruded aluminum grating frame for embedded concrete applications. The angle frame incorporates a continuous slot to accommodate grating fasteners, clips or self tapping screws. The extruded angle frame also provides a continuous anchor for embedding in concrete and may be used alone or in conjunction with a supplemental anchor strap (if necessary). Grating angle frame is offered to match grating depths from 1" to 2-1/2" and shall have mitered corners (where applicable). Angle frames can be provided in mill finish or coated with bituminous paint to protect surfaces that will come into contact with concrete.

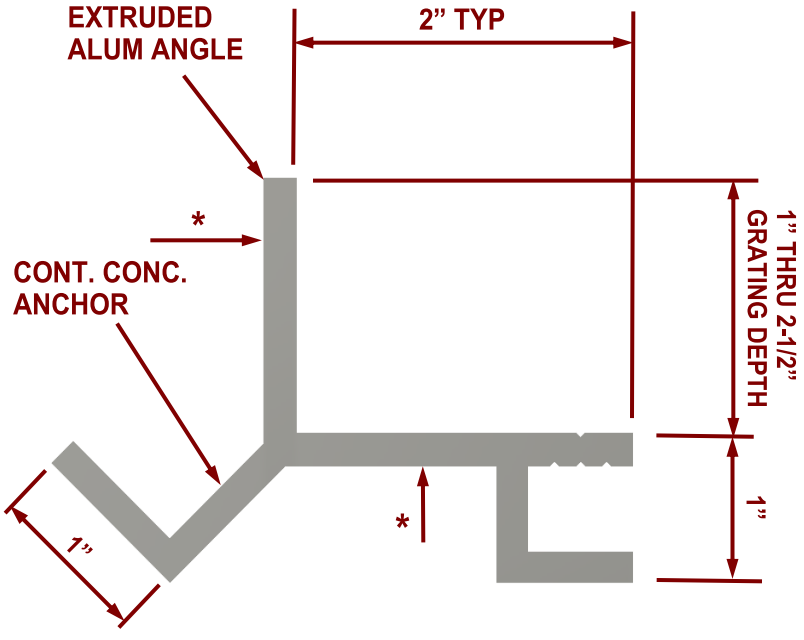




Extruded Angle Frame



Note: Concrete not shown



PMWI EXTRUDED ANGLE SECTION

HEAVY DUTY STEEL GRATING FEATURES & BENEFITS

Features & Benefits

Heavy duty steel grating is used in areas where heavy static or rolling loads are generally encountered. This includes heavy vehicular traffic up to H-25 loading. Calculations for vehicular loadings are based on the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges and can be calculated by our Engineering department for your specific project applications.

Heavy duty welded carbon steel is by far the most popular choice where high strength is required. Heavy duty steel grating is used in high load areas such as airports, industrial plants, truck and bus terminals, parking lots and railroad yards. Common uses are flooring, bridge decking, ramps, subway and tunnel ventilation grilles, docks, and curb grates.

Our sturdy heavy duty steel grating maintains the same level over many years of service and has minimal deflection under heavy rolling loads.







PMWI, providing quality products and superior service for 40 Years



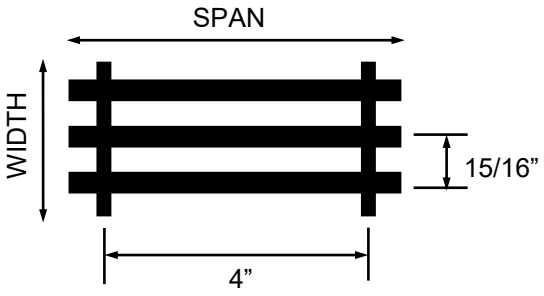


Heavy Duty Welded Steel (W Series)

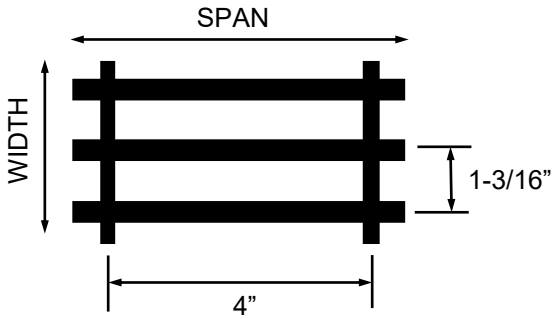
Heavy Duty Welded Carbon Steel grating is the most popular choice where high strength is the primary grating requirement. The main bearing bars are slotted and assembled with cross bars that are welded with one fillet weld at every bearing bar/cross bar joint. Galvanizing is an option and Stainless steel can also be provided for highly corrosive applications. Our Heavy Duty Welded Steel (W Series) grating meets the demanding vehicular loading requirements of the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges and can handle heavy rolling loads. ***Slipnot*™** slip resistance coating is also available. The typical markets for Heavy Duty Steel grating include highway bridge decks, ramps, airfields, industrial flooring and trenches.

GRATING PROFILES - HEAVY DUTY WELDED STEEL (W SERIES)

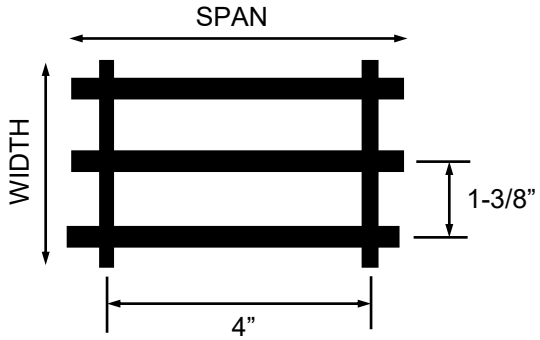
All profiles shown below are also available with 2” cross bar center-to-center spacing. Product numbers for those profiles would be 15-W-2, 19-W-2, 22-W-2, 30-W-2 and 38-W-2.



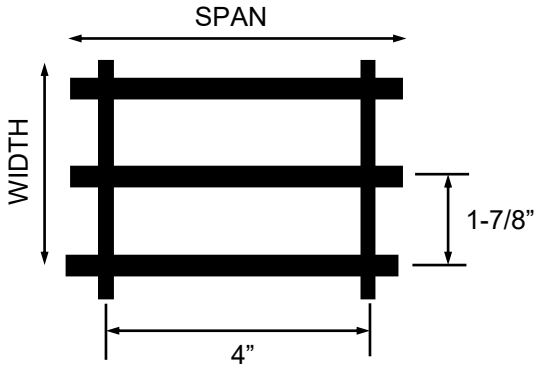
15-W-4



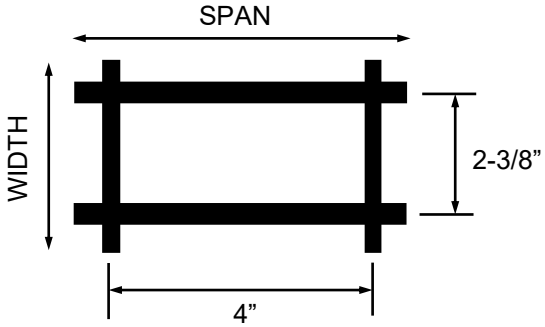
19-W-4



22-W-4



30-W-4



38-W-4

HEAVY DUTY STEEL GRATING DESIGN CRITERIA

Design Criteria

The following pages provide Vehicular Load Tables, Maximum Safe Concentrated Loads, and Static Load & Deflection Tables to assist the designer with a convenient reference for the load carrying capabilities of typical heavy duty grating. Calculations for uniform and concentrated loads per foot of grating width are similar in format to those shown for Aluminum Bar grating on page 7, except that F = 20,000 psi and E = 29,000,000 psi. Calculations for vehicular loadings are based on the 16th Edition of the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges and utilize the following formulas:

M = Bending Moment
S = Section Modulus - in^3/ft of grating width
I = Moment of Inertia - in^4/bar
E = Modulus of Elasticity (29,000,000 psi)
F = Allowable Bending Stress (20,000 psi)
L = Simple Clear Span - inches
D = Deflection - inches

a = Partial Load Contact Parallel to Span - inches
s = Center-to-Center Spacing between Bearing Bars - inches
b = Partial Load Contact Dimension at 90° to Span - inches
b = a + (2s)
P = Total Wheel or Partial Load Including Impact - lbs.
$\mathbf{P_1}$ = P per Bearing Bar - lbs.
$\mathbf{P_1}$ = P x (s/b)

Step 1. Determine M:	$\mathbf{M} = \frac{FS}{12}$
Step 2. Substituting for M, solve for L:	(i) a > L $\quad \mathbf{M} = \frac{PL^2}{8ab}$ (ii) a < L $\quad \mathbf{M} = \frac{P(.25L - .125a)}{b}$
Step 3. Check D*:	$\mathbf{D} = \frac{P_1[(2L^3) - (a^2L) + (a^3/4)]}{96EI}$

** Deflection limited to the lesser of .125 inches or L/400 of span to a maximum 8'-0" per AASHTO*

Maximum Traffic Conditions	Wheel Load (lbs.) (1/2 of Axle Load + 30% Impact)	Loading	Load Distribution[2]	
			a	b
Truck Traffic 52,000 Lbs. Total Load 40,000 Lbs. Axle Load Dual Wheels 	26,000	H-25	25"	25" + (2s)
Truck Traffic 41,600 Lbs. Total Load 32,000 Lbs. Axle Load Dual Wheels 	20,800	H-20/ HL-93[6]	20"	20" + (2s)
Truck Traffic 31,200 Lbs. Total Load 24,000 Lbs. Axle Load Dual Wheels 	15,600	H-15	15"	15" + (2s)
10,000 Lbs. Capacity Forklift Truck 14,400 Lbs. Vehicle Weight 31,720 Lbs. Total Load (Rubber Tires) 85% Drive Axle Load 	13,481	5-Ton[3]	11"	11" + (2s)
6,000 Lbs. Capacity Forklift Truck 9,800 Lbs. Vehicle Weight 20,540 Lbs. Total Load (Rubber Tires) 85% Drive Axle Load 	8,730	3-Ton[3]	7"	7" + (2s)
2,000 Lbs. Capacity Forklift Truck 4,200 Lbs. Vehicle Weight 8,060 Lbs. Total Load (Rubber Tires) 85% Drive Axle Load 	3,426	1-Ton[3]	4"	4" + (2s)
3,578 Lbs. Capacity Passenger Vehicle 6,322 Lbs. Vehicle Weight 12,870 Lbs. Total Load (Rubber Tires) 60% Drive Axle Load 	3,861	Passenger Vehicle	9"	9" + (2s)

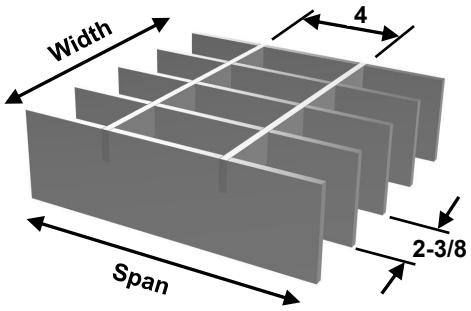
Notes:
1) For continuous spans, use continuity factor = .80.
2) This distribution results in larger grating sizes for lighter trucks on shorter spans. Spans shown for H15/H20 reflect more critical condition.
3) The forklift wheel loads and load distribution patterns depicted above, generally, and only partially, represent the broad range of rubber-tired lift trucks available. For those applications falling outside of these examples, please contact PMWI.
4) Wheeled vehicles with urethane tires should **NEVER** be used in conjunction with open grid bar grating.
5) HS20 is the same as H20 and HS15 is the same as H15. The "S" stands for semi-trailer.
6) The "HL-93" notation shown with "H-20" represents AASHTO's truck loading standard post-1993. Since 1993, H-10, H-20, etc. have been retired in lieu of the "HL-93" loading which represents all trucks.

Technical information provided herein is intended only for evaluation by technically qualified persons, with any use thereof to be at their own discretion and risk. Such information is reliable when evaluated in proper manner under conditions described herein. Pleasant Mount Welding, Inc. shall have no responsibility or liability for results obtained or damages resulting from improper evaluation or use.

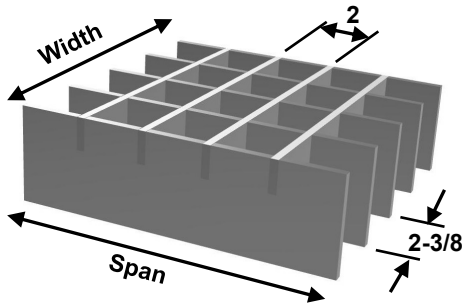
38-SPACE

HEAVY DUTY WELDED STEEL GRATING

38-W-4



38-W-2



% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	82%	80%	77%	-
	2" cc	76%	73%	71%	-
3" to 6"	4" cc	84%	82%	79%	74%
	2" cc	80%	78%	75%	71%

VEHICULAR LOAD TABLE

Bearing Bar Size (Inches)	Weight ** (Lbs./Sqft.)	Section Properties		Maximum Safe Clear Span (Inches)						
		Sx ** (In^3/Ft. Width)	Ix ** (In^4/Ft. Width)	Auto Traffic	1 Ton	3 Ton	5 Ton	H-15	H20/ HL-93	H-25
1 x 1/4	5.42	0.211	0.105	9	5	5	6	7	8	8
1 x 3/8	7.57	0.316	0.158	11	7	6	7	8	10	10
1-1/4 x 1/4	6.49	0.329	0.206	12	7	6	7	9	10	11
1-1/4 x 3/8	9.17	0.493	0.308	16	10	7	9	11	12	13
1-1/2 x 1/4	7.59	0.474	0.355	15	10	7	9	10	12	13
1-1/2 x 5/16	9.17	0.592	0.444	18	12	8	10	12	13	15
1-1/2 x 3/8	10.78	0.711	0.533	21	14	9	11	13	15	16
1-3/4 x 1/4	8.66	0.645	0.564	19	12	9	10	12	14	16
1-3/4 x 3/8	12.40	0.967	0.846	27	18	12	13	15	17	19
2 x 1/4	9.72	0.842	0.842	24	16	11	12	14	16	17
2 x 5/16	11.89	1.053	1.053	29	19	12	13	16	18	20
2 x 3/8	14.01	1.263	1.263	34	23	14	15	18	20	21
2-1/4 x 1/4	10.78	1.066	1.199	29	20	13	13	16	18	20
2-1/4 x 3/8	15.63	1.599	1.799	42	29	17	17	20	22	24
2-1/2 x 1/4	11.89	1.316	1.645	35	24	15	15	18	20	22
2-1/2 x 5/16	14.57	1.645	2.056	43	30	18	18	21	23	25
2-1/2 x 3/8	17.25	1.974	2.467	50*	35	21	20	24	25	27
3 x 1/4	16.06	1.895	2.842	49	34	20	20	23	25	26
3 x 5/16	19.30	2.369	3.553	57*	42	24	23	27	28	30
3 x 3/8	22.53	2.842	4.263	60*	50	29	27	31	32	34
3 x 1/2	28.95	3.790	5.685	66*	59*	37	35	39	40	41
3-1/2 x 1/4	18.24	2.579	4.513	61	45	26	25	29	30	32
3-1/2 x 3/8	25.72	3.869	6.770	70*	63*	38	35	40	40	42
3-1/2 x 1/2	33.25	5.158	9.027	77*	69*	49	45	50	50	51
4 x 1/4	20.36	3.369	6.737	70*	59	33	31	35	36	38
4 x 5/16	24.66	4.211	8.422	75*	67*	41	38	43	43	44
4 x 3/8	28.95	5.053	10.106	80*	72*	48	44	50	50	51
4 x 1/2	37.54	6.737	13.475	88*	79*	63	57	63*	62*	62*
4-1/2 x 1/4	22.53	4.263	9.593	81*	73*	41	38	43	43	45
4-1/2 x 3/8	32.18	6.395	14.389	83*	75*	60	55	61	60	61
4-1/2 x 1/2	41.84	8.527	19.186	96*	89*	72*	69*	71*	70*	69*
5 x 1/4	24.66	5.264	13.159	88*	78*	50	46	51	51	52
5 x 5/16	30.01	6.579	16.449	94*	84*	62	56	63	62	62
5 x 3/8	35.42	7.895	19.738	96*	90*	72*	66	71*	70*	70*
5 x 1/2	46.13	10.527	26.318	96*	96*	80*	76*	78*	77*	77*
5-1/2 x 1/4	26.80	6.369	17.514	96*	86*	60	55	61	60	61
5-1/2 x 3/8	38.60	9.553	26.272	96*	96*	80*	76*	78*	77*	77*
5-1/2 x 1/2	50.42	12.738	35.029	96*	96*	88*	84*	86*	85*	84*
6 x 1/4	28.95	7.580	22.739	96*	94*	71	64	71	70	70
6 x 5/16	35.42	9.474	28.423	96*	96*	82*	78*	80*	79*	79*
6 x 3/8	41.83	11.369	34.108	96*	96*	87*	83*	85*	84*	83*
6 x 1/2	54.72	15.159	45.477	96*	96*	96*	91*	94*	92*	92*

*Maximum spans are limited by maximum allowable stress or the lesser deflection of L/400 or 1/8" to a maximum simple span of 8'-0" (2,438mm). **Based on 5.053 bars/ft. of grating width. Bearing bars 2-3/8" center-to-center spacing. When serrated grating is specified, the depth of grating required for a specified load will be 1/4" greater than that shown in these tables. Weights shown are for 4" cross bar centers. Add 1.13 lbs/sqft. (3/8" Dia. CB) or 3.18 lbs./sqft. (1-1/4" x 1/4" CB) for 2" cross bar centers. Cross bars are determined based on project applications and bearing bar height.

HEAVY DUTY WELDED STEEL GRATING

MAXIMUM SAFE CONCENTRATED LOADS

Bearing Bar Size (Inches)	Maximum Safe Concentrated Load* (Lbs./Foot of Grating Width) - Clear Span												
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"
1 x 1/4	1407	938	703	563	469	402							
1 x 3/8	2107	1404	1053	843	702	602							
1-1/4 x 1/4	2193	1462	1097	877	731	627	548						
1-1/4 x 3/8	3287	2191	1643	1315	1096	939	822						
1-1/2 x 1/4	3160	2107	1580	1264	1053	903	790	702					
1-1/2 x 5/16	3947	2631	1973	1579	1316	1128	987	877					
1-1/2 x 3/8	4740	3160	2370	1896	1580	1354	1185	1053					
1-3/4 x 1/4	4300	2867	2150	1720	1433	1229	1075	956	860				
1-3/4 x 3/8	6447	4298	3223	2579	2149	1842	1612	1433	1289				
2 x 1/4	5613	3742	2807	2245	1871	1604	1403	1247	1123				
2 x 5/16	7020	4680	3510	2808	2340	2006	1755	1560	1404				
2 x 3/8	8420	5613	4210	3368	2807	2406	2105	1871	1684				
2-1/4 x 1/4	7107	4738	3553	2843	2369	2030	1777	1579	1421	1292			
2-1/4 x 3/8	10660	7107	5330	4264	3553	3046	2665	2369	2132	1938			
2-1/2 x 1/4	8773	5849	4387	3509	2924	2507	2193	1950	1755	1595	1462		
2-1/2 x 5/16	10967	7311	5483	4387	3656	3133	2742	2437	2193	1994	1828		
2-1/2 x 3/8	13160	8773	6580	5264	4387	3760	3290	2924	2632	2393	2193		
3 x 1/4	12633	8422	6317	5053	4211	3610	3158	2807	2527	2297	2106		
3 x 5/16	15793	10529	7897	6317	5264	4512	3948	3510	3159	2872	2632		
3 x 3/8	18947	12631	9473	7579	6316	5413	4737	4210	3789	3445	3158		
3 x 1/2	25267	16844	12633	10107	8422	7219	6317	5615	5053	4594	4211		
3-1/2 x 1/4	17193	11462	8597	6877	5731	4912	4298	3821	3439	3126	2866	2456	
3-1/2 x 3/8	25793	17196	12897	10317	8598	7370	6448	5732	5159	4690	4299	3685	
3-1/2 x 1/2	34387	22924	17193	13755	11462	9825	8597	7641	6877	6252	5731	4912	
4 x 1/4	22460	14973	11230	8984	7487	6417	5615	4991	4492	4084	3743	3209	
4 x 5/16	28073	18716	14037	11229	9358	8021	7018	6239	5615	5104	4679	4010	
4 x 3/8	33687	22458	16843	13475	11229	9625	8422	7486	6737	6125	5614	4812	
4 x 1/2	44913	29942	22457	17965	14971	12832	11228	9981	8983	8166	7486	6416	
4-1/2 x 1/4	28420	18947	14210	11368	9473	8120	7105	6316	5684	5167	4737	4060	3553
4-1/2 x 3/8	42633	28422	21317	17053	14211	12181	10658	9474	8527	7752	7106	6090	5329
4-1/2 x 1/2	56847	37898	28423	22739	18949	16242	14212	12633	11369	10336	9474	8121	7106
5 x 1/4	35093	23396	17547	14037	11698	10027	8773	7799	7019	6381	5849	5013	4387
5 x 5/16	43860	29240	21930	17544	14620	12531	10965	9747	8772	7975	7310	6266	5483
5 x 3/8	52633	35089	26317	21053	17544	15038	13158	11696	10527	9570	8772	7519	6579
5 x 1/2		46787	35090	28072	23393	20051	17545	15596	14036	12760	11697	10026	8773
5-1/2 x 1/4		28307	21230	16984	14153	12131	10615	9436	8492	7720	7077	6066	5308
5-1/2 x 3/8		42458	31843	25475	21229	18196	15922	14153	12737	11579	10614	9098	7961
5-1/2 x 1/2		56613	42460	33968	28307	24263	21230	18871	16984	15440	14153	12131	10615
6 x 1/4		33689	25267	20213	16844	14438	12633	11230	10107	9188	8422	7219	6317
6 x 5/16		42107	31580	25264	21053	18046	15790	14036	12632	11484	10527	9023	7895
6 x 3/8		50529	37897	30317	25264	21655	18948	16843	15159	13781	12632	10828	9474
6 x 1/2			50530	40424	33587	28874	25265	22458	20212	18375	16843	14437	12633

% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	82%	80%	77%	-
	2" cc	76%	73%	71%	-
3" to 6"	4" cc	84%	82%	79%	74%
	2" cc	80%	78%	75%	71%

Loads are theoretical, and are based on a unit stress of 20,000 psi.

*Based on 5.053 bars/ft. of grating width. Bearing bars 2-3/8" center-to-center spacing. **Note:** When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Panel Width Chart (in.) - 38-W-4 & 38-W-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Bars	$2^{5}/_{8}$	5	$7^{3}/_{8}$	$9^{3}/_{4}$	$12^{1}/_{8}$	$14^{1}/_{2}$	$16^{7}/_{8}$	$19^{1}/_{4}$	$21^{5}/_{8}$	24	$26^{3}/_{8}$	$28^{3}/_{4}$	$31^{1}/_{8}$	$33^{1}/_{2}$	$35^{7}/_{8}$
5/16" Bars	$2^{11}/_{16}$	$5^{1}/_{16}$	$7^{7}/_{16}$	$9^{13}/_{16}$	$12^{3}/_{16}$	$14^{9}/_{16}$	$16^{15}/_{16}$	$19^{5}/_{16}$	$21^{11}/_{16}$	$24^{1}/_{16}$	$26^{7}/_{16}$	$28^{13}/_{16}$	$31^{3}/_{16}$	$33^{9}/_{16}$	$35^{15}/_{16}$
3/8" Bars	$2^{3}/_{4}$	$5^{1}/_{8}$	$7^{1}/_{2}$	$9^{7}/_{8}$	$12^{1}/_{4}$	$14^{5}/_{8}$	17	$19^{3}/_{8}$	$21^{3}/_{4}$	$24^{1}/_{8}$	$26^{1}/_{2}$	$28^{7}/_{8}$	$31^{1}/_{4}$	$33^{5}/_{8}$	36
1/2" Bars	$2^{7}/_{8}$	$5^{1}/_{4}$	$7^{1}/_{8}$	10	$12^{3}/_{8}$	$14^{3}/_{4}$	$17^{1}/_{8}$	$19^{1}/_{2}$	$21^{7}/_{8}$	$24^{1}/_{4}$	$26^{5}/_{8}$	29	$31^{3}/_{8}$	$33^{3}/_{4}$	$36^{1}/_{8}$

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 51)

No. Bars/Ft. of Grating Width = 5.053 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
1 x 1/4	0.211	0.105	5.42	U	2813	1250	703	450	313	230	176	139
				Du	0.021	0.047	0.083	0.130	0.187	0.255	0.333	0.421
				C	1407	938	703	563	469	402	352	313
				Dc	0.017	0.037	0.066	0.104	0.150	0.204	0.266	0.337
1 x 3/8	0.316	0.158	7.57	U	4213	1873	1053	674	468	344	263	208
				Du	0.021	0.047	0.083	0.129	0.186	0.253	0.331	0.419
				C	2107	1404	1053	843	702	602	527	468
				Dc	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
1-1/4 x 1/4	0.329	0.206	6.49	U	4387	1950	1097	702	487	358	274	217
				Du	0.017	0.037	0.066	0.103	0.149	0.202	0.264	0.335
				C	2193	1462	1097	877	731	627	548	487
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.211	0.267
1-1/4 x 3/8	0.493	0.308	9.17	U	6573	2921	1643	1052	730	537	411	325
				Du	0.017	0.037	0.066	0.104	0.149	0.203	0.265	0.336
				C	3287	2191	1643	1315	1096	939	822	730
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/2 x 1/4	0.474	0.355	7.59	U	6320	2809	1580	1011	702	516	395	312
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.280
				C	3160	2107	1580	1264	1053	903	790	702
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.224
1-1/2 x 5/16	0.592	0.444	9.17	U	7893	3508	1973	1263	877	644	493	390
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	3947	2631	1973	1579	1316	1128	987	877
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.233
1-1/2 x 3/8	0.711	0.533	10.78	U	9480	4213	2370	1517	1053	774	593	468
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	4740	3160	2370	1896	1580	1354	1185	1053
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.224
1-3/4 x 1/4	0.645	0.564	8.66	U	8600	3822	2150	1376	956	702	538	425
				Du	0.012	0.027	0.047	0.074	0.107	0.145	0.190	0.240
				C	4300	2867	2150	1720	1433	1229	1075	956
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.192
1-3/4 x 3/8	0.967	0.846	12.40	U	12893	5730	3223	2063	1433	1053	806	637
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.240
				C	6447	4298	3223	2579	2149	1842	1612	1433
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.192
2 x 1/4	0.842	0.842	9.72	U	11227	4990	2807	1796	1247	916	702	554
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	5613	3742	2807	2245	1871	1604	1403	1247
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2 x 5/16	1.053	1.053	11.89	U	14040	6240	3510	2246	1560	1146	878	693
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	7020	4680	3510	2808	2340	2006	1755	1560
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2 x 3/8	1.263	1.263	14.01	U	16840	7484	4210	2694	1871	1375	1053	832
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	8420	5613	4210	3368	2807	2406	2105	1871
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2-1/4 x 1/4	1.066	1.199	10.78	U	14213	6317	3553	2274	1579	1160	888	702
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	7107	4738	3553	2843	2369	2030	1777	1579
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149
2-1/4 x 3/8	1.599	1.799	15.63	U	21320	9476	5330	3411	2369	1740	1333	1053
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	10660	7107	5330	4264	3553	3046	2665	2369
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 50)

No. Bars/Ft. of Grating Width = 5.053 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 60	66	72	78	84	90	96
1 x 1/4	0.211	0.105	5.42	U	113	93	78	67	57	50	44
				Du	0.522	0.629	0.747	0.884	1.011	1.169	1.332
				C	281	256	234	216	201	188	176
				Dc	0.415	0.504	0.598	0.701	0.815	0.938	1.065
1 x 3/8	0.316	0.158	7.57	U	169	139	117	100	86	75	66
				Du	0.519	0.625	0.745	0.877	1.014	1.165	1.328
				C	421	383	351	324	301	281	263
				Dc	0.414	0.501	0.596	0.699	0.811	0.931	1.058
1-1/4 x 1/4	0.329	0.206	6.49	U	175	145	122	104	90	78	69
				Du	0.412	0.500	0.596	0.699	0.814	0.930	1.065
				C	439	399	366	337	313	292	274
				Dc	0.331	0.400	0.476	0.558	0.647	0.742	0.845
1-1/4 x 3/8	0.493	0.308	9.17	U	263	217	183	156	134	117	103
				Du	0.414	0.500	0.597	0.702	0.811	0.933	1.063
				C	657	598	548	506	470	438	411
				Dc	0.331	0.401	0.477	0.560	0.650	0.745	0.848
1-1/2 x 1/4	0.474	0.355	7.59	U	253	209	176	150	129	112	99
				Du	0.346	0.418	0.499	0.585	0.677	0.775	0.886
				C	632	575	527	486	451	421	395
				Dc	0.276	0.335	0.398	0.467	0.541	0.621	0.707
1-1/2 x 5/16	0.592	0.444	9.17	U	316	261	219	187	161	140	123
				Du	0.345	0.417	0.496	0.583	0.675	0.774	0.880
				C	789	718	658	607	564	526	493
				Dc	0.276	0.334	0.397	0.466	0.541	0.620	0.706
1-1/2 x 3/8	0.711	0.533	10.78	U	379	313	263	224	193	169	148
				Du	0.345	0.417	0.496	0.582	0.675	0.778	0.882
				C	948	862	790	729	677	632	593
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.707
1-3/4 x 1/4	0.645	0.564	8.66	U	344	284	239	204	176	153	134
				Du	0.296	0.358	0.426	0.501	0.581	0.666	0.755
				C	860	782	717	662	614	573	538
				Dc	0.237	0.286	0.341	0.400	0.464	0.532	0.606
1-3/4 x 3/8	0.967	0.846	12.40	U	516	426	358	305	263	229	201
				Du	0.296	0.358	0.426	0.499	0.579	0.665	0.755
				C	1289	1172	1074	992	921	860	806
				Dc	0.236	0.286	0.340	0.400	0.464	0.532	0.606
2 x 1/4	0.842	0.842	9.72	U	449	371	312	266	229	200	175
				Du	0.259	0.313	0.373	0.438	0.507	0.583	0.661
				C	1123	1021	936	864	802	748	702
				Dc	0.207	0.250	0.298	0.350	0.406	0.465	0.530
2 x 5/16	1.053	1.053	11.89	U	562	464	390	332	287	250	219
				Du	0.259	0.313	0.372	0.437	0.508	0.583	0.661
				C	1404	1276	1170	1080	1003	936	878
				Dc	0.207	0.250	0.298	0.350	0.406	0.466	0.530
2 x 3/8	1.263	1.263	14.01	U	674	557	468	399	344	299	263
				Du	0.259	0.313	0.373	0.438	0.507	0.581	0.662
				C	1684	1531	1403	1295	1203	1123	1053
				Dc	0.207	0.250	0.298	0.350	0.408	0.466	0.530
2-1/4 x 1/4	1.066	1.199	10.78	U	569	470	395	336	290	253	222
				Du	0.230	0.278	0.331	0.388	0.451	0.518	0.588
				C	1421	1292	1184	1093	1015	948	888
				Dc	0.184	0.223	0.265	0.311	0.361	0.414	0.471
2-1/4 x 3/8	1.599	1.799	15.63	U	853	705	592	505	435	379	333
				Du	0.230	0.278	0.331	0.389	0.450	0.517	0.588
				C	2132	1938	1777	1640	1523	1421	1333
				Dc	0.184	0.223	0.265	0.311	0.361	0.414	0.471

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 53)

No. Bars/Ft. of Grating Width = 5.053 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
2-1/2 x 1/4	1.316	1.645	11.89	U	17547	7799	4387	2807	1950	1432	1097	867
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.133	0.168
				C	8773	5849	4387	3509	2924	2507	2193	1950
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
2-1/2 x 5/16	1.645	2.056	14.57	U	21933	9748	5483	3509	2437	1790	1371	1037
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.175
				C	10967	7311	5483	4387	3656	3133	2742	2384
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.140
2-1/2 x 3/8	1.974	2.467	17.25	U	26320	11698	6580	4211	2924	2149	1645	1300
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	13160	8773	6580	5264	4387	3760	3290	2924
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
3 x 1/4	1.895	2.842	16.06	U	25267	11230	6317	4043	2807	2063	1579	1248
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	12633	8422	6317	5053	4211	3610	3158	2807
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 5/16	2.369	3.553	19.30	U	31587	14039	7897	5054	3510	2579	1974	1560
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	15793	10529	7897	6317	5264	4512	3948	3510
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3 x 3/8	2.842	4.263	22.53	U	37893	16841	9473	6063	4210	3093	2368	1871
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	18947	12631	9473	7579	6316	5413	4737	4210
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 1/2	3.790	5.685	28.95	U	50533	22459	12633	8085	5615	4125	3158	2495
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	25267	16844	12633	10107	8422	7219	6317	5615
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3-1/2 x 1/4	2.579	4.513	18.24	U	34387	15283	8597	5502	3821	2807	2149	1698
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	17193	11462	8597	6877	5731	4912	4298	3821
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 3/8	3.869	6.770	25.72	U	51587	22927	12897	8254	5732	4211	3224	2547
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	25793	17196	12897	10317	8598	7370	6448	5732
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 1/2	5.158	9.027	33.25	U	68773	30566	17193	11004	7641	5614	4298	3396
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	34387	22924	17193	13755	11462	9825	8597	7641
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
4 x 1/4	3.369	6.737	20.36	U	44920	19964	11230	7187	4991	3667	2808	2218
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	22460	14973	11230	8984	7487	6417	5615	4991
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 5/16	4.211	8.422	24.66	U	56147	24954	14037	8983	6239	4583	3509	2773
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	28073	18716	14037	11229	9358	8021	7018	6239
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 3/8	5.053	10.106	28.95	U	67373	29944	16843	10780	7486	5500	4211	3327
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	33687	22458	16843	13475	11229	9625	8422	7486
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 1/2	6.737	13.475	37.54	U	89827	39923	22457	14372	9981	7333	5614	4436
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	44913	29942	22457	17965	14971	12832	11228	9981
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 52)

No. Bars/Ft. of Grating Width = 5.053 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 60	66	72	78	84	90	96
2-1/2 x 1/4	1.316	1.645	11.89	U	702	580	487	415	358	312	274
				Du	0.207	0.250	0.298	0.349	0.405	0.466	0.529
				C	1755	1595	1462	1350	1253	1170	1097
				Dc	0.166	0.200	0.238	0.280	0.324	0.373	0.424
2-1/2 x 5/16	1.645	2.056	14.57	U	877	725	609	519	448	390	343
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.530
				C	2193	1994	1828	1687	1567	1462	1371
				Dc	0.166	0.200	0.238	0.280	0.325	0.372	0.424
2-1/2 x 3/8	1.974	2.467	17.25	U	1053	870	731	623	537	468	411
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.529
				C	2632	2393	2193	2025	1880	1755	1645
				Dc	0.166	0.200	0.238	0.280	0.325	0.373	0.424
3 x 1/4	1.895	2.842	16.06	U	1011	835	702	598	516	449	395
				Du	0.173	0.209	0.248	0.291	0.338	0.388	0.442
				C	2527	2297	2106	1944	1805	1684	1579
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 5/16	2.369	3.553	19.30	U	1263	1044	877	748	645	562	494
				Du	0.172	0.209	0.248	0.292	0.338	0.388	0.442
				C	3159	2872	2632	2430	2256	2106	1974
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 3/8	2.842	4.263	22.53	U	1516	1253	1053	897	773	674	592
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	3789	3445	3158	2915	2707	2526	2368
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 1/2	3.790	5.685	28.95	U	2021	1671	1404	1196	1031	898	790
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.442
				C	5053	4594	4211	3887	3610	3369	3158
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3-1/2 x 1/4	2.579	4.513	18.24	U	1375	1137	955	814	702	611	537
				Du	0.148	0.179	0.213	0.250	0.290	0.332	0.378
				C	3439	3126	2866	2645	2456	2292	2149
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 3/8	3.869	6.770	25.72	U	2063	1705	1433	1221	1053	917	806
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	5159	4690	4299	3968	3685	3439	3224
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 1/2	5.158	9.027	33.25	U	2751	2273	1910	1628	1404	1223	1075
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	6877	6252	5731	5290	4912	4585	4298
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
4 x 1/4	3.369	6.737	20.36	U	1797	1485	1248	1063	917	799	702
				Du	0.129	0.157	0.186	0.219	0.254	0.291	0.331
				C	4492	4084	3743	3455	3209	2995	2808
				Dc	0.104	0.125	0.149	0.175	0.203	0.233	0.265
4 x 5/16	4.211	8.422	24.66	U	2246	1856	1560	1329	1146	998	877
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	5615	5104	4679	4319	4041	3743	3509
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 3/8	5.053	10.106	28.95	U	2695	2227	1871	1595	1375	1198	1053
				Du	0.129	0.157	0.186	0.219	0.254	0.291	0.331
				C	6737	6125	5614	5183	4812	4492	4211
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 1/2	6.737	13.475	37.54	U	3593	2969	2495	2126	1833	1597	1404
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	8983	8166	7486	6910	6416	5988	5614
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 55)

No. Bars/Ft. of Grating Width = 5.053 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
4-1/2 x 1/4	4.263	9.593	22.53	U	56840	25262	14210	9094	6316	4640	3553	2807
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	28420	18947	14210	11368	9473	8120	7105	6316
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 3/8	6.395	14.389	32.18	U	85267	37896	21317	13643	9474	6961	5329	4211
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	42633	28422	21317	17053	14211	12181	10658	9474
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 1/2	8.527	19.186	41.84	U	113693	50530	28423	18191	12633	9281	7106	5614
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	56847	37898	28423	22739	18949	16242	14212	12633
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.074
5 x 1/4	5.264	13.159	24.66	U	70187	31194	17547	11230	7799	5730	4387	3466
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	35093	23396	17547	14037	11698	10027	8773	7799
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 5/16	6.579	16.449	30.01	U	87720	38987	21930	14035	9747	7161	5483	4332
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	43860	29240	21930	17544	14620	12531	10965	9747
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 3/8	7.895	19.738	35.42	U	105267	46785	26317	16843	11696	8593	6579	5198
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	52633	35089	26317	21053	17544	15038	13158	11696
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 1/2	10.527	26.318	46.13	U	140360	62382	35090	22458	15596	11458	8773	6931
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	70180	46787	35090	28072	23393	20051	17545	15596
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5-1/2 x 1/4	6.369	17.514	26.80	U	84920	37742	21230	13587	9436	6932	5308	4194
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	42460	28307	21230	16984	14153	12131	10615	9436
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 3/8	9.553	26.272	38.60	U	127373	56610	31843	20380	14153	10398	7961	6290
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	63687	42458	31843	25475	21229	18196	15922	14153
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 1/2	12.738	35.029	50.42	U	169840	75484	42460	27174	18871	13864	10615	8387
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	84920	56613	42460	33968	28307	24263	21230	18871
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
6 x 1/4	7.580	22.739	28.95	U	101067	44919	25267	16171	11230	8250	6317	4991
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	50533	33689	25267	20213	16844	14438	12633	11230
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 5/16	9.474	28.423	35.42	U	126320	56142	31580	20211	14036	10312	7895	6238
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	63160	42107	31580	25264	21053	18046	15790	14036
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 3/8	11.369	34.108	41.83	U	151587	67372	37897	24254	16843	12374	9474	7486
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	75793	50529	37897	30317	25264	21655	18948	16843
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 1/2	15.159	45.477	54.72	U	202120	89831	50530	32339	22458	16500	12633	9981
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	101060	67373	50530	40424	33687	28874	25265	22458
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 54)

No. Bars/Ft. of Grating Width = 5.053 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
4-1/2 x 1/4	4.263	9.593	22.53	U	2274	1879	1579	1345	1160	1010	888
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	5684	5167	4737	4372	4060	3789	3553
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 3/8	6.395	14.389	32.18	U	3411	2819	2369	2018	1740	1516	1332
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	8527	7752	7106	6559	6090	5684	5329
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 1/2	8.527	19.186	41.84	U	4548	3758	3158	2691	2320	2021	1776
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	11369	10336	9474	8746	8121	7580	7106
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
5 x 1/4	5.264	13.159	24.66	U	2807	2320	1950	1661	1432	1248	1097
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	7019	6381	5849	5399	5013	4679	4387
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 5/16	6.579	16.449	30.01	U	3509	2900	2437	2076	1790	1559	1371
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	8772	7975	7310	6748	6266	5848	5483
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 3/8	7.895	19.738	35.42	U	4211	3480	2924	2492	2148	1871	1645
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	10527	9570	8772	8097	7519	7018	6579
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 1/2	10.527	26.318	46.13	U	5614	4640	3899	3322	2864	2495	2193
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	14036	12760	11697	10797	10026	9357	8773
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5-1/2 x 1/4	6.369	17.514	26.80	U	3397	2807	2359	2010	1733	1510	1327
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	8492	7720	7077	6532	6066	5661	5308
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 3/8	9.553	26.272	38.60	U	5095	4211	3538	3015	2599	2264	1990
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	12737	11579	10614	9798	9098	8492	7961
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 1/2	12.738	35.029	50.42	U	6794	5615	4718	4020	3466	3019	2654
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	16984	15440	14153	13065	12131	11323	10615
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
6 x 1/4	7.580	22.739	28.95	U	4043	3341	2807	2392	2063	1797	1579
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	10107	9188	8422	7774	7219	6738	6317
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 5/16	9.474	28.423	35.42	U	5053	4176	3509	2990	2578	2246	1974
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	12632	11484	10527	9717	9023	8421	7895
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 3/8	11.369	34.108	41.83	U	6063	5011	4211	3588	3094	2695	2369
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	15159	13781	12632	11661	10828	10106	9474
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 1/2	15.159	45.477	54.72	U	8085	6682	5614	4784	4125	3593	3158
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	20212	18375	16843	15548	14437	13475	12633
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

Model Specification: 38-W-4 Heavy-Duty Steel Bar Gratings

September 14, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "38-W-4 Heavy-Duty Steel Bar Grating." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, heavy-duty carbon steel bar gratings.

B. Prefabricated support frames for gratings.

C. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM Grade-36 Carbon Steel.

C. ASTM A-510: Carbon Steel Wire Rods.

D. ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 5 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Heavy-Duty Carbon Steel Bar Grating type **38-W-4 with a Galvanized finish**. Heavy-duty cross bars are welded perpendicular to heavy-duty main bearing bars.

1. Main Bearing Bar Spacing: **2-3/8"** on center.
2. Main Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Main Bearing Bar Thickness: **1/4" | 5/16" | 3/8" | 1/2"** as shown on drawings.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Main Bearing Bars: **Smooth | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Load Band ends of grating with bars of the same thickness as main bearing bars. Weld banding flush with the top surface of grating. Depth of banding is to be 1/2" less than the depth of the main bearing bars (as shown in drawings). **Include welded anchor blocks 1/4" from the bottom surface with hole to accept washer and attachment bolts.**

C. **Steel Frames: Carbon Steel ASTM Grade-36 frames shall be provided as shown on contract drawings to support and attach gratings. Include anchors as shown for locking frame into concrete as shown on the plans. Galvanize frames after fabrication per ASTM A-123.**

D. **Design Criteria:**

1. **Loading:** Unless shown otherwise on the contract drawings, gratings shall be designed and manufactured to meet live load conditions of **AASHTO HS-20 with 30% impact factor**. Main bearing bar depth shall be as shown in contract drawings or as recommended by the manufacturer to meet loading requirements and clear span conditions.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

E. **Materials:** Main bearing bars and rectangular cross bars are to be type ASTM Grade-36 Carbon Steel. Round cross bars are to be per ASTM A-510. Banding is to be carbon steel per ASTM Grade-36.

F. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

G. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 D.2 above.

H. **Finish:** Gratings and frames shall be **Hot-Dip Galvanized per ASTM A-123 or Powder Coated Black [or other color] as shown on drawings.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system. **Include lifting devices and all other accessories as shown on the drawings.**

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

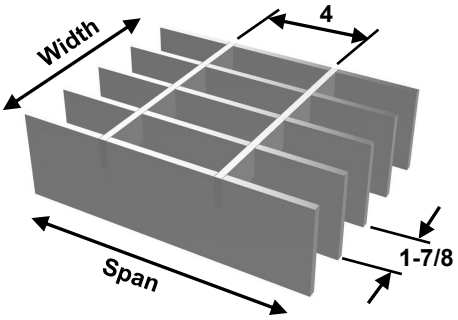
3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

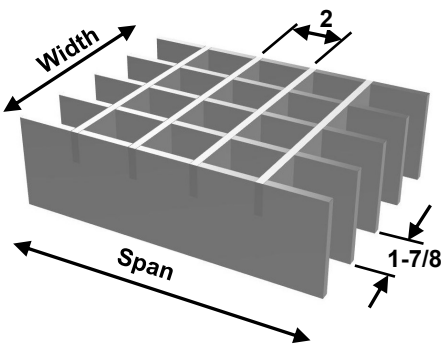
30-SPACE

HEAVY DUTY WELDED STEEL GRATING

30-W-4



30-W-2



% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	79%	76%	73%	-
	2" cc	72%	70%	67%	-
3" to 6"	4" cc	82%	78%	75%	69%
	2" cc	77%	74%	71%	65%

VEHICULAR LOAD TABLE

Bearing Bar Size (Inches)	Weight ** (Lbs./Sqft.)	Section Properties		Maximum Safe Clear Span (Inches)						
		Sx ** (In^3/Ft. Width)	Ix ** (In^4/Ft. Width)	Auto Traffic	1 Ton	3 Ton	5 Ton	H-15	H20/ HL-93	H-25
1 x 1/4	6.57	0.267	0.133	10	6	5	6	8	9	9
1 x 3/8	9.32	0.400	0.200	13	8	6	8	9	11	12
1-1/4 x 1/4	7.92	0.417	0.260	13	8	6	8	10	11	12
1-1/4 x 3/8	11.31	0.625	0.391	18	11	8	10	12	13	15
1-1/2 x 1/4	9.32	0.600	0.450	17	11	8	9	12	13	14
1-1/2 x 5/16	11.31	0.750	0.563	21	13	9	10	13	15	16
1-1/2 x 3/8	13.36	0.900	0.675	24	15	10	12	14	16	18
1-3/4 x 1/4	10.67	0.817	0.715	22	14	10	11	14	15	11
1-3/4 x 3/8	15.40	1.225	1.072	31	20	13	14	17	19	21
2 x 1/4	12.01	1.067	1.067	27	18	12	13	16	18	19
2 x 5/16	14.76	1.333	1.333	33	22	14	15	18	20	22
2 x 3/8	17.45	1.600	1.600	39	26	16	17	20	22	24
2-1/4 x 1/4	13.35	1.350	1.519	34	22	14	15	18	20	22
2-1/4 x 3/8	19.50	2.025	2.278	47*	32	20	20	23	25	27
2-1/2 x 1/4	14.76	1.667	2.083	41	27	17	17	20	22	24
2-1/2 x 5/16	18.15	2.083	2.604	50	33	20	20	24	25	27
2-1/2 x 3/8	21.55	2.500	3.125	53*	39	24	23	27	29	30
3 x 1/4	19.50	2.400	3.600	55*	38	23	23	26	28	30
3 x 5/16	23.60	3.000	4.500	60*	47	28	27	31	32	34
3 x 3/8	27.69	3.600	5.400	63*	56	33	31	36	37	39
3 x 1/2	35.82	4.800	7.200	70*	61*	42	40	45	46	47
3-1/2 x 1/4	22.25	3.267	5.717	65*	51	30	29	33	34	36
3-1/2 x 3/8	31.72	4.900	8.575	74*	65*	43	41	46	47	48
3-1/2 x 1/2	41.26	6.533	11.433	81*	72*	57	53	59	58*	58*
4 x 1/4	24.94	4.267	8.533	74*	65*	38	36	41	42	43
4 x 5/16	30.38	5.333	10.667	80*	70*	47	44	50	50	51
4 x 3/8	35.82	6.400	12.800	85*	74*	56	52	58	58	59
4 x 1/2	46.70	8.533	17.067	93*	82*	67*	64*	67*	66*	66*
4-1/2 x 1/4	27.69	5.400	12.150	83*	73*	47	44	50	51	52
4-1/2 x 3/8	39.92	8.100	18.225	95*	84*	68*	64	68*	67*	67*
4-1/2 x 1/2	52.14	10.800	24.300	96*	92*	75*	73*	75*	74*	74*
5 x 1/4	30.38	6.667	16.667	92*	81*	58	54	60	60	61
5 x 5/16	37.16	8.333	20.833	96*	88*	71	66	71*	71*	70*
5 x 3/8	44.01	10.000	25.000	96*	93*	76*	73*	76*	75*	75*
5 x 1/2	57.58	13.333	33.333	96*	96*	84*	81*	83*	82*	82*
5-1/2 x 1/4	33.10	8.067	22.183	96*	89*	69	64	72	71	71
5-1/2 x 3/8	48.04	12.100	33.275	96*	96*	84*	81*	83*	82*	82*
5-1/2 x 1/2	63.02	16.133	44.367	96*	96*	92*	89*	92*	90*	90*
6 x 1/4	35.82	9.600	28.800	96*	96*	80*	75	79*	78*	78*
6 x 5/16	44.01	12.000	36.000	96*	96*	86*	83*	86*	84*	84*
6 x 3/8	52.14	14.400	43.200	96*	96*	91*	88*	91*	90*	89*
6 x 1/2	68.46	19.200	57.600	96*	96*	96*	96*	96*	96*	96*

*Maximum spans are limited by maximum allowable stress or the lesser deflection of L/400 or 1/8" to a maximum simple span of 8'-0" (2,438mm). **Based on 6.4 bars/ft. of grating width. Bearing bars 1-7/8" center-to-center spacing. When serrated grating is specified, the depth of grating required for a specified load will be 1/4" greater than that shown in these tables. Weights shown are for 4" cross bar centers. Add 1.13 lbs/sqft. (3/8" Dia. CB) or 3.18 lbs./sqft. (1-1/4" x 1/4" CB) for 2" cross bar centers. Cross bars are determined based on project applications and bearing bar height.

HEAVY DUTY WELDED STEEL GRATING

MAXIMUM SAFE CONCENTRATED LOADS

Bearing Bar Size (Inches)	Maximum Safe Concentrated Load* (Lbs./Ft. of Grating Width) - Clear Span												
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"
1 x 1/4	1780	1187	890	712	593	509							
1 x 3/8	2667	1778	1333	1067	889	762							
1-1/4 x 1/4	2780	1853	1390	1112	927	794	695						
1-1/4 x 3/8	4167	2778	2083	1667	1389	1190	1042						
1-1/2 x 1/4	4000	2667	2000	1600	1333	1143	1000	889					
1-1/2 x 5/16	5000	3333	2500	2000	1667	1429	1250	1111					
1-1/2 x 3/8	6000	4000	3000	2400	2000	1714	1500	1333					
1-3/4 x 1/4	5447	3631	2723	2179	1816	1556	1362	1210	1089				
1-3/4 x 3/8	8167	5444	4083	3267	2722	2333	2042	1815	1633				
2 x 1/4	7113	4742	3557	2845	2371	2032	1778	1581	1423				
2 x 5/16	8887	5924	4443	3555	2962	2539	2222	1975	1777				
2 x 3/8	10667	7111	5333	4267	3556	3048	2667	2370	2133				
2-1/4 x 1/4	9000	6000	4500	3600	3000	2571	2250	2000	1800	1636			
2-1/4 x 3/8	13500	9000	6750	5400	4500	3857	3375	3000	2700	2455			
2-1/2 x 1/4	11113	7409	5557	4445	3704	3175	2778	2470	2223	2021	1852		
2-1/2 x 5/16	13887	9258	6943	5555	4629	3968	3472	3086	2777	2525	2314		
2-1/2 x 3/8	16667	11111	8333	6667	5556	4762	4167	3704	3333	3030	2778		
3 x 1/4	16000	10667	8000	6400	5333	4571	4000	3556	3200	2909	2667		
3 x 5/16	20000	13333	10000	8000	6667	5714	5000	4444	4000	3636	3333		
3 x 3/8	24000	16000	12000	9600	8000	6857	6000	5333	4800	4364	4000		
3 x 1/2	32000	21333	16000	12800	10667	9143	8000	7111	6400	5818	5333		
3-1/2 x 1/4	21780	14520	10890	8712	7260	6223	5445	4840	4356	3960	3630	3111	
3-1/2 x 3/8	32667	21778	16333	13067	10889	9333	8167	7259	6533	5939	5444	4667	
3-1/2 x 1/2	43553	29036	21777	17421	14518	12444	10888	9679	8711	7919	7259	6222	
4 x 1/4	28447	18964	14223	11379	9482	8128	7112	6321	5689	5172	4741	4064	
4 x 5/16	35553	23702	17777	14221	11851	10158	8888	7901	7111	6464	5926	5079	
4 x 3/8	42667	28444	21333	17067	14222	12190	10667	9481	8533	7758	7111	6095	
4 x 1/2	56887	37924	28443	22755	18962	16253	14222	12641	11377	10343	9481	8127	
4-1/2 x 1/4	36000	24000	18000	14400	12000	10286	9000	8000	7200	6545	6000	5143	4500
4-1/2 x 3/8	54000	36000	27000	21600	18000	15429	13500	12000	10800	9818	9000	7714	6750
4-1/2 x 1/2		48000	36000	28800	24000	20571	18000	16000	14400	13091	12000	10286	9000
5 x 1/4		29631	22223	17779	14816	12699	11112	9877	8889	8081	7408	6350	5556
5 x 5/16		37036	27777	22221	18518	15872	13888	12345	11111	10101	9259	7936	6944
5 x 3/8		44444	33333	26667	22222	19048	16667	14815	13333	12121	11111	9524	8333
5 x 1/2		59258	44443	35555	29629	25396	22222	19753	17777	16161	14814	12698	11111
5-1/2 x 1/4		35853	26890	21512	17927	15366	13445	11951	10756	9778	8963	7683	6723
5-1/2 x 3/8		53778	40333	32267	26889	23048	20167	17926	16133	14667	13444	11524	10083
5-1/2 x 1/2			53777	43021	35851	30730	26888	23901	21511	19555	17926	15365	13444
6 x 1/4			32000	25600	21333	18286	16000	14222	12800	11636	10667	9143	8000
6 x 5/16			40000	32000	26667	22857	20000	17778	16000	14545	13333	11429	10000
6 x 3/8			48000	38400	32000	27429	24000	21333	19200	17455	16000	13714	12000
6 x 1/2				51200	42667	36571	32000	28444	25600	23273	21333	18286	16000

% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	79%	76%	73%	-
	2" cc	72%	70%	67%	-
3" to 6"	4" cc	82%	78%	75%	69%
	2" cc	77%	74%	71%	65%

Loads are theoretical, and are based on a unit stress of 20,000 psi.

*Based on 6.4 bars/ft. of grating width. Bearing bars 1-7/8" center-to-center spacing. **Note:** When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Panel Width Chart (in.) - 30-W-4 & 30-W-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Bars	2 1/8	4	5 7/8	7 3/4	9 5/8	11 1/2	13 3/8	15 1/4	17 1/8	19	20 7/8	22 3/4	24 5/8	26 1/2	28 3/8
5/16" Bars	2 3/16	4 1/16	5 15/16	7 13/16	9 11/16	11 9/16	13 7/16	15 5/16	17 3/16	19 1/16	20 15/16	22 13/16	24 11/16	26 9/16	28 7/16
3/8" Bars	2 1/4	4 1/8	6	7 7/8	9 3/4	11 5/8	13 1/2	15 3/8	17 1/4	19 1/8	21	22 7/8	24 3/4	26 5/8	28 1/2
1/2" Bars	2 3/8	4 1/4	6 1/8	8	9 7/8	11 3/4	13 5/8	15 1/2	17 3/8	19 1/4	21 1/8	23	24 7/8	26 3/4	28 5/8

No. of Bars	17	18	19	20
1/4" Bars	30 1/4	32 1/8	34	35 7/8
5/16" Bars	30 5/16	32 3/16	34 1/16	35 15/16
3/8" Bars	30 3/8	32 1/4	34 1/8	36
1/2" Bars	30 1/2	32 3/8	34 1/4	36 1/8

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 62)

No. Bars/Ft. of Grating Width = 6.400 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
1 x 1/4	0.267	0.133	6.57	U	3560	1582	890	570	396	291	223	176
				Du	0.021	0.047	0.083	0.130	0.187	0.255	0.333	0.421
				C	1780	1187	890	712	593	509	445	396
				Dc	0.017	0.037	0.067	0.104	0.149	0.204	0.266	0.337
1 x 3/8	0.400	0.200	9.32	U	5333	2370	1333	853	593	435	333	263
				Du	0.021	0.047	0.083	0.129	0.186	0.253	0.331	0.418
				C	2667	1778	1333	1067	889	762	667	593
				Dc	0.017	0.037	0.066	0.104	0.149	0.203	0.265	0.335
1-1/4 x 1/4	0.417	0.260	7.92	U	5560	2471	1390	890	618	454	348	275
				Du	0.017	0.037	0.066	0.104	0.149	0.203	0.266	0.337
				C	2780	1853	1390	1112	927	794	695	618
				Dc	0.013	0.030	0.053	0.083	0.120	0.163	0.212	0.269
1-1/4 x 3/8	0.625	0.391	11.31	U	8333	3704	2083	1333	926	680	521	412
				Du	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
				C	4167	2778	2083	1667	1389	1190	1042	926
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/2 x 1/4	0.600	0.450	9.32	U	8000	3556	2000	1280	889	653	500	395
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	4000	2667	2000	1600	1333	1143	1000	889
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.224
1-1/2 x 5/16	0.750	0.563	11.31	U	10000	4444	2500	1600	1111	816	625	494
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.220	0.279
				C	5000	3333	2500	2000	1667	1429	1250	1111
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.176	0.223
1-1/2 x 3/8	0.900	0.675	13.36	U	12000	5333	3000	1920	1333	980	750	593
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.280
				C	6000	4000	3000	2400	2000	1714	1500	1333
				Dc	0.011	0.025	0.044	0.069	0,099	0.135	0.177	0.223
1-3/4 x 1/4	0.817	0.715	10.67	U	10893	4841	2723	1743	1210	889	681	538
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.239
				C	5447	3631	2723	2179	1816	1556	1362	1210
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.191
1-3/4 x 3/8	1.225	1.072	15.40	U	16333	7259	4083	2613	1815	1333	1021	807
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.240
				C	8167	5444	4083	3267	2722	2333	2042	1815
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.192
2 x 1/4	1.067	1.067	12.01	U	14227	6323	3557	2276	1581	1161	889	703
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	7113	4742	3557	2845	2371	2032	1778	1581
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2 x 5/16	1.333	1.333	14.76	U	17773	7899	4443	2844	1975	1451	1111	878
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	8887	5924	4443	3555	2962	2539	2222	1975
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2 x 3/8	1.600	1.600	17.45	U	21333	9481	5333	3413	2370	1741	1333	1053
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	10667	7111	5333	4267	3556	3048	2667	2370
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2-1/4 x 1/4	1.350	1.519	13.35	U	18000	8000	4500	2880	2000	1469	1125	889
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	9000	6000	4500	3600	3000	2571	2250	2000
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149
2-1/4 x 3/8	2.025	2.278	19.50	U	27000	12000	6750	4320	3000	2204	1688	1333
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	13500	9000	6750	5400	4500	3857	3375	3000
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 61)

No. Bars/Ft. of Grating Width = 6.400 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
1 x 1/4	0.267	0.133	6.57	U	142	118	99	84	73	63	56
				Du	0.518	0.630	0.749	0.875	1.023	1.163	1.338
				C	356	324	297	274	254	237	223
				Dc	0.415	0.503	0.599	0.702	0.813	0.933	1.066
1 x 3/8	0.400	0.200	9.32	U	213	176	148	126	109	95	83
				Du	0.516	0.625	0.744	0.873	1.015	1.166	1.319
				C	533	485	444	410	381	356	333
				Dc	0.414	0.501	0.595	0.699	0.811	0.932	1.058
1-1/4 x 1/4	0.417	0.260	7.92	U	222	184	154	132	113	99	87
				Du	0.414	0.502	0.596	0.703	0.810	0.935	1.063
				C	556	505	463	428	397	371	348
				Dc	0.332	0.401	0.478	0.561	0.650	0.747	0.851
1-1/4 x 3/8	0.625	0.391	11.31	U	333	275	231	197	170	148	130
				Du	0.413	0.499	0.594	0.698	0.810	0.929	1.057
				C	833	758	694	641	595	556	521
				Dc	0.331	0.400	0.476	0.559	0.648	0.745	0.847
1-1/2 x 1/4	0.600	0.450	9.32	U	320	264	222	189	163	142	125
				Du	0.345	0.417	0.496	0.582	0.675	0.775	0.883
				C	800	727	667	615	571	533	500
				Dc	0.276	0.334	0.397	0.466	0.540	0.620	0.706
1-1/2 x 5/16	0.750	0.563	11.31	U	400	331	278	237	204	178	156
				Du	0.345	0.417	0.497	0.583	0.675	0.776	0.881
				C	1000	909	833	769	714	667	625
				Dc	0.276	0.333	0.397	0.466	0.540	0.620	0.706
1-1/2 x 3/8	0.900	0.675	13.36	U	480	397	333	284	245	213	188
				Du	0.345	0.418	0.496	0.583	0.676	0.775	0.885
				C	1200	1091	1000	923	857	800	750
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.706
1-3/4 x 1/4	0.817	0.715	10.67	U	436	360	303	258	222	194	170
				Du	0.296	0.358	0.426	0.500	0.578	0.666	0.756
				C	1089	990	908	838	778	726	681
				Dc	0.236	0.286	0.341	0.400	0.463	0.532	0.605
1-3/4 x 3/8	1.225	1.072	15.40	U	653	540	454	387	333	290	255
				Du	0.295	0.358	0.426	0.500	0.579	0.664	0.756
				C	1633	1485	1361	1256	1167	1089	1021
				Dc	0.236	0.286	0.340	0.399	0.464	0.532	0.605
2 x 1/4	1.067	1.067	12.01	U	569	470	395	337	290	253	222
				Du	0.259	0.313	0.372	0.437	0.506	0.582	0.661
				C	1423	1293	1186	1094	1016	948	889
				Dc	0.207	0.250	0.298	0.350	0.405	0.465	0.530
2 x 5/16	1.333	1.333	14.76	U	711	588	494	421	363	316	278
				Du	0.259	0.313	0.373	0.437	0.507	0.582	0.663
				C	1777	1616	1481	1367	1270	1185	1111
				Dc	0.207	0.250	0.298	0.350	0.406	0.466	0.530
2 x 3/8	1.600	1.600	17.45	U	853	705	593	505	435	379	333
				Du	0.259	0.313	0.373	0.437	0.507	0.582	0.661
				C	2133	1939	1778	1641	1524	1422	1333
				Dc	0.207	0.250	0.298	0.350	0.406	0.465	0.530
2-1/4 x 1/4	1.350	1.519	13.35	U	720	595	500	426	367	320	281
				Du	0.230	0.278	0.331	0.388	0.450	0.517	0.588
				C	1800	1636	1500	1385	1286	1200	1125
				Dc	0.184	0.222	0.265	0.311	0.361	0.414	0.471
2-1/4 x 3/8	2.025	2.278	19.50	U	1080	893	750	639	551	480	422
				Du	0.230	0.278	0.331	0.389	0.451	0.517	0.589
				C	2700	2455	2250	2077	1929	1800	1688
				Dc	0.184	0.223	0.265	0.311	0.361	0.414	0.471

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 64)

No. Bars/Ft. of Grating Width = 6.400 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
2-1/2 x 1/4	1.667	2.083	14.76	U	22227	9879	5557	3556	2470	1814	1389	1098
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	11113	7409	5557	4445	3704	3175	2778	2470
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
2-1/2 x 5/16	2.083	2.604	18.15	U	27773	12344	6943	4444	3086	2267	1736	1372
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
				C	13887	9258	6943	5555	4629	3968	3472	3086
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.134
2-1/2 x 3/8	2.500	3.125	21.55	U	33333	14815	8333	5333	3704	2721	2083	1646
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	16667	11111	8333	6667	5556	4762	4167	3704
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
3 x 1/4	2.400	3.600	19.50	U	32000	14222	8000	5120	3556	2612	2000	1580
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	16000	10667	8000	6400	5333	4571	4000	3556
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 5/16	3.000	4.500	23.60	U	40000	17778	10000	6400	4444	3265	2500	1975
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	20000	13333	10000	8000	6667	5714	5000	4444
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3 x 3/8	3.600	5.400	27.69	U	48000	21333	12000	7680	5333	3918	3000	2370
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	24000	16000	12000	9600	8000	6857	6000	5333
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 1/2	4.800	7.200	35.82	U	64000	28444	16000	10240	7111	5224	4000	3160
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	32000	21333	16000	12800	10667	9143	8000	7111
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3-1/2 x 1/4	3.267	5.717	22.25	U	43560	19360	10890	6970	4840	3556	2723	2151
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	21780	14520	10890	8712	7260	6223	5445	4840
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 3/8	4.900	8.575	31.72	U	65333	29037	16333	10453	7259	5333	4083	3226
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	32667	21778	16333	13067	10889	9333	8167	7259
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 1/2	6.533	11.433	41.26	U	87107	38714	21777	13937	9679	7111	5444	4302
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	43553	29036	21777	17421	14518	12444	10888	9679
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
4 x 1/4	4.267	8.533	24.94	U	56893	25286	14223	9103	6321	4644	3556	2810
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	28447	18964	14223	11379	9482	8128	7112	6321
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 5/16	5.333	10.667	30.38	U	71107	31603	17777	11377	7901	5805	4444	3511
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	35553	23702	17777	14221	11851	10158	8888	7901
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 3/8	6.400	12.800	35.82	U	85333	37926	21333	13653	9481	6966	5333	4214
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	42667	28444	21333	17067	14222	12190	10667	9481
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 1/2	8.533	17.067	46.70	U	113773	50556	28443	18204	12641	9288	7111	5618
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	56887	37924	28443	22755	18962	16253	14222	12641
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DELECTION TABLE

(Chart begins on page 63)

No. Bars/Ft. of Grating Width = 6.400 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus $in.^3$/ Foot of Grating Width	Moment of Inertia $in.^4$/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
2-1/2 x 1/4	1.667	2.083	14.76	U	889	735	617	526	454	395	347
				Du	0.207	0.251	0.298	0.350	0.406	0.466	0.529
				C	2223	2021	1852	1710	1588	1482	1389
				Dc	0.166	0.200	0.238	0.280	0.325	0.373	0.424
2-1/2 x 5/16	2.083	2.604	18.15	U	1111	918	771	657	567	494	434
				Du	0.207	0.250	0.298	0.349	0.406	0.466	0.530
				C	2777	2525	2314	2136	1984	1852	1736
				Dc	0.165	0.200	0.238	0.280	0.324	0.372	0.424
2-1/2 x 3/8	2.500	3.125	21.55	U	1333	1102	926	789	680	593	521
				Du	0.207	0.250	0.298	0.350	0.405	0.466	0.530
				C	3333	3030	2778	2564	2381	2222	2083
				Dc	0.166	0.200	0.238	0.280	0.324	0.372	0.424
3 x 1/4	2.400	3.600	19.50	U	1280	1058	889	757	653	569	500
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	3200	2909	2667	2462	2286	2133	2000
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 5/16	3.000	4.500	23.60	U	1600	1322	1111	947	816	711	625
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	4000	3636	3333	3077	2857	2667	2500
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 3/8	3.600	5.400	27.69	U	1920	1587	1333	1136	980	853	750
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	4800	4364	4000	3692	3429	3200	3000
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 1/2	4.800	7.200	35.82	U	2560	2116	1778	1515	1306	1138	1000
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	6400	5818	5333	4923	4571	4267	4000
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3-1/2 x 1/4	3.267	5.717	22.25	U	1742	1440	1210	1031	889	774	681
				Du	0.148	0.179	0.213	0.250	0.290	0.332	0.379
				C	4356	3960	3630	3351	3111	2904	2723
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 3/8	4.900	8.575	31.72	U	2613	2160	1815	1546	1333	1161	1021
				Du	0.148	0.179	0.213	0.250	0.290	0.332	0.378
				C	6533	5939	5444	5026	4667	4356	4083
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 1/2	6.533	11.433	41.26	U	3484	2880	2420	2062	1778	1549	1361
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	8711	7919	7259	6701	6222	5807	5444
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
4 x 1/4	4.267	8.533	24.94	U	2276	1881	1580	1347	1161	1011	889
				Du	0.129	0.157	0.186	0.219	0.254	0.291	0.331
				C	5689	5172	4741	4376	4064	3793	3556
				Dc	0.104	0.125	0.149	0.175	0.203	0.233	0.265
4 x 5/16	5.333	10.667	30.38	U	2844	2351	1975	1683	1451	1264	1111
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	7111	6464	5926	5470	5079	4740	4444
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 3/8	6.400	12.800	35.82	U	3413	2821	2370	2020	1741	1517	1333
				Du	0.129	0.157	0.186	0.219	0.253	0.291	0.331
				C	8533	7758	7111	6564	6095	5689	5333
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 1/2	8.533	17.067	46.70	U	4551	3761	3160	2693	2322	2023	1778
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	11377	10343	9481	8752	8127	7585	7111
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 66)

No. Bars/Ft. of Grating Width = 6.400 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
4-1/2 x 1/4	5.400	12.150	27.69	U	72000	32000	18000	11520	8000	5878	4500	3556
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	36000	24000	18000	14400	12000	10286	9000	8000
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 3/8	8.100	18.225	39.92	U	108000	48000	27000	17280	12000	8816	6750	5333
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	54000	36000	27000	21600	18000	15429	13500	12000
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 1/2	10.800	24.300	52.14	U	144000	64000	36000	23040	16000	11755	9000	7111
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	72000	48000	36000	28800	24000	20571	18000	16000
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.074
5 x 1/4	6.667	16.667	30.38	U	88893	39508	22223	14223	9877	7257	5556	4390
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	44447	29631	22223	17779	14816	12699	11112	9877
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 5/16	8.333	20.833	37.16	U	111107	49381	27777	17777	12345	9070	6944	5487
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	55553	37036	27777	22221	18518	15872	13888	12345
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 3/8	10.000	25.000	44.01	U	133333	59259	33333	21333	14815	10884	8333	6584
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	66667	44444	33333	26667	22222	19048	16667	14815
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 1/2	13.333	33.333	57.58	U	177773	79010	44443	28444	19753	14512	11111	8779
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	88887	59258	44443	35555	29629	25396	22222	19753
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5-1/2 x 1/4	8.067	22.183	33.10	U	107560	47804	26890	17210	11951	8780	6723	5312
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	53780	35853	26890	21512	17927	15366	13445	11951
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 3/8	12.100	33.275	48.04	U	161333	71704	40333	25813	17926	13170	10083	7967
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	80667	53778	40333	32267	26889	23048	20167	17926
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 1/2	16.133	44.367	63.02	U	215107	95603	53777	34417	23901	17560	13444	10623
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	107553	71702	53777	43021	35851	30730	26888	23901
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
6 x 1/4	9.600	28.800	35.82	U	128000	56889	32000	20480	14222	10449	8000	6321
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	64000	42667	32000	25600	21333	18286	16000	14222
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 5/16	12.000	36.000	44.01	U	160000	71111	40000	25600	17778	13061	10000	7901
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	80000	53333	40000	32000	26667	22857	20000	17778
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 3/8	14.400	43.200	52.14	U	192000	85333	48000	30720	21333	15673	12000	9481
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	96000	64000	48000	38400	32000	27429	24000	21333
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 1/2	19.200	57.600	68.46	U	256000	113778	64000	40960	28444	20898	16000	12642
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	128000	85333	64000	51200	42667	36571	32000	28444
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 65)

No. Bars/Ft. of Grating Width = 6.400 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
4-1/2 x 1/4	5.400	12.150	27.69	U	2880	2380	2000	1704	1469	1280	1125
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	7200	6545	6000	5538	5143	4800	4500
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 3/8	8.100	18.225	39.92	U	4320	3570	3000	2556	2204	1920	1688
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	10800	9818	9000	8308	7714	7200	6750
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 1/2	10.800	24.300	52.14	U	5760	4760	4000	3408	2939	2560	2250
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	14400	13091	12000	11077	10286	9600	9000
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
5 x 1/4	6.667	16.667	30.38	U	3556	2939	2469	2104	1814	1580	1389
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	8889	8081	7408	6838	6350	5926	5556
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 5/16	8.333	20.833	37.16	U	4444	3673	3086	2630	2267	1975	1736
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	11111	10101	9259	8547	7936	7407	6944
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 3/8	10.000	25.000	44.01	U	5333	4408	3704	3156	2721	2370	2083
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	13333	12121	11111	10256	9524	8889	8333
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 1/2	13.333	33.333	57.58	U	7111	5877	4938	4208	3628	3160	2778
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	17777	16161	14814	13675	12698	11852	11111
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5-1/2 x 1/4	8.067	22.183	33.10	U	4302	3556	2988	2546	2195	1912	1681
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	10756	9778	8963	8274	7683	7171	6723
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 3/8	12.100	33.275	48.04	U	6453	5333	4481	3819	3293	2868	2521
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	16133	14667	13444	12410	11524	10756	10083
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 1/2	16.133	44.367	63.02	U	8604	7111	5975	5091	4390	3824	3361
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	21511	19555	17926	16547	15365	14340	13444
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
6 x 1/4	9.600	28.800	35.82	U	5120	4231	3556	3030	2612	2276	2000
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	12800	11636	10667	9846	9143	8533	8000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 5/16	12.000	36.000	44.01	U	6400	5289	4444	3787	3265	2844	2500
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	16000	14545	13333	12308	11429	10667	10000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 3/8	14.400	43.200	52.14	U	7680	6347	5333	4544	3918	3413	3000
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	19200	17455	16000	14769	13714	12800	12000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 1/2	19.200	57.600	68.46	U	10240	8463	7111	6059	5224	4551	4000
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	25600	23273	21333	19692	18286	17067	16000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

Model Specification: 30-W-4 Heavy-Duty Steel Bar Gratings

September 14, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "30-W-4 Heavy-Duty Steel Bar Gratings." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, heavy-duty carbon steel bar gratings.

B. Prefabricated support frames for gratings.

C. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM Grade-36 Carbon Steel.

C. ASTM A-510: Carbon Steel Wire Rods.

D. ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 5 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Heavy-Duty Carbon Steel Bar Grating type **30-W-4 with a Galvanized finish**. Heavy-duty cross bars are welded perpendicular to heavy-duty main bearing bars.

1. Main Bearing Bar Spacing: **1-7/8"** on center.
2. Main Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Main Bearing Bar Thickness: **1/4" | 5/16" | 3/8" | 1/2"** as shown on drawings.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Main Bearing Bars: **Smooth | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Load Band ends of grating with bars of the same thickness as main bearing bars. Weld banding flush with the top surface of grating. Depth of banding is to be 1/2" less than the depth of the main bearing bars (as shown in drawings). **Include welded anchor blocks 1/4" from the bottom surface with hole to accept washer and attachment bolts.**

C. **Steel Frames: Carbon Steel ASTM Grade-36 frames shall be provided as shown on contract drawings to support and attach gratings. Include anchors as shown for locking frame into concrete as shown on the plans. Galvanize frames after fabrication per ASTM A-123.**

D. **Design Criteria:**

1. **Loading:** Unless shown otherwise on the contract drawings, gratings shall be designed and manufactured to meet live load conditions of **AASHTO HS-20 with 30% impact factor**. Main bearing bar depth shall be as shown in contract drawings or as recommended by the manufacturer to meet loading requirements and clear span conditions.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

E. **Materials:** Main bearing bars and rectangular cross bars are to be type ASTM Grade-36 Carbon Steel. Round cross bars are to be per ASTM A-510. Banding is to be carbon steel per ASTM Grade-36.

F. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

G. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 D.2 above.

H. **Finish:** Gratings and frames shall be **Hot-Dip Galvanized per ASTM A-123 or Powder Coated Black [or other color] as shown on drawings.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system. **Include lifting devices and all other accessories as shown on the drawings.**

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

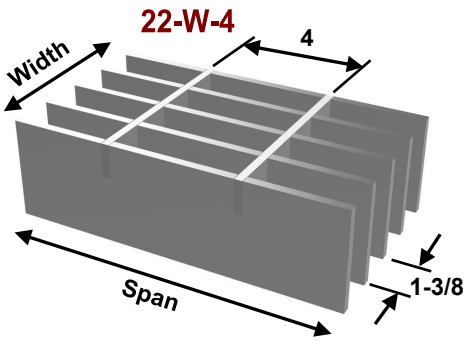
B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

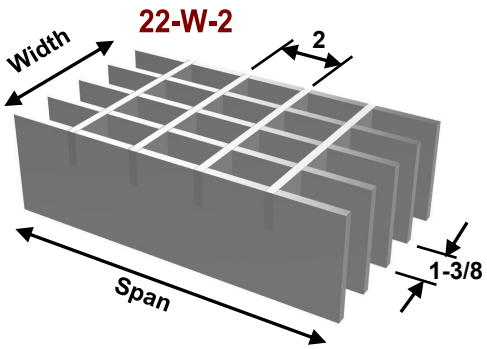
3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

22-SPACE

HEAVY DUTY WELDED STEEL GRATING





% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	75%	70%	66%	-
	2" cc	68%	64%	60%	-
3" to 6"	4" cc	77%	72%	68%	60%
	2" cc	72%	68%	64%	56%

VEHICULAR LOAD TABLE

Bearing Bar Size (Inches)	Weight ** (Lbs./Sqft.)	Section Properties		Maximum Safe Clear Span (Inches)						
		Sx ** (In^3/Ft. Width)	Ix ** (In^4/Ft. Width)	Auto Traffic	1 Ton	3 Ton	5 Ton	H-15	H20/ HL-93	H-25
1 x 1/4	8.55	0.364	0.182	11	6	6	7	9	10	11
1 x 3/8	12.30	0.545	0.273	15	9	7	9	11	12	13
1-1/4 x 1/4	10.38	0.568	0.355	16	9	7	9	11	12	14
1-1/4 x 3/8	15.01	0.852	0.533	21	13	9	11	13	15	17
1-1/2 x 1/4	12.30	0.818	0.614	21	12	9	11	13	15	17
1-1/2 x 5/16	15.01	1.023	0.767	25	15	11	12	15	17	19
1-1/2 x 3/8	17.80	1.227	0.920	29	18	12	13	16	18	20
1-3/4 x 1/4	14.13	1.114	0.974	27	16	11	13	15	18	20
1-3/4 x 3/8	20.59	1.670	1.462	36*	23	15	16	20	22	24
2 x 1/4	15.97	1.455	1.455	34	21	14	15	18	20	22
2 x 5/16	19.72	1.818	1.818	40*	25	17	17	21	23	25
2 x 3/8	23.38	2.182	2.182	44*	30	19	20	24	25	28
2-1/4 x 1/4	17.80	1.841	2.071	41	26	17	18	21	23	25
2-1/4 x 3/8	26.18	2.761	3.106	51*	38	24	24	28	30	32
2-1/2 x 1/4	19.72	2.273	2.841	50	31	20	20	24	26	28
2-1/2 x 5/16	24.34	2.841	3.551	54*	39	24	24	29	30	32
2-1/2 x 3/8	28.97	3.409	4.261	57*	46	28	28	33	34	36
3 x 1/4	25.43	3.273	4.909	60*	44	27	27	32	33	35
3 x 5/16	31.02	4.091	6.136	64*	55	33	33	38	39	41
3 x 3/8	36.60	4.909	7.363	68*	59*	40	38	44	45	47
3 x 1/2	47.69	6.545	9.818	75*	65*	52	50	55*	54*	55*
3-1/2 x 1/4	29.19	4.454	7.795	70*	60	36	35	41	42	44
3-1/2 x 3/8	42.10	6.682	11.693	80*	69*	53	50	58	58	58*
3-1/2 x 1/2	55.11	8.909	15.590	88*	76*	63*	61*	64*	63*	63*
4 x 1/4	32.85	5.818	11.636	80*	69*	46	45	51	52	53
4 x 5/16	40.27	7.273	14.545	86*	74*	57	54	62	62*	62*
4 x 3/8	47.69	8.727	17.454	91*	79*	65*	63*	66*	66*	66*
4 x 1/2	62.52	11.636	23.272	96*	87*	72*	70*	73*	72*	72*
4-1/2 x 1/4	36.60	7.363	16.568	90*	77*	58	55	63	63	64
4-1/2 x 3/8	53.27	11.045	24.851	96*	89*	73*	71*	74*	74*	74*
4-1/2 x 1/2	69.94	14.727	33.135	96*	96*	81*	79*	82*	81*	81*
5 x 1/4	40.27	9.091	22.727	96*	86*	71	67	72*	72*	71*
5 x 5/16	49.52	11.363	28.408	96*	93*	77*	75*	78*	77*	77*
5 x 3/8	58.86	13.636	34.090	96*	96*	82*	79*	82*	82*	81*
5 x 1/2	77.36	18.181	45.453	96*	96*	90*	87*	91*	90*	90*
5-1/2 x 1/4	43.98	11.000	30.249	96*	95*	78*	76*	79*	79*	78*
5-1/2 x 3/8	64.36	16.499	45.374	96*	96*	90*	87*	91*	90*	89*
5-1/2 x 1/2	84.78	21.999	60.498	96*	96*	96*	96*	96*	96*	96*
6 x 1/4	47.69	13.091	39.272	96*	96*	86*	83*	86*	86*	85*
6 x 5/16	58.86	16.363	49.089	96*	96*	92*	90*	93*	92*	92*
6 x 3/8	69.94	19.636	58.907	96*	96*	96*	95*	96*	96*	96*
6 x 1/2	92.20	26.181	78.543	96*	96*	96*	96*	96*	96*	96*

*Maximum spans are limited by maximum allowable stress or the lesser deflection of L/400 or 1/8" to a maximum simple span of 8'-0" (2,438mm). **Based on 8.727 bars/ft. of grating width. Bearing bars 1-3/8" center-to-center spacing. When serrated grating is specified, the depth of grating required for a specified load will be 1/4" greater than that shown in these tables. Weights shown are for 4" cross bar centers. Add 1.13 lbs/sqft. (3/8" Dia. CB) or 3.18 lbs./sqft. (1-1/4" x 1/4" CB) for 2" cross bar centers. Cross bars are determined based on project applications and bearing bar height.

22-SPACE

HEAVY DUTY WELDED STEEL GRATING

MAXIMUM SAFE CONCENTRATED LOADS

Bearing Bar Size (Inches)	Maximum Safe Concentrated Load* (Lbs./Ft. of Grating Width) - Clear Span												
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"
1 x 1/4	2427	1618	1213	971	809	693							
1 x 3/8	3633	2422	1817	1453	1211	1038							
1-1/4 x 1/4	3787	2524	1893	1515	1262	1082	947						
1-1/4 x 3/8	5680	3787	2840	2272	1893	1623	1420						
1-1/2 x 1/4	5453	3636	2727	2181	1818	1558	1363	1212					
1-1/2 x 5/16	6820	4547	3410	2728	2273	1949	1705	1516					
1-1/2 x 3/8	8180	5453	4090	3272	2727	2337	2045	1818					
1-3/4 x 1/4	7427	4951	3713	2971	2476	2122	1857	1650	1485				
1-3/4 x 3/8	11133	7422	5567	4453	3711	3181	2783	2474	2227				
2 x 1/4	9700	6467	4850	3880	3233	2771	2425	2156	1940				
2 x 5/16	12120	8080	6060	4848	4040	3463	3030	2693	2424				
2 x 3/8	14547	9698	7273	5819	4849	4156	3637	3233	2909				
2-1/4 x 1/4	12273	8182	6137	4909	4091	3507	3068	2727	2455	2232			
2-1/4 x 3/8	18407	12271	9203	7363	6136	5259	4602	4090	3681	3347			
2-1/2 x 1/4	15153	10102	7577	6061	5051	4330	3788	3367	3031	2755	2526		
2-1/2 x 5/16	18940	12627	9470	7576	6313	5411	4735	4209	3788	3444	3157		
2-1/2 x 3/8	22727	15151	11363	9091	7576	6493	5682	5050	4545	4132	3788		
3 x 1/4	21820	14547	10910	8728	7273	6234	5455	4849	4364	3967	3637		
3 x 5/16	27273	18182	13637	10909	9091	7792	6818	6061	5455	4959	4546		
3 x 3/8	32727	21818	16363	13091	10909	9350	8182	7273	6545	5950	5454		
3 x 1/2	43633	29089	21817	17453	14544	12467	10908	9696	8727	7933	7272		
3-1/2 x 1/4	29693	19796	14847	11877	9898	8484	7423	6599	5939	5399	4949	4242	
3-1/2 x 3/8	44547	29698	22273	17819	14849	12728	11137	9899	8909	8099	7424	6364	
3-1/2 x 1/2	59393	39596	29697	23757	19798	16970	14848	13199	11879	10799	9899	8485	
4 x 1/4	38787	25858	19393	15515	12929	11082	9697	8619	7757	7052	6464	5541	
4 x 5/16	48487	32324	24243	19395	16162	13853	12122	10775	9697	8816	8081	6927	
4 x 3/8	58180	38787	29090	23272	19393	16623	14545	12929	11636	10578	9697	8311	
4 x 1/2		51716	38787	31029	25858	22164	19393	17239	15515	14104	12929	11082	
4-1/2 x 1/4		32724	24543	19635	16362	14025	12272	10908	9817	8925	8181	7012	6136
4-1/2 x 3/8		49089	36817	29453	24544	21038	18404	16363	14727	13388	12272	10519	9204
4-1/2 x 1/2			49090	39272	32727	28051	24545	21818	19636	17851	16363	14026	12273
5 x 1/4			30303	24243	20202	17316	15152	13468	12121	11019	10101	8658	7576
5 x 5/16			37877	30301	25251	21644	18938	16834	15151	13733	12626	10822	9469
5 x 3/8			45453	36363	30302	25973	22727	20201	18181	16528	15151	12987	11363
5 x 1/2				48483	40402	34630	30302	26935	24241	22038	20201	17315	15151
5-1/2 x 1/4				29333	24444	20952	18333	16296	14667	13333	12222	10476	9167
5-1/2 x 3/8				43997	36664	31427	27498	24443	21999	19999	18332	15713	13749
5-1/2 x 1/2				58664	48887	41903	36665	32591	29332	26665	24443	20951	18333
6 x 1/4				34909	29091	24935	21818	19394	17455	15868	14546	12468	10909
6 x 5/16				43635	36362	31168	27272	24241	21817	19834	18181	15584	13636
6 x 3/8				52363	43636	37402	32727	29090	26181	23801	21818	18701	16363
6 x 1/2					58180	49869	43635	38787	34908	31735	29090	24934	21818

% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	75%	70%	66%	-
	2" cc	68%	64%	60%	-
3" to 6"	4" cc	77%	72%	68%	60%
	2" cc	72%	68%	64%	56%

Loads are theoretical, and are based on a unit stress of 20,000 psi.

*Based on 8.727 bars/ft. of grating width. Bearing bars 1-3/8" center-to-center spacing. **Note:** When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Panel Width Chart (in.) - 22-W-4 & 22-W-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Bars	1 5/8	3	4 3/8	5 3/4	7 1/8	8 1/2	9 7/8	11 1/4	12 5/8	14	15 3/8	16 3/4	18 1/8	19 1/2	20 7/8
5/16" Bars	1 11/16	3 1/16	4 7/16	5 13/16	7 3/16	8 9/16	9 15/16	11 5/16	12 11/16	14 1/16	15 7/16	16 13/16	18 3/16	19 9/16	20 15/16
3/8" Bars	1 3/4	3 1/8	4 1/2	5 7/8	7 1/4	8 5/8	10	11 3/8	12 3/4	14 1/8	15 1/2	16 7/8	18 1/4	19 5/8	21
1/2" Bars	1 7/8	3 1/4	4 5/8	6	7 3/8	8 3/4	10 1/8	11 1/2	12 7/8	14 1/4	15 5/8	17	18 3/8	19 3/4	21 1/8

No. of Bars	17	18	19	20	21	22	23	24	25	26	27				
1/4" Bars	22 1/4	23 5/8	25	26 3/8	27 3/4	29 1/8	30 1/2	31 7/8	33 1/4	34 5/8	36				
5/16" Bars	22 5/16	23 11/16	25 1/16	26 7/16	27 13/16	29 3/16	30 9/16	31 15/16	33 5/16	34 11/16	36 1/16				
3/8" Bars	22 3/8	23 3/4	25 1/8	26 1/2	27 7/8	29 1/4	30 5/8	32	33 3/8	34 3/4	36 1/8				
1/2" Bars	22 1/2	23 7/8	25 1/4	26 5/8	28	29 3/8	30 3/4	32 1/8	33 1/2	34 7/8	36 1/4				

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 73)

No. Bars/Ft. of Grating Width = 8.727 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus $in.^3$/ Foot of Grating Width	Moment of Inertia $in.^4$/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
1 x 1/4	0.364	0.182	8.55	U	4853	2157	1213	777	539	396	303	240
				Du	0.021	0.047	0.083	0.129	0.186	0.253	0.331	0.420
				C	2427	1618	1213	971	809	693	607	539
				Dc	0.017	0.037	0.066	0.104	0.149	0.203	0.265	0.335
1 x 3/8	0.545	0.273	12.30	U	7267	3230	1817	1163	807	593	454	359
				Du	0.021	0.047	0.083	0.129	0.186	0.253	0.331	0.418
				C	3633	2422	1817	1453	1211	1038	908	807
				Dc	0.017	0.037	0.066	0.103	0.149	0.202	0.264	0.334
1-1/4 x 1/4	0.568	0.355	10.38	U	7573	3366	1893	1212	841	618	473	374
				Du	0.017	0.037	0.066	0.104	0.149	0.203	0.265	0.335
				C	3787	2524	1893	1515	1262	1082	947	841
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/4 x 3/8	0.852	0.533	15.01	U	11360	5049	2840	1818	1262	927	710	561
				Du	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
				C	5680	3787	2840	2272	1893	1623	1420	1262
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/2 x 1/4	0.818	0.614	12.30	U	10907	4847	2727	1745	1212	890	682	539
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	5453	3636	2727	2181	1818	1558	1363	1212
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.176	0.223
1-1/2 x 5/16	1.023	0.767	15.01	U	13640	6062	3410	2182	1516	1113	853	674
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.280
				C	6820	4547	3410	2728	2273	1949	1705	1516
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.224
1-1/2 x 3/8	1.227	0.920	17.80	U	16360	7371	4090	2618	1818	1336	1023	808
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	8180	5453	4090	3272	2727	2337	2045	1818
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.224
1-3/4 x 1/4	1.114	0.974	14.13	U	14853	6601	3713	2377	1650	1213	928	733
				Du	0.012	0.027	0.047	0.074	0.107	0.145	0.189	0.239
				C	7427	4951	3713	2971	2476	2122	1857	1650
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.152	0.192
1-3/4 x 3/8	1.670	1.462	20.59	U	22267	9896	5567	3563	2474	1818	1392	1100
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.239
				C	11133	7422	5567	4453	3711	3181	2783	2474
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.191
2 x 1/4	1.455	1.455	15.97	U	19400	8622	4850	3104	2156	1584	1213	958
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	9700	6467	4850	3880	3233	2771	2425	2156
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2 x 5/16	1.818	1.818	19.72	U	24240	10773	6060	3878	2693	1979	1515	1197
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	12120	8080	6060	4848	4040	3463	3030	2693
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2 x 3/8	2.182	2.182	23.38	U	29093	12930	7273	4655	3233	2375	1818	1437
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	14547	9698	7273	5819	4849	4156	3637	3233
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2-1/4 x 1/4	1.841	2.071	17.80	U	24547	10910	6137	3927	2727	2004	1534	1212
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	12273	8182	6137	4909	4091	3507	3068	2727
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149
2-1/4 x 3/8	2.761	3.106	26.18	U	36813	16361	9203	5890	4090	3005	2301	1818
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	18407	12271	9203	7363	6136	5259	4602	4090
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 72)

No. Bars/Ft. of Grating Width = 8.727 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
1 x 1/4	0.364	0.182	8.55	U	194	160	135	115	99	86	76
				Du	0.517	0.624	0.746	0.875	1.013	1.160	1.327
				C	485	441	404	373	347	324	303
				Dc	0.414	0.500	0.595	0.699	0.812	0.932	1.058
1 x 3/8	0.545	0.273	12.30	U	291	240	202	172	148	129	114
				Du	0.517	0.624	0.744	0.873	1.010	1.160	1.327
				C	727	661	606	559	519	484	454
				Dc	0.413	0.500	0.595	0.698	0.810	0.929	1.057
1-1/4 x 1/4	0.568	0.355	10.38	U	303	250	210	179	155	135	118
				Du	0.414	0.500	0.595	0.698	0.813	0.934	1.056
				C	757	688	631	583	541	505	473
				Dc	0.331	0.400	0.477	0.560	0.649	0.745	0.847
1-1/4 x 3/8	0.852	0.533	15.01	U	454	376	316	269	232	202	178
				Du	0.413	0.501	0.596	0.699	0.811	0.930	1.061
				C	1136	1033	947	874	811	757	710
				Dc	0.331	0.400	0.476	0.559	0.648	0.744	0.847
1-1/2 x 1/4	0.818	0.614	12.30	U	436	361	303	258	223	194	170
				Du	0.344	0.417	0.496	0.582	0.677	0.776	0.880
				C	1091	992	909	839	779	727	682
				Dc	0.276	0.334	0.397	0.466	0.540	0.620	0.706
1-1/2 x 5/16	1.023	0.767	15.01	U	546	451	379	323	278	242	213
				Du	0.345	0.417	0.497	0.583	0.675	0.775	0.883
				C	1364	1240	1137	1049	974	909	853
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.707
1-1/2 x 3/8	1.227	0.920	17.80	U	654	541	454	387	334	291	256
				Du	0.345	0.418	0.496	0.583	0.676	0.777	0.884
				C	1636	1487	1363	1258	1169	1091	1023
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.707
1-3/4 x 1/4	1.114	0.974	14.13	U	594	491	413	352	303	264	232
				Du	0.296	0.358	0.426	0.501	0.580	0.665	0.757
				C	1485	1350	1238	1143	1061	990	928
				Dc	0.237	0.286	0.341	0.400	0.464	0.532	0.606
1-3/4 x 3/8	1.670	1.462	20.59	U	891	736	619	527	454	396	348
				Du	0.296	0.357	0.426	0.499	0.579	0.665	0.756
				C	2227	2024	1856	1713	1590	1484	1392
				Dc	0.236	0.286	0.340	0.399	0.463	0.532	0.605
2 x 1/4	1.455	1.455	15.97	U	776	641	539	459	396	345	303
				Du	0.259	0.313	0.373	0.437	0.507	0.582	0.662
				C	1940	1764	1617	1492	1386	1293	1213
				Dc	0.207	0.250	0.298	0.350	0.406	0.465	0.530
2 x 5/16	1.818	1.818	19.72	U	970	801	673	574	495	431	379
				Du	0.259	0.313	0.372	0.437	0.507	0.582	0.663
				C	2424	2204	2020	1865	1731	1616	1515
				Dc	0.207	0.250	0.298	0.350	0.405	0.466	0.530
2 x 3/8	2.182	2.182	23.38	U	1164	962	808	689	594	517	455
				Du	0.259	0.313	0.372	0.437	0.507	0.582	0.663
				C	2909	2645	2424	2238	2078	1940	1818
				Dc	0.207	0.250	0.298	0.350	0.406	0.466	0.530
2-1/4 x 1/4	1.841	2.071	17.80	U	982	811	682	581	501	436	384
				Du	0.230	0.278	0.331	0.389	0.451	0.517	0.589
				C	2455	2232	2046	1888	1753	1636	1534
				Dc	0.184	0.223	0.265	0.311	0.360	0.414	0.471
2-1/4 x 3/8	2.761	3.106	26.18	U	1473	1217	1023	871	751	654	575
				Du	0.230	0.278	0.331	0.388	0.450	0.517	0.588
				C	3681	3347	3068	2832	2630	2454	2301
				Dc	0.184	0.223	0.265	0.311	0.361	0.414	0.471

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 75)

No. Bars/Ft. of Grating Width = 8.727 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches							
					12	18	24	30	36	42	48	54
2-1/2 x 1/4	2.273	2.841	19.72	U	30307	13470	7577	4849	3367	2474	1894	1497
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	15153	10102	7577	6061	5051	4330	3788	3367
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
2-1/2 x 5/16	2.841	3.551	24.34	U	37880	16836	9470	6061	4209	3092	2368	1871
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
				C	18940	12627	9470	7576	6313	5411	4735	4209
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.134
2-1/2 x 3/8	3.409	4.261	28.97	U	45453	20201	11363	7273	5050	3710	2841	2245
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	22727	15151	11363	9091	7576	6493	5682	5050
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
3 x 1/4	3.273	4.909	25.43	U	43640	19396	10910	6982	4849	3562	2728	2155
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	21820	14547	10910	8728	7273	6234	5455	4849
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 5/16	4.091	6.136	31.02	U	54547	24243	13637	8727	6061	4453	3409	2694
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	27273	18182	13637	10909	9091	7792	6818	6061
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3 x 3/8	4.909	7.363	36.60	U	65453	29090	16363	10473	7273	5343	4091	3232
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	32727	21818	16363	13091	10909	9350	8182	7273
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 1/2	6.545	9.818	47.69	U	87267	38785	21817	13963	9696	7124	5454	4309
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	43633	29089	21817	17453	14544	12467	10908	9696
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3-1/2 x 1/4	4.454	7.795	29.19	U	59387	26394	14847	9502	6599	4848	3712	2933
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	29693	19796	14847	11877	9898	8484	7423	6599
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 3/8	6.682	11.693	42.10	U	89093	39597	22273	14255	9899	7273	5568	4400
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	44547	29698	22273	17819	14849	12728	11137	9899
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 1/2	8.909	15.590	55.11	U	118787	52794	29697	19006	13199	9697	7424	5866
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	59393	39596	29697	23757	19798	16970	14848	13199
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
4 x 1/4	5.818	11.636	32.85	U	77573	34477	19393	12412	8619	6333	4848	3831
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	38787	25858	19393	15515	12929	11082	9697	8619
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 5/16	7.273	14.545	40.27	U	96973	43099	24243	15516	10775	7916	6061	4789
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	48487	32324	24243	19395	16162	13853	12122	10775
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 3/8	8.727	17.454	47.69	U	116360	51716	29090	18618	12929	9499	7272	5746
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	58180	38787	29090	23272	19393	16623	14545	12929
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 1/2	11.636	23.272	62.52	U	155147	68954	38787	24823	17239	12665	9697	7662
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	77573	51716	38787	31029	25858	22164	19393	17239
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 74)

No. Bars/Ft. of Grating Width = 8.727 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
2-1/2 x 1/4	2.273	2.841	19.72	U	1212	1002	842	717	619	539	474
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.530
				C	3031	2755	2526	2331	2165	2020	1894
				Dc	0.166	0.200	0.238	0.280	0.325	0.372	0.424
2-1/2 x 5/16	2.841	3.551	24.34	U	1515	1252	1052	897	773	673	592
				Du	0.207	0.250	0.298	0.350	0.406	0.465	0.530
				C	3788	3444	3157	2914	2706	2525	2368
				Dc	0.166	0.200	0.238	0.280	0.324	0.372	0.424
2-1/2 x 3/8	3.409	4.261	28.97	U	1818	1503	1263	1076	928	808	710
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.530
				C	4545	4132	3788	3496	3247	3030	2841
				Dc	0.166	0.200	0.238	0.280	0.325	0.372	0.424
3 x 1/4	3.273	4.909	25.43	U	1746	1443	1212	1033	891	776	682
				Du	0.173	0.209	0.248	0.291	0.338	0.388	0.442
				C	4364	3967	3637	3357	3117	2909	2728
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 5/16	4.091	6.136	31.02	U	2182	1803	1515	1291	1113	970	852
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	5455	4959	4546	4196	3896	3636	3409
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 3/8	4.909	7.363	36.60	U	2618	2164	1818	1549	1336	1164	1023
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.442
				C	6545	5950	5454	5035	4675	4364	4091
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 1/2	6.545	9.818	47.69	U	3491	2885	2424	2065	1781	1551	1364
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.442
				C	8727	7933	7272	6713	6233	5818	5454
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3-1/2 x 1/4	4.454	7.795	29.19	U	2375	1963	1650	1406	1212	1056	928
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	5939	5399	4949	4568	4242	3959	3712
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 3/8	6.682	11.693	42.10	U	3564	2945	2475	2109	1818	1584	1392
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	8909	8099	7424	6853	6364	5940	5568
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 1/2	8.909	15.590	55.11	U	4751	3927	3300	2812	2424	2112	1856
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	11879	10799	9899	9137	8485	7919	7424
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
4 x 1/4	5.818	11.636	32.85	U	3103	2564	2155	1836	1583	1379	1212
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	7757	7052	6464	5967	5541	5172	4848
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 5/16	7.273	14.545	40.27	U	3879	3206	2694	2295	1979	1724	1515
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	9697	8816	8081	7459	6927	6465	6061
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 3/8	8.727	17.454	47.69	U	4654	3847	3232	2754	2375	2069	1818
				Du	0.129	0.157	0.186	0.219	0.254	0.291	0.331
				C	11636	10578	9697	8951	8311	7757	7273
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 1/2	11.636	23.272	62.52	U	6206	5129	4310	3672	3166	2758	2424
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	15515	14104	12929	11934	11082	10343	9697
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 77)

No. Bars/Ft. of Grating Width = 8.727 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
4-1/2 x 1/4	7.363	16.568	36.60	U	98173	43633	24543	15708	10908	8014	6136	4848
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	49087	32724	24543	19635	16362	14025	12272	10908
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 3/8	11.045	24.851	53.27	U	147267	65452	36817	23563	16363	12022	9204	7272
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	73633	49089	36817	29453	24544	21038	18408	16363
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 1/2	14.727	33.135	69.94	U	196360	87271	49090	31418	21818	16029	12273	9697
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	98180	65453	49090	39272	32727	28051	24545	21818
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.074
5 x 1/4	9.091	22.727	40.27	U	121213	53873	30303	19394	13468	9895	7576	5986
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	60607	40404	30303	24243	20202	17316	15152	13468
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 5/16	11.363	28.408	49.52	U	151507	67336	37877	24241	16834	12368	9469	7482
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	75753	50502	37877	30301	25251	21644	18938	16834
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 3/8	13.636	34.090	58.86	U	181813	80806	45453	29090	20201	14842	11363	8978
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	90907	60604	45453	36363	30302	25973	22727	20201
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 1/2	18.181	45.453	77.36	U	242413	107739	60603	38786	26935	19789	15151	11971
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	121207	80804	60603	48483	40402	34630	30302	26935
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5-1/2 x 1/4	11.000	30.249	43.98	U	146667	65185	36667	23467	16296	11973	9167	7243
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	73333	48889	36667	29333	24444	20952	18333	16296
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 3/8	16.499	45.374	64.36	U	219987	97772	54997	35198	24443	17958	13749	10864
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	109993	73329	54997	43997	36664	31427	27498	24443
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 1/2	21.999	60.498	84.78	U	293320	130364	73330	46931	32591	23944	18333	14485
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	146660	97773	73330	58664	48887	41903	36665	32591
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
6 x 1/4	13.091	39.272	47.69	U	174547	77576	43637	27927	19394	14249	10909	8620
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	87273	58182	43637	34909	29091	24935	21818	19394
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 5/16	16.363	49.089	58.86	U	218173	96966	54543	34908	24241	17810	13636	10774
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	109087	72724	54543	43635	36362	31168	27272	24241
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 3/8	19.636	58.907	69.94	U	261813	116361	65453	41890	29090	21373	16363	12929
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	130907	87271	65453	52363	43636	37402	32727	29090
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 1/2	26.181	78.543	92.20	U	349080	155147	87270	55853	38787	28496	21818	17239
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	174540	116360	87270	69816	58180	49869	43635	38787
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 76)

No. Bars/Ft. of Grating Width = 8.727 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 60	66	72	78	84	90	96
4-1/2 x 1/4	7.363	16.568	36.60	U	3927	3245	2727	2324	2004	1745	1534
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	9817	8925	8181	7552	7012	6545	6136
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 3/8	11.045	24.851	53.27	U	5891	4868	4091	3486	3005	2618	2301
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	14727	13388	12272	11328	10519	9818	9204
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 1/2	14.727	33.135	69.94	U	7854	6491	5454	4648	4007	3491	3068
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	19636	17851	16363	15105	14026	13091	12273
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
5 x 1/4	9.091	22.727	40.27	U	4849	4007	3367	2869	2474	2155	1894
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	12121	11019	10101	9324	8658	8081	7576
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 5/16	11.363	28.408	49.52	U	6060	5008	4209	3585	3092	2693	2367
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	15151	13773	12626	11654	10822	10100	9469
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 3/8	13.636	34.090	58.86	U	7273	6010	5050	4303	3710	3232	2841
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	18181	16528	15151	13986	12987	12121	11363
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 1/2	18.181	45.453	77.36	U	9697	8014	6734	5738	4947	4310	3788
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	24241	22038	20201	18647	17315	16161	15151
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5-1/2 x 1/4	11.000	30.249	43.98	U	5867	4848	4074	3471	2993	2607	2292
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	14667	13333	12222	11282	10476	9778	9167
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 3/8	16.499	45.374	64.36	U	8799	7272	6111	5207	4490	3911	3437
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	21999	19999	18332	16922	15713	14666	13749
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 1/2	21.999	60.498	84.78	U	11733	9697	8148	6942	5986	5215	4583
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	29332	26665	24443	22563	20951	19555	18333
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
6 x 1/4	13.091	39.272	47.69	U	6982	5770	4849	4131	3562	3103	2727
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	17455	15868	14546	13427	12468	11636	10909
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 5/16	16.363	49.089	58.86	U	8727	7212	6060	5164	4453	3879	3409
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	21817	19834	18181	16783	15584	14545	13636
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 3/8	19.636	58.907	69.94	U	10473	8655	7273	6197	5343	4654	4091
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	26181	23801	21818	20139	18701	17454	16363
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 1/2	26.181	78.543	92.20	U	13963	11540	9697	8262	7124	6206	5454
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	34908	31735	29090	26852	24934	23272	21818
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

Model Specification: 22-W-4 Heavy-Duty Steel Bar Gratings

September 14, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "22-W-4 Heavy-Duty Steel Bar Gratings." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, heavy-duty carbon steel bar gratings.

B. Prefabricated support frames for gratings.

C. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM Grade-36 Carbon Steel.

C. ASTM A-510: Carbon Steel Wire Rods.

D. ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 5 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Heavy-Duty Carbon Steel Bar Grating type **22-W-4 with a Galvanized finish**. Heavy-duty cross bars are welded perpendicular to heavy-duty main bearing bars.

1. Main Bearing Bar Spacing: **1-3/8"** on center.
2. Main Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Main Bearing Bar Thickness: **1/4" | 5/16" | 3/8" | 1/2"** as shown on drawings.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Main Bearing Bars: **Smooth | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Load Band ends of grating with bars of the same thickness as main bearing bars. Weld banding flush with the top surface of grating. Depth of banding is to be 1/2" less than the depth of the main bearing bars (as shown in drawings). **Include welded anchor blocks 1/4" from the bottom surface with hole to accept washer and attachment bolts.**

C. **Steel Frames: Carbon Steel ASTM Grade-36 frames shall be provided as shown on contract drawings to support and attach gratings. Include anchors as shown for locking frame into concrete as shown on the plans. Galvanize frames after fabrication per ASTM A-123.**

D. **Design Criteria:**

1. **Loading:** Unless shown otherwise on the contract drawings, gratings shall be designed and manufactured to meet live load conditions of **AASHTO HS-20 with 30% impact factor**. Main bearing bar depth shall be as shown in contract drawings or as recommended by the manufacturer to meet loading requirements and clear span conditions.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

E. **Materials:** Main bearing bars and rectangular cross bars are to be type ASTM Grade-36 Carbon Steel. Round cross bars are to be per ASTM A-510. Banding is to be carbon steel per ASTM Grade-36.

F. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

G. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 D.2 above.

H. **Finish:** Gratings and frames shall be **Hot-Dip Galvanized per ASTM A-123 or Powder Coated Black [or other color] as shown on drawings.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system. **Include lifting devices and all other accessories as shown on the drawings.**

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

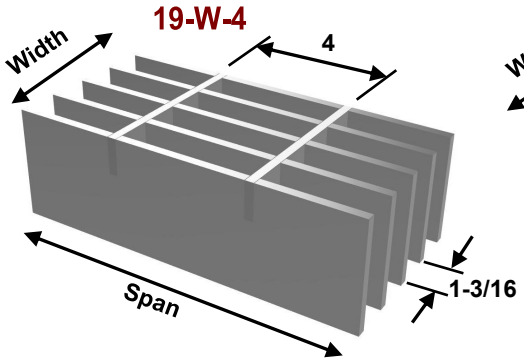
B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

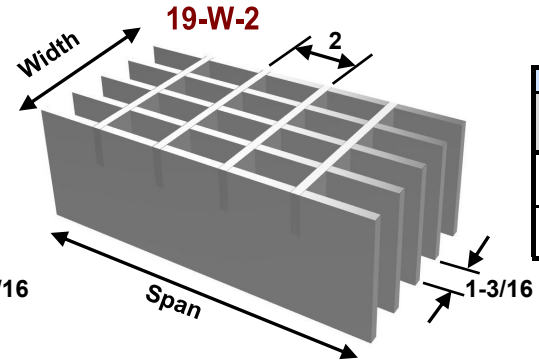
3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

19-SPACE

HEAVY DUTY WELDED STEEL GRATING





% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	72%	67%	62%	-
	2" cc	65%	61%	56%	-
3" to 6"	4" cc	74%	69%	64%	54%
	2" cc	70%	65%	60%	51%

VEHICULAR LOAD TABLE

Bearing Bar Size (Inches)	Weight ** (Lbs./Sqft.)	Section Properties		Maximum Safe Clear Span (Inches)						
		Sx ** (In^3/Ft. Width)	Ix ** (In^4/Ft. Width)	Auto Traffic	1 Ton	3 Ton	5 Ton	H-15	H20/ HL-93	H-25
1 x 1/4	9.72	0.421	0.211	12	7	6	7	9	10	12
1 x 3/8	14.06	0.632	0.316	16	9	8	9	11	13	14
1-1/4 x 1/4	11.84	0.658	0.411	17	10	8	9	12	13	15
1-1/4 x 3/8	17.20	0.987	0.617	23	14	10	12	14	16	18
1-1/2 x 1/4	14.06	0.947	0.711	23	13	10	11	14	16	18
1-1/2 x 5/16	17.20	1.184	0.888	27	16	11	13	16	18	20
1-1/2 x 3/8	20.43	1.421	1.066	30*	19	13	14	18	20	22
1-3/4 x 1/4	16.19	1.289	1.128	29	17	12	14	17	19	21
1-3/4 x 3/8	23.66	1.934	1.692	38*	25	17	18	21	23	26
2 x 1/4	18.31	1.684	1.684	37	22	15	16	20	22	24
2 x 5/16	22.65	2.105	2.105	42*	28	18	19	23	25	27
2 x 3/8	26.90	2.526	2.526	46*	33	21	22	26	28	30
2-1/4 x 1/4	20.43	2.132	2.398	45*	28	18	19	23	25	27
2-1/4 x 3/8	30.13	3.197	3.597	53*	41	26	26	31	32	34
2-1/2 x 1/4	22.65	2.632	3.289	52*	34	22	22	27	28	30
2-1/2 x 5/16	28.01	3.289	4.112	56*	42	27	27	31	33	35
2-1/2 x 3/8	33.36	3.947	4.934	59*	50	31	31	36	38	40
3 x 1/4	28.95	3.789	5.684	62*	49	30	30	35	37	39
3 x 5/16	35.41	4.737	7.105	67*	57*	37	36	42	43	45
3 x 3/8	41.88	5.684	8.526	71*	61*	44	43	49	50	52
3 x 1/2	54.72	7.579	11.368	78*	67*	56*	55	57*	57*	57*
3-1/2 x 1/4	33.29	5.158	9.026	72*	62*	40	39	45	46	48
3-1/2 x 3/8	48.25	7.737	13.539	83*	71*	58	56	60*	60*	60*
3-1/2 x 1/2	63.30	10.316	18.052	91*	78*	65*	64*	66*	66*	66*
4 x 1/4	37.54	6.737	13.473	83*	71*	51	50	57	58	59
4 x 5/16	46.13	8.421	16.842	89*	76*	63	61	65*	65*	65*
4 x 3/8	54.72	10.105	20.210	95*	81*	68*	66*	69*	68*	68*
4 x 1/2	71.89	13.473	26.947	96*	89*	74*	73*	76*	75*	75*
4-1/2 x 1/4	41.88	8.526	19.184	96*	80*	64	61	68*	67*	67*
4-1/2 x 3/8	61.18	12.789	28.776	96*	91*	76*	74*	77*	77*	77*
4-1/2 x 1/2	80.48	17.052	38.367	96*	96*	84*	82*	85*	85*	84*
5 x 1/4	46.13	10.526	26.315	96*	89*	74*	72*	75*	75*	75*
5 x 5/16	56.84	13.158	32.894	96*	96*	80*	78*	81*	80*	80*
5 x 3/8	67.65	15.789	39.473	96*	96*	85*	83*	86*	85*	85*
5 x 1/2	89.07	21.052	52.630	96*	96*	93*	91*	95*	94*	94*
5-1/2 x 1/4	50.42	12.737	35.025	96*	96*	81*	79*	83*	82*	82*
5-1/2 x 3/8	74.02	19.105	52.538	96*	96*	93*	91*	95*	94*	93*
5-1/2 x 1/2	97.66	25.473	70.051	96*	96*	96*	96*	96*	96*	96*
6 x 1/4	54.72	15.158	45.473	96*	96*	89*	87*	90*	89*	89*
6 x 5/16	67.65	18.497	56.841	96*	96*	96*	93*	96*	96*	96*
6 x 3/8	80.48	22.736	68.209	96*	96*	96*	96*	96*	96*	96*
6 x 1/2	106.25	30.315	90.945	96*	96*	96*	96*	96*	96*	96*

*Maximum spans are limited by maximum allowable stress or the lesser deflection of L/400 or 1/8" to a maximum simple span of 8'-0" (2,438mm). **Based on 10.105 bars/ft. of grating width. Bearing bars 1-3/16" center-to-center spacing. When serrated grating is specified, the depth of grating required for a specified load will be 1/4" greater than that shown in these tables. Weights shown are for 4" cross bar centers. Add 1.13 lbs/sqft. (3/8" Dia. CB) or 3.18 lbs./sqft. (1-1/4" x 1/4" CB) for 2" cross bar centers. Cross bars are determined based on project applications and bearing bar height.

HEAVY DUTY WELDED STEEL GRATING

MAXIMUM SAFE CONCENTRATED LOADS

Bearing Bar Size (Inches)	Maximum Safe Concentrated Load* (Lbs./Ft. of Grating Width) - Clear Span												
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"
1 x 1/4	2807	1871	1403	1123	936	802							
1 x 3/8	4213	2809	2107	1685	1404	1204							
1-1/4 x 1/4	4387	2924	2193	1755	1462	1253	1097						
1-1/4 x 3/8	6580	4387	3290	2632	2193	1880	1645						
1-1/2 x 1/4	6313	4209	3157	2525	2104	1804	1578	1403					
1-1/2 x 5/16	7893	5262	3947	3157	2631	2255	1973	1754					
1-1/2 x 3/8	9473	6316	4737	3789	3158	2707	2368	2105					
1-3/4 x 1/4	8593	5729	4297	3437	2864	2455	2148	1910	1719				
1-3/4 x 3/8	12893	8596	6447	5157	4298	3684	3223	2865	2579				
2 x 1/4	11227	7484	5613	4491	3742	3208	2807	2495	2245				
2 x 5/16	14033	9356	7017	5613	4678	4010	3508	3119	2807				
2 x 3/8	16840	11227	8420	6736	5613	4811	4210	3742	3368				
2-1/4 x 1/4	14213	9476	7107	5685	4738	4061	3553	3159	2843	2584			
2-1/4 x 3/8	21313	14209	10657	8525	7104	6090	5328	4736	4263	3875			
2-1/2 x 1/4	17547	11698	8773	7019	5849	5013	4387	3899	3509	3190	2924		
2-1/2 x 5/16	21927	14618	10963	8771	7309	6265	5482	4873	4385	3987	3654		
2-1/2 x 3/8	26313	17542	13157	10525	8771	7518	6578	5847	5263	4784	4386		
3 x 1/4	25260	16840	12630	10104	8420	7217	6315	5613	5052	4593	4210		
3 x 5/16	31580	21053	15790	12632	10527	9023	7895	7018	6316	5742	5263		
3 x 3/8	37893	25262	18947	15157	12631	10827	9473	8421	7579	6890	6316		
3 x 1/2	50527	33684	25263	20211	16842	14436	12632	11228	10105	9187	8421		
3-1/2 x 1/4	34387	22924	17193	13755	11462	9825	8597	7641	6877	6252	5731	4912	
3-1/2 x 3/8	51580	34387	25790	20632	17193	14737	12895	11462	10316	9378	8597	7369	
3-1/2 x 1/2		45849	34387	27509	22924	19650	17193	15283	13755	12504	11462	9825	
4 x 1/4		29942	22457	17965	14971	12832	11228	9981	8983	8166	7486	6416	
4 x 5/16		37427	28070	22456	18713	16040	14035	12476	11228	10207	9357	8020	
4 x 3/8		44911	33683	26947	22456	19248	16842	14970	13473	12248	11228	9624	
4 x 1/2		59880	44910	35928	29940	25663	22455	19960	17964	16331	14970	12831	
4-1/2 x 1/4		37893	28420	22736	18947	16240	14210	12631	11368	10335	9473	8120	7105
4-1/2 x 3/8		56840	42630	34104	28420	24360	21315	18947	17052	15502	14210	12180	10658
4-1/2 x 1/2			56840	45472	37893	32480	28420	25262	22736	20669	18947	16240	14210
5 x 1/4			35087	28069	23391	20050	17543	15594	14035	12759	11696	10025	8772
5 x 5/16			43860	35088	29240	25063	21930	19493	17544	15949	14620	12531	10965
5 x 3/8			52630	42104	35087	30074	26315	23391	21052	19138	17543	15037	13158
5 x 1/2				56139	46782	40099	35087	31188	28069	25518	23391	20050	17543
5-1/2 x 1/4				33965	28304	24261	21228	18870	16983	15439	14152	12130	10614
5-1/2 x 3/8				50947	42456	36390	31842	28304	25473	23158	21228	18195	15921
5-1/2 x 1/2					56607	48520	42455	37738	33964	20876	28303	24260	21228
6 x 1/4					33684	28872	25263	22456	20211	18373	16842	14436	12632
6 x 5/16					42104	26090	31578	28070	25263	22966	21052	18045	15789
6 x 3/8					50524	43307	37893	33683	30315	27559	25262	21653	18947
6 x 1/2						57743	50525	44911	40420	36745	33683	28871	25263

% Open Area*					
BB Size	CB Ctrs	Bearing Bar Thickness			
		1/4"	5/16"	3/8"	1/2"
Thru 2-1/2"	4" cc	72%	67%	62%	-
	2" cc	65%	61%	56%	-
3" to 6"	4" cc	74%	69%	64%	54%
	2" cc	70%	65%	60%	51%

Loads are theoretical, and are based on a unit stress of 20,000 psi.

*Based on 10.105 bars/ft. of grating width. Bearing bars 1-3/16" center-to-center spacing. **Note:** When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Panel Width Chart (in.) - 19-W-4 & 19-W-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Bars	1 7/16	2 5/8	3 13/16	5	6 3/16	7 3/8	8 9/16	9 3/4	10 15/16	12 1/8	13 5/16	14 1/2	15 11/16	16 7/8	18 1/16
5/16" Bars	1 1/2	2 11/16	3 7/8	5 1/16	6 1/4	7 7/16	8 5/8	9 13/16	11	12 3/16	13 3/8	14 9/16	15 3/4	16 15/16	18 1/8
3/8" Bars	1 9/16	2 3/4	3 15/16	5 1/8	6 5/16	7 1/2	8 11/16	9 7/8	11 1/16	12 1/4	13 7/16	14 5/8	15 13/16	17	18 3/16
1/2" Bars	1 11/16	2 7/8	4 1/16	5 1/4	6 7/16	7 5/8	8 13/16	10	11 3/16	12 3/8	13 9/16	14 3/4	15 15/16	17 1/8	18 5/16

No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1/4" Bars	19 1/4	20 7/16	21 5/8	22 13/16	24	25 3/16	26 3/8	27 9/16	28 3/4	29 15/16	31 1/8	32 5/16	33 1/2	34 11/16	35 7/8
5/16" Bars	19 5/16	20 1/2	21 11/16	22 7/8	24 1/16	25 1/4	26 7/16	27 5/8	28 13/16	30	31 3/16	32 3/8	33 9/16	34 3/4	35 15/16
3/8" Bars	19 3/8	20 9/16	21 3/4	22 15/16	24 1/8	25 5/16	26 1/2	27 11/16	28 7/8	30 1/16	31 1/4	32 7/16	33 5/8	34 13/16	36
1/2" Bars	19 1/2	20 11/16	21 7/8	23 1/16	24 1/4	25 7/16	26 5/8	27 13/16	29	30 3/16	31 3/8	32 9/16	33 3/4	34 15/16	36 1/8

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 84)

No. Bars/Ft. of Grating Width = 10.105 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus $in.^3$/ Foot of Grating Width	Moment of Inertia $in.^4$/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
1 x 1/4	0.421	0.211	9.72	U	5613	2495	1403	898	624	458	351	277
				Du	0.021	0.046	0.083	0.129	0.186	0.253	0.330	0.418
				C	2807	1871	1403	1123	936	802	702	624
				Dc	0.017	0.037	0.066	0.103	0.149	0.202	0.264	0.335
1 x 3/8	0.632	0.316	14.06	U	8427	3745	2107	1348	936	688	527	416
				Du	0.021	0.047	0.083	0.129	0.186	0.254	0.331	0.419
				C	4213	2809	2107	1685	1404	1204	1053	936
				Dc	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
1-1/4 x 1/4	0.658	0.411	11.84	U	8773	3899	2193	1404	975	716	548	433
				Du	0.017	0.037	0.066	0.104	0.149	0.203	0.265	0.335
				C	4387	2924	2193	1755	1462	1253	1097	975
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/4 x 3/8	0.987	0.617	17.20	U	13160	5849	3290	2106	1462	1074	823	650
				Du	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
				C	6580	4387	3290	2632	2193	1880	1645	1462
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/2 x 1/4	0.947	0.711	14.06	U	12627	5612	3157	2020	1403	1031	789	624
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.220	0.279
				C	6313	4209	3157	2525	2104	1804	1578	1403
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.176	0.223
1-1/2 x 5/16	1.184	0.888	17.20	U	15787	7016	3947	2526	1754	1289	987	780
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	7893	5262	3947	3157	2631	2255	1973	1754
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.223
1-1/2 x 3/8	1.421	1.066	20.43	U	18947	8421	4737	3031	2105	1547	1184	936
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	9473	6316	4737	3789	3158	2707	2368	2105
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.223
1-3/4 x 1/4	1.289	1.128	16.19	U	17187	7639	4297	2750	1910	1403	1074	849
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.240
				C	8593	5729	4297	3437	2864	2455	2148	1910
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.192
1-3/4 x 3/8	1.934	1.692	23.66	U	25787	11461	6447	4126	2865	2105	1612	1273
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.239
				C	12893	8596	6447	5157	4298	3684	3223	2865
				Dc	0.010	0.021	0.038	0.059	0.085	0.116	0.151	0.192
2 x 1/4	1.684	1.684	18.31	U	22453	9979	5613	3593	2495	1833	1403	1109
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	11227	7484	5613	4491	3742	3208	2807	2495
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2 x 5/16	2.105	2.105	22.65	U	28067	12474	7017	4491	3119	2291	1754	1386
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	14033	9356	7017	5613	4678	4010	3508	3119
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2 x 3/8	2.526	2.526	26.90	U	33680	14969	8420	5389	3742	2749	2105	1663
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.210
				C	16840	11227	8420	6736	5613	4811	4210	3742
				Dc	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
2-1/4 x 1/4	2.132	2.398	20.43	U	28427	12634	7107	4548	3159	2321	1777	1404
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	14213	9476	7107	5685	4738	4061	3553	3159
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149
2-1/4 x 3/8	3.197	3.597	30.13	U	42627	18945	10657	6820	4736	3480	2664	2105
				Du	0.009	0.021	0.037	0.058	0.083	0.113	0.147	0.186
				C	21313	14209	10657	8525	7104	6090	5328	4736
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 83)

No. Bars/Ft. of Grating Width = 10.105 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
1 x 1/4	0.421	0.211	9.72	U	225	186	156	133	115	100	88
				Du	0.517	0.626	0.743	0.873	1.015	1.163	1.325
				C	561	510	468	432	401	374	351
				Dc	0.413	0.499	0.595	0.698	0.809	0.928	1.057
1 x 3/8	0.632	0.316	14.06	U	337	279	234	199	172	150	132
				Du	0.517	0.627	0.745	0.872	1.014	1.165	1.328
				C	843	766	702	648	602	562	527
				Dc	0.414	0.501	0.596	0.699	0.811	0.931	1.060
1-1/4 x 1/4	0.658	0.411	11.84	U	351	290	244	208	179	156	137
				Du	0.414	0.501	0.597	0.701	0.811	0.932	1.059
				C	877	798	731	675	627	585	548
				Dc	0.331	0.401	0.477	0.560	0.650	0.745	0.847
1-1/4 x 3/8	0.987	0.617	17.20	U	526	435	366	311	269	234	206
				Du	0.413	0.501	0.597	0.698	0.812	0.931	1.061
				C	1316	1196	1097	1012	940	877	823
				Dc	0.331	0.400	0.477	0.559	0.649	0.744	0.848
1-1/2 x 1/4	0.947	0.711	14.06	U	505	417	351	299	258	224	197
				Du	0.344	0.416	0.496	0.582	0.676	0.773	0.881
				C	1263	1148	1052	971	902	842	789
				Dc	0.276	0.334	0.397	0.466	0.540	0.620	0.705
1-1/2 x 5/16	1.184	0.888	17.20	U	631	522	439	374	322	281	247
				Du	0.345	0.417	0.497	0.583	0.675	0.777	0.884
				C	1579	1435	1316	1214	1128	1052	987
				Dc	0.276	0.334	0.397	0.466	0.541	0.620	0.706
1-1/2 x 3/8	1.421	1.066	20.43	U	758	626	526	448	387	337	296
				Du	0.345	0.417	0.496	0.582	0.676	0.776	0.882
				C	1895	1722	1579	1457	1353	1263	1184
				Dc	0.276	0.334	0.397	0.466	0.540	0.621	0.706
1-3/4 x 1/4	1.289	1.128	16.19	U	687	568	477	407	351	306	269
				Du	0.295	0.358	0.425	0.500	0.580	0.666	0.758
				C	1719	1562	1432	1322	1228	1146	1074
				Dc	0.237	0.286	0.340	0.400	0.464	0.532	0.605
1-3/4 x 3/8	1.934	1.692	23.66	U	1031	852	716	610	526	458	403
				Du	0.296	0.358	0.426	0.499	0.579	0.665	0.757
				C	2579	2344	2149	1984	1842	1719	1612
				Dc	0.237	0.286	0.341	0.400	0.464	0.532	0.606
2 x 1/4	1.684	1.684	18.31	U	898	742	624	531	458	399	351
				Du	0.259	0.313	0.373	0.437	0.507	0.582	0.662
				C	2245	2041	1871	1727	1604	1497	1403
				Dc	0.207	0.250	0.298	0.350	0.406	0.466	0.530
2 x 5/16	2.105	2.105	22.65	U	1123	928	780	664	573	499	439
				Du	0.259	0.313	0.373	0.437	0.507	0.582	0.663
				C	2807	2552	2339	2159	2005	1871	1754
				Dc	0.207	0.250	0.298	0.350	0.406	0.465	0.530
2 x 3/8	2.526	2.526	26.90	U	1347	1113	936	797	687	599	526
				Du	0.259	0.313	0.373	0.437	0.507	0.582	0.662
				C	3368	3062	2807	2591	2406	2245	2105
				Dc	0.207	0.250	0.298	0.350	0.406	0.465	0.530
2-1/4 x 1/4	2.132	2.398	20.43	U	1137	940	790	673	580	505	444
				Du	0.230	0.278	0.331	0.389	0.451	0.517	0.588
				C	2843	2584	2369	2187	2030	1895	1777
				Dc	0.184	0.223	0.265	0.311	0.361	0.414	0.471
2-1/4 x 3/8	3.197	3.597	30.13	U	1705	1409	1184	1009	870	758	666
				Du	0.230	0.278	0.331	0.389	0.451	0.517	0.588
				C	4263	3875	3552	3279	3045	2842	2664
				Dc	0.184	0.223	0.265	0.311	0.361	0.414	0.471

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 86)

No. Bars/Ft. of Grating Width = 10.105 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
2-1/2 x 1/4	2.632	3.289	22.65	U	35093	15597	8773	5615	3899	2865	2193	1733
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	17547	11698	8773	7019	5849	5013	4387	3899
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
2-1/2 x 5/16	3.289	4.112	28.01	U	43853	19490	10963	7017	4873	3580	2741	2166
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
				C	21927	14618	10963	8771	7309	6265	5482	4873
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.134
2-1/2 x 3/8	3.947	4.934	33.36	U	52627	23390	13157	8420	5847	4296	3289	2599
				Du	0.008	0.019	0.033	0.052	0.075	0.101	0.132	0.168
				C	26313	17542	13157	10525	8771	7518	6578	5847
				Dc	0.007	0.015	0.027	0.041	0.060	0.081	0.106	0.134
3 x 1/4	3.789	5.684	28.95	U	50520	22453	12630	8083	5613	4124	3158	2495
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	25260	16840	12630	10104	8420	7217	6315	5613
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 5/16	4.737	7.105	35.41	U	63160	28071	15790	10106	7018	5156	3948	3119
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	31580	21053	15790	12632	10527	9023	7895	7018
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3 x 3/8	5.684	8.526	41.88	U	75787	33683	18947	12126	8421	6187	4737	3743
				Du	0.007	0.016	0.028	0.043	0.062	0.085	0.110	0.140
				C	37893	25262	18947	15157	12631	10827	9473	8421
				Dc	0.006	0.012	0.022	0.035	0.050	0.068	0.088	0.112
3 x 1/2	7.579	11.368	54.72	U	101053	44913	25263	16169	11228	8249	6316	4990
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	50527	33684	25263	20211	16842	14436	12632	11228
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3-1/2 x 1/4	5.158	9.026	33.29	U	68773	30566	17193	11004	7641	5614	4298	3396
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	34387	22924	17193	13755	11462	9825	8597	7641
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 3/8	7.737	13.539	48.25	U	103160	45849	25790	16506	11462	8421	6448	5094
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	51580	34387	25790	20632	17193	14737	12895	11462
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 1/2	10.316	18.052	63.30	U	137547	61132	34387	22007	15283	11228	8597	6792
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	68773	45849	34387	27509	22924	19650	17193	15283
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
4 x 1/4	6.737	13.473	37.54	U	89827	39923	22457	14372	9981	7333	5614	4436
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	44913	29942	22457	17965	14971	12832	11228	9981
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 5/16	8.421	16.842	46.13	U	112280	49902	28070	17965	12476	9166	7018	5545
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	56140	37427	28070	22456	18713	16040	14035	12476
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 3/8	10.105	20.210	54.72	U	134733	59881	33683	21557	14970	10999	8421	6653
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	67367	44911	33683	26947	22456	19248	16842	14970
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 1/2	13.473	26.947	71.89	U	179640	79840	44910	28742	19960	14664	11228	8871
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	89820	59880	44910	35928	29940	25663	22455	19960
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 85)

No. Bars/Ft. of Grating Width = 10.105 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
2-1/2 x 1/4	2.632	3.289	22.65	U	1404	1160	975	831	716	624	548
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.530
				C	3509	3190	2924	2699	2507	2340	2193
				Dc	0.166	0.200	0.238	0.280	0.325	0.373	0.424
2-1/2 x 5/16	3.289	4.112	28.01	U	1754	1450	1218	1038	895	780	685
				Du	0.207	0.250	0.298	0.350	0.405	0.466	0.529
				C	4385	3987	3654	3373	3132	2924	2741
				Dc	0.165	0.200	0.238	0.280	0.324	0.372	0.424
2-1/2 x 3/8	3.947	4.934	33.36	U	2105	1740	1462	1246	1074	936	822
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.529
				C	5263	4784	4386	4048	3759	3508	3289
				Dc	0.166	0.200	0.238	0.280	0.324	0.372	0.424
3 x 1/4	3.789	5.684	28.95	U	2021	1670	1403	1196	1031	898	789
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	5052	4593	4210	3886	3609	3368	3158
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 5/16	4.737	7.105	35.41	U	2526	2088	1754	1495	1289	1123	987
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	6316	5742	5263	4858	4511	4211	3948
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 3/8	5.684	8.526	41.88	U	3031	2505	2105	1794	1547	1347	1184
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	7579	6890	6316	5830	5413	5052	4737
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 1/2	7.579	11.368	54.72	U	4042	3341	2807	2392	2062	1797	1579
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	10105	9187	8421	7773	7218	6737	6316
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3-1/2 x 1/4	5.158	9.026	33.29	U	2751	2273	1910	1628	1404	1223	1075
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.379
				C	6877	6252	5731	5290	4912	4585	4298
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 3/8	7.737	13.539	48.25	U	4126	3410	2866	2442	2105	1834	1612
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	10316	9378	8597	7935	7369	6877	6448
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 1/2	10.316	18.052	63.30	U	5502	4547	3821	3256	2807	2445	2149
				Du	0.148	0.179	0.213	0.250	0.290	0.332	0.378
				C	13755	12504	11462	10581	9825	9170	8597
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
4 x 1/4	6.737	13.473	37.54	U	3593	2969	2495	2126	1833	1597	1404
				Du	0.129	0.157	0.186	0.219	0.253	0.291	0.331
				C	8983	8166	7486	6910	6416	5988	5614
				Dc	0.104	0.125	0.149	0.175	0.203	0.233	0.265
4 x 5/16	8.421	16.842	46.13	U	4491	3712	3119	2658	2291	1996	1754
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	11228	10207	9357	8637	8020	7485	7018
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 3/8	10.105	20.210	54.72	U	5389	4454	3743	3189	2750	2395	2105
				Du	0.129	0.157	0.186	0.219	0.254	0.291	0.331
				C	13473	12248	11228	10364	9624	8982	8421
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 1/2	13.473	26.947	71.89	U	7186	5939	4990	4252	3666	3194	2807
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	17964	16331	14970	13818	12831	11976	11228
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 88)

No. Bars/Ft. of Grating Width = 10.105 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
4-1/2 x 1/4	8.526	19.184	41.88	U	113680	50524	28420	18189	12631	9280	7105	5614
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	56840	37893	28420	22736	18947	16240	14210	12631
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 3/8	12.789	28.776	61.18	U	170520	75787	42630	27283	18947	13920	10658	8421
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	85260	56840	42630	34104	28420	24360	21315	18947
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.075
4-1/2 x 1/2	17.052	38.367	80.48	U	227360	101049	56840	36378	25262	18560	14210	11228
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	113680	75787	56840	45472	37893	32480	28420	25262
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.074
5 x 1/4	10.526	26.315	46.13	U	140347	62376	35087	22455	15594	11457	8772	6931
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	70173	46782	35087	28069	23391	20050	17543	15594
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 5/16	13.158	32.894	56.84	U	175440	77973	43860	28070	19493	14322	10965	8664
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	87720	58480	43860	35088	29240	25063	21930	19493
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 3/8	15.789	39.473	67.65	U	210520	93564	52630	33683	23391	17185	13158	10396
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	105260	70173	52630	42104	35087	30074	26315	23391
				Dc	0.003	0.007	0.013	0.013	0.030	0.041	0.053	0.067
5 x 1/2	21.052	52.630	89.07	U	280693	124753	70173	44911	31188	22914	17543	13861
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	140347	93564	70173	56139	46782	40099	35087	31188
				Dc	0.003	0.007	0.013	0.013	0.030	0.041	0.053	0.067
5-1/2 x 1/4	12.737	35.025	50.42	U	169827	75479	42457	27172	18870	13863	10614	8387
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	84913	56609	42457	33965	28304	24261	21228	18870
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 3/8	19.105	52.538	74.02	U	254733	113215	63683	40757	28304	20795	15921	12579
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	127367	84911	63683	50947	42456	36390	31842	28304
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 1/2	25.473	70.051	97.66	U	339640	150951	84910	54342	37738	27726	21228	16772
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	169820	113213	84910	67928	56607	48520	42455	37738
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
6 x 1/4	15.158	45.473	54.72	U	202107	89825	50527	32337	22456	16499	12632	9981
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	101053	67369	50527	40421	33684	28872	25263	22456
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 5/16	18.497	56.841	67.65	U	252627	112279	63157	40420	28070	20623	15789	12475
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	126313	84209	63157	50525	42104	36090	31578	28070
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 3/8	22.736	68.209	80.48	U	303147	134732	75787	48503	33683	24747	18947	14970
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	151573	101049	75787	60629	50524	43307	37893	33683
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 1/2	30.315	90.945	106.25	U	404200	179644	101050	64672	44911	32996	25263	19960
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	202100	134733	101050	80840	67367	57743	50525	44911
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 87)

No. Bars/Ft. of Grating Width = 10.105 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 60	66	72	78	84	90	96
4-1/2 x 1/4	8.526	19.184	41.88	U	4547	3758	3158	2691	2320	2021	1776
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	11368	10335	9473	8745	8120	7579	7105
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 3/8	12.789	28.776	61.18	U	6821	5637	4737	4036	3480	3031	2664
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	17052	15502	14210	13117	12180	11368	10658
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 1/2	17.052	38.367	80.48	U	9094	7516	6316	5381	4640	4042	3553
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	22736	20669	18947	17489	16240	15157	14210
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
5 x 1/4	10.526	26.315	46.13	U	5614	4640	3899	3322	2864	2495	2193
				Du	0.104	0.125	0.149	0.175	0.203	0.233	0.265
				C	14035	12759	11696	10796	10025	9356	8772
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 5/16	13.158	32.894	56.84	U	7018	5800	4873	4152	3580	3119	2741
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	17544	16949	14620	13495	12531	11696	10965
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 3/8	15.789	39.473	67.65	U	8421	6959	5848	4983	4296	3743	3289
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	21052	19138	17543	16194	15037	14035	13158
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 1/2	21.052	52.630	89.07	U	11228	9279	7797	6644	5728	4990	4386
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	28069	25518	23391	21592	20050	18713	17543
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5-1/2 x 1/4	12.737	35.025	50.42	U	6793	5614	4717	4020	3466	3019	2654
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	16983	15439	14152	13064	12130	11322	10614
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 3/8	19.105	52.538	74.02	U	10189	8421	7076	6029	5199	4529	3980
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	25473	23158	21228	19595	18195	16982	15921
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 1/2	25.473	70.051	97.66	U	13586	11228	9434	8039	6931	6038	5307
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	33964	30876	28303	26126	24260	22643	21228
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
6 x 1/4	15.158	45.473	54.72	U	8084	6681	5614	4784	4125	3593	3158
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	20211	18373	16842	15547	14436	13474	12632
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 5/16	18.497	56.841	67.65	U	10105	8351	7017	5979	5156	4491	3947
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	25263	22966	21052	19433	18045	16842	15789
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 3/8	22.736	68.209	80.48	U	12126	10021	8421	7175	6187	5389	4737
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	30315	27559	25262	23319	21653	20210	18947
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 1/2	30.315	90.945	106.25	U	16168	13362	11228	9567	8249	7186	6316
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	40420	36745	33683	31092	28871	26947	25263
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

Model Specification: 19-W-4 Heavy-Duty Steel Bar Gratings

September 14, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "19-W-4 Heavy-Duty Steel Bar Gratings." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, heavy-duty carbon steel bar gratings.

B. Prefabricated support frames for gratings.

C. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM Grade-36 Carbon Steel.

C. ASTM A-510: Carbon Steel Wire Rods.

D. ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 5 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Heavy-Duty Carbon Steel Bar Grating type **19-W-4 with a Galvanized finish**. Heavy-duty cross bars are welded perpendicular to heavy-duty main bearing bars.

1. Main Bearing Bar Spacing: **1-3/16"** on center.
2. Main Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Main Bearing Bar Thickness: **1/4" | 5/16" | 3/8" | 1/2"** as shown on drawings.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Main Bearing Bars: **Smooth | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Load Band ends of grating with bars of the same thickness as main bearing bars. Weld banding flush with the top surface of grating. Depth of banding is to be 1/2" less than the depth of the main bearing bars (as shown in drawings). **Include welded anchor blocks 1/4" from the bottom surface with hole to accept washer and attachment bolts.**

C. **Steel Frames: Carbon Steel ASTM Grade-36 frames shall be provided as shown on contract drawings to support and attach gratings. Include anchors as shown for locking frame into concrete as shown on the plans. Galvanize frames after fabrication per ASTM A-123.**

D. **Design Criteria:**

1. **Loading:** Unless shown otherwise on the contract drawings, gratings shall be designed and manufactured to meet live load conditions of **AASHTO HS-20 with 30% impact factor**. Main bearing bar depth shall be as shown in contract drawings or as recommended by the manufacturer to meet loading requirements and clear span conditions.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

E. **Materials:** Main bearing bars and rectangular cross bars are to be type ASTM Grade-36 Carbon Steel. Round cross bars are to be per ASTM A-510. Banding is to be carbon steel per ASTM Grade-36.

F. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

G. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 D.2 above.

H. **Finish:** Gratings and frames shall be **Hot-Dip Galvanized per ASTM A-123 or Powder Coated Black [or other color] as shown on drawings.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system. **Include lifting devices and all other accessories as shown on the drawings.**

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

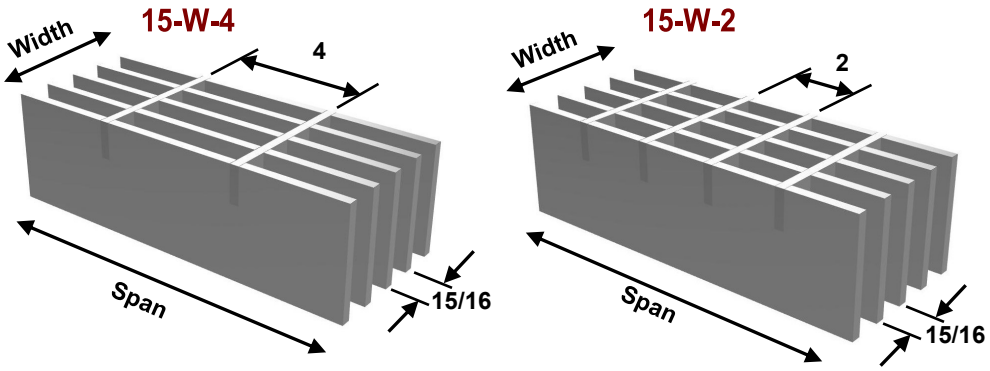
B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

3.3 Grating Attachment:

Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

15-SPACE

HEAVY DUTY WELDED STEEL GRATING



% Open Area*				
BB Size	CB Ctrs	Bearing Bar Thickness		
		1/4"	5/16"	3/8"
Thru 2-1/2"	4" cc	66%	60%	54%
	2" cc	60%	55%	49%
3" to 6"	4" cc	69%	62%	56%
	2" cc	64%	58%	53%

VEHICULAR LOAD TABLE

Bearing Bar Size (Inches)	Weight ** (Lbs./Sqft.)	Section Properties		Maximum Safe Clear Span (Inches)						
		Sx ** (In^3/Ft. Width)	Ix ** (In^4/Ft. Width)	Auto Traffic	1 Ton	3 Ton	5 Ton	H-15	H20/ HL-93	H-25
1 x 1/4	12.01	0.533	0.267	14	8	7	8	10	12	13
1 x 3/8	17.51	0.800	0.400	19	11	8	10	13	15	16
1-1/4 x 1/4	14.70	0.833	0.521	20	11	9	10	13	15	16
1-1/4 x 3/8	21.48	1.250	0.781	25*	16	11	13	16	18	20
1-1/2 x 1/4	17.51	1.200	0.900	27	15	11	13	16	18	29
1-1/2 x 5/16	21.48	1.500	1.125	30*	19	13	15	18	20	22
1-1/2 x 3/8	25.58	1.800	1.350	33*	22	15	16	20	22	24
1-3/4 x 1/4	20.20	1.633	1.429	34*	20	14	15	19	21	23
1-3/4 x 3/8	29.67	2.450	2.144	42*	30	20	21	25	27	29
2 x 1/4	22.89	2.133	2.133	42*	26	17	19	22	24	27
2 x 5/16	28.39	2.667	2.667	47*	32	21	22	26	28	30
2 x 3/8	33.77	3.200	3.200	51*	38	25	25	30	32	34
2-1/4 x 1/4	25.58	2.700	3.038	50*	32	21	22	26	28	31
2-1/4 x 3/8	37.87	4.050	4.556	57*	47*	30	31	36	38	40
2-1/2 x 1/4	28.39	3.333	4.167	55*	40	26	26	31	33	35
2-1/2 x 5/16	35.18	4.167	5.208	59*	49	31	32	37	39	41
2-1/2 x 3/8	41.96	5.000	6.250	63*	53*	37	37	43	45	46
3 x 1/4	35.82	4.800	7.200	66*	56	36	36	42	43	45
3 x 5/16	44.01	6.000	9.000	71*	60*	44	43	50	52	53
3 x 3/8	52.20	7.200	10.800	76*	64*	52	51	55*	55*	56*
3-1/2 x 1/4	41.32	6.533	11.433	77*	65*	47	47	54	55	57
3-1/2 x 3/8	60.27	9.800	17.150	88*	75*	63*	62*	65*	64*	65*
4 x 1/4	46.70	8.533	17.067	88*	75*	61	59	64*	64*	64*
4 x 5/16	57.58	10.667	21.333	95*	80*	68*	66*	69*	69*	69*
4 x 3/8	68.46	12.800	25.600	96*	86*	72*	71*	74*	73*	73*
4-1/2 x 1/4	52.20	10.800	24.300	96*	84*	71*	69*	72*	72*	72*
4-1/2 x 3/8	76.65	16.200	36.450	96*	96*	81*	79*	83*	82*	82*
5 x 1/4	57.58	13.333	33.333	96*	93*	79*	77*	81*	80*	80*
5 x 5/16	71.15	16.667	41.667	96*	96*	85*	83*	87*	86*	86*
5 x 3/8	84.84	20.000	50.000	96*	96*	90*	88*	92*	92*	91*
5-1/2 x 1/4	63.02	16.133	44.367	96*	96*	86*	85*	89*	88*	88*
5-1/2 x 3/8	92.91	24.200	66.550	96*	96*	96*	96*	96*	96*	96*
6 x 1/4	68.46	19.200	57.600	96*	96*	94*	92*	96*	96*	96*
6 x 5/16	84.84	24.000	72.000	96*	96*	96*	96*	96*	96*	96*
6 x 3/8	101.10	28.800	86.400	96*	96*	96*	96*	96*	96*	96*

*Maximum spans are limited by maximum allowable stress or the lesser deflection of L/400 or 1/8" to a maximum simple span of 8'-0" (2,438mm). **Based on 12.8 bars/ft. of grating width. Bearing bars 15/16" center-to-center spacing. When serrated grating is specified, the depth of grating required for a specified load will be 1/4" greater than that shown in these tables. Weights shown are for 4" cross bar centers. Add 1.13 lbs/sqft. (3/8" Dia. CB) or 3.18 lbs./sqft. (1-1/4" x 1/4" CB) for 2" cross bar centers. Cross bars are determined based on project applications and bearing bar height.

15-SPACE

HEAVY DUTY WELDED STEEL GRATING

MAXIMUM SAFE CONCENTRATED LOADS

Bearing Bar Size (Inches)	Maximum Safe Concentrated Load* (Lbs./Ft. of Grating Width) - Clear Span												
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"
1 x 1/4	3553	2369	1777	1421	1184	1015							
1 x 3/8	5333	3556	2667	2133	1778	1524							
1-1/4 x 1/4	5553	3702	2777	2221	1851	1587	1388						
1-1/4 x 3/8	8333	5556	4167	3333	2778	2381	2083						
1-1/2 x 1/4	8000	5333	4000	3200	2667	2286	2000	1778					
1-1/2 x 5/16	10000	6667	5000	4000	3333	2857	2500	2222					
1-1/2 x 3/8	12000	8000	6000	4800	4000	3429	3000	2667					
1-3/4 x 1/4	10887	7258	5443	4355	3629	3110	2722	2419	2177				
1-3/4 x 3/8	16333	10889	8167	6533	5444	4667	4083	3630	3267				
2 x 1/4	14220	9480	7110	5688	4740	4063	3555	3160	2844				
2 x 5/16	17780	11853	8890	7112	5927	5080	4445	3951	3556				
2 x 3/8	21333	14222	10667	8533	7111	6095	5333	4741	4267				
2-1/4 x 1/4	18000	12000	9000	7200	6000	5143	4500	4000	3600	3273			
2-1/4 x 3/8	27000	18000	13500	10800	9000	7714	6750	6000	5400	4909			
2-1/2 x 1/4	22220	14813	11110	8888	7407	6349	5555	4938	4444	4040	3703		
2-1/2 x 5/16	27780	18520	13890	11112	9260	7937	6945	6173	5556	5051	4630		
2-1/2 x 3/8	33333	22222	16667	13333	11111	9524	8333	7407	6667	6061	5556		
3 x 1/4	32000	21333	16000	12800	10667	9143	8000	7111	6400	5818	5333		
3 x 5/16	40000	26667	20000	16000	13333	11429	10000	8889	8000	7273	6667		
3 x 3/8	48000	32000	24000	19200	16000	13714	12000	10667	9600	8727	8000		
3-1/2 x 1/4	43553	29036	21777	17421	14518	12444	10888	9679	8711	7919	7259	6222	
3-1/2 x 3/8	65333	43556	32667	26133	21778	18667	16333	14519	13067	11879	10889	9333	
4 x 1/4	56887	37924	28443	22755	18962	16253	14222	12641	11377	10343	9481	8127	
4 x 5/16		47409	35557	28445	23704	20318	17778	15803	14223	12930	11852	10159	
4 x 3/8		56889	42667	34133	28444	24381	21333	18963	17067	15515	14222	12190	
4-1/2 x 1/4		48000	36000	28800	24000	20571	18000	16000	14400	13091	12000	10286	9000
4-1/2 x 3/8			54000	43200	36000	30857	27000	24000	21600	19636	18000	15429	13500
5 x 1/4			44443	35555	29629	25396	22222	19753	17777	16161	14814	12698	11111
5 x 5/16			55557	44445	37038	31747	27778	24692	22223	20202	18519	15873	13889
5 x 3/8			66667	53333	44444	38095	33333	29630	26667	24242	22222	19048	16667
5-1/2 x 1/4			53777	43021	35851	30730	26888	23901	21511	19555	17926	15365	13444
5-1/2 x 3/8					53778	46095	40333	35852	32267	29333	26889	23048	20167
6 x 1/4					42667	36571	32000	28444	25600	23273	21333	18286	16000
6 x 5/16					53333	45714	40000	35556	32000	29091	26667	22857	20000
6 x 3/8						54857	48000	42667	38400	34909	32000	27429	24000

% Open Area*				
BB Size	CB Ctrs	Bearing Bar Thickness 1/4"	5/16"	3/8"
Thru 2-1/2"	4" cc	66%	60%	54%
	2" cc	60%	55%	49%
3" to 6"	4" cc	69%	62%	56%
	2" cc	64%	58%	53%

Loads are theoretical, and are based on a unit stress of 20,000 psi.

*Based on 12.8 bars/ft. of grating width. Bearing bars 15/16" center-to-center spacing. **Note:** When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Panel Width Chart (in.) - 15-W-4 & 15-W-2

Dimensions are Out-to-Out of Bearing Bars**

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/4" Bars	1 3/16	2 1/8	3 1/16	4	4 15/16	5 7/8	6 13/16	7 3/4	8 11/16	9 5/8	10 9/16	11 1/2	12 7/16	13 3/8	14 5/16
5/16" Bars	1 1/4	2 3/16	3 1/8	4 1/16	5	5 15/16	6 7/8	7 13/16	8 3/4	9 11/16	10 5/8	11 9/16	12 1/2	13 7/16	14 3/8
3/8" Bars	1 5/16	2 1/4	3 3/16	4 1/8	5 1/16	6	6 15/16	7 7/8	8 13/16	9 3/4	10 11/16	11 5/8	12 9/16	13 1/2	14 7/16

No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1/4" Bars	15 1/4	16 3/16	17 1/8	18 1/16	19	19 15/16	20 7/8	21 13/16	22 3/4	23 11/16	24 5/8	25 9/16	26 1/2	27 7/16	28 3/8
5/16" Bars	15 5/16	16 1/4	17 3/16	18 1/8	19 1/16	20	20 15/16	21 7/8	22 13/16	23 3/14	24 11/16	25 5/8	26 9/16	27 1/2	28 7/16
3/8" Bars	15 3/8	16 5/16	17 1/4	18 3/16	19 1/8	20 1/16	21	21 15/16	22 7/8	23 13/16	24 3/4	25 11/16	26 5/8	27 9/16	28 1/2

No. of Bars	32	33	34	35	36	37	38	39							
1/4" Bars	29 5/16	30 1/4	31 3/16	32 1/8	33 1/16	34	34 15/16	35 7/8							
5/16" Bars	29 3/8	30 5/16	31 1/4	32 3/16	33 1/8	34 1/16	35	35 15/16							
3/8" Bars	29 7/16	30 3/8	31 5/16	32 1/4	33 3/16	34 1/8	35 1/16	36							

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 95)

No. Bars/Ft. of Grating Width = 12.800 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches							
					12	18	24	30	36	42	48	54
1 x 1/4	0.533	0.267	12.01	U	7107	3159	1777	1137	790	580	444	351
				Du	0.021	0.046	0.083	0.129	0.186	0.253	0.330	0.418
				C	3553	2369	1777	1421	1184	1015	888	790
				Dc	0.017	0.037	0.066	0.103	0.149	0.202	0.264	0.335
1 x 3/8	0.800	0.400	17.51	U	10667	4741	2667	1707	1185	871	667	527
				Du	0.021	0.047	0.083	0.129	0.186	0.254	0.331	0.419
				C	5333	3556	2667	2133	1778	1524	1333	1185
				Dc	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
1-1/4 x 1/4	0.833	0.521	14.70	U	11107	4936	2777	1777	1234	907	694	548
				Du	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
				C	5553	3702	2777	2221	1851	1587	1388	1234
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/4 x 3/8	1.250	0.781	21.48	U	16667	7407	4167	2667	1852	1361	1042	823
				Du	0.017	0.037	0.066	0.103	0.149	0.203	0.265	0.335
				C	8333	5556	4167	3333	2778	2381	2083	1852
				Dc	0.013	0.030	0.053	0.083	0.119	0.162	0.212	0.268
1-1/2 x 1/4	1.200	0.900	17.51	U	16000	7111	4000	2560	1778	1306	1000	790
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	8000	5333	4000	3200	2667	2286	2000	1778
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.223
1-1/2 x 5/16	1.500	1.125	21.48	U	20000	8889	5000	3200	2222	1633	1250	988
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	10000	6667	5000	4000	3333	2857	2500	2222
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.223
1-1/2 x 3/8	1.800	1.350	25.58	U	24000	10667	6000	3840	2667	1959	1500	1185
				Du	0.014	0.031	0.055	0.086	0.124	0.169	0.221	0.279
				C	12000	8000	6000	4800	4000	3429	3000	2667
				Dc	0.011	0.025	0.044	0.069	0.099	0.135	0.177	0.223
1-3/4 x 1/4	1.633	1.429	20.20	U	21773	9677	5443	3484	2419	1777	1361	1075
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.239
				C	10887	7258	5443	4355	3629	3110	2722	2419
				Dc	0.009	0.021	0.038	0.059	0.085	0.116	0.151	0.191
1-3/4 x 3/8	2.450	2.144	29.67	U	32667	14519	8167	5227	3630	2667	2042	1613
				Du	0.012	0.027	0.047	0.074	0.106	0.145	0.189	0.239
				C	16333	10889	8167	6533	5444	4667	4083	3630
				Dc	0.009	0.021	0.038	0.059	0.085	0.116	0.151	0.191
2 x 1/4	2.133	2.133	22.89	U	28440	12640	7110	4550	3160	2322	1778	1404
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	14220	9480	7110	5688	4740	4063	3555	3160
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2 x 5/16	2.667	2.667	28.39	U	35560	15804	8890	5690	3951	2903	2223	1756
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	17780	11853	8890	7112	5927	5080	4445	3951
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2 x 3/8	3.200	3.200	33.77	U	42667	18963	10667	6827	4741	3483	2667	2107
				Du	0.010	0.023	0.041	0.065	0.093	0.127	0.166	0.209
				C	21333	14222	10667	8533	7111	6095	5333	4741
				Dc	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
2-1/4 x 1/4	2.700	3.038	25.58	U	36000	16000	9000	5760	4000	2939	2250	1778
				Du	0.009	0.021	0.037	0.057	0.083	0.113	0.147	0.186
				C	18000	12000	9000	7200	6000	5143	4500	4000
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149
2-1/4 x 3/8	4.050	4.556	37.87	U	54000	24000	13500	8640	6000	4408	3375	2667
				Du	0.009	0.021	0.037	0.057	0.083	0.113	0.147	0.186
				C	27000	18000	13500	10800	9000	7714	6750	6000
				Dc	0.007	0.017	0.029	0.046	0.066	0.090	0.118	0.149

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 94)

No. Bars/Ft. of Grating Width = 12.800 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
1 x 1/4	0.533	0.267	12.01	U	284	235	197	168	145	126	111
				Du	0.516	0.625	0.742	0.871	1.012	1.158	1.321
				C	711	646	592	547	508	474	444
				Dc	0.413	0.500	0.595	0.698	0.810	0.930	1.057
1 x 3/8	0.800	0.400	17.51	U	427	353	296	252	218	190	167
				Du	0.518	0.627	0.744	0.873	1.015	1.166	1.327
				C	1067	970	889	821	762	711	667
				Dc	0.414	0.501	0.596	0.700	0.811	0.931	1.060
1-1/4 x 1/4	0.833	0.521	14.70	U	444	367	309	263	227	197	174
				Du	0.413	0.500	0.596	0.699	0.812	0.928	1.061
				C	1111	1010	926	854	793	740	694
				Dc	0.331	0.400	0.477	0.559	0.648	0.744	0.847
1-1/4 x 3/8	1.250	0.781	21.48	U	667	551	463	394	340	296	260
				Du	0.414	0.501	0.596	0.699	0.811	0.930	1.058
				C	1667	1515	1389	1282	1190	1111	1042
				Dc	0.331	0.401	0.477	0.560	0.649	0.745	0.848
1-1/2 x 1/4	1.200	0.900	17.51	U	640	529	444	379	327	284	250
				Du	0.345	0.417	0.496	0.583	0.677	0.775	0.883
				C	1600	1455	1333	1231	1143	1067	1000
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.706
1-1/2 x 5/16	1.500	1.125	21.48	U	800	661	556	473	408	356	313
				Du	0.345	0.417	0.497	0.582	0.676	0.777	0.884
				C	2000	1818	1667	1538	1429	1333	1250
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.706
1-1/2 x 3/8	1.800	1.350	25.58	U	960	793	667	568	490	427	375
				Du	0.345	0.417	0.497	0.583	0.676	0.776	0.883
				C	2400	2182	2000	1846	1714	1600	1500
				Dc	0.276	0.334	0.397	0.466	0.541	0.621	0.706
1-3/4 x 1/4	1.633	1.429	20.20	U	871	720	605	515	444	387	340
				Du	0.296	0.358	0.426	0.499	0.579	0.665	0.756
				C	2177	1979	1814	1675	1555	1452	1361
				Dc	0.236	0.286	0.340	0.400	0.463	0.532	0.605
1-3/4 x 3/8	2.450	2.144	29.67	U	1307	1080	907	773	667	581	510
				Du	0.296	0.358	0.425	0.499	0.580	0.665	0.756
				C	3267	2970	2722	2513	2333	2178	2042
				Dc	0.236	0.286	0.340	0.400	0.463	0.532	0.605
2 x 1/4	2.133	2.133	22.89	U	1138	940	790	673	580	506	444
				Du	0.259	0.313	0.372	0.437	0.507	0.582	0.662
				C	2844	2585	2370	2188	2031	1896	1778
				Dc	0.207	0.250	0.298	0.350	0.405	0.466	0.530
2 x 5/16	2.667	2.667	28.39	U	1422	1176	988	842	726	632	556
				Du	0.259	0.313	0.372	0.437	0.507	0.582	0.663
				C	3556	3233	2963	2735	2540	2371	2223
				Dc	0.207	0.250	0.298	0.350	0.406	0.466	0.530
2 x 3/8	3.200	3.200	33.77	U	1707	1410	1185	1010	871	759	667
				Du	0.259	0.313	0.372	0.437	0.507	0.582	0.662
				C	4267	3879	3556	3282	3048	2844	2667
				Dc	0.207	0.250	0.298	0.350	0.406	0.465	0.530
2-1/4 x 1/4	2.700	3.038	25.58	U	1440	1190	1000	852	735	640	563
				Du	0.230	0.278	0.331	0.388	0.451	0.517	0.589
				C	3600	3273	3000	2769	2571	2400	2250
				Dc	0.184	0.223	0.265	0.311	0.360	0.414	0.471
2-1/4 x 3/8	4.050	4.556	37.87	U	2160	1785	1500	1278	1102	960	844
				Du	0.230	0.278	0.331	0.388	0.451	0.517	0.589
				C	5400	4909	4500	4154	3857	3600	3375
				Dc	0.184	0.223	0.265	0.311	0.360	0.414	0.471

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 97)

No. Bars/Ft. of Grating Width = 12.800 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches 12	18	24	30	36	42	48	54
2-1/2 x 1/4	3.333	4.167	28.39	U	44440	19751	11110	7110	4938	3628	2778	2195
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
				C	22220	14813	11110	8888	7407	6349	5555	4938
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.134
2-1/2 x 5/16	4.167	5.208	35.18	U	55560	24693	13890	8890	6173	4536	3473	2744
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
				C	27780	18520	13890	11112	9260	7937	6945	6173
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.134
2-1/2 x 3/8	5.000	6.250	41.96	U	66667	29630	16667	10667	7407	5442	4167	3292
				Du	0.008	0.019	0.033	0.052	0.074	0.101	0.132	0.168
				C	33333	22222	16667	13333	11111	9524	8333	7407
				Dc	0.007	0.015	0.026	0.041	0.060	0.081	0.106	0.134
3 x 1/4	4.800	7.200	35.82	U	64000	28444	16000	10240	7111	5224	4000	3160
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	32000	21333	16000	12800	10667	9143	8000	7111
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3 x 5/16	6.000	9.000	44.01	U	80000	35556	20000	12800	8889	6531	5000	3951
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	40000	26667	20000	16000	13333	11429	10000	8889
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3 x 3/8	7.200	10.800	52.20	U	96000	42667	24000	15360	10667	7837	6000	4741
				Du	0.007	0.016	0.028	0.043	0.062	0.084	0.110	0.140
				C	48000	32000	24000	19200	16000	13714	12000	10667
				Dc	0.006	0.012	0.022	0.034	0.050	0.068	0.088	0.112
3-1/2 x 1/4	6.533	11.433	41.32	U	87107	38714	21777	13937	9679	7111	5444	4302
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	43553	29036	21777	17421	14518	12444	10888	9679
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
3-1/2 x 3/8	9.800	17.150	60.27	U	130667	58074	32667	20907	14519	10667	8167	6453
				Du	0.006	0.013	0.024	0.037	0.053	0.072	0.095	0.120
				C	65333	43556	32667	26133	21778	18667	16333	14519
				Dc	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096
4 x 1/4	8.533	17.067	46.70	U	113773	50566	28443	18204	12641	9288	7111	5618
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	56887	37924	28443	22755	18962	16253	14222	12641
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 5/16	10.667	21.333	57.58	U	142227	63212	35557	22756	15803	11610	8889	7024
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	71113	47409	35557	28445	23704	20318	17778	15803
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4 x 3/8	12.800	25.600	68.46	U	170667	75852	42667	27307	18963	13932	10667	8428
				Du	0.005	0.012	0.021	0.032	0.047	0.063	0.083	0.105
				C	85333	56889	42667	34133	28444	24381	21333	18963
				Dc	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
4-1/2 x 1/4	10.800	24.300	52.20	U	144000	64000	36000	23040	16000	11755	9000	7111
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	72000	48000	36000	28800	24000	20571	18000	16000
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.074
4-1/2 x 3/8	16.200	36.450	76.65	U	216000	96000	54000	34560	24000	17633	13500	10667
				Du	0.005	0.010	0.018	0.029	0.041	0.056	0.074	0.093
				C	108000	72000	54000	43200	36000	30857	27000	24000
				Dc	0.004	0.008	0.015	0.023	0.033	0.045	0.059	0.074

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 96)

No. Bars/Ft. of Grating Width = 12.800 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
2-1/2 x 1/4	3.333	4.167	28.39	U	1778	1469	1234	1052	907	790	694
				Du	0.207	0.250	0.298	0.350	0.405	0.465	0.529
				C	4444	4040	3703	3418	3174	2963	2778
				Dc	0.165	0.200	0.238	0.280	0.324	0.372	0.424
2-1/2 x 5/16	4.167	5.208	35.18	U	2222	1837	1543	1315	1134	988	868
				Du	0.207	0.250	0.298	0.350	0.406	0.466	0.530
				C	5556	5051	4630	4274	3969	3704	3473
				Dc	0.166	0.200	0.238	0.280	0.324	0.372	0.424
2-1/2 x 3/8	5.000	6.250	41.96	U	2667	2204	1852	1578	1361	1185	1042
				Du	0.207	0.250	0.298	0.350	0.406	0.465	0.530
				C	6667	6061	5556	5128	4762	4444	4167
				Dc	0.166	0.200	0.238	0.280	0.324	0.372	0.424
3 x 1/4	4.800	7.200	35.82	U	2560	2116	1778	1515	1306	1138	1000
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	6400	5818	5333	4923	4571	4267	4000
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 5/16	6.000	9.000	44.01	U	3200	2645	2222	1893	1633	1422	1250
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	8000	7273	6667	6154	5714	5333	5000
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3 x 3/8	7.200	10.800	52.20	U	3840	3174	2667	2272	1959	1707	1500
				Du	0.172	0.209	0.248	0.291	0.338	0.388	0.441
				C	9600	8727	8000	7385	6857	6400	6000
				Dc	0.138	0.167	0.199	0.233	0.270	0.310	0.353
3-1/2 x 1/4	6.533	11.433	41.32	U	3484	2880	2420	2062	1778	1549	1361
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	8711	7919	7259	6701	6222	5807	5444
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
3-1/2 x 3/8	9.800	17.150	60.27	U	5277	4320	3630	3093	2667	2323	2042
				Du	0.148	0.179	0.213	0.250	0.290	0.333	0.378
				C	13067	11879	10889	10051	9333	8711	8167
				Dc	0.118	0.143	0.170	0.200	0.232	0.266	0.303
4 x 1/4	8.533	17.067	46.70	U	4551	3761	3160	2693	2322	2023	1778
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	11377	10343	9481	8752	8127	7585	7111
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 5/16	10.667	21.333	57.58	U	5689	4702	3951	3366	2903	2528	2222
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	14223	12930	11852	10941	10159	9482	8889
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4 x 3/8	12.800	25.600	68.46	U	6827	5642	4741	4039	3483	3034	2667
				Du	0.129	0.156	0.186	0.219	0.253	0.291	0.331
				C	17067	15515	14222	13128	12190	11378	10667
				Dc	0.103	0.125	0.149	0.175	0.203	0.233	0.265
4-1/2 x 1/4	10.800	24.300	52.20	U	5760	4760	4000	3408	2939	2560	2250
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	14400	13091	12000	11077	10286	9600	9000
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235
4-1/2 x 3/8	16.200	36.450	76.65	U	8640	7140	6000	5112	4408	3840	3375
				Du	0.115	0.139	0.166	0.194	0.225	0.259	0.294
				C	21600	19636	18000	16615	15429	14400	13500
				Dc	0.092	0.111	0.132	0.155	0.180	0.207	0.235

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart continues on page 99)

No. Bars/Ft. of Grating Width = 12.800 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus $in.^3$/ Foot of Grating Width	Moment of Inertia $in.^4$/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches							
					12	18	24	30	36	42	48	54
5 x 1/4	13.333	33.333	57.58	U	177773	79010	44443	28444	19753	14512	11111	8779
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	88887	59258	44443	35555	29629	25396	22222	19753
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 5/16	16.667	41.667	71.15	U	222227	98767	55557	35556	24692	18141	13889	10974
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	111113	74076	55557	44445	37038	31747	27778	24692
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5 x 3/8	20.000	50.000	84.84	U	266667	118519	66667	42667	29630	21769	16667	13169
				Du	0.004	0.009	0.017	0.026	0.037	0.051	0.066	0.084
				C	133333	88889	66667	53333	44444	38095	33333	29630
				Dc	0.003	0.007	0.013	0.021	0.030	0.041	0.053	0.067
5-1/2 x 1/4	16.133	44.367	63.02	U	215107	95603	53777	34417	23901	17560	13444	10623
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	107553	71702	53777	43021	35851	30730	26888	23901
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
5-1/2 x 3/8	24.200	66.550	92.91	U	322667	143407	80667	51627	35852	26340	20167	15934
				Du	0.004	0.008	0.015	0.024	0.034	0.046	0.060	0.076
				C	161333	107556	80667	64533	53778	46095	40333	35852
				Dc	0.003	0.007	0.012	0.019	0.027	0.037	0.048	0.061
6 x 1/4	19.200	57.600	68.46	U	256000	113778	64000	40960	28444	20898	16000	12642
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	128000	85333	64000	51200	42667	36571	32000	28444
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 5/16	24.000	72.000	84.84	U	320000	142222	80000	51200	35556	26122	20000	15802
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	160000	106667	80000	64000	53333	45714	40000	35556
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056
6 x 3/8	28.800	86.400	101.10	U	384000	170667	96000	61440	42667	31347	24000	18963
				Du	0.003	0.008	0.014	0.022	0.031	0.042	0.055	0.070
				C	192000	128000	96000	76800	64000	54857	48000	42667
				Dc	0.003	0.006	0.011	0.017	0.025	0.034	0.044	0.056

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

HEAVY DUTY WELDED STEEL GRATING

STATIC LOAD & DEFLECTION TABLE

(Chart begins on page 98)

No. Bars/Ft. of Grating Width = 12.800 — Allowable Fiber Stress = 20,000 psi

U - Uniform Load, Pounds per Square Foot — C - Concentrated Load, Pounds per Foot of Grating Width — D - Deflection, Inches

Bearing Bar Size (Inches)	Section Modulus in.^{3}/ Foot of Grating Width	Moment of Inertia in.^{4}/ Foot of Grating Width	Approx. Weight (lbs/sqft)		Span in Inches						
					60	66	72	78	84	90	96
5 x 1/4	13.333	33.333	57.58	U	7111	5877	4938	4208	3628	3160	2778
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	17777	16161	14814	13675	12698	11852	11111
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 5/16	16.667	41.667	71.15	U	8889	7346	6173	5260	4535	3951	3472
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	22223	20202	18519	17094	15873	14815	13889
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5 x 3/8	20.000	50.000	84.84	U	10667	8815	7407	6312	5442	4741	4167
				Du	0.103	0.125	0.149	0.175	0.203	0.233	0.265
				C	26667	24242	22222	20513	19048	17778	16667
				Dc	0.083	0.100	0.119	0.140	0.162	0.186	0.212
5-1/2 x 1/4	16.133	44.367	63.02	U	8604	7111	5975	5091	4390	3824	3361
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	21511	19555	17926	16547	15365	14340	13444
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
5-1/2 x 3/8	24.200	66.550	92.91	U	12907	10667	8963	7637	6585	5736	5042
				Du	0.094	0.114	0.135	0.159	0.184	0.212	0.241
				C	32267	29333	26889	24821	23048	21511	20167
				Dc	0.075	0.091	0.108	0.127	0.147	0.169	0.193
6 x 1/4	19.200	57.600	68.46	U	10240	8463	7111	6059	5224	4551	4000
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	25600	23273	21333	19692	18286	17067	16000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 5/16	24.000	72.000	84.84	U	12800	10579	8889	7574	6531	5689	5000
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	32000	29091	26667	24615	22857	21333	20000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177
6 x 3/8	28.800	86.400	101.10	U	15360	12694	10667	9089	7837	6827	6000
				Du	0.086	0.104	0.124	0.146	0.169	0.194	0.221
				C	38400	34909	32000	29538	27429	25600	24000
				Dc	0.069	0.083	0.099	0.117	0.135	0.155	0.177

NOTE: When serrated grating is specified, the depth of grating required for a specific load will be 1/4" greater than that shown in these tables. Loads are theoretical and are based on a unit stress of 20,000 psi.

Loads shown above DO NOT include the dead load of the grating

Model Specification: 15-W-4 Heavy-Duty Steel Bar Gratings

September 14, 2022

Specifier Notes: Architect or engineer should carefully review and edit this section to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and the drawings and delete any unused "Specifier Notes" and options shown in **"red"** after editing.

This section covers Pleasant Mount Welding, Inc.'s "15-W-4 Heavy-Duty Steel Bar Gratings." Consult PMWI (www.pmwi.net) for assistance in editing this section for specific applications. Call 570.282.6164 or email sales@pmwi.net with any questions.

SECTION 055300 - Metal Fabrications: Metal Gratings

Part 1: General

1.1 Section Includes

A. Prefabricated, heavy-duty carbon steel bar gratings.

B. Prefabricated support frames for gratings.

C. Miscellaneous installation hardware and accessories.

1.2 Reference Standards

A. ANSI A326.3-2017: American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

B. ASTM Grade-36 Carbon Steel.

C. ASTM A-510: Carbon Steel Wire Rods.

D. ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

1.3 Action Submittals

A. Product Data: The contractor shall submit the manufacturer's catalog pages including load tables, anchor details and standard installation details.

B. Shop Drawings: The contractor shall submit for approval shop drawings for the fabrication and erection of all gratings, based on construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners.

C. Samples of grating and anchorage system shall be submitted for approval.

1.4 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 5 years of documented experience.

B. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

Part 2: Products

2.1 Source Requirements:

Design is based upon use of gratings as manufactured by Pleasant Mount Welding, Inc. and terminology used herein may include reference to the specific performance or product of this manufacturer. Such reference shall be construed only as establishing the quality of materials, operational features and workmanship used under this section and shall not, in any way, be construed as limiting competition.

2.2 Manufacturers:

Acceptable manufacturers include Pleasant Mount Welding, Inc. (45 Dundaff Street, Carbondale, PA 18407, 570-282-6164, www.pmwi.net) or approved equal.

2.3 Manufactured Units:

A. **Description:** Heavy-Duty Carbon Steel Bar Grating type **15-W-4 with a Galvanized finish**. Heavy-duty cross bars are welded perpendicular to heavy-duty main bearing bars.

1. Main Bearing Bar Spacing: **15/16"** on center.
2. Main Bearing Bar Depth: based on loading requirements and clear span as shown on drawings.
3. Main Bearing Bar Thickness: **1/4" | 5/16" | 3/8"** as shown on drawings.
4. Cross Bar Spacing: **4"** on center.
5. Top Surface of Main Bearing Bars: **Smooth | Serrated | SlipNOT® Slip Resistance Coating**

B. **Fabrication:** Load Band ends of grating with bars of the same thickness as main bearing bars. Weld banding flush with the top surface of grating. Depth of banding is to be 1/2" less than the depth of the main bearing bars (as shown in drawings). **Include welded anchor blocks 1/4" from the bottom surface with hole to accept washer and attachment bolts.**

C. **Steel Frames: Carbon Steel ASTM Grade-36 frames shall be provided as shown on contract drawings to support and attach gratings. Include anchors as shown for locking frame into concrete as shown on the plans. Galvanize frames after fabrication per ASTM A-123.**

D. **Design Criteria:**

1. **Loading:** Unless shown otherwise on the contract drawings, gratings shall be designed and manufactured to meet live load conditions of **AASHTO HS-20 with 30% impact factor**. Main bearing bar depth shall be as shown in contract drawings or as recommended by the manufacturer to meet loading requirements and clear span conditions.

2. **Traction / Slip-Resistance**: When a traction surface is required, it is to be tested per ANSI A326.3-2017. Top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet high traction classification.

E. **Materials:** Main bearing bars and rectangular cross bars are to be type ASTM Grade-36 Carbon Steel. Round cross bars are to be per ASTM A-510. Banding is to be carbon steel per ASTM Grade-36.

F. **Fabrication Tolerances** shall be in accordance with ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

G. **Top Surface:** When required, **SlipNOT® Slip Resistance Coating** will be included in order to meet or exceed Wet Dynamic COF requirements of paragraph 2.3 D.2 above.

H. **Finish:** Gratings and frames shall be **Hot-Dip Galvanized per ASTM A-123 or Powder Coated Black [or other color] as shown on drawings.**

2.4 Accessories:

Provide appropriate fasteners for type, grade, and class required for approved anchorage system. **Include lifting devices and all other accessories as shown on the drawings.**

Part 3: Execution

3.1 Field Verification:

Take field measurements prior to preparation of final shop drawings (and fabrication where required) to ensure proper fitting of the work.

3.2 Installation

A. Prior to grating installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the gratings. Metal shall be used for all grating supports and provide the minimum bearing surface for the depth of grating per ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual. Ends of all bearing bars at cutouts for penetrations are to be supported in like manner. Any inconsistencies between contract drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the engineer, architect or owner's agent prior to placement.

B. Install grating in accordance with shop drawings and standard installation clearances as recommended by ANSI/NAAMM MBG 532-19: Heavy-Duty Metal Bar Grating Manual.

3.3 Grating Attachment:

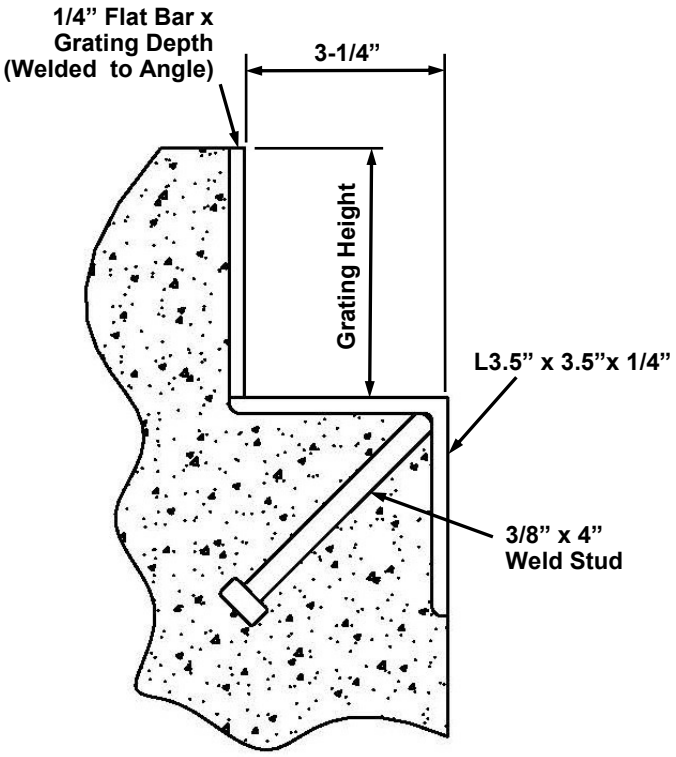
Use approved attachment system and fasteners to secure grating to supporting members as shown on plans.

GRATING EMBED FRAMES

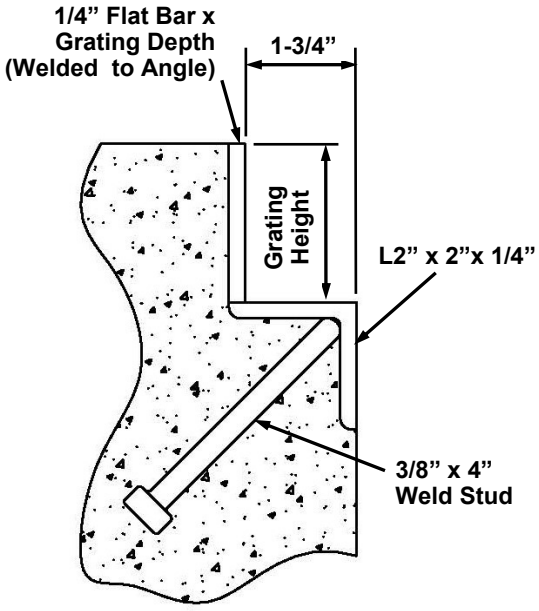
Grating embed frames cast into concrete floors and substructures have many advantages that help to extend the life of all projects where open flooring is required. Steel frames form a permanent perimeter shield for concrete leading edges that are subject to cracking and chipping when left unprotected. During construction these rigid embed frames expedite forming and provide a welded structure that ensures accuracy in the concrete pour. These grating frames provide a uniform bearing surface for our Heavy Duty Welded Steel grating and helps eliminate the potential for rocking or irregular elevations typically experienced when grating is installed directly on poured concrete.

All embed steel frames are available in four sided, one-piece construction and can accommodate any clear opening requirements. Long lengths can be provided with fabricated corners for field installation when required. Embed frames can be provided mill finished, galvanized or with a black powder coat finish. All PMWI steel embed frames are provided with 3/8" x 4" headed concrete stud anchors welded within 6" of each corner and at a maximum 24" center-to-center spacing.

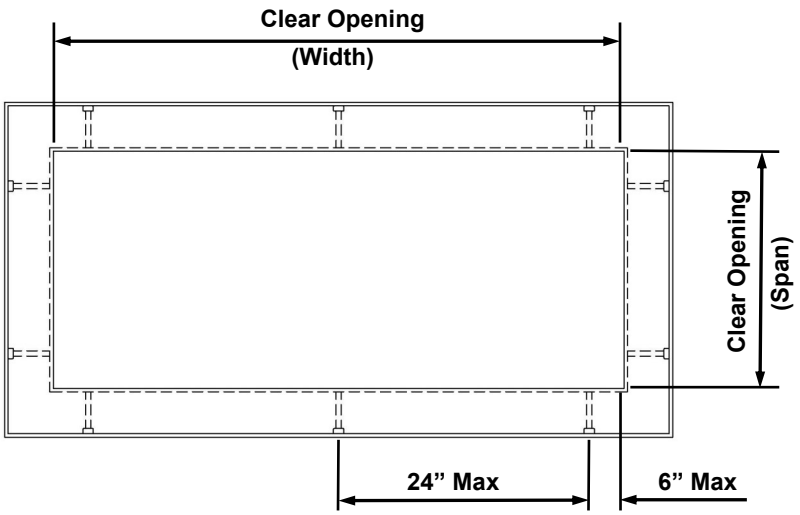
PMWI offers two styles of embed frames as shown. The Light Duty frame provides a minimal amount of bearing surface for lighter loads and the Heavy Duty frame option offers greater load bearing capability for heavier loading conditions.



Heavy Duty



Light Duty



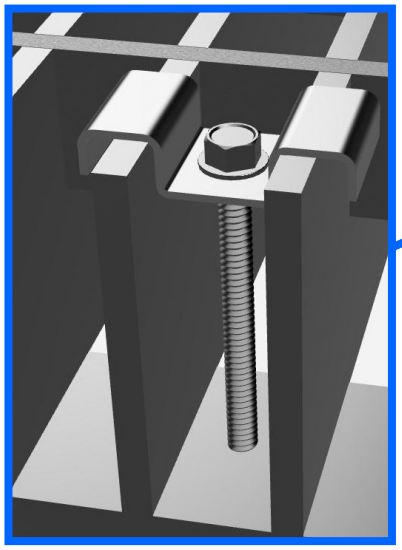
Frames are available as one-piece welded construction or individual pieces

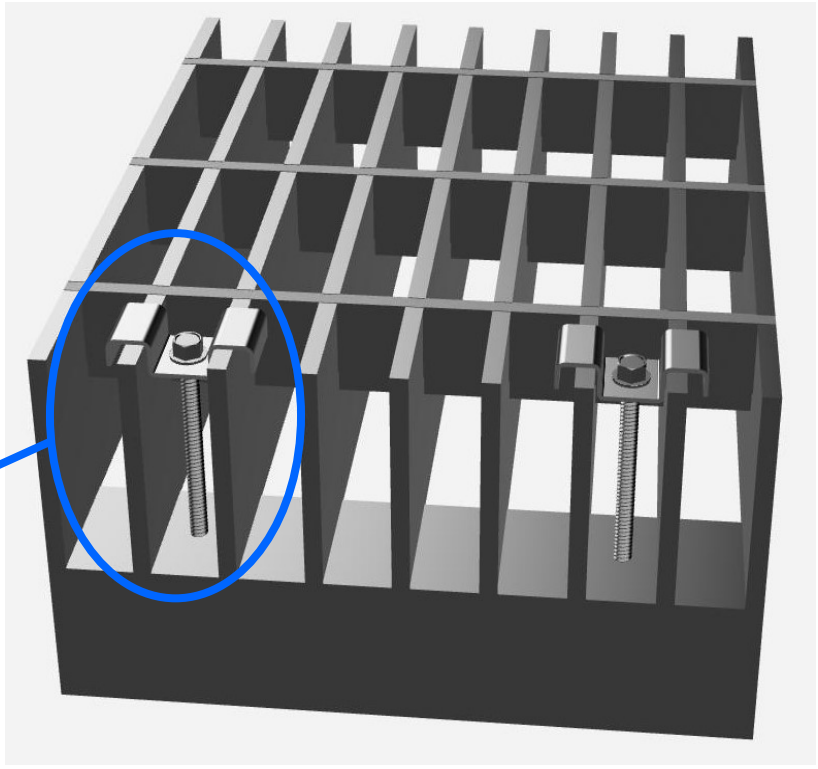
STEEL GRATING ANCHOR DEVICES

SADDLE CLIP

A special bent-clip type fastener for removable steel bar grating panels, available in stainless steel and galvanized steel.

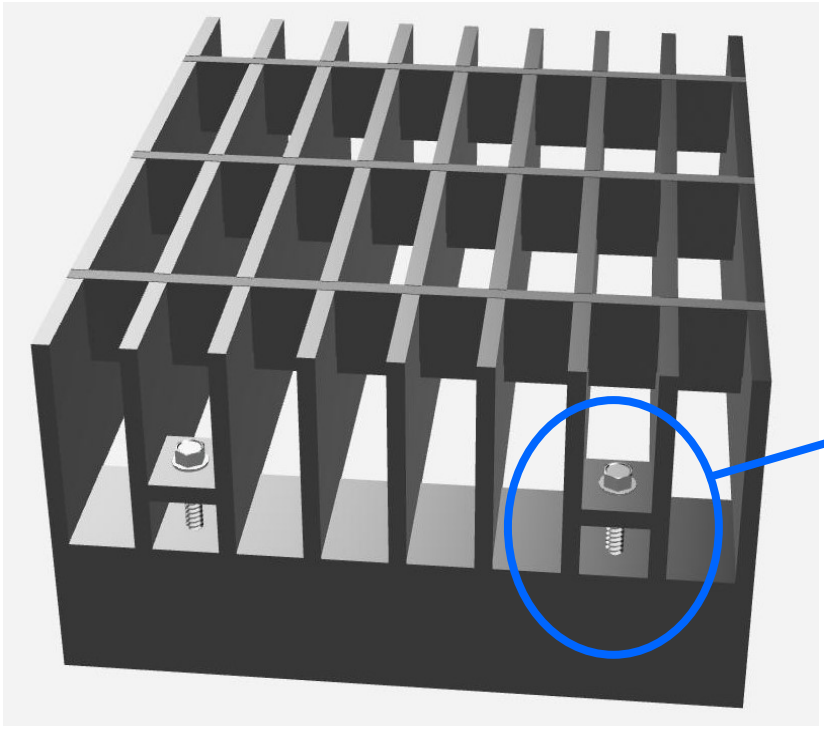
Note: Cross bars may need to be snipped in the field to facilitate placement of saddle clips.

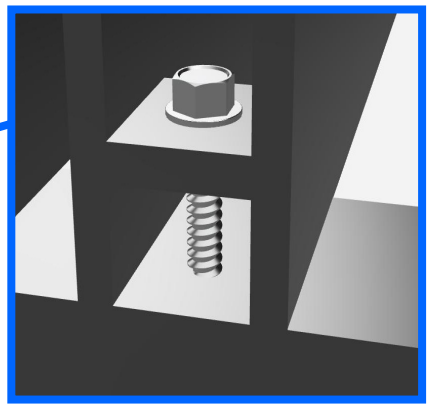




ANCHOR BLOCK

Anchor blocks of 1/4” or 3/16” thick steel may be shop welded by grating manufacturer and used to fasten permanent or removable grating panels. Anchor blocks are recessed to provide a trip-free surface.

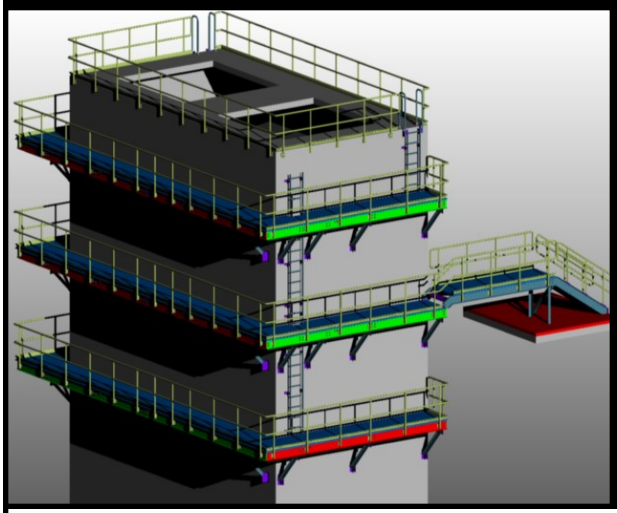


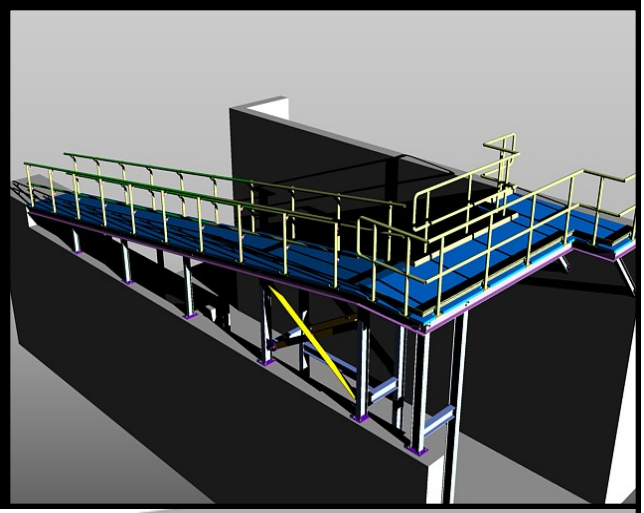


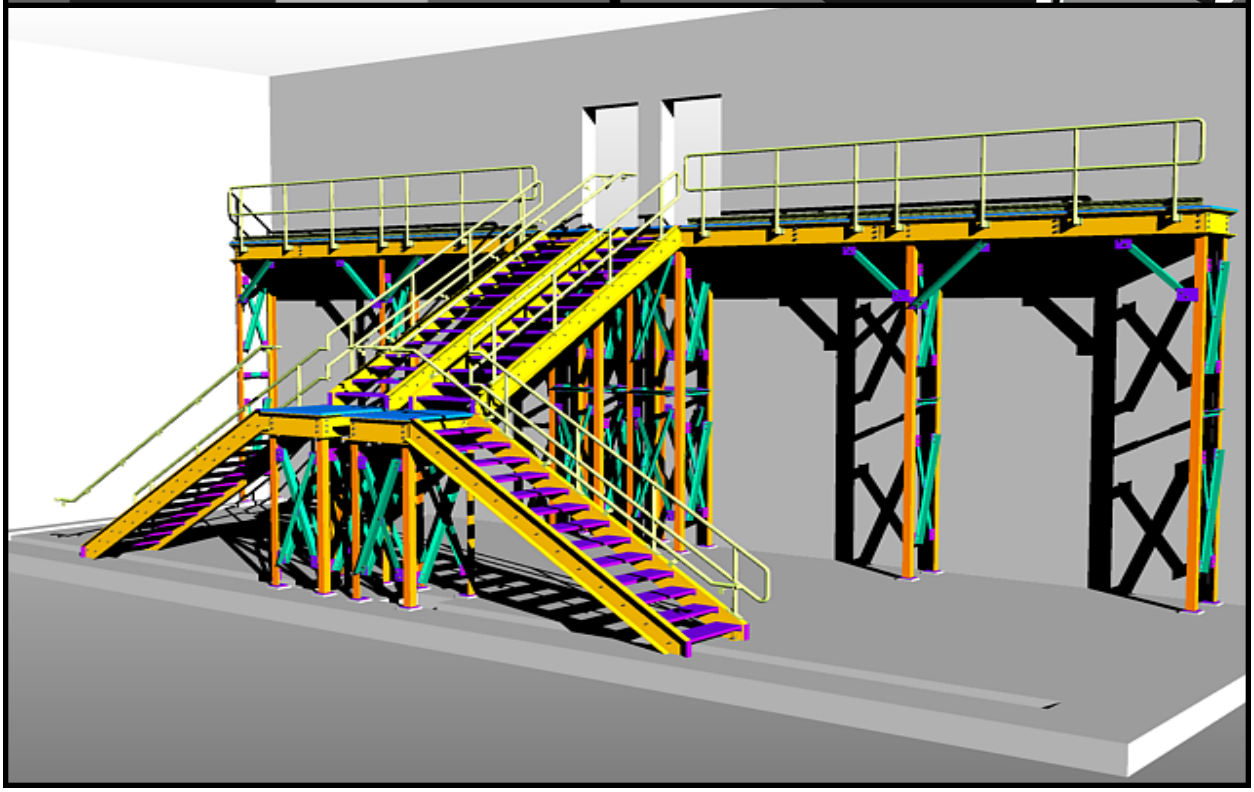
Note: Tack welding of grating in the field (by others) is also an acceptable method for anchoring all permanently installed grating.

Pleasant Mount Welding Inc.
continues to advance into the
future by now offering drawings in
3D modeling software

ADVANCE STEEL







ENGINEERING FIRMS

PMWI HAS COMPLETED MISCELLANEOUS METALS CONTRACTS FOR WATER OR WASTEWATER PROJECTS DESIGNED BY THE FOLLOWING ENGINEERS.

KARAM ASSOCIATES
CLARK ENGINEERS
GANNETT FLEMING, INC.
BRINJAC KAMBIC & ASSOCIATES
CHARLES MANGANARO CONSULTING ENGINEERS
GLACE ASSOCIATES
BCM ENGINEERS & SCIENTISTS
KILLAM ASSOCIATES
CLOUGH HARBOUR ASSOCIATES
MILNES ENGINEERING
RIELLY ASSOCIATES
DELAWARE ENGINEERING
T & M ASSOCIATES
LANC & TULLY ENGINEERING, INC
STEARNS & WHELER, INC.
C.T. CONSULTANTS, INC.
WHITMAN, REQUARDT & ASSOCIATES
ROY F. WESTON ENGINEERS
HAVENS & EMERSON, INC.
POST, BUCKELY, SCHUH & JERNIGAN, INC.
HAZEN & SAWYER, INC.
ACER ENGINEERS & CONSULTANTS
O'BRIEN & GERE ENGINEERS, INC.
GSEE ENVIROMENTAL CONSULTANTS
SYSTEMS DESIGN ENGINEERING, INC.
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