

ICC-ES Evaluation Report

ESR-4135

Reissued June 2024

Revised October 2024

Subject to renewal June 2025

This report also contains:

[- City of LA Supplement](#)

[- City of Chicago Supplement](#)

[- CA Supplement](#)



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<p>DIVISION: 05 00 00—METALS</p> <p>Section: 05 40 00—Cold-formed Metal Framing</p> <p>Section: 05 41 00—Structural Metal Stud Framing</p> <p>DIVISION: 09 00 00—FINISHES</p> <p>Section: 09 22 16.13—Non-Structural Metal Stud Framing</p>	<p>REPORT HOLDER:</p> <p>SUNSHA INTERNATIONAL LLC</p>  <p>ADDITIONAL LISTEE:</p> <p>SECURE SOURCE AMERICA</p>	<p>EVALUATION SUBJECT:</p> <p>COLD-FORMED STEEL FRAMING MEMBERS</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018, 2015 and 2012 [International Building Code® \(IBC\)](#)
- 2024, 2021, 2018, 2015 and 2012 [International Residential Code® \(IRC\)](#)

Property evaluated:

- Structural

2.0 USES

Members with a minimum Z120 (G40) coating are used as non-structural members as defined by AISI S220.

Members with a minimum Z180 (G60) coating are used as structural members as defined in AISI S240 and AISI S200, as applicable, and may also be used as nonstructural members.

3.0 DESCRIPTION

3.1 General:

The framing members are factory-formed with and without web punch-outs from coils of light gage steel. When provided, the punch-outs measure from 19 mm to 38 mm (0.75 inch to 1.50 inch) wide by 44 mm to 57 mm (1.75 inch to 2.26 inch) long and are located along the centerline of the webs of the stud sections and have a minimum 762 mm (30 inches) clear distance between punch-outs. The minimum distance between the end of the stud and the near edge of the web punch-out is 380 mm (15 inches). See [Tables 1](#) through [7](#) and [Figure 1](#) for descriptions and properties of the framing members.

3.2 Material:

The framing members are cold-formed from steel coils complying with Chinese National Standard GB/T 700-2006 Grade Q235. Grade Q235 steel has a minimum yield strength of 235 MPa (34.1 ksi), a minimum tensile strength of 370 Mpa (53.7 ksi), and a minimum elongation of 25 percent in a 2-inch gauge length in accordance with GB/T 700. The members either have a minimum Z120 (G40) or minimum Z180 (G60) galvanized coating.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The properties listed in [Tables 1](#) through [7](#) have been determined in accordance with the North American Specification for Design of Cold-formed Steel Structural Members (AISI S100) based on the allowable strength design (ASD) method.

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 during the installation.

5.0 CONDITIONS OF USE:

The cold-formed steel framing members described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The cold-formed steel framing members must be installed in accordance with the applicable code, the approved plans, and this report.
- 5.2 Minimum uncoated base-metal thickness of the framing members as delivered to the jobsite must be at least 95 percent of the design base-metal thickness.
- 5.3 The construction documents prepared or reviewed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed specifying the cold-formed steel framing members must indicate compliance with this evaluation report and applicable codes and must be submitted to the code official for approval.
- 5.4 The cold-formed steel members are manufactured in Huzhou, Zhejiang Province, China, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Cold-formed Steel Framing Members \(AC46\)](#), dated October 2019 (editorially revised February 2024).

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4135) along with the name, registered trademark, or registered logo of the report holder or listee must be included in the product label.
- 7.2 In addition, each member must have a legible label, stamp, or embossment, at a maximum of 96 inches (2440 mm) on center, indicating the report holder's or listee's name; the evaluation report number (ESR-4135); member designation; minimum base-metal thickness (uncoated) in decimal thickness or mils; in addition to the following:
 - For non-structural members, each member must have the minimum specified yield strength (if other than 33 ksi), and the designation "NS".
 - For structural members, each member must have the minimum specified yield strength; and a designation for the Z180 (G60) galvanized coating.
- 7.3 The report holder's contact information is the following:

SUNSHA INTERNATIONAL LLC
1 GARVIES POINT ROAD
GLEN COVE, NEW YORK 11542
(914) 262-2047
www.sunsha.net

7.4 The additional listee's contact information is the following:

SECURE SOURCE AMERICA
1285 101ST STREET
LEMONT, ILLINOIS 60439
(708) 882-1188
info@securesourceamerica.com
www.securesourceamerica.com

Definitions of structural property symbols:

F_y : Yield Strength
 L_u : Critical Unbraced Length for lateral-torsional buckling. Members are considered fully braced when the unbraced length is less than L_u .
 K_ϕ : Distortional buckling moment (M_{ad}) is calculated without the beneficial effect of sheathing to rotational stiffness. $K_\phi = 0$.

Gross Properties

A_r : The cross sectional area of the full unreduced cross-section of the studs, away from the punch-outs.
Weight: The weight per foot of the full unreduced cross-section of the studs, away from the punch-outs.
 I_x : Moment of inertia of the gross section about the strong axis (X-X).
 R_x : Radius of gyration of the gross section about the X-X axis.
 S_x : Gross section-modulus about the strong axis (X-X).
 I_y : Moment of inertia of the gross section about the weak axis (Y-Y).
 R_y : Radius of gyration of the gross section about the Y-Y axis.

Effective Properties

I_{ex} : Effective moment of inertia about the strong axis (X-X).
 S_{ex} : Effective section modulus about the strong axis (X-X).
 M_a : Allowable Bending Moment based on local buckling.
 M_{ad} : Allowable Bending Moment based on Distortional Buckling, assuming $K_\phi = 0$.
 V_a : Allowable strong axis shear away from punchout.
 $V_a(\text{net})$: Allowable strong axis shear at punchout.

Torsional Properties

J : St. Venant Torsional Constant
 C_w : Torsional warping constant.
 m : Distance from shear center to mid-plane of web.
 X_o : Distance from the shear center to the centroid along the principal X-axis.
 R_o : Polar radius of gyration about the centroidal principal axis.
 β : Torsional flexural constant: $1 - (X_o/R_o)^2$

TABLE 1—STEEL THICKNESS

THICKNESS DESIGNATION (mils)	DESIGN THICKNESS (in)	MINIMUM DELIVERED THICKNESS (in)	INSIDE BEND RADIUS (in)
18	0.0188	0.0179	0.0937
27	0.0283	0.0269	0.0796
30	0.0312	0.0296	0.0781
33	0.0346	0.0329	0.0764
43	0.0451	0.0428	0.0712
54	0.0566	0.0538	0.0849

For **SI**: 1 inch = 25.4 mm.

TABLE 2—MEMBER DESIGNATION AND DIMENSIONS

Member Designation	Web (in)	Flange (in)	Lip (in)	Member Designation	Web (in)	Flange (in)
162S125	1.625	1.250	0.188	162T125	1.625	1.250
250S125	2.500	1.250	0.188	250T125	2.500	1.250
250S137	2.500	1.375	0.375	250T150	2.500	1.500
250S162	2.500	1.625	0.500	250T200	2.500	2.000
350S125	3.500	1.250	0.188	350T125	3.500	1.250
350S162	3.500	1.625	0.500	350T150	3.500	1.500
350S200	3.500	2.000	0.625	350T200	3.500	2.000
362S125	3.625	1.250	0.188	362T125	3.625	1.250
362S137	3.625	1.375	0.375	362T150	3.625	1.500
362S162	3.625	1.625	0.500	362T200	3.625	2.000
362S200	3.625	2.000	0.625	400T125	4.000	1.250
400S125	4.000	1.250	0.188	400T150	4.000	1.500
400S137	4.000	1.375	0.375	400T200	4.000	2.000
400S162	4.000	1.625	0.500	550T125	5.500	1.250
400S200	4.000	2.000	0.625	550T150	5.500	1.500
550S125	5.500	1.250	0.188	550T200	5.500	2.000
550S162	5.500	1.625	0.500	600T125	6.000	1.250
550S200	5.500	2.000	0.625	600T150	6.000	1.500
600S125	6.000	1.250	0.188	600T200	6.000	2.000
600S137	6.000	1.375	0.375	150U050	1.500	0.500
600S162	6.000	1.625	0.500	200U050	2.000	0.500
600S200	6.000	2.000	0.625	250U050	2.500	0.500
				087F125	1.25	0.875

For **SI**: 1 inch = 25.4 mm

TABLE 3—C-SECTION PROPERTIES^{1,2,3,4,5,6}

Section	Design Thickness (in)	Fy(ksi)	A(in ²)	Weight (lb/ft)	Ix(in ⁴)	Sx(in ³)	Rx(in)	Iy(in ⁴)	Ry(in)	Ixx (in ⁴)	Sxx (in ³)	Mal (kip-in)	Mad (kip-in)	Vag (lb)	Vanet (lb)	Jx1000 (in ⁴)	Cw(in ⁶)	Xo (in)	m (in)	Ro (in)	β	Lu (in)
162S125-18	0.0188	33	0.08	0.27	0.038	0.046	0.686	0.016	0.447	0.034	0.031	0.61	0.65	302	100	0.009	0.009	-1.029	0.594	1.315	0.388	29
162S125-27	0.0283	33	0.12	0.41	0.056	0.068	0.682	0.023	0.443	0.055	0.053	1.05	1.14	494	106	0.032	0.013	-1.017	0.587	1.302	0.39	29.1
162S125-30	0.0312	33	0.131	0.45	0.061	0.075	0.681	0.026	0.441	0.06	0.06	1.19	1.29	543	106	0.043	0.014	-1.014	0.585	1.298	0.39	29.2
162S125-33	0.0346	33	0.145	0.49	0.067	0.083	0.679	0.028	0.44	0.066	0.069	1.37	1.48	601	105	0.058	0.016	-1.01	0.583	1.294	0.391	29.2
250S125-18	0.0188	33	0.097	0.33	0.099	0.079	1.014	0.019	0.439	0.089	0.059	1.17	1.03	258	196	0.011	0.023	-0.904	0.543	1.427	0.599	29
250S125-27	0.0283	33	0.144	0.49	0.147	0.118	1.009	0.027	0.434	0.144	0.097	1.92	1.83	685	344	0.039	0.034	-0.893	0.536	1.416	0.602	28.9
250S125-30	0.0312	33	0.159	0.54	0.161	0.129	1.008	0.03	0.433	0.159	0.11	2.17	2.09	832	378	0.052	0.037	-0.889	0.534	1.412	0.603	28.9
250S125-33	0.0346	33	0.176	0.6	0.178	0.142	1.006	0.033	0.431	0.175	0.125	2.48	2.41	975	399	0.07	0.04	-0.885	0.532	1.408	0.605	28.9
250S125-43	0.0451	33	0.227	0.77	0.228	0.182	1.001	0.041	0.426	0.225	0.177	3.49	3.43	1265	394	0.154	0.05	-0.873	0.525	1.396	0.608	28.9
250S125-54	0.0566	33	0.28	0.95	0.277	0.222	0.994	0.049	0.419	0.277	0.218	4.98	5.07	1553	373	0.299	0.06	-0.859	0.518	1.379	0.612	28.8
250S125-54	0.0566	50	0.28	0.95	0.277	0.222	0.994	0.049	0.419	0.274	0.209	6.25	6.17	2353	565	0.299	0.06	-0.859	0.518	1.379	0.612	23.3
250S125-18	0.0188	33	0.115	0.39	0.215	0.123	1.366	0.021	0.423	0.203	0.072	1.42	1.47	180	159	0.014	0.05	-0.797	0.495	1.637	0.763	28.8
350S125-27	0.0283	33	0.173	0.59	0.25	0.183	1.361	0.03	0.418	0.315	0.13	2.57	2.65	614	359	0.046	0.072	-0.787	0.489	1.627	0.766	28.7
350S125-30	0.0312	33	0.19	0.65	0.351	0.201	1.359	0.033	0.417	0.346	0.15	2.96	3.04	824	436	0.062	0.079	-0.784	0.487	1.624	0.767	28.6
350S125-33	0.0346	33	0.21	0.72	0.387	0.221	1.358	0.036	0.415	0.382	0.175	3.45	3.53	1024	487	0.084	0.087	-0.78	0.485	1.62	0.768	28.6
350S125-43	0.0451	33	0.272	0.93	0.498	0.284	1.352	0.046	0.41	0.495	0.258	5.1	5.11	1739	631	0.184	0.109	-0.769	0.479	1.609	0.771	28.4
350S125-54	0.0566	33	0.337	1.15	0.608	0.348	1.344	0.055	0.402	0.608	0.328	6.49	6.87	2253	633	0.36	0.131	-0.755	0.471	1.593	0.775	28.4
350S125-54	0.0566	50	0.337	1.15	0.608	0.348	1.344	0.055	0.402	0.604	0.308	9.22	9.25	3372	947	0.36	0.131	-0.755	0.471	1.593	0.775	22.9
362S125-18	0.0188	33	0.118	0.4	0.234	0.129	1.409	0.021	0.421	0.221	0.075	1.48	1.52	173	163	0.014	0.054	-0.786	0.49	1.667	0.778	28.8
362S125-27	0.0283	33	0.176	0.6	0.347	0.192	1.404	0.031	0.416	0.313	0.163	3.218	3.122	592	370	0.047	0.079	-0.776	0.484	1.657	0.781	28.6
362S125-30	0.0312	33	0.194	0.66	0.381	0.21	1.402	0.033	0.415	0.376	0.156	3.08	3.17	794	449	0.063	0.086	-0.773	0.482	1.654	0.782	28.6
362S125-33	0.0346	33	0.215	0.73	0.421	0.232	1.4	0.037	0.413	0.415	0.182	3.59	3.67	1024	521	0.086	0.094	-0.769	0.48	1.65	0.783	28.5
362S125-43	0.0451	33	0.278	0.95	0.54	0.298	1.395	0.046	0.408	0.537	0.269	5.31	5.33	1739	676	0.188	0.118	-0.758	0.473	1.639	0.786	28.4
362S125-54	0.0566	33	0.344	1.17	0.661	0.365	1.386	0.055	0.4	0.661	0.343	6.78	7.19	2341	705	0.367	0.142	-0.744	0.466	1.623	0.79	28.3
362S125-54	0.0566	50	0.344	1.17	0.661	0.365	1.386	0.055	0.4	0.656	0.321	9.62	9.65	3372	1016	0.367	0.142	-0.744	0.466	1.623	0.79	22.8
400S125-18 (1)	0.0188	33	0.125	0.42	0.294	0.147	1.536	0.021	0.414	0.281	0.083	1.64	1.68	156	156	0.015	0.068	-0.754	0.475	1.76	0.816	28.7
400S125-27	0.0283	33	0.187	0.64	0.438	0.219	1.531	0.031	0.41	0.431	0.151	2.97	3.07	533	398	0.05	0.098	-0.744	0.469	1.751	0.819	28.5
400S125-30	0.0312	33	0.206	0.7	0.481	0.24	1.529	0.034	0.408	0.474	0.174	3.44	3.53	715	484	0.067	0.107	-0.741	0.467	1.748	0.82	28.5
400S125-33	0.0346	33	0.228	0.77	0.531	0.265	1.527	0.038	0.407	0.524	0.203	4.01	4.1	976	595	0.091	0.118	-0.738	0.465	1.744	0.821	28.4
400S125-43	0.0451	33	0.295	1	0.682	0.341	1.521	0.048	0.402	0.68	0.301	5.96	5.99	1739	810	0.2	0.148	-0.727	0.459	1.733	0.824	28.2
400S125-54	0.0566	33	0.365	1.24	0.835	0.418	1.512	0.057	0.394	0.835	0.387	7.65	8.12	2603	944	0.39	0.178	-0.713	0.451	1.718	0.828	28.1
400S125-54	0.0566	50	0.365	1.24	0.835	0.418	1.512	0.057	0.394	0.83	0.361	10.81	10.87	3372	1223	0.39	0.178	-0.713	0.451	1.718	0.828	22.7
550S125-18 (2)	0.0188	33	0.153	0.52	0.63	0.229	2.029	0.023	0.39	-	-	-	-	-	-	0.018	0.14	-0.651	0.423	2.166	0.91	22.9
550S125-27	0.0283	33	0.229	0.78	0.938	0.341	2.023	0.034	0.385	0.898	0.246	4.86	4.26	382	382	0.061	0.205	-0.641	0.417	2.157	0.912	27.9
550S125-30	0.0312	33	0.252	0.86	1.031	0.375	2.021	0.037	0.384	0.996	0.286	5.65	4.95	512	512	0.082	0.224	-0.639	0.415	2.154	0.912	27.9
550S125-33	0.0346	33	0.279	0.95	1.139	0.414	2.019	0.041	0.382	1.111	0.335	6.62	5.78	699	699	0.112	0.246	-0.635	0.413	2.151	0.913	27.8
550S125-43	0.0451	33	0.362	1.23	1.468	0.534	2.013	0.052	0.377	1.458	0.5	9.88	8.61	1550	1199	0.246	0.309	-0.625	0.407	2.141	0.915	27.6
550S125-54	0.0566	33	0.45	1.53	1.805	0.656	2.002	0.061	0.369	1.805	0.647	12.79	11.92	2739	1666	0.481	0.374	-0.613	0.401	2.126	0.917	27.3
550S125-54	0.0566	50	0.45	1.53	1.805	0.656	2.002	0.061	0.369	1.791	0.606	18.13	15.75	3093	1881	0.481	0.374	-0.613	0.401	2.126	0.917	22.1
600S125-18 (2)	0.0188	33	0.162	0.55	0.778	0.259	2.189	0.024	0.382	-	-	-	-	-	-	0.019	0.172	-0.623	0.408	2.308	0.927	22.7
600S125-27 (1)	0.0283	33	0.243	0.83	1.16	0.387	2.183	0.035	0.377	1.097	0.271	5.35	4.63	349	349	0.065	0.251	-0.614	0.402	2.299	0.929	27.7
600S125-30	0.0312	33	0.268	0.91	1.275	0.425	2.181	0.038	0.376	1.218	0.315	6.22	5.39	468	468	0.087	0.274	-0.611	0.401	2.296	0.929	27.6
600S125-33	0.0346	33	0.297	1.01	1.409	0.47	2.179	0.042	0.374	1.361	0.369	7.3	6.32	638	638	0.118	0.3	-0.608	0.399	2.293	0.93	27.6
600S125-43	0.0451	33	0.385	1.31	1.817	0.606	2.173	0.053	0.369	1.807	0.555	10.96	9.46	1416	1240	0.261	0.378	-0.598	0.393	2.284	0.931	27.3
600S125-54	0.0566	33	0.479	1.63	2.236	0.745	2.161	0.063	0.362	2.236	0.727	14.37	13.18	2739	1890	0.511	0.457	-0.586	0.386	2.269	0.933	27.1
600S125-54	0.0566	50	0.479	1.63	2.236	0.745	2.161	0.063	0.362	2.22	0.679	20.15	17.34	2823	1947	0.511	0.457	-0.586	0.386	2.269	0.933	21.9
250S137-33	0.0346	33	0.197	0.67	0.203	0.163	1.015	0.052	0.515	0.203	0.158	3.11	3.1	975	399	0.079	0.076	-1.141	0.677	1.612	0.499	35.6
250S137-43	0.0451	33	0.255	0.87	0.261	0.208	1.01	0.067	0.511	0.261	0.205	4.53	4.6	1265	394	0.173	0.096	-1.129	0.67	1.599	0.501	33.6
250S137-54	0.0566	33	0.316	1.07	0.318	0.255	1.004	0.08	0.504	0.318	0.255	5.76	5.75	1553	373	0.337	0.115	-1.115	0.663	1.583	0.504	33.4
250S137-54	0.0566	50	0.316	1.07	0.318	0.255	1.004	0.08	0.504	0.318	0.244	8.22	8.34	2353	565	0.337	0.115	-1.115	0.663	1.583	0.504	27.1
250S162-33	0.0346	33	0.223	0.76	0.235	0.188	1.027	0.087	0.624	0.235	0.18	3.55	3.56	975	399	0.089	0.146	-1.47	0.859	1.898	0.401	44.1
250S162-43	0.0451	33	0.289	0.98	0.302	0.242	1.022	0.111	0.62	0.302	0.24	5.22	5.25	1265	394	0.196	0.184	-1.457	0.852	1.885	0.402	42.1

TABLE 3—C-SECTION PROPERTIES^{1,2,3,4,5,6} (CONTINUED)

Section	Design Thickness (in)	Fy(ksi)	A(in ²)	Weight (lb/ft)	Ix(in ⁴)	Sx(in ³)	Rx(in)	Iy(in ⁴)	Ry(in)	Iex (in ⁴)	Sex (in ³)	Mal (kip-in)	Mad (kip-in)	Vag (lb)	Vanet (lb)	Jx1000 (in ⁴)	Cw(in ⁶)	Xo (in)	m (in)	Ro (in)	β	Lu (in)
350S200-43	0.0451	33	0.379	1.29	0.771	0.441	1.426	0.224	0.768	0.771	0.41	8.09	8.36	1739	631	0.257	0.687	-1.748	1.032	2.383	0.462	53.7
350S200-54	0.0566	33	0.471	1.6	0.95	0.543	1.42	0.274	0.762	0.95	0.53	10.47	10.73	2253	633	0.503	0.838	-1.733	1.024	2.367	0.464	53.8
350S200-54	0.0566	50	0.471	1.6	0.95	0.543	1.42	0.274	0.762	0.95	0.47	14.07	14.86	3372	947	0.503	0.838	-1.733	1.024	2.367	0.464	43.5
362S137-33	0.0346	33	0.236	0.8	0.479	0.264	1.424	0.059	0.501	0.479	0.232	4.59	4.73	1024	521	0.094	0.165	-1.003	0.615	1.813	0.694	34.7
362S137-43	0.0451	33	0.306	1.04	0.616	0.34	1.419	0.075	0.497	0.616	0.32	6.32	6.65	1739	676	0.207	0.208	-0.991	0.608	1.801	0.697	34.6
362S137-54	0.0566	33	0.379	1.29	0.756	0.417	1.411	0.091	0.49	0.756	0.402	7.94	8.24	2341	705	0.405	0.251	-0.978	0.601	1.785	0.7	34.6
362S137-54	0.0566	50	0.379	1.29	0.756	0.417	1.411	0.091	0.49	0.756	0.381	11.42	11.91	3372	1016	0.405	0.251	-0.978	0.601	1.785	0.7	27.9
362S162-33	0.0346	33	0.262	0.89	0.551	0.304	1.45	0.099	0.616	0.551	0.268	5.29	5.43	1024	521	0.105	0.297	-1.308	0.789	2.048	0.592	42.6
362S162-43	0.0451	33	0.34	1.16	0.71	0.392	1.445	0.127	0.611	0.71	0.372	7.34	7.62	1739	676	0.23	0.376	-1.297	0.782	2.036	0.594	42.5
362S162-54	0.0566	33	0.422	1.44	0.873	0.481	1.438	0.154	0.604	0.873	0.466	9.22	9.51	2341	705	0.451	0.457	-1.283	0.774	2.02	0.597	42.5
362S162-54	0.0566	50	0.422	1.44	0.873	0.481	1.438	0.154	0.604	0.873	0.444	13.28	13.59	3372	1016	0.451	0.457	-1.283	0.774	2.02	0.597	34.4
362S200-33	0.0346	33	0.297	1.01	0.648	0.358	1.478	0.177	0.772	0.647	0.294	5.81	6.19	1024	521	0.118	0.577	-1.741	1.03	2.411	0.478	53.6
362S200-43	0.0451	33	0.385	1.31	0.836	0.461	1.474	0.227	0.767	0.836	0.427	8.43	8.7	1739	676	0.261	0.734	-1.729	1.024	2.398	0.48	53.5
362S200-54	0.0566	33	0.479	1.63	1.03	0.568	1.467	0.277	0.761	1.03	0.553	10.93	11.23	2341	705	0.511	0.896	-1.715	1.016	2.382	0.482	53.6
362S200-54	0.0566	50	0.479	1.63	1.03	0.568	1.467	0.277	0.761	1.03	0.49	14.66	15.47	3372	1016	0.511	0.896	-1.715	1.016	2.382	0.482	43.3
400S137-33	0.0346	33	0.249	0.85	0.603	0.301	1.556	0.061	0.496	0.603	0.259	5.12	5.29	976	595	0.099	0.204	-0.965	0.597	1.897	0.741	34.5
400S137-43	0.0451	33	0.323	1.1	0.776	0.388	1.551	0.078	0.491	0.776	0.359	7.09	7.47	1739	810	0.219	0.257	-0.954	0.591	1.885	0.744	34.3
400S137-54	0.0566	33	0.401	1.36	0.953	0.477	1.542	0.094	0.484	0.953	0.453	8.96	9.42	2603	944	0.428	0.311	-0.94	0.583	1.87	0.747	34.3
400S137-54	0.0566	50	0.401	1.36	0.953	0.477	1.542	0.094	0.484	0.953	0.428	12.82	13.38	3372	1223	0.428	0.311	-0.94	0.583	1.87	0.747	27.7
400S162-33	0.0346	33	0.275	0.94	0.692	0.346	1.586	0.103	0.611	0.692	0.299	5.91	6.07	976	595	0.11	0.363	-1.263	0.768	2.118	0.644	42.3
400S162-43	0.0451	33	0.357	1.21	0.892	0.446	1.581	0.131	0.606	0.892	0.417	8.23	8.54	1739	810	0.242	0.46	-1.252	0.761	2.106	0.647	42.2
400S162-54	0.0566	33	0.443	1.51	1.098	0.549	1.574	0.159	0.6	1.098	0.526	10.39	10.84	2603	944	0.473	0.56	-1.238	0.754	2.09	0.649	42.2
400S162-54	0.0566	50	0.443	1.51	1.098	0.549	1.574	0.159	0.6	1.098	0.498	14.9	15.25	3372	1223	0.473	0.56	-1.238	0.754	2.09	0.649	34.1
400S200-33	0.0346	33	0.31	1.05	0.812	0.406	1.619	0.183	0.769	0.812	0.328	6.49	6.9	976	595	0.124	0.697	-1.688	1.007	2.462	0.53	53.1
400S200-43	0.0451	33	0.402	1.37	1.047	0.524	1.615	0.235	0.764	1.047	0.478	9.45	9.74	1739	810	0.272	0.886	-1.676	1	2.449	0.532	53
400S200-54	0.0566	33	0.5	1.7	1.292	0.646	1.608	0.287	0.758	1.292	0.623	12.3	12.77	2603	944	0.534	1.083	-1.662	0.993	2.433	0.534	53
400S200-54	0.0566	50	0.5	1.7	1.292	0.646	1.608	0.287	0.758	1.292	0.549	16.43	17.31	3372	1223	0.534	1.083	-1.662	0.993	2.433	0.534	42.9
550S162-33	0.0346	33	0.327	1.11	1.458	0.53	2.112	0.113	0.589	1.458	0.512	10.11	8.63	699	699	0.13	0.713	-1.114	0.697	2.459	0.795	41.4
550S162-43	0.0451	33	0.424	1.44	1.883	0.685	2.107	0.145	0.584	1.883	0.681	14.79	13.14	1550	1199	0.288	0.905	-1.103	0.691	2.448	0.797	39.2
550S162-54	0.0566	33	0.528	1.8	2.324	0.845	2.098	0.176	0.577	2.324	0.845	18.76	17.87	2739	1666	0.564	1.105	-1.09	0.684	2.434	0.8	38.7
550S162-54	0.0566	50	0.528	1.8	2.324	0.845	2.098	0.176	0.577	2.324	0.811	26.86	23.52	3093	1881	0.564	1.105	-1.09	0.684	2.434	0.8	31.6
550S200-33	0.0346	33	0.362	1.23	1.694	0.616	2.164	0.204	0.751	1.678	0.559	11.05	9.8	699	699	0.144	1.326	-1.508	0.925	2.742	0.698	51.9
550S200-43	0.0451	33	0.469	1.6	2.189	0.796	2.159	0.261	0.746	2.189	0.776	15.33	13.96	1550	1199	0.318	1.691	-1.496	0.918	2.731	0.7	51.7
550S200-54	0.0566	33	0.585	1.99	2.706	0.984	2.152	0.32	0.739	2.706	0.984	21.41	19.98	2739	1666	0.624	2.072	-1.483	0.911	2.716	0.702	49.2
550S200-54	0.0566	50	0.585	1.99	2.706	0.984	2.152	0.32	0.739	2.706	0.901	26.98	24.84	3093	1881	0.624	2.072	-1.483	0.911	2.716	0.702	41.8
600S137-33	0.0346	33	0.318	1.08	1.582	0.527	2.229	0.069	0.464	1.548	0.455	8.98	8.19	638	638	0.127	0.5	-0.807	0.519	2.416	0.889	33.5
600S137-43	0.0451	33	0.413	1.41	2.042	0.681	2.223	0.087	0.459	2.041	0.645	12.74	11.82	1416	1240	0.28	0.633	-0.796	0.513	2.406	0.89	33.3
600S137-54	0.0566	33	0.514	1.75	2.518	0.839	2.213	0.105	0.452	2.518	0.832	16.44	15.95	2739	1890	0.549	0.769	-0.784	0.506	2.391	0.893	33
600S137-54	0.0566	50	0.514	1.75	2.518	0.839	2.213	0.105	0.452	2.518	0.777	23.26	21.24	2823	1947	0.549	0.769	-0.784	0.506	2.391	0.893	26.8
600S162-33	0.0346	33	0.344	1.17	1.793	0.598	2.282	0.116	0.581	1.793	0.577	11.41	9.47	638	638	0.137	0.861	-1.072	0.677	2.587	0.828	41.1
600S162-43	0.0451	33	0.447	1.52	2.316	0.772	2.276	0.148	0.576	2.316	0.767	16.68	14.46	1416	1240	0.303	1.095	-1.062	0.67	2.577	0.83	39
600S162-54	0.0566	33	0.556	1.89	2.86	0.953	2.267	0.18	0.57	2.86	0.953	21.17	19.75	2739	1890	0.594	1.337	-1.049	0.663	2.562	0.832	38.4
600S162-54	0.0566	50	0.556	1.89	2.86	0.953	2.267	0.18	0.57	2.86	0.916	30.33	25.9	2823	1947	0.594	1.337	-1.049	0.663	2.562	0.832	31.4
600S200-33	0.0346	33	0.379	1.29	2.075	0.692	2.34	0.209	0.743	2.058	0.621	12.28	10.77	638	638	0.151	1.593	-1.457	0.901	2.855	0.74	51.6
600S200-43	0.0451	33	0.492	1.67	2.683	0.894	2.335	0.268	0.739	2.634	0.873	17.25	15.27	1416	1240	0.334	2.033	-1.446	0.894	2.844	0.742	51.4
600S200-54	0.0566	33	0.613	2.09	3.319	1.106	2.327	0.328	0.732	3.319	1.106	24.07	22.07	2739	1890	0.655	2.493	-1.432	0.887	2.829	0.744	48.9
600S200-54	0.0566	50	0.613	2.09	3.319	1.106	2.327	0.328	0.732	3.319	1.015	30.4	27.38	2823	1947	0.655	2.493	-1.432	0.887	2.829	0.744	41.6

For SI: 1 inch = 25.4 mm; 1 lb/ft = 14.5939 N/m; 1 kip-in = 12.8 N-m; 1 ksi = 6.89 Mpa

¹ See Page 2 for definitions of symbols.

² Web height-to-thickness ratio (h/t) exceeds 200. Web stiffeners are required at all supports and concentrated loads. No holes in the web are allowed.

³ When web height-to-thickness ratio (h/t) exceeds 260, or flange-width-to-thickness ratio exceeds 60, the effective properties are not calculated (limitations in AISI S100 Chapter B).

⁴ Tabulated gross properties, including torsional properties, are based on the full unreduced cross section of the studs, away from punch-outs.

⁵ Tabulated effective properties are based on the reduced cross sections of the studs at the punchouts.

⁶ For deflection calculations, use the effective moment of inertia.

TABLE 4—TRACK SECTION PROPERTIES^{1,2,3}

Section	Design Thickness (in)	Fy(ksi)	A(in ²)	Weight (lb/ft)	Ix(in ⁴)	Sx(in ³)	Rx(in)	Iy(in ⁴)	Ry(in)	Ixx(in ⁴)	Sxx(in ³)	Mal (kip-in)	Vag (lb)	Jx1000 (in ⁴)	Cw in(6)	Xo (in)	m (in)	Ro (in)	β
162T125-18	0.0188	33	0.077	0.26	0.041	0.047	0.733	0.013	0.411	0.03	0.025	0.5	302	0.009	0.007	-0.878	0.503	1.215	0.478
162T125-27	0.0283	33	0.117	0.4	0.063	0.072	0.735	0.02	0.41	0.05	0.044	0.87	541	0.031	0.01	-0.872	0.501	1.211	0.482
162T125-30	0.0312	33	0.129	0.44	0.07	0.079	0.735	0.022	0.409	0.057	0.05	1	597	0.042	0.012	-0.87	0.5	1.21	0.483
162T125-33	0.0346	33	0.143	0.49	0.077	0.087	0.736	0.024	0.408	0.066	0.058	1.15	663	0.057	0.013	-0.868	0.499	1.209	0.484
250T125-18	0.0188	33	0.094	0.32	0.103	0.079	1.051	0.015	0.4	0.078	0.045	0.9	249	0.011	0.018	-0.769	0.46	1.362	0.681
250T125-27	0.0283	33	0.141	0.48	0.157	0.119	1.053	0.022	0.398	0.129	0.079	1.56	685	0.038	0.027	-0.763	0.457	1.36	0.685
250T125-30	0.0312	33	0.156	0.53	0.173	0.131	1.053	0.025	0.397	0.145	0.09	1.77	832	0.051	0.03	-0.762	0.456	1.359	0.686
250T125-33	0.0346	33	0.173	0.59	0.192	0.145	1.054	0.027	0.397	0.166	0.103	2.03	1024	0.069	0.033	-0.76	0.456	1.358	0.687
250T125-43	0.0451	33	0.225	0.77	0.25	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	0.69
250T125-54	0.0566	33	0.282	0.96	0.318	0.236	1.062	0.043	0.392	0.31	0.203	4.01	1692	0.301	0.054	-0.749	0.449	1.357	0.696
250T125-54	0.0566	50	0.282	0.96	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
250T150-27	0.0283	33	0.156	0.53	0.181	0.137	1.078	0.037	0.486	0.139	0.082	1.61	685	0.042	0.044	-0.976	0.575	1.534	0.595
250T150-30	0.0312	33	0.172	0.58	0.199	0.151	1.078	0.04	0.486	0.157	0.093	1.83	832	0.056	0.049	-0.975	0.574	1.533	0.595
250T150-33	0.0346	33	0.19	0.65	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	0.0451	33	0.248	0.84	0.289	0.217	1.08	0.058	0.483	0.252	0.154	3.03	1356	0.168	0.07	-0.968	0.57	1.529	0.599
250T150-54	0.0566	33	0.311	1.06	0.368	0.273	1.088	0.072	0.481	0.342	0.213	4.22	1692	0.332	0.089	-0.961	0.566	1.529	0.605
250T150-54	0.0566	50	0.311	1.06	0.368	0.273	1.088	0.072	0.481	0.342	0.213	4.22	1692	0.332	0.089	-0.961	0.566	1.529	0.605
250T200-33	0.0346	33	0.225	0.76	0.28	0.212	1.117	0.097	0.658	0.203	0.112	2.22	1024	0.09	0.118	-1.418	0.813	1.921	0.455
250T200-43	0.0451	33	0.293	1	0.366	0.275	1.118	0.126	0.657	0.325	0.197	5.89	2563	0.198	0.153	-1.413	0.81	1.918	0.457
250T200-54	0.0566	33	0.367	1.25	0.466	0.346	1.127	0.157	0.654	0.396	0.228	4.51	1692	0.392	0.195	-1.405	0.806	1.917	0.462
250T200-54	0.0566	50	0.367	1.25	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
350T125-18	0.0188	33	0.113	0.38	0.219	0.121	1.394	0.016	0.383	0.174	0.063	1.25	175	0.013	0.038	-0.675	0.418	1.595	0.821
350T125-27	0.0283	33	0.17	0.58	0.331	0.182	1.396	0.025	0.381	0.277	0.128	2.53	590	0.045	0.057	-0.67	0.416	1.595	0.823
350T125-30	0.0312	33	0.187	0.64	0.365	0.2	1.396	0.027	0.38	0.312	0.145	2.86	790	0.061	0.063	-0.669	0.415	1.594	0.824
350T125-33	0.0346	33	0.207	0.71	0.405	0.222	1.397	0.03	0.379	0.354	0.165	3.27	1024	0.083	0.07	-0.668	0.414	1.594	0.824
350T125-43	0.0451	33	0.27	0.92	0.528	0.288	1.397	0.038	0.377	0.49	0.233	4.61	1739	0.183	0.09	-0.663	0.412	1.592	0.826
350T125-54	0.0566	33	0.339	1.15	0.668	0.361	1.404	0.048	0.375	0.651	0.317	6.26	2392	0.362	0.114	-0.658	0.408	1.595	0.83
350T125-54	0.0566	50	0.339	1.15	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	0.83
350T150-27	0.0283	33	0.184	0.63	0.377	0.207	1.431	0.041	0.47	0.298	0.132	2.62	590	0.049	0.094	-0.869	0.529	1.739	0.75
350T150-30	0.0312	33	0.203	0.69	0.416	0.228	1.432	0.045	0.469	0.336	0.15	2.96	790	0.066	0.103	-0.867	0.528	1.739	0.751
350T150-33	0.0346	33	0.225	0.76	0.461	0.253	1.432	0.049	0.469	0.382	0.171	3.39	1024	0.09	0.114	-0.866	0.527	1.738	0.752
350T150-43	0.0451	33	0.293	1	0.601	0.328	1.433	0.064	0.467	0.531	0.243	4.8	1739	0.198	0.148	-0.861	0.525	1.736	0.754
350T150-54	0.0566	33	0.367	1.25	0.761	0.412	1.44	0.079	0.465	0.712	0.332	6.57	2392	0.392	0.187	-0.855	0.521	1.738	0.758
350T150-54	0.0566	50	0.367	1.25	0.761	0.412	1.44	0.079	0.465	0.679	0.31	9.28	3372	0.392	0.187	-0.855	0.521	1.738	0.758
350T200-33	0.0346	33	0.259	0.88	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	0.0451	33	0.338	1.15	0.749	0.409	1.489	0.14	0.645	0.6	0.257	5.09	1739	0.229	0.323	-1.28	0.758	2.066	0.616
350T200-54	0.0566	33	0.424	1.44	0.949	0.513	1.496	0.175	0.642	0.814	0.355	7.01	2392	0.453	0.409	-1.273	0.754	2.067	0.621
350T200-54	0.0566	50	0.424	1.44	0.949	0.513	1.496	0.175	0.642	0.77	0.329	9.85	3372	0.453	0.409	-1.273	0.754	2.067	0.621
362T125-18	0.0188	33	0.115	0.39	0.237	0.126	1.435	0.017	0.38	0.189	0.065	1.29	169	0.014	0.042	-0.665	0.413	1.627	0.833
362T125-27	0.0283	33	0.173	0.59	0.358	0.191	1.438	0.025	0.378	0.301	0.135	2.66	569	0.046	0.062	-0.661	0.411	1.627	0.835
362T125-30	0.0312	33	0.191	0.65	0.395	0.21	1.438	0.027	0.378	0.339	0.152	3.01	762	0.062	0.068	-0.659	0.41	1.626	0.836
362T125-33	0.0346	33	0.212	0.72	0.438	0.232	1.438	0.03	0.377	0.384	0.174	3.44	1024	0.085	0.076	-0.658	0.409	1.626	0.836
362T125-43	0.0451	33	0.276	0.94	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	0.0566	33	0.346	1.18	0.723	0.378	1.445	0.048	0.373	0.705	0.332	6.57	2480	0.369	0.123	-0.648	0.404	1.627	0.841
362T125-54	0.0566	50	0.346	1.18	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
362T150-27	0.0283	33	0.187	0.64	0.408	0.217	1.475	0.041	0.468	0.323	0.14	2.76	569	0.05	0.102	-0.857	0.524	1.769	0.765
362T150-30	0.0312	33	0.207	0.7	0.449	0.239	1.475	0.045	0.467	0.364	0.158	3.12	762	0.067	0.112	-0.856	0.523	1.768	0.766
362T150-33	0.0346	33	0.229	0.78	0.499	0.264	1.475	0.05	0.467	0.414	0.18	3.56	1024	0.091	0.124	-0.854	0.522	1.767	0.766
362T150-43	0.0451	33	0.298	1.02	0.65	0.343	1.476	0.064	0.465	0.574	0.255	5.04	1739	0.202	0.16	-0.85	0.519	1.766	0.768

(CONTINUED)

TABLE 4—TRACK SECTION PROPERTIES^{1,2,3} (CONTINUED)

Section	Design Thickness (in)	F _y (ksi)	A (in ²)	Weight (lb/ft)	I _x (in ⁴)	S _x (in ³)	R _x (in)	I _y (in ⁴)	R _y (in)	I _{ex} (in ⁴)	S _{ex} (in ³)	Mal (kip-in)	V _{ag} (lb)	J _x 1000 (in ⁴)	C _w in(6)	X _o (in)	m (in)	R _o (in)	β
362T150-54	0.0566	33	0.374	1.27	0.823	0.431	1.483	0.08	0.462	0.769	0.349	6.89	2480	0.4	0.202	-0.844	0.516	1.768	0.772
362T150-54	0.0566	50	0.374	1.27	0.823	0.431	1.483	0.08	0.462	0.735	0.325	9.74	3372	0.4	0.202	-0.844	0.516	1.768	0.772
362T200-33	0.0346	33	0.264	0.9	0.619	0.328	1.532	0.11	0.645	0.464	0.19	3.76	1024	0.105	0.269	-1.27	0.754	2.092	0.631
362T200-43	0.0451	33	0.343	1.17	0.808	0.427	1.534	0.142	0.643	0.649	0.27	5.34	1739	0.233	0.35	-1.265	0.752	2.09	0.633
362T200-54	0.0566	33	0.431	1.47	1.024	0.536	1.541	0.177	0.64	0.879	0.372	7.35	2480	0.46	0.442	-1.259	0.748	2.091	0.637
362T200-54	0.0566	50	0.431	1.47	1.024	0.536	1.541	0.177	0.64	0.832	0.345	10.34	3372	0.46	0.442	-1.259	0.748	2.091	0.637
400T125-18 (1)	0.0188	33	0.122	0.41	0.297	0.144	1.56	0.017	0.374	0.241	0.072	1.42	153	0.014	0.052	-0.637	0.4	1.726	0.864
400T125-27	0.0283	33	0.184	0.63	0.449	0.217	1.562	0.025	0.372	0.38	0.156	3.08	515	0.049	0.078	-0.633	0.398	1.726	0.866
400T125-30	0.0312	33	0.203	0.69	0.495	0.239	1.562	0.028	0.371	0.427	0.176	3.49	689	0.066	0.085	-0.632	0.397	1.726	0.866
400T125-33	0.0346	33	0.225	0.76	0.549	0.265	1.563	0.031	0.371	0.484	0.201	3.97	940	0.09	0.095	-0.63	0.396	1.725	0.867
400T125-43	0.0451	33	0.293	1	0.716	0.344	1.563	0.04	0.369	0.666	0.282	5.57	1739	0.198	0.122	-0.626	0.394	1.724	0.868
400T125-54	0.0566	33	0.367	1.25	0.904	0.431	1.569	0.049	0.366	0.882	0.381	7.53	2739	0.392	0.154	-0.621	0.39	1.727	0.871
400T125-54	0.0566	50	0.367	1.25	0.904	0.431	1.569	0.049	0.366	0.849	0.359	10.74	3372	0.392	0.154	-0.621	0.39	1.727	0.871
400T150-27	0.0283	33	0.198	0.67	0.509	0.246	1.602	0.042	0.461	0.409	0.154	3.04	515	0.053	0.127	-0.824	0.509	1.86	0.804
400T150-30	0.0312	33	0.218	0.74	0.561	0.271	1.603	0.046	0.461	0.458	0.183	3.61	689	0.071	0.14	-0.823	0.508	1.859	0.804
400T150-33	0.0346	33	0.242	0.82	0.622	0.3	1.603	0.051	0.46	0.519	0.208	4.12	940	0.097	0.155	-0.821	0.507	1.859	0.805
400T150-43	0.0451	33	0.315	1.07	0.811	0.39	1.604	0.066	0.458	0.719	0.293	5.8	1739	0.214	0.2	-0.817	0.504	1.857	0.807
400T150-54	0.0566	33	0.396	1.35	1.025	0.489	1.61	0.082	0.456	0.96	0.399	7.89	2739	0.422	0.252	-0.811	0.501	1.86	0.81
400T150-54	0.0566	50	0.396	1.35	1.025	0.489	1.61	0.082	0.456	0.918	0.374	11.19	3372	0.422	0.252	-0.811	0.501	1.86	0.81
400T200-33	0.0346	33	0.277	0.94	0.768	0.371	1.666	0.113	0.639	0.581	0.22	4.34	940	0.11	0.336	-1.229	0.737	2.166	0.678
400T200-43	0.0451	33	0.36	1.23	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	0.68
400T200-54	0.0566	33	0.452	1.54	1.268	0.604	1.675	0.182	0.635	1.093	0.426	8.42	2739	0.483	0.551	-1.217	0.73	2.165	0.684
400T200-54	0.0566	50	0.452	1.54	1.268	0.604	1.675	0.182	0.635	1.037	0.397	11.88	3372	0.483	0.551	-1.217	0.73	2.165	0.684
550T125-27	0.0283	33	0.226	0.77	0.948	0.336	2.046	0.027	0.348	0.786	0.192	3.79	372	0.06	0.16	-0.543	0.352	2.145	0.936
550T125-30	0.0312	33	0.25	0.85	1.045	0.37	2.046	0.03	0.347	0.897	0.226	4.47	499	0.081	0.176	-0.542	0.351	2.145	0.936
550T125-33	0.0346	33	0.277	0.94	1.159	0.41	2.046	0.033	0.346	1.029	0.27	5.33	680	0.11	0.195	-0.541	0.35	2.145	0.936
550T125-43	0.0451	33	0.36	1.23	1.51	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	0.0566	33	0.452	1.54	1.903	0.668	2.052	0.053	0.342	1.862	0.597	11.8	2739	0.483	0.315	-0.532	0.345	2.147	0.939
550T125-54	0.0566	50	0.452	1.54	1.903	0.668	2.052	0.053	0.342	1.665	0.538	16.11	2980	0.483	0.315	-0.532	0.345	2.147	0.939
550T150-27	0.0283	33	0.241	0.82	1.059	0.376	2.098	0.046	0.436	0.893	0.207	4.1	372	0.064	0.263	-0.716	0.456	2.259	0.9
550T150-30	0.0312	33	0.265	0.9	1.168	0.414	2.098	0.05	0.435	0.995	0.251	4.96	499	0.086	0.289	-0.715	0.455	2.259	0.9
550T150-33	0.0346	33	0.294	1	1.295	0.459	2.099	0.055	0.434	1.115	0.31	6.12	680	0.117	0.32	-0.714	0.455	2.259	0.9
550T150-43	0.0451	33	0.383	1.3	1.688	0.596	2.099	0.072	0.432	1.516	0.468	9.25	1504	0.26	0.414	-0.709	0.452	2.258	0.901
550T150-54	0.0566	33	0.48	1.63	2.128	0.747	2.105	0.089	0.43	2.005	0.628	12.41	2739	0.513	0.519	-0.704	0.449	2.261	0.903
550T150-54	0.0566	50	0.48	1.63	2.128	0.747	2.105	0.089	0.43	1.928	0.595	17.81	2980	0.513	0.519	-0.704	0.449	2.261	0.903
550T200-33	0.0346	33	0.329	1.12	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	0.0451	33	0.428	1.46	2.043	0.722	2.185	0.16	0.611	1.69	0.495	9.79	1504	0.29	0.9	-1.083	0.671	2.514	0.814
550T200-54	0.0566	33	0.537	1.83	2.578	0.905	2.191	0.199	0.609	2.253	0.669	13.21	2739	0.573	1.133	-1.077	0.668	2.517	0.817
550T200-54	0.0566	50	0.537	1.83	2.578	0.905	2.191	0.199	0.609	2.153	0.63	18.86	2980	0.573	1.133	-1.077	0.668	2.517	0.817
600T125-27 (1)	0.0283	33	0.241	0.82	1.168	0.381	2.204	0.028	0.34	0.958	0.21	4.16	341	0.064	0.196	-0.519	0.339	2.29	0.949
600T125-30	0.0312	33	0.265	0.9	1.288	0.419	2.204	0.031	0.34	1.095	0.249	4.92	456	0.086	0.215	-0.518	0.338	2.289	0.949
600T125-33	0.0346	33	0.294	1	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	0.0451	33	0.383	1.3	1.861	0.604	2.205	0.044	0.337	1.768	0.461	9.11	1377	0.26	0.307	-0.513	0.335	2.288	0.95
600T125-54	0.0566	33	0.48	1.63	2.344	0.756	2.209	0.054	0.335	2.299	0.666	13.15	2728	0.513	0.384	-0.508	0.332	2.291	0.951
600T125-54	0.0566	50	0.48	1.63	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
600T150-27	0.0283	33	0.255	0.87	1.3	0.424	2.26	0.047	0.427	1.011	0.214	4.23	341	0.068	0.32	-0.686	0.441	2.4	0.918
600T150-30	0.0312	33	0.281	0.96	1.434	0.467	2.26	0.051	0.427	1.159	0.253	5.01	456	0.091	0.352	-0.685	0.44	2.4	0.918
600T150-33	0.0346	33	0.311	1.06	1.59	0.517	2.26	0.057	0.426	1.334	0.303	5.99	622	0.124	0.39	-0.684	0.439	2.399	0.919
600T150-43	0.0451	33	0.405	1.38	2.072	0.673	2.261	0.073	0.424	1.89	0.474	9.36	1377	0.275	0.504	-0.68	0.437	2.398	0.92
600T150-54	0.0566	33	0.509	1.73	2.611	0.843	2.266	0.091	0.422	2.473	0.689	13.62	2728	0.543	0.632	-0.675	0.434	2.401	0.921
600T150-54	0.0566	50	0.509	1.73	2.611	0.843	2.266	0.091	0.422	2.4	0.609	18.24	2728	0.543	0.632	-0.675	0.434	2.401	0.921
600T200-33	0.0346	33	0.346	1.18	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	0.0451	33	0.451	1.53	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	0.0566	33	0.565	1.92	3.145	1.015	2.359	0.203	0.6	2.759	0.759	15	2728	0.604	1.381	-1.038	0.649	2.646	0.846
600T200-54	0.0566	50	0.565	1.92	3.145	1.015	2.359	0.203	0.6	2.641	0.717	21.48	2728	0.604	1.381	-1.038	0.649	2.646	0.846

For SI: 1 inch = 25.4 mm; 1 lb/ft = 14.5939 N/m; 1 kip-in = 12.8 N-m; 1 ksi = 6.89 Mpa

¹ See Page 2 for definitions of symbols.

² Web height-to-thickness ratio (h/t) exceeds 200. Web stiffeners are required at all supports and concentrated loads.

³ For deflection calculations, use the effective moment of inertia.

TABLE 5—U-CHANNEL SECTION PROPERTIES^{1,2}

Member Designation	Design Thickness (in)	Minimum Thickness (in)	F _y (ksi)	Area (in ²)	I _x (in ⁴)	R _x (in)	I _y (in ⁴)	R _y (in)	I _{ex} (in ⁴)	S _{ex} (in ³)	M _a (k-in)	V _a (lbs)
150U050-54	0.0566	0.0538	33	0.130	0.039	0.549	0.003	0.146	0.039	0.0		

TABLE 6—(HAT) FURRING CHANNEL SECTION PROPERTIES^{1,2}

Member Designation	Design Thickness (in)	Minimum Thickness (in)	F _y (ksi)	Area (in ²)	I _x (in ⁴)	R _x (in)	I _y (in ⁴)	R _y (in)	I _{ex} (in ⁴)	S _{ex} (in ³)	M _a (k-in)
087F125-18	0.0188	0.0179	33	0.072	0.009	0.354	0.035	0.698	0.008	0.016	0.319
087F125-27	0.0283	0.0269	33	0.107	0.013	0.351	0.051	0.693	0.013	0.027	0.542
087F125-30	0.0312	0.0296	33	0.118	0.014	0.350	0.056	0.691	0.014	0.031	0.612
087F125-33	0.0346	0.0329	33	0.130	0.016	0.349	0.062	0.689	0.016	0.034	0.675
087F125-43	0.0451	0.0428	33	0.168	0.020	0.345	0.079	0.684	0.020	0.043	0.852

For **S1**: 1 inch = 25.4 mm; 1 lb = 4.448 N; 1 kip-in = 12.8 N-m; 1 ksi = 6.89 Mpa

¹ See Page 2 for definitions of symbols.

² Unbraced length, L_u, is equal to 0.

TABLE 7—ALLOWABLE WEB CRIPPLING LOAD (lbs) – 50 ksi C-SECTION MEMBERS (SINGLE)^{1, 2, 3, 4, 5}

Section	F _y (ksi)	Inside R (in)	t (in)	Condition 1				Condition 2				Condition 3				Condition 4			
				1 in	3.5 in	4 in	6 in	1 in	3.5 in	4 in	6 in	1 in	3.5 in	4 in	6 in	1 in	3.5 in	4 in	6 in
250S125-54	50	0.0849	0.0566	656	996	1046	1222	1350	1785	1850	2075	652	842	870	968	1730	2109	2165	2361
250S137-54	50	0.0849	0.0566	656	996	1046	1222	1350	1785	1850	2075	652	842	870	968	1730	2109	2165	2361
250S162-54	50	0.0849	0.0566	656	996	1046	1222	1350	1785	1850	2075	652	842	870	968	1730	2109	2165	2361
350S125-54	50	0.0849	0.0566	637	967	1016	1186	1331	1761	1825	2046	594	768	794	883	1645	2005	2059	2245
350S162-54	50	0.0849	0.0566	637	967	1016	1186	1331	1761	1825	2046	594	768	794	883	1645	2005	2059	2245
350S200-54	50	0.0849	0.0566	637	967	1016	1186	1331	1761	1825	2046	594	768	794	883	1645	2005	2059	2245
362S125-54	50	0.0849	0.0566	634	963	1012	1182	1329	1758	1822	2043	588	760	785	874	1635	1994	2047	2232
362S137-54	50	0.0849	0.0566	634	963	1012	1182	1329	1758	1822	2043	588	760	785	874	1635	1994	2047	2232
362S162-54	50	0.0849	0.0566	634	963	1012	1182	1329	1758	1822	2043	588	760	785	874	1635	1994	2047	2232
362S200-54	50	0.0849	0.0566	634	963	1012	1182	1329	1758	1822	2043	588	760	785	874	1635	1994	2047	2232
400S125-54	50	0.0849	0.0566	628	954	1002	1170	1323	1750	1813	2034	569	735	760	846	1607	1960	2012	2194
400S137-54	50	0.0849	0.0566	628	954	1002	1170	1323	1750	1813	2034	569	735	760	846	1607	1960	2012	2194
400S162-54	50	0.0849	0.0566	628	954	1002	1170	1323	1750	1813	2034	569	735	760	846	1607	1960	2012	2194
400S200-54	50	0.0849	0.0566	628	954	1002	1170	1323	1750	1813	2034	569	735	760	846	1607	1960	2012	2194
550S125-54	50	0.0849	0.0566	606	920	966	1128	1302	1722	1784	2001	502	649	671	746	1508	1838	1887	2058
550S162-54	50	0.0849	0.0566	606	920	966	1128	1302	1722	1784	2001	502	649	671	746	1508	1838	1887	2058
550S200-54	50	0.0849	0.0566	606	920	966	1128	1302	1722	1784	2001	502	649	671	746	1508	1838	1887	2058
600S125-54	50	0.0849	0.0566	599	909	956	1116	1295	1713	1775	1991	482	623	644	716	1478	1802	1850	2017
600S137-54	50	0.0849	0.0566	599	909	956	1116	1295	1713	1775	1991	482	623	644	716	1478	1802	1850	2017
600S162-54	50	0.0849	0.0566	599	909	956	1116	1295	1713	1775	1991	482	623	644	716	1478	1802	1850	2017
600S200-54	50	0.0849	0.0566	599	909	956	1116	1295	1713	1775	1991	482	623	644	716	1478	1802	1850	2017

For **S1**: 1 inch = 25.4 mm; 1 lb = 4.448 N; 1 ksi = 6.89 Mpa

¹ For multiple members, multiply the listed capacity of a single member by the number of members in the assembly.

² Values shown are for unpunched and punched members. For punched members, the clear distance between the edge of bearing and the edge of punch-out must be at least two times the depth of the web to a maximum of 10 inches.

³ Conditions for Bearing Length based on minimum bearing widths of 1 inch; 3.5 inches, 4 inches and 6 inches:

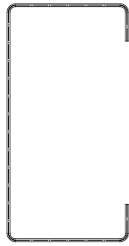
- Condition 1 - End Reaction - One Flange Loading
- Condition 2 - Interior Reaction - One Flange Loading
- Condition 3 - End Reaction - Two Flange Loading
- Condition 4 - Interior Reaction - Two Flange Loading

⁴ As defined by AISI S100:

- One-flange loading or reaction is defined as the condition where the clear distance between the bearing edges of adjacent opposite concentrated loads or reactions is equal to or greater than 1.5h.
- Two-flange loading or reaction is defined as the condition where the clear distance between the bearing edges of adjacent opposite concentrated loads or reactions is less than 1.5h.
- End loading or reaction is defined as the condition where the distance from the edge of the bearing to the end of the member is equal to or less than 1.5h.
- Interior loading or reaction is defined as the condition where the distance from the edge of the bearing to the end of the member is greater than 1.5h, except as noted in AISI S100 Chapter G (Chapter C for AISI S100-12).

⁵ For 33 ksi members, multiply the tabulated values by 0.66.

PUNCH-OUT DIMENSION FOR C-SECTION SIZES:



Member Size	Punch-out Dimension (inch x inch)
162S	0.75 x 1.75 or 0.75 x 2.26
250S	1.40 x 2.26
350S	1.40 x 2.26
362S	1.50 x 2.26
400S	1.50 x 2.26
550S	1.50 x 2.26
600S	1.50 x 2.26

For SI: 1 inch = 25.4 mm

C-SECTION PROFILE WITH PUNCH-OUT DIMENSIONS



TRACK



U-CHANNEL



(HAT) FURRING CHANNEL

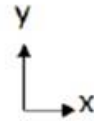


FIGURE 1—COLD-FORMED STEEL MEMBER PROFILES

DIVISION: 05 00 00—METALS

Section: 05 40 00—Cold-Formed Metal Framing

Section: 05 41 00—Structural Metal Stud Framing

DIVISION: 09 00 00—FINISHES

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

REPORT HOLDER:

SUNSHA INTERNATIONAL LLC

EVALUATION SUBJECT:

COLD-FORMED STEEL FRAMING MEMBERS

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the cold-formed steel framing members, described in ICC-ES evaluation report [ESR-4135](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2023 *City of Los Angeles Building Code* ([LABC](#))
- 2023 *City of Los Angeles Residential Code* ([LARC](#))

2.0 CONCLUSIONS

The cold-formed steel framing members, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4135](#), comply with the LABC Chapter 22, and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The cold-formed steel framing members described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4135](#).
- The design, installation, conditions of use and identification of the cold-formed steel framing members are in accordance with the 2021 *International Building Code*® (IBC) and 2021 *International Residential Code*® (IRC) provisions, as applicable, noted in the evaluation report [ESR-4135](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16, 17 and 22, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued June 2024 and revised October 2024.

DIVISION: 05 00 00—METALS

Section: 05 40 00—Cold-formed Metal Framing

Section: 05 41 00—Structural Metal Stud Framing

DIVISION: 09 00 00—FINISHES

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

REPORT HOLDER:

SUNSHA INTERNATIONAL LLC

EVALUATION SUBJECT:

COLD-FORMED STEEL FRAMING MEMBERS

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that cold-formed steel framing members, described in ICC-ES evaluation report ESR-4135, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2022 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see section 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)

2.0 CONCLUSIONS**2.1 CBC:**

The cold-formed steel framing members, described in Sections 2.0 through 7.0 of the evaluation report ESR-4135, comply with CBC Chapter 22, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 22, as applicable.

2.1.1 OHSPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The cold-formed steel framing members, described in Sections 2.0 through 7.0 of the evaluation report ESR-4135, comply with the CRC, provided the design and installation are in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued June 2024 and revised October 2024.

DIVISION: 05 00 00—METALS

Section: 05 40 00—Cold-Formed Metal Framing

Section: 05 41 00—Structural Metal Stud Framing

DIVISION: 09 00 00—FINISHES

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

REPORT HOLDER:

SUNSHA INTERNATIONAL LLC

EVALUATION SUBJECT:

COLD-FORMED STEEL FRAMING MEMBERS

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the cold-formed steel framing members, described in ICC-ES evaluation report [ESR-4135](#), have also been evaluated for compliance with the Chicago Construction Codes (Title 14 of the Chicago Municipal Code) as noted below.

Applicable code editions:

- 2019 *Chicago Building Code* (Title 14B with Revised April 2022 Supplement)

2.0 CONCLUSIONS

The cold-formed steel framing members, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4135](#), comply with Title 14B, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The cold-formed steel framing members described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4135](#).
- The design, installation, conditions of use and identification of the cold-formed steel framing members are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-4135](#).
- The design, installation and inspection are in accordance with additional requirements of Chapters 16, 17 and 22 of Title 14B, as applicable.

This supplement expires concurrently with the evaluation report, reissued June 2024 and revised October 2024.