

**...the pioneer in the
development of
modern open web
framing systems**

The origin of modern open web framing systems was Macomber's development of the first open web steel joist in 1923.

Every major improvement of open web structural framing components since then has been pioneered by Macomber.

Open web steel framing systems have been accepted throughout the western world among architects and engineers, providing clients with economical steel systems that are architecturally attractive and structurally sound.

Through engineering redesign and standardization, Macomber has developed an improved system programmed to effect the most efficient usage of each component. These economies will result in direct cost savings to the customer, faster delivery and erection time, while still maintaining the same Macomber time-proven engineering and quality excellence.

This catalog has been prepared to assist you in utilizing the Macomber open web framing system to its fullest advantage, both structurally and economically.

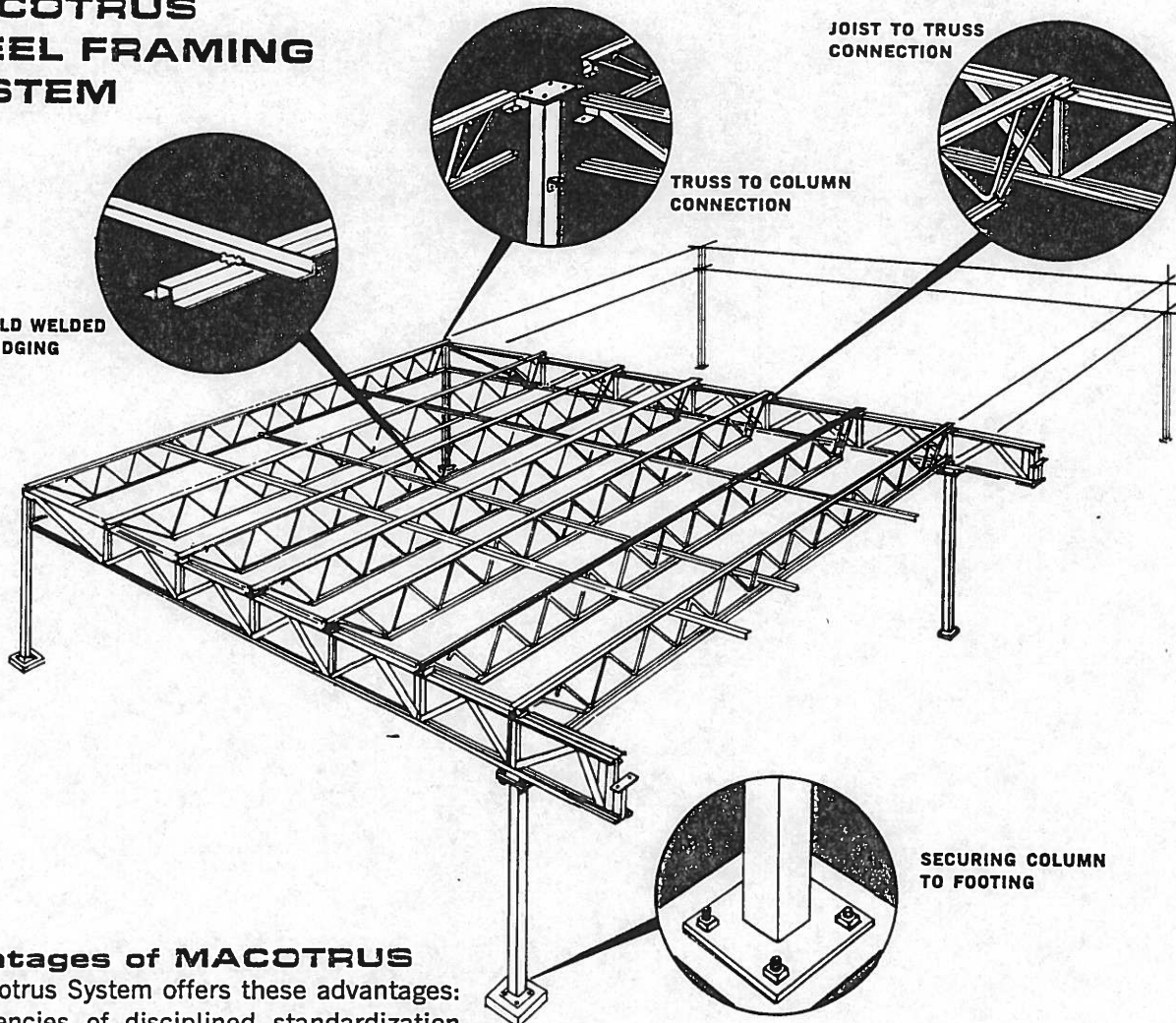
MACOTRUS STEEL FRAMING SYSTEM

FIELD WELDED
BRIDGING

JOIST TO TRUSS
CONNECTION

TRUSS TO COLUMN
CONNECTION

SECURING COLUMN
TO FOOTING



advantages of MACOTRUS

The Macotrus System offers these advantages:

1. Efficiencies of disciplined standardization result in cost savings to the customer.
2. Strength and rigidity of frame is due to utilization of Macomber high strength cold roll formed sections throughout its components.
3. Economy is realized through high strength to weight ratio of the joist design.
4. Macotrus allows the use of larger bay sizes. Savings on labor costs result from fewer columns to erect.
5. Erection is simple, fast and economical.
6. Relatively rigid girder to column connections insure stiffness, strength and stability under service conditions.
7. The open web feature of purlins and Macotrus permits penetration of mechanical and electrical services. This feature eliminates unsightly suspended ducts and conduits which interfere with clear heights.

dimensional freedom

The Macomber Macotrus System is available for five planning modules or joist spacings. These spacings — 5'-0", 5'-6", 6'-0", 6'-3" and 6'-8" — satisfy most framing requirements. Column spacings along truss lines are in multiples of these modules. Column spacings perpendicular to truss lines may vary, allowing customer complete freedom to suit conditions.

MACOTRUS framing components

The Macotrus System is composed of open web girders, open web joists and tubular columns.

Standard tubular columns designed, formed and fabricated by Macomber support the open web framing system.

Primary framing members are Macotrus Girders. They span between columns and support steel joists. High Strength cold roll formed chords and webs are utilized for components of the girder. Standard Macotrus girders are available in depths of 28", 32" or 36". Deep girder to column connections give exceptional rigidity on simple span conditions.

Use of cantilevered girders may provide a more economical roof framing for buildings requiring larger clear areas.

Open web steel joists are the secondary members. They bear on the top chord of the Macotrus Girders and span between the girders to support steel roof or floor deck.

High strength cold roll formed sections are utilized as top and bottom chords for Macomber joists.

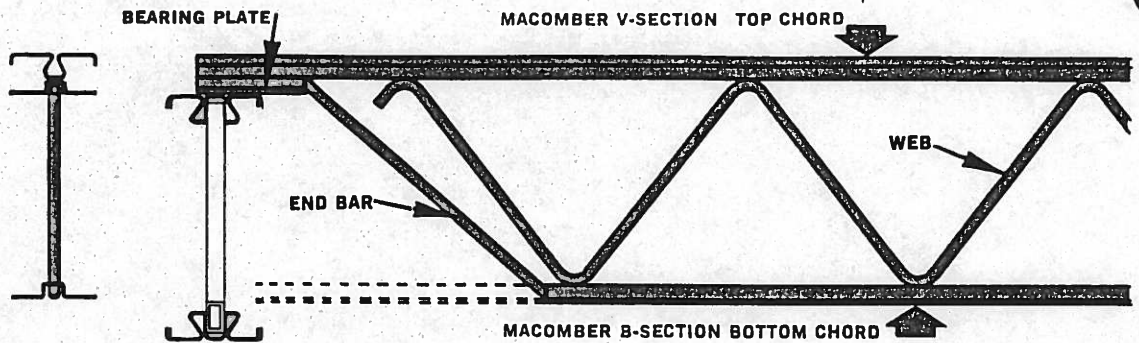
A complete range of open web joists is available for use, depending on loading requirements. The joists may be bolted or welded to the top chord of the girders.

MACOTRUS framing systems

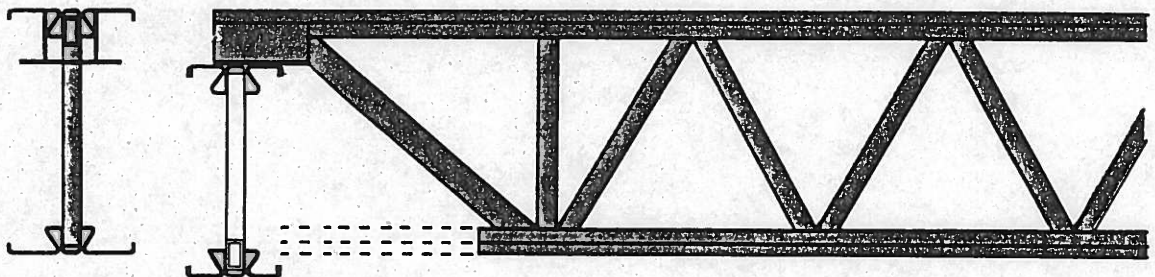
standard open web joists

Open web joists consist of chords, bearing plates, end bars and web system. The open web design provides a freeway for duct, pipe and conduit installations.

1 1/4" V-Section chords are generally used for joists under uniform loading for spans to 56 feet.



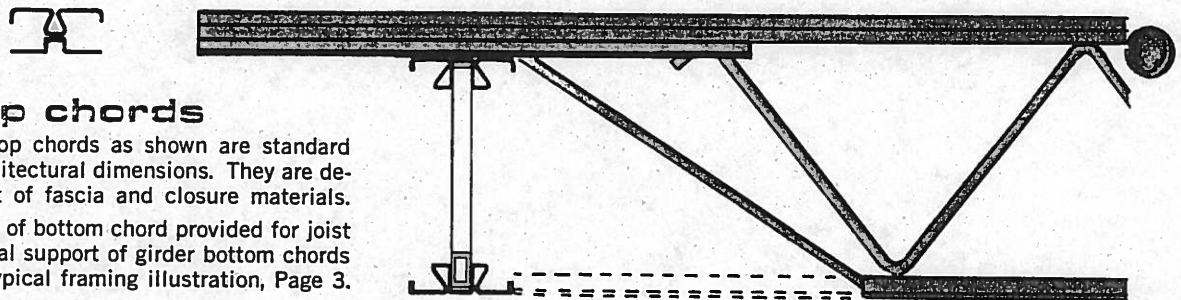
The Macomber VV-Section chords and rectangular tube webs are used for spans over 40 feet, depending on loading conditions.



extended top chords

Open web joist extended top chords as shown are standard components, subject to architectural dimensions. They are designed for easy attachment of fascia and closure materials.

Dotted line shows extension of bottom chord provided for joist at column line and for lateral support of girder bottom chords in compression. Refer to typical framing illustration, Page 3.



how to use the load tables

OPEN WEB JOISTS, Pages 8 through 11:

Multiply the required total load per square foot by the joist spacing to determine the total load per lineal foot of joist. Under the proper "Clear Span in Feet" column, select the joist with the smallest size top chord, whose capacity equals or exceeds the required load per lineal foot. If there is a limitation on the joist depth, select the joist having the maximum allowable depth.

OPEN WEB GIRDERS, Pages 12 through 15:

Determine the load on the girder from each joist by multiplying the total load per lineal foot of joist by one-half of the span. Remember there are usually two joists at each connection, one coming from each side of the girder. The total load at the connection, from both joists, equals "P" in the formulas for bending moments and reactions on Page 6.

Determine the required bending moment and reaction from the formulas, being careful to choose the proper formula according to the number of joist

spaces in the length of the girder. Note that girder span "L" is the distance from center to center of column.

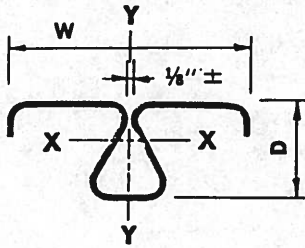
Resisting moments and allowable shears for standard simple span girders are found on page 12. For standard cantilever girders refer to the tables on either page 13 or 14, depending on the module used. Select the deepest and smallest chord size girder capable of carrying these bending moments and reactions within the existing limitations of depth.

STANDARD COLUMNS, Page 7:

Determine the total load to be supported by the column. Under the heading for the longest unbraced height along either axis of the column, select the lightest size which will carry the required load.

If the column must resist wind forces or other loads inducing bending, refer to the AISC Specifications governing combined stresses for determining proper column sizes.

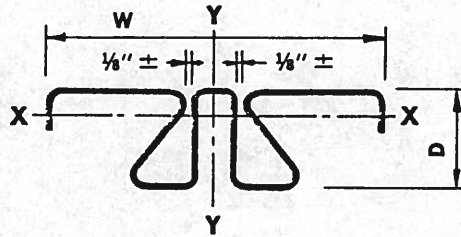
chord properties



1 1/4" V Section

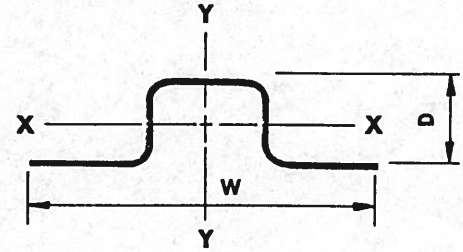
V-Section No.	Flange Width W In.	Overall Depth D In.	Radii of Gyration	
			r _{x-x} In.	r _{y-y} In.
31	2 1/4	1.31	0.46	0.70
32	2 1/4	1.32	0.46	0.72
33	2 1/4	1.34	0.45	0.72
34	3 1/2	1.35	0.46	0.87
35	3 1/2	1.37	0.45	0.90
36	3 1/2	1.38	0.45	0.94
37	4 1/4	1.38	0.45	1.12
38	4 1/4	1.40	0.45	1.15
39	5 1/4	1.39	0.43	1.60
40	5 1/4	1.43	0.43	1.61

chord sizes for open web joists



VV Section

V-Section No.	Flange Width W In.	Overall Depth D In.	Radii of Gyration	
			r _{x-x} In.	r _{y-y} In.
9	7 1/4	2.34	0.83	1.90
10	7 1/4	2.35	0.82	1.90
11	7 1/4	2.36	0.82	1.92
12	7 1/4	2.38	0.82	1.93
13	8 1/4	2.38	0.80	2.26
14	8 1/4	2.39	0.80	2.27
15	8 1/4	2.38	1.20	2.18
16	8 1/2	3.40	1.20	2.20
17	8 1/2	3.41	1.20	2.22
18	10 1/4	3.42	1.21	2.52
19	10 1/4	3.45	1.21	2.56
20	12 1/4	3.44	1.17	3.30
21	12 3/4	3.47	1.17	3.33
22	14 1/4	3.48	1.16	3.88



B Section

B-Section No.	Flange Width W In.	Overall Depth D In.	Radii of Gyration	
			r _{x-x} In.	r _{y-y} In.
52	2 1/4	1.02	0.38	0.78
53	3 1/4	1.04	0.38	0.83
54	3 1/4	1.06	0.38	0.82
55	4 1/4	1.06	0.38	1.06
56	3 1/4	1.11	0.39	0.85
57	3 1/4	1.11	0.38	0.96
58	4 1/4	1.11	0.38	1.08
59	4 1/4	1.11	0.37	1.27
60	5 1/4	1.13	0.37	1.43
61	6 1/4	1.16	0.36	1.64

chord sizes for open web joists

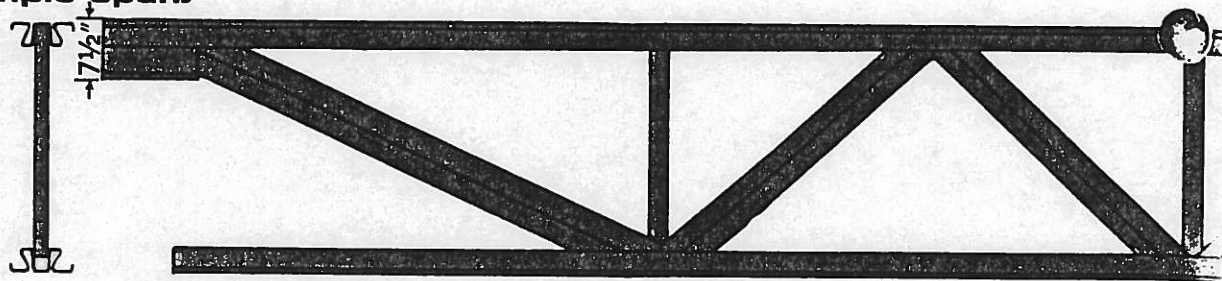
Joist Designation	Chord	D E P T H													Joist Designation
		8	10	12	14	16	18	20	22	24	26	28	32	36	
A	T.C. B.C.	31V 52B	31V 52B	31V 52B											A
B	T.C. B.C.	32V 53B	32V 53B	32V 53B	32V 53B	32V 53B									B
C	T.C. B.C.		33V 54B	33V 54B	33V 54B	33V 54B	33V 54B								C
D	T.C. B.C.		34V 55B	34V 55B	34V 55B	34V 55B	34V 55B	34V 55B	34V 55B	34V 55B	34V 55B	34V 55B			D
E	T.C. B.C.			35V 56B	35V 56B	35V 56B	35V 56B	35V 56B	35V 56B	35V 56B	35V 56B	35V 56B			E
F	T.C. B.C.			36V 57B	36V 57B	36V 57B	36V 57B	36V 57B	36V 57B	36V 57B	36V 57B	36V 57B			F
G	T.C. B.C.				37V 58B	37V 58B	37V 58B	37V 58B	37V 58B	37V 58B	37V 58B	37V 58B			G
H	T.C. B.C.					38V 59B	38V 59B	38V 59B	38V 59B	38V 59B	38V 59B	38V 59B			H
I	T.C. B.C.						39V 60B	39V 60B	39V 60B	39V 60B	39V 60B	39V 60B			I
J	T.C. B.C.							40V 61B	40V 61B	40V 61B	40V 61B	40V 61B			J
06	T.C. B.C.						11VV 10VV						10VV 9VV		06
07	T.C. B.C.						12VV 10VV	12VV 10VV		12VV 10VV			11VV 10VV	10VV 9VV	07
08	T.C. B.C.						13VV 11VV	13VV 11VV		13VV 11VV		12VV 10VV	12VV 10VV	11VV 10VV	08
09	T.C. B.C.						14VV 12VV	15VV 12VV		14VV 12VV		14VV 12VV	14VV 12VV	13VV 11VV	09
10	T.C. B.C.							15VV 14VV		15VV 14VV		15VV 13VV	14VV 12VV	14VV 12VV	10
11	T.C. B.C.									16VV 15VV		16VV 14VV	15VV 14VV	15VV 13VV	11
12	T.C. B.C.											17VV 16VV	16VV 15VV	16VV 15VV	12
13	T.C. B.C.											18VV 16VV	18VV 16VV	17VV 16VV	13
14	T.C. B.C.												18VV 17VV	18VV 17VV	14
15	T.C. B.C.												19VV 18VV	19VV 18VV	15

MACOTRUS framing systems (continued)

girders (simple span)

The primary member of the MACOTRUS system is the deep open web girder which is used between columns to support joists.

The open web girder with Macomber VV-Section chords is shown.



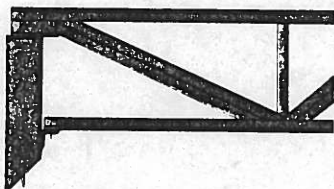
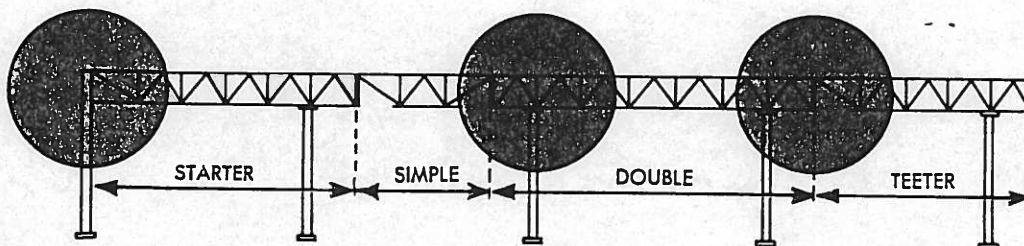
L = SPAN (FEET)

P = JOIST LOAD (KIPS)

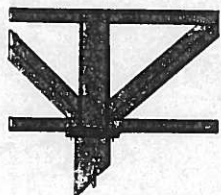
JOIST SPACES	TYPE	MOMENT (IN.-KIPS)	REACTION (KIPS)
2		3 PL	0.5 P
3		4 PL	1.0 P
4		6 PL	1.5 P
5		7.2 PL	2.0 P

JOIST SPACES	TYPE	MOMENT (IN.-KIPS)	REACTION (KIPS)
6		9 PL	2.5 P
7		10.29 PL	3.0 P
8		12 PL	3.5 P

girders cantilevered



GIRDER TO COLUMN CONNECTION



BOLTED GIRDER TO COLUMN PLATE



GIRDER TO GIRDER CONNECTION

LOAD SPACING	MEMBER	LOADING	MOMENT (IN.-KIPS)	SHEAR (KIPS)	REACTION (KIPS)
L/5	Starter		5.28 PL	2.4 P	5.4 P
	Double & Teeter		3.87 PL*	2.0 P	5.0 P
	Simple		2.4 PL	1.0 P	
L/6	Starter		6.5 PL	2.92 P	6.42 P
	Double & Teeter		4.0 PL	2.5 P	6.0 P
	Simple		4.0 PL	1.5 P	
L/7	Starter		8.13 PL	3.42 P	7.42 P
	Double & Teeter		5.14 PL	3.0 P	7.0 P
	Simple		5.14 PL	2.0 P	

*The asterisk on Type 5 Double Cantilever Moments indicates the factors have been adjusted to accommodate the negative moment at the points of support.

For Simples, see Load Capacity Table on page 12. For Starters, Doubles, and Teeters, use Load Capacity Tables on either page 13 or 14, depending on module used.

columns

ALLOWABLE CONCENTRIC LOAD IN KIPS

Column Size	Area (in. ²)	S (in. ³)	r (in.)	CLEAR HEIGHT (FEET)																																															
				8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																			
4" Sq.	9.7	2.86	3.50	1.56	39	35	31	26	22	19	16	14	12	11																																					
6" Sq.	14.5	4.20			72	68	65	61	57	53	49	44	40	35	31	28	25	23	21	19	17	16																													
Major Axis		7.80	2.36																																																
Minor Axis		7.40	2.30																																																
6" Sq.	18.4	5.41			92	88	83	78	73	68	62	56	50	44	39	35	32	29	26	24	22	20																													
Major Axis		9.80	2.33																																																
Minor Axis		9.30	2.27																																																
8" Sq.	24.7	7.25			135	131	127	123	119	114	110	105	100	95	89	84	78	72	65	60	55	51	47	43	40	38	35																								
Major Axis		18.00	3.15																																																
Minor Axis		17.20	3.09																																																
8" x 10"	29.0	8.16																																																	
Major Axis		24.30	3.86																																																
Minor Axis		20.70	3.18																																																
8" x 12"	37.0	10.86																																																	
Major Axis		29.72	4.14																																																
Minor Axis		27.00	3.15																																																
10" x 12"	44.0	12.24																																																	
Major Axis		34.82	4.23																																																
Minor Axis		36.48	3.86																																																

Load capacities are determined in accordance with American Institute of Steel Construction Specification adopted February 12, 1969.

K = 1.5"

Max. KL/r = 200

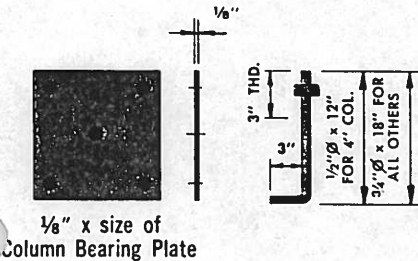
Fy = 36 ksi.

Max. KL/r = 120 for clear heights to left of heavy line.

E = 29,500 ksi

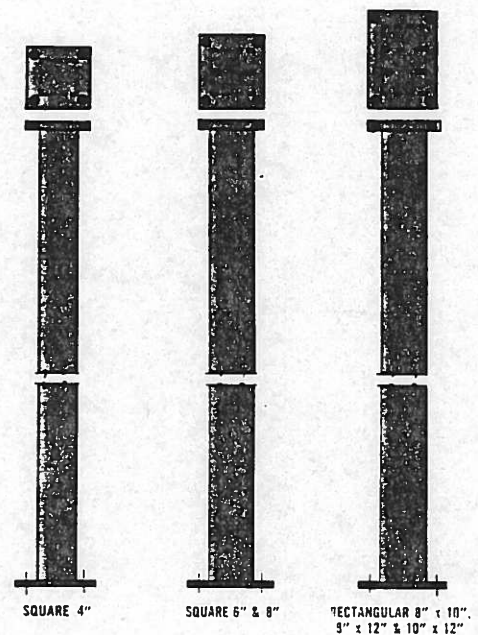
*(Effective lengths have been determined by multiplying clear heights times "K".

Other "K" values may be used provided job conditions permit. Refer to above AISC Specification)

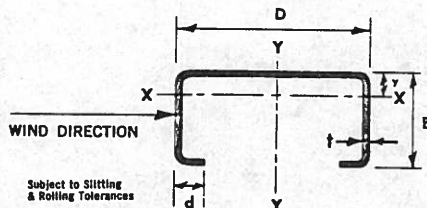


8" x 1/8" x 0-8" COL.
10 1/2" x 3/4" x 0-10 1/2" COL.
14" x 1" x 1-2" COL.
15" x 1" x 1-3" COL.
16" x 1" x 1-4" COL.
17" x 1" x 1-5" COL.
18" x 1" x 1-6" COL.
19" x 1" x 1-7" COL.
20" x 1" x 1-8" COL.
21" x 1" x 1-9" COL.
22" x 1" x 1-10" COL.
23" x 1" x 1-11" COL.
24" x 1" x 1-12" COL.

BEARING PLATE



channel girts



Design stress — 22,000 psi .

For wind analyses allowable design stresses may be increased by 1/3.

SIZE B x D IN.	AREA SQ. IN.	WT. LB./FT.	t IN.	Y-Y AXIS			X-X AXIS			
				I	S	r	I	S	r	y
3 x 6	1.25	4.2	.100	7.2	2.4	2.40	1.3	.7	1.04	0.98
3 x 6	2.10	7.2	.177	11.7	3.9	2.36	2.2	1.1	1.03	0.95
4 x 8	1.65	5.5	.100	17.1	4.2	3.21	2.8	1.1	1.31	1.22
4 x 8	3.62	12.3	.230	36.0	9.0	3.15	6.6	2.4	1.35	1.23
4 x 10	1.85	6.4	.100	28.6	5.7	3.93	3.6	1.2	1.39	1.10
4 x 10	4.08	14.2	.230	60.8	12.1	3.85	7.1	2.4	1.32	1.10

Dimensions subject to slitting and rolling tolerances

ALLOWABLE UNIFORM LOAD IN POUNDS PER LINEAL FOOT

C SIZE B x D x t IN.	SPAN IN FEET														
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3 x 6 x 0.100	468	354	273	214	172	139									
3 x 6 x 0.177		500	443	349	279	227									
4 x 8 x 0.100			500	485	408	332	273	228	192	163	140				
4 x 8 x 0.230							500	480	404	344	295				
4 x 10 x 0.100						497	437	383	323	275	235	203	177	155	136
4 x 10 x 0.230						500	500	500	500	500	499	431	375	328	289

LOADS TO LEFT OF BREAK LINE GOVERNED BY MAXIMUM STRESS OF 29.3 KSI. LOADS TO RIGHT OF BREAK LINE GOVERNED BY MAXIMUM DEFLECTION OF L/240. MAXIMUM LOAD = 500 PLF.

load table-V series (11 1/4" V-Beam) 8 to 56 ft.

SPANS TO THE RIGHT OF THE DASHED LINES ARE TO BE USED FOR ROOF CONSTRUCTION ONLY.

CLEAR SPAN IN FEET																												Jolst Design- ation
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56		
																												8A
																												8B
																												10A
																												10B
																												10C
																												10D
																												12A
																												12B
																												12C
																												12D
																												12E
																												12F
																												14B
																												14C
																												14D
																												14E
																												14F
																												14G
180	169	158																										16B
225	210	197																										16C
267	250	234																										16D
294	275	258																										16E
321	300	282																										16F
365	342	321																										16G
																												16H
204	191	179																										18C
254	238	223	210	198	186	176																						18D
302	283	265	249	235	222	209																						18E
332	311	292	274	258	244	230																						18F
363	339	319	300	282	266	252																						18G
412	386	362	340	321	303	286																						18H
464	449	428	402	379	358	338																						18I
283	265	249	234	220	208	197	186	176																				20D
337	315	296	278	262	247	234	221	210	199	189																		20E
370	347	325	306	288	272	257	243	231	219	208																		20F
404	379	355	334	315	297	281	266	252	239	227																		20G
459	430	404	380	358	337	319	302	286	272	258																		20H
510	494	477	448	422	398	377	356	338	321	305																		20I
494	478	463	449	436	423	411	400	390	380	370																		20J
313	293	275	258	243	230	217	205	195																				22D
372	348	327	307	289	273	258	244	231	220	209																		22E
372	360	349	338	318	300	284	269	255	242	230																		22F
405	392	380	368	347	327	310	293	278	264	251	239	227	217	207														22G
489	474	445	419	394	372	352	333	316	300	285	271	258	246	235														22H
477	462	447	434	421	409	398	387	373	354	336	320	305	291	278														22I
545	528	511	496	481	467	454	442	430	419	409	399	389	378	361														22J
342	320	300	283	266	251	237	225	213																				24D
379	367	355	336	316	299	282	267	253	240	228																		24E
447	419	393	369	348	328	310	294	278	264	251																		24F
452	437	424	403	380	358	338	320	304	288	274	261	249	237	226	216	207	198	190										24G
554	519	487	458	431	407	385	364	345	328	311	296	282	269	257	246	235	225	216										24H
573	554	537	521	505	480	454	430	407	387	368	350	333	318	304	290	278	266	255										24I
584	565	548	531	515	501	487	473	461	449	438	427	417	407	394	377	360	345	331										24J
371	348	326	307	289	273	258	244	231																				26D
408	395	383	365	344	324	306	290	275	261	248																		26E
402	389	377	366	355	345	335	319	302	287	273																		26F
529	496	465	437	412	389	367	348	330	313	298	283	270	257	246	235	225	215	206	198	190								26G
534	516	500	485	468	442	417	395	375	356	338	322	307	292	279	267	255	245	235	225	216								26H
628	608	589	571	552	521	493	466	442	420	399	380	362	345	330	315	301	289	277	266	255	245	236						26I
620	600	581	563	547	531	516	502	489	477	465	453	443	432	422	409	391	375	359	345	331	318	306						26J
401	375	352	331	312	294	278	263	250																				28D
476	446	419	394	371	350	331	313	297	282	268																		28E
487	471	456	433	408	385	364	344	326	310	294																		28F
480	465	450	437	424	412	396	375	356	338	321	305	291	278	264	254	243	232	223	214	205								28G
543	526	509	494	479	466	450	426	404	384	365	347	331	315	301	288	276	264	253	243	233								28H
614	594	576	558	542	526	512	498	477	453	430	409	390	372	355	340	325	311	299	287	275	264	254	245	236	227	219	28I	
596	577	559	542	526	511	497	483	471	458	447	436	425	416	406	397	389	380	372	365	357	343	330	318	306	295	284	28J	

ALLOWABLE LOADS TO THE RIGHT OF THE LINE ARE DETERMINED BY THE CHORDS.
ALLOWABLE LOADS TO THE LEFT OF THE LINE ARE DETERMINED BY THE END REACTION.

MACOTRUS framing systems (continued)

load table - VV series 29 to 72 ft. longspans

Joist Designation	Nom. Depth (in.)	Max. End Reaction (lbs.)	CLEAR OPENING OR NET SPAN IN FEET																											
			29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
18VV06	18	10382	605	566	531	499	470	443	418	396																				
18VV07	18	10790	678	635	595	559	526	496	469	444																				
18VV08	18	11233	758	717	680	641	604	571	540	512																				
18VV09	18	12017	810	783	759	713	671	633	598	566																				
20VV07	20	11273	760	711	667	627	590	556	526	497	471	447	425	404																
20VV08	20	11653	785	760	722	687	654	621	588	558	530	503	479	457																
20VV09	20	12709	856	828	802	778	755	712	673	636	603	572	544	517																
20VV10	20	13710	924	894	865	839	814	791	748	707	670	636	604	575																
24VV07	24	11194					665	638	613	588	565	541	516	491	468	446	426	407	389	373	357	343								
24VV08	24	11901					707	677	649	622	597	572	545	520	497	475	455	435	417	400	384	369								
24VV09	24	14006					832	808	785	764	731	696	663	632	602	574	548	524	501	480	460	441								
24VV10	24	14848					882	856	832	809	788	768	737	702	668	637	608	582	556	533	511	490								
24VV11	24	15616					927	900	875	851	829	807	787	768	734	701	671	642	616	590	567	544								
28VV08	28	11250													540	517	496	475	456	438	420	403	387	371	357	344	331	319	308	297
28VV09	28	13895													667	639	612	586	563	540	519	499	481	463	446	430	415	401	387	374
28VV10	28	15187													729	704	679	651	625	600	576	554	533	513	495	477	460	444	429	415
28VV11	28	16256													780	762	736	711	682	655	629	605	582	561	540	521	502	485	468	453
28VV12	28	17873													857	837	818	800	782	766	737	709	682	656	632	609	587	566	546	527
28VV13	28	18649													895	874	854	835	816	799	782	766	751	722	694	668	643	620	598	577
32VV06	32	8393																					338	326	315	304	294	284	275	266
32VV07	32	9411																					379	366	353	341	329	318	308	298
32VV08	32	10206																					411	397	383	396	357	345	333	322
32VV09	32	12814																					516	498	480	463	447	432	418	404
32VV10	32	14179																					571	550	531	512	495	478	462	445
32VV11	32	15520																					625	602	580	560	541	522	505	488
32VV12	32	18227																					734	712	688	664	641	619	598	578
32VV13	32	20303																					817	801	785	771	742	715	690	666
32VV14	32	20937																					843	826	810	795	780	766	738	713
32VV15	32	21625																					870	853	837	821	805	791	776	763
36VV07	36	8419																												
36VV08	36	9255																												
36VV09	36	11850																												
36VV10	36	13090																												
36VV11	36	14272																												
36VV12	36	17098																												
36VV13	36	20096																												
36VV14	36	22146																												
36VV15	36	23326																												

ALLOWABLE LOADS TO THE RIGHT OF THE LINE ARE DETERMINED BY THE CHORDS.
ALLOWABLE LOADS TO THE LEFT OF THE LINE ARE DETERMINED BY THE END REACTION.

V Series (recommended bridging lines for open web joists)

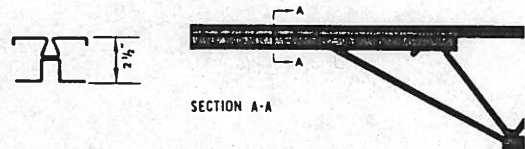
Number of Rows	1 Row	2 Rows	3 Rows
6-12	7-14	8-16	9-18
10-20	11-22	12-24	13-26
14-28	16-24	18-27	20-30
22-33	24-36	26-39	28-42
Over 18	Over 21	Over 24	Over 27
Over 30	Over 33	Over 36	Over 39
Over 42			

VV series (recommended bridging lines)

Number of Rows	1 Row	2 Rows	3 Rows
18-36	20-40	25-50	
36-54	40-60	50-72	
54-72	60-72		

Table lists Top Chord Bridging for Floors and Roofs,
Bottom Chord Bridging for Floors.

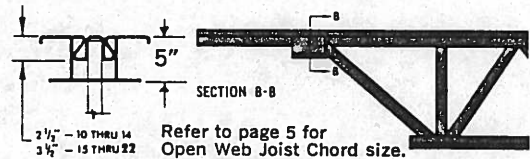
For Bottom Chord Bridging in Roofs, use one line of Bridging
only where 2 or 3 Top Chord Rows are required.



V Series Extended End Load Table Table
Table of Capacity in LB./L.F. for Extended Ends

	AA	31	2	350	350	322	236	181	142	103
	BA	32	2	350	350	350	273	209	160	116
	CA	33	2	350	350	350	326	250	184	134
	DA	34	7	350	350	350	350	328	248	181
	EA	35	7	350	350	350	350	350	280	204
	FA	36	7	350	350	350	350	350	298	217
	GA	37	7	350	350	350	350	350	323	235
	HA	38	7	350	350	350	350	350	350	259
	IA	39	7	350	350	350	350	350	350	288
	JA	40	7	350	350	350	350	350	350	330

NOTE: Capacities to the left of break line are governed by stress, those to the right by deflection of L/120.



VV Series Extended End Load Table

	10E	10	700	632	439	322	247	185	135	101	78
	11E	11	700	700	496	364	279	211	154	115	89
	12E	12	700	700	554	407	311	236	172	129	100
	13E	13	700	700	574	422	323	249	182	137	105
	14E	14	700	700	637	468	358	276	201	151	117
	15E	15	700	700	700	700	684	541	438	362	296
	16E	16	700	700	700	700	700	620	502	415	341
	17E	17	700	700	700	700	700	680	551	455	374
	18E	18	700	700	700	700	700	700	577	477	401
	19E	19	700	700	700	700	700	700	671	555	466
	20E	20	700	700	700	700	700	700	690	570	479
	21E	21	700	700	700	700	700	700	700	662	556
	22E	22	700	700	700	700	700	700	700	700	597

NOTE: Capacities to the left of break line are governed by stress, those to the right by deflection of L/120.

CLEAR OPENING OR NET SPAN IN FEET																	Joist Designation
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72		
																18VV06	
																18VV07	
																18VV08	
																18VV09	
																20VV07	
																20VV08	
																20VV09	
																20VV10	
																24VV07	
																24VV08	
																24VV09	
																24VV10	
																24VV11	
																28VV08	
																28VV09	
																28VV10	
																28VV11	
																28VV12	
																28VV13	
257	249	242	234	227	220	214	208									32VV06	
288	279	271	262	254	247	240	233									32VV07	
312	302	293	284	275	267	259	252									32VV08	
391	379	367	356	345	335	325	315									32VV09	
430	416	402	389	376	364	353	342									32VV10	
473	458	443	429	416	403	390	378									32VV11	
559	541	524	508	492	477	463	449									32VV12	
643	621	600	581	562	544	527	511									32VV13	
688	665	643	622	602	583	564	547									32VV14	
750	725	701	678	656	635	616	597									32VV15	
292	283	274	266	258	251	244	237	230	224	218	212	207	201	196	191	36VV07	
321	311	302	293	284	276	268	260	253	246	239	233	227	221	215	209	36VV08	
411	398	386	374	363	352	342	333	323	314	306	297	289	282	275	267	36VV09	
454	440	426	413	401	389	378	367	357	347	338	328	320	311	303	295	36VV10	
495	480	465	451	438	425	412	401	389	378	368	358	348	339	330	322	36VV11	
593	575	557	540	523	508	493	478	464	450	437	424	412	400	389	378	36VV12	
697	675	654	634	615	596	579	562	546	531	516	502	488	475	463	451	36VV13	
768	755	729	706	683	661	641	621	602	584	567	551	535	520	505	492	36VV14	
809	795	781	769	744	721	698	677	656	637	618	600	583	567	551	536	36VV15	

SPANS TO THE RIGHT OF THE DASHED LINES ARE TO BE USED FOR ROOF CONSTRUCTION ONLY.

load table-dimensions and properties of VV-Series extended ends

38B	38	2½"X 1½" RECT. TUBE	3.73	1.52	350	350	350	350	350	300	243							38B
39B	39		4.02	1.58	350	350	350	350	350	312	252							39B
40B	40		4.43	1.65	350	350	350	350	350	350	325	264						
10E	10	3"X1½" RECT. TUBE	1.24	0.84	700	632	439	322	247	185	135	101	78					10E
11E	11		1.41	0.95	700	700	496	364	279	211	154	115	89					11E
12E	12		1.58	1.06	700	700	554	407	311	236	172	129	100					12E
13E	13		1.67	1.10	700	700	574	422	323	249	182	137	105	83				13E
14E	14		1.85	1.22	700	700	637	468	358	276	201	151	117	92				14E
15E	15		4.69	2.33	700	700	700	700	684	541	438	362	296	232	186	151	125	15E
16E	16		5.41	2.67	700	700	700	700	700	620	502	415	341	268	215	175	144	16E
17E	17		5.94	2.93	700	700	700	700	700	680	551	455	374	294	236	192	158	17E
18E	18		6.62	3.07	700	700	700	700	700	700	577	477	401	328	263	214	176	18E
19E	19		7.73	3.57	700	700	700	700	700	700	671	555	466	383	307	249	205	19E
20E	20		8.13	3.67	700	700	700	700	700	700	690	570	479	403	323	262	216	20E
21E	21		9.47	4.26	700	700	700	700	700	700	700	700	662	556	469	376	306	252
22E	22	10.41	4.57	700	700	700	700	700	700	700	700	700	597	508	413	336	277	22E
10F	10	3"X1½" RECT. TUBE	6.94	2.39	700	700	700	700	598	472	382	316	266	226	195	170	149	10F
11F	11		7.30	2.46	700	700	700	700	615	486	394	325	273	233	201	175	154	11F
12F	12		7.62	2.51	700	700	700	700	628	496	402	332	279	238	205	178	157	12F
13F	13		7.99	2.58	700	700	700	700	645	510	413	341	287	244	211	183	161	13F
14F	14		8.30	2.63	700	700	700	700	658	520	421	348	292	249	215	187	164	14F

NOTE: Capacities to the left of break line are governed by stress, those to the right by deflection of L/120. The allowable uniform load in pounds per lineal foot of extended end shall not exceed the allowable uniform load for the member to which it is attached.

MACOTRUS simple span girders

	GIRDER SIZE	CHORD SIZES		LOAD CAPACITIES					
		T.C.	B.C.	28" DEEP — 35' MAX. SPAN		32" DEEP — 40' MAX. SPAN		36" DEEP — 45' MAX. SPAN	
				RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)	RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)	RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)
5'-0" MODULE	G0909	9VV	9VV	1023	19.6	1179	19.6	1334	19.6
	G1009	10VV	9VV	1253	19.6	1434	19.6	1624	19.6
	G1116	11VV	10VV	1457	22.1	1679	22.1	1901	22.1
	G1211	12VV	11VV	1636	24.5	1885	24.5	2134	24.5
	G1312	13VV	12VV	1800	26.5	2075	26.5	2349	26.5
	G1413	14VV	13VV	2001	26.5	2306	26.5	2611	26.5
	G1514	15VV	14VV	2250	28.7	2599	28.7	2948	28.7
	G1615	16VV	15VV	2449	36.5	2836	36.5	3224	36.5
	G1716	17VV	16VV	2833	36.7	3282	41.3	3731	41.5
	G1817	18VV	17VV	3136	36.7	3624	41.3	4118	45.0
	G1918	19VV	18VV	3541	36.7	4099	41.3	4657	45.0
	G2019	20VV	19VV	4153	36.7	4806	41.3	5459	45.6
5'-6" MODULE	G0909	9VV	9VV	1010	19.6	1163	19.6	1317	19.6
	G1009	10VV	9VV	1245	19.6	1434	19.6	1624	19.6
	G1110	11VV	10VV	1427	22.1	1645	22.1	1862	22.1
	G1211	12VV	11VV	1602	24.5	1846	24.5	2091	24.5
	G1312	13VV	12VV	1763	26.5	2031	26.5	2300	26.5
	G1413	14VV	13VV	1960	26.5	2258	26.5	2556	26.5
	G1514	15VV	14VV	2249	28.7	2598	28.7	2948	28.7
	G1615	16VV	15VV	2448	33.9	2836	36.5	3223	36.5
	G1716	17VV	16VV	2826	33.9	3274	38.3	3722	41.5
	G1817	18VV	17VV	3129	33.9	3623	38.3	4118	42.4
	G1918	19VV	18VV	3540	33.9	4098	38.3	4656	42.4
	G2019	20VV	19VV	4123	33.9	4771	38.3	5419	42.4
6'-0" MODULE	G0909	9VV	9VV	996	19.6	1148	19.6	00	19.6
	G1009	10VV	9VV	1228	19.6	1415	19.6	1602	19.6
	G1110	11VV	10VV	1400	22.1	1614	22.1	1827	22.1
	G1211	12VV	11VV	1572	24.5	1811	24.5	2051	24.5
	G1312	13VV	12VV	1727	26.5	1990	26.5	2253	26.5
	G1413	14VV	13VV	1920	26.5	2212	26.5	2504	26.5
	G1514	15VV	14VV	2228	28.7	2574	28.7	2920	28.7
	G1615	16VV	15VV	2449	31.5	2836	35.6	3224	36.5
	G1716	17VV	16VV	2793	31.5	3235	35.6	3678	39.5
	G1817	18VV	17VV	3130	31.5	3624	35.6	4118	39.5
	G1918	19VV	18VV	3541	31.5	4099	35.6	4657	39.5
	G2019	20VV	19VV	4077	31.5	4717	35.6	5358	39.5
6'-3" MODULE	G0909	9VV	9VV	988	19.6	1139	19.6	1289	19.6
	G1009	10VV	9VV	121	19.6	1399	19.6	1584	19.6
	G1109	11VV	9VV	1244	19.6	1434	19.6	1623	19.6
	G1210	12VV	10VV	1456	22.1	1678	22.1	1900	22.1
	G1311	13VV	11VV	1662	24.5	1915	24.5	2168	24.5
	G1412	14VV	12VV	1865	26.5	2150	26.5	2434	26.5
	G1514	15VV	14VV	2212	28.7	2555	28.7	2899	28.7
	G1615	16VV	15VV	2448	30.3	2836	34.3	3223	36.5
	G1716	17VV	16VV	2773	30.3	3211	34.3	3650	38.2
	G1817	18VV	17VV	3129	30.3	3623	34.3	4118	38.2
	G1918	19VV	18VV	3540	30.3	4098	34.3	4656	38.2
	G2019	20VV	19VV	4049	30.3	4686	34.3	5322	38.2
6'-6" MODULE	G0909	9VV	9VV	976	19.6	1124	19.6	27	19.6
	G1009	10VV	9VV	1192	19.6	1374	19.6	1555	19.6
	G1109	11VV	9VV	1245	19.6	1435	19.6	162	19.6
	G1210	12VV	10VV	1456	22.1	1678	22.1	1900	22.1
	G1311	13VV	11VV	1663	24.5	1916	24.5	21	22.1
	G1412	14VV	12VV	1859	26.5	2144	26.5	26	26.5
	G1514	15VV	14VV	2188	28.7	2528	28.7	2867	28.7
	G1615	16VV	15VV	2449	28.7	2836	32.5	76	36.1
	G1716	17VV	16VV	2744	28.7	3179	32.5	3613	36.1
	G1817	18VV	17VV	3130	28.7	3624	32.5	4118	36.1
	G1918	19VV	18VV	3541	28.7	4099	32.5	4657	36.1
	G2019	20VV	19VV	4153	28.7	4641	32.5	5271	36.1
6'-9" MODULE	G2120	21VV	20VV	4532	28.7	5243	32.5	5953	36.1
	G2221	22VV	21VV	5229	28.7	6048	32.5	6867	36.1

MACOTRUS cantilever girders



	GIRDER SIZE	CHORD SIZES		LOAD CAPACITIES					
		T.C.	B.C.	28" DEEP		32" DEEP		36" DEEP	
				RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)	RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)	RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)
5'-0" MODULE	G0909	9VV	9VV	1023	19.6	1179	19.6	1334	19.6
	G1009	10VV	9VV	1253	19.6	1434	19.6	1624	19.6
	G1010	10VV	10VV	1277	22.1	1471	22.1	1666	22.1
	G1110	11VV	10VV	1457	22.1	1679	22.1	1901	22.1
	G1111	11VV	11VV	1457	24.5	1679	24.5	1901	24.5
	G1211	12VV	11VV	1636	24.5	1885	24.5	2134	24.5
	G1212	12VV	12VV	1636	26.5	1885	26.5	2134	26.5
	G1312	13VV	12VV	1800	26.5	2075	26.5	2349	26.5
	G1412	14VV	12VV	866	26.5	2150	26.5	2434	26.5
	G1413	14VV	13VV	2001	26.5	2306	26.5	2611	26.5
	G1414	14VV	14VV	2001	28.7	2306	28.7	2611	28.7
	G1514	15VV	14VV	2250	28.7	2599	28.7	2948	28.7
	G1515	15VV	15VV	42	36.5	2596	36.5	2951	36.5
	G1615	16VV	15VV	2449	36.5	2836	36.5	3224	36.5
	G1616	16VV	16VV	2596	38.6	3008	41.5	3419	41.2
	G1716	17VV	16VV	2833	38.6	3282	41.5	3731	41.2
	G1717	17VV	17VV	2861	41.5	3314	43.5	3768	44.0
	G1817	18VV	17VV	3130	41.5	3624	43.5	4118	44.0
	G1818	18VV	18VV	3280	41.5	3797	43.5	4313	44.0
	G1918	19VV	18VV	3541	41.5	4099	43.5	4657	44.0
	G1919	19VV	19VV	3831	45.4	4436	46.0	5040	46.0
	G2019	20VV	19VV	4153	45.4	4806	46.0	5459	46.0
	G2120	21VV	20VV	532	45.4	5243	46.0	5953	46.0
	G2121	21VV	21VV	4876	46.3	5641	48.3	6406	48.7
	G2221	22VV	21VV	5297	46.3	6126	48.3	6955	48.7
5'-6" MODULE	G0909	9VV	9VV	1010	19.6	1163	19.6	1317	19.6
	G1009	10VV	9VV	1245	19.6	1434	19.6	1624	19.6
	G1010	10VV	10VV	1252	22.1	1443	22.1	1633	22.1
	G1110	11VV	10VV	1427	22.1	1644	22.1	1862	22.1
	G1111	11VV	11VV	1427	24.5	1644	24.5	1862	24.5
	G1211	12VV	11VV	1601	24.5	1846	24.5	2090	24.5
	G1212	12VV	12VV	1601	6.5	1846	26.5	2090	26.5
	G1312	13VV	12VV	1763	26.5	2031	26.5	2300	26.5
	G1412	14VV	12VV	1865	26.5	2150	26.5	2434	26.5
	G1413	14VV	13VV	1959	26.5	2257	26.5	2556	26.5
	G1414	14VV	14VV	1959	28.7	2257	28.7	2556	28.7
	G1513	15VV	13VV	2026	26.5	2340	26.5	2655	26.5
	G1514	15VV	14VV	2249	28.7	2598	28.7	2948	28.7
	G1515	15VV	15VV	2213	36.5	2563	36.5	2913	36.5
	G1615	16VV	15VV	2448	36.5	2836	36.5	3223	36.5
	G1616	16VV	16VV	2564	41.5	2971	41.5	3377	41.5
	G1716	17VV	16VV	2825	41.5	3273	41.5	3720	41.5
	G1717	17VV	17VV	2825	44.4	3273	45.0	3720	45.0
	G1817	18VV	17VV	3129	44.4	3623	45.0	4118	45.0
	G1818	18VV	18VV	3245	44.4	3756	45.0	4267	45.0
	G1918	19VV	18VV	3540	44.4	4098	45.0	4656	45.0
	G1919	19VV	19VV	3791	44.4	4389	46.0	4986	46.0
	G2019	20VV	19VV	4123	44.4	4771	46.0	5419	46.0
	G2120	21VV	20VV	4532	44.4	5242	46.0	5953	46.0
	G2121	21VV	21VV	4822	44.4	5579	47.0	6335	48.5
G2221	22VV	21VV	5296	44.4	6125	47.0	6954	48.5	
6'-0" MODULE	G0909	9VV	9VV	996	19.6	1148	19.6	1300	19.6
	G1009	10VV	9VV	1228	19.6	1415	19.6	1602	19.6
	G1010	10VV	10VV	1228	22.1	1415	22.1	1602	22.1
	G1110	11VV	10VV	1400	22.1	1614	22.1	1827	22.1
	G1111	11VV	11VV	1400	24.5	1614	24.5	1827	24.5
	G1210	12VV	10VV	1456	22.1	1678	22.1	1900	22.1
	G1211	12VV	11VV	1572	24.5	1811	24.5	2051	24.5
	G1212	12VV	12VV	570	26.5	1811	26.5	2051	26.5
	G1311	13VV	11VV	1663	24.5	1916	24.5	2169	24.5
	G1312	13VV	12VV	1727	26.5	1990	26.5	2253	26.5
	G1412	14VV	12VV	1866	26.5	2150	26.5	2434	26.5
	G1413	14VV	13VV	1920	26.5	2212	26.5	2504	26.5
	G1414	14VV	14VV	1920	28.7	2212	28.7	2504	28.7
	G1513	15VV	13VV	2026	26.5	2341	26.5	2655	26.5
	G1514	15VV	14VV	2228	28.7	2574	28.7	2920	28.7
	G1515	15VV	15VV	2186	35.8	2532	36.5	2878	36.5
	G1615	16VV	15VV	2449		2836	36.5	3224	36.5
	G1616	16VV	16VV	2533	37.8	2934	38.6	3335	41.4
	G1716	17VV	16VV	2793	38	3235	38.6	3678	41.4

6'-0" MODULE CONTINUED ON PAGE 14

MACOTRUS cantilever girders

	GIRDER SIZE	CHORD SIZES		LOAD CAPACITIES					
		T.C.	B.C.	28" DEEP		32" DEEP		36" DEEP	
				RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)	RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)	RESISTING MOMENT (IN.-K)	ALLOWABLE SHEAR (KIPS)
6'-0" MODULE	G1717	17VV	17VV	2793	40.7	3235	41.5	3578	44.5
	G1818	18VV	16VV	2842	37.8	3291	38.6	3740	41.1
	G1817	18VV	17VV	3130	40.7	3624	41.5	4118	44.5
	G1816	18VV	18VV	3211	40.7	3716	41.5	4222	44.5
	G1919	19VV	18VV	3541	40.7	4099	41.5	4657	44.5
	G1918	19VV	19VV	3750	41.0	4342	43.8	4933	45.4
	G2019	20VV	19VV	4077	41.0	4717	43.8	5358	45.4
	G2119	21VV	19VV	4150	41.0	4803	43.8	5456	45.4
6'-3" MODULE	G2120	21VV	20VV	4532	41.0	5243	43.8	5953	45.4
	G2221	22VV	21VV	5297	41.0	6126	43.8	6955	45.4
	G0909	9VV	9VV	968	19.6	1139	19.6	1289	19.6
	G1009	10VV	9VV	1214	19.6	1399	19.6	1583	19.6
	G1010	10VV	10VV	1214	22.1	1399	22.1	1583	22.1
	G1110	11VV	9VV	1244	19.6	1434	19.6	1623	19.6
	G1111	11VV	10VV	1383	22.1	1594	22.1	1805	22.1
	G1112	11VV	11VV	1383	24.5	1594	24.5	1805	24.5
	G1211	12VV	10VV	1456	22.1	1678	22.1	1900	22.1
	G1212	12VV	11VV	1552	24.5	1789	24.5	2026	24.5
	G1213	12VV	12VV	1552	26.5	1789	26.5	2026	26.5
	G1311	13VV	11VV	1662	24.5	1915	24.5	2168	24.5
	G1312	13VV	12VV	1706	26.5	1966	26.5	2226	26.5
	G1412	14VV	12VV	1865	26.5	2150	26.5	2434	26.5
	G1413	14VV	14VV	1896	28.7	2185	28.7	2474	28.7
	G1513	15VV	13VV	2026	26.5	2340	26.5	2655	26.5
	G1514	15VV	14VV	2212	28.7	2555	28.7	2899	28.7
	G1515	15VV	15VV	2170	36.5	2513	36.5	2857	36.5
	G1615	16VV	15VV	2448	36.5	2836	36.5	3223	36.5
	G1616	16VV	16VV	2514	39.5	2912	41.5	3311	41.5
	G1716	17VV	16VV	2773	39.5	3211	41.5	3650	41.5
	G1717	17VV	17VV	—	—	3211	42.1	3650	43.7
	G1816	18VV	16VV	2842	39.5	3290	41.5	3739	41.5
	G1817	18VV	17VV	3129	39.5	3623	42.1	4118	43.7
	G1818	18VV	18VV	3192	39.5	3695	42.1	4197	43.7
	G1918	19VV	18VV	3540	39.5	4098	42.1	4656	43.7
	G1919	19VV	19VV	3728	39.5	4317	42.1	4905	43.7
	G2019	20VV	19VV	4048	39.5	4686	42.1	5322	43.7
	G2119	21VV	19VV	4150	39.5	4802	42.1	5455	43.7
	G2120	21VV	20VV	4532	39.5	5242	42.1	5953	43.7
	G2121	21VV	21VV	4736	39.5	5479	42.1	6222	43.7
	G2221	22VV	21VV	5280	39.5	6106	42.1	6933	43.7
6'-8" MODULE	G0909	9VV	9VV	976	19.6	1124	19.6	1273	19.6
	G1009	10VV	9VV	1192	19.6	1374	19.6	1555	19.6
	G1010	10VV	10VV	1192	22.1	1374	22.1	1555	22.1
	G1110	11VV	9VV	1245	19.6	1435	19.6	1616	19.6
	G1111	11VV	10VV	1360	22.1	1567	22.1	1774	22.1
	G1112	11VV	11VV	1360	24.5	1567	24.5	1774	24.5
	G1211	12VV	10VV	1456	22.1	1678	22.1	1900	22.1
	G1212	12VV	11VV	1526	24.5	1759	24.5	199	24.5
	G1213	12VV	12VV	1526	26.5	1759	26.5	199	26.5
	G1311	13VV	11VV	1663	24.5	1916	24.5	2168	24.5
	G1312	13VV	12VV	1675	26.5	1930	26.5	2185	26.5
	G1412	14VV	12VV	1859	26.5	2144	26.5	2426	26.5
	G1413	14VV	14VV	1861	28.7	2144	28.7	2426	28.7
	G1513	15VV	13VV	2026	26.5	2341	26.5	2655	26.5
	G1514	15VV	14VV	2188	28.7	2528	28.7	286	28.7
	G1515	15VV	15VV	2146	35.4	2486	35.4	2826	35.4
	G1615	16VV	14VV	2249	28.7	2598	28.7	2977	28.7
	G1616	16VV	16VV	2448	32.3	2836	35.4	3224	36.5
	G1716	17VV	16VV	2744	34.1	3179	37.3	3276	39.3
	G1717	17VV	17VV	2744	36.5	3177	39.5	3613	41.5
	G1816	18VV	16VV	2842	34.1	3291	37.3	3740	39.3
	G1817	18VV	17VV	3130	38.6	3624	39.5	4118	41.5
	G1818	18VV	18VV	3161	38.6	3659	39.5	4179	41.5
	G1918	19VV	18VV	—	—	4099	39.5	457	41.5
	G1919	19VV	19VV	3693	37.0	4275	39.5	4858	41.5
	G2019	20VV	19VV	4011	37.0	4641	39.5	521	41.5
	G2119	21VV	19VV	4150	37.0	4803	39.5	5456	41.5
	G2120	21VV	20VV	4532	37.0	5243	39.5	5953	41.5
	G2221	22VV	21VV	5229	37.0	6048	39.5	6867	41.5

MACOTRUS special girders (simple span and cantilevered)



M - Resisting Moment (in.-k.)

(Purlin Spaces up to 6'-8")

V - Allowable Shear (kips)

Nominal Depth	20"		24"		28"		32"		36"		40"	
Maximum Span	25'-0"		30'-0"		35'-0"		40'-0"		45'-0"		50'-0"	
Girder Size	M	V	M	V	M	V	M	V	M	V	M	V
SG0909	669	19.6	816	19.6	976	19.6	1124	19.6	1273	19.6	1401	19.6
SG1009	829	19.6	1010	19.6	1192	19.6	1374	19.6	1555	19.6	1736	19.6
SG1010	829	22.1	1010	22.1	1192	22.1	1374	22.1	1555	22.1	1736	22.1
SG1109	866	19.6	1055	19.6	1245	19.6	1435	19.6	1624	19.6	1814	19.6
SG1110	944	22.1	1151	22.1	1360	22.1	1567	22.1	1774	22.1	1979	22.1
SG1111	944	24.5	1151	24.5	1360	24.5	1567	24.5	1774	24.5	1979	24.5
SG1210	1012	22.1	1234	22.1	1456	22.1	1678	22.1	1900	22.1	2122	22.1
SG1211	1059	24.5	1292	24.5	1526	24.5	1759	24.5	1991	24.5	2222	24.5
SG1212	1059	26.5	1292	26.5	1526	26.5	1759	26.5	1991	26.5	2222	26.5
SG1311	1156	24.5	1409	24.5	1663	24.5	1916	24.5	2169	24.5	2422	24.5
SG1312	1164	26.5	1419	26.5	1675	26.5	1930	26.5	2185	26.5	2440	26.5
SG1412	1292	26.5	1575	26.5	1859	26.5	2144	26.5	2426	26.5	2709	26.5
SG1414	1292	28.7	1577	28.7	1861	28.7	2144	28.7	2428	28.7	2709	28.7
SG1513	1398	26.5	1712	26.5	2026	26.5	2341	26.5	2655	26.5	2970	26.5
SG1514	1509	28.7	1849	28.7	2188	28.7	2528	28.7	2867	28.7	3207	28.7
SG1515	1467	36.5	1807	36.5	2146	36.5	2486	36.5	2826	36.5	3165	36.5
SG1614	1550	28.7	1900	28.7	2249	28.7	2598	28.7	2947	28.7	3296	28.7
SG1615	1674	35.9	2061	35.9	2449	35.9	2836	35.9	3224	35.9	3612	35.9
SG1616	1700	35.9	2094	35.9	2488	35.9	2882	35.9	3276	35.9	3669	35.9
SG1716	1875	35.9	2310	35.9	2744	35.9	3179	35.9	3613	35.9	4049	35.9
SG1717	899	35.9	2309	42.0	2744	45.0	3177	45.0	3613	45.0	4048	45.0
SG1816	1944	35.9	2393	41.5	2842	41.5	3291	41.5	3740	41.5	4188	41.5
SG1817	2141	35.9	2635	42.0	3130	45.0	3624	45.0	4118	45.0	4613	45.0
SG1818	2166	35.9	2663	42.0	3161	45.0	3659	45.0	4157	45.0	4655	45.0
SG1918	2425	35.9	2983	42.0	3541	45.0	4099	45.0	4657	45.0	5215	45.0
SG1919	2528	35.9	3110	42.0	3693	45.0	4275	46.0	4858	46.0	5440	46.0
SG2019	2749	35.9	3380	42.0	4011	46.0	4641	46.0	5271	46.0	5901	46.0
SG2119	2845	35.9	3497	42.0	4150	46.0	4803	46.0	5456	46.0	6109	46.0
SG2120	3112	35.9	3822	42.0	4532	46.0	5243	46.0	5953	46.0	6664	46.0
SG2221	3591	35.9	4410	42.0	5229	47.6	6048	50.0	6867	50.0	7694	50.0

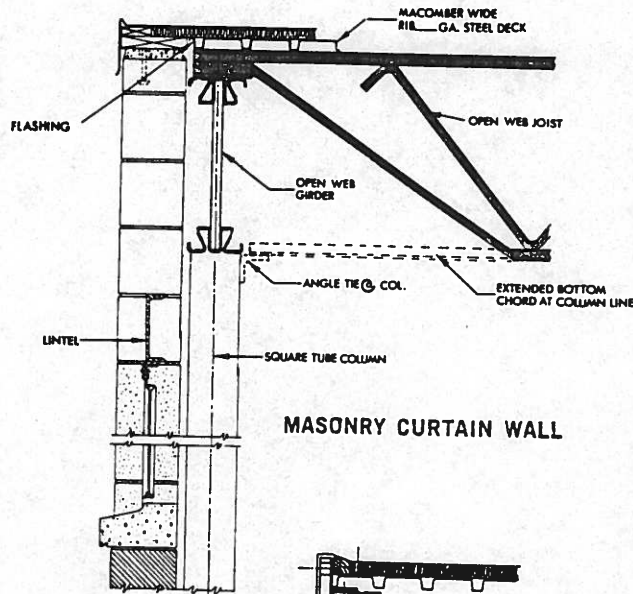
M - Resisting Moment (in.-k.)

(Purlin Spaces from 6'-8" to 8'-0")

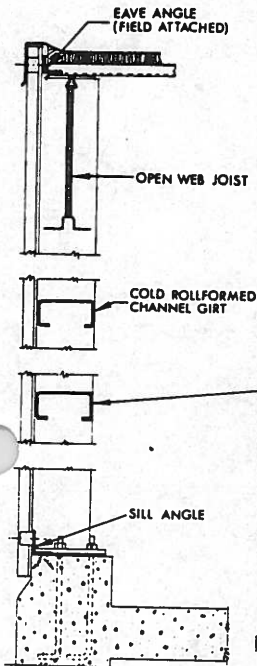
V - Allowable Shear (kips)

Nominal Depth	20"		24"		28"		32"		36"		40"	
Maximum Span	25'-0"		30'-0"		35'-0"		40'-0"		45'-0"		50'-0"	
Girder Size	M	V	M	V	M	V	M	V	M	V	M	V
SG0909	637	19.6	776	19.6	915	19.6	1055	19.6	1194	19.6	1333	19.6
SG1009	776	19.6	946	19.6	1116	19.6	1285	19.6	1455	19.6	1625	19.6
SG1010	776	22.1	946	22.1	1116	22.1	1285	22.1	1455	22.1	1625	22.1
SG1109	866	19.6	1055	19.6	1245	19.6	1434	19.6	1624	19.6	1814	19.6
SG1110	884	22.1	1078	22.1	1271	22.1	1465	22.1	1659	22.1	1853	22.1
SG1111	884	24.5	1078	24.5	1271	24.5	1465	24.5	1659	24.5	1853	24.5
SG1210	993	22.1	1209	22.1	1427	22.1	1645	22.1	1863	22.1	2081	22.1
SG1211	992	24.5	1209	24.5	1427	24.5	1645	24.5	1863	24.5	2081	24.5
SG1212	992	26.5	1209	26.5	1427	26.5	1645	26.5	1863	26.5	2080	26.5
SG1311	1086	24.5	1324	24.5	1562	24.5	1800	24.5	2038	24.5	2276	24.5
SG1312	1086	26.5	1324	26.5	1562	26.5	1800	26.5	2038	26.5	2276	26.5
SG1412	1206	26.5	1470	26.5	1734	26.5	1999	26.5	2263	26.5	2527	26.5
SG1414	1206	28.7	1470	28.7	1734	28.7	1999	28.7	2263	28.7	2527	28.7
SG1513	1398	26.5	1712	26.5	2026	26.5	2341	26.5	2655	26.5	2970	26.5
SG1514	1450	28.7	1776	28.7	2103	28.7	2429	28.7	2755	28.7	3082	28.7
SG1515	1410	30.3	1736	35.9	2063	36.5	2389	36.5	2715	36.5	3042	36.5
SG1614	1550	30.3	1900	35.9	2249	28.7	2598	28.7	2947	28.7	3296	28.7
SG1615	1635	30.3	2013	35.9	2392	36.5	2771	36.5	3150	36.5	3529	36.5
SG1616	1635	30.3	2013	35.9	2392	40.9	2771	41.5	3150	41.5	3529	41.5
SG1716	1802	30.3	2220	35.9	2638	40.9	3056	41.5	3474	41.5	3892	41.5
SG1717	1802	30.3	2220	35.9	2638	40.9	3056	45.0	3474	45.0	3892	45.0
SG1816	1944	30.3	2393	35.9	2842	40.9	3291	41.5	3740	41.5	4188	41.5
SG1817	2084	30.3	2565	35.9	3047	40.9	3528	45.0	4009	45.0	4490	45.0
SG1918	2425	30.3	2983	35.9	3541	40.9	4099	45.0	4657	45.0	5215	45.0
SG1919	2444	30.3	3007	35.9	3570	40.9	4133	45.2	4696	46.0	5259	46.0
SG2019	2653	30.3	3262	35.9	3870	40.9	4478	45.2	5086	46.0	5694	46.0
SG2119	2845	30.3	3497	35.9	4150	40.9	4803	45.2	5456	46.0	6109	46.0
SG2120	3109	30.3	3819	35.9	4529	40.9	5239	45.2	5949	46.0	6659	46.0
SG2222	3464	30.3	4254	35.9	5043	40.9	5833	45.2	6622	49.2	7412	50.0

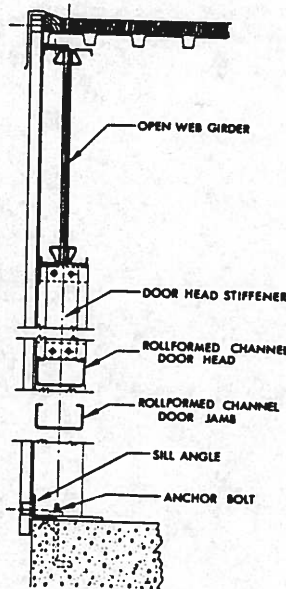
MACOTRUS framing and specifications



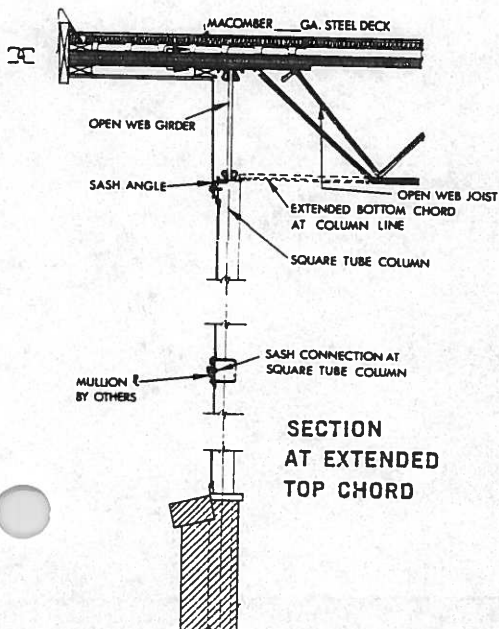
MASONRY CURTAIN WALL



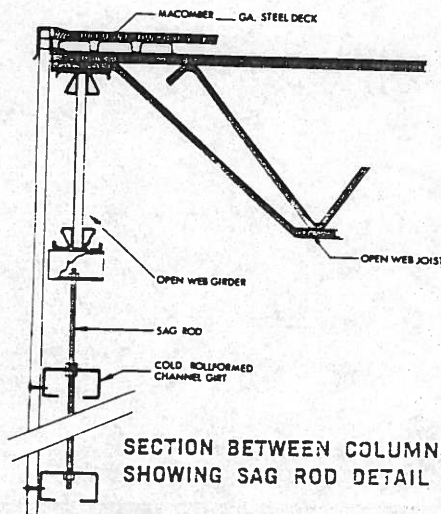
WALL — FACILITATING FUTURE CONSTRUCTION



SECTION THROUGH OVERHEAD DOOR OPENING



SECTION AT EXTENDED TOP CHORD



SECTION BETWEEN COLUMNS SHOWING SAG ROD DETAIL

recommended specifications

MACOTRUS framing

The work covered by this section shall include all labor, materials, equipment and services necessary for and incidental to the installation of the steel framing complete in accordance with this specification and applicable drawings.

Structural steel shall be completely integrated, free standing open web framing system as manufactured by Macomber Incorporated of Canton, Ohio, or approved equal; and shall consist of columns, base plates, leveling plates, foundation bolts, girders, purlins, bridging, and bracing. Details for connection to masonry, headers, canopies, etc. shall be as shown on drawings.

Top chords of purlins shall be nailable V-Sections, with nail holding capacity at least equal to that of wood.

Bridging shall be horizontal angle bridging field welded to joist top and bottom chords. Bracing shall be in accordance with good engineering practice, per manufacturer's recommendation, and as indicated on shop drawings.

Framing shall be expandable, with minor modifications except where limited by finished masonry walls, etc.

Manufacturer of a proposed alternate system must submit to the architect, at least five days before bid opening, design and test data proving his system to be equal in structural capacity, rigidity, and nailability.

Manufacturer of structural system to be used by general contractor shall submit shop drawings for approval by the architect.

All structural framing shall receive one shop coat of manufacturer's standard paint.

alternate in lieu of standard structural

Contractor will submit figures showing addition or deduction for furnishing a complete open web structural system as manufactured by Macomber Incorporated of Canton, Ohio, in lieu of standard structural members specified. The open web framing system shall be structurally capable of carrying load requirements dictated by the architect and the engineer. Necessary architectural modifications shall be subject to the approval of the architect. Shop drawings and substantiating data, when requested, shall be prepared by Macomber Incorporated, approval by the architect and engineer.

All structural framing shall receive one shop coat of manufacturer's standard paint.


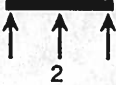
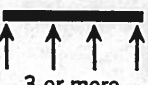
Other Macomber Products

Steel Roof Deck

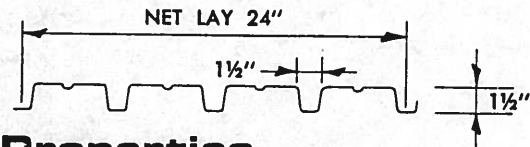
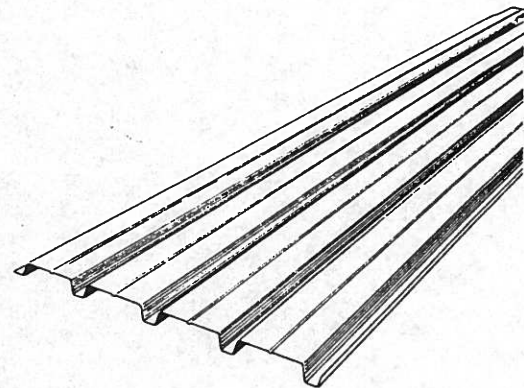
intermediate rib roof deck

Uniform Load Capacities

Painted — Uniform Total (Dead & Live) Load in Pounds Per Sq. Ft.

SPAN CONDITION	GA.	INTERMEDIATE RIB DECK												
		SPAN LENGTH — C/C JOISTS OR PURLINS												
		5-0	5-6	6-0	6-6	6-8	7-0	7-6	8-0	8-4	8-6	9-0	9-6	10-0
 Simple	22	69	57	48	41	38	35	30						
	20	85	70	59	49	45	41	35	31					
	18	115	95	80	65	61	54	46	40	36	35	31		
 2	22	76	63	53	45	43	39	34	30					
	20	90	75	63	54	51	46	40	35	33	31			
	18	119	98	82	70	67	61	53	46	43	41	37	33	30
 3 or more	22	95	78	66	56	53	48	42	37	34	33			
	20	113	93	79	67	64	58	50	44	41	39	34	31	
	18	148	123	103	88	83	76	66	58	53	51	45	39	35

Loads in shaded area are governed by live load deflection not in excess of 1/240 x span. The dead load included is 10 PSF. All other loads are governed by the allowable flexural stress limit of 20,000 psi for a 33,000 psi minimum yield.



Properties

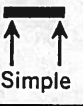
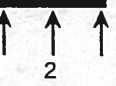
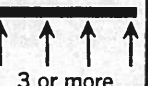
TYPE	GAUGE	SECTION MODULUS	MOMENT OF INERTIA	TYPE
W-18	18	0.252 in. ³	0.264 in. ⁴	W-18
W-20	20	0.184 in. ³	0.182 in. ⁴	W-20
W-22	22	0.150 in. ³	0.142 in. ⁴	W-22

(For 12" Width)

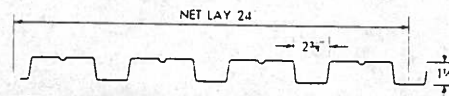
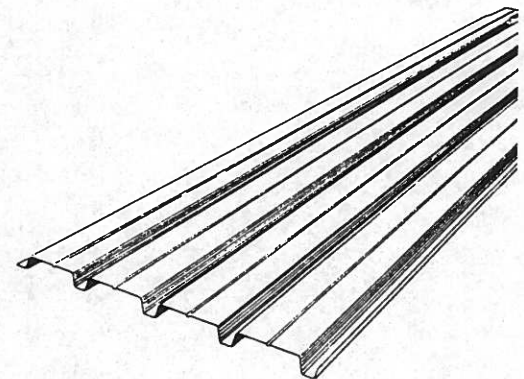
wide rib "B" roof deck

Uniform Load Capacities

Painted — Uniform Total (Dead & Live) Load in Pounds Per Sq. Ft.

SPAN CONDITION	GA.	WIDE RIB "B" DECK												
		SPAN LENGTH — C/C JOISTS OR PURLINS												
		5-0	5-6	6-0	6-6	6-8	7-0	7-6	8-0	8-4	8-6	9-0	9-6	10-0
 Simple	22	97	75	60	49	47	42	36						
	20	121	93	74	60	57	50	43	37	34				
	18	171	131	103	83	78	69	58	49	44	39	38		
 2	22	103	85	72	61	58	53	46	40	37	36			
	20	129	107	90	76	73	66	57	50	46	45	40	36	
	18	176	145	122	104	99	90	78	69	63	61	54	49	44
 3 or more	22	129	107	90	76	73	66	57	50	46	45	40	36	
	20	161	133	112	94	88	77	65	56	49	46	40	37	
	18	220	182	153	130	123	108	89	75	67	65	56	49	44

Loads in shaded area are governed by live load deflection not in excess of 1/240 x span. The dead load included is 10 PSF. All other loads are governed by the allowable flexural stress limit of 20,000 psi for a 33,000 psi minimum yield.



Properties

TYPE	GAUGE	SECTION MODULUS	MOMENT OF INERTIA	TYPE
B-18	18	0.351 in. ³	0.311 in. ⁴	B-18
B-20	20	0.253 in. ³	0.214 in. ⁴	B-20
B-22	22	0.194 in. ³	0.167 in. ⁴	B-22

(For 12" Width)

for wind and seismic loadings-diaphragm action

The greater part of all buildings constructed throughout North America are influenced to some degree by the lateral forces of wind and/or seismic thrust. The presence of these factors requires special consideration in the design of a structure.

Effective in providing the necessary lateral stability is the utilization of steel deck as a horizontal diaphragm. Macomber Intermediate Rib Deck has excellent diaphragm properties. These properties were established

through tests on the Macomber deck, conducted by S. B. Barnes and Associates of Los Angeles, California.

Satisfactory diaphragm action using Macomber steel deck can be obtained without the use of welding washers or side lap welding.

Test data is available by writing to Macomber Incorporated in Canton, Ohio or by contacting the Macomber Representative in your area.