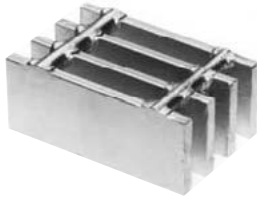


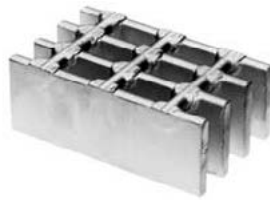
19-H-4 & 19-H-2 Heavy-Duty Steel Grating

Heavy-Duty Welded

1-3/16" Center to Center of Bearing Bars



19-H-4
Cross Rods 4" C/C



19-H-2
Cross Rods 2" C/C

Material: ASTM A-36 standard

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

General: Loads and deflections are theoretical and based on static loading.

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. These can be exceeded for other types of loads with engineer's approval. For deflections of uniform and concentrated loads, consult Marco's engineering departments.

U= safe uniform load, psf
C= safe concentrated load, pfw
D= deflection, inches
E= modulus of elasticity, 29,000,000 psi
F= fiber stress, 20,000 psi

Load & Deflection Table

Bar Size	Symbol	Approx. Weight psf	Sec mod Per Ft of Width	SPAN (Length of Bearing Bar)	SPAN (Length of Bearing Bar)											
					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"	19-4-44	9.4	0.421	U	1,404	898	624	458	351	277	225	186	156	115	88	
	19-2-44	10.0		C	1,404	1,123	936	802	702	624	561	510	468	401	351	
1" x 5/16"	19-4-45	12.5	0.526	U	1,754	1,123	780	573	439	347	281	232	195	143	110	
	19-2-45	14.0		C	1,754	1,404	1,170	1,003	877	780	702	638	585	501	439	
1" x 3/8"	19-4-46	14.7	0.632	U	2,105	1,347	936	687	526	416	337	278	234	172	132	
	19-2-46	16.2		C	2,105	1,684	1,404	1,203	1,053	936	842	766	702	602	526	
1-1/4" x 1/4"	19-4-54	11.6	0.658	U	2,193	1,404	975	716	548	433	351	290	244	179	137	
	19-2-54	12.2		C	2,193	1,754	1,462	1,253	1,096	975	877	797	731	627	548	
1-1/4" x 5/16"	19-4-55	15.2	0.822	U	2,741	1,754	1,218	895	685	541	439	362	305	224	171	
	19-2-55	16.8		C	2,741	2,193	1,827	1,566	1,371	1,218	1,096	997	914	783	685	
1-1/4" x 3/8"	19-4-56	18.0	0.987	U	3,289	2,105	1,462	1,074	822	650	526	435	365	269	206	
	19-2-56	19.5		C	3,289	2,632	2,193	1,880	1,645	1,462	1,316	1,196	1,096	940	822	
1-1/2" x 1/4"	19-4-64	13.8	0.947	U	3,158	2,021	1,404	1,031	789	624	505	418	351	258	197	
	19-2-64	14.3		C	3,158	2,526	2,105	1,805	1,579	1,404	1,263	1,148	1,053	902	789	
1-1/2" x 5/16"	19-4-65	18.0	1.184	U	3,947	2,526	1,754	1,289	987	780	632	522	439	322	247	
	19-2-65	19.5		C	3,947	3,158	2,632	2,256	1,974	1,754	1,579	1,435	1,316	1,128	987	
1-1/2" x 3/8"	19-4-66	21.3	1.421	U	4,737	3,032	2,105	1,547	1,184	936	758	626	526	387	296	
	19-2-66	22.8		C	4,737	3,789	3,158	2,707	2,368	2,105	1,895	1,722	1,579	1,353	1,184	
1-3/4" x 1/4"	19-4-74	16.0	1.289	U	4,298	2,751	1,910	1,404	1,075	849	688	568	478	351	269	
	19-2-74	16.6		C	4,298	3,439	2,865	2,456	2,149	1,910	1,719	1,563	1,433	1,228	1,075	
1-3/4" x 5/16"	19-4-75	20.7	1.612	U	5,373	3,439	2,388	1,754	1,343	1,061	860	710	597	439	336	
	19-2-75	22.3		C	5,373	4,298	3,582	3,070	2,686	2,388	2,149	1,954	1,791	1,535	1,343	
1-3/4" x 3/8"	19-4-76	24.6	1.934	U	6,447	4,126	2,865	2,105	1,612	1,274	1,032	853	716	526	403	
	19-2-76	26.1		C	6,447	5,158	4,298	3,684	3,224	2,865	2,579	2,344	2,149	1,842	1,612	
2" x 1/4"	19-4-84	18.2	1.684	U	5,614	3,593	2,495	1,833	1,404	1,109	898	742	624	458	351	
	19-2-84	18.8		C	5,614	4,491	3,743	3,208	2,807	2,495	2,246	2,041	1,871	1,604	1,404	
2" x 5/16"	19-4-85	23.5	2.105	U	7,018	4,491	3,119	2,291	1,754	1,386	1,123	928	780	573	439	
	19-2-85	25.0		C	7,018	5,614	4,678	4,010	3,509	3,119	2,807	2,552	2,339	2,005	1,754	
2" x 3/8"	19-4-86	27.9	2.526	U	8,421	5,389	3,743	2,750	2,105	1,663	1,347	1,114	936	687	526	
	19-2-86	29.4		C	8,421	6,737	5,614	4,812	4,211	3,743	3,368	3,062	2,807	2,406	2,105	
2-1/4" x 1/4"	19-4-94	20.4	2.132	U	7,105	4,547	3,158	2,320	1,776	1,404	1,137	940	789	580	444	
	19-2-94	21.1		C	7,105	5,684	4,737	4,060	3,553	3,158	2,842	2,584	2,368	2,030	1,776	
2-1/4" x 5/16"	19-4-95	26.2	2.664	U	8,882	5,684	3,947	2,900	2,220	1,754	1,421	1,174	987	725	555	
	19-2-95	27.8		C	8,882	7,105	5,921	5,075	4,441	3,947	3,553	3,230	2,961	2,538	2,220	
2-1/4" x 3/8"	19-4-96	31.1	3.197	U	10,658	6,821	4,737	3,480	2,664	2,105	1,705	1,409	1,184	870	666	
	19-2-96	32.6		C	10,658	8,526	7,105	6,090	5,329	4,737	4,263	3,876	3,553	3,045	2,664	
2-1/2" x 1/4"	19-4-104	22.6	2.632	U	8,772	5,614	3,899	2,864	2,193	1,733	1,404	1,160	975	716	548	
	19-2-104	23.3		C	8,772	7,018	5,848	5,013	4,386	3,899	3,509	3,190	2,924	2,506	2,193	
2-1/2" x 5/16"	19-4-105	29.0	3.289	U	10,965	7,018	4,873	3,580	2,741	2,166	1,754	1,450	1,218	895	685	
	19-2-105	30.5		C	10,965	8,772	7,310	6,266	5,482	4,873	4,386	3,987	3,655	3,133	2,741	
2-1/2" x 3/8"	19-4-106	34.4	3.947	U	13,158	8,421	5,848	4,296	3,289	2,599	2,105	1,740	1,462	1,074	822	
	19-2-106	35.9		C	13,158	10,526	8,772	7,519	6,579	5,848	5,263	4,785	4,386	3,759	3,289	
2-3/4" x 1/4"	19-4-114	25.7	3.184	U	10,614	6,793	4,717	3,466	2,654	2,097	1,698	1,404	1,179	866	663	
	19-2-114	27.2		C	10,614	8,491	7,076	6,065	5,307	4,717	4,246	3,860	3,538	3,033	2,654	
2-3/4" x 5/16"	19-4-115	32.3	3.980	U	13,268	8,491	5,897	4,332	3,317	2,621	2,123	1,754	1,474	1,083	829	
	19-2-115	34.3		C	13,268	10,614	8,845	7,581	6,634	5,897	5,307	4,825	4,423	3,791	3,317	
2-3/4" x 3/8"	19-4-116	38.3	4.776	U	15,921	10,189	7,076	5,199	3,980	3,145	2,547	2,105	1,769	1,300	995	
	19-2-116	40.3		C	15,921	12,737	10,614	9,098	7,961	7,076	6,368	5,789	5,307	4,549	3,980	

19-H-4 & 19-H-2 Heavy-Duty Steel Grating

19-H-4 & 19-H-2 (continued)

1-3/16" Center to Center of Bearing Bars

Load & Deflection Table

Bar Size	Symbol	Approx. Weight psf	Sec mod Per Ft of Width	SPAN (Length of Bearing Bar)											
				2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"	
3" x 1/4"	19-4-124	27.9	3.789	U	12,632	8,084	5,614	4,125	3,158	2,495	2,021	1,670	1,404	1,031	789
	19-2-124	29.4		C	12,632	10,105	8,421	7,218	6,316	5,614	5,053	4,593	4,211	3,609	3,158
3" x 5/16"	19-4-125	35.0	4.737	U	15,789	10,105	7,018	5,156	3,947	3,119	2,526	2,088	1,754	1,289	987
	19-2-125	37.1		C	15,789	12,632	10,526	9,023	7,895	7,018	6,316	5,742	5,263	4,511	3,947
3" x 3/8"	19-4-126	41.6	5.684	U	18,947	12,126	8,421	6,187	4,737	3,743	3,032	2,505	2,105	1,547	1,184
	19-2-126	43.6		C	18,947	15,158	12,632	10,827	9,474	8,421	7,579	6,890	6,316	5,414	4,737
3-1/4" x 1/4"	19-4-134	30.1	4.447	U	14,825	9,488	6,589	4,841	3,706	2,928	2,372	1,960	1,647	1,210	927
	19-2-134	31.6		C	14,825	11,860	9,883	8,471	7,412	6,589	5,930	5,391	4,942	4,236	3,706
3-1/4" x 5/16"	19-4-135	37.8	5.559	U	18,531	11,860	8,236	6,051	4,633	3,660	2,965	2,450	2,059	1,513	1,158
	19-2-135	39.8		C	18,531	14,825	12,354	10,589	9,265	8,236	7,412	6,738	6,177	5,294	4,633
3-1/4" x 3/8"	19-4-136	44.9	6.671	U	22,237	14,232	9,883	7,261	5,559	4,392	3,558	2,940	2,471	1,815	1,390
	19-2-136	46.9		C	22,237	17,789	14,825	12,707	11,118	9,883	8,895	8,086	7,412	6,353	5,559
3-1/2" x 1/4"	19-4-144	32.4	5.158	U	17,193	11,004	7,641	5,614	4,298	3,396	2,751	2,273	1,910	1,404	1,075
	19-2-144	33.9		C	17,193	13,754	11,462	9,825	8,596	7,641	6,877	6,252	5,731	4,912	4,298
3-1/2" x 5/16"	19-4-145	40.5	6.447	U	21,491	13,754	9,552	7,018	5,373	4,245	3,439	2,842	2,388	1,754	1,343
	19-2-145	42.6		C	21,491	17,193	14,327	12,281	10,746	9,552	8,596	7,815	7,164	6,140	5,373
3-1/2" x 3/8"	19-4-146	42.6	7.737	U	25,789	16,505	11,462	8,421	6,447	5,094	4,126	3,410	2,865	2,105	1,612
	19-2-146	50.2		C	25,789	20,632	17,193	14,737	12,895	11,462	10,316	9,378	8,596	7,368	6,447
4" x 1/4"	19-4-164	36.8	6.737	U	22,456	14,372	9,981	7,333	5,614	4,436	3,593	2,969	2,495	1,833	1,404
	19-2-164	38.3		C	22,456	17,965	14,971	12,832	11,228	9,981	8,982	8,166	7,485	6,416	5,614
4" x 5/16"	19-4-165	46.0	8.421	U	28,070	17,965	12,476	9,166	7,018	5,545	4,491	3,712	3,119	2,291	1,754
	19-2-165	48.1		C	28,070	22,456	18,713	16,040	14,035	12,476	11,228	10,207	9,357	8,020	7,018
4" x 3/8"	19-4-166	54.7	10.105	U	33,684	21,558	14,971	10,999	8,421	6,654	5,389	4,454	3,743	2,750	2,105
	19-2-166	56.8		C	33,684	26,947	22,456	19,248	16,842	14,971	13,474	12,249	11,228	9,624	8,421
4-1/2" x 1/4"	19-4-184	41.2	8.526	U	28,421	18,189	12,632	9,280	7,105	5,614	4,547	3,758	3,158	2,320	1,776
	19-4-185	42.7		C	28,421	22,737	18,947	16,241	14,211	12,632	11,368	10,335	9,474	8,120	7,105
4-1/2" x 5/16"	19-2-185	51.5	10.658	U	35,526	22,737	15,789	11,600	8,882	7,018	5,684	4,698	3,947	2,900	2,220
	19-4-186	53.6		C	35,526	28,421	23,684	20,301	17,763	15,789	14,211	12,919	11,842	10,150	8,882
4-1/2" x 3/8"	19-2-186	61.3	12.789	U	42,632	27,284	18,947	13,921	10,658	8,421	6,821	5,637	4,737	3,480	2,664
	19-4-204	63.4		C	42,632	34,105	28,421	24,361	21,316	18,947	17,053	15,502	14,211	12,180	10,658
5" x 1/4"	19-2-204	45.6	10.526	U	35,088	22,456	15,595	11,457	8,772	6,931	5,614	4,640	3,899	2,864	2,193
	19-4-205	47.1		C	35,088	28,070	23,392	20,050	17,544	15,595	14,035	12,759	11,696	10,025	8,772
5" x 5/16"	19-2-205	57.0	13.158	U	43,860	28,070	19,493	14,322	10,965	8,664	7,018	5,800	4,873	3,580	2,741
	19-4-206	59.1		C	43,860	35,088	29,240	25,063	21,930	19,493	17,544	15,949	14,620	12,531	10,965
5" x 3/8"	19-2-206	67.9	15.789	U	52,632	33,684	23,392	17,186	13,158	10,396	8,421	6,960	5,848	4,296	3,289
	19-4-244	70.0		C	52,632	42,105	35,088	30,075	26,316	23,392	21,053	19,139	17,544	15,038	13,158
6" x 1/4"	19-2-244	54.4	15.158	U	50,526	32,337	22,456	16,498	12,498	9,981	8,084	6,681	5,614	4,125	3,158
	19-4-245	55.9		C	50,526	40,421	33,684	28,872	25,263	22,456	20,211	18,373	16,842	14,436	12,632
6" x 5/16"	19-2-245	68.0	18.947	U	63,158	40,421	28,070	20,623	15,789	12,476	10,105	8,351	7,018	5,156	3,947
	19-4-246	70.1		C	63,158	50,526	42,105	36,090	31,579	28,070	25,263	22,967	21,053	18,045	15,789
6" x 3/8"	19-2-246	81.1	22.737	U	75,789	48,505	33,684	24,748	18,947	14,971	12,126	10,022	8,421	6,187	4,737
	19-2-245	83.1		C	75,789	60,632	50,526	43,308	37,895	33,684	30,316	27,560	25,263	21,654	18,947

U= safe uniform load, psf - C= safe concentrated load, pfw - D= deflection, inches - E= modulus of elasticity, 29,000,000 psi - F= fiber stress, 20,000 psi

H-19 PANEL WIDTH (inches) Note: H-Heavy-Duty cross rods may extend 1/8" each side. Panel widths do not include these extensions.

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1/4" Bar	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	19 1/4
5/16" Bar	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	19 5/16
3/8" Bar	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	19 3/8
No. of Bars	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
1/4" Bar	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" Bar	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" Bar	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		