



DIVISION: 05 00 00—METALS

Section: 05 40 00—Cold-Formed Metal Framing

Section: 05 41 00—Structural Metal Stud Framing

Section: 05 42 00—Cold-Formed Metal Joist Framing

DIVISION: 09 00 00—FINISHES

Section: 09 22 13—Metal Furring

Section: 09 22 16.13—Non-Structural Metal Stud Framing

REPORT HOLDER:

CALIFORNIA EXPANDED METAL PRODUCTS
COMPANY (CEMCO)

EVALUATION SUBJECT:

COLD-FORMED STEEL FRAMING

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The steel framing described in this report is used for framing of nonload-bearing interior walls, curtain walls and load-bearing walls, floor joists, ceiling joists and furring.

3.0 DESCRIPTION

3.1 General:

The steel framing described in this report, consisting of structural C-shapes (studs and joists), tracks, furring channels and U-channels, is fabricated from coils of cold-rolled steel. The C-shapes are manufactured with or without web punch-outs; all other framing members (tracks, U-channels and furring hat channels) are manufactured without web punch-outs. When provided in the structural C-shapes, punch-outs measuring up to 0.75 inch by 2 inches (19 mm by 51 mm) for the 2.5-inch-deep members and 1.5 inches by 3.25 inches (38 mm by 83 mm) for the other sized members are located along the centerline of the webs. (**Note:** 1200Sxxx-118 members are un-punched only.) The minimum distance between the end of the C-shape and the near edge of the web punch-out is 10 inches (254 mm). The minimum distance between centerlines of punch-outs is 24

inches (610 mm). See Tables 1, 2, 7, 8 and Figure 1 for recognized framing section names, profiles and dimensions. The values in each of the tables for C-shapes are for C-shapes with punch-outs. See Table 10 for manufacturing locations.

3.2 Materials:

3.2.1 General: Steel framing members are available in design steel thicknesses ranging from 0.0188 inch to 0.1242 inch (0.478 mm to 3.155 mm), as shown in Table 3, and in the sizes and configurations shown in Tables 1, 2, 7, 8 and Figure 1.

3.2.2 Studs and Tracks: Studs and tracks are cold-formed from galvanized steel coils conforming to ASTM A653, SS Grade 33 or Grade 50, Class 1; or ASTM A1003, Structural Grade 33, Type H, (ST33H) or Structural Grade 50, Type H (ST50H). The steel has a minimum metallic coating of G60 in accordance with ASTM A653, AZ50 in accordance with ASTM A792, or CF30 in accordance with ASTM A875..

3.2.3 U-channels: U-channels are cold-formed from galvanized steel coils conforming to ASTM A653, SS Grade 50; or ASTM A1003, Structural Grade 50, Type H (ST50H), with a minimum metallic coating of G60 in accordance with ASTM A653, AZ50 in accordance with ASTM A792, or CF30 in accordance with ASTM A875.

3.2.4 Furring Channels: Furring channels are cold-formed from galvanized steel coils conforming to ASTM A1003, Nonstructural Grade 33 (NS33), with a minimum metallic coating of G40 in accordance with ASTM A653.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 IBC Method: The section properties indicated in Tables 4, 5, 7 and 8 have been determined in accordance with the applicable edition of the North American Specification for Design of Cold-formed Steel Structural Members (AISI). The allowable moments as indicated in Tables 4, 5, 7 and 8 are for use with Allowable Strength Design (ASD), and are for flexural members installed with the compression flange continuously braced. For other conditions of compression flange bracing, the allowable moment must be determined in accordance with the applicable edition of AISI. Allowable concentrated loads and reactions based on web crippling are shown in Table 6, for related web crippling loading conditions. The design of flexural members used for framing of nonload-bearing interior walls, curtain walls, load-bearing walls, floors or ceilings must address combined bending and web crippling, and combined bending and shear.

4.1.2 IRC Method: The steel framing members identified in Table 9 comply with the structural framing requirements of IRC Sections R505.2, R603.2 and R804.2, and qualify for use with the prescriptive requirements of the IRC. When steel framing members are used to construct buildings that do not conform to the applicable requirements of IRC Section R505.1.1, R603.1.1 or R804.1.1; and for steel framing members not identified in Table 3, the structural analysis and design must be in accordance with the IBC, as described in Section 4.1.1 of this report.

4.2 Installation:

The framing members must be installed in accordance with the applicable code, the approved plans and this report. If there is a conflict between the plans submitted for approval and this report, this report governs. The approved plans must be available at the jobsite at all times.

5.0 CONDITIONS OF USE

The CEMCO cold-formed steel framing described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The framing members are installed in accordance with the applicable code, the approved construction documents and this report.
- 5.2** Minimum uncoated steel thickness of the framing members as delivered to the jobsite is at least 95 percent of the design steel thickness noted in Table 3.
- 5.3** Complete construction documents and calculations verifying compliance with this report and the applicable code must be submitted to the code official

for each project. The calculations and construction documents must be prepared and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Cold-formed Steel Framing Members (AC46), dated June 2012 (editorially revised April 2015).

7.0 IDENTIFICATION

- 7.1** At a spacing not exceeding 96 inches (2440 mm) on center, each framing member is stamped with the name of the manufacturer; the member designation as provided in Tables 1, 2, 7 and 8; the evaluation report number (ESR-3016); the minimum uncoated steel thickness in decimal inches; the steel designation and minimum specified yield strength; and the coating designation (CP 60) for framing members if G60 or greater galvanization coating.
- 7.2** The report holder's contact information is the following:

**CALIFORNIA EXPANDED METAL PRODUCTS
COMPANY (CEMCO)
13191 CROSSROADS PARKWAY NORTH,
SUITE 325
CITY OF INDUSTRY, CALIFORNIA 91746
(800) 416-2278
www.cemcosteel.com**

TABLE 1—C-SHAPES

MEMBER	WEB ² (in)	FLANGE (in)	LIP (in)	THICKNESS ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)	MEMBER	WEB ² (in)	FLANGE (in)	LIP (in)	THICKNESS ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)
250S137-33	2.500	1.375	0.375	33	0.197	0.67	400S162-33	4.000	1.625	0.0346	33	0.275	0.94
250S137-43	2.500	1.375	0.375	43	0.255	0.87	400S162-43	4.000	1.625	0.0451	43	0.357	1.21
250S137-54	2.500	1.375	0.375	54	0.316	1.07	400S162-54	4.000	1.625	0.0566	54	0.443	1.51
250S137-68	2.500	1.375	0.375	68	0.390	1.33	400S162-68	4.000	1.625	0.0713	68	0.550	1.87
250S137-97	2.500	1.375	0.375	97	0.533	1.81	400S162-97	4.000	1.625	0.1017	97	0.762	2.59
250S162-33	2.500	1.625	0.500	33	0.223	0.76	400S162-118	4.000	1.625	0.500	118	0.910	3.10
250S162-43	2.500	1.625	0.500	43	0.289	0.98	400S200-33	4.000	2.000	0.0346	33	0.310	1.05
250S162-54	2.500	1.625	0.500	54	0.358	1.22	400S200-43	4.000	2.000	0.0451	43	0.402	1.37
250S162-68	2.500	1.625	0.500	68	0.443	1.51	400S200-54	4.000	2.000	0.0566	54	0.500	1.70
250S162-97	2.500	1.625	0.500	97	0.610	2.07	400S200-68	4.000	2.000	0.0713	68	0.622	2.12
350S137-33	3.500	1.375	0.375	33	0.232	0.79	400S200-97	4.000	2.000	0.1017	97	0.864	2.94
350S137-43	3.500	1.375	0.375	43	0.300	1.02	400S200-118	4.000	2.000	0.625	118	1.034	3.52
350S137-54	3.500	1.375	0.375	54	0.372	1.27	400S250-43	4.000	2.500	0.0451	43	0.447	1.52
350S137-68	3.500	1.375	0.375	68	0.461	1.57	400S250-54	4.000	2.500	0.0566	54	0.556	1.89
350S137-97	3.500	1.375	0.375	97	0.635	2.16	400S250-68	4.000	2.500	0.0713	68	0.693	2.36
350S162-33	3.500	1.625	0.500	33	0.258	0.88	400S250-97	4.000	2.500	0.1017	97	0.966	3.29
350S162-43	3.500	1.625	0.500	43	0.334	1.14	400S250-118	4.000	2.500	0.625	118	1.158	3.94
350S162-54	3.500	1.625	0.500	54	0.415	1.41	400S300-54	4.000	3.000	0.0566	54	0.641	2.18
350S162-68	3.500	1.625	0.500	68	0.515	1.75	400S300-68	4.000	3.000	0.0713	68	0.800	2.72
350S162-97	3.500	1.625	0.500	97	0.711	2.42	400S300-97	4.000	3.000	0.1017	97	1.118	3.80
350S200-33	3.500	2.000	0.625	33	0.292	0.99	400S300-118	4.000	3.000	0.875	118	1.345	4.58
350S200-43	3.500	2.000	0.625	43	0.379	1.29	400S350-54	4.000	3.500	1.000	54	0.712	2.42
350S200-54	3.500	2.000	0.625	54	0.471	1.60	400S350-68	4.000	3.500	1.000	68	0.889	3.03
350S200-68	3.500	2.000	0.625	68	0.586	1.99	400S350-97	4.000	3.500	1.000	97	1.245	4.24
350S200-97	3.500	2.000	0.625	97	0.813	2.77	400S350-118	4.000	3.500	1.000	118	1.50	5.10
362S137-33	3.625	1.375	0.375	33	0.236	0.80	550S137-33	5.500	1.375	0.375	33	0.301	1.02
362S137-43	3.625	1.375	0.375	43	0.306	1.04	550S137-43	5.500	1.375	0.375	43	0.391	1.33
362S137-54	3.625	1.375	0.375	54	0.379	1.29	550S137-54	5.500	1.375	0.375	54	0.486	1.65
362S137-68	3.625	1.375	0.375	68	0.470	1.60	550S137-68	5.500	1.375	0.375	68	0.604	2.05
362S137-97	3.625	1.375	0.375	97	0.648	2.20	550S137-97	5.500	1.375	0.375	97	0.838	2.85
362S162-33	3.625	1.625	0.500	33	0.262	0.89	550S162-33	5.500	1.625	0.500	33	0.327	1.11
362S162-43	3.625	1.625	0.500	43	0.340	1.16	550S162-43	5.500	1.625	0.500	43	0.424	1.44
362S162-54	3.625	1.625	0.500	54	0.422	1.44	550S162-54	5.500	1.625	0.500	54	0.528	1.80
362S162-68	3.625	1.625	0.500	68	0.524	1.78	550S162-68	5.500	1.625	0.500	68	0.657	2.24
362S162-97	3.625	1.625	0.500	97	0.724	2.46	550S162-97	5.500	1.625	0.500	97	0.915	3.11
362S162-118	3.625	1.625	0.500	118	0.863	2.94	550S200-33	5.500	2.000	0.625	33	0.362	1.23
362S200-33	3.625	2.000	0.625	33	0.297	1.01	550S200-43	5.500	2.000	0.625	43	0.469	1.60
362S200-43	3.625	2.000	0.625	43	0.385	1.31	550S200-54	5.500	2.000	0.625	54	0.585	1.99
362S200-54	3.625	2.000	0.625	54	0.479	1.63	550S200-68	5.500	2.000	0.625	68	0.729	2.48
362S200-68	3.625	2.000	0.625	68	0.595	2.02	550S200-97	5.500	2.000	0.625	97	1.016	3.46
362S200-97	3.625	2.000	0.625	97	0.826	2.81	600S137-33	6.000	1.375	0.375	33	0.318	1.08
362S200-118	3.625	2.000	0.625	118	0.988	3.36	600S137-43	6.000	1.375	0.375	43	0.413	1.41
362S250-43	3.625	2.500	0.625	43	0.430	1.46	600S137-54	6.000	1.375	0.375	54	0.514	1.75
362S250-54	3.625	2.500	0.625	54	0.535	1.82	600S137-68	6.000	1.375	0.375	68	0.640	2.18
362S250-68	3.625	2.500	0.625	68	0.666	2.27	600S137-97	6.000	1.375	0.375	97	0.889	3.03
362S250-97	3.625	2.500	0.625	97	0.927	3.16	600S162-33	6.000	1.625	0.500	33	0.344	1.17
362S250-118	3.625	2.500	0.625	118	1.112	3.78	600S162-43	6.000	1.625	0.500	43	0.447	1.52
362S300-54	3.625	3.000	0.785	54	0.620	2.11	600S162-54	6.000	1.625	0.500	54	0.556	1.89
362S300-68	3.625	3.000	0.875	68	0.773	2.63	600S162-68	6.000	1.625	0.500	68	0.693	2.36
362S300-97	3.625	3.000	0.875	97	1.080	3.67	600S162-97	6.000	1.625	0.500	97	0.966	3.29
362S300-118	3.625	3.000	0.875	118	1.298	4.42	600S162-118	6.000	1.625	0.500	118	1.158	3.94
362S350-54	3.625	3.500	1.000	54	0.691	2.35	600S200-33	6.000	2.000	0.625	33	0.379	1.29
362S350-68	3.625	3.500	1.000	68	0.862	2.93	600S200-43	6.000	2.000	0.625	43	0.492	1.67
362S350-97	3.625	3.500	1.000	97	1.207	4.11	600S200-54	6.000	2.000	0.625	54	0.613	2.09
362S350-118	3.625	3.500	1.000	118	1.453	4.95	600S200-68	6.000	2.000	0.625	68	0.764	2.60
400S137-33	4.000	1.375	0.0346	33	0.249	0.85	600S200-97	6.000	2.000	0.625	97	1.067	3.63
400S137-43	4.000	1.375	0.0451	43	0.323	1.10	600S200-118	6.000	2.000	0.625	118	1.283	4.36
400S137-54	4.000	1.375	0.0566	54	0.401	1.36							
400S137-68	4.000	1.375	0.0713	68	0.497	1.69							
400S137-97	4.000	1.375	0.1017	97	0.686	2.33							

For SI: 1 inch = 25.4 mm, 1 plf = 1.4882 kg/m

TABLE 1—C-SHAPES (Continued)

MEMBER	WEB ² (in)	FLANGE (in)	LIP (in)	THICKNESS DESIGNATION ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)	MEMBER	WEB ² (in)	FLANGE (in)	LIP (in)	THICKNESS DESIGNATION ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)
600S250-43	6.000	2.500	0.625	43	0.537	1.83	1000S162-43 ¹	10.000	1.625	0.500	43	0.627	2.13
600S250-54	6.000	2.500	0.625	54	0.670	2.28	1000S162-54	10.000	1.625	0.500	54	0.783	2.66
600S250-68	6.000	2.500	0.625	68	0.836	2.84	1000S162-68	10.000	1.625	0.500	68	0.978	3.33
600S250-97	6.000	2.500	0.625	97	1.169	3.98	1000S162-97	10.000	1.625	0.500	97	1.372	4.67
600S250-118	6.000	2.500	0.625	118	1.407	4.79	1000S162-118	10.000	1.625	0.500	118	1.655	5.63
600S300-54	6.000	3.000	0.785	54	0.754	2.57	1000S200-43 ¹	10.000	2.000	0.625	43	0.672	2.29
600S300-68	6.000	3.000	0.875	68	0.943	3.21	1000S200-54	10.000	2.000	0.625	54	0.839	2.86
600S300-97	6.000	3.000	0.875	97	1.321	4.50	1000S200-68	10.000	2.000	0.625	68	1.050	3.57
600S300-118	6.000	3.000	0.875	118	1.593	5.421	1000S200-97	10.000	2.000	0.625	97	1.474	5.02
600S350-54	6.000	3.500	1.000	54	0.825	2.81	1000S200-118	10.000	2.000	0.625	118	1.779	6.05
600S350-68	6.000	3.500	1.000	68	1.032	3.51	1000S250-43 ¹	10.000	2.500	0.625	43	0.717	2.44
600S350-97	6.000	3.500	1.000	97	1.449	4.93	1000S250-54	10.000	2.500	0.625	54	0.896	3.05
600S350-118	6.000	3.500	1.000	118	1.748	5.949	1000S250-68	10.000	2.500	0.625	68	1.121	3.81
800S137-33 ¹	8.000	1.375	0.375	33	0.388	1.32	1000S250-97	10.000	2.500	0.625	97	1.576	5.36
800S137-43	8.000	1.375	0.375	43	0.503	1.71	1000S250-118	10.000	2.500	0.625	118	1.904	6.48
800S137-54	8.000	1.375	0.375	54	0.627	2.13	1000S300-54	10.000	3.000	0.785	54	0.981	3.34
800S137-68	8.000	1.375	0.375	68	0.782	2.66	1000S300-68	10.000	3.000	0.875	68	1.228	4.18
800S137-97	8.000	1.375	0.375	97	1.093	3.72	1000S300-97	10.000	3.000	0.875	97	1.728	5.88
800S162-33 ¹	8.000	1.625	0.500	33	0.413	1.41	1000S300-118	10.000	3.000	0.875	118	2.090	7.11
800S162-43	8.000	1.625	0.500	43	0.537	1.83	1000S350-54	10.000	3.500	1.000	54	1.052	3.58
800S162-54	8.000	1.625	0.500	54	0.670	2.28	1000S350-68	10.000	3.500	1.000	68	1.317	4.48
800S162-68	8.000	1.625	0.500	68	0.836	2.84	1000S350-97	10.000	3.500	1.000	97	1.855	6.31
800S162-97	8.000	1.625	0.500	97	1.169	3.98	1000S350-118	10.000	3.500	1.000	118	2.245	7.64
800S162-118	8.000	1.625	0.500	118	1.407	4.79	1200S162-54 ¹	12.000	1.625	0.500	54	0.896	3.05
800S200-33 ¹	8.000	2.000	0.625	33	0.448	1.52	1200S162-68	12.000	1.625	0.500	68	1.121	3.81
800S200-43	8.000	2.000	0.625	43	0.582	1.98	1200S162-97	12.000	1.625	0.500	97	1.576	5.36
800S200-54	8.000	2.000	0.625	54	0.726	2.47	1200S200-54 ¹	12.000	2.000	0.625	54	0.953	3.24
800S200-68	8.000	2.000	0.625	68	0.907	3.09	1200S200-68	12.000	2.000	0.625	68	1.192	4.06
800S200-97	8.000	2.000	0.625	97	1.271	4.32	1200S200-97	12.000	2.000	0.625	97	1.677	5.71
800S200-118	8.000	2.000	0.625	118	1.531	5.21	1200S200-118 ⁴	12.000	2.000	0.625	118	2.028	6.90
800S250-43	8.000	2.500	0.625	43	0.627	2.13	1200S250-54 ¹	12.000	2.500	0.625	54	1.009	3.43
800S250-54	8.000	2.500	0.625	54	0.783	2.66	1200S250-68	12.000	2.500	0.625	68	1.263	4.30
800S250-68	8.000	2.500	0.625	68	0.978	3.33	1200S250-97	12.000	2.500	0.625	97	1.779	6.05
800S250-97	8.000	2.500	0.625	97	1.372	4.67	1200S250-118 ⁴	12.000	2.500	0.625	118	2.152	7.32
800S250-118	8.000	2.500	0.625	118	1.655	5.63	1200S300-54 ¹	12.000	3.000	0.785	54	1.094	3.72
800S300-54	8.000	3.000	0.785	54	0.868	2.95	1200S300-68	12.000	3.000	0.875	68	1.370	4.66
800S300-68	8.000	3.000	0.875	68	1.085	3.69	1200S300-97	12.000	3.000	0.875	97	1.932	6.57
800S300-97	8.000	3.000	0.875	97	1.525	5.19	1200S300-118 ⁴	12.000	3.000	0.875	118	2.338	7.96
800S300-118	8.000	3.000	0.875	118	1.842	6.27	1200S350-54 ^{1,4}	12.000	3.500	1.000	54	1.168	3.96
800S350-54	8.000	3.500	1.000	54	0.938	3.19	1200S350-68 ⁴	12.000	3.500	1.000	68	1.460	4.97
800S350-68	8.000	3.500	1.000	68	1.174	4.00	1200S350-97 ⁴	12.000	3.500	1.000	97	2.059	7.01
800S350-97	8.000	3.500	1.000	97	1.652	5.62	1200S350-118 ⁴	12.000	3.500	1.000	118	2.494	8.48
800S350-118	8.000	3.500	1.000	118	1.997	6.79							

For SI: 1 inch = 25.4 mm, 1 plf = 1.4882 kg/m

¹Web-height to thickness ratio exceeds 200. Web Stiffeners are required at all support points and concentrated loads. Punchouts/holes in the web are outside the scope of this report.²Web height measured from outside face to outside face of flanges.³See Table 3 for design thickness, minimum thickness, and inside bend radius.⁴These members are available un-punched only.

TABLE 2—TRACKS

MEMBER	WEB ² (in)	FLANGE (in)	THICKNESS DESIGNATION ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)	MEMBER	WEB ² (in)	FLANGE (in)	THICKNESS DESIGNATION ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)
250T125-33	2.500	1.250	33	0.173	0.59	400T125-33	4.000	1.250	33	0.225	0.76
250T125-43	2.500	1.250	43	0.225	0.77	400T125-43	4.000	1.250	43	0.293	1.00
250T125-54	2.500	1.250	54	0.282	0.96	400T125-54	4.000	1.250	54	0.367	1.25
250T125-68	2.500	1.250	68	0.355	1.21	400T125-68	4.000	1.250	68	0.462	1.57
250T125-97	2.500	1.250	97	0.506	1.72	400T125-97	4.000	1.250	97	0.659	2.24
250T150-33	2.500	1.500	33	0.190	0.65	400T125-118	4.000	1.250	118	0.804	2.74
250T150-43	2.500	1.500	43	0.248	0.84	400T150-33	4.000	1.500	33	0.242	0.82
250T150-54	2.500	1.500	54	0.311	1.06	400T150-43	4.000	1.500	43	0.315	1.07
250T150-68	2.500	1.500	68	0.391	1.33	400T150-54	4.000	1.500	54	0.396	1.35
250T150-97	2.500	1.500	97	0.557	1.90	400T150-68	4.000	1.500	68	0.498	1.69
250T200-33	2.500	2.000	33	0.225	0.76	400T150-97	4.000	1.500	97	0.710	2.41
250T200-43	2.500	2.000	43	0.293	1.00	400T150-118	4.000	1.500	118	0.866	2.95
250T200-54	2.500	2.000	54	0.367	1.25	400T200-33	4.000	2.000	33	0.277	0.94
250T200-68	2.500	2.000	68	0.462	1.57	400T200-43	4.000	2.000	43	0.360	1.23
250T200-97	2.500	2.000	97	0.659	2.24	400T200-54	4.000	2.000	54	0.452	1.54
250T250-43	2.500	2.500	43	0.338	1.15	400T200-68	4.000	2.000	68	0.569	1.94
250T250-54	2.500	2.500	54	0.424	1.44	400T200-97	4.000	2.000	97	0.811	2.76
250T250-68	2.500	2.500	68	0.534	1.82	400T200-118	4.000	2.000	118	0.990	3.38
250T250-97	2.500	2.500	97	0.761	2.59	400T250-43	4.000	2.500	43	0.405	1.38
350T125-33	3.500	1.250	33	0.207	0.71	400T250-54	4.000	2.500	54	0.509	1.73
350T125-43	3.500	1.250	43	0.270	0.92	400T250-68	4.000	2.500	68	0.641	2.18
350T125-54	3.500	1.250	54	0.339	1.15	400T250-97	4.000	2.500	97	0.913	3.11
350T125-68	3.500	1.250	68	0.427	1.45	400T250-118	4.000	2.500	118	1.115	3.79
350T125-97	3.500	1.250	97	0.608	2.07	400T300-54	4.000	3.000	54	0.565	1.92
350T150-33	3.500	1.500	33	0.225	0.76	400T300-68	4.000	3.000	68	0.712	2.42
350T150-43	3.500	1.500	43	0.293	1.00	400T300-97	4.000	3.000	97	1.015	3.45
350T150-54	3.500	1.500	54	0.367	1.25	400T300-118	4.000	3.000	118	1.239	4.21
350T150-68	3.500	1.500	68	0.462	1.57	550T125-33	5.500	1.250	33	0.277	0.94
350T150-97	3.500	1.500	97	0.659	2.24	550T125-43	5.500	1.250	43	0.360	1.23
350T200-33	3.500	2.000	33	0.259	0.88	550T125-54	5.500	1.250	54	0.452	1.54
350T200-43	3.500	2.000	43	0.338	1.15	550T125-68	5.500	1.250	68	0.569	1.94
350T200-54	3.500	2.000	54	0.424	1.44	550T125-97	5.500	1.250	97	0.811	2.76
350T200-68	3.500	2.000	68	0.534	1.82	550T150-33	5.500	1.500	33	0.294	1.00
350T200-97	3.500	2.000	97	0.761	2.59	550T150-43	5.500	1.500	43	0.383	1.30
350T250-43	3.500	2.500	43	0.383	1.30	550T150-54	5.500	1.500	54	0.480	1.63
350T250-54	3.500	2.500	54	0.480	1.63	550T150-68	5.500	1.500	68	0.605	2.06
350T250-68	3.500	2.500	68	0.605	2.06	550T150-97	5.500	1.500	97	0.862	2.93
350T250-97	3.500	2.500	97	0.862	2.93	550T200-33	5.500	2.000	33	0.329	1.12
362T125-33	3.625	1.250	33	0.212	0.72	550T200-43	5.500	2.000	43	0.428	1.46
362T125-43	3.625	1.250	43	0.276	0.94	550T200-54	5.500	2.000	54	0.537	1.83
362T125-54	3.625	1.250	54	0.346	1.18	550T200-68	5.500	2.000	68	0.676	2.30
362T125-68	3.625	1.250	68	0.436	1.48	550T200-97	5.500	2.000	97	0.964	3.28
362T125-97	3.625	1.250	97	0.621	2.11	550T250-43	5.500	2.500	43	0.473	1.61
362T125-118	3.625	1.250	118	0.757	2.58	550T250-54	5.500	2.500	54	0.594	2.02
362T150-33	3.625	1.500	33	0.229	0.78	550T250-68	5.500	2.500	68	0.748	2.54
362T150-43	3.625	1.500	43	0.298	1.02	550T250-97	5.500	2.500	97	1.066	3.63
362T150-54	3.625	1.500	54	0.374	1.27	600T125-33	6.000	1.250	33	0.294	1.00
362T150-68	3.625	1.500	68	0.471	1.60	600T125-43	6.000	1.250	43	0.383	1.30
362T150-97	3.625	1.500	97	0.672	2.29	600T125-54	6.000	1.250	54	0.480	1.63
362T150-118	3.625	1.500	118	0.820	2.79	600T125-68	6.000	1.250	68	0.605	2.06
362T200-33	3.625	2.000	33	0.264	0.90	600T125-97	6.000	1.250	97	0.862	2.93
362T200-43	3.625	2.000	43	0.343	1.17	600T125-118	6.000	1.250	118	1.052	3.58
362T200-54	3.625	2.000	54	0.431	1.47	600T150-33	6.000	1.500	33	0.311	1.06
362T200-68	3.625	2.000	68	0.543	1.85	600T150-43	6.000	1.500	43	0.405	1.38
362T200-97	3.625	2.000	97	0.773	2.63	600T150-54	6.000	1.500	54	0.509	1.73
362T200-118	3.625	2.000	118	0.944	3.21	600T150-68	6.000	1.500	68	0.641	2.18
362T250-43	3.625	2.500	43	0.389	1.32	600T150-97	6.000	1.500	97	0.913	3.11
362T250-54	3.625	2.500	54	0.487	1.66	600T150-118	6.000	1.500	118	1.115	3.79
362T250-68	3.625	2.500	68	0.614	2.09	600T200-33	6.000	2.000	33	0.346	1.18
362T250-97	3.625	2.500	97	0.875	2.98	600T200-43	6.000	2.000	43	0.451	1.53
362T250-118	3.625	2.500	118	1.068	3.63	600T200-54	6.000	2.000	54	0.565	1.92
362T300-54	3.625	3.000	54	0.544	1.85	600T200-68	6.000	2.000	68	0.712	2.42
362T300-68	3.625	3.000	68	0.685	2.33	600T200-97	6.000	2.000	97	1.015	3.45
362T300-97	3.625	3.000	97	0.977	3.32	600T200-118	6.000	2.000	118	1.239	4.21
362T300-118	3.625	3.000	118	1.192	4.06						

For SI: 1 inch = 25.4 mm, 1 plf = 1.4882 kg/m

TABLE 2—TRACKS (Continued)

MEMBER	WEB ² (in)	FLANGE (in)	THICKNESS DESIGNATION ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)	MEMBER	WEB ² (in)	FLANGE (in)	THICKNESS DESIGNATION ³ (mils)	AREA (in ²)	WEIGHT (lb/ft)
600T250-43	6.000	2.500	43	0.496	1.69	1000T150-43 ¹	10.000	1.500	43	0.586	1.99
600T250-54	6.000	2.500	54	0.622	2.12	1000T150-54	10.000	1.500	54	0.735	2.50
600T250-68	6.000	2.500	68	0.783	2.67	1000T150-68	10.000	1.500	68	0.926	3.15
600T250-97	6.000	2.500	97	1.116	3.80	1000T150-97	10.000	1.500	97	1.320	4.49
600T250-118	6.000	2.500	118	1.363	4.64	1000T150-118	10.000	1.500	118	1.611	5.48
600T300-54	6.000	3.000	54	0.679	2.31	1000T200-43 ¹	10.000	2.000	43	0.631	2.15
600T300-68	6.000	3.000	68	0.855	2.91	1000T200-54	10.000	2.000	54	0.792	2.69
600T300-97	6.000	3.000	97	1.218	4.15	1000T200-68	10.000	2.000	68	0.997	3.39
600T300-118	6.000	3.000	118	1.487	5.06	1000T200-97	10.000	2.000	97	1.422	4.84
800T125-33 ¹	8.000	1.250	33	0.363	1.24	1000T200-118	10.000	2.000	118	1.736	5.91
800T125-43	8.000	1.250	43	0.473	1.61	1000T250-43 ¹	10.000	2.500	43	0.676	2.30
800T125-54	8.000	1.250	54	0.594	2.02	1000T250-54	10.000	2.500	54	0.848	2.89
800T125-68	8.000	1.250	68	0.748	2.54	1000T250-68	10.000	2.500	68	1.068	3.64
800T125-97	8.000	1.250	97	1.066	3.63	1000T250-97	10.000	2.500	97	1.523	5.18
800T125-118	8.000	1.250	118	1.301	4.43	1000T250-118	10.000	2.500	118	1.860	6.33
800T150-33 ¹	8.000	1.500	33	0.380	1.29	1000T300-54	10.000	3.000	54	0.905	3.08
800T150-43	8.000	1.500	43	0.496	1.69	1000T300-68	10.000	3.000	68	1.140	3.88
800T150-54	8.000	1.500	54	0.622	2.12	1000T300-97	10.000	3.000	97	1.625	5.53
800T150-68	8.000	1.500	68	0.783	2.67	1000T300-118	10.000	3.000	118	1.984	6.75
800T150-97	8.000	1.500	97	1.116	3.80	1200T125-54 ¹	12.000	1.250	54	0.820	2.79
800T150-118	8.000	1.500	118	1.363	4.64	1200T125-68	12.000	1.250	68	1.033	3.51
800T200-33 ¹	8.000	2.000	33	0.415	1.41	1200T125-97	12.000	1.250	97	1.472	5.01
800T200-43	8.000	2.000	43	0.541	1.84	1200T150-54 ¹	12.000	1.500	54	0.848	2.89
800T200-54	8.000	2.000	54	0.679	2.31	1200T150-68	12.000	1.500	68	1.068	3.64
800T200-68	8.000	2.000	68	0.854	2.91	1200T150-97	12.000	1.500	97	1.523	5.18
800T200-97	8.000	2.000	97	1.218	4.15	1200T150-118	12.000	1.500	118	1.860	6.33
800T200-118	8.000	2.000	118	1.487	5.06	1200T200-54 ¹	12.000	2.000	54	0.905	3.08
800T250-43	8.000	2.500	43	0.586	1.99	1200T200-68	12.000	2.000	68	1.140	3.88
800T250-54	8.000	2.500	54	0.735	2.50	1200T200-97	12.000	2.000	97	1.625	5.53
800T250-68	8.000	2.500	68	0.926	3.15	1200T200-118	12.000	2.000	118	1.984	6.75
800T250-97	8.000	2.500	97	1.320	4.49	1200T250-54 ¹	12.000	2.500	54	0.962	3.27
800T250-118	8.000	2.500	118	1.611	5.48	1200T250-68	12.000	2.500	68	1.211	4.12
800T300-54	8.000	3.000	54	0.792	2.69	1200T250-97	12.000	2.500	97	1.727	5.88
800T300-68	8.000	3.000	68	0.997	3.39	1200T250-118	12.000	2.500	118	2.108	7.17
800T300-97	8.000	3.000	97	1.422	4.84	1200T300-54	12.000	3.000	54	1.018	3.46
800T300-118	8.000	3.000	118	1.736	5.91	1200T300-68	12.000	3.000	68	1.282	4.36
1000T125-43 ¹	10.000	1.250	43	0.563	1.92	1200T300-97	12.000	3.000	97	1.828	6.22
1000T125-54	10.000	1.250	54	0.707	2.41	1200T300-118	12.000	3.000	118	2.232	7.60
1000T125-68	10.000	1.250	68	0.890	3.03						
1000T125-97	10.000	1.250	97	1.269	4.32						
1000T125-118	10.000	1.250	118	1.549	5.27						

For SI: 1 inch = 25.4 mm, 1 plf = 1.4882 kg/m

¹Web-height to thickness ratio exceeds 200. Web Stiffeners are required at all support points and concentrated loads.²Web height measured from inside face to inside face of flanges.³See Table 3 for design thickness, minimum thickness, and inside bend radius.

TABLE 3—UNCOATED STEEL THICKNESS

THICKNESS DESIGNATION (mils)	DESIGN THICKNESS (in)	MINIMUM THICKNESS ¹ (in)	INSIDE BEND RADIUS (in)
18	0.0188	0.0179	0.0843
27	0.0283	0.0269	0.0796
33	0.0346	0.0329	0.0764
43	0.0451	0.0428	0.0712
54	0.0566	0.0538	0.0849
68	0.0713	0.0677	0.1069
97	0.1017	0.0966	0.1525
118	0.1242	0.1180	0.1863

For SI: 1 inch = 25.4 mm.

¹Minimum thickness represents 95 percent of the design thickness and is the minimum acceptable thickness of the uncoated steel delivered to the jobsite.

TABLE 4—C-SHAPE PROPERTIES^{4,5}

MEMBER	F _y (ksi)	GROSS ³					EFFECTIVE PROPERTIES ²						TORSIONAL PROPERTIES						L _u (in)
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	V _{anet} (lb)	M _{ad} (in-k)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β	
250S137-33	33	0.203	0.163	1.015	0.052	0.515	0.203	0.158	3.11	975	399	3.10	0.079	0.076	-1.141	0.677	1.612	0.499	35.5
250S137-43	33	0.261	0.208	1.010	0.067	0.511	0.261	0.205	4.53	1265	394	4.60	0.173	0.096	-1.129	0.670	1.599	0.501	33.7
250S137-54	50	0.318	0.255	1.004	0.080	0.504	0.318	0.244	8.22	2353	565	8.36	0.337	0.115	-1.115	0.663	1.583	0.504	27.1
250S137-68	50	0.386	0.309	0.994	0.095	0.495	0.386	0.308	10.65	2866	519	10.68	0.661	0.138	-1.096	0.653	1.561	0.507	26.8
250S137-97	50	0.506	0.405	0.975	0.120	0.475	0.506	0.405	14.75	3798	429	14.74	1.839	0.176	-1.057	0.633	1.514	0.513	26.5
250S162-33	33	0.235	0.188	1.027	0.087	0.624	0.235	0.180	3.55	975	399	3.56	0.089	0.146	-1.470	0.859	1.898	0.401	44.1
250S162-43	33	0.302	0.242	1.022	0.111	0.620	0.302	0.240	5.22	1265	394	5.26	0.196	0.184	-1.457	0.852	1.885	0.402	42.0
250S162-54	50	0.370	0.296	1.016	0.135	0.613	0.370	0.284	9.42	2353	565	9.48	0.383	0.223	-1.443	0.845	1.868	0.403	33.9
250S162-68	50	0.450	0.360	1.007	0.162	0.605	0.450	0.357	12.11	2866	519	12.21	0.752	0.268	-1.424	0.835	1.846	0.405	33.7
250S162-97	50	0.596	0.477	0.989	0.209	0.586	0.596	0.477	16.93	3798	429	16.91	2.102	0.346	-1.386	0.815	1.801	0.408	33.5
350S137-33	33	0.441	0.252	1.380	0.059	0.503	0.441	0.223	4.41	1024	487	4.54	0.093	0.153	-1.016	0.621	1.786	0.676	34.8
350S137-43	33	0.568	0.324	1.375	0.075	0.498	0.568	0.307	6.07	1739	631	6.38	0.204	0.193	-1.005	0.615	1.774	0.679	34.7
350S137-54	50	0.696	0.398	1.367	0.090	0.492	0.696	0.366	10.95	3372	947	11.43	0.398	0.233	-0.991	0.607	1.759	0.683	28.0
350S137-68	50	0.849	0.485	1.357	0.107	0.482	0.849	0.472	14.12	4202	897	14.52	0.782	0.280	-0.973	0.598	1.738	0.687	27.9
350S137-97	50	1.130	0.646	1.334	0.136	0.462	1.130	0.629	22.9	5704	775	19.34	2.189	0.361	-0.935	0.579	1.693	0.695	27.9
350S162-33	33	0.508	0.290	1.404	0.098	0.617	0.508	0.257	5.08	1024	487	5.21	0.103	0.277	-1.324	0.796	2.026	0.573	42.8
350S162-43	33	0.654	0.374	1.400	0.125	0.612	0.654	0.357	7.05	1739	631	7.31	0.227	0.350	-1.312	0.789	2.014	0.575	42.6
350S162-54	50	0.804	0.460	1.392	0.152	0.606	0.804	0.426	12.74	3372	947	13.06	0.443	0.426	-1.298	0.782	1.998	0.578	34.5
350S162-68	50	0.985	0.563	1.383	0.184	0.597	0.985	0.549	16.44	4202	897	16.86	0.872	0.514	-1.280	0.772	1.977	0.581	34.5
350S162-97	50	1.320	0.754	1.362	0.238	0.578	1.320	0.738	26.18	5704	775	22.57	2.452	0.672	-1.242	0.752	1.932	0.587	34.7
350S200-33	33	0.598	0.342	1.431	0.175	0.773	0.597	0.283	5.58	1024	487	5.94	0.117	0.541	-1.760	1.039	2.396	0.461	53.7
350S200-43	33	0.771	0.441	1.426	0.224	0.768	0.771	0.410	8.09	1739	631	8.36	0.257	0.687	-1.748	1.032	2.383	0.462	53.7
350S200-54	50	0.950	0.543	1.420	0.274	0.762	0.950	0.470	14.07	3372	947	14.86	0.503	0.838	-1.733	1.024	2.367	0.464	43.4
350S200-68	50	1.167	0.667	1.411	0.333	0.754	1.167	0.638	19.11	4202	897	19.68	0.993	1.018	-1.715	1.014	2.345	0.465	43.5
350S200-97	50	1.576	0.901	1.393	0.440	0.736	1.576	0.885	30.51	5704	775	31.08	2.803	1.347	-1.676	0.994	2.300	0.469	40.7
362S137-33	33	0.479	0.264	1.424	0.059	0.501	0.479	0.232	4.59	1024	521	4.72	0.094	0.165	-1.003	0.615	1.813	0.694	34.7
362S137-43	33	0.616	0.340	1.419	0.075	0.497	0.616	0.320	6.32	1739	676	6.65	0.207	0.208	-0.991	0.608	1.801	0.697	34.6
362S137-54	50	0.756	0.417	1.411	0.091	0.490	0.756	0.381	11.42	3372	1016	11.91	0.405	0.251	-0.978	0.601	1.785	0.700	27.9
362S137-68	50	0.922	0.509	1.401	0.109	0.480	0.922	0.493	14.77	4370	1004	15.24	0.797	0.302	-0.959	0.592	1.764	0.704	27.8
362S137-97	50	1.229	0.678	1.377	0.137	0.460	1.229	0.662	24.1	5943	875	20.30	2.233	0.390	-0.922	0.573	1.720	0.713	27.8
362S162-33	33	0.551	0.304	1.450	0.099	0.616	0.551	0.268	5.29	1024	521	5.43	0.105	0.297	-1.308	0.789	2.048	0.592	42.6
362S162-43	33	0.710	0.392	1.445	0.127	0.611	0.710	0.372	7.34	1739	676	7.63	0.230	0.376	-1.297	0.782	2.036	0.594	42.5
362S162-54	50	0.873	0.481	1.438	0.154	0.604	0.873	0.444	13.28	3372	1016	13.58	0.451	0.457	-1.283	0.774	2.020	0.597	34.4
362S162-68	50	1.069	0.590	1.429	0.186	0.596	1.069	0.574	17.18	4370	1004	17.66	0.887	0.552	-1.264	0.765	1.998	0.600	34.3
362S162-97	50	1.435	0.792	1.408	0.241	0.577	1.435	0.776	27.52	5943	875	23.71	2.496	0.723	-1.226	0.745	1.954	0.606	34.5
362S162-118	50	1.672	0.923	1.392	0.273	0.562	1.672	0.923	33.05	6996	784	33.76	4.440	0.828	-1.198	0.731	1.920	0.611	31.1

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 4—C-SHAPE PROPERTIES^{4,5} (Continued)

MEMBER	F _y (ksi)	GROSS ³					EFFECTIVE PROPERTIES ²						TORSIONAL PROPERTIES						L _u (in)
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	V _{anet} (lb)	M _{ad} (in-k)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β	
362S200-33	33	0.648	0.358	1.478	0.177	0.772	0.647	0.294	5.81	1024	521	6.19	0.118	0.577	-1.741	1.030	2.411	0.478	53.5
362S200-43	33	0.836	0.461	1.474	0.227	0.767	0.836	0.427	8.43	1739	676	8.70	0.261	0.734	-1.729	1.024	2.398	0.480	53.5
362S200-54	50	1.030	0.568	1.467	0.277	0.761	1.030	0.49	14.66	3372	1016	15.46	0.511	0.896	-1.715	1.016	2.382	0.482	43.3
362S200-68	50	1.265	0.698	1.458	0.337	0.753	1.265	0.666	19.95	4370	1004	20.51	1.008	1.089	-1.696	1.006	2.360	0.484	43.4
362S200-97	50	1.711	0.944	1.440	0.446	0.735	1.711	0.928	32.03	5943	875	28.26	2.847	1.441	-1.658	0.986	2.315	0.487	43.7
362S200-118	50	2.006	1.107	1.425	0.513	0.721	2.006	1.088	38.54	6996	784	39.22	5.078	1.664	-1.629	0.971	2.281	0.490	40.1
362S250-43	33	0.980	0.541	1.510	0.385	0.946	0.980	0.449	8.88	1739	676	9.36	0.292	1.230	-2.199	1.277	2.830	0.396	64.1
362S250-54	50	1.210	0.668	1.504	0.473	0.940	1.205	0.514	15.4	3372	1016	16.55	0.571	1.506	-2.184	1.269	2.813	0.397	52.0
362S250-68	50	1.490	0.822	1.496	0.578	0.931	1.490	0.689	20.63	4370	1004	22.16	1.129	1.837	-2.165	1.259	2.791	0.398	52.0
362S250-97	50	2.027	1.118	1.478	0.772	0.912	2.027	1.046	35.17	5943	875	33.47	3.197	2.452	-2.126	1.239	2.746	0.400	52.5
362S250-118	50	2.387	1.317	1.465	0.897	0.898	2.387	1.258	43.29	6996	784	45.30	5.717	2.849	-2.097	1.224	2.711	0.402	49.1
362S300-54	50	1.422	0.785	1.515	0.822	1.151	1.386	0.628	18.81	3372	1016	19.02	0.662	3.237	-2.860	1.640	3.435	0.307	66.6
362S300-68	50	1.756	0.969	1.507	1.010	1.143	1.756	0.812	24.31	4370	1004	25.48	1.310	3.965	-2.841	1.630	3.413	0.307	66.7
362S300-97	50	2.400	1.324	1.491	1.368	1.126	2.400	1.259	37.68	5943	875	38.69	3.723	5.337	-2.803	1.610	3.369	0.307	67.3
362S300-118	50	2.838	1.566	1.479	1.606	1.112	2.838	1.503	50.63	6996	784	52.76	6.675	6.241	-2.775	1.595	3.335	0.308	63.8
362S350-54	50	1.614	0.890	1.528	1.240	1.340	1.518	0.655	19.62	3372	1016	21.31	0.738	5.430	-3.447	1.954	4.001	0.258	78.8
362S350-68	50	1.995	1.101	1.521	1.529	1.521	1.980	0.895	26.79	4370	1004	28.62	1.461	6.669	-3.428	1.944	3.980	0.258	79.0
362S350-97	50	2.735	1.509	1.505	2.085	1.314	2.735	1.339	40.10	5943	875	44.06	4.162	9.022	-3.391	1.924	3.936	0.258	79.7
362S350-118	50	3.242	1.789	1.494	2.460	1.301	3.242	1.694	56.21	6996	784	59.35	7.473	10.592	-3.363	1.909	3.903	0.258	76.2
400S137-33	33	0.603	0.301	1.556	0.061	0.496	0.603	0.259	5.12	976	595	5.28	0.099	0.204	-0.965	0.597	1.897	0.741	34.5
400S137-43	33	0.776	0.388	1.551	0.078	0.491	0.776	0.359	7.09	1739	810	7.47	0.219	0.257	-0.954	0.591	1.885	0.744	34.4
400S137-54	50	0.953	0.477	1.542	0.094	0.484	0.953	0.428	12.82	3372	1223	13.39	0.428	0.311	-0.940	0.583	1.870	0.747	27.7
400S137-68	50	1.165	0.582	1.531	0.112	0.475	1.165	0.558	16.7	4871	1356	17.43	0.842	0.375	-0.922	0.574	1.849	0.751	27.6
400S137-97	50	1.557	0.779	1.507	0.142	0.454	1.557	0.764	27.81	6658	1207	23.32	2.365	0.486	-0.885	0.555	1.806	0.760	27.5
400S162-33	33	0.692	0.346	1.586	0.103	0.611	0.692	0.299	5.91	976	595	6.06	0.110	0.363	-1.263	0.768	2.118	0.644	42.3
400S162-43	33	0.892	0.446	1.581	0.131	0.606	0.892	0.417	8.23	1739	810	8.54	0.242	0.460	-1.252	0.761	2.106	0.647	42.2
400S162-54	50	1.098	0.549	1.574	0.159	0.600	1.098	0.498	14.9	3372	1223	15.25	0.473	0.560	-1.238	0.754	2.090	0.649	34.1
400S162-68	50	1.346	0.673	1.564	0.192	0.591	1.346	0.648	19.41	4871	1356	20.15	0.933	0.677	-1.220	0.745	2.069	0.653	34.0
400S162-97	50	1.812	0.906	1.542	0.249	0.572	1.812	0.892	31.64	6658	1207	27.13	2.628	0.889	-1.182	0.725	2.025	0.659	34.0
400S162-118	50	2.118	1.059	1.526	0.282	0.557	2.118	1.041	38.10	7869	1102	38.74	4.679	1.020	-1.154	0.711	1.992	0.664	30.6
400S200-33	33	0.812	0.406	1.619	0.183	0.769	0.812	0.328	6.49	976	595	6.90	0.124	0.697	-1.688	1.007	2.462	0.530	53.1
400S200-43	33	1.047	0.524	1.615	0.235	0.764	1.047	0.478	9.45	1739	810	9.74	0.272	0.886	-1.676	1.000	2.449	0.532	53.0
400S200-54	50	1.292	0.646	1.608	0.287	0.758	1.292	0.549	16.43	3372	1223	17.31	0.534	1.083	-1.662	0.993	2.433	0.534	42.9
400S200-68	50	1.589	0.795	1.599	0.349	0.750	1.589	0.751	22.48	4871	1356	23.05	1.054	1.318	-1.643	0.983	2.412	0.536	42.9
400S200-97	50	2.155	1.077	1.579	0.462	0.731	2.155	1.063	36.68	6658	1207	32.25	2.978	1.749	-1.605	0.963	2.368	0.540	43.0
400S200-118	50	2.532	1.266	1.565	0.532	0.717	2.532	1.248	44.23	7869	1102	44.85	5.318	2.024	-1.577	0.948	2.334	0.544	39.5

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴ mm³; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁹ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 4—C-SHAPE PROPERTIES^{4,5} (Continued)

MEMBER	F _y (ksi)	GROSS ³					EFFECTIVE PROPERTIES ²						TORSIONAL PROPERTIES						L _u (in)
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	V _{anet} (lb)	M _{ad} (in-k)	J _{x1000} (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β	
400S250-43	33	1.224	0.612	1.655	0.399	0.945	1.224	0.503	9.93	1739	810	10.42	0.303	1.486	-2.139	1.252	2.864	0.443	63.7
400S250-54	50	1.512	0.756	1.649	0.490	0.938	1.506	0.576	17.24	3372	1223	18.42	0.594	1.821	-2.124	1.244	2.848	0.444	51.6
400S250-68	50	1.864	0.932	1.640	0.599	0.929	1.864	0.775	23.19	4871	1356	24.76	1.174	2.225	-2.105	1.235	2.826	0.445	51.6
400S250-97	50	2.541	1.271	1.622	0.801	0.911	2.541	1.191	40.06	6658	1207	38.05	3.329	2.978	-2.066	1.214	2.780	0.448	51.9
400S250-118	50	2.998	1.499	1.609	0.931	0.897	2.998	1.436	49.40	7869	1102	51.57	5.956	3.467	-2.037	1.199	2.746	0.450	48.5
400S300-54	33	1.776	0.888	1.664	0.852	1.153	1.734	0.705	21.11	3372	1223	21.12	0.685	3.819	-2.792	1.613	3.449	0.345	65.7
400S300-68	33	2.195	1.098	1.657	1.048	1.145	2.195	0.913	27.33	4871	1356	28.36	1.356	4.683	-2.774	1.603	3.428	0.345	65.8
400S300-97	33	3.007	1.504	1.640	1.420	1.127	3.007	1.43	42.81	6658	1207	44.72	3.855	6.317	-2.735	1.583	3.383	0.346	66.2
400S300-118	50	3.562	1.781	1.628	1.668	1.114	3.562	1.711	57.64	7869	1102	60.01	6.914	7.400	-2.707	1.568	3.349	0.347	62.6
400S350-54	50	2.013	1.006	1.681	1.286	1.344	1.899	0.735	22.01	3372	1223	23.68	0.760	6.333	-3.375	1.927	4.003	0.289	77.6
400S350-68	50	2.491	1.245	1.674	1.586	1.336	2.474	1.007	30.16	4871	1356	31.88	1.507	7.786	-3.357	1.917	3.982	0.289	77.7
400S350-97	50	3.422	1.711	1.658	2.164	1.318	3.422	1.520	45.50	6658	1207	49.33	4.293	10.555	-3.319	1.897	3.937	0.289	78.3
400S350-118	50	4.063	2.032	1.646	2.555	1.305	4.063	1.923	63.80	7869	1102	67.06	7.713	12.410	-3.290	1.882	3.904	0.290	74.7
550S137-33	33	1.283	0.467	2.064	0.067	0.472	1.283	0.453	8.95	699	699	7.49	0.120	0.411	-0.841	0.536	2.278	0.864	33.7
550S137-43	33	1.655	0.602	2.059	0.085	0.467	1.655	0.592	13.08	1550	1199	11.61	0.265	0.520	-0.830	0.530	2.268	0.866	31.7
550S137-54	50	2.039	0.741	2.049	0.103	0.460	2.039	0.714	24.03	3093	1881	20.86	0.519	0.632	-0.817	0.523	2.254	0.868	25.5
550S137-68	50	2.503	0.910	2.036	0.123	0.451	2.503	0.909	31.42	5350	2532	28.87	1.023	0.764	-0.801	0.514	2.234	0.871	24.9
550S137-97	50	3.380	1.229	2.008	0.155	0.430	3.380	1.229	44.72	9518	3026	46.64	2.891	0.997	-0.766	0.497	2.192	0.878	23.8
550S162-33	33	1.458	0.530	2.112	0.113	0.589	1.458	0.512	10.11	699	699	8.62	0.130	0.713	-1.114	0.697	2.459	0.795	41.4
550S162-43	33	1.883	0.685	2.107	0.145	0.584	1.883	0.681	14.79	1550	1199	13.14	0.288	0.905	-1.103	0.691	2.448	0.797	39.2
550S162-54	50	2.324	0.845	2.098	0.176	0.577	2.324	0.811	26.86	3093	1881	23.51	0.564	1.105	-1.090	0.684	2.434	0.800	31.6
550S162-68	50	2.861	1.040	2.086	0.212	0.568	2.861	1.031	34.94	5350	2532	32.26	1.114	1.342	-1.072	0.675	2.414	0.803	31.1
550S162-97	50	3.886	1.413	2.061	0.276	0.549	3.886	1.413	50.13	9518	3026	51.55	3.154	1.775	-1.037	0.656	2.372	0.809	30.0
550S200-33	50	1.694	0.616	2.164	0.204	0.751	1.694	0.559	11.05	699	699	9.80	0.144	1.326	-1.508	0.925	2.742	0.698	42.1
550S200-43	50	2.189	0.796	2.159	0.261	0.746	2.189	0.776	15.34	1550	1199	13.96	0.163	1.691	-1.496	0.918	2.731	0.700	51.7
550S200-54	50	2.706	0.984	2.152	0.320	0.739	2.706	0.901	26.98	3093	1881	24.85	0.624	2.072	-1.483	0.911	2.716	0.702	41.8
550S200-68	50	3.341	1.215	2.141	0.389	0.731	3.341	1.170	38.83	5350	2532	35.92	1.235	2.531	-1.465	0.902	2.695	0.705	39.6
550S200-97	50	4.563	1.659	2.119	0.516	0.712	4.563	1.659	57.25	9518	3026	57.25	3.504	3.384	-1.428	0.882	2.652	0.710	38.6
600S137-33	33	1.582	0.527	2.229	0.069	0.464	1.548	0.455	8.98	638	638	8.72	0.127	0.500	-0.807	0.519	2.416	0.889	33.5
600S137-43	33	2.042	0.681	2.223	0.087	0.459	2.041	0.645	12.74	1416	1240	11.83	0.280	0.633	-0.796	0.513	2.406	0.890	33.2
600S137-54	50	2.518	0.839	2.213	0.105	0.452	2.518	0.777	23.26	2823	1947	21.24	0.549	0.769	-0.784	0.506	2.391	0.893	26.8
600S137-68	50	3.094	1.031	2.200	0.125	0.443	3.094	1.03	30.84	5350	2879	28.87	1.084	0.930	-0.768	0.497	2.371	0.895	26.5
600S137-97	50	4.188	1.396	2.170	0.159	0.422	4.188	1.396	50.8	10472	3805	50.82	3.066	1.216	-0.734	0.480	2.330	0.901	23.6
600S162-33	33	1.793	0.598	2.282	0.116	0.581	1.793	0.577	11.41	638	638	9.48	0.137	0.861	-1.072	0.677	2.587	0.828	41.1
600S162-43	33	2.316	0.772	2.276	0.148	0.576	2.316	0.767	16.68	1416	1240	14.47	0.303	1.095	-1.062	0.670	2.577	0.830	39.0
600S162-54	50	2.860	0.953	2.267	0.180	0.570	2.860	0.916	30.33	2823	1947	25.90	0.594	1.337	-1.049	0.663	2.562	0.832	31.4
600S162-68	50	3.525	1.175	2.255	0.218	0.560	3.525	1.164	39.47	5350	2879	35.69	1.174	1.626	-1.032	0.655	2.543	0.835	30.8
600S162-97	50	4.797	1.599	2.229	0.283	0.541	4.797	1.599	56.73	10472	3805	56.68	3.329	2.153	-0.997	0.636	2.501	0.841	29.8
600S162-118	50	5.652	1.884	2.209	0.321	0.526	5.652	1.884	68.94	12526	3622	68.94	5.956	2.487	-0.971	0.623	2.470	0.845	29.1
600S200-33	33	2.075	0.692	2.340	0.209	0.743	2.058	0.621	12.28	638	638	10.76	0.151	1.593	-1.457	0.901	2.855	0.740	51.6
600S200-43	33	2.683	0.894	2.335	0.268	0.739	2.683	0.873	17.24	1416	1240	15.38	0.334	2.033	-1.446	0.894	2.844	0.742	51.5
600S200-54	50	3.319	1.106	2.327	0.328	0.732	3.319	1.015	30.4	2823	1947	27.37	0.655	2.493	-1.432	0.887	2.829	0.744	41.6
600S200-68	50	4.101	1.367	2.316	0.400	0.723	4.101	1.317	43.71	5350	2879	39.69	1.295	3.047	-1.415	0.878	2.809	0.746	39.3
600S200-97	50	5.612	1.871	2.293	0.530	0.705	5.612	1.871	64.53	10472	3805	63.66	3.679	4.080	-1.378	0.859	2.767	0.752	38.3
600S200-118	50	6.641	2.214	2.276	0.611	0.690	6.641	2.214	78.44	12526	3622	78.44	6.595	4.753	-1.351	0.845	2.735	0.756	37.6

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁻⁴; 1 inch⁴ = 4.15x10⁻⁹ mm⁴; 1 inch⁶ = 2.69x10⁻⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 4—C-SHAPE PROPERTIES^{4,5} (Continued)

MEMBER	F _y (ksi)	GROSS ³					EFFECTIVE PROPERTIES ²						TORSIONAL PROPERTIES							L _u (in)
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	V _{anet} (lb)	M _{ad} (in-k)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β		
600S250-43	33	3.082	1.027	2.396	0.458	0.923	3.082	0.918	18.14	1416	1240	16.21	0.364	3.411	-1.874	1.136	3.179	0.652	62.4	
600S250-54	50	3.819	1.273	2.388	0.562	0.917	3.766	1.069	32.00	2823	1947	28.72	0.715	4.194	-1.860	1.129	3.163	0.654	50.5	
600S250-68	50	4.727	1.576	2.378	0.688	0.908	4.723	1.386	41.49	5350	2879	39.08	1.416	5.145	-1.842	1.119	3.142	0.656	50.4	
600S250-97	50	6.496	2.165	2.357	0.923	0.889	6.496	2.063	69.38	10472	3805	66.82	4.030	6.947	-1.803	1.100	3.098	0.661	47.3	
600S250-118	50	7.713	2.571	2.342	1.075	0.874	7.713	2.498	85.92	12526	3622	86.83	7.234	8.142	-1.775	1.085	3.066	0.665	46.6	
600S300-54	50	4.462	1.487	2.432	0.986	1.143	4.332	1.277	38.23	2823	1947	29.62	0.806	8.115	-2.483	1.481	3.659	0.539	59.1	
600S300-68	50	5.534	1.845	2.423	1.214	1.135	5.534	1.61	48.2	5350	2879	40.53	1.597	9.992	-2.465	1.471	3.638	0.541	59.0	
600S300-97	50	7.639	2.546	2.404	1.649	1.117	7.639	2.442	73.11	10472	3805	64.67	4.556	13.587	-2.427	1.451	3.594	0.544	58.8	
600-300S-118	50	9.100	3.033	2.390	1.940	1.104	9.100	2.939	99.02	12526	3622	99.47	8.1914	16.0127	-2.398	1.437	3.561	0.546	55.3	
600S350-54	50	5.023	1.674	2.467	1.491	1.344	4.774	1.335	39.97	2823	1947	36.56	0.8812	12.9421	-3.037	1.787	4.137	0.461	74.4	
600S350-68	50	6.237	2.079	2.459	1.841	1.336	6.207	1.771	53.01	5350	2879	49.70	1.7483	15.9678	-3.018	1.777	4.115	0.462	74.3	
600S350-97	50	8.631	2.877	2.441	2.518	1.318	8.631	2.593	77.64	10472	3805	78.36	4.9943	21.811	-2.979	1.757	4.071	0.464	74.3	
600S350-118	50	10.304	3.435	2.428	2.978	1.305	10.304	3.268	108.43	12526	3622	107.66	8.9897	25.7905	-2.951	1.742	4.038	0.466	70.6	
800S137-33'	33	3.198	0.799	2.873	0.073	0.435	2.998	0.622	12.30	474	474	10.71	0.155	0.957	-0.696	0.460	2.987	0.946	32.5	
800S137-43	33	4.134	1.033	2.866	0.093	0.430	4.001	0.896	17.70	1051	1051	15.76	0.341	1.214	-0.687	0.454	2.978	0.947	32.2	
800S137-54	50	5.110	1.277	2.855	0.112	0.423	4.974	1.083	32.42	2091	2091	28.46	0.670	1.478	-0.676	0.448	2.964	0.948	25.9	
800S137-68	50	6.303	1.576	2.839	0.134	0.414	6.285	1.468	43.96	4221	3367	39.61	1.325	1.789	-0.661	0.440	2.944	0.950	25.6	
800S137-97	50	8.597	2.149	2.805	0.169	0.394	8.597	2.149	64.35	10885	5938	63.90	3.767	2.349	-0.630	0.423	2.902	0.953	25.0	
800S162-33'	33	3.582	0.896	2.943	0.125	0.550	3.384	0.710	14.03	474	474	12.61	0.165	1.630	-0.936	0.607	3.137	0.911	40.1	
800S162-43	33	4.633	1.158	2.937	0.160	0.546	4.500	1.019	20.14	1051	1051	18.33	0.364	2.076	-0.926	0.601	3.128	0.912	39.9	
800S162-54	50	5.736	1.434	2.927	0.194	0.539	5.600	1.229	36.79	2091	2091	32.81	0.715	2.539	-0.914	0.594	3.113	0.914	32.1	
800S162-68	50	7.089	1.772	2.913	0.235	0.530	7.070	1.663	49.8	4221	3367	45.09	1.416	3.093	-0.899	0.586	3.094	0.916	31.9	
800S162-97	50	9.713	2.428	2.883	0.305	0.510	9.713	2.428	72.7	10885	5938	71.91	4.030	4.114	-0.866	0.568	3.053	0.919	31.4	
800S162-118	50	11.504	2.876	2.860	0.346	0.496	11.504	2.876	105.227	16235	7115	105.23	7.234	4.766	-0.842	0.556	3.022	0.922	28.0	
800S200-33'	33	4.096	1.024	3.023	0.227	0.712	4.096	0.816	16.12	474	474	14.52	0.179	2.971	-1.288	0.817	3.363	0.853	50.5	
800S200-43	33	5.302	1.325	3.018	0.292	0.708	5.302	1.293	25.54	1051	1051	20.98	0.395	3.797	-1.277	0.811	3.353	0.855	50.4	
800S200-54	50	6.573	1.643	3.009	0.357	0.701	6.573	1.499	44.87	2091	2091	37.39	0.775	4.663	-1.265	0.804	3.338	0.856	40.7	
800S200-68	50	8.140	2.035	2.996	0.435	0.692	8.140	1.964	65.21	4221	3367	54.62	1.537	5.712	-1.248	0.796	3.319	0.859	38.4	
800S200-97	50	11.203	2.801	2.969	0.576	0.673	11.203	2.801	96.63	10885	5938	89.69	4.381	7.684	-1.214	0.777	3.278	0.863	37.2	
800S200-118	50	13.316	3.329	2.949	0.665	0.659	13.316	3.329	117.953	16235	7115	117.55	7.872	8.981	-1.188	0.764	3.247	0.866	36.5	
800S250-43	33	6.015	1.504	3.097	0.500	0.893	6.015	1.313	25.95	1051	1051	22.08	0.425	6.374	-1.675	1.043	3.632	0.787	61.5	
800S250-54	50	7.465	1.866	3.088	0.614	0.886	7.378	1.525	45.66	2091	2091	39.10	0.836	7.850	-1.661	1.036	3.617	0.789	49.8	
800S250-68	50	9.261	2.315	3.077	0.752	0.877	9.240	2.059	61.65	4221	3367	53.69	1.658	9.652	-1.644	1.027	3.597	0.791	49.6	
800S250-97	50	12.789	3.197	3.053	1.009	0.857	12.789	3.054	102.7	10885	5938	93.51	4.731	13.091	-1.607	1.008	3.555	0.796	46.4	
800S250-118	50	15.242	3.810	3.035	1.175	0.843	15.242	3.707	127.507	16235	7115	122.92	8.511	15.395	-1.580	0.994	3.524	0.799	45.6	
800S300-54	50	8.657	2.164	3.159	1.085	1.118	8.443	1.826	54.66	2091	2091	40.22	0.927	14.642	-2.244	1.372	4.033	0.690	58.6	
800S300-68	50	10.758	2.690	3.149	1.336	1.110	10.758	2.371	70.98	4221	3367	55.46	1.839	18.066	-2.226	1.363	4.012	0.692	58.4	
800S300-97	50	14.913	3.728	3.127	1.817	1.092	14.913	3.576	107.05	10885	5938	89.89	5.257	24.677	-2.188	1.343	3.970	0.696	58.1	
800S300-118	50	17.824	4.456	3.111	2.139	1.078	17.824	4.316	145.434	16235	7115	139.91	9.469	29.179	-2.161	1.329	3.938	0.699	54.5	

For **SI**: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 4—C-SHAPE PROPERTIES^{4,5} (Continued)

MEMBER	F _y (ksi)	GROSS ³					EFFECTIVE PROPERTIES ²						TORSIONAL PROPERTIES							L _u (in)
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	V _{anet} (lb)	M _{ad} (in-k)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β		
800S350-54	50	9.683	2.421	3.212	1.646	1.325	9.310	1.869	55.9632	2091	2091	49.74	1.002	22.897	-2.766	1.668	4.441	0.612	73.0	
800S350-68	50	12.046	3.012	3.203	2.034	1.316	12.046	2.596	77.7324	4221	3367	68.05	1.990	28.308	-2.748	1.658	4.421	0.614	72.9	
800S350-97	50	16.737	4.184	3.183	2.784	1.298	16.737	3.786	113.339	10885	5938	108.67	5.696	38.834	-2.710	1.639	4.377	0.617	72.7	
800S350-118	50	20.041	5.010	3.168	3.295	1.285	20.041	4.762	158.021	16235	7115	150.37	10.267	46.068	-2.682	1.624	4.345	0.619	68.9	
1000S162-43 ¹	33	8.025	1.605	3.577	0.168	0.518	7.523	1.302	25.74	836	836	22.47	0.425	3.430	-0.823	0.545	3.707	0.951	38.8	
1000S162-54	50	9.950	1.990	3.565	0.204	0.511	9.391	1.572	47.07	1661	1661	40.37	0.836	4.198	-0.812	0.538	3.692	0.952	31.3	
1000S162-68	50	12.325	2.465	3.550	0.246	0.502	11.978	2.154	64.51	3345	3345	56.37	1.658	5.121	-0.798	0.531	3.673	0.953	31.0	
1000S162-97	50	16.967	3.393	3.516	0.320	0.483	16.967	3.269	97.89	9864	7177	92.57	4.731	6.827	-0.768	0.514	3.631	0.955	30.4	
1000S162-118	50	20.169	4.034	3.491	0.363	0.468	20.169	4.034	120.774	16235	9536	120.34	8.511	7.924	-0.746	0.502	3.600	0.957	30.0	
1000S200-43 ¹	33	9.085	1.817	3.676	0.309	0.677	8.602	1.470	29.05	836	836	26.15	0.456	6.236	-1.147	0.743	3.910	0.914	49.3	
1000S200-54	50	11.278	2.256	3.666	0.378	0.671	10.769	1.705	51.05	1661	1661	46.64	0.896	7.665	-1.135	0.737	3.896	0.915	39.8	
1000S200-68	50	13.994	2.799	3.652	0.460	0.662	13.665	2.42	72.46	3345	3345	64.50	1.779	9.401	-1.120	0.729	3.876	0.917	39.6	
1000S200-97	50	19.336	3.867	3.622	0.609	0.643	19.336	3.741	112	9864	7177	104.74	5.082	12.679	-1.088	0.711	3.836	0.920	39.0	
1000S200-118	50	23.052	4.610	3.599	0.703	0.629	23.052	4.610	138.036	16235	9536	135.74	9.149	14.848	-1.064	0.699	3.805	0.922	38.7	
1000S250-43 ¹	33	10.203	2.041	3.771	0.531	0.860	10.203	1.617	31.95	836	836	27.68	0.486	10.481	-1.518	0.965	4.155	0.867	60.7	
1000S250-54	50	12.677	2.535	3.762	0.653	0.854	12.660	1.879	56.26	1661	1661	49.20	0.957	12.922	-1.505	0.958	4.140	0.868	49.1	
1000S250-68	50	15.751	3.150	3.749	0.799	0.844	15.741	2.768	82.89	3345	3345	68.09	1.899	15.909	-1.488	0.950	4.121	0.870	48.8	
1000S250-97	50	21.827	4.365	3.722	1.072	0.825	21.827	4.181	140.63	9864	7177	120.08	5.433	21.632	-1.454	0.932	4.080	0.873	45.6	
1000S250-118	50	26.080	5.216	3.701	1.249	0.810	26.080	5.082	174.836	16235	9536	159.79	9.788	25.490	-1.428	0.918	4.049	0.876	44.8	
1000S300-54	50	14.587	2.917	3.856	1.161	1.088	14.360	2.262	67.74	1661	1661	50.69	1.047	23.644	-2.051	1.280	4.502	0.792	58.1	
1000S300-68	50	18.153	3.631	3.845	1.430	1.079	18.153	3.153	94.41	3345	3345	70.10	2.081	29.210	-2.034	1.271	4.482	0.794	57.8	
1000S300-97	50	25.237	5.047	3.821	1.945	1.061	25.237	4.847	145.13	9864	7177	115.62	5.959	40.007	-1.998	1.253	4.441	0.798	57.4	
1000S300-118	50	30.231	6.046	3.803	2.291	1.047	30.231	5.862	197.522	16235	9536	181.54	10.746	47.400	-1.972	1.239	4.410	0.800	53.8	
1000S350-54	50	16.220	3.244	3.927	1.768	1.297	15.734	2.328	69.69	1661	1661	62.97	1.123	36.575	-2.546	1.566	4.857	0.725	72.2	
1000S350-68	50	20.204	4.041	3.917	2.185	1.288	20.204	3.417	102.317	3345	3345	86.60	2.232	45.277	-2.529	1.557	4.837	0.727	72.0	
1000S350-97	50	28.148	5.630	3.895	2.992	1.270	28.148	5.118	153.246	9864	7177	139.74	6.397	62.280	-2.492	1.538	4.795	0.730	71.6	
1000S350-118	50	33.772	6.754	3.878	3.543	1.256	33.772	6.427	213.251	16235	9536	194.46	11.544	74.030	-2.465	1.524	4.764	0.732	67.8	
1200S162-54 ¹	50	15.730	2.622	4.190	0.212	0.486	14.298	1.914	57.31	1377	1377	46.77	0.957	6.340	-0.732	0.493	4.281	0.971	30.5	
1200S162-68	50	19.518	3.253	4.173	0.255	0.477	18.390	2.645	79.19	2771	2771	66.08	1.899	7.739	-0.719	0.485	4.261	0.972	30.2	
1200S162-97	50	26.966	4.494	4.137	0.331	0.459	26.735	4.091	122.49	8147	7411	111.39	5.433	10.331	-0.691	0.470	4.219	0.973	29.5	
1200S200-54 ¹	50	17.662	2.944	4.306	0.393	0.643	16.334	2.073	62.07	1377	1377	54.76	1.017	11.550	-1.032	0.681	4.474	0.947	39	
1200S200-68	50	21.947	3.658	4.291	0.479	0.634	20.864	2.963	88.71	2771	2771	76.57	2.020	14.176	-1.017	0.673	4.455	0.948	38.7	
1200S200-97	50	30.417	5.069	4.258	0.635	0.615	30.175	4.66	139.51	8147	7411	126.88	5.783	19.150	-0.987	0.656	4.414	0.950	38.1	
1200S200-118	50	36.347	6.058	4.234	0.732	0.601	36.347	5.865	175.59	14986	---	166.80	10.427	22.451	-0.964	0.644	4.384	0.952	37.7	
1200S250-54 ¹	50	19.681	3.280	4.416	0.683	0.823	18.433	2.149	64.34	1377	1377	58.41	1.078	19.505	-1.378	0.892	4.699	0.914	48.3	
1200S250-68	50	24.484	4.081	4.402	0.836	0.813	23.575	3.007	90.04	2771	2771	81.58	2.141	24.034	-1.362	0.884	4.679	0.915	48.1	
1200S250-97	50	34.016	5.669	4.373	1.121	0.794	33.835	5.037	150.82	8147	7411	135.18	6.134	32.734	-1.329	0.867	4.639	0.918	47.5	
1200S250-118 ⁶	50	40.726	6.788	4.350	1.307	0.779	40.726	6.541	195.84	14986	---	178.57	11.065	38.619	-1.305	0.854	4.608	0.920	47.1	
1200S300-54 ¹	50	22.479	3.747	4.533	1.221	1.057	22.278	2.702	80.9	1377	1377	60.65	1.168	35.310	-1.893	1.201	5.025	0.858	57.4	
1200S300-68	50	28.003	4.667	4.520	1.504	1.048	28.003	3.734	111.79	2771	2771	84.79	2.322	43.658	-1.876	1.193	5.005	0.860	57.2	
1200S300-97	50	39.017	6.503	4.494	2.046	1.029	39.017	6.256	187.31	8147	7411	141.05	6.660	59.901	-1.842	1.175	4.965	0.862	56.7	
1200S300-118 ⁶	50	45.106	7.518	4.452	2.095	0.959	45.106	7.232	243.67	14986	---	201.68	11.704	60.251	-1.666	1.071	4.849	0.882	53.0	

TABLE 4—C-SHAPE PROPERTIES^{4,5} (Continued)

1200S350-54 ^{1,6}	50	24.860	4.143	4.620	1.866	1.266	24.292	2.788	83.46	1377	---	75.91	1.244	54.279	-2.363	1.478	5.341	0.804	71.4
1200S350-68 ⁶	50	30.996	5.166	4.608	2.306	1.257	30.996	4.061	121.59	2771	---	104.89	2.473	67.251	-2.346	1.469	5.322	0.806	71.2
1200S350-97 ⁶	50	43.269	7.211	4.584	3.159	1.239	43.269	6.590	197.31	8147	---	170.84	7.098	92.673	-2.310	1.450	5.281	0.809	70.8
1200S350-118 ⁶	50	51.993	8.665	4.566	3.741	1.225	51.993	8.260	274.07	14986	---	238.96	12.821	110.302	-2.284	1.436	5.250	0.811	66.9

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

¹Web-height to thickness ratio, h/t, exceeds 200. Web Stiffeners designed in accordance with AISI are required at support points and concentrated Loads. Holes/punchouts in the web are outside the scope of this report.

²The values are for members with punch-outs.

³Gross properties are based on the full, unreduced cross-section, away from web punchouts.

⁴Use the effective moment of inertia for deflection calculation.

⁵Allowable moment is lesser of M_a and M_{ad}. Distortional buckling is based on an assumed KΦ = 0.

⁶These members are available un-punched only.

SYMBOLS

I_x = Strong axis moment of inertia

S_x = Strong axis section modulus

R_x = Strong axis radius of gyration

I_y = Weak axis moment of inertia

R_y = Weak axis radius of gyration

M_a = Strong axis allowable bending moment

V_{ag} = Allowable shear of unpunched web section

V_{anet} = Allowable shear of punched web section

L_u = Unbraced length

M_{ad} = Allowable moment based on distortional buckling

J = St. Venant torsion constant

C_w = Torsional warping constant

X_o = Distance from shear center to the centroid along the principal X-axis

m = Distance from shear center to mid-plane of web

R_o = Torsional radii of gyration

β = Torsional flexural constant

TABLE 5—TRACK PROPERTIES³

MEMBER	F _y (ksi)	GROSS ²					EFFECTIVE PROPERTIES				TORSIONAL PROPERTIES					
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β
250T125-33	33	0.192	0.145	1.054	0.027	0.397	0.166	0.103	2.03	1024	0.069	0.033	-0.760	0.456	1.358	0.687
250T125-43	33	0.250	0.188	1.055	0.035	0.395	0.231	0.147	2.91	1356	0.153	0.042	-0.755	0.453	1.356	0.690
250T125-54	50	0.318	0.236	1.062	0.043	0.392	0.297	0.188	5.64	2563	0.301	0.054	-0.749	0.449	1.357	0.696
250T125-68	50	0.408	0.297	1.072	0.054	0.389	0.402	0.262	7.85	3199	0.602	0.069	-0.740	0.444	1.360	0.704
250T125-97	50	0.604	0.423	1.092	0.074	0.383	0.604	0.423	12.67	4476	1.745	0.101	-0.724	0.434	1.365	0.719
250T150-33	33	0.221	0.167	1.079	0.045	0.485	0.179	0.107	2.11	1024	0.076	0.054	-0.973	0.573	1.532	0.596
250T150-43	33	0.289	0.217	1.080	0.058	0.483	0.252	0.154	3.03	1356	0.168	0.070	-0.968	0.570	1.529	0.599
250T150-54	50	0.368	0.273	1.088	0.072	0.481	0.325	0.197	5.89	2563	0.332	0.089	-0.961	0.566	1.529	0.605
250T150-68	50	0.472	0.344	1.099	0.089	0.478	0.445	0.276	8.27	3199	0.663	0.114	-0.953	0.561	1.531	0.613
250T150-97	50	0.701	0.491	1.121	0.124	0.471	0.701	0.463	13.86	4476	1.921	0.168	-0.935	0.550	1.534	0.629
250T200-33	33	0.280	0.212	1.117	0.097	0.658	0.203	0.112	2.22	1024	0.090	0.118	-1.418	0.813	1.921	0.455
250T200-43	33	0.366	0.275	1.118	0.126	0.657	0.288	0.163	3.21	1356	0.198	0.153	-1.413	0.810	1.918	0.457
250T200-54	50	0.466	0.346	1.127	0.157	0.654	0.371	0.209	6.25	2563	0.392	0.195	-1.405	0.806	1.917	0.462
250T200-68	50	0.600	0.437	1.139	0.196	0.652	0.517	0.296	8.86	3199	0.783	0.251	-1.396	0.800	1.916	0.469
250T200-97	50	0.893	0.626	1.165	0.275	0.646	0.856	0.510	15.27	4476	2.271	0.374	-1.376	0.789	1.915	0.484
250T250-43	33	0.443	0.333	1.146	0.230	0.826	0.318	0.169	3.34	1356	0.229	0.283	-1.873	1.053	2.346	0.362
250T250-54	50	0.565	0.419	1.155	0.287	0.824	0.410	0.217	6.50	2563	0.453	0.361	-1.865	1.049	2.343	0.366
250T250-68	50	0.728	0.530	1.168	0.360	0.821	0.576	0.310	9.27	3199	0.904	0.466	-1.855	1.043	2.341	0.372
250T250-97	50	1.086	0.761	1.195	0.506	0.815	0.972	0.541	16.20	4476	2.622	0.696	-1.834	1.031	2.336	0.384
350T125-33	33	0.405	0.222	1.397	0.030	0.379	0.354	0.165	3.27	1024	0.083	0.070	-0.668	0.414	1.594	0.824
350T125-43	33	0.528	0.288	1.397	0.038	0.377	0.490	0.233	4.61	1739	0.183	0.090	-0.663	0.412	1.592	0.826
350T125-54	50	0.668	0.361	1.404	0.048	0.375	0.626	0.297	8.89	3372	0.362	0.114	-0.658	0.408	1.595	0.830
350T125-68	50	0.851	0.454	1.412	0.059	0.372	0.839	0.407	12.18	4536	0.723	0.144	-0.650	0.403	1.599	0.835
350T125-97	50	1.243	0.645	1.430	0.081	0.366	1.243	0.645	19.30	6383	2.096	0.209	-0.636	0.394	1.607	0.844
350T150-33	33	0.461	0.253	1.432	0.049	0.469	0.382	0.171	3.39	1024	0.090	0.114	-0.866	0.527	1.738	0.752
350T150-43	33	0.601	0.328	1.433	0.064	0.467	0.531	0.243	4.80	1739	0.198	0.148	-0.861	0.525	1.736	0.754
350T150-54	50	0.761	0.412	1.440	0.079	0.465	0.679	0.310	9.28	3372	0.392	0.187	-0.855	0.521	1.738	0.758
350T150-68	50	0.972	0.518	1.450	0.099	0.462	0.919	0.428	12.81	4536	0.783	0.238	-0.847	0.516	1.741	0.763
350T150-97	50	1.422	0.738	1.469	0.136	0.455	1.422	0.701	20.98	6383	2.271	0.346	-0.831	0.506	1.748	0.774
350T200-33	33	0.574	0.315	1.487	0.108	0.647	0.428	0.181	3.57	1024	0.103	0.249	-1.285	0.761	2.069	0.614
350T200-43	33	0.749	0.409	1.489	0.140	0.645	0.600	0.257	5.09	1739	0.229	0.323	-1.280	0.758	2.066	0.616
350T200-54	50	0.949	0.513	1.496	0.175	0.642	0.770	0.329	9.85	3372	0.453	0.409	-1.273	0.754	2.067	0.621
350T200-68	50	1.213	0.647	1.508	0.218	0.639	1.054	0.458	13.71	4536	0.904	0.522	-1.264	0.749	2.069	0.626
350T200-97	50	1.780	0.923	1.530	0.305	0.633	1.708	0.769	23.01	6383	2.622	0.765	-1.247	0.738	2.073	0.638
350T250-43	33	0.896	0.490	1.530	0.257	0.819	0.659	0.268	5.29	1739	0.260	0.593	-1.719	0.996	2.443	0.505
350T250-54	50	1.137	0.615	1.538	0.321	0.817	0.846	0.343	10.26	3372	0.513	0.752	-1.712	0.992	2.442	0.509
350T250-68	50	1.454	0.776	1.550	0.401	0.814	1.168	0.479	14.35	4536	1.025	0.961	-1.703	0.987	2.443	0.514
350T250-97	50	2.139	1.109	1.575	0.563	0.808	1.924	0.815	24.39	6383	2.973	1.413	-1.684	0.975	2.443	0.525

For **SI**: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁹ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 5—TRACK PROPERTIES³ (Continued)

MEMBER	F _y (ksi)	GROSS ²					EFFECTIVE PROPERTIES				TORSIONAL PROPERTIES					
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β
362T125-33	33	0.438	0.232	1.438	0.030	0.377	0.384	0.174	3.44	1024	0.085	0.076	-0.658	0.409	1.626	0.836
362T125-43	33	0.571	0.302	1.439	0.039	0.375	0.531	0.245	4.84	1739	0.187	0.098	-0.654	0.407	1.625	0.838
362T125-54	50	0.723	0.378	1.445	0.048	0.373	0.678	0.312	9.34	3372	0.369	0.123	-0.648	0.404	1.627	0.841
362T125-68	50	0.921	0.475	1.454	0.060	0.370	0.907	0.427	12.78	4703	0.738	0.156	-0.641	0.399	1.631	0.846
362T125-97	50	1.343	0.675	1.471	0.082	0.363	1.343	0.675	20.20	6622	2.140	0.226	-0.626	0.390	1.639	0.854
362T125-118	50	1.666	0.821	1.483	0.097	0.358	1.666	0.821	28.24	8008	3.894	0.278	-0.615	0.383	1.645	0.860
362T150-33	33	0.499	0.264	1.475	0.050	0.467	0.414	0.180	3.56	1024	0.091	0.124	-0.854	0.522	1.767	0.766
362T150-43	33	0.650	0.343	1.476	0.064	0.465	0.574	0.255	5.04	1739	0.202	0.160	-0.850	0.519	1.766	0.768
362T150-54	50	0.823	0.431	1.483	0.080	0.462	0.735	0.325	9.74	3372	0.400	0.202	-0.844	0.516	1.768	0.772
362T150-68	50	1.050	0.542	1.492	0.099	0.459	0.993	0.449	13.43	4703	0.799	0.257	-0.836	0.511	1.771	0.777
362T150-97	50	1.534	0.771	1.512	0.138	0.453	1.534	0.733	21.94	6622	2.315	0.374	-0.820	0.501	1.778	0.787
362T150-118	50	1.907	0.939	1.525	0.165	0.448	1.907	0.939	31.65	8008	4.214	0.462	-0.808	0.494	1.784	0.795
362T200-33	33	0.619	0.328	1.532	0.110	0.645	0.464	0.190	3.76	1024	0.105	0.269	-1.270	0.754	2.092	0.631
362T200-43	33	0.808	0.427	1.534	0.142	0.643	0.649	0.270	5.34	1739	0.233	0.350	-1.265	0.752	2.090	0.633
362T200-54	50	1.024	0.536	1.541	0.177	0.640	0.832	0.345	10.34	3372	0.460	0.442	-1.259	0.748	2.091	0.637
362T200-68	50	1.307	0.675	1.552	0.221	0.638	1.138	0.480	14.37	4703	0.919	0.564	-1.250	0.743	2.093	0.643
362T200-97	50	1.917	0.963	1.575	0.308	0.631	1.839	0.803	24.06	6622	2.666	0.825	-1.232	0.732	2.097	0.655
362T200-118	50	2.388	1.176	1.591	0.371	0.627	2.388	1.072	32.09	8008	4.852	1.026	-1.219	0.724	2.100	0.663
362T250-43	33	0.966	0.510	1.577	0.260	0.818	0.713	0.281	5.56	1739	0.263	0.641	-1.702	0.990	2.460	0.521
362T250-54	50	1.224	0.641	1.585	0.324	0.816	0.914	0.360	10.77	3372	0.521	0.812	-1.695	0.986	2.460	0.525
362T250-68	50	1.565	0.808	1.597	0.406	0.813	1.259	0.502	15.04	4703	1.040	1.038	-1.686	0.980	2.460	0.530
362T250-97	50	2.300	1.155	1.621	0.570	0.807	2.069	0.851	25.49	6622	3.016	1.524	-1.667	0.969	2.461	0.541
362T250-118	50	2.868	1.413	1.639	0.688	0.802	2.732	1.149	34.41	8008	5.491	1.900	-1.653	0.961	2.462	0.549
362T300-54	50	1.425	0.746	1.619	0.531	0.988	0.995	0.371	11.11	3372	0.581	1.337	-2.146	1.227	2.863	0.439
362T300-68	50	1.823	0.941	1.631	0.665	0.985	1.364	0.519	15.55	4703	1.161	1.711	-2.136	1.221	2.862	0.443
362T300-97	50	2.682	1.348	1.657	0.937	0.979	2.269	0.887	26.55	6622	3.367	2.518	-2.116	1.209	2.860	0.453
362T300-118	50	3.349	1.650	1.676	1.133	0.975	3.022	1.205	36.09	8008	6.130	3.145	-2.101	1.201	2.859	0.460
400T125-33	33	0.549	0.265	1.563	0.031	0.371	0.484	0.201	3.97	940	0.090	0.095	-0.630	0.396	1.725	0.867
400T125-43	33	0.716	0.344	1.563	0.040	0.369	0.666	0.282	5.57	1739	0.198	0.122	-0.626	0.394	1.724	0.868
400T125-54	50	0.904	0.431	1.569	0.049	0.366	0.849	0.359	10.74	3372	0.392	0.154	-0.621	0.390	1.727	0.871
400T125-68	50	1.150	0.541	1.577	0.061	0.363	1.134	0.488	14.62	5205	0.783	0.194	-0.614	0.386	1.731	0.874
400T125-97	50	1.673	0.768	1.594	0.084	0.357	1.673	0.768	23.00	7337	2.271	0.280	-0.600	0.377	1.740	0.881
400T125-118	50	2.072	0.934	1.605	0.100	0.352	2.072	0.934	32.14	8881	4.134	0.343	-0.589	0.370	1.746	0.886
400T150-33	33	0.622	0.300	1.603	0.051	0.460	0.519	0.208	4.12	940	0.097	0.155	-0.821	0.507	1.859	0.805
400T150-43	33	0.811	0.390	1.604	0.066	0.458	0.719	0.293	5.80	1739	0.214	0.200	-0.817	0.504	1.857	0.807
400T150-54	50	1.025	0.489	1.610	0.082	0.456	0.918	0.374	11.19	3372	0.422	0.252	-0.811	0.501	1.860	0.810
400T150-68	50	1.306	0.615	1.619	0.102	0.453	1.237	0.513	15.35	5205	0.844	0.320	-0.804	0.496	1.864	0.814
400T150-97	50	1.903	0.874	1.638	0.141	0.447	1.903	0.832	24.92	7337	2.447	0.463	-0.788	0.487	1.872	0.823
400T150-118	50	2.360	1.064	1.651	0.169	0.442	2.360	1.064	35.86	8881	4.453	0.572	-0.777	0.479	1.877	0.829
400T200-33	33	0.768	0.371	1.666	0.113	0.639	0.581	0.220	4.34	940	0.110	0.336	-1.229	0.737	2.166	0.678
400T200-43	33	1.002	0.482	1.668	0.146	0.637	0.811	0.311	6.14	1739	0.244	0.436	-1.224	0.734	2.164	0.680
400T200-54	50	1.268	0.604	1.675	0.182	0.635	1.037	0.397	11.88	3372	0.483	0.551	-1.217	0.730	2.165	0.684
400T200-68	50	1.617	0.761	1.685	0.227	0.632	1.412	0.549	16.42	5205	0.965	0.702	-1.209	0.725	2.168	0.689
400T200-97	50	2.363	1.085	1.707	0.317	0.625	2.268	0.911	27.28	7337	2.797	1.022	-1.192	0.715	2.173	0.699
400T200-118	50	2.937	1.325	1.722	0.381	0.621	2.937	1.211	36.25	8881	5.092	1.268	-1.179	0.707	2.177	0.707

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 5—TRACK PROPERTIES³ (Continued)

MEMBER	F _y (ksi)	GROSS ²					EFFECTIVE PROPERTIES				TORSIONAL PROPERTIES					
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β
400T250-43	33	1.193	0.573	1.715	0.268	0.813	0.888	0.324	6.40	1739	0.275	0.799	-1.653	0.970	2.517	0.569
400T250-54	50	1.511	0.720	1.723	0.335	0.811	1.137	0.413	12.38	3372	0.543	1.011	-1.646	0.966	2.517	0.572
400T250-68	50	1.928	0.907	1.735	0.418	0.808	1.559	0.574	17.19	5205	1.086	1.289	-1.637	0.961	2.518	0.578
400T250-97	50	2.823	1.296	1.758	0.587	0.802	2.546	0.965	28.89	7337	3.148	1.886	-1.618	0.950	2.521	0.588
400T250-118	50	3.514	1.585	1.776	0.709	0.798	3.349	1.297	38.84	8881	5.730	2.345	-1.605	0.942	2.523	0.595
400T300-54	50	1.754	0.835	1.761	0.548	0.985	1.244	0.427	12.77	3372	0.604	1.662	-2.090	1.206	2.905	0.482
400T300-68	50	2.239	1.054	1.774	0.686	0.982	1.687	0.594	17.78	5205	1.206	2.122	-2.081	1.200	2.905	0.487
400T300-97	50	3.284	1.508	1.799	0.967	0.976	2.786	1.005	30.09	7337	3.499	3.111	-2.061	1.189	2.905	0.496
400T300-118	50	4.091	1.845	1.817	1.170	0.972	3.696	1.360	40.72	8881	6.369	3.876	-2.047	1.180	2.904	0.503
550T125-33	33	1.159	0.410	2.046	0.033	0.346	1.029	0.270	5.33	680	0.110	0.195	-0.541	0.350	2.145	0.936
550T125-43	33	1.510	0.533	2.047	0.043	0.344	1.428	0.416	8.23	1504	0.244	0.252	-0.537	0.348	2.144	0.937
550T125-54	50	1.903	0.668	2.052	0.053	0.342	1.811	0.535	16.01	2980	0.483	0.315	-0.532	0.345	2.147	0.939
550T125-68	50	2.412	0.839	2.058	0.066	0.339	2.379	0.769	23.02	5350	0.965	0.397	-0.526	0.341	2.152	0.940
550T125-97	50	3.483	1.190	2.072	0.090	0.333	3.483	1.190	35.62	10197	2.797	0.564	-0.514	0.333	2.161	0.943
550T150-33	33	1.295	0.459	2.099	0.055	0.434	1.115	0.310	6.12	680	0.117	0.320	-0.714	0.455	2.259	0.900
550T150-43	33	1.688	0.596	2.099	0.072	0.432	1.516	0.468	9.25	1504	0.260	0.414	-0.709	0.452	2.258	0.901
550T150-54	50	2.128	0.747	2.105	0.089	0.430	1.928	0.595	17.81	2980	0.513	0.519	-0.704	0.449	2.261	0.903
550T150-68	50	2.699	0.939	2.112	0.110	0.427	2.569	0.804	24.07	5350	1.025	0.655	-0.698	0.445	2.265	0.905
550T150-97	50	3.904	1.333	2.128	0.153	0.421	3.904	1.278	38.27	10197	2.973	0.937	-0.684	0.436	2.275	0.909
550T200-33	33	1.567	0.555	2.184	0.123	0.613	1.246	0.307	6.06	680	0.131	0.694	-1.088	0.674	2.516	0.813
550T200-43	33	2.043	0.722	2.185	0.160	0.611	1.690	0.495	9.79	1504	0.290	0.900	-1.083	0.671	2.514	0.814
550T200-54	50	2.578	0.905	2.191	0.199	0.609	2.153	0.630	18.86	2980	0.573	1.133	-1.077	0.668	2.517	0.817
550T200-68	50	3.274	1.139	2.200	0.248	0.606	2.894	0.857	25.67	5350	1.146	1.434	-1.070	0.663	2.521	0.820
550T200-97	50	4.746	1.621	2.219	0.347	0.600	4.566	1.391	41.64	10197	3.323	2.067	-1.055	0.653	2.529	0.826
550T250-43	33	2.399	0.848	2.252	0.295	0.790	1.841	0.516	10.20	1504	0.321	1.643	-1.484	0.899	2.810	0.721
550T250-54	50	3.029	1.063	2.259	0.368	0.788	2.405	0.657	19.66	2980	0.634	2.070	-1.478	0.895	2.812	0.724
550T250-68	50	3.849	1.339	2.269	0.460	0.785	3.201	0.897	26.86	5350	1.267	2.627	-1.470	0.890	2.815	0.727
550T250-97	50	5.588	1.908	2.290	0.646	0.779	5.073	1.470	44.01	10197	3.674	3.801	-1.453	0.880	2.822	0.735
600T125-33	33	1.428	0.465	2.204	0.034	0.339	1.258	0.297	5.87	622	0.117	0.238	-0.516	0.337	2.289	0.949
600T125-43	33	1.861	0.604	2.205	0.044	0.337	1.768	0.461	9.11	1377	0.260	0.307	-0.513	0.335	2.288	0.950
600T125-54	50	2.344	0.756	2.209	0.054	0.335	2.241	0.592	17.73	2728	0.513	0.384	-0.508	0.332	2.291	0.951
600T125-68	50	2.969	0.950	2.215	0.067	0.332	2.934	0.858	25.69	5350	1.025	0.483	-0.503	0.329	2.296	0.952
600T125-97	50	4.281	1.347	2.228	0.092	0.326	4.281	1.347	40.33	10885	2.973	0.685	-0.491	0.321	2.305	0.955
600T125-118	50	5.268	1.637	2.237	0.109	0.322	5.268	1.637	56.32	13539	5.411	0.832	-0.483	0.315	2.311	0.956
600T150-33	33	1.590	0.517	2.260	0.057	0.426	1.334	0.303	5.99	622	0.124	0.390	-0.684	0.439	2.399	0.919
600T150-43	33	2.072	0.673	2.261	0.073	0.424	1.890	0.474	9.36	1377	0.275	0.504	-0.680	0.437	2.398	0.920
600T150-54	50	2.611	0.843	2.266	0.091	0.422	2.400	0.609	18.24	2728	0.543	0.632	-0.675	0.434	2.401	0.921
600T150-68	50	3.309	1.059	2.273	0.113	0.419	3.162	0.891	26.68	5350	1.086	0.797	-0.669	0.430	2.406	0.923
600T150-97	50	4.778	1.504	2.288	0.156	0.413	4.778	1.444	43.23	10885	3.148	1.138	-0.656	0.421	2.415	0.926
600T150-118	50	5.886	1.829	2.298	0.186	0.409	5.886	1.829	61.64	13539	5.730	1.389	-0.647	0.415	2.422	0.929

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 5—TRACK PROPERTIES³ (Continued)

MEMBER	F _y (ksi)	GROSS ²					EFFECTIVE PROPERTIES				TORSIONAL PROPERTIES					
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β
600T200-33	33	1.913	0.622	2.352	0.126	0.604	1.542	0.333	6.59	622	0.138	0.847	-1.048	0.655	2.645	0.843
600T200-43	33	2.494	0.809	2.353	0.163	0.602	2.076	0.565	11.16	1377	0.305	1.098	-1.044	0.652	2.643	0.844
600T200-54	50	3.145	1.015	2.359	0.203	0.600	2.641	0.717	21.48	2728	0.604	1.381	-1.038	0.649	2.646	0.846
600T200-68	50	3.990	1.277	2.367	0.254	0.597	3.540	0.973	29.12	5350	1.206	1.746	-1.031	0.644	2.650	0.849
600T200-97	50	5.773	1.816	2.385	0.354	0.591	5.558	1.568	46.94	10885	3.499	2.510	-1.016	0.635	2.659	0.854
600T200-118	50	7.122	2.214	2.398	0.426	0.586	7.122	2.051	61.42	13539	6.369	3.083	-1.006	0.628	2.665	0.858
600T250-43	33	2.916	0.946	2.425	0.303	0.781	2.322	0.563	11.13	1377	0.336	2.004	-1.436	0.878	2.925	0.759
600T250-54	50	3.678	1.187	2.432	0.377	0.779	2.953	0.732	21.92	2728	0.664	2.523	-1.430	0.874	2.927	0.761
600T250-68	50	4.670	1.495	2.442	0.472	0.776	3.918	1.017	30.46	5350	1.327	3.198	-1.422	0.869	2.930	0.764
600T250-97	50	6.767	2.129	2.462	0.662	0.770	6.157	1.656	49.58	10885	3.849	4.616	-1.406	0.859	2.938	0.771
600T250-118	50	8.359	2.598	2.477	0.798	0.765	7.990	2.188	65.51	13539	7.008	5.686	-1.394	0.852	2.943	0.776
600T300-54	50	4.212	1.359	2.492	0.622	0.957	3.186	0.722	21.61	2728	0.725	4.129	-1.842	1.105	3.243	0.677
600T300-68	50	5.351	1.712	2.502	0.778	0.955	4.238	1.053	31.53	5350	1.448	5.239	-1.834	1.100	3.246	0.681
600T300-97	50	7.762	2.442	2.524	1.096	0.948	6.682	1.724	51.62	10885	4.200	7.583	-1.816	1.089	3.251	0.688
600T300-118	50	9.595	2.982	2.540	1.325	0.944	8.734	2.291	68.59	13539	7.646	9.359	-1.803	1.082	3.255	0.693
800T125-33 ¹	33	2.895	0.711	2.824	0.036	0.313	2.441	0.407	8.03	465	0.145	0.456	-0.439	0.294	2.875	0.977
800T125-43	33	3.773	0.924	2.824	0.046	0.311	3.484	0.640	12.65	1030	0.321	0.589	-0.436	0.292	2.874	0.977
800T125-54	50	4.745	1.158	2.827	0.057	0.309	4.426	0.824	24.66	2039	0.634	0.735	-0.432	0.289	2.877	0.977
800T125-68	50	5.998	1.454	2.833	0.070	0.306	5.956	1.216	36.39	4087	1.267	0.920	-0.427	0.286	2.881	0.978
800T125-97	50	8.613	2.062	2.843	0.096	0.301	8.613	2.062	61.72	10885	3.674	1.296	-0.417	0.279	2.889	0.979
800T125-118	50	10.569	2.506	2.850	0.114	0.297	10.569	2.506	86.21	16235	6.688	1.567	-0.410	0.274	2.895	0.980
800T150-33 ¹	33	3.180	0.781	2.891	0.060	0.397	2.569	0.414	8.18	465	0.152	0.751	-0.588	0.388	2.977	0.961
800T150-43	33	4.144	1.015	2.891	0.077	0.395	3.689	0.655	12.95	1030	0.336	0.972	-0.584	0.386	2.976	0.961
800T150-54	50	5.214	1.272	2.896	0.096	0.393	4.692	0.844	25.27	2039	0.664	1.215	-0.580	0.383	2.979	0.962
800T150-68	50	6.594	1.599	2.902	0.119	0.390	6.361	1.255	37.58	4087	1.327	1.526	-0.575	0.379	2.984	0.963
800T150-97	50	9.479	2.269	2.914	0.165	0.384	9.479	2.192	65.62	10885	3.849	2.162	-0.564	0.372	2.993	0.965
800T150-118	50	11.641	2.760	2.923	0.197	0.380	11.641	2.760	93.00	16235	7.008	2.627	-0.555	0.366	2.999	0.966
800T200-33 ¹	33	3.749	0.921	3.005	0.135	0.571	2.788	0.424	8.37	465	0.166	1.638	-0.917	0.589	3.194	0.918
800T200-43	33	4.887	1.197	3.006	0.175	0.569	4.043	0.676	13.35	1030	0.367	2.124	-0.913	0.587	3.193	0.918
800T200-54	50	6.152	1.501	3.011	0.218	0.567	5.149	0.871	26.09	2039	0.725	2.664	-0.908	0.584	3.196	0.919
800T200-68	50	7.786	1.888	3.019	0.272	0.564	7.051	1.310	39.22	4087	1.448	3.357	-0.902	0.580	3.201	0.921
800T200-97	50	11.212	2.683	3.034	0.379	0.558	10.833	2.347	70.27	10885	4.200	4.792	-0.889	0.571	3.210	0.923
800T200-118	50	13.785	3.269	3.045	0.455	0.553	13.785	3.059	91.59	16235	7.646	5.854	-0.879	0.565	3.217	0.925
800T250-43	33	5.629	1.380	3.100	0.326	0.746	4.655	0.739	14.60	1030	0.397	3.877	-1.274	0.801	3.433	0.862
800T250-54	50	7.090	1.730	3.106	0.407	0.744	5.902	0.959	28.71	2039	0.785	4.870	-1.268	0.798	3.436	0.864
800T250-68	50	8.978	2.177	3.114	0.509	0.741	7.756	1.560	46.72	4087	1.569	6.151	-1.261	0.793	3.441	0.866
800T250-97	50	12.944	3.098	3.132	0.713	0.735	11.872	2.487	74.47	10885	4.550	8.818	-1.247	0.784	3.450	0.869
800T250-118	50	15.930	3.777	3.144	0.860	0.731	15.272	3.248	97.26	16235	8.285	10.807	-1.236	0.777	3.457	0.872
800T300-54	50	8.0278	1.9585	3.1843	0.6745	0.923	6.3363	0.9559	28.62	2039	0.8454	7.9602	-1.652	1.02	3.704	0.801
800T300-68	50	10.171	2.466	3.194	0.844	0.920	8.345	1.548	46.36	4087	1.690	10.067	-1.644	1.015	3.708	0.803
800T300-97	50	14.676	3.513	3.213	1.188	0.914	12.862	2.586	77.43	10885	4.901	14.473	-1.628	1.006	3.716	0.808
800T300-118	50	18.074	4.286	3.227	1.436	0.910	16.563	3.394	101.63	16235	8.924	17.775	-1.617	0.998	3.722	0.811

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 5—TRACK PROPERTIES³ (Continued)

MEMBER	F _y (ksi)	GROSS ²					EFFECTIVE PROPERTIES				TORSIONAL PROPERTIES					
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β
1000T125-43 ¹	33	6.630	1.305	3.431	0.047	0.290	5.886	0.819	16.19	822	0.382	0.973	-0.379	0.259	3.464	0.988
1000T125-54	50	8.333	1.634	3.434	0.059	0.288	7.479	1.055	31.59	1628	0.755	1.212	-0.376	0.256	3.466	0.988
1000T125-68	50	10.522	2.053	3.438	0.073	0.286	10.155	1.575	47.15	3261	1.508	1.515	-0.372	0.253	3.470	0.989
1000T125-97	50	15.077	2.912	3.447	0.100	0.280	15.077	2.753	82.42	9507	4.375	2.123	-0.363	0.247	3.477	0.989
1000T125-118	50	18.471	3.540	3.453	0.118	0.276	18.471	3.535	105.85	16235	7.966	2.558	-0.357	0.243	3.482	0.990
1000T150-43 ¹	33	7.207	1.419	3.507	0.080	0.370	6.195	0.837	16.54	822	0.397	1.612	-0.513	0.345	3.564	0.979
1000T150-54	50	9.061	1.777	3.511	0.100	0.368	7.880	1.079	32.29	1628	0.785	2.013	-0.509	0.342	3.567	0.980
1000T150-68	50	11.445	2.233	3.516	0.124	0.366	10.774	1.621	48.53	3261	1.569	2.522	-0.505	0.339	3.571	0.980
1000T150-97	50	16.413	3.170	3.526	0.171	0.360	16.413	2.902	86.90	9507	4.550	3.557	-0.495	0.332	3.579	0.981
1000T150-118	50	20.121	3.857	3.534	0.204	0.356	20.121	3.852	115.32	16235	8.285	4.307	-0.488	0.328	3.585	0.982
1000T200-43 ¹	33	8.361	1.646	3.640	0.183	0.539	6.722	0.861	17.01	822	0.428	3.540	-0.813	0.534	3.769	0.953
1000T200-54	50	10.516	2.062	3.645	0.228	0.537	8.560	1.111	33.26	1628	0.845	4.434	-0.809	0.531	3.772	0.954
1000T200-68	50	13.292	2.594	3.651	0.284	0.534	11.820	1.684	50.42	3261	1.690	5.576	-0.803	0.527	3.776	0.955
1000T200-97	50	19.087	3.686	3.664	0.397	0.528	18.583	3.081	92.25	9507	4.901	7.924	-0.791	0.519	3.786	0.956
1000T200-118	50	23.422	4.489	3.674	0.476	0.524	23.422	4.208	125.99	16235	8.924	9.649	-0.783	0.514	3.793	0.957
1000T250-43 ¹	33	9.515	1.873	3.751	0.344	0.713	7.283	0.876	17.32	822	0.458	6.477	-1.147	0.737	3.987	0.917
1000T250-54	50	11.972	2.348	3.757	0.429	0.711	9.309	1.132	33.89	1628	0.906	8.125	-1.142	0.734	3.990	0.918
1000T250-68	50	15.138	2.954	3.764	0.536	0.708	12.867	1.726	51.68	3261	1.810	10.240	-1.135	0.730	3.995	0.919
1000T250-97	50	21.760	4.202	3.780	0.751	0.702	20.304	3.201	95.84	9507	5.252	14.617	-1.122	0.721	4.005	0.921
1000T250-118	50	26.723	5.122	3.791	0.905	0.698	25.734	4.422	132.38	16235	9.562	17.858	-1.112	0.715	4.012	0.923
1000T300-54	50	13.427	2.633	3.852	0.714	0.888	10.940	1.191	35.65	1628	0.966	13.289	-1.500	0.947	4.228	0.874
1000T300-68	50	16.985	3.314	3.860	0.894	0.885	14.316	1.904	57.01	3261	1.931	16.771	-1.493	0.943	4.233	0.876
1000T300-97	50	24.434	4.719	3.878	1.257	0.879	21.816	3.589	107.45	9507	5.602	24.009	-1.478	0.934	4.242	0.879
1000T300-118	50	30.024	5.755	3.890	1.519	0.875	27.760	4.668	139.76	16235	10.201	29.395	-1.468	0.927	4.249	0.881
1200T125-54 ¹	50	13.335	2.186	4.033	0.060	0.271	11.460	1.286	38.51	1354	0.876	1.820	-0.333	0.230	4.055	0.993
1200T125-68	50	16.826	2.747	4.036	0.074	0.268	15.686	1.934	57.90	2713	1.750	2.270	-0.329	0.227	4.059	0.993
1200T125-97	50	24.078	3.897	4.044	0.102	0.263	23.751	3.442	103.06	7902	5.076	3.171	-0.322	0.222	4.065	0.994
1200T150-54 ¹	50	14.378	2.357	4.117	0.103	0.348	12.020	1.313	39.31	1354	0.906	3.033	-0.454	0.310	4.156	0.988
1200T150-68	50	18.148	2.963	4.121	0.127	0.345	16.566	1.987	59.48	2713	1.810	3.795	-0.450	0.307	4.160	0.988
1200T150-97	50	25.987	4.206	4.130	0.176	0.340	25.719	3.616	108.27	7902	5.252	5.335	-0.441	0.301	4.168	0.989
1200T150-118	50	31.825	5.119	4.137	0.210	0.336	31.825	4.865	145.66	14434	9.562	6.444	-0.435	0.296	4.173	0.989
1200T200-54 ¹	50	16.464	2.699	4.265	0.236	0.510	12.962	1.350	40.41	1354	0.966	6.714	-0.730	0.487	4.357	0.972
1200T200-68	50	20.791	3.395	4.271	0.294	0.508	18.026	2.058	61.62	2713	1.931	8.431	-0.725	0.483	4.362	0.972
1200T200-97	50	29.805	4.824	4.283	0.410	0.502	28.959	3.819	114.35	7902	5.602	11.945	-0.714	0.476	4.371	0.973
1200T200-118	50	36.530	5.876	4.291	0.492	0.498	36.530	5.278	158.02	14434	10.201	14.513	-0.706	0.471	4.377	0.974
1200T250-54 ¹	50	18.550	3.041	4.392	0.445	0.681	14.092	1.374	41.14	1354	1.027	12.339	-1.039	0.680	4.565	0.948
1200T250-68	50	23.435	3.826	4.399	0.556	0.678	19.608	2.106	63.04	2713	2.052	15.529	-1.033	0.676	4.569	0.949
1200T250-97	50	33.623	5.442	4.413	0.780	0.672	31.596	3.954	118.37	7902	5.953	22.101	-1.021	0.668	4.579	0.950
1200T250-118	50	41.236	6.632	4.423	0.940	0.668	40.068	5.519	165.24	14434	10.839	26.943	-1.013	0.662	4.586	0.951

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

TABLE 5—TRACK PROPERTIES³ (Continued)

MEMBER	F _y (ksi)	GROSS ²					EFFECTIVE PROPERTIES				TORSIONAL PROPERTIES					
		I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _{ag} (lb)	Jx1000 (in ⁴)	C _w (in ⁶)	X _o (in)	m (in)	R _o (in)	β
1200T300-54	50	20.636	3.383	4.502	0.745	0.855	14.784	1.391	41.65	1354	1.087	20.211	-1.375	0.884	4.784	0.917
1200T300-68	50	26.079	4.258	4.510	0.932	0.852	20.690	2.140	64.06	2713	2.173	25.471	-1.369	0.880	4.789	0.918
1200T300-97	50	37.441	6.060	4.525	1.310	0.847	33.655	4.052	121.30	7902	6.304	36.357	-1.355	0.871	4.799	0.920
1200T300-118	50	45.941	7.389	4.537	1.583	0.842	42.986	5.695	170.51	14434	11.478	44.420	-1.346	0.865	4.806	0.922

For SI: 1 inch = 25.4 mm; 1 inch³ = 1.64x10⁴ mm³; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁶ = 2.69x10⁸ mm⁶; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N

¹Web-height to thickness ratio, h/t, exceeds 200. Web Stiffeners designed in accordance with AISI are required at support points and concentrated Loads.

²Gross properties are based on the full, unreduced cross-section.

³Use the effective moment of inertia for deflection calculation.

SYMBOLS

I_x = Strong axis moment of inertia
 S_x = Strong axis section modulus
 R_x = Strong axis radius of gyration
 I_y = Weak axis moment of inertia

R_y = Weak axis radius of gyration
 M_a = Strong axis allowable bending moment
 V_{ag} = Allowable shear of unpunched web section
 V_{anet} = Allowable shear of punched web section

J = St. Venant torsion constant
 C_w = Torsional warping constant
 X_o = Distance from shear center to the centroid along the principal X-axis
 m = Distance from shear center to mid-plane of web

R_o = Torsional radii of gyration
 β = Torsional flexural constant

TABLE 6—ALLOWABLE CONCENTRATED LOADS AND END REACTIONS FOR C-SHAPES BASED ON WEB CRIPPLING² (lb)

STUD DESIGNATION	F _y (ksi)	CONDITION 1 (E1F)				CONDITION 2 (I1F)				CONDITION 3 (E2F)				CONDITION 4 (I2F)			
		Bearing Length (in)				Bearing Length (in)				Bearing Length (in)				Bearing Length (in)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
162S__-33	33	180	See Note 1	See Note 1	See Note 1	336	See Note 1	See Note 1	See Note 1	170	See Note 1	See Note 1	See Note 1	441	See Note 1	See Note 1	See Note 1
250 S__-33	33	173	271	285	See Note 1	330	453	472	See Note 1	150	201	209	See Note 1	411	519	535	See Note 1
250 S__-43	33	287	443	466	See Note 1	580	780	810	See Note 1	267	351	364	See Note 1	720	892	918	See Note 1
250 S__-54	50	656	996	1046	See Note 1	1350	1785	1850	See Note 1	652	842	870	See Note 1	1730	2109	2165	See Note 1
250 S__-68	50	990	1480	1552	See Note 1	2073	2693	2785	See Note 1	1049	1333	1375	See Note 1	2750	3302	3384	See Note 1
250 S__-97	50	1872	2726	See Note 1	See Note 1	4025	5095	See Note 1	See Note 1	2167	2683	See Note 1	See Note 1	5597	6575	See Note 1	See Note 1
350 S__-33	33	166	260	274	323	324	445	463	526	131	175	182	205	384	484	499	551
350 S__-43	33	278	428	451	528	571	768	798	900	240	315	326	365	680	842	866	949
350 S__-54	50	637	967	1016	1186	1331	1761	1825	2046	594	768	794	883	1645	2005	2059	2245
350 S__-68	50	965	1441	1512	1758	2047	2660	2751	3068	970	1232	1271	1406	2631	3159	3238	3510
350 S__-97	50	1831	2666	2790	See Note 1	3983	5041	5198	See Note 1	2035	2520	2592	See Note 1	5397	6339	6479	See Note 1
362 S__-33	33	165	259	273	322	323	444	462	525	129	173	179	202	381	480	495	547
362 S__-43	33	277	427	449	526	570	767	796	898	236	311	322	360	675	836	860	943
362 S__-54	50	634	963	1012	1182	1329	1758	1822	2043	588	760	785	874	1635	1994	2047	2232
362 S__-68	50	962	1437	1507	1752	2044	2657	2747	3064	961	1221	1259	1393	2618	3143	3221	3492
362 S__-97	50	1827	2659	2783	3212	3978	5035	5192	5738	2020	2501	2573	2821	5374	6313	6452	6936
362 S__-118	50	2625	3764	3933	4521	5799	7235	7448	8189	3053	3729	3829	4178	8044	9340	9532	10201
400 S__-33	33	163	256	269	317	322	442	460	522	122	164	170	192	372	469	483	534
400 S__-43	33	274	422	444	520	567	763	792	893	227	299	309	346	662	819	843	924
400 S__-54	50	628	954	1002	1170	1323	1750	1813	2034	569	735	760	846	1607	1960	2012	2194
400 S__-68	50	953	1424	1494	1737	2036	2646	2736	3051	936	1188	1226	1356	2579	3096	3173	3440
400 S__-97	50	1814	2640	2762	3189	3965	5018	5174	5718	1978	2448	2518	2761	5309	6236	6374	6852
400 S__-118	50	2608	3739	3907	4491	5781	7212	7424	8163	2996	3659	3757	4099	7956	9238	9428	10089

For SI: 1 inch = 25.4 mm, 1 pound = 4.4482 N

TABLE 6—ALLOWABLE CONCENTRATED LOADS AND END REACTIONS FOR C-SHAPES BASED ON WEB CRIPPLING² (lb) (Continued)

STUD DESIGNATION	F _y (ksi)	CONDITION 1 ³ (E1F)				CONDITION 2 ³ (I1F)				CONDITION 3 ³ (E2F)				CONDITION 4 ³ (I2F)			
		Bearing Length (in)				Bearing Length (in)				Bearing Length (in)				Bearing Length (in)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
550 S___-33	33	155	243	256	302	315	432	450	511	100	134	139	157	339	428	441	487
550 S___-43	33	262	405	426	499	556	749	778	877	195	256	265	297	614	760	782	858
550 S___-54	50	606	920	966	1128	1302	1722	1784	2001	502	649	671	746	1508	1838	1887	2058
550 S___-68	50	923	1380	1447	1683	2007	2608	2697	3007	844	1071	1105	1223	2441	2931	3003	3256
550 S___-97	50	1766	2571	2691	3106	3917	4957	5111	5648	1826	2261	2325	2550	5078	5965	6097	6555
600 S___-33	33	153	240	253	297	313	430	447	507	93	125	130	146	329	416	429	473
600 S___-43	33	259	400	420	493	553	745	773	872	185	243	252	282	600	743	764	838
600 S___-54	50	599	909	956	1116	1295	1713	1775	1991	482	623	644	716	1478	1802	1850	2017
600 S___-68	50	914	1366	1433	1666	1998	2596	2685	2994	816	1036	1069	1183	2399	2881	2952	3201
600 S___-97	50	1752	2551	2669	3081	3902	4939	5093	5628	1781	2205	2268	2487	5010	5885	6014	6466
600 S___-118	50	2528	3625	3788	4354	5698	7108	7318	8046	2734	3339	3429	3741	7555	8772	8952	9581
800 S___-43	33	247	381	401	470	542	730	757	854	150	197	204	228	548	678	698	765
800 S___-64	50	575	872	917	1070	1272	1682	1743	1955	409	529	547	608	1370	1670	1714	1869
800 S___-68	50	882	1318	1382	1607	1966	2555	2642	2946	716	910	939	1038	2250	2701	2768	3001
800 S___-97	50	1702	2477	2592	2992	3850	4873	5025	5553	1618	2003	2060	2259	4761	5593	5716	6145
800 S___-118	50	2462	3531	3689	4241	5629	7023	7229	7949	2518	3075	3158	3445	7223	8387	8559	9160
1000 S___-54	50	553	840	882	1031	1251	1655	1715	1923	346	447	462	514	1275	1554	1595	1740
1000 S___-68	50	854	1275	1338	1555	1938	2518	2604	2904	629	799	824	912	2119	2544	2607	2826
1000 S___-97	50	1657	2412	2525	2914	3805	4815	4965	5487	1476	1827	1879	2060	4545	5338	5456	5866
1000 S___-118	50	2405	3449	3604	4143	5569	6948	7152	7864	2330	2845	2921	3187	6934	8051	8217	8794
1200 S___-68	50	828	1237	1298	1509	1913	2485	2570	2866	551	699	721	798	2001	2402	2462	2669
1200 S___-97	50	1618	2355	2464	2844	3764	4764	4912	5428	1348	1668	1716	1882	4350	5109	5222	5614
1200 S___-118	50	2354	3375	3527	4054	5515	6881	7083	7788	2161	2638	2709	2956	6675	7750	7910	8465

For SI: 1 inch = 25.4 mm, 1 pound = 4.4482 N

¹ Bearing length to web height ratio, N/h, exceeds 2. Web stiffeners are required.² Values are for members fastened to supports.³ Allowable web conditions are as follows (See Figure 2 for illustration):

Condition 1 – End One Flange Loading (E1F)

Condition 2 – Interior One Flange Loading (I1F)

Condition 3 – End Two Flange Loading (E2F)

Condition 4 – Interior Two Flange Loading (I2F)

TABLE 7—STRUCTURAL PROPERTIES OF FURRING CHANNELS^{1,2}

SECTION	F _y (ksi)	DESIGN THICKNESS (in)	GROSS PROPERTIES						EFFECTIVE PROPERTIES		
			Area (in ²)	Weight (lb/ft)	I _x (in ⁴)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (ft-lb)
087F125-18	33	0.0188	0.070	0.239	0.009	0.356	0.0422	0.774	0.0086	0.0160	26.41
087F125-30	33	0.0312	0.115	0.392	0.014	0.352	0.0691	0.774	0.0143	0.0307	50.47
087F125-33	33	0.0346	0.127	0.433	0.016	0.351	0.0763	0.774	0.0157	0.0337	55.43

For SI: 1 inch = 25.4 mm; 1 inch² = 645 mm²; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁵ = 2.69x10⁶ mm⁵; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

¹ For deflection calculations, use effective I_x.

² Effective properties are given as the minimum value for positive or negative bending.

SYMBOLS

I_x = Strong axis moment of inertia
R_x = Strong axis radius of gyration

I_y = Weak axis moment of inertia
R_y = Weak axis radius of gyration

S_x = Strong axis section modulus
M_a = Strong axis allowable bending moment

TABLE 8—STRUCTURAL PROPERTIES OF U-CHANNELS^{1,2}

SECTION	F _y (ksi)	DESIGN THICKNESS	GROSS						EFFECTIVE PROPERTIES			
			Area (in ²)	Weight (lb/ft)	I _x (in ⁴)	R _x (in)	I _y (in ⁴)	R _y (in)	I _x (in ⁴)	S _x (in ³)	M _a (in-k)	V _a (lb)
75U050-54	50	0.0566	0.087	0.30	0.007	0.288	0.002	0.155	0.007	0.019	0.45	315
150U050-54	50	0.0566	0.129	0.44	0.039	0.547	0.003	0.144	0.039	0.052	1.22	840
200U050-54	50	0.0566	0.157	0.54	0.079	0.709	0.003	0.136	0.079	0.079	1.87	1190

For SI: 1 inch = 25.4 mm; 1 inch² = 645 mm²; 1 inch³ = 1.64x10⁴; 1 inch⁴ = 4.15x10⁵ mm⁴; 1 inch⁵ = 2.69x10⁶ mm⁵; 1 lb/lin ft = 14.5939 N/m; 1 kip-in = 112.99 N-m; 1 ksi = 6.89 Mpa; 1 lb = 4.45 N.

¹For deflection calculations, use effective I_x.

SYMBOLS

I_x = Strong axis moment of inertia
R_x = Strong axis radius of gyration

I_y = Weak axis moment of inertia
R_y = Weak axis radius of gyration

S_x = Strong axis section modulus V_a = Allowable shear of web section
M_a = Strong axis allowable bending moment

TABLE 9—C-SECTIONS FOR USE WITH THE IRC²

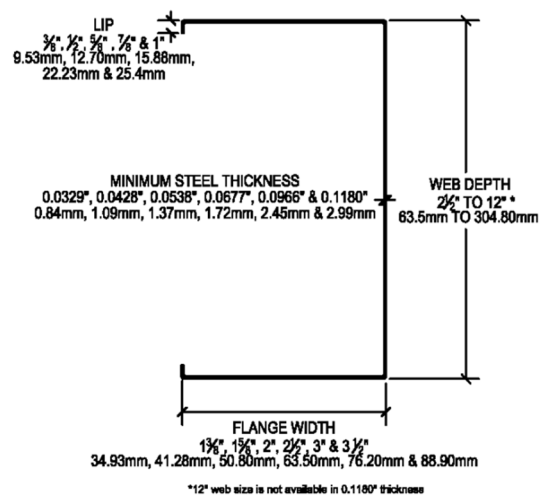
IRC MEMBER DESIGNATION	EQUIVALENT CEMCO MEMBER DESIGNATION				
	t = 33	t = 43	t = 54 ¹	t = 68 ¹	t=97 ¹
350S162-t	350S162-33	350S162-43	350S162-54	350S162-68	----
	350S200-33	350S200-43	350S200-54	350S200-68	----
550S162-t	550S162-33	550S162-43	550S162-54	550S162-68	550S162-97
	550S200-33	550S200-43	550S200-54	550S200-68	550S200-97
800S162-t	800S162-33	800S162-43	800S162-54	800S162-68	800S162-97
	800S200-33	800S200-43	800S200-54	800S200-68	800S200-97
1000S162-t	---	1000S162-43	1000S162-54	1000S162-68	1000S162-97
	---	1000S200-43	1000S200-54	1000S200-68	1000S200-97
1200S162-t	---	---	1200S162-54	1200S162-68	1200S162-97
	---	---	1200S200-54	1200S200-68	1200S200-97

¹These members are applicable to the 2015 IRC and 2012 IRC and are not applicable to the 2009 IRC.

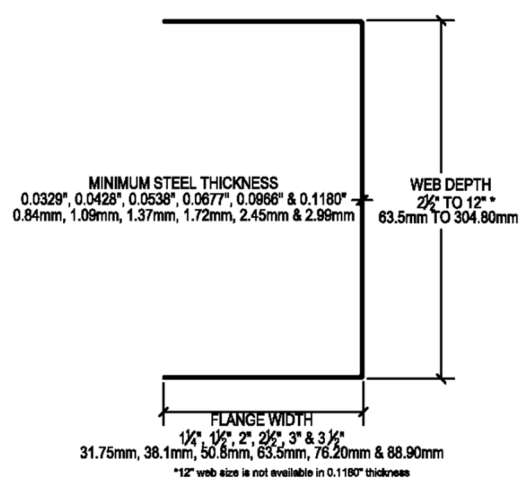
²Framing members must have a minimum lip size of 0.5 inch (12.7 mm).

TABLE 10—MANUFACTURING LOCATIONS

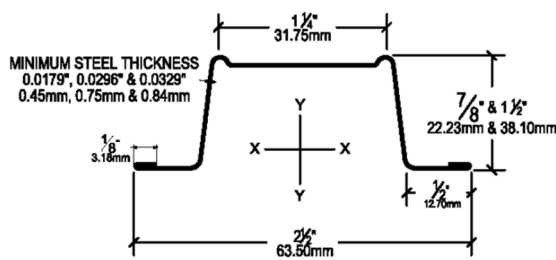
CEMCO – City of Industry City of Industry, CA 91746
CEMCO – Pittsburg Pittsburg, CA 94565
CEMCO – Denver Denver, CO 80204
CEMCO – Fort Worth Fort Worth, TX 76140



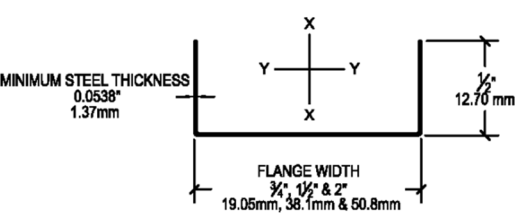
STRUCTURAL STUD



STRUCTURAL TRACK



FURRING HAT CHANNEL



U-CHANNEL

FIGURE 1—SECTION PROFILES

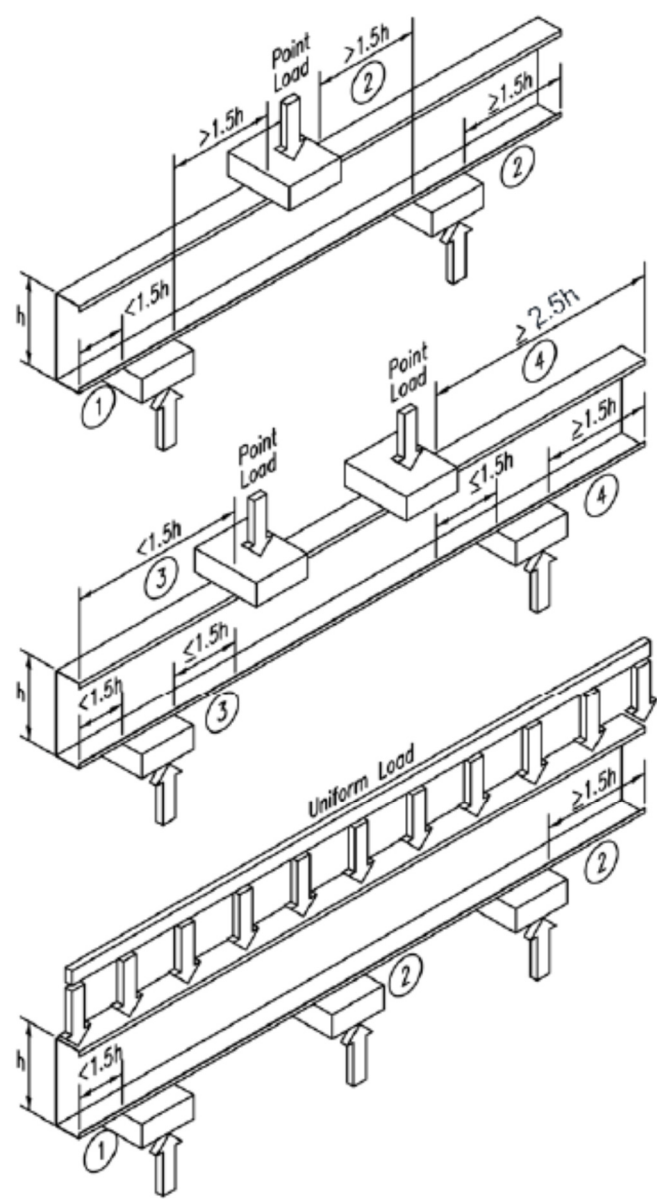


FIGURE 2

DIVISION: 05 00 00—METALS**Section: 05 40 00—Cold-Formed Metal Framing****Section: 05 41 00—Structural Metal Stud Framing****Section: 05 42 00—Cold-Formed Metal Joist Framing****DIVISION: 09 00 00—FINISHES****Section: 09 22 13—Metal Furring****Section: 09 22 16.13—Non-Structural Metal Stud Framing****REPORT HOLDER:****CALIFORNIA EXPANDED METAL PRODUCTS COMPANY (CEMCO)****EVALUATION SUBJECT:****COLD-FORMED STEEL FRAMING****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that CEMCO Cold-Formed Steel Framing, described in ICC-ES evaluation report ESR-3016, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2016 *California Building Code* (CBC)
- 2016 *California Residential Code* (CRC)

2.0 CONCLUSIONS**2.1 CBC:**

The CEMCO Cold-Formed Steel Framing, described in Sections 2.0 through 7.0 of the evaluation report ESR-3016, complies with CBC Chapters 22 and 22A, provided the design and installation are in accordance with the 2015 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 16A, 17, 17A, 22, and 22A, as applicable.

2.2 CRC:

The CEMCO Cold-Formed Steel Framing, described in Sections 2.0 through 7.0 of the evaluation report ESR-3016, complies with CRC Chapters 5, 6 and 8, provided the design and installation are in accordance with the 2015 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued July 2021.