ICC-ES Evaluation Report

ESR-4114

Reissued July 2024

This report also contains:

- CBC Supplement

Subject to renewal July 2025

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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 16.13—Non-Structural Metal Stud Framing**	**REPORT HOLDER:** **PINNACLELGS INC.**	**EVALUATION SUBJECT:** **PINNACLELGS COLD-FORMED STEEL FRAMING**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

■ 2021, 2018, 2015, and 2012 *International Building Code*® (IBC)

For evaluation of compliance with codes 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 Architects (DSA), see the ESR-4114 CBC Supplement.

Property evaluated:

■ Structural

2.0 USES

The framing members with a minimum G40 coating are used only as nonstructural members as defined by the North American Standard for Cold-Formed Steel Nonstructural Framing (AISI S220).

The framing members with a minimum G60 coating are used as structural members as defined by the North American Standard for Cold-Formed Steel Structural Framing (AISI S240) and may also be used as nonstructural members.

3.0 DESCRIPTION

The designations and dimensions of studs and tracks are provided in Table 1. Figure 1 includes profiles of the studs and tracks. Figure 2 includes profiles, designations, and dimensions of the hats.

The studs are manufactured with and without web punch-outs. When provided, the punch-outs have a width of 1 1/2 inches (38 mm) and a length of 4 inches (102 mm) in members with a depth of 3 1/2 inches (89 mm) or greater. In members with a depth smaller than 3 1/2 inches (89 mm), punch-outs have a width of 3/4 inch (19 mm) and a length of 4 inches (102 mm). The punch-outs are spaced a minimum of 24 inches (610 mm) on center and have a minimum distance between the end of the member and the near edge of the punch-out of 10 inches (254 mm).

The stud, track, and hat sections are cold-formed from steel coils conforming to ASTM A653 SS Grade 50 Class 1 with a minimum G40 or G60 galvanized coating or ASTM A1003 Structural Grade 50 Type H (ST50H).

4.0 DESIGN AND INSTALLATION

4.1 Design:

The structural properties are provided in Tables 2, 3, and 5. The web crippling capacities for the studs are provided in Table 4. These values have been determined in accordance with the North American Specification for the Design of Cold-Formed Steel Structural Members (AISI S100). However, additional design considerations per AISI S100 must be considered, such as the design of flexural members must address combined bending and web crippling, and combined bending and shear.

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 installation.

5.0 CONDITIONS OF USE:

The framing members described in this report comply with, or are 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 cold-formed steel 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 cold formed steel members as delivered to the jobsite must be at least 95 percent of the design base-metal thickness.

5.3 Complete plans and calculations verifying compliance with this report must be submitted to the code official for each project at the time of permit application. The calculations and drawings 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.

5.4 The framing members are manufactured in New Taipei, Taiwan.

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 December).

7.0 IDENTIFICATION

7.1 Product labeling shall include, the name of the report holder or listee, and the ICC-ES mark of conformity. The listing or evaluation report number (ICC-ES ESR-4114) may be used in lieu of the mark of conformity. At a spacing not exceeding 96 inches (2440 mm) on center, each cold-formed steel member is stamped, stenciled, or embossed with the company name or initials; the acronym “ICC-ES”; the evaluation report number (ESR-4114); the minimum uncoated base-metal thickness in mils or decimal inches; the minimum specified yield strength; in addition to the following:

- For nonstructural members, each member must have the designation “NS”;
- For structural members, a designation for the coating (minimum G60).

7.2 The report holder’s contact information is the following:

PINNACLELGS INC.
1636 240TH STREET
HARBOR CITY, CALIFORNIA 90710
(310) 534-3300
www.pinnaclelgs.com

Definition of Symbols

Gross Properties
I_{xx} = Moment of inertia about the x-axis.
R_x = Strong axis radius of gyration.
I_{yy} = Weak axis moment of inertia.
R_y = Weak axis radius of gyration.

Torsional and Other Properties
J = St. Venant torsion constant.
C_w = Warping constant.
X_o = Distance from shear center to neutral axis.
R_o = Radii of gyration.
β = Torsional flexural constant.
L_u = Critical unbraced length for lateral-torsional buckling. Moments are considered fully braced when unbraced length is less than Lu.

Effective Properties:
I_{xx} = Effective moment of inertia about the x-axis.
S_{xx} = Effective section modulus about the x-axis.
$M_{a\text{-}L}$ = Allowable moment based on local buckling.
$M_{a\text{-}D}$ = Allowable moment based on distorsional buckling.
V_{ag} = Allowable strong axis shear away from punch-out.
V_{net} = Allowable strong axis shear at the punch-out.

TABLE 1 – STUD AND TRACK PHYSICAL PROPERITES[1]

STUD DESIGNATION	TRACK DESIGNATION	MILS	DESIGN BASE STEEL THICKNESS (in.)	FLANGE (in.)	LIP[2] (in.)	INTERNAL CORNER RADII (in.)
---	XXXT150-33	33	0.0346	1.50	---	0.090
---	XXXT150-43	43	0.0451	1.50	---	0.090
---	XXXT150-54	54	0.0566	1.50	---	0.090
---	XXXT150-68	68	0.0713	1.50	---	0.090
---	XXXT150-97	97	0.1017	1.50	---	0.110
---	XXXT150-118	118	0.1242	1.50	---	0.110
---	XXXT150-142	142	0.1495	1.50	---	0.110
---	XXXT150-156	156	0.1644	1.50	---	0.110
---	XXXT150-170	170	0.1793	1.50	---	0.110
---	XXXT150-185	185	0.1943	1.50	---	0.110
XXXS162-33	XXXT162-33	33	0.0346	1.625	0.500	0.090
XXXS162-43	XXXT162-43	43	0.0451	1.625	0.500	0.090
XXXS162-54	XXXT162-54	54	0.0566	1.625	0.500	0.090
XXXS162-68	XXXT162-68	68	0.0713	1.625	0.500	0.090
XXXS162-97	XXXT162-97	97	0.1017	1.625	0.500	0.110
XXXS162-118	XXXT162-118	118	0.1242	1.625	0.500	0.110
XXXS162-142	XXXT162-142	142	0.1495	1.625	0.500	0.110
XXXS162-156	XXXT162-156	156	0.1644	1.625	0.500	0.110
XXXS162-170	XXXT162-170	170	0.1793	1.625	0.500	0.110
XXXS162-185	XXXT162-185	185	0.1943	1.625	0.500	0.110
XXXS200-33	XXXT200-33	33	0.0346	2.00	0.625	0.090
XXXS200-43	XXXT200-43	43	0.0451	2.00	0.625	0.090
XXXS200-54	XXXT200-54	54	0.0566	2.00	0.625	0.090
XXXS200-68	XXXT200-68	68	0.0713	2.00	0.625	0.090
XXXS200-97	XXXT200-97	97	0.1017	2.00	0.625	0.110
XXXS200-118	XXXT200-118	118	0.1242	2.00	0.625	0.110
XXXS200-142	XXXT200-142	142	0.1495	2.00	0.625	0.110

TABLE 1 – STUD AND TRACK PHYSICAL PROPERITES[1]

STUD DESIGNATION	TRACK DESIGNATION	MILS	DESIGN BASE STEEL THICKNESS (in.)	FLANGE (in.)	LIP[2] (in.)	INTERNAL CORNER RADII (in.)
XXXS200-156	XXXT200-156	156	0.1644	2.00	0.625	0.110
XXXS200-170	XXXT200-170	170	0.1793	2.00	0.625	0.110
XXXS200-185	XXXT200-185	185	0.1943	2.00	0.625	0.110
XXXS250-33	XXXT250-33	33	0.0346	2.50	0.625	0.090
XXXS250-43	XXXT250-43	43	0.0451	2.50	0.625	0.090
XXXS250-54	XXXT250-54	54	0.0566	2.50	0.625	0.090
XXXS250-68	XXXT250-68	68	0.0713	2.50	0.625	0.090
XXXS250-97	XXXT250-97	97	0.1017	2.50	0.625	0.110
XXXS250-118	XXXT250-118	118	0.1242	2.50	0.625	0.110
XXXS250-142	XXXT250-142	142	0.1495	2.50	0.625	0.110
XXXS250-156	XXXT250-156	156	0.1644	2.50	0.625	0.110
XXXS250-170	XXXT250-170	170	0.1793	2.50	0.625	0.110
XXXS250-185	XXXT250-185	185	0.1943	2.50	0.625	0.110
XXXS300-33	XXXT300-33	33	0.0346	3.00	0.625	0.090
XXXS300-43	XXXT300-43	43	0.0451	3.00	0.625	0.090
XXXS300-54	XXXT300-54	54	0.0566	3.00	0.625	0.090
XXXS300-68	XXXT300-68	68	0.0713	3.00	0.625	0.090
XXXS300-97	XXXT300-97	97	0.1017	3.00	0.625	0.110
XXXS300-118	XXXT300-118	118	0.1242	3.00	0.625	0.110
XXXS300-142	XXXT300-142	142	0.1495	3.00	0.625	0.110
XXXS300-156	XXXT300-156	156	0.1644	3.00	0.625	0.110
XXXS300-170	XXXT300-170	170	0.1793	3.00	0.625	0.110
XXXS300-185	XXXT300-185	185	0.1943	3.00	0.625	0.110

For **SI:** 1 lbf = 4.448 N, 1 kip = 4448 N, 1 inch = 25.4 mm, 1 lb/lin ft = 14.5939 N/m, 1 inch-kip = 12.8 N-m

[1]XXX = Overall depth in 100's of an inch. For example: 200 = 2.00 inches; 362 = 3.625 inches; and 1000 = 10.0 inches.

[2]For Tracks at location 2 (see Figure 1), there are no lips.

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
200S162-33	0.205	0.70	0.141	0.141	0.829	0.079	0.622	0.141	0.118	294.2	291.7	1136	304	0.082	0.100	-1.556	0.895	1.869	0.307	36.8
200S162-43	0.265	0.90	0.180	0.180	0.824	0.101	0.617	0.180	0.160	400.0	405.8	1463	294	0.180	0.126	-1.543	0.888	1.855	0.308	36.9
200S162-54	0.329	1.12	0.221	0.221	0.819	0.123	0.612	0.221	0.213	532.5	532.5	1811	284	0.352	0.152	-1.530	0.880	1.840	0.309	37.1
200S200-33	0.240	0.82	0.168	0.168	0.836	0.141	0.767	0.160	0.132	329.2	338.3	1136	304	0.096	0.216	-2.019	1.143	2.316	0.240	47.2
200S200-43	0.310	1.06	0.214	0.214	0.831	0.180	0.762	0.214	0.185	460.8	472.5	1463	294	0.210	0.273	-2.007	1.136	2.302	0.240	47.3
200S200-54	0.386	1.31	0.264	0.264	0.826	0.221	0.757	0.264	0.238	595.0	623.3	1811	284	0.412	0.331	-1.993	1.128	2.286	0.240	47.6
250S162-33	0.222	0.76	0.234	0.187	1.026	0.086	0.623	0.234	0.163	405.8	374.2	1260	506	0.089	0.146	-1.469	0.859	1.897	0.400	35.7
250S162-43	0.288	0.98	0.300	0.240	1.021	0.110	0.618	0.300	0.217	541.7	525.0	1886	573	0.195	0.184	-1.456	0.852	1.883	0.402	35.7
250S162-54	0.358	1.22	0.369	0.295	1.016	0.134	0.613	0.369	0.288	717.5	694.2	2342	558	0.382	0.223	-1.443	0.845	1.868	0.403	35.8
250S200-33	0.257	0.87	0.277	0.222	1.039	0.153	0.772	0.265	0.182	455.0	432.5	1260	506	0.103	0.302	-1.925	1.108	2.320	0.311	45.4
250S200-43	0.333	1.13	0.356	0.285	1.034	0.196	0.768	0.356	0.250	624.2	607.5	1886	573	0.226	0.382	-1.913	1.101	2.306	0.312	45.4
250S200-54	0.414	1.41	0.439	0.351	1.029	0.241	0.762	0.439	0.321	800.0	806.7	2342	558	0.442	0.464	-1.899	1.093	2.291	0.313	45.5
300S162-33	0.240	0.82	0.355	0.237	1.217	0.092	0.621	0.355	0.189	471.7	458.3	1260	422	0.096	0.205	-1.392	0.826	1.950	0.491	35.1
300S162-43	0.310	1.06	0.455	0.304	1.212	0.118	0.616	0.455	0.259	646.7	646.7	2141	540	0.210	0.259	-1.379	0.819	1.937	0.493	35.0
300S162-54	0.386	1.31	0.562	0.375	1.206	0.144	0.610	0.562	0.352	879.2	860.8	2873	567	0.412	0.314	-1.366	0.812	1.922	0.495	35.0
300S162-68	0.481	1.64	0.692	0.461	1.199	0.175	0.603	0.692	0.448	1117.5	1095.0	3579	547	0.815	0.378	-1.349	0.802	1.903	0.498	35.0
300S162-97	0.668	2.27	0.934	0.623	1.183	0.230	0.587	0.934	0.604	1506.7	1506.7	4913	482	2.303	0.492	-1.312	0.782	1.861	0.503	35.4
300S162-118	0.802	2.73	1.101	0.734	1.172	0.266	0.576	1.101	0.711	1773.3	1773.3	5895	453	4.124	0.561	-1.285	0.767	1.832	0.508	35.9
300S162-142	0.947	3.22	1.273	0.848	1.159	0.301	0.564	1.273	0.820	2046.7	2046.7	6955	423	7.056	0.623	-1.255	0.751	1.799	0.513	36.8
300S162-156	1.030	3.50	1.366	0.911	1.152	0.319	0.557	1.366	0.880	2195.0	2195.0	7556	405	9.275	0.654	-1.238	0.741	1.780	0.517	37.4
300S162-170	1.110	3.78	1.454	0.969	1.144	0.335	0.550	1.454	0.936	2334.2	2334.2	8140	387	11.894	0.680	-1.220	0.731	1.761	0.520	38.2
300S162-185	1.189	4.04	1.536	1.024	1.137	0.349	0.542	1.536	0.988	2465.0	2465.0	8712	370	14.957	0.702	-1.203	0.721	1.741	0.523	39.0
300S200-33	0.274	0.93	0.420	0.280	1.237	0.164	0.774	0.405	0.213	530.8	528.3	1260	422	0.109	0.409	-1.838	1.072	2.347	0.386	44.3
300S200-43	0.355	1.21	0.539	0.359	1.232	0.210	0.769	0.539	0.300	748.3	746.7	2141	540	0.241	0.519	-1.826	1.065	2.333	0.388	44.3
300S200-54	0.443	1.51	0.666	0.444	1.227	0.258	0.764	0.666	0.391	974.2	995.8	2873	567	0.473	0.633	-1.812	1.058	2.318	0.389	44.3
300S200-68	0.553	1.88	0.822	0.548	1.220	0.316	0.757	0.822	0.523	1304.2	1299.2	3579	547	0.936	0.767	-1.795	1.048	2.298	0.390	44.4
300S200-97	0.770	2.62	1.117	0.745	1.205	0.423	0.741	1.117	0.725	1810.0	1810.0	4913	482	2.653	1.010	-1.757	1.028	2.256	0.393	44.9
300S200-118	0.926	3.15	1.321	0.881	1.194	0.494	0.731	1.321	0.857	2139.2	2139.2	5895	453	4.763	1.161	-1.731	1.013	2.226	0.396	45.6

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
300S200-142	1.097	3.73	1.533	1.022	1.183	0.566	0.719	1.533	0.994	2480.8	2480.8	6955	423	8.169	1.305	-1.700	0.996	2.192	0.398	46.7
300S200-156	1.194	4.06	1.650	1.100	1.176	0.605	0.712	1.650	1.069	2667.5	2667.5	7556	405	10.756	1.378	-1.683	0.986	2.173	0.400	47.5
300S200-170	1.289	4.39	1.761	1.174	1.169	0.640	0.705	1.761	1.140	2845.0	2845.0	8140	387	13.815	1.442	-1.665	0.976	2.153	0.402	48.5
300S200-185	1.383	4.71	1.866	1.244	1.162	0.673	0.697	1.866	1.208	3012.5	3012.5	8712	370	17.402	1.499	-1.647	0.966	2.133	0.404	49.5
350S162-33	0.257	0.87	0.506	0.289	1.403	0.097	0.616	0.506	0.225	561.7	545.0	1134	531	0.103	0.277	-1.323	0.796	2.025	0.573	34.7
350S162-43	0.333	1.13	0.650	0.371	1.398	0.124	0.611	0.650	0.310	774.2	771.7	2141	760	0.226	0.350	-1.311	0.789	2.012	0.575	34.6
350S162-54	0.414	1.41	0.803	0.459	1.392	0.152	0.605	0.803	0.425	1060.8	1032.5	3372	941	0.442	0.426	-1.298	0.782	1.997	0.578	34.5
350S162-68	0.517	1.76	0.991	0.566	1.385	0.185	0.598	0.991	0.552	1377.5	1354.2	4248	925	0.876	0.514	-1.281	0.772	1.979	0.581	34.4
350S162-97	0.719	2.45	1.344	0.768	1.367	0.244	0.582	1.344	0.751	1875.0	1875.0	5867	842	2.478	0.672	-1.244	0.752	1.938	0.588	34.6
350S162-118	0.864	2.94	1.588	0.908	1.356	0.282	0.571	1.588	0.888	2215.0	2215.0	7060	806	4.443	0.769	-1.218	0.738	1.910	0.593	34.8
350S162-142	1.022	3.48	1.842	1.053	1.343	0.319	0.559	1.842	1.029	2566.7	2566.7	8356	766	7.613	0.859	-1.189	0.721	1.879	0.599	35.3
350S162-156	1.112	3.78	1.981	1.132	1.335	0.338	0.551	1.981	1.106	2759.2	2759.2	9097	744	10.016	0.903	-1.172	0.712	1.860	0.603	35.7
350S162-170	1.200	4.08	2.113	1.208	1.327	0.355	0.544	2.113	1.179	2940.8	2940.8	9821	721	12.854	0.942	-1.155	0.702	1.841	0.607	36.1
350S162-185	1.286	4.38	2.238	1.279	1.319	0.370	0.537	2.238	1.248	3113.3	3113.3	10534	698	16.180	0.975	-1.137	0.692	1.823	0.611	36.7
350S200-33	0.292	0.99	0.596	0.341	1.430	0.174	0.772	0.578	0.253	632.5	625.0	1134	531	0.116	0.541	-1.759	1.039	2.394	0.460	43.6
350S200-43	0.378	1.29	0.767	0.438	1.425	0.222	0.767	0.767	0.360	897.5	887.5	2141	760	0.256	0.687	-1.747	1.032	2.381	0.462	43.5
350S200-54	0.471	1.60	0.949	0.542	1.419	0.273	0.762	0.949	0.470	1173.3	1188.3	3372	941	0.503	0.838	-1.733	1.024	2.366	0.463	43.5
350S200-68	0.588	2.00	1.173	0.670	1.412	0.335	0.755	1.173	0.640	1597.5	1585.0	4248	925	0.997	1.018	-1.716	1.014	2.347	0.466	43.5
350S200-97	0.820	2.79	1.600	0.914	1.396	0.448	0.739	1.600	0.898	2240.0	2240.0	5867	842	2.829	1.347	-1.679	0.994	2.305	0.470	43.8
350S200-118	0.988	3.36	1.898	1.084	1.386	0.524	0.728	1.898	1.064	2655.8	2655.8	7060	806	5.082	1.554	-1.652	0.979	2.276	0.473	44.1
350S200-142	1.171	3.99	2.210	1.263	1.374	0.601	0.716	2.210	1.239	3090.8	3090.8	8356	766	8.726	1.754	-1.622	0.963	2.243	0.477	44.8
350S200-156	1.276	4.34	2.382	1.361	1.366	0.642	0.709	2.382	1.335	3330.8	3330.8	9097	744	11.497	1.856	-1.605	0.953	2.224	0.479	45.3
350S200-170	1.379	4.69	2.547	1.456	1.359	0.680	0.702	2.547	1.427	3560.0	3560.0	9821	721	14.776	1.947	-1.587	0.943	2.204	0.482	45.9
350S200-185	1.480	5.04	2.705	1.546	1.352	0.715	0.695	2.705	1.514	3778.3	3778.3	10534	698	18.625	2.029	-1.569	0.933	2.185	0.484	46.6
362S162-33	0.261	0.89	0.548	0.303	1.449	0.099	0.615	0.548	0.234	584.2	566.7	1092	548	0.104	0.297	-1.308	0.789	2.046	0.592	34.6
362S162-43	0.338	1.15	0.705	0.389	1.443	0.126	0.610	0.705	0.323	805.8	803.3	2141	815	0.229	0.376	-1.295	0.782	2.033	0.594	34.5
362S162-54	0.421	1.43	0.871	0.481	1.438	0.154	0.604	0.871	0.443	1105.8	1075.8	3372	1010	0.450	0.457	-1.282	0.774	2.019	0.597	34.4
362S162-68	0.526	1.79	1.076	0.593	1.430	0.187	0.597	1.076	0.577	1439.2	1420.8	4415	1033	0.891	0.552	-1.265	0.765	2.001	0.600	34.3

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_{a-L}	M_{a-D}	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
362S162-97	0.731	2.49	1.460	0.805	1.413	0.247	0.581	1.460	0.790	1970.0	1970.0	6105	946	2.522	0.723	-1.229	0.745	1.960	0.607	34.4
362S162-118	0.880	2.99	1.727	0.953	1.401	0.285	0.570	1.727	0.933	2329.2	2329.2	7351	908	4.523	0.827	-1.203	0.731	1.933	0.612	34.6
362S162-142	1.040	3.54	2.004	1.106	1.388	0.323	0.557	2.004	1.083	2700.8	2700.8	8707	866	7.752	0.925	-1.174	0.714	1.901	0.619	35.0
362S162-156	1.132	3.85	2.157	1.190	1.380	0.342	0.550	2.157	1.164	2905.0	2905.0	9482	842	10.201	0.974	-1.157	0.705	1.883	0.623	35.3
362S162-170	1.222	4.16	2.301	1.270	1.372	0.360	0.542	2.301	1.242	3098.3	3098.3	10242	818	13.094	1.016	-1.140	0.695	1.864	0.626	35.7
362S162-185	1.310	4.46	2.438	1.345	1.364	0.375	0.535	2.438	1.315	3281.7	3281.7	10989	794	16.485	1.052	-1.122	0.686	1.846	0.630	36.2
362S200-33	0.296	1.01	0.646	0.356	1.477	0.176	0.771	0.626	0.264	657.5	650.0	1092	548	0.118	0.577	-1.740	1.030	2.409	0.478	43.5
362S200-43	0.383	1.30	0.831	0.458	1.472	0.225	0.766	0.831	0.374	934.2	923.3	2141	815	0.260	0.734	-1.728	1.024	2.396	0.480	43.4
362S200-54	0.478	1.63	1.028	0.567	1.467	0.277	0.761	1.028	0.490	1222.5	1237.5	3372	1010	0.510	0.896	-1.714	1.016	2.381	0.482	43.3
362S200-68	0.597	2.03	1.272	0.702	1.460	0.339	0.754	1.272	0.669	1668.3	1651.7	4415	1033	1.012	1.089	-1.697	1.006	2.362	0.484	43.3
362S200-97	0.833	2.83	1.736	0.958	1.444	0.454	0.738	1.736	0.942	2350.8	2350.8	6105	946	2.872	1.441	-1.660	0.986	2.321	0.488	43.5
362S200-118	1.004	3.42	2.061	1.137	1.433	0.531	0.728	2.061	1.118	2788.3	2788.3	7351	908	5.162	1.664	-1.634	0.971	2.292	0.492	43.9
362S200-142	1.190	4.05	2.401	1.325	1.421	0.609	0.715	2.401	1.302	3247.5	3247.5	8707	866	8.866	1.880	-1.604	0.955	2.259	0.496	44.4
362S200-156	1.297	4.41	2.590	1.429	1.413	0.651	0.708	2.590	1.404	3501.7	3501.7	9482	842	11.682	1.990	-1.586	0.945	2.240	0.498	44.9
362S200-170	1.401	4.77	2.770	1.528	1.406	0.689	0.701	2.770	1.501	3744.2	3744.2	10242	818	15.016	2.089	-1.569	0.935	2.220	0.501	45.4
362S200-185	1.504	5.12	2.943	1.624	1.399	0.724	0.694	2.943	1.594	3975.8	3975.8	10989	794	18.930	2.178	-1.551	0.925	2.201	0.503	46.1
400S162-33	0.274	0.93	0.689	0.344	1.585	0.102	0.610	0.689	0.261	650.8	632.5	983	592	0.109	0.363	-1.262	0.768	2.116	0.644	34.3
400S162-43	0.355	1.21	0.886	0.443	1.579	0.130	0.605	0.886	0.361	900.8	899.2	2141	980	0.241	0.460	-1.250	0.761	2.103	0.647	34.2
400S162-54	0.443	1.51	1.096	0.548	1.573	0.159	0.599	1.096	0.497	1240.8	1207.5	3372	1217	0.473	0.560	-1.237	0.754	2.089	0.649	34.1
400S162-68	0.553	1.88	1.354	0.677	1.566	0.194	0.592	1.354	0.651	1624.2	1614.2	4916	1390	0.936	0.677	-1.221	0.745	2.072	0.653	34.0
400S162-97	0.770	2.62	1.843	0.921	1.547	0.255	0.576	1.843	0.907	2263.3	2263.3	6820	1289	2.653	0.889	-1.185	0.725	2.032	0.660	34.0
400S162-118	0.926	3.15	2.184	1.092	1.535	0.295	0.565	2.184	1.074	2680.8	2680.8	8224	1246	4.763	1.020	-1.159	0.711	2.005	0.666	34.0
400S162-142	1.097	3.73	2.540	1.270	1.522	0.334	0.552	2.540	1.249	3115.8	3115.8	9758	1197	8.169	1.143	-1.131	0.695	1.975	0.672	34.3
400S162-156	1.194	4.06	2.736	1.368	1.514	0.354	0.545	2.736	1.345	3355.0	3355.0	10638	1169	10.756	1.204	-1.114	0.685	1.957	0.676	34.5
400S162-170	1.289	4.39	2.923	1.461	1.506	0.372	0.537	2.923	1.436	3583.3	3583.3	11502	1141	13.815	1.258	-1.097	0.676	1.939	0.680	34.8
400S162-185	1.383	4.71	3.101	1.550	1.497	0.388	0.530	3.101	1.523	3800.0	3800.0	12355	1114	17.402	1.305	-1.080	0.666	1.921	0.684	35.1
400S200-33	0.309	1.05	0.809	0.404	1.618	0.182	0.768	0.787	0.294	733.3	724.2	983	592	0.123	0.697	-1.687	1.007	2.461	0.530	43.1
400S200-43	0.400	1.36	1.042	0.521	1.613	0.233	0.763	1.042	0.419	1045.0	1030.8	2141	980	0.271	0.886	-1.675	1.000	2.447	0.532	43.0
400S200-54	0.499	1.70	1.290	0.645	1.607	0.287	0.758	1.290	0.549	1370.0	1385.0	3372	1217	0.533	1.083	-1.661	0.993	2.433	0.534	42.9

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
400S200-68	0.624	2.12	1.598	0.799	1.600	0.352	0.751	1.598	0.753	1878.3	1855.0	4916	1390	1.057	1.318	-1.644	0.983	2.414	0.536	42.9
400S200-97	0.871	2.96	2.185	1.093	1.584	0.471	0.735	2.185	1.078	2690.0	2690.0	6820	1289	3.004	1.749	-1.608	0.963	2.373	0.541	42.9
400S200-118	1.050	3.57	2.598	1.299	1.573	0.551	0.724	2.598	1.281	3196.7	3196.7	8224	1246	5.401	2.024	-1.581	0.948	2.345	0.545	43.1
400S200-142	1.246	4.24	3.032	1.516	1.560	0.632	0.712	3.032	1.495	3730.8	3730.8	9758	1197	9.283	2.292	-1.552	0.932	2.313	0.550	43.5
400S200-156	1.358	4.62	3.274	1.637	1.553	0.675	0.705	3.274	1.614	4027.5	4027.5	10638	1169	12.237	2.430	-1.534	0.922	2.294	0.553	43.8
400S200-170	1.468	5.00	3.506	1.753	1.545	0.715	0.698	3.506	1.728	4310.8	4310.8	11502	1141	15.736	2.554	-1.517	0.912	2.275	0.555	44.2
400S200-185	1.577	5.37	3.729	1.864	1.538	0.752	0.690	3.729	1.837	4583.3	4583.3	12355	1114	19.847	2.667	-1.500	0.903	2.256	0.558	44.7
500S162-33	0.309	1.05	1.160	0.464	1.938	0.110	0.595	1.160	0.403	1005.8	808.3	776	675	0.123	0.580	-1.158	0.719	2.335	0.754	33.8
500S162-43	0.400	1.36	1.494	0.598	1.932	0.140	0.590	1.494	0.547	1363.3	1158.3	1726	1145	0.271	0.737	-1.147	0.713	2.323	0.756	33.7
500S162-54	0.499	1.70	1.851	0.740	1.926	0.171	0.585	1.851	0.720	1795.0	1565.8	3372	1769	0.533	0.898	-1.134	0.705	2.310	0.759	33.5
500S162-68	0.624	2.12	2.293	0.917	1.917	0.208	0.578	2.293	0.917	2288.3	2111.7	5350	2208	1.057	1.090	-1.118	0.696	2.293	0.762	33.3
500S162-97	0.871	2.96	3.136	1.254	1.897	0.274	0.561	3.136	1.254	3130.0	3100.8	8727	2445	3.004	1.439	-1.083	0.677	2.256	0.769	33.1
500S162-118	1.050	3.57	3.729	1.492	1.884	0.317	0.550	3.729	1.492	3721.7	3686.7	10553	2385	5.401	1.657	-1.059	0.663	2.230	0.775	33.0
500S162-142	1.246	4.24	4.355	1.742	1.869	0.359	0.537	4.355	1.742	4345.8	4304.2	12561	2319	9.283	1.866	-1.032	0.648	2.202	0.780	32.9
500S162-156	1.358	4.62	4.703	1.881	1.861	0.381	0.529	4.703	1.881	4693.3	4647.5	13721	2281	12.237	1.972	-1.015	0.639	2.185	0.784	32.9
500S162-170	1.468	5.00	5.036	2.014	1.852	0.400	0.522	5.036	2.014	5025.8	4975.8	14864	2242	15.736	2.066	-0.999	0.629	2.168	0.788	33.0
500S162-185	1.577	5.37	5.357	2.143	1.843	0.417	0.514	5.357	2.143	5345.8	5291.7	15998	2204	19.847	2.149	-0.983	0.620	2.151	0.791	33.1
500S200-33	0.343	1.17	1.352	0.541	1.984	0.197	0.756	1.304	0.442	1103.3	923.3	776	675	0.137	1.088	-1.562	0.950	2.636	0.649	42.4
500S200-43	0.445	1.52	1.744	0.698	1.979	0.252	0.751	1.744	0.624	1555.8	1322.5	1726	1145	0.302	1.387	-1.550	0.944	2.623	0.651	42.3
500S200-54	0.556	1.89	2.163	0.865	1.973	0.309	0.746	2.163	0.792	1976.7	1788.3	3372	1769	0.594	1.698	-1.537	0.936	2.610	0.653	42.1
500S200-68	0.695	2.37	2.685	1.074	1.965	0.380	0.739	2.685	1.050	2619.2	2412.5	5350	2208	1.178	2.072	-1.520	0.927	2.592	0.656	42.0
500S200-97	0.973	3.31	3.689	1.476	1.947	0.508	0.723	3.689	1.476	3681.7	3651.7	8727	2445	3.354	2.765	-1.485	0.907	2.553	0.662	41.9
500S200-118	1.175	4.00	4.399	1.760	1.935	0.595	0.712	4.399	1.760	4390.8	4355.8	10553	2385	6.040	3.212	-1.459	0.893	2.526	0.666	41.8
500S200-142	1.396	4.75	5.155	2.062	1.922	0.683	0.700	5.155	2.062	5144.2	5102.5	12561	2319	10.397	3.653	-1.430	0.877	2.496	0.672	41.9
500S200-156	1.523	5.18	5.578	2.231	1.914	0.730	0.692	5.578	2.231	5566.7	5520.8	13721	2281	13.719	3.884	-1.414	0.867	2.478	0.675	42.0
500S200-170	1.648	5.61	5.986	2.394	1.906	0.773	0.685	5.986	2.394	5973.3	5923.3	14864	2242	17.658	4.095	-1.397	0.858	2.460	0.678	42.1
500S200-185	1.771	6.03	6.381	2.552	1.898	0.813	0.678	6.381	2.552	6367.5	6313.3	15998	2204	22.292	4.287	-1.380	0.848	2.442	0.681	42.3
550S162-33	0.326	1.11	1.452	0.528	2.110	0.113	0.588	1.452	0.441	1100.8	895.8	702	702	0.130	0.713	-1.113	0.697	2.457	0.795	33.6

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
550S162-43	0.423	1.44	1.872	0.681	2.104	0.144	0.583	1.872	0.624	1556.7	1287.5	1561	1195	0.287	0.905	-1.102	0.691	2.445	0.797	33.4
550S162-54	0.528	1.80	2.320	0.844	2.097	0.176	0.577	2.320	0.820	2046.7	1746.7	3099	1880	0.563	1.105	-1.089	0.684	2.433	0.800	33.3
550S162-68	0.659	2.24	2.877	1.046	2.089	0.214	0.570	2.877	1.046	2610.0	2365.0	5350	2555	1.117	1.342	-1.074	0.675	2.417	0.803	33.1
550S162-97	0.922	3.14	3.943	1.434	2.068	0.282	0.553	3.943	1.434	3577.5	3550.8	9680	3152	3.179	1.775	-1.040	0.656	2.380	0.809	32.7
550S162-118	1.113	3.79	4.695	1.707	2.054	0.327	0.542	4.695	1.707	4260.0	4228.3	11717	3085	5.721	2.047	-1.016	0.642	2.355	0.814	32.6
550S162-142	1.321	4.49	5.491	1.997	2.039	0.370	0.529	5.491	1.997	4982.5	4944.2	13962	3010	9.840	2.309	-0.989	0.627	2.327	0.819	32.4
550S162-156	1.441	4.90	5.936	2.158	2.030	0.392	0.522	5.936	2.158	5385.0	5343.3	15262	2967	12.978	2.442	-0.973	0.618	2.311	0.823	32.4
550S162-170	1.558	5.30	6.363	2.314	2.021	0.412	0.514	6.363	2.314	5772.5	5726.7	16545	2923	16.697	2.561	-0.957	0.609	2.294	0.826	32.3
550S162-185	1.674	5.70	6.774	2.463	2.011	0.429	0.506	6.774	2.463	6145.8	6096.7	17820	2880	21.070	2.667	-0.942	0.600	2.278	0.829	32.3
550S200-33	0.361	1.23	1.688	0.614	2.163	0.203	0.750	1.634	0.485	1210.8	1023.3	702	702	0.144	1.326	-1.507	0.925	2.740	0.698	42.2
550S200-43	0.468	1.59	2.178	0.792	2.157	0.259	0.745	2.178	0.710	1771.7	1470.0	1561	1195	0.317	1.691	-1.495	0.918	2.728	0.700	42.0
550S200-54	0.584	1.99	2.703	0.983	2.151	0.319	0.739	2.703	0.901	2248.3	1992.5	3099	1880	0.624	2.072	-1.482	0.911	2.715	0.702	41.9
550S200-68	0.731	2.49	3.356	1.220	2.143	0.392	0.732	3.356	1.193	2976.7	2696.7	5350	2555	1.238	2.531	-1.466	0.902	2.698	0.705	41.7
550S200-97	1.024	3.48	4.620	1.680	2.124	0.524	0.716	4.620	1.680	4191.7	4150.0	9680	3152	3.530	3.384	-1.431	0.882	2.659	0.711	41.5
550S200-118	1.237	4.21	5.517	2.006	2.112	0.614	0.705	5.517	2.006	5005.0	4973.3	11717	3085	6.359	3.937	-1.406	0.868	2.633	0.715	41.3
550S200-142	1.470	5.00	6.473	2.354	2.098	0.705	0.692	6.473	2.354	5872.5	5834.2	13962	3010	10.954	4.485	-1.378	0.852	2.604	0.720	41.3
550S200-156	1.605	5.46	7.010	2.549	2.090	0.753	0.685	7.010	2.549	6360.0	6318.3	15262	2967	14.459	4.773	-1.361	0.843	2.586	0.723	41.3
550S200-170	1.737	5.91	7.529	2.738	2.082	0.798	0.678	7.529	2.738	6830.8	6785.0	16545	2923	18.619	5.037	-1.345	0.833	2.569	0.726	41.4
550S200-185	1.869	6.36	8.032	2.921	2.073	0.839	0.670	8.032	2.921	7287.5	7238.3	17820	2880	23.515	5.279	-1.328	0.824	2.552	0.729	41.5
600S162-33	0.343	1.17	1.785	0.595	2.280	0.116	0.580	1.785	0.479	1195.8	981.7	641	641	0.137	0.861	-1.071	0.677	2.585	0.828	33.4
600S162-43	0.445	1.52	2.303	0.768	2.274	0.147	0.575	2.303	0.705	1760.0	1415.8	1425	1237	0.302	1.095	-1.060	0.670	2.574	0.830	33.2
600S162-54	0.556	1.89	2.856	0.952	2.267	0.180	0.569	2.856	0.926	2310.0	1927.5	2828	1946	0.594	1.337	-1.048	0.663	2.561	0.832	33.0
600S162-68	0.695	2.37	3.543	1.181	2.258	0.219	0.562	3.543	1.181	2946.7	2619.2	5350	2902	1.178	1.626	-1.033	0.655	2.546	0.835	32.8
600S162-97	0.973	3.31	4.865	1.622	2.236	0.289	0.545	4.865	1.622	4045.8	4022.5	10634	3947	3.354	2.153	-1.000	0.636	2.509	0.841	32.4
600S162-118	1.175	4.00	5.800	1.933	2.222	0.335	0.534	5.800	1.933	4824.2	4795.0	12882	3872	6.040	2.487	-0.976	0.623	2.485	0.846	32.2
600S162-142	1.396	4.75	6.793	2.264	2.206	0.379	0.521	6.793	2.264	5649.2	5614.2	15364	3788	10.397	2.809	-0.950	0.608	2.458	0.851	32.0
600S162-156	1.523	5.18	7.349	2.450	2.197	0.402	0.514	7.349	2.450	6111.7	6073.3	16803	3739	13.719	2.973	-0.935	0.599	2.442	0.853	31.9
600S162-170	1.648	5.61	7.884	2.628	2.187	0.422	0.506	7.884	2.628	6556.7	6515.0	18226	3691	17.658	3.121	-0.919	0.590	2.426	0.856	31.8
600S162-185	1.771	6.03	8.401	2.800	2.178	0.440	0.498	8.401	2.800	6986.7	6941.7	19642	3642	22.292	3.253	-0.904	0.581	2.410	0.859	31.8

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
600S200-33	0.378	1.29	2.068	0.689	2.339	0.208	0.742	2.010	0.529	1319.2	1123.3	641	641	0.151	1.593	-1.456	0.901	2.853	0.739	41.9
600S200-43	0.491	1.67	2.669	0.890	2.333	0.267	0.737	2.669	0.801	1997.5	1617.5	1425	1237	0.333	2.033	-1.445	0.894	2.841	0.741	41.8
600S200-54	0.612	2.08	3.315	1.105	2.326	0.328	0.732	3.315	1.015	2532.5	2198.3	2828	1946	0.654	2.493	-1.432	0.887	2.828	0.744	41.6
600S200-68	0.766	2.61	4.119	1.373	2.318	0.402	0.725	4.119	1.342	3349.2	2983.3	5350	2902	1.299	3.047	-1.416	0.878	2.812	0.746	41.4
600S200-97	1.075	3.66	5.679	1.893	2.299	0.539	0.708	5.679	1.893	4723.3	4660.0	10634	3947	3.705	4.080	-1.381	0.859	2.774	0.752	41.1
600S200-118	1.299	4.42	6.789	2.263	2.286	0.631	0.697	6.789	2.263	5645.8	5616.7	12882	3872	6.679	4.753	-1.357	0.845	2.748	0.756	40.9
600S200-142	1.545	5.26	7.974	2.658	2.272	0.724	0.685	7.974	2.658	6632.5	6597.5	15364	3788	11.511	5.423	-1.329	0.829	2.720	0.761	40.8
600S200-156	1.687	5.74	8.643	2.881	2.263	0.774	0.677	8.643	2.881	7188.3	7149.2	16803	3739	15.200	5.776	-1.313	0.820	2.703	0.764	40.8
600S200-170	1.827	6.22	9.289	3.096	2.255	0.820	0.670	9.289	3.096	7725.8	7683.3	18226	3691	19.579	6.100	-1.297	0.811	2.686	0.767	40.8
600S200-185	1.966	6.69	9.918	3.306	2.246	0.863	0.662	9.918	3.306	8248.3	8203.3	19642	3642	24.738	6.398	-1.280	0.801	2.669	0.770	40.8
800S162-33[1]	0.413	1.40	3.569	0.892	2.941	0.124	0.549	3.315	0.612	1527.5	1301.7	476		0.165	1.630	-0.935	0.607	3.134	0.911	32.6
800S162-43	0.536	1.82	4.610	1.153	2.934	0.159	0.544	4.409	0.871	2172.5	1901.7	1056	1056	0.363	2.076	-0.925	0.601	3.124	0.912	32.4
800S162-54	0.669	2.28	5.728	1.432	2.926	0.194	0.538	5.593	1.228	3065.0	2621.7	2094	2094	0.714	2.539	-0.914	0.594	3.112	0.914	32.1
800S162-68	0.838	2.85	7.123	1.781	2.916	0.236	0.531	7.099	1.668	4161.7	3617.5	4202	3371	1.420	3.093	-0.900	0.586	3.097	0.916	31.9
800S162-97	1.176	4.00	9.833	2.458	2.891	0.311	0.514	9.833	2.458	6133.3	5809.2	10885	6022	4.056	4.114	-0.869	0.568	3.062	0.919	31.3
800S162-118	1.423	4.84	11.766	2.941	2.875	0.360	0.503	11.766	2.941	7339.2	7317.5	16235	7300	7.317	4.766	-0.848	0.556	3.040	0.922	31.0
800S162-142	1.695	5.77	13.837	3.459	2.858	0.408	0.491	13.837	3.459	8630.8	8605.0	20970	7768	12.625	5.403	-0.824	0.541	3.014	0.925	30.6
800S162-156	1.852	6.30	15.007	3.752	2.847	0.432	0.483	15.007	3.752	9360.8	9331.7	22968	7699	16.681	5.732	-0.809	0.533	2.999	0.927	30.4
800S162-170	2.006	6.83	16.140	4.035	2.836	0.454	0.476	16.140	4.035	10067.5	10035.8	24950	7629	21.501	6.029	-0.795	0.525	2.984	0.929	30.2
800S162-185	2.160	7.35	17.245	4.311	2.825	0.473	0.468	17.245	4.311	10756.7	10722.5	26928	7560	27.183	6.297	-0.781	0.516	2.969	0.931	30.0
800S200-33[1]	0.447	1.52	4.083	1.021	3.021	0.226	0.711	3.930	0.703	1753.3	1510.0	476		0.178	2.971	-1.287	0.817	3.360	0.853	41.1
800S200-43	0.581	1.98	5.278	1.320	3.015	0.290	0.706	5.278	1.061	2647.5	2193.3	1056	1056	0.394	3.797	-1.276	0.811	3.349	0.855	40.9
800S200-54	0.726	2.47	6.565	1.641	3.008	0.356	0.701	6.565	1.501	3744.2	3010.0	2094	2094	0.775	4.663	-1.264	0.804	3.337	0.856	40.7
800S200-68	0.909	3.09	8.174	2.043	2.999	0.437	0.694	8.174	2.000	4989.2	4130.8	4202	3371	1.540	5.712	-1.249	0.796	3.322	0.859	40.4
800S200-97	1.278	4.35	11.323	2.831	2.976	0.586	0.677	11.323	2.831	7062.5	6595.8	10885	6022	4.406	7.684	-1.217	0.777	3.286	0.863	40.0
800S200-118	1.547	5.26	13.577	3.394	2.962	0.686	0.666	13.577	3.394	8469.2	8446.7	16235	7300	7.956	8.981	-1.194	0.764	3.262	0.866	39.7
800S200-142	1.844	6.27	16.007	4.002	2.946	0.787	0.653	16.007	4.002	9984.2	9957.5	20970	7768	13.738	10.284	-1.168	0.749	3.236	0.870	39.4
800S200-156	2.016	6.86	17.385	4.346	2.937	0.841	0.646	17.385	4.346	10844.2	10815.0	22968	7699	18.162	10.979	-1.153	0.740	3.220	0.872	39.2
800S200-170	2.186	7.44	18.726	4.682	2.927	0.891	0.638	18.726	4.682	11680.8	11649.2	24950	7629	23.422	11.621	-1.138	0.732	3.205	0.874	39.0

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
800S200-185	2.354	8.01	20.038	5.010	2.917	0.937	0.631	20.038	5.010	12499.2	12465.0	26928	7560	29.628	12.217	-1.123	0.723	3.189	0.876	38.9
1000S200-33[2]	0.516	1.76	6.993	1.399	3.680	0.240	0.681							0.206	4.876	-1.156	0.749	3.917	0.913	
1000S200-43[1]	0.671	2.28	9.049	1.810	3.672	0.307	0.676	8.421	1.265	3155.8	2720.8	839		0.455	6.236	-1.146	0.743	3.906	0.914	40.1
1000S200-54	0.839	2.85	11.266	2.253	3.665	0.377	0.670	10.759	1.707	4259.2	3766.7	1663	1663	0.896	7.665	-1.135	0.737	3.895	0.915	39.8
1000S200-68	1.052	3.58	14.046	2.809	3.655	0.463	0.663	13.707	2.423	6044.2	5224.2	3334	3334	1.782	9.401	-1.121	0.729	3.880	0.917	39.6
1000S200-97	1.481	5.04	19.523	3.905	3.630	0.620	0.647	19.523	3.764	9392.5	8513.3	9776	7189	5.108	12.679	-1.090	0.711	3.845	0.920	39.0
1000S200-118	1.796	6.11	23.460	4.692	3.615	0.725	0.636	23.460	4.692	11706.7	11125.0	16235	9721	9.233	14.848	-1.069	0.699	3.823	0.922	38.6
1000S200-142	2.143	7.29	27.727	5.545	3.597	0.832	0.623	27.727	5.545	13835.8	13815.0	23522	11627	15.966	17.038	-1.045	0.684	3.797	0.924	38.2
1000S200-156	2.345	7.98	30.160	6.032	3.586	0.889	0.616	30.160	6.032	15050.0	15026.7	28445	12738	21.124	18.211	-1.031	0.676	3.782	0.926	38.0
1000S200-170	2.544	8.66	32.535	6.507	3.576	0.942	0.608	32.535	6.507	16235.0	16210.0	31674	12957	27.265	19.300	-1.017	0.668	3.767	0.927	37.8
1000S200-185	2.743	9.33	34.867	6.973	3.565	0.991	0.601	34.867	6.973	17399.2	17371.7	34214	12867	34.518	20.315	-1.003	0.659	3.752	0.929	37.5
1000S250-33[2,3]	0.551	1.88	7.852	1.570	3.775	0.412	0.864							0.220	8.173	-1.527	0.971	4.162	0.865	
1000S250-43[1]	0.716	2.44	10.166	2.033	3.768	0.528	0.859	10.055	1.341	3345.0	2871.7	839		0.485	10.481	-1.516	0.965	4.151	0.867	49.3
1000S250-54	0.895	3.05	12.665	2.533	3.761	0.652	0.853	12.641	1.879	4689.2	3976.7	1663	1663	0.956	12.922	-1.504	0.958	4.139	0.868	49.1
1000S250-68	1.123	3.82	15.804	3.161	3.751	0.803	0.846	15.804	2.756	6875.0	5521.7	3334	3334	1.903	15.909	-1.489	0.950	4.124	0.870	48.8
1000S250-97	1.583	5.39	22.014	4.403	3.729	1.088	0.829	22.014	4.236	10568.3	9039.2	9776	7189	5.458	21.632	-1.457	0.932	4.088	0.873	48.3
1000S250-118	1.920	6.53	26.489	5.298	3.714	1.283	0.818	26.489	5.248	13093.3	11870.8	16235	9721	9.872	25.490	-1.434	0.918	4.065	0.876	48.0
1000S250-142	2.293	7.80	31.353	6.271	3.698	1.485	0.805	31.353	6.271	15645.0	15171.7	23522	11627	17.080	29.461	-1.408	0.903	4.038	0.878	47.6
1000S250-156	2.509	8.54	34.136	6.827	3.688	1.594	0.797	34.136	6.827	17034.2	17010.8	28445	12738	22.605	31.625	-1.393	0.895	4.022	0.880	47.4
1000S250-170	2.724	9.27	36.858	7.372	3.679	1.698	0.790	36.858	7.372	18392.5	18367.5	31674	12957	29.186	33.664	-1.378	0.886	4.007	0.882	47.2
1000S250-185	2.937	9.99	39.538	7.908	3.669	1.796	0.782	39.538	7.908	19729.2	19702.5	34214	12867	36.963	35.594	-1.363	0.877	3.991	0.883	47.0
1000S300-33[2,3]	0.586	1.99	8.711	1.742	3.857	0.642	1.047							0.234	12.530	-1.915	1.199	4.431	0.813	
1000S300-43[1,3]	0.761	2.59	11.283	2.257	3.850	0.826	1.042							0.516	16.099	-1.904	1.192	4.420	0.814	
1000S300-54	0.952	3.24	14.064	2.813	3.843	1.022	1.036	13.422	1.904	4750.0	4105.0	1663	1663	1.017	19.888	-1.892	1.185	4.407	0.816	58.1
1000S300-68	1.194	4.06	17.561	3.512	3.835	1.264	1.029	17.153	2.793	6969.2	5709.2	3334	3334	2.024	24.551	-1.876	1.176	4.391	0.818	57.8
1000S300-97	1.685	5.73	24.505	4.901	3.814	1.724	1.011	24.182	4.503	11235.8	9392.5	9776	7189	5.809	33.570	-1.842	1.158	4.354	0.821	57.3
1000S300-118	2.044	6.96	29.517	5.903	3.800	2.044	1.000	29.517	5.637	14063.3	12390.8	16235	9721	10.510	39.725	-1.818	1.144	4.329	0.824	57.0
1000S300-142	2.442	8.31	34.980	6.996	3.785	2.378	0.987	34.980	6.761	16868.3	15936.7	23522	11627	18.194	46.138	-1.790	1.129	4.302	0.827	56.7
1000S300-156	2.674	9.10	38.112	7.622	3.776	2.564	0.979	38.112	7.466	18627.5	18078.3	28445	12738	24.086	49.671	-1.775	1.120	4.285	0.829	56.5

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1000S300-170	2.903	9.88	41.181	8.236	3.766	2.740	0.972	41.181	8.236	20550.0	20237.5	31674	12957	31.108	53.031	-1.759	1.111	4.269	0.830	56.4
1000S300-185	3.132	10.66	44.209	8.842	3.757	2.909	0.964	44.209	8.842	22060.0	22032.5	34214	12867	39.408	56.241	-1.743	1.101	4.252	0.832	56.2
1050S200-33[2]	0.534	1.82	7.876	1.500	3.841	0.242	0.674							0.213	5.438	-1.128	0.734	4.060	0.923	
1050S200-43[1]	0.693	2.36	10.194	1.942	3.834	0.310	0.669	9.401	1.332	3322.5	2841.7	798		0.470	6.956	-1.118	0.728	4.049	0.924	39.9
1050S200-54	0.867	2.95	12.694	2.418	3.826	0.381	0.663	12.030	1.799	4489.2	3942.5	1581	1581	0.926	8.552	-1.107	0.722	4.038	0.925	39.6
1050S200-68	1.087	3.70	15.832	3.016	3.816	0.468	0.656	15.351	2.558	6382.5	5482.5	3170	3170	1.842	10.491	-1.093	0.714	4.023	0.926	39.3
1050S200-97	1.532	5.21	22.020	4.194	3.791	0.627	0.639	22.020	3.994	9964.2	8977.5	9291	7255	5.283	14.156	-1.063	0.697	3.989	0.929	38.8
1050S200-118	1.858	6.32	26.473	5.042	3.775	0.734	0.628	26.473	5.010	12499.2	11769.2	16235	10326	9.552	16.582	-1.042	0.684	3.966	0.931	38.4
1050S200-142	2.218	7.55	31.303	5.963	3.757	0.842	0.616	31.303	5.963	14876.7	14856.7	23522	12356	16.523	19.036	-1.018	0.670	3.941	0.933	38.0
1050S200-156	2.427	8.26	34.061	6.488	3.746	0.899	0.609	34.061	6.488	16186.7	16165.0	28445	13539	21.865	20.351	-1.004	0.662	3.926	0.935	37.7
1050S200-170	2.634	8.96	36.754	7.001	3.736	0.952	0.601	36.754	7.001	17467.5	17443.3	33355	14506	28.226	21.573	-0.991	0.653	3.911	0.936	37.5
1050S200-185	2.840	9.66	39.402	7.505	3.725	1.002	0.594	39.402	7.505	18725.0	18699.2	36036	14410	35.740	22.713	-0.977	0.645	3.896	0.937	37.2
1050S250-33[2,3]	0.568	1.93	8.824	1.681	3.940	0.417	0.856							0.227	9.119	-1.492	0.954	4.299	0.879	
1050S250-43[1]	0.739	2.51	11.426	2.176	3.933	0.535	0.851	10.377	1.367	3410.0	3009.2	798		0.501	11.697	-1.482	0.948	4.288	0.881	49.1
1050S250-54	0.924	3.14	14.237	2.712	3.926	0.660	0.845	13.593	1.865	4652.5	4173.3	1581	1581	0.986	14.423	-1.470	0.941	4.277	0.882	48.9
1050S250-68	1.159	3.94	17.771	3.385	3.916	0.814	0.838	17.399	2.590	6462.5	5805.8	3170	3170	1.963	17.761	-1.455	0.932	4.261	0.883	48.6
1050S250-97	1.634	5.56	24.769	4.718	3.893	1.101	0.821	24.769	4.318	10772.5	9540.8	9291	7255	5.633	24.162	-1.423	0.914	4.226	0.887	48.1
1050S250-118	1.982	6.74	29.816	5.679	3.879	1.299	0.810	29.816	5.589	13944.2	12560.8	16235	10326	10.191	28.481	-1.401	0.901	4.202	0.889	47.7
1050S250-142	2.367	8.06	35.307	6.725	3.862	1.503	0.797	35.307	6.725	16779.2	16094.2	23522	12356	17.637	32.931	-1.375	0.887	4.176	0.892	47.4
1050S250-156	2.591	8.82	38.451	7.324	3.852	1.614	0.789	38.451	7.324	18273.3	18203.3	28445	13539	23.346	35.358	-1.360	0.878	4.161	0.893	47.1
1050S250-170	2.813	9.57	41.529	7.910	3.842	1.719	0.782	41.529	7.910	19735.8	19712.5	33355	14506	30.147	37.647	-1.345	0.869	4.145	0.895	46.9
1050S250-185	3.034	10.33	44.561	8.488	3.832	1.818	0.774	44.561	8.488	21176.7	21150.8	36036	14410	38.186	39.815	-1.330	0.860	4.130	0.896	46.7
1050S300-33[2,3]	0.603	2.05	9.771	1.861	4.025	0.651	1.039							0.241	13.983	-1.875	1.179	4.561	0.831	
1050S300-43[1,3]	0.784	2.67	12.659	2.411	4.019	0.838	1.034							0.531	17.970	-1.864	1.173	4.549	0.832	
1050S300-54	0.980	3.34	15.781	3.006	4.012	1.036	1.028	15.107	1.996	4980.0	4314.2	1581	1581	1.047	22.203	-1.852	1.166	4.537	0.833	57.9
1050S300-68	1.230	4.18	19.709	3.754	4.003	1.281	1.020	19.275	2.921	7288.3	6009.2	3170	3170	2.084	27.415	-1.836	1.157	4.521	0.835	57.7
1050S300-97	1.736	5.91	27.518	5.241	3.982	1.747	1.003	27.155	4.824	12035.8	9916.7	9291	7255	5.984	37.505	-1.802	1.139	4.484	0.838	57.2
1050S300-118	2.106	7.17	33.158	6.316	3.968	2.071	0.992	33.158	6.035	15056.7	13109.2	16235	10326	10.830	44.397	-1.779	1.125	4.460	0.841	56.8
1050S300-142	2.517	8.56	39.311	7.488	3.952	2.410	0.979	39.311	7.240	18063.3	16895.0	23522	12356	18.750	51.585	-1.752	1.110	4.432	0.844	56.5

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1050S300-156	2.756	9.38	42.842	8.160	3.943	2.598	0.971	42.842	7.995	19947.5	19187.5	28445	13539	24.827	55.550	-1.736	1.101	4.416	0.845	56.3
1050S300-170	2.993	10.18	46.304	8.820	3.934	2.776	0.963	46.304	8.820	22005.0	21503.3	33355	14506	32.068	59.321	-1.720	1.092	4.400	0.847	56.1
1050S300-185	3.229	10.99	49.720	9.470	3.924	2.947	0.955	49.720	9.470	23628.3	23602.5	36036	14410	40.631	62.928	-1.705	1.083	4.384	0.849	55.9
1100S200-33[3]	0.551	1.88	8.826	1.605	4.002	0.245	0.667							0.220	6.036	-1.101	0.720	4.204	0.931	
1100S200-43[1]	0.716	2.44	11.426	2.077	3.995	0.313	0.662	10.441	1.398	3489.2	2958.3	761		0.485	7.722	-1.091	0.714	4.194	0.932	39.7
1100S200-54	0.895	3.05	14.231	2.587	3.987	0.385	0.656	13.380	1.892	4719.2	4112.5	1507	1507	0.956	9.495	-1.080	0.708	4.182	0.933	39.4
1100S200-68	1.123	3.82	17.754	3.228	3.976	0.473	0.649	17.100	2.694	6720.8	5734.2	3021	3021	1.903	11.650	-1.067	0.699	4.168	0.934	39.1
1100S200-97	1.583	5.39	24.708	4.492	3.951	0.633	0.632	24.696	4.223	10537.5	9432.5	8852	7315	5.458	15.726	-1.037	0.683	4.133	0.937	38.6
1100S200-118	1.920	6.53	29.718	5.403	3.934	0.741	0.621	29.718	5.315	13261.7	12405.0	16191	10902	9.872	18.427	-1.016	0.670	4.111	0.939	38.1
1100S200-142	2.293	7.80	35.157	6.392	3.916	0.850	0.609	35.157	6.392	15948.3	15842.5	23522	13084	17.080	21.161	-0.993	0.656	4.086	0.941	37.7
1100S200-156	2.509	8.54	38.265	6.957	3.905	0.908	0.602	38.265	6.957	17358.3	17337.5	28445	14340	22.605	22.627	-0.980	0.648	4.071	0.942	37.4
1100S200-170	2.724	9.27	41.303	7.510	3.894	0.962	0.594	41.303	7.510	18736.7	18713.3	33834	15588	29.186	23.991	-0.966	0.640	4.056	0.943	37.2
1100S200-185	2.937	9.99	44.291	8.053	3.883	1.012	0.587	44.291	8.053	20091.7	20067.5	37857	16041	36.963	25.263	-0.952	0.632	4.041	0.944	37.0
1100S250-33[3]	0.586	1.99	9.866	1.794	4.104	0.422	0.848							0.234	10.125	-1.460	0.937	4.438	0.892	
1100S250-43[1]	0.761	2.59	12.779	2.323	4.098	0.541	0.843	11.515	1.435	3580.0	3142.5	761		0.516	12.990	-1.449	0.931	4.427	0.893	48.9
1100S250-54	0.952	3.24	15.926	2.896	4.090	0.668	0.837	15.108	1.960	4889.2	4365.0	1507	1507	1.017	16.019	-1.438	0.924	4.415	0.894	48.7
1100S250-68	1.194	4.06	19.882	3.615	4.080	0.823	0.830	19.360	2.725	6800.0	6085.0	3021	3021	2.024	19.731	-1.423	0.916	4.400	0.895	48.4
1100S250-97	1.685	5.73	27.728	5.041	4.057	1.114	0.813	27.728	4.560	11376.7	10036.7	8852	7315	5.809	26.855	-1.391	0.898	4.365	0.898	47.9
1100S250-118	2.044	6.96	33.390	6.071	4.042	1.314	0.802	33.390	5.921	14772.5	13246.7	16191	10902	10.510	31.665	-1.369	0.885	4.342	0.901	47.5
1100S250-142	2.442	8.31	39.557	7.192	4.025	1.520	0.789	39.557	7.192	17945.0	17015.8	23522	13084	18.194	36.626	-1.344	0.870	4.316	0.903	47.1
1100S250-156	2.674	9.10	43.090	7.835	4.015	1.633	0.781	43.090	7.835	19547.5	19273.3	28445	14340	24.086	39.333	-1.329	0.862	4.301	0.904	46.9
1100S250-170	2.903	9.88	46.551	8.464	4.005	1.739	0.774	46.551	8.464	21117.5	21094.2	33834	15588	31.108	41.888	-1.315	0.853	4.285	0.906	46.7
1100S250-185	3.132	10.66	49.962	9.084	3.994	1.839	0.766	49.962	9.084	22665.0	22640.0	37857	16041	39.408	44.310	-1.300	0.844	4.270	0.907	46.5
1100S300-33[3]	0.620	2.11	10.906	1.983	4.193	0.659	1.031							0.248	15.530	-1.837	1.160	4.692	0.847	
1100S300-43[1,3]	0.806	2.74	14.132	2.569	4.187	0.848	1.026							0.547	19.961	-1.826	1.154	4.681	0.848	
1100S300-54	1.009	3.43	17.620	3.204	4.180	1.049	1.020	16.929	2.089	5210.8	4520.0	1507	1507	1.077	24.667	-1.814	1.147	4.669	0.849	57.8
1100S300-68	1.266	4.31	22.011	4.002	4.171	1.297	1.012	21.554	3.049	7608.3	6306.7	3021	3021	2.144	30.464	-1.798	1.138	4.653	0.851	57.5
1100S300-97	1.787	6.08	30.748	5.590	4.149	1.768	0.995	30.343	5.153	12856.7	10439.2	8852	7315	6.159	41.695	-1.765	1.120	4.617	0.854	57.0
1100S300-118	2.168	7.38	37.063	6.739	4.134	2.097	0.983	37.063	6.443	16076.7	13826.7	16191	10902	11.149	49.373	-1.741	1.106	4.593	0.856	56.6

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1100S300-142	2.592	8.82	43.957	7.992	4.118	2.440	0.970	43.957	7.732	19290.0	17855.8	23522	13084	19.307	57.388	-1.715	1.091	4.566	0.859	56.3
1100S300-156	2.838	9.66	47.916	8.712	4.109	2.630	0.963	47.916	8.538	21302.5	20301.7	28445	14340	25.567	61.812	-1.699	1.082	4.550	0.860	56.1
1100S300-170	3.082	10.49	51.800	9.418	4.100	2.811	0.955	51.800	9.418	23498.3	22776.7	33834	15588	33.029	66.023	-1.684	1.073	4.534	0.862	55.9
1100S300-185	3.326	11.32	55.634	10.115	4.090	2.984	0.947	55.634	10.115	25237.5	25212.5	37857	16041	41.853	70.052	-1.668	1.064	4.518	0.864	55.7
1150S200-33[3]	0.568	1.93	9.845	1.712	4.162	0.247	0.660							0.227	6.669	-1.075	0.706	4.349	0.939	
1150S200-43[1]	0.739	2.51	12.747	2.217	4.154	0.317	0.655	11.540	1.465	3655.8	3070.0	727		0.501	8.534	-1.066	0.700	4.339	0.940	39.5
1150S200-54	0.924	3.14	15.880	2.762	4.146	0.389	0.649	14.810	1.984	4949.2	4276.7	1440	1440	0.986	10.494	-1.055	0.694	4.327	0.941	39.2
1150S200-68	1.159	3.94	19.815	3.446	4.136	0.478	0.642	18.956	2.829	7058.3	5977.5	2886	2886	1.963	12.878	-1.042	0.686	4.313	0.942	38.9
1150S200-97	1.634	5.56	27.595	4.799	4.109	0.639	0.626	27.466	4.453	11110.0	9879.2	8452	7369	5.633	17.390	-1.013	0.669	4.278	0.944	38.3
1150S200-118	1.982	6.74	33.202	5.774	4.093	0.749	0.615	33.202	5.622	14025.8	13030.8	15457	10984	10.191	20.383	-0.992	0.657	4.256	0.946	37.9
1150S200-142	2.367	8.06	39.297	6.834	4.074	0.859	0.602	39.297	6.834	17051.7	16695.8	23522	13812	17.637	23.414	-0.969	0.643	4.231	0.948	37.5
1150S200-156	2.591	8.82	42.783	7.440	4.063	0.917	0.595	42.783	7.440	18564.2	18544.2	28445	15141	23.346	25.041	-0.956	0.635	4.216	0.949	37.2
1150S200-170	2.813	9.57	46.192	8.033	4.052	0.971	0.588	46.192	8.033	20043.3	20021.7	33834	16462	30.147	26.555	-0.943	0.627	4.202	0.950	36.9
1150S200-185	3.034	10.33	49.547	8.617	4.041	1.022	0.580	49.547	8.617	21499.2	21475.8	39679	17758	38.186	27.968	-0.929	0.619	4.187	0.951	36.7
1150S250-33[3]	0.603	2.05	10.982	1.910	4.268	0.426	0.841							0.241	11.193	-1.428	0.921	4.578	0.903	
1150S250-43[1]	0.784	2.67	14.227	2.474	4.261	0.547	0.835	12.718	1.503	3750.0	3271.7	727		0.531	14.361	-1.418	0.915	4.568	0.904	48.8
1150S250-54	0.980	3.34	17.733	3.084	4.253	0.675	0.830	16.713	2.054	5125.8	4552.5	1440	1440	1.047	17.713	-1.407	0.908	4.556	0.905	48.5
1150S250-68	1.230	4.18	22.144	3.851	4.243	0.832	0.822	21.439	2.861	7137.5	6359.2	2886	2886	2.084	21.822	-1.392	0.900	4.541	0.906	48.3
1150S250-97	1.736	5.91	30.898	5.374	4.219	1.126	0.805	30.824	4.802	11980.8	10527.5	8452	7369	5.984	29.711	-1.361	0.882	4.506	0.909	47.7
1150S250-118	2.106	7.17	37.221	6.473	4.204	1.328	0.794	37.221	6.253	15601.7	13926.7	15457	10984	10.830	35.043	-1.339	0.869	4.483	0.911	47.3
1150S250-142	2.517	8.56	44.112	7.672	4.187	1.537	0.781	44.112	7.672	19140.8	17934.2	23522	13812	18.750	40.546	-1.314	0.855	4.457	0.913	46.9
1150S250-156	2.756	9.38	48.064	8.359	4.176	1.650	0.774	48.064	8.359	20855.8	20342.5	28445	15141	24.827	43.552	-1.300	0.846	4.442	0.914	46.6
1150S250-170	2.993	10.18	51.936	9.032	4.166	1.757	0.766	51.936	9.032	22535.8	22514.2	33834	16462	32.068	46.390	-1.285	0.838	4.427	0.916	46.4
1150S250-185	3.229	10.99	55.756	9.697	4.156	1.858	0.759	55.756	9.697	24193.3	24169.2	39679	17758	40.631	49.081	-1.271	0.829	4.411	0.917	46.2
1150S300-33[3]	0.638	2.17	12.120	2.108	4.360	0.667	1.023							0.254	17.172	-1.800	1.142	4.826	0.861	
1150S300-43[1,3]	0.829	2.82	15.706	2.731	4.353	0.858	1.017							0.562	22.074	-1.789	1.136	4.815	0.862	
1150S300-54	1.037	3.53	19.586	3.406	4.346	1.061	1.012	18.907	2.181	5442.5	4723.3	1440	1440	1.107	27.282	-1.777	1.129	4.803	0.863	57.6
1150S300-68	1.301	4.43	24.472	4.256	4.337	1.312	1.004	23.993	3.178	7929.2	6600.8	2886	2886	2.205	33.700	-1.762	1.120	4.788	0.865	57.3
1150S300-97	1.837	6.25	34.201	5.948	4.314	1.789	0.987	33.751	5.490	13699.2	10958.3	8452	7369	6.335	46.143	-1.729	1.102	4.751	0.868	56.8

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_{a-L}	M_{a-D}	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1150S300-118	2.230	7.59	41.239	7.172	4.300	2.121	0.975	41.239	6.862	17121.7	14541.7	15457	10984	11.468	54.656	-1.706	1.089	4.728	0.870	56.5
1150S300-142	2.666	9.07	48.927	8.509	4.284	2.468	0.962	48.927	8.236	20548.3	18817.5	23522	13812	19.864	63.550	-1.680	1.074	4.701	0.872	56.1
1150S300-156	2.920	9.94	53.345	9.277	4.274	2.660	0.954	53.345	9.095	22691.7	21418.3	28445	15141	26.308	68.463	-1.664	1.065	4.685	0.874	55.8
1150S300-170	3.172	10.79	57.681	10.031	4.264	2.843	0.947	57.681	10.031	25028.3	24055.8	33834	16462	33.990	73.141	-1.649	1.056	4.669	0.875	55.6
1150S300-185	3.423	11.65	61.965	10.776	4.255	3.018	0.939	61.965	10.776	26887.5	26726.7	39679	17758	43.076	77.620	-1.634	1.047	4.653	0.877	55.4
1200S200-33[3]	0.586	1.99	10.935	1.823	4.321	0.250	0.653							0.234	7.338	-1.051	0.693	4.495	0.945	
1200S200-43[1]	0.761	2.59	14.161	2.360	4.313	0.319	0.648							0.516	9.391	-1.042	0.687	4.484	0.946	
1200S200-54[1]	0.952	3.24	17.644	2.941	4.305	0.393	0.642	16.320	2.076	5179.2	4435.0	1379		1.017	11.550	-1.031	0.681	4.473	0.947	39.0
1200S200-68	1.194	4.06	22.022	3.670	4.294	0.482	0.635	20.919	2.964	7396.7	6213.3	2763	2763	2.024	14.176	-1.018	0.673	4.459	0.948	38.7
1200S200-97	1.685	5.73	30.685	5.114	4.268	0.645	0.619	30.405	4.683	11683.3	10315.8	8087	7419	5.809	19.150	-0.989	0.656	4.424	0.950	38.1
1200S200-118	2.044	6.96	36.935	6.156	4.251	0.755	0.608	36.935	5.928	14790.8	13646.7	14787	11059	10.510	22.451	-0.969	0.644	4.402	0.952	37.7
1200S200-142	2.442	8.31	43.733	7.289	4.232	0.866	0.596	43.733	7.289	18185.8	17538.3	23522	14541	18.194	25.796	-0.947	0.630	4.377	0.953	37.2
1200S200-156	2.674	9.10	47.624	7.937	4.221	0.925	0.588	47.624	7.937	19804.2	19784.2	28445	15942	24.086	27.593	-0.934	0.622	4.362	0.954	36.9
1200S200-170	2.903	9.88	51.432	8.572	4.209	0.980	0.581	51.432	8.572	21387.5	21366.7	33834	17335	31.108	29.266	-0.920	0.614	4.348	0.955	36.7
1200S200-185	3.132	10.66	55.183	9.197	4.198	1.031	0.574	55.183	9.197	22946.7	22924.2	39732	18729	39.408	30.829	-0.907	0.606	4.333	0.956	36.4
1200S250-33[3]	0.620	2.11	12.174	2.029	4.430	0.431	0.833							0.248	12.322	-1.399	0.905	4.720	0.912	
1200S250-43[1]	0.806	2.74	15.772	2.629	4.423	0.553	0.828							0.547	15.812	-1.388	0.899	4.709	0.913	
1200S250-54[1]	1.009	3.43	19.663	3.277	4.415	0.682	0.822	18.408	2.149	5361.7	4735.0	1379		1.077	19.505	-1.377	0.892	4.698	0.914	48.4
1200S250-68	1.266	4.31	24.559	4.093	4.405	0.840	0.815	23.638	2.996	7475.0	6626.7	2763	2763	2.144	24.034	-1.363	0.884	4.683	0.915	48.1
1200S250-97	1.787	6.08	34.285	5.714	4.381	1.137	0.798	34.072	5.044	12585.0	11010.8	8087	7419	6.159	32.734	-1.332	0.867	4.648	0.918	47.5
1200S250-118	2.168	7.38	41.314	6.886	4.365	1.342	0.787	41.314	6.586	16431.7	14600.0	14787	11059	11.149	38.619	-1.310	0.854	4.625	0.920	47.1
1200S250-142	2.592	8.82	48.982	8.164	4.347	1.552	0.774	48.982	8.164	20368.3	18847.5	23522	14541	19.307	44.696	-1.286	0.840	4.599	0.922	46.7
1200S250-156	2.838	9.66	53.382	8.897	4.337	1.667	0.766	53.382	8.897	22197.5	21407.5	28445	15942	25.567	48.018	-1.272	0.831	4.584	0.923	46.4
1200S250-170	3.082	10.49	57.696	9.616	4.327	1.775	0.759	57.696	9.616	23991.7	23956.7	33834	17335	33.029	51.155	-1.257	0.823	4.569	0.924	46.2
1200S250-185	3.326	11.32	61.953	10.325	4.316	1.877	0.751	61.953	10.325	25762.5	25739.2	39732	18729	41.853	54.132	-1.243	0.814	4.554	0.925	45.9
1200S300-33[3]	0.655	2.23	13.412	2.235	4.526	0.674	1.015							0.261	18.909	-1.765	1.124	4.962	0.873	
1200S300-43[1,3]	0.851	2.90	17.384	2.897	4.519	0.867	1.009							0.577	24.310	-1.754	1.118	4.951	0.874	
1200S300-54[1]	1.065	3.62	21.681	3.614	4.511	1.073	1.003	21.022	2.274	5674.2	4922.5	1379		1.138	30.051	-1.742	1.111	4.939	0.876	57.5
1200S300-68	1.337	4.55	27.095	4.516	4.502	1.326	0.996	26.598	3.307	8250.8	6890.0	2763	2763	2.265	37.126	-1.727	1.103	4.924	0.877	57.2

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1200S300-97	1.888	6.43	37.884	6.314	4.479	1.808	0.979	37.387	5.837	14562.5	11472.5	8087	7419	6.510	50.853	-1.695	1.085	4.888	0.880	56.6
1200S300-118	2.292	7.80	45.693	7.616	4.465	2.144	0.967	45.693	7.292	18193.3	15254.2	14787	11059	11.788	60.251	-1.672	1.071	4.864	0.882	56.3
1200S300-142	2.741	9.33	54.231	9.038	4.448	2.495	0.954	54.231	8.752	21837.5	19778.3	23522	14541	20.421	70.076	-1.646	1.056	4.838	0.884	55.9
1200S300-156	3.002	10.22	59.139	9.856	4.438	2.689	0.946	59.139	9.665	24115.0	22536.7	28445	15942	27.048	75.507	-1.631	1.048	4.822	0.886	55.6
1200S300-170	3.261	11.10	63.959	10.660	4.428	2.874	0.939	63.959	10.660	26596.7	25338.3	33834	17335	34.950	80.681	-1.616	1.039	4.806	0.887	55.4
1200S300-185	3.520	11.98	68.723	11.454	4.418	3.051	0.931	68.723	11.454	28577.5	28180.8	39732	18729	44.298	85.636	-1.600	1.030	4.791	0.888	55.2
1250S200-33[3]	0.603	2.05	12.099	1.936	4.479	0.252	0.646							0.241	8.044	-1.028	0.680	4.641	0.951	
1250S200-43[2]	0.784	2.67	15.670	2.507	4.472	0.322	0.641							0.531	10.296	-1.019	0.674	4.631	0.952	
1250S200-54[1]	0.980	3.34	19.528	3.124	4.463	0.396	0.636	17.912	2.168	5408.3	4586.7	1322		1.047	12.664	-1.008	0.668	4.620	0.952	38.8
1250S200-68	1.230	4.18	24.378	3.900	4.452	0.486	0.629	22.990	3.100	7734.2	6441.7	2649	2649	2.084	15.545	-0.995	0.660	4.605	0.953	38.5
1250S200-97	1.736	5.91	33.987	5.438	4.425	0.651	0.612	33.516	4.912	12256.7	10741.7	7752	7465	5.984	21.005	-0.967	0.644	4.571	0.955	37.9
1250S200-118	2.106	7.17	40.923	6.548	4.408	0.762	0.601	40.923	6.235	15557.5	14250.0	14173	11128	10.830	24.632	-0.947	0.632	4.549	0.957	37.5
1250S200-142	2.517	8.56	48.474	7.756	4.389	0.874	0.589	48.474	7.710	19237.5	18369.2	23522	15269	18.750	28.309	-0.925	0.618	4.524	0.958	37.0
1250S200-156	2.756	9.38	52.800	8.448	4.377	0.933	0.582	52.800	8.448	21077.5	20830.0	28445	16743	24.827	30.285	-0.912	0.610	4.509	0.959	36.7
1250S200-170	2.993	10.18	57.036	9.126	4.366	0.988	0.575	57.036	9.126	22768.3	22748.3	33834	18209	32.068	32.126	-0.899	0.603	4.494	0.960	36.4
1250S200-185	3.229	10.99	61.210	9.794	4.354	1.039	0.567	61.210	9.794	24435.0	24413.3	39732	19675	40.631	33.846	-0.886	0.595	4.479	0.961	36.2
1250S250-33[3]	0.638	2.17	13.443	2.151	4.592	0.435	0.826							0.254	13.514	-1.370	0.890	4.862	0.921	
1250S250-43[2]	0.829	2.82	17.419	2.787	4.584	0.558	0.820							0.562	17.343	-1.360	0.884	4.852	0.921	
1250S250-54[1]	1.037	3.53	21.719	3.475	4.577	0.688	0.815	20.194	2.244	5597.5	4912.5	1322		1.107	21.397	-1.349	0.877	4.840	0.922	48.2
1250S250-68	1.301	4.43	27.132	4.341	4.566	0.848	0.807	25.957	3.131	7812.5	6888.3	2649	2649	2.205	26.368	-1.335	0.869	4.826	0.923	47.9
1250S250-97	1.837	6.25	37.895	6.063	4.541	1.148	0.790	37.508	5.287	13190.0	11485.8	7752	7465	6.335	35.925	-1.304	0.852	4.791	0.926	47.3
1250S250-118	2.230	7.59	45.679	7.309	4.526	1.354	0.779	45.679	6.919	17263.3	15265.0	14173	11128	11.468	42.393	-1.283	0.839	4.768	0.928	46.9
1250S250-142	2.666	9.07	54.175	8.668	4.508	1.566	0.766	54.175	8.622	21510.8	19753.3	23522	15269	19.864	49.077	-1.259	0.825	4.742	0.930	46.4
1250S250-156	2.920	9.94	59.054	9.449	4.497	1.682	0.759	59.054	9.449	23574.2	22466.7	28445	16743	26.308	52.733	-1.245	0.817	4.727	0.931	46.2
1250S250-170	3.172	10.79	63.840	10.214	4.486	1.791	0.751	63.840	10.214	25485.0	25200.8	33834	18209	33.990	56.186	-1.231	0.808	4.712	0.932	45.9
1250S250-185	3.423	11.65	68.565	10.970	4.476	1.894	0.744	68.565	10.970	27371.7	27349.2	39732	19675	43.076	59.465	-1.217	0.800	4.697	0.933	45.7
1250S300-33[3]	0.672	2.29	14.787	2.366	4.690	0.681	1.007							0.268	20.744	-1.731	1.107	5.100	0.885	
1250S300-43[2,3]	0.874	2.97	19.168	3.067	4.683	0.876	1.001							0.592	26.672	-1.721	1.101	5.089	0.886	
1250S300-54[1]	1.094	3.72	23.910	3.826	4.676	1.084	0.995	21.113	2.293	5721.7	5118.3	1322		1.168	32.974	-1.709	1.094	5.077	0.887	57.3

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1250S300-68	1.372	4.67	29.885	4.782	4.666	1.340	0.988	28.143	3.229	8057.5	7175.0	2649	2649	2.326	40.745	-1.694	1.086	5.062	0.888	57.0
1250S300-97	1.939	6.60	41.803	6.688	4.643	1.827	0.971	41.256	5.583	13930.0	11982.5	7752	7465	6.685	55.827	-1.662	1.068	5.026	0.891	56.5
1250S300-118	2.355	8.01	50.434	8.069	4.628	2.166	0.959	50.434	7.372	18392.5	15962.5	14173	11128	12.107	66.161	-1.639	1.055	5.003	0.893	56.1
1250S300-142	2.816	9.58	59.876	9.580	4.611	2.520	0.946	59.876	9.211	22981.7	20735.8	23522	15269	20.978	76.971	-1.614	1.040	4.976	0.895	55.6
1250S300-156	3.085	10.50	65.308	10.449	4.601	2.716	0.938	65.308	10.250	25572.5	23653.3	28445	16743	27.789	82.948	-1.599	1.031	4.961	0.896	55.4
1250S300-170	3.351	11.40	70.644	11.303	4.591	2.903	0.931	70.644	11.303	28201.7	26620.8	33834	18209	35.911	88.647	-1.584	1.022	4.945	0.897	55.2
1250S300-185	3.617	12.31	75.921	12.147	4.581	3.081	0.923	75.921	12.147	30307.5	29637.5	39732	19675	45.521	94.107	-1.569	1.014	4.930	0.899	55.0
1400S200-33[3]	0.655	2.23	16.050	2.293	4.950	0.258	0.627							0.261	10.383	-0.965	0.644	5.082	0.964	
1400S200-43[3]	0.851	2.90	20.795	2.971	4.942	0.330	0.622							0.577	13.293	-0.956	0.638	5.072	0.964	
1400S200-54[1]	1.065	3.62	25.927	3.704	4.933	0.405	0.617	23.181	2.443	6095.8	5007.5	1177		1.138	16.355	-0.946	0.633	5.061	0.965	38.2
1400S200-68	1.337	4.55	32.386	4.627	4.922	0.497	0.610	29.865	3.505	8745.8	7080.8	2359	2359	2.265	20.083	-0.933	0.625	5.047	0.966	37.9
1400S200-97	1.888	6.43	45.218	6.460	4.894	0.665	0.594	43.906	5.602	13976.7	11953.3	6896	6896	6.510	27.156	-0.907	0.609	5.012	0.967	37.3
1400S200-118	2.292	7.80	54.497	7.785	4.876	0.779	0.583	54.221	7.158	17860.0	15981.7	12602	11303	11.788	31.861	-0.888	0.598	4.990	0.968	36.8
1400S200-142	2.741	9.33	64.624	9.232	4.856	0.893	0.571	64.624	8.925	22266.7	20772.5	22060	16370	20.421	36.640	-0.866	0.585	4.965	0.970	36.3
1400S200-156	3.002	10.22	70.435	10.062	4.844	0.954	0.564	70.435	9.952	24830.8	23669.2	28445	19146	27.048	39.211	-0.854	0.577	4.950	0.970	36.0
1400S200-170	3.261	11.10	76.135	10.876	4.832	1.010	0.556	76.135	10.876	27136.7	26588.3	33834	20830	34.950	41.609	-0.842	0.569	4.936	0.971	35.7
1400S200-185	3.520	11.98	81.761	11.680	4.819	1.062	0.549	81.761	11.680	29141.7	29122.5	39732	22515	44.298	43.852	-0.829	0.562	4.921	0.972	35.4
1400S250-33[3]	0.689	2.35	17.737	2.534	5.072	0.446	0.804							0.275	17.469	-1.291	0.847	5.295	0.941	
1400S250-43[3]	0.896	3.05	22.991	3.284	5.064	0.572	0.799							0.608	22.425	-1.282	0.842	5.285	0.941	
1400S250-54[1]	1.122	3.82	28.678	4.097	5.056	0.706	0.793	26.105	2.527	6305.0	5411.7	1177		1.198	27.675	-1.271	0.835	5.273	0.942	47.6
1400S250-68	1.408	4.79	35.844	5.121	5.045	0.870	0.786	33.647	3.536	8822.5	7631.7	2359	2359	2.386	34.118	-1.258	0.827	5.259	0.943	47.3
1400S250-97	1.990	6.77	50.129	7.161	5.019	1.177	0.769	48.953	6.013	15003.3	12858.3	6896	6896	6.861	46.520	-1.228	0.811	5.224	0.945	46.7
1400S250-118	2.417	8.22	60.476	8.639	5.002	1.388	0.758	60.214	7.920	19760.0	17202.5	12602	11303	12.426	54.927	-1.208	0.798	5.202	0.946	46.2
1400S250-142	2.891	9.84	71.793	10.256	4.984	1.605	0.745	71.793	9.943	24808.3	22411.7	22060	16370	21.535	63.628	-1.185	0.784	5.177	0.948	45.8
1400S250-156	3.167	10.78	78.303	11.186	4.973	1.724	0.738	78.303	11.074	27630.0	25587.5	28445	19146	28.530	68.394	-1.171	0.776	5.162	0.949	45.5
1400S250-170	3.441	11.71	84.697	12.100	4.961	1.835	0.730	84.697	12.100	30188.3	28810.0	33834	20830	36.872	72.901	-1.158	0.768	5.147	0.949	45.2
1400S250-185	3.714	12.64	91.019	13.003	4.950	1.941	0.723	91.019	13.003	32441.7	32075.0	39732	22515	46.743	77.185	-1.144	0.760	5.132	0.950	44.9
1400S300-33[3]	0.724	2.46	19.424	2.775	5.179	0.700	0.983							0.289	26.840	-1.638	1.059	5.520	0.912	
1400S300-43[3]	0.942	3.20	25.187	3.598	5.172	0.900	0.978							0.638	34.521	-1.628	1.053	5.510	0.913	

TABLE 2 – STUD SECTION PROPERTIES[4,5,6,7,8,9]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)						TORSIONAL PROPERTIES						
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	$M_{a\text{-}L}$	$M_{a\text{-}D}$	V_{ag}	V_{aNet}	Jx1000	C_w	X_o	m	R_o	β	L_u
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(ft-lb)	(ft-lb)	(lb)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)		(in)
1400S300-54[1]	1.178	4.01	31.429	4.490	5.164	1.113	0.972	27.195	2.582	6441.7	5678.3	1177		1.258	42.690	-1.617	1.046	5.498	0.914	56.8
1400S300-68	1.479	5.03	39.303	5.615	5.154	1.376	0.965	36.391	3.645	9093.3	7998.3	2359	2359	2.507	52.772	-1.602	1.038	5.483	0.915	56.5
1400S300-97	2.092	7.12	55.040	7.863	5.130	1.877	0.947	53.749	6.341	15820.8	13474.2	6896	6896	7.211	72.365	-1.571	1.020	5.448	0.917	55.9
1400S300-118	2.541	8.65	66.454	9.493	5.114	2.225	0.936	66.301	8.418	21003.3	18048.3	12602	11303	13.065	85.812	-1.549	1.008	5.425	0.918	55.5
1400S300-142	3.040	10.34	78.963	11.280	5.096	2.589	0.923	78.963	10.592	26425.8	23577.5	22060	16370	22.649	99.901	-1.525	0.993	5.399	0.920	55.0
1400S300-156	3.331	11.34	86.170	12.310	5.086	2.790	0.915	86.170	11.952	29820.0	26977.5	28445	19146	30.011	107.703	-1.510	0.985	5.384	0.921	54.8
1400S300-170	3.620	12.32	93.259	13.323	5.076	2.981	0.908	93.259	13.323	33240.8	30453.3	33834	20830	38.793	115.147	-1.496	0.976	5.369	0.922	54.5
1400S300-185	3.909	13.30	100.277	14.325	5.065	3.165	0.900	100.277	14.325	35741.7	34004.2	39732	22515	49.189	122.289	-1.481	0.968	5.353	0.923	54.3

For **SI:** 1 lbf = 4.448 N, 1 kip = 4448 N, 1 inch = 25.4 mm, 1 lb/lin ft = 14.5939 N/m, 1 inch-kip = 12.8 N-m

[1] Web height-to-thickness ratio (h/t) exceeds 200 and is less than or equal to 260 per AISI S100. Web stiffeners are required at all support points and concentrated loads.
[2] Web height-to-thickness ratio, h/t, exceeds 260 and is less than or equal to 300. Bearing (at support points and concentrated loads) and intermediate stiffeners are required.
[3] Web height-to-thickness ratio, h/t, exceeds 300 or flange width-to-thickness ratio (b/t or d/t), exceeds 60. Effective section properties are outside the scope of this evaluation report and must be determined by a registered design professional. Bearing and intermediate stiffeners are required for members with web height-to-thickness ratio exceeding 260.
[4] Gross and torsional properties are based on the full-unreduced cross section of the studs, away from web punch-outs.
[5] Effective properties, except for V_a, are based on studs with or without punchouts. Cold work of forming has not been considered.
[6] Use the effective moment of inertia for deflection calculations.
[7] M_{al} and M_{ad} are based on the compression flange fully braced. For other conditions of compression flange bracing, the allowable moment must be determined in accordance with AISI S100.
[8] M_{ad} is calculated without the beneficial effect of sheathing to rotational stiffness. Ko =0.
[9] For definition of symbols, see page 2.

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
250T150-33	0.185	0.63	0.194	0.155	1.025	0.044	0.487	0.149	0.092	2.75	1260	0.074	0.047	-0.993	0.580	1.508	0.567
250T150-43	0.240	0.82	0.250	0.200	1.021	0.056	0.485	0.206	0.130	3.90	1886	0.162	0.060	-0.990	0.579	1.502	0.566
250T150-54	0.299	1.02	0.309	0.247	1.016	0.070	0.483	0.272	0.177	5.30	2342	0.319	0.074	-0.987	0.576	1.496	0.565
250T150-68	0.374	1.27	0.381	0.305	1.009	0.087	0.481	0.358	0.242	7.23	2911	0.634	0.091	-0.983	0.574	1.488	0.564
250T150-97	0.525	1.79	0.520	0.416	0.995	0.119	0.476	0.520	0.386	11.55	3960	1.809	0.122	-0.976	0.568	1.473	0.561
250T150-118	0.634	2.16	0.616	0.492	0.985	0.142	0.473	0.616	0.492	14.74	4731	3.259	0.143	-0.970	0.564	1.461	0.560
250T150-142	0.754	2.57	0.716	0.573	0.974	0.165	0.468	0.716	0.573	17.14	5553	5.616	0.164	-0.963	0.559	1.448	0.558
250T150-156	0.823	2.80	0.771	0.617	0.968	0.179	0.466	0.771	0.617	18.47	6015	7.415	0.175	-0.959	0.556	1.440	0.557
250T150-170	0.891	3.03	0.824	0.659	0.961	0.191	0.463	0.824	0.659	19.73	6460	9.549	0.186	-0.955	0.553	1.432	0.555
250T150-185	0.959	3.26	0.874	0.699	0.955	0.204	0.461	0.874	0.699	20.93	6891	12.063	0.195	-0.951	0.551	1.424	0.554
250T200-33	0.219	0.75	0.247	0.197	1.061	0.095	0.659	0.167	0.096	2.89	1260	0.088	0.103	-1.442	0.821	1.907	0.429
250T200-43	0.285	0.97	0.318	0.254	1.056	0.123	0.658	0.234	0.138	4.12	1886	0.193	0.133	-1.439	0.819	1.902	0.428
250T200-54	0.356	1.21	0.393	0.314	1.051	0.153	0.656	0.312	0.188	5.62	2342	0.380	0.163	-1.436	0.817	1.897	0.427
250T200-68	0.446	1.52	0.486	0.389	1.045	0.190	0.653	0.416	0.259	7.74	2911	0.755	0.201	-1.432	0.814	1.889	0.425
250T200-97	0.626	2.13	0.666	0.533	1.031	0.263	0.648	0.634	0.424	12.70	3960	2.159	0.273	-1.426	0.809	1.875	0.422
250T200-118	0.758	2.58	0.791	0.633	1.021	0.315	0.644	0.789	0.555	16.61	4731	3.898	0.321	-1.420	0.805	1.864	0.420
250T200-142	0.903	3.07	0.922	0.738	1.010	0.370	0.640	0.922	0.703	21.04	5553	6.730	0.370	-1.414	0.800	1.852	0.417
250T200-156	0.987	3.36	0.995	0.796	1.004	0.401	0.638	0.995	0.788	23.60	6015	8.896	0.397	-1.410	0.797	1.845	0.416
250T200-170	1.070	3.64	1.065	0.852	0.997	0.432	0.635	1.065	0.852	25.51	6460	11.471	0.422	-1.407	0.794	1.838	0.414
250T200-185	1.153	3.92	1.132	0.906	0.991	0.461	0.633	1.132	0.906	27.12	6891	14.508	0.446	-1.403	0.792	1.830	0.413
250T250-33[3]	0.254	0.86	0.299	0.239	1.086	0.174	0.827					0.101	0.191	-1.905	1.065	2.344	0.339
250T250-43	0.330	1.12	0.386	0.308	1.081	0.225	0.825	0.257	0.142	4.27	1886	0.224	0.245	-1.903	1.063	2.339	0.338
250T250-54	0.412	1.40	0.478	0.382	1.076	0.280	0.823	0.345	0.195	5.84	2342	0.440	0.303	-1.900	1.061	2.334	0.337
250T250-68	0.517	1.76	0.592	0.473	1.070	0.348	0.821	0.464	0.270	8.09	2911	0.876	0.373	-1.896	1.058	2.327	0.336
250T250-97	0.728	2.48	0.812	0.650	1.056	0.484	0.815	0.721	0.449	13.45	3960	2.510	0.509	-1.891	1.053	2.315	0.332
250T250-118	0.882	3.00	0.966	0.773	1.046	0.581	0.812	0.910	0.594	17.80	4731	4.537	0.601	-1.886	1.049	2.304	0.330
250T250-142	1.053	3.58	1.129	0.903	1.035	0.686	0.807	1.115	0.765	22.91	5553	7.844	0.696	-1.880	1.044	2.293	0.328
250T250-156	1.152	3.92	1.219	0.976	1.029	0.745	0.805	1.219	0.867	25.96	6015	10.377	0.748	-1.876	1.041	2.286	0.326
250T250-170	1.250	4.25	1.306	1.045	1.022	0.804	0.802	1.306	0.969	29.00	6460	13.392	0.797	-1.873	1.039	2.279	0.325
250T250-185	1.347	4.58	1.390	1.112	1.016	0.861	0.799	1.390	1.069	32.02	6891	16.953	0.844	-1.869	1.036	2.273	0.323

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
250T300-33[3]	0.289	0.98	0.352	0.281	1.104	0.284	0.991					0.115	0.317	-2.378	1.311	2.803	0.280
250T300-43[3]	0.375	1.28	0.453	0.363	1.100	0.367	0.989					0.254	0.407	-2.375	1.309	2.798	0.279
250T300-54	0.469	1.60	0.562	0.450	1.095	0.457	0.987	0.373	0.201	6.01	2342	0.501	0.503	-2.373	1.307	2.794	0.279
250T300-68	0.588	2.00	0.697	0.557	1.088	0.570	0.985	0.505	0.279	8.34	2911	0.997	0.621	-2.370	1.304	2.787	0.277
250T300-97	0.830	2.82	0.958	0.767	1.075	0.795	0.979	0.795	0.467	13.99	3960	2.861	0.849	-2.365	1.299	2.776	0.274
250T300-118	1.007	3.42	1.141	0.913	1.065	0.957	0.975	1.014	0.622	18.64	4731	5.175	1.005	-2.360	1.294	2.767	0.272
250T300-142	1.202	4.09	1.335	1.068	1.054	1.132	0.970	1.255	0.809	24.22	5553	8.958	1.167	-2.354	1.290	2.756	0.270
250T300-156	1.316	4.48	1.444	1.155	1.047	1.232	0.968	1.393	0.922	27.61	6015	11.858	1.256	-2.351	1.287	2.750	0.269
250T300-170	1.429	4.86	1.548	1.238	1.041	1.330	0.965	1.527	1.037	31.04	6460	15.314	1.341	-2.348	1.284	2.743	0.268
250T300-185	1.541	5.25	1.649	1.319	1.034	1.427	0.962	1.649	1.153	34.51	6891	19.398	1.422	-2.345	1.282	2.737	0.266
300T150-33	0.202	0.69	0.294	0.196	1.205	0.046	0.480	0.229	0.121	3.61	1260	0.081	0.072	-0.933	0.556	1.598	0.659
300T150-43	0.262	0.89	0.378	0.252	1.201	0.060	0.478	0.316	0.170	5.09	2141	0.178	0.093	-0.930	0.554	1.592	0.659
300T150-54	0.327	1.11	0.468	0.312	1.196	0.074	0.476	0.415	0.229	6.86	2873	0.350	0.114	-0.927	0.552	1.586	0.659
300T150-68	0.410	1.39	0.580	0.387	1.190	0.092	0.474	0.545	0.311	9.31	3579	0.695	0.140	-0.922	0.549	1.578	0.658
300T150-97	0.575	1.96	0.795	0.530	1.175	0.127	0.469	0.795	0.494	14.79	4913	1.984	0.190	-0.915	0.543	1.562	0.657
300T150-118	0.696	2.37	0.945	0.630	1.165	0.151	0.466	0.945	0.630	18.86	5895	3.579	0.223	-0.909	0.539	1.549	0.656
300T150-142	0.829	2.82	1.104	0.736	1.154	0.176	0.462	1.104	0.736	22.03	6955	6.173	0.256	-0.902	0.534	1.536	0.655
300T150-156	0.905	3.08	1.192	0.795	1.148	0.191	0.459	1.192	0.795	23.80	7556	8.155	0.275	-0.898	0.532	1.528	0.655
300T150-170	0.981	3.34	1.277	0.851	1.141	0.205	0.457	1.277	0.851	25.49	8140	10.510	0.292	-0.894	0.529	1.520	0.654
300T150-185	1.056	3.59	1.359	0.906	1.134	0.218	0.454	1.359	0.906	27.12	8712	13.286	0.308	-0.889	0.526	1.511	0.654
300T200-33	0.237	0.81	0.370	0.246	1.250	0.102	0.655	0.256	0.127	3.79	1260	0.094	0.158	-1.369	0.794	1.966	0.515
300T200-43	0.307	1.05	0.477	0.318	1.245	0.131	0.653	0.357	0.179	5.37	2141	0.208	0.203	-1.366	0.792	1.960	0.515
300T200-54	0.384	1.31	0.591	0.394	1.240	0.163	0.652	0.474	0.243	7.28	2873	0.410	0.250	-1.363	0.789	1.954	0.514
300T200-68	0.481	1.64	0.733	0.489	1.234	0.203	0.649	0.630	0.333	9.97	3579	0.815	0.308	-1.359	0.787	1.947	0.513
300T200-97	0.677	2.30	1.008	0.672	1.220	0.281	0.644	0.960	0.542	16.23	4913	2.335	0.421	-1.352	0.781	1.932	0.510
300T200-118	0.820	2.79	1.202	0.801	1.210	0.337	0.641	1.198	0.707	21.18	5895	4.217	0.497	-1.346	0.777	1.920	0.509
300T200-142	0.978	3.33	1.407	0.938	1.200	0.396	0.636	1.407	0.896	26.83	6955	7.287	0.576	-1.339	0.772	1.907	0.507
300T200-156	1.070	3.64	1.523	1.015	1.193	0.430	0.634	1.523	1.005	30.10	7556	9.636	0.619	-1.335	0.769	1.900	0.506
300T200-170	1.160	3.95	1.634	1.089	1.187	0.463	0.632	1.634	1.089	32.61	8140	12.432	0.660	-1.331	0.767	1.892	0.505

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
300T200-185	1.250	4.25	1.741	1.161	1.180	0.495	0.629	1.741	1.161	34.75	8712	15.731	0.699	-1.327	0.764	1.884	0.504
300T250-33[3]	0.271	0.92	0.446	0.297	1.282	0.185	0.826					0.108	0.291	-1.822	1.035	2.376	0.412
300T250-43	0.352	1.20	0.575	0.383	1.277	0.240	0.825	0.391	0.186	5.57	2141	0.239	0.374	-1.819	1.033	2.371	0.411
300T250-54	0.441	1.50	0.713	0.476	1.272	0.298	0.823	0.523	0.253	7.58	2873	0.471	0.462	-1.816	1.031	2.365	0.410
300T250-68	0.553	1.88	0.886	0.591	1.266	0.372	0.820	0.701	0.348	10.42	3579	0.936	0.571	-1.812	1.028	2.358	0.409
300T250-97	0.779	2.65	1.222	0.815	1.252	0.518	0.815	1.087	0.574	17.19	4913	2.685	0.781	-1.807	1.023	2.345	0.406
300T250-118	0.944	3.21	1.459	0.972	1.243	0.622	0.811	1.375	0.757	22.68	5895	4.856	0.926	-1.801	1.019	2.334	0.405
300T250-142	1.128	3.84	1.711	1.141	1.232	0.735	0.807	1.689	0.974	29.16	6955	8.401	1.077	-1.794	1.014	2.321	0.402
300T250-156	1.234	4.20	1.853	1.235	1.225	0.799	0.805	1.853	1.104	33.05	7556	11.117	1.160	-1.791	1.011	2.314	0.401
300T250-170	1.339	4.56	1.990	1.327	1.219	0.862	0.802	1.990	1.234	36.94	8140	14.353	1.240	-1.787	1.008	2.307	0.400
300T250-185	1.444	4.91	2.124	1.416	1.213	0.923	0.800	2.124	1.363	40.81	8712	18.176	1.316	-1.783	1.006	2.300	0.399
300T300-33[3]	0.306	1.04	0.522	0.348	1.306	0.302	0.994					0.122	0.480	-2.286	1.279	2.814	0.340
300T300-43[3]	0.397	1.35	0.673	0.449	1.302	0.391	0.992					0.269	0.618	-2.284	1.277	2.809	0.339
300T300-54	0.497	1.69	0.836	0.557	1.297	0.488	0.990	0.564	0.260	7.80	2873	0.531	0.764	-2.281	1.275	2.804	0.339
300T300-68	0.624	2.12	1.039	0.692	1.290	0.609	0.988	0.761	0.359	10.76	3579	1.057	0.945	-2.277	1.273	2.798	0.337
300T300-97	0.881	3.00	1.435	0.957	1.277	0.850	0.982	1.196	0.597	17.88	4913	3.036	1.299	-2.272	1.267	2.785	0.335
300T300-118	1.069	3.64	1.715	1.144	1.267	1.023	0.978	1.527	0.793	23.75	5895	5.495	1.542	-2.267	1.263	2.775	0.333
300T300-142	1.277	4.35	2.015	1.343	1.256	1.212	0.974	1.895	1.029	30.81	6955	9.514	1.798	-2.261	1.258	2.763	0.331
300T300-156	1.398	4.76	2.184	1.456	1.250	1.320	0.971	2.107	1.173	35.12	7556	12.599	1.940	-2.257	1.256	2.757	0.330
300T300-170	1.519	5.17	2.347	1.565	1.243	1.426	0.969	2.313	1.319	39.50	8140	16.274	2.077	-2.253	1.253	2.750	0.328
300T300-185	1.639	5.58	2.506	1.671	1.237	1.530	0.966	2.506	1.467	43.93	8712	20.621	2.208	-2.250	1.250	2.743	0.327
350T150-33	0.219	0.75	0.418	0.239	1.381	0.049	0.471	0.330	0.152	4.56	1134	0.088	0.104	-0.881	0.534	1.704	0.733
350T150-43	0.285	0.97	0.539	0.308	1.376	0.063	0.470	0.454	0.213	6.39	2141	0.193	0.133	-0.878	0.532	1.699	0.733
350T150-54	0.356	1.21	0.669	0.382	1.371	0.078	0.468	0.596	0.286	8.57	3372	0.380	0.164	-0.874	0.529	1.692	0.733
350T150-68	0.446	1.52	0.830	0.474	1.365	0.097	0.466	0.782	0.387	11.58	4248	0.755	0.202	-0.870	0.527	1.684	0.733
350T150-97	0.626	2.13	1.142	0.652	1.350	0.133	0.461	1.142	0.611	18.29	5867	2.159	0.274	-0.863	0.521	1.667	0.732
350T150-118	0.758	2.58	1.362	0.778	1.340	0.159	0.457	1.362	0.778	23.30	7060	3.898	0.323	-0.856	0.517	1.655	0.732
350T150-142	0.903	3.07	1.595	0.912	1.329	0.186	0.453	1.595	0.912	27.29	8356	6.730	0.373	-0.849	0.512	1.641	0.732
350T150-156	0.987	3.36	1.727	0.987	1.322	0.201	0.451	1.727	0.987	29.54	9097	8.896	0.401	-0.845	0.509	1.633	0.732

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
350T150-170	1.070	3.64	1.853	1.059	1.316	0.215	0.449	1.853	1.059	31.70	9821	11.471	0.426	-0.841	0.506	1.624	0.732
350T150-185	1.153	3.92	1.976	1.129	1.309	0.230	0.446	1.976	1.129	33.80	10534	14.508	0.451	-0.836	0.504	1.616	0.732
350T200-33	0.254	0.86	0.522	0.298	1.434	0.107	0.649	0.371	0.156	4.68	1134	0.101	0.226	-1.304	0.768	2.044	0.593
350T200-43	0.330	1.12	0.674	0.385	1.429	0.138	0.647	0.512	0.225	6.75	2141	0.224	0.291	-1.301	0.766	2.038	0.593
350T200-54	0.412	1.40	0.837	0.478	1.425	0.172	0.645	0.677	0.304	9.10	3372	0.440	0.359	-1.297	0.764	2.032	0.592
350T200-68	0.517	1.76	1.040	0.594	1.418	0.214	0.643	0.898	0.414	12.39	4248	0.876	0.444	-1.293	0.761	2.024	0.592
350T200-97	0.728	2.48	1.435	0.820	1.404	0.297	0.638	1.368	0.669	20.03	5867	2.510	0.607	-1.286	0.755	2.008	0.590
350T200-118	0.882	3.00	1.715	0.980	1.394	0.355	0.635	1.709	0.871	26.07	7060	4.537	0.719	-1.280	0.751	1.996	0.589
350T200-142	1.053	3.58	2.015	1.151	1.383	0.419	0.631	2.015	1.102	32.99	8356	7.844	0.836	-1.273	0.746	1.983	0.588
350T200-156	1.152	3.92	2.184	1.248	1.377	0.454	0.628	2.184	1.237	37.02	9097	10.377	0.900	-1.269	0.743	1.975	0.587
350T200-170	1.250	4.25	2.347	1.341	1.370	0.489	0.626	2.347	1.341	40.16	9821	13.392	0.961	-1.265	0.741	1.967	0.587
350T200-185	1.347	4.58	2.506	1.432	1.364	0.523	0.623	2.506	1.432	42.88	10534	16.953	1.020	-1.261	0.738	1.959	0.586
350T250-33[3]	0.289	0.98	0.626	0.358	1.473	0.195	0.823					0.115	0.415	-1.746	1.007	2.428	0.483
350T250-43	0.375	1.28	0.809	0.462	1.469	0.253	0.821	0.560	0.234	7.01	2141	0.254	0.534	-1.744	1.005	2.423	0.482
350T250-54	0.469	1.60	1.005	0.574	1.464	0.315	0.819	0.745	0.316	9.48	3372	0.501	0.661	-1.741	1.003	2.417	0.481
350T250-68	0.588	2.00	1.249	0.714	1.457	0.392	0.817	0.996	0.433	12.96	4248	0.997	0.818	-1.737	1.000	2.410	0.481
350T250-97	0.830	2.82	1.729	0.988	1.444	0.547	0.812	1.543	0.708	21.21	5867	2.861	1.124	-1.730	0.995	2.395	0.478
350T250-118	1.007	3.42	2.069	1.182	1.434	0.657	0.808	1.952	0.932	27.90	7060	5.175	1.335	-1.724	0.990	2.384	0.477
350T250-142	1.202	4.09	2.435	1.391	1.423	0.777	0.804	2.402	1.196	35.81	8356	8.958	1.558	-1.718	0.986	2.371	0.475
350T250-156	1.316	4.48	2.641	1.509	1.417	0.846	0.802	2.641	1.355	40.57	9097	11.858	1.681	-1.714	0.983	2.363	0.474
350T250-170	1.429	4.86	2.842	1.624	1.410	0.913	0.799	2.842	1.514	45.34	9821	15.314	1.800	-1.710	0.980	2.356	0.473
350T250-185	1.541	5.25	3.037	1.735	1.404	0.979	0.797	3.037	1.674	50.11	10534	19.398	1.914	-1.706	0.977	2.348	0.472
350T300-33[3]	0.323	1.10	0.730	0.417	1.503	0.319	0.993					0.129	0.683	-2.202	1.249	2.845	0.401
350T300-43[3]	0.420	1.43	0.943	0.539	1.498	0.413	0.991					0.285	0.880	-2.200	1.247	2.840	0.400
350T300-54	0.526	1.79	1.172	0.670	1.494	0.515	0.990	0.803	0.326	9.76	3372	0.561	1.090	-2.197	1.245	2.835	0.399
350T300-68	0.659	2.24	1.459	0.834	1.487	0.643	0.987	1.080	0.447	13.39	4248	1.118	1.351	-2.193	1.243	2.828	0.399
350T300-97	0.931	3.17	2.023	1.156	1.474	0.898	0.982	1.693	0.737	22.07	5867	3.211	1.862	-2.187	1.237	2.814	0.396
350T300-118	1.131	3.85	2.423	1.385	1.464	1.082	0.978	2.161	0.976	29.21	7060	5.814	2.217	-2.181	1.233	2.803	0.394
350T300-142	1.352	4.60	2.854	1.631	1.453	1.283	0.974	2.686	1.263	37.82	8356	10.071	2.592	-2.175	1.228	2.791	0.393
350T300-156	1.481	5.04	3.098	1.771	1.447	1.398	0.972	2.990	1.439	43.08	9097	13.339	2.802	-2.171	1.225	2.784	0.392

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
350T300-170	1.608	5.47	3.336	1.906	1.440	1.510	0.969	3.287	1.618	48.43	9821	17.235	3.004	-2.168	1.223	2.777	0.391
350T300-185	1.736	5.91	3.568	2.039	1.434	1.622	0.967	3.568	1.799	53.87	10534	21.844	3.200	-2.164	1.220	2.770	0.390
362T150-33	0.224	0.76	0.454	0.250	1.424	0.049	0.469	0.359	0.161	4.81	1092	0.089	0.113	-0.869	0.528	1.733	0.749
362T150-43	0.290	0.99	0.585	0.323	1.420	0.064	0.468	0.494	0.225	6.73	2141	0.197	0.145	-0.866	0.526	1.727	0.749
362T150-54	0.363	1.23	0.726	0.401	1.415	0.079	0.466	0.648	0.301	9.02	3372	0.387	0.178	-0.862	0.524	1.721	0.749
362T150-68	0.455	1.55	0.901	0.497	1.408	0.098	0.464	0.849	0.407	12.17	4415	0.770	0.220	-0.858	0.521	1.713	0.749
362T150-97	0.639	2.17	1.240	0.684	1.393	0.135	0.459	1.240	0.641	19.20	6105	2.203	0.299	-0.850	0.516	1.696	0.748
362T150-118	0.774	2.63	1.480	0.817	1.383	0.160	0.455	1.480	0.817	24.45	7351	3.978	0.352	-0.844	0.511	1.683	0.749
362T150-142	0.922	3.14	1.736	0.958	1.372	0.188	0.451	1.736	0.958	28.67	8707	6.869	0.407	-0.837	0.507	1.669	0.749
362T150-156	1.008	3.43	1.879	1.037	1.365	0.203	0.449	1.879	1.037	31.04	9482	9.081	0.437	-0.833	0.504	1.661	0.749
362T150-170	1.093	3.72	2.017	1.113	1.359	0.218	0.447	2.017	1.113	33.33	10242	11.711	0.465	-0.828	0.501	1.653	0.749
362T150-185	1.177	4.01	2.152	1.187	1.352	0.232	0.444	2.152	1.187	35.54	10989	14.814	0.492	-0.824	0.498	1.644	0.749
362T200-33	0.258	0.88	0.565	0.312	1.479	0.108	0.647	0.404	0.162	4.85	1092	0.103	0.246	-1.288	0.762	2.066	0.611
362T200-43	0.335	1.14	0.730	0.403	1.475	0.140	0.645	0.556	0.237	7.11	2141	0.227	0.316	-1.285	0.760	2.060	0.611
362T200-54	0.419	1.43	0.906	0.500	1.470	0.174	0.643	0.735	0.320	9.58	3372	0.448	0.390	-1.282	0.757	2.054	0.610
362T200-68	0.526	1.79	1.126	0.621	1.463	0.216	0.641	0.974	0.435	13.03	4415	0.891	0.482	-1.278	0.755	2.046	0.610
362T200-97	0.741	2.52	1.556	0.859	1.449	0.300	0.636	1.483	0.702	21.03	6105	2.554	0.660	-1.271	0.749	2.030	0.608
362T200-118	0.898	3.06	1.861	1.027	1.440	0.360	0.633	1.853	0.913	27.35	7351	4.617	0.782	-1.265	0.745	2.018	0.607
362T200-142	1.072	3.65	2.187	1.207	1.429	0.424	0.629	2.187	1.155	34.59	8707	7.983	0.909	-1.258	0.740	2.005	0.606
362T200-156	1.172	3.99	2.371	1.308	1.422	0.460	0.626	2.371	1.296	38.82	9482	10.562	0.980	-1.254	0.737	1.997	0.606
362T200-170	1.272	4.33	2.550	1.407	1.416	0.495	0.624	2.550	1.407	42.12	10242	13.632	1.047	-1.250	0.734	1.989	0.605
362T200-185	1.371	4.67	2.723	1.503	1.409	0.530	0.622	2.723	1.503	44.99	10989	17.259	1.112	-1.245	0.732	1.981	0.605
362T250-33[3]	0.293	1.00	0.677	0.373	1.520	0.198	0.821					0.117	0.450	-1.729	1.000	2.444	0.500
362T250-43	0.381	1.29	0.874	0.482	1.516	0.256	0.820	0.608	0.247	7.39	2141	0.258	0.579	-1.726	0.998	2.439	0.499
362T250-54	0.476	1.62	1.086	0.599	1.511	0.318	0.818	0.808	0.333	9.98	3372	0.508	0.717	-1.723	0.996	2.433	0.499
362T250-68	0.597	2.03	1.351	0.746	1.504	0.397	0.816	1.080	0.455	13.63	4415	1.012	0.888	-1.719	0.993	2.425	0.498
362T250-97	0.842	2.87	1.872	1.033	1.491	0.554	0.811	1.671	0.743	22.26	6105	2.904	1.221	-1.712	0.988	2.411	0.495
362T250-118	1.022	3.48	2.241	1.237	1.481	0.666	0.807	2.114	0.977	29.25	7351	5.255	1.451	-1.706	0.984	2.399	0.494
362T250-142	1.221	4.15	2.638	1.456	1.470	0.787	0.803	2.603	1.254	37.53	8707	9.097	1.694	-1.700	0.979	2.386	0.493

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
362T250-156	1.337	4.55	2.863	1.580	1.464	0.857	0.801	2.863	1.420	42.52	9482	12.043	1.829	-1.696	0.976	2.379	0.492
362T250-170	1.451	4.94	3.082	1.700	1.457	0.924	0.798	3.082	1.587	47.52	10242	15.554	1.959	-1.692	0.973	2.371	0.491
362T250-185	1.566	5.33	3.295	1.818	1.451	0.991	0.796	3.295	1.754	52.51	10989	19.704	2.084	-1.688	0.970	2.363	0.490
362T300-33[3]	0.327	1.11	0.788	0.435	1.551	0.323	0.993					0.131	0.740	-2.182	1.242	2.856	0.416
362T300-43[3]	0.426	1.45	1.019	0.562	1.547	0.418	0.991					0.289	0.954	-2.180	1.240	2.851	0.415
362T300-54	0.533	1.81	1.266	0.699	1.542	0.521	0.989	0.871	0.343	10.28	3372	0.569	1.182	-2.177	1.238	2.845	0.415
362T300-68	0.668	2.27	1.576	0.870	1.536	0.651	0.987	1.170	0.470	14.08	4415	1.133	1.466	-2.173	1.235	2.838	0.414
362T300-97	0.944	3.21	2.187	1.207	1.522	0.910	0.982	1.833	0.774	23.16	6105	3.255	2.021	-2.167	1.230	2.824	0.411
362T300-118	1.146	3.90	2.622	1.447	1.512	1.096	0.978	2.340	1.023	30.63	7351	5.894	2.408	-2.161	1.226	2.813	0.410
362T300-142	1.371	4.66	3.090	1.705	1.502	1.299	0.974	2.909	1.324	39.63	8707	10.211	2.817	-2.155	1.221	2.801	0.408
362T300-156	1.501	5.11	3.356	1.851	1.495	1.416	0.971	3.238	1.508	45.14	9482	13.524	3.047	-2.151	1.218	2.794	0.407
362T300-170	1.631	5.55	3.614	1.994	1.489	1.530	0.969	3.560	1.695	50.74	10242	17.475	3.268	-2.147	1.215	2.787	0.406
362T300-185	1.760	5.99	3.867	2.133	1.482	1.643	0.966	3.867	1.885	56.44	10989	22.149	3.481	-2.143	1.213	2.779	0.405
400T150-33	0.237	0.81	0.570	0.285	1.553	0.051	0.463	0.457	0.183	5.47	983	0.094	0.142	-0.834	0.513	1.822	0.790
400T150-43	0.307	1.05	0.736	0.368	1.548	0.065	0.461	0.625	0.261	7.81	2141	0.208	0.183	-0.831	0.511	1.817	0.791
400T150-54	0.384	1.31	0.914	0.457	1.543	0.081	0.459	0.818	0.348	10.43	3372	0.410	0.225	-0.828	0.509	1.810	0.791
400T150-68	0.481	1.64	1.136	0.568	1.536	0.101	0.457	1.072	0.468	14.03	4916	0.815	0.277	-0.824	0.506	1.802	0.791
400T150-97	0.677	2.30	1.567	0.784	1.521	0.139	0.452	1.567	0.736	22.04	6820	2.335	0.378	-0.816	0.500	1.785	0.791
400T150-118	0.820	2.79	1.873	0.936	1.511	0.165	0.449	1.873	0.936	28.04	8224	4.217	0.446	-0.810	0.496	1.772	0.791
400T150-142	0.978	3.33	2.200	1.100	1.500	0.194	0.445	2.200	1.100	32.93	9758	7.287	0.516	-0.803	0.491	1.758	0.792
400T150-156	1.070	3.64	2.384	1.192	1.493	0.209	0.442	2.384	1.192	35.69	10638	9.636	0.555	-0.798	0.489	1.750	0.792
400T150-170	1.160	3.95	2.563	1.281	1.486	0.225	0.440	2.563	1.281	38.36	11502	12.432	0.591	-0.794	0.486	1.742	0.792
400T150-185	1.250	4.25	2.736	1.368	1.480	0.239	0.438	2.736	1.368	40.96	12355	15.731	0.626	-0.790	0.483	1.733	0.792
400T200-33	0.271	0.92	0.706	0.353	1.614	0.112	0.641	0.515	0.180	5.38	983	0.108	0.309	-1.245	0.744	2.137	0.660
400T200-43	0.352	1.20	0.913	0.456	1.609	0.144	0.640	0.701	0.275	8.25	2141	0.239	0.398	-1.242	0.742	2.131	0.660
400T200-54	0.441	1.50	1.134	0.567	1.604	0.179	0.638	0.925	0.370	11.07	3372	0.471	0.492	-1.239	0.739	2.125	0.660
400T200-68	0.553	1.88	1.411	0.705	1.598	0.223	0.635	1.225	0.501	15.00	4916	0.936	0.608	-1.235	0.737	2.117	0.660
400T200-97	0.779	2.65	1.953	0.977	1.584	0.310	0.631	1.863	0.805	24.10	6820	2.685	0.835	-1.227	0.731	2.101	0.659
400T200-118	0.944	3.21	2.339	1.170	1.574	0.372	0.627	2.329	1.045	31.28	8224	4.856	0.990	-1.221	0.727	2.088	0.658

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
400T200-142	1.128	3.84	2.754	1.377	1.563	0.438	0.623	2.754	1.321	39.54	9758	8.401	1.153	-1.214	0.722	2.075	0.658
400T200-156	1.234	4.20	2.989	1.494	1.556	0.476	0.621	2.989	1.481	44.36	10638	11.117	1.244	-1.210	0.719	2.067	0.657
400T200-170	1.339	4.56	3.217	1.609	1.550	0.512	0.618	3.217	1.609	48.16	11502	14.353	1.331	-1.206	0.716	2.059	0.657
400T200-185	1.444	4.91	3.440	1.720	1.543	0.548	0.616	3.440	1.720	51.50	12355	18.176	1.414	-1.201	0.714	2.051	0.657
400T250-33[3]	0.306	1.04	0.842	0.421	1.660	0.204	0.817					0.122	0.566	-1.678	0.980	2.498	0.549
400T250-43	0.397	1.35	1.089	0.544	1.655	0.264	0.815	0.766	0.286	8.57	2141	0.269	0.729	-1.675	0.978	2.492	0.548
400T250-54	0.497	1.69	1.354	0.677	1.650	0.329	0.814	1.016	0.385	11.53	3372	0.531	0.903	-1.672	0.976	2.486	0.548
400T250-68	0.624	2.12	1.686	0.843	1.644	0.411	0.811	1.354	0.524	15.70	4916	1.057	1.118	-1.668	0.974	2.478	0.547
400T250-97	0.881	3.00	2.340	1.170	1.630	0.573	0.807	2.093	0.852	25.50	6820	3.036	1.541	-1.661	0.968	2.463	0.545
400T250-118	1.069	3.64	2.806	1.403	1.620	0.689	0.803	2.649	1.117	33.44	8224	5.495	1.834	-1.655	0.964	2.451	0.544
400T250-142	1.277	4.35	3.308	1.654	1.609	0.815	0.799	3.263	1.431	42.85	9758	9.514	2.144	-1.648	0.959	2.438	0.543
400T250-156	1.398	4.76	3.594	1.797	1.603	0.887	0.796	3.594	1.620	48.51	10638	12.599	2.318	-1.644	0.956	2.430	0.542
400T250-170	1.519	5.17	3.871	1.936	1.597	0.958	0.794	3.871	1.810	54.20	11502	16.274	2.485	-1.640	0.953	2.423	0.542
400T250-185	1.639	5.58	4.143	2.072	1.590	1.027	0.792	4.143	2.001	59.90	12355	20.621	2.646	-1.636	0.951	2.415	0.541
400T300-33[3]	0.340	1.16	0.978	0.489	1.695	0.334	0.990					0.136	0.929	-2.125	1.221	2.893	0.460
400T300-43[3]	0.443	1.51	1.265	0.633	1.691	0.432	0.988					0.300	1.198	-2.122	1.219	2.888	0.460
400T300-54	0.554	1.88	1.574	0.787	1.686	0.539	0.986	1.094	0.397	11.89	3372	0.591	1.485	-2.119	1.217	2.882	0.459
400T300-68	0.695	2.37	1.961	0.981	1.680	0.673	0.984	1.466	0.542	16.23	4916	1.178	1.843	-2.116	1.214	2.875	0.458
400T300-97	0.982	3.34	2.726	1.363	1.666	0.942	0.979	2.292	0.886	26.54	6820	3.387	2.546	-2.109	1.208	2.861	0.456
400T300-118	1.193	4.06	3.272	1.636	1.656	1.135	0.976	2.924	1.170	35.02	8224	6.133	3.037	-2.103	1.204	2.849	0.455
400T300-142	1.427	4.85	3.862	1.931	1.645	1.346	0.971	3.637	1.511	45.23	9758	10.628	3.560	-2.097	1.199	2.837	0.454
400T300-156	1.563	5.32	4.198	2.099	1.639	1.467	0.969	4.051	1.719	51.48	10638	14.080	3.853	-2.093	1.197	2.829	0.453
400T300-170	1.698	5.78	4.526	2.263	1.633	1.586	0.967	4.457	1.932	57.84	11502	18.196	4.136	-2.089	1.194	2.822	0.452
400T300-185	1.833	6.24	4.847	2.423	1.626	1.703	0.964	4.847	2.148	64.33	12355	23.066	4.411	-2.085	1.191	2.814	0.451
550T150-33	0.289	0.98	1.213	0.441	2.050	0.055	0.437	1.020	0.249	7.45	702	0.115	0.301	-0.723	0.459	2.218	0.894
550T150-43	0.375	1.28	1.569	0.570	2.045	0.071	0.435	1.358	0.425	12.71	1561	0.254	0.386	-0.720	0.457	2.212	0.894
550T150-54	0.469	1.60	1.952	0.710	2.040	0.088	0.434	1.768	0.563	16.87	3099	0.501	0.478	-0.717	0.455	2.205	0.894
550T150-68	0.588	2.00	2.432	0.884	2.033	0.109	0.431	2.306	0.750	22.46	5350	0.997	0.590	-0.713	0.453	2.197	0.895
550T150-97	0.830	2.82	3.376	1.228	2.017	0.151	0.427	3.376	1.164	34.84	9680	2.861	0.808	-0.705	0.447	2.179	0.895

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
550T150-118	1.007	3.42	4.053	1.474	2.007	0.180	0.423	4.053	1.474	44.13	11717	5.175	0.957	-0.699	0.443	2.167	0.896
550T150-142	1.202	4.09	4.784	1.740	1.995	0.211	0.419	4.784	1.740	52.09	13962	8.958	1.112	-0.692	0.438	2.152	0.897
550T150-156	1.316	4.48	5.201	1.891	1.988	0.229	0.417	5.201	1.891	56.62	15262	11.858	1.198	-0.687	0.436	2.144	0.897
550T150-170	1.429	4.86	5.607	2.039	1.981	0.245	0.414	5.607	2.039	61.04	16545	15.314	1.280	-0.683	0.433	2.136	0.898
550T150-185	1.541	5.25	6.005	2.184	1.974	0.262	0.412	6.005	2.184	65.38	17820	19.398	1.359	-0.679	0.430	2.128	0.898
550T200-33	0.323	1.10	1.471	0.535	2.134	0.122	0.616	1.137	0.249	7.45	702	0.129	0.653	-1.100	0.679	2.479	0.803
550T200-43	0.420	1.43	1.904	0.692	2.129	0.158	0.614	1.522	0.418	12.50	1561	0.285	0.841	-1.097	0.677	2.473	0.803
550T200-54	0.526	1.79	2.371	0.862	2.124	0.197	0.612	1.976	0.597	17.88	3099	0.561	1.042	-1.094	0.675	2.466	0.803
550T200-68	0.659	2.24	2.957	1.075	2.117	0.245	0.610	2.601	0.800	23.96	5350	1.118	1.291	-1.090	0.672	2.458	0.803
550T200-97	0.931	3.17	4.117	1.497	2.102	0.341	0.605	3.938	1.265	37.87	9680	3.211	1.781	-1.082	0.667	2.441	0.803
550T200-118	1.131	3.85	4.950	1.800	2.092	0.410	0.602	4.924	1.631	48.82	11717	5.814	2.121	-1.076	0.663	2.428	0.804
550T200-142	1.352	4.60	5.854	2.129	2.081	0.483	0.598	5.854	2.052	61.43	13962	10.071	2.481	-1.068	0.658	2.414	0.804
550T200-156	1.481	5.04	6.371	2.317	2.074	0.525	0.596	6.371	2.299	68.83	15262	13.339	2.683	-1.064	0.655	2.406	0.804
550T200-170	1.608	5.47	6.876	2.500	2.068	0.566	0.593	6.876	2.500	74.86	16545	17.235	2.877	-1.060	0.652	2.398	0.805
550T200-185	1.736	5.91	7.372	2.681	2.061	0.606	0.591	7.372	2.681	80.27	17820	21.844	3.065	-1.056	0.650	2.390	0.805
550T250-33[3]	0.358	1.22	1.730	0.629	2.199	0.226	0.794					0.143	1.190	-1.504	0.908	2.780	0.707
550T250-43	0.465	1.58	2.240	0.814	2.194	0.292	0.793	1.666	0.413	12.36	1561	0.315	1.535	-1.501	0.906	2.775	0.707
550T250-54	0.582	1.98	2.790	1.015	2.189	0.364	0.791	2.156	0.623	18.64	3099	0.622	1.905	-1.498	0.904	2.768	0.707
550T250-68	0.731	2.49	3.482	1.266	2.183	0.455	0.789	2.853	0.837	25.06	5350	1.238	2.366	-1.494	0.901	2.760	0.707
550T250-97	1.033	3.52	4.858	1.767	2.168	0.635	0.784	4.379	1.336	40.00	9680	3.562	3.276	-1.486	0.896	2.743	0.706
550T250-118	1.255	4.27	5.848	2.126	2.159	0.765	0.781	5.535	1.738	52.04	11717	6.453	3.914	-1.480	0.891	2.731	0.706
550T250-142	1.501	5.11	6.924	2.518	2.148	0.906	0.777	6.827	2.214	66.28	13962	11.185	4.596	-1.473	0.887	2.717	0.706
550T250-156	1.645	5.60	7.541	2.742	2.141	0.986	0.774	7.541	2.501	74.87	15262	14.820	4.980	-1.469	0.884	2.709	0.706
550T250-170	1.788	6.08	8.145	2.962	2.135	1.065	0.772	8.145	2.790	83.53	16545	19.156	5.351	-1.464	0.881	2.701	0.706
550T250-185	1.930	6.57	8.740	3.178	2.128	1.143	0.770	8.740	3.081	92.23	17820	24.289	5.713	-1.460	0.878	2.693	0.706
550T300-33[3]	0.392	1.33	1.988	0.723	2.251	0.370	0.972					0.157	1.945	-1.927	1.142	3.119	0.618
550T300-43[3]	0.510	1.74	2.575	0.936	2.247	0.480	0.970					0.346	2.512	-1.924	1.140	3.113	0.618
550T300-54	0.639	2.17	3.209	1.167	2.242	0.599	0.968	2.316	0.641	19.19	3099	0.682	3.121	-1.921	1.138	3.107	0.618
550T300-68	0.802	2.73	4.007	1.457	2.235	0.748	0.966	3.075	0.866	25.94	5350	1.359	3.881	-1.917	1.136	3.099	0.617
550T300-97	1.135	3.86	5.599	2.036	2.221	1.049	0.961	4.763	1.391	41.63	9680	3.912	5.389	-1.910	1.130	3.083	0.616

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
550T300-118	1.379	4.69	6.745	2.453	2.212	1.265	0.958	6.065	1.819	54.45	11717	7.091	6.451	-1.903	1.126	3.071	0.616
550T300-142	1.651	5.62	7.994	2.907	2.201	1.502	0.954	7.545	2.333	69.84	13962	12.299	7.592	-1.896	1.121	3.058	0.615
550T300-156	1.809	6.16	8.711	3.168	2.194	1.638	0.952	8.411	2.648	79.27	15262	16.301	8.239	-1.892	1.118	3.050	0.615
550T300-170	1.967	6.69	9.414	3.423	2.188	1.772	0.949	9.267	2.969	88.89	16545	21.078	8.866	-1.888	1.115	3.042	0.615
550T300-185	2.124	7.23	10.107	3.675	2.181	1.904	0.947	10.107	3.297	98.71	17820	26.734	9.480	-1.884	1.113	3.034	0.614
600T150-33	0.306	1.04	1.496	0.499	2.212	0.056	0.429	1.274	0.271	8.12	641	0.122	0.369	-0.693	0.444	2.357	0.914
600T150-43	0.397	1.35	1.936	0.645	2.207	0.073	0.427	1.696	0.459	13.73	1425	0.269	0.474	-0.690	0.442	2.351	0.914
600T150-54	0.497	1.69	2.410	0.803	2.202	0.090	0.425	2.191	0.645	19.31	2828	0.531	0.586	-0.687	0.440	2.345	0.914
600T150-68	0.624	2.12	3.005	1.002	2.195	0.112	0.423	2.854	0.856	25.64	5350	1.057	0.724	-0.683	0.437	2.337	0.915
600T150-97	0.881	3.00	4.178	1.393	2.178	0.154	0.419	4.178	1.323	39.62	10634	3.036	0.993	-0.675	0.432	2.318	0.915
600T150-118	1.069	3.64	5.021	1.674	2.168	0.184	0.415	5.021	1.674	50.11	12882	5.495	1.177	-0.668	0.428	2.306	0.916
600T150-142	1.277	4.35	5.934	1.978	2.156	0.216	0.411	5.934	1.978	59.22	15364	9.514	1.370	-0.661	0.423	2.292	0.917
600T150-156	1.398	4.76	6.455	2.152	2.148	0.234	0.409	6.455	2.152	64.42	16803	12.599	1.476	-0.657	0.420	2.284	0.917
600T150-170	1.519	5.17	6.964	2.321	2.141	0.251	0.406	6.964	2.321	69.50	18226	16.274	1.578	-0.653	0.418	2.275	0.918
600T150-185	1.639	5.58	7.464	2.488	2.134	0.267	0.404	7.464	2.488	74.49	19642	20.621	1.676	-0.649	0.415	2.267	0.918
600T200-33	0.340	1.16	1.804	0.601	2.302	0.125	0.607	1.416	0.272	8.14	641	0.136	0.801	-1.060	0.660	2.606	0.835
600T200-43	0.443	1.51	2.336	0.779	2.297	0.162	0.605	1.894	0.454	13.60	1425	0.300	1.032	-1.057	0.658	2.600	0.835
600T200-54	0.554	1.88	2.910	0.970	2.292	0.202	0.603	2.441	0.683	20.44	2828	0.591	1.279	-1.054	0.656	2.594	0.835
600T200-68	0.695	2.37	3.631	1.210	2.286	0.251	0.601	3.207	0.912	27.31	5350	1.178	1.586	-1.049	0.653	2.586	0.835
600T200-97	0.982	3.34	5.063	1.688	2.270	0.350	0.597	4.847	1.435	42.97	10634	3.387	2.190	-1.042	0.648	2.568	0.836
600T200-118	1.193	4.06	6.093	2.031	2.260	0.420	0.593	6.060	1.847	55.30	12882	6.133	2.610	-1.035	0.644	2.556	0.836
600T200-142	1.427	4.85	7.213	2.404	2.249	0.495	0.589	7.213	2.321	69.48	15364	10.628	3.056	-1.028	0.639	2.542	0.836
600T200-156	1.563	5.32	7.855	2.618	2.242	0.538	0.587	7.855	2.599	77.81	16803	14.080	3.306	-1.024	0.636	2.533	0.837
600T200-170	1.698	5.78	8.483	2.828	2.235	0.580	0.584	8.483	2.828	84.66	18226	18.196	3.548	-1.019	0.633	2.525	0.837
600T200-185	1.833	6.24	9.101	3.034	2.228	0.621	0.582	9.101	3.034	90.83	19642	23.066	3.781	-1.015	0.631	2.517	0.837
600T250-33[3]	0.375	1.28	2.112	0.704	2.373	0.232	0.786					0.150	1.459	-1.455	0.886	2.893	0.747
600T250-43	0.488	1.66	2.736	0.912	2.368	0.300	0.784	2.069	0.451	13.50	1425	0.331	1.883	-1.452	0.884	2.887	0.747
600T250-54	0.610	2.08	3.410	1.137	2.363	0.374	0.782	2.657	0.711	21.30	2828	0.652	2.338	-1.449	0.882	2.880	0.747
600T250-68	0.766	2.61	4.258	1.419	2.357	0.467	0.780	3.509	0.954	28.57	5350	1.299	2.905	-1.445	0.880	2.872	0.747

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
600T250-97	1.084	3.69	5.947	1.982	2.342	0.652	0.776	5.373	1.515	45.37	10634	3.737	4.027	-1.437	0.874	2.855	0.747
600T250-118	1.317	4.48	7.165	2.388	2.332	0.785	0.772	6.789	1.967	58.88	12882	6.772	4.814	-1.431	0.870	2.843	0.747
600T250-142	1.576	5.36	8.493	2.831	2.321	0.930	0.768	8.372	2.500	74.85	15364	11.742	5.658	-1.423	0.865	2.829	0.747
600T250-156	1.727	5.88	9.254	3.085	2.315	1.013	0.766	9.254	2.822	84.50	16803	15.561	6.134	-1.419	0.862	2.821	0.747
600T250-170	1.877	6.39	10.001	3.334	2.308	1.094	0.764	10.001	3.147	94.21	18226	20.117	6.596	-1.415	0.859	2.813	0.747
600T250-185	2.027	6.90	10.738	3.579	2.302	1.175	0.761	10.738	3.473	103.99	19642	25.511	7.046	-1.410	0.857	2.805	0.747
600T300-33[3]	0.410	1.39	2.420	0.807	2.430	0.381	0.964					0.163	2.382	-1.870	1.119	3.215	0.662
600T300-43[3]	0.533	1.81	3.135	1.045	2.426	0.493	0.962					0.361	3.078	-1.867	1.117	3.209	0.661
600T300-54	0.667	2.27	3.910	1.303	2.421	0.616	0.961	2.869	0.700	20.97	2828	0.712	3.826	-1.864	1.114	3.203	0.661
600T300-68	0.838	2.85	4.884	1.628	2.415	0.769	0.958	3.777	0.987	29.56	5350	1.420	4.760	-1.860	1.112	3.195	0.661
600T300-97	1.186	4.03	6.832	2.277	2.400	1.079	0.954	5.834	1.577	47.21	10634	4.088	6.617	-1.852	1.106	3.178	0.660
600T300-118	1.441	4.90	8.237	2.746	2.391	1.301	0.950	7.422	2.057	61.59	12882	7.410	7.929	-1.846	1.102	3.166	0.660
600T300-142	1.726	5.87	9.772	3.257	2.380	1.545	0.946	9.229	2.633	78.83	15364	12.856	9.340	-1.839	1.097	3.153	0.660
600T300-156	1.892	6.44	10.654	3.551	2.373	1.685	0.944	10.290	2.986	89.39	16803	17.042	10.141	-1.835	1.094	3.145	0.660
600T300-170	2.057	7.00	11.520	3.840	2.367	1.823	0.942	11.339	3.346	100.17	18226	22.039	10.919	-1.830	1.091	3.137	0.659
600T300-185	2.222	7.56	12.376	4.125	2.360	1.960	0.939	12.376	3.713	111.16	19642	27.956	11.681	-1.826	1.089	3.128	0.659
800T150-33[1]	0.375	1.28	3.034	0.758	2.844	0.060	0.399	2.262	0.351	10.50		0.150	0.721	-0.594	0.391	2.933	0.959
800T150-43	0.488	1.66	3.931	0.983	2.839	0.077	0.397	3.278	0.558	16.70	1056	0.331	0.928	-0.591	0.389	2.927	0.959
800T150-54	0.610	2.08	4.900	1.225	2.833	0.096	0.396	4.428	0.823	24.63	2094	0.652	1.148	-0.588	0.387	2.921	0.959
800T150-68	0.766	2.61	6.121	1.530	2.826	0.119	0.393	5.901	1.203	36.01	4202	1.299	1.421	-0.585	0.385	2.913	0.960
800T150-97	1.084	3.69	8.551	2.138	2.809	0.164	0.389	8.551	2.046	61.27	10885	3.737	1.953	-0.577	0.380	2.894	0.960
800T150-118	1.317	4.48	10.306	2.577	2.797	0.196	0.386	10.306	2.577	77.14	16235	6.772	2.321	-0.571	0.376	2.881	0.961
800T150-142	1.576	5.36	12.222	3.056	2.785	0.230	0.382	12.222	3.056	91.49	20970	11.742	2.707	-0.565	0.372	2.867	0.961
800T150-156	1.727	5.88	13.323	3.331	2.777	0.249	0.379	13.323	3.331	99.72	22968	15.561	2.923	-0.561	0.369	2.859	0.962
800T150-170	1.877	6.39	14.402	3.601	2.770	0.267	0.377	14.402	3.601	107.80	24950	20.117	3.129	-0.557	0.366	2.850	0.962
800T150-185	2.027	6.90	15.469	3.867	2.762	0.285	0.375	15.469	3.867	115.78	26928	25.511	3.328	-0.553	0.364	2.842	0.962
800T200-33[1]	0.410	1.39	3.582	0.896	2.957	0.135	0.573	2.645	0.365	10.93		0.163	1.571	-0.926	0.594	3.151	0.914
800T200-43	0.533	1.81	4.644	1.161	2.952	0.174	0.572	3.932	0.602	18.02	1056	0.361	2.027	-0.923	0.592	3.146	0.914
800T200-54	0.667	2.27	5.793	1.448	2.947	0.217	0.570	5.027	0.943	28.24	2094	0.712	2.515	-0.920	0.590	3.139	0.914

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
800T200-68	0.838	2.85	7.242	1.810	2.940	0.270	0.567	6.482	1.421	42.55	4202	1.420	3.124	-0.916	0.587	3.131	0.914
800T200-97	1.186	4.03	10.137	2.534	2.924	0.376	0.563	9.739	2.204	65.98	10885	4.088	4.325	-0.908	0.582	3.113	0.915
800T200-118	1.441	4.90	12.232	3.058	2.913	0.451	0.559	12.160	2.816	84.33	16235	7.410	5.166	-0.902	0.578	3.101	0.915
800T200-142	1.726	5.87	14.526	3.631	2.901	0.533	0.556	14.526	3.521	105.43	20970	12.856	6.065	-0.895	0.573	3.087	0.916
800T200-156	1.892	6.44	15.846	3.962	2.894	0.579	0.553	15.846	3.936	117.84	22968	17.042	6.572	-0.891	0.570	3.078	0.916
800T200-170	2.057	7.00	17.144	4.286	2.887	0.624	0.551	17.144	4.286	128.32	24950	22.039	7.062	-0.886	0.568	3.070	0.917
800T200-185	2.222	7.56	18.428	4.607	2.880	0.668	0.549	18.428	4.607	137.94	26928	27.956	7.539	-0.882	0.565	3.062	0.917
800T250-33[1,3]	0.444	1.51	4.131	1.033	3.050	0.251	0.751					0.177	2.863	-1.289	0.809	3.395	0.856
800T250-43	0.578	1.97	5.358	1.339	3.045	0.325	0.749	4.262	0.604	18.07	1056	0.392	3.699	-1.286	0.807	3.389	0.856
800T250-54	0.724	2.46	6.686	1.672	3.040	0.404	0.748	5.466	0.939	28.12	2094	0.773	4.598	-1.283	0.805	3.383	0.856
800T250-68	0.909	3.09	8.362	2.091	3.033	0.505	0.745	7.034	1.484	44.43	4202	1.540	5.722	-1.279	0.802	3.375	0.856
800T250-97	1.287	4.38	11.723	2.931	3.018	0.707	0.741	10.684	2.320	69.45	10885	4.438	7.956	-1.271	0.796	3.357	0.857
800T250-118	1.565	5.33	14.158	3.540	3.007	0.851	0.737	13.464	2.987	89.42	16235	8.049	9.534	-1.264	0.792	3.345	0.857
800T250-142	1.875	6.38	16.829	4.207	2.996	1.008	0.733	16.592	3.773	112.95	20970	13.970	11.234	-1.257	0.788	3.331	0.858
800T250-156	2.056	7.00	18.370	4.592	2.989	1.099	0.731	18.370	4.247	127.14	22968	18.523	12.198	-1.253	0.785	3.322	0.858
800T250-170	2.236	7.61	19.886	4.971	2.982	1.187	0.729	19.886	4.725	141.46	24950	23.960	13.136	-1.249	0.782	3.314	0.858
800T250-185	2.416	8.22	21.388	5.347	2.975	1.275	0.726	21.388	5.207	155.89	26928	30.401	14.054	-1.244	0.779	3.306	0.858
800T300-33[1,3]	0.479	1.63	4.680	1.170	3.126	0.414	0.930					0.191	4.670	-1.675	1.032	3.667	0.791
800T300-43[3]	0.623	2.12	6.071	1.518	3.122	0.537	0.928					0.422	6.040	-1.672	1.030	3.661	0.791
800T300-54	0.780	2.66	7.579	1.895	3.117	0.670	0.927	5.866	0.936	28.01	2094	0.833	7.516	-1.669	1.028	3.655	0.792
800T300-68	0.980	3.34	9.483	2.371	3.110	0.838	0.924	7.556	1.492	44.67	4202	1.661	9.365	-1.664	1.025	3.647	0.792
800T300-97	1.389	4.73	13.309	3.327	3.095	1.175	0.920	11.519	2.412	72.20	10885	4.789	13.058	-1.657	1.020	3.629	0.792
800T300-118	1.690	5.75	16.084	4.021	3.085	1.419	0.916	14.603	3.119	93.37	16235	8.688	15.681	-1.650	1.015	3.617	0.792
800T300-142	2.025	6.89	19.133	4.783	3.074	1.685	0.912	18.129	3.963	118.65	20970	15.083	18.520	-1.643	1.011	3.603	0.792
800T300-156	2.220	7.56	20.893	5.223	3.067	1.839	0.910	20.207	4.479	134.09	22968	20.004	20.138	-1.639	1.008	3.595	0.792
800T300-170	2.415	8.22	22.627	5.657	3.061	1.990	0.908	22.271	5.005	149.85	24950	25.881	21.717	-1.634	1.005	3.587	0.792
800T300-185	2.610	8.88	24.347	6.087	3.054	2.140	0.905	24.323	5.542	165.94	26928	32.846	23.268	-1.630	1.002	3.578	0.793
1000T150-33[2]	0.444	1.51	5.321	1.064	3.461	0.062	0.374					0.177	1.206	-0.521	0.350	3.520	0.978
1000T150-43[1]	0.578	1.97	6.901	1.380	3.456	0.080	0.372	5.509	0.712	21.31		0.392	1.554	-0.518	0.348	3.514	0.978

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1000T150-54	0.724	2.46	8.612	1.722	3.450	0.099	0.371	7.525	1.058	31.69	1663	0.773	1.924	-0.516	0.346	3.508	0.978
1000T150-68	0.909	3.09	10.771	2.154	3.442	0.123	0.369	10.148	1.565	46.86	3334	1.540	2.383	-0.512	0.344	3.499	0.979
1000T150-97	1.287	4.38	15.091	3.018	3.424	0.171	0.364	15.091	2.757	82.55	9776	4.438	3.281	-0.505	0.339	3.480	0.979
1000T150-118	1.565	5.33	18.225	3.645	3.412	0.204	0.361	18.225	3.645	109.13	16235	8.049	3.903	-0.500	0.335	3.467	0.979
1000T150-142	1.875	6.38	21.663	4.333	3.399	0.239	0.357	21.663	4.333	129.72	23522	13.970	4.560	-0.494	0.331	3.453	0.980
1000T150-156	2.056	7.00	23.645	4.729	3.391	0.259	0.355	23.645	4.729	141.59	28445	18.523	4.927	-0.490	0.329	3.445	0.980
1000T150-170	2.236	7.61	25.596	5.119	3.383	0.278	0.352	25.596	5.119	153.27	31674	23.960	5.279	-0.486	0.326	3.436	0.980
1000T150-185	2.416	8.22	27.528	5.506	3.376	0.296	0.350	27.528	5.506	164.84	34214	30.401	5.618	-0.483	0.324	3.428	0.980
1000T200-33[2]	0.479	1.63	6.180	1.236	3.593	0.141	0.543					0.191	2.642	-0.824	0.539	3.726	0.951
1000T200-43[1]	0.623	2.12	8.018	1.604	3.588	0.183	0.541	5.943	0.729	21.83		0.422	3.411	-0.821	0.538	3.720	0.951
1000T200-54	0.780	2.66	10.011	2.002	3.582	0.227	0.539	8.183	1.090	32.64	1663	0.833	4.236	-0.818	0.536	3.714	0.952
1000T200-68	0.980	3.34	12.528	2.506	3.575	0.283	0.537	11.140	1.626	48.68	3334	1.661	5.265	-0.814	0.533	3.705	0.952
1000T200-97	1.389	4.73	17.582	3.516	3.558	0.394	0.533	17.036	2.924	87.54	9776	4.789	7.302	-0.806	0.528	3.687	0.952
1000T200-118	1.690	5.75	21.254	4.251	3.547	0.473	0.529	21.132	3.943	118.06	16235	8.688	8.734	-0.800	0.524	3.674	0.953
1000T200-142	2.025	6.89	25.290	5.058	3.534	0.559	0.525	25.290	4.922	147.36	23522	15.083	10.269	-0.794	0.520	3.660	0.953
1000T200-156	2.220	7.56	27.621	5.524	3.527	0.608	0.523	27.621	5.493	164.45	28445	20.004	11.136	-0.790	0.517	3.652	0.953
1000T200-170	2.415	8.22	29.919	5.984	3.520	0.655	0.521	29.919	5.984	179.15	31674	25.881	11.977	-0.786	0.514	3.644	0.953
1000T200-185	2.610	8.88	32.198	6.440	3.512	0.702	0.519	32.198	6.440	192.81	34214	32.846	12.797	-0.782	0.512	3.635	0.954
1000T250-33[2,3]	0.513	1.75	7.039	1.408	3.703	0.264	0.718					0.205	4.826	-1.159	0.744	3.946	0.914
1000T250-43[1]	0.668	2.27	9.135	1.827	3.698	0.342	0.716	6.951	0.757	22.68		0.453	6.239	-1.156	0.742	3.940	0.914
1000T250-54	0.837	2.85	11.410	2.282	3.692	0.427	0.714	9.646	1.168	34.98	1663	0.894	7.761	-1.153	0.740	3.934	0.914
1000T250-68	1.052	3.58	14.285	2.857	3.686	0.533	0.712	12.381	1.851	55.42	3334	1.782	9.665	-1.149	0.737	3.926	0.914
1000T250-97	1.491	5.07	20.073	4.015	3.669	0.746	0.707	18.432	3.263	97.69	9776	5.140	13.464	-1.141	0.732	3.907	0.915
1000T250-118	1.814	6.17	24.282	4.856	3.659	0.899	0.704	23.171	4.175	125.01	16235	9.326	16.156	-1.135	0.728	3.895	0.915
1000T250-142	2.174	7.40	28.916	5.783	3.647	1.065	0.700	28.517	5.247	157.09	23522	16.197	19.064	-1.128	0.723	3.881	0.916
1000T250-156	2.385	8.12	31.597	6.319	3.640	1.161	0.698	31.597	5.892	176.41	28445	21.485	20.719	-1.124	0.720	3.873	0.916
1000T250-170	2.594	8.83	34.242	6.848	3.633	1.254	0.695	34.242	6.543	195.91	31674	27.803	22.332	-1.120	0.718	3.865	0.916
1000T250-185	2.804	9.54	36.869	7.374	3.626	1.347	0.693	36.869	7.200	215.57	34214	35.292	23.915	-1.116	0.715	3.856	0.916
1000T300-33[2,3]	0.548	1.86	7.898	1.580	3.796	0.439	0.895					0.219	7.876	-1.520	0.958	4.186	0.868
1000T300-43[1,3]	0.713	2.43	10.253	2.051	3.792	0.569	0.894					0.484	10.192	-1.517	0.956	4.180	0.868

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1000T300-54	0.893	3.04	12.809	2.562	3.786	0.710	0.892	10.299	1.171	35.06	1663	0.954	12.691	-1.513	0.954	4.174	0.869
1000T300-68	1.123	3.82	16.042	3.208	3.780	0.888	0.889	13.254	1.844	55.22	3334	1.903	15.828	-1.509	0.951	4.166	0.869
1000T300-97	1.592	5.42	22.564	4.513	3.764	1.247	0.885	19.754	3.387	101.41	9776	5.490	22.110	-1.501	0.946	4.148	0.869
1000T300-118	1.938	6.59	27.310	5.462	3.754	1.506	0.882	24.964	4.351	130.28	16235	9.965	26.586	-1.495	0.941	4.136	0.869
1000T300-142	2.324	7.91	32.543	6.509	3.742	1.789	0.878	30.930	5.497	164.58	23522	17.311	31.447	-1.488	0.937	4.122	0.870
1000T300-156	2.549	8.67	35.573	7.115	3.736	1.953	0.875	34.456	6.196	185.50	28445	22.966	34.225	-1.483	0.934	4.114	0.870
1000T300-170	2.774	9.44	38.565	7.713	3.729	2.114	0.873	37.967	6.908	206.82	31674	29.724	36.943	-1.479	0.931	4.105	0.870
1000T300-185	2.999	10.20	41.540	8.308	3.722	2.273	0.871	41.467	7.635	228.59	34214	37.737	39.617	-1.475	0.929	4.097	0.870
1050T150-33[2]	0.462	1.57	6.026	1.148	3.614	0.063	0.368					0.184	1.349	-0.506	0.341	3.667	0.981
1050T150-43[1]	0.600	2.04	7.817	1.489	3.608	0.081	0.367	6.169	0.750	22.47		0.407	1.738	-0.503	0.339	3.661	0.981
1050T150-54	0.752	2.56	9.757	1.858	3.602	0.100	0.365	8.446	1.117	33.45	1581	0.803	2.153	-0.500	0.337	3.655	0.981
1050T150-68	0.945	3.21	12.206	2.325	3.595	0.124	0.363	11.419	1.656	49.57	3170	1.601	2.666	-0.497	0.335	3.647	0.981
1050T150-97	1.338	4.55	17.113	3.260	3.576	0.172	0.359	17.113	2.933	87.80	9291	4.614	3.672	-0.490	0.330	3.627	0.982
1050T150-118	1.628	5.54	20.675	3.938	3.564	0.205	0.355	20.675	3.907	116.97	16235	8.368	4.369	-0.485	0.326	3.614	0.982
1050T150-142	1.950	6.63	24.586	4.683	3.551	0.241	0.351	24.586	4.683	140.21	23522	14.526	5.106	-0.479	0.322	3.600	0.982
1050T150-156	2.138	7.28	26.842	5.113	3.543	0.261	0.349	26.842	5.113	153.08	28445	19.263	5.517	-0.475	0.320	3.592	0.983
1050T150-170	2.326	7.91	29.065	5.536	3.535	0.280	0.347	29.065	5.536	165.75	33355	24.921	5.912	-0.471	0.318	3.583	0.983
1050T150-185	2.513	8.55	31.267	5.956	3.527	0.299	0.345	31.267	5.956	178.31	36036	31.624	6.294	-0.468	0.315	3.575	0.983
1050T200-33[2]	0.496	1.69	6.974	1.328	3.749	0.142	0.536					0.198	2.959	-0.802	0.527	3.871	0.957
1050T200-43[1]	0.646	2.20	9.049	1.724	3.744	0.184	0.534	6.641	0.768	23.00		0.438	3.820	-0.799	0.526	3.865	0.957
1050T200-54	0.809	2.75	11.300	2.152	3.738	0.229	0.532	9.165	1.150	34.44	1581	0.863	4.745	-0.796	0.524	3.859	0.957
1050T200-68	1.016	3.46	14.144	2.694	3.731	0.286	0.530	12.507	1.719	51.46	3170	1.722	5.898	-0.792	0.521	3.851	0.958
1050T200-97	1.440	4.90	19.862	3.783	3.714	0.398	0.526	19.282	3.105	92.97	9291	4.964	8.184	-0.784	0.516	3.832	0.958
1050T200-118	1.752	5.96	24.018	4.575	3.703	0.478	0.522	23.900	4.204	125.86	16235	9.007	9.791	-0.779	0.512	3.820	0.958
1050T200-142	2.099	7.14	28.590	5.446	3.690	0.564	0.518	28.590	5.303	158.77	23522	15.640	11.514	-0.772	0.508	3.806	0.959
1050T200-156	2.303	7.84	31.233	5.949	3.683	0.614	0.516	31.233	5.916	177.13	28445	20.745	12.488	-0.768	0.505	3.797	0.959
1050T200-170	2.505	8.52	33.839	6.446	3.676	0.662	0.514	33.839	6.446	192.98	33355	26.842	13.434	-0.764	0.503	3.789	0.959
1050T200-185	2.707	9.21	36.426	6.938	3.668	0.709	0.512	36.426	6.938	207.73	36036	34.069	14.356	-0.760	0.500	3.781	0.960
1050T250-33[2,3]	0.531	1.81	7.921	1.509	3.863	0.267	0.710					0.212	5.408	-1.131	0.729	4.088	0.923

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1050T250-43[1]	0.691	2.35	10.281	1.958	3.858	0.346	0.708	7.039	0.780	23.34		0.468	6.992	-1.128	0.727	4.082	0.924
1050T250-54	0.865	2.94	12.843	2.446	3.853	0.431	0.706	9.777	1.172	35.09	1581	0.924	8.699	-1.125	0.725	4.075	0.924
1050T250-68	1.087	3.70	16.083	3.063	3.846	0.539	0.704	13.431	1.760	52.71	3170	1.842	10.835	-1.121	0.723	4.067	0.924
1050T250-97	1.542	5.25	22.611	4.307	3.830	0.754	0.699	20.988	3.221	96.45	9291	5.315	15.099	-1.113	0.717	4.049	0.924
1050T250-118	1.876	6.38	27.361	5.212	3.819	0.909	0.696	26.184	4.405	131.89	16235	9.646	18.122	-1.107	0.713	4.037	0.925
1050T250-142	2.249	7.65	32.594	6.208	3.807	1.077	0.692	32.148	5.647	169.06	23522	16.754	21.390	-1.100	0.709	4.023	0.925
1050T250-156	2.467	8.39	35.623	6.785	3.800	1.174	0.690	35.623	6.338	189.76	28445	22.226	23.251	-1.096	0.706	4.015	0.925
1050T250-170	2.684	9.13	38.614	7.355	3.793	1.268	0.687	38.614	7.036	210.64	33355	28.764	25.066	-1.092	0.703	4.006	0.926
1050T250-185	2.902	9.87	41.585	7.921	3.786	1.362	0.685	41.585	7.739	231.71	36036	36.514	26.846	-1.088	0.701	3.998	0.926
1050T300-33[2,3]	0.565	1.92	8.869	1.689	3.961	0.444	0.887					0.226	8.828	-1.486	0.941	4.322	0.882
1050T300-43[1,3]	0.736	2.50	11.514	2.193	3.956	0.576	0.885					0.499	11.426	-1.483	0.939	4.316	0.882
1050T300-54	0.922	3.14	14.387	2.740	3.951	0.719	0.883	11.659	1.230	36.84	1581	0.984	14.230	-1.479	0.937	4.310	0.882
1050T300-68	1.159	3.94	18.022	3.433	3.944	0.899	0.881	15.001	1.933	57.87	3170	1.963	17.749	-1.475	0.934	4.302	0.882
1050T300-97	1.643	5.59	25.360	4.830	3.928	1.262	0.876	22.259	3.653	109.36	9291	5.666	24.802	-1.467	0.929	4.284	0.883
1050T300-118	2.000	6.81	30.703	5.848	3.918	1.524	0.873	28.109	4.686	140.29	16235	10.284	29.831	-1.461	0.925	4.272	0.883
1050T300-142	2.398	8.16	36.598	6.971	3.906	1.811	0.869	34.810	5.912	177.01	23522	17.868	35.295	-1.454	0.920	4.258	0.883
1050T300-156	2.631	8.95	40.014	7.622	3.900	1.977	0.867	38.773	6.660	199.39	28445	23.707	38.420	-1.450	0.917	4.250	0.884
1050T300-170	2.863	9.74	43.388	8.264	3.893	2.140	0.864	42.719	7.421	222.20	33355	30.685	41.478	-1.445	0.915	4.241	0.884
1050T300-185	3.096	10.53	46.744	8.904	3.886	2.301	0.862	46.656	8.199	245.47	36036	38.959	44.488	-1.441	0.912	4.233	0.884
1100T150-33[3]	0.479	1.63	6.789	1.234	3.766	0.063	0.363					0.191	1.501	-0.491	0.332	3.815	0.983
1100T150-43[1]	0.623	2.12	8.808	1.601	3.760	0.081	0.361	6.870	0.789	23.62		0.422	1.933	-0.489	0.330	3.809	0.984
1100T150-54	0.780	2.66	10.996	1.999	3.754	0.101	0.360	9.427	1.176	35.21	1507	0.833	2.395	-0.486	0.329	3.802	0.984
1100T150-68	0.980	3.34	13.759	2.502	3.746	0.125	0.358	12.778	1.746	52.29	3021	1.661	2.967	-0.482	0.326	3.794	0.984
1100T150-97	1.389	4.73	19.301	3.509	3.728	0.173	0.353	19.301	3.108	93.06	8852	4.789	4.088	-0.476	0.322	3.774	0.984
1100T150-118	1.690	5.75	23.328	4.241	3.716	0.207	0.350	23.328	4.157	124.46	16191	8.688	4.864	-0.470	0.318	3.762	0.984
1100T150-142	2.025	6.89	27.752	5.046	3.702	0.243	0.346	27.752	5.046	151.07	23522	15.083	5.686	-0.464	0.314	3.747	0.985
1100T150-156	2.220	7.56	30.307	5.510	3.694	0.263	0.344	30.307	5.510	164.98	28445	20.004	6.144	-0.461	0.312	3.739	0.985
1100T150-170	2.415	8.22	32.824	5.968	3.687	0.282	0.342	32.824	5.968	178.68	33834	25.881	6.585	-0.458	0.309	3.731	0.985
1100T150-185	2.610	8.88	35.321	6.422	3.679	0.301	0.339	35.321	6.422	192.27	37857	32.846	7.011	-0.454	0.307	3.722	0.985

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1100T200-33[3]	0.513	1.75	7.830	1.424	3.905	0.144	0.529					0.205	3.295	-0.781	0.516	4.017	0.962
1100T200-43[1]	0.668	2.27	10.161	1.847	3.900	0.186	0.527	7.381	0.807	24.17		0.453	4.255	-0.778	0.514	4.012	0.962
1100T200-54	0.837	2.85	12.691	2.307	3.894	0.231	0.526	10.208	1.210	36.23	1507	0.894	5.286	-0.775	0.512	4.005	0.963
1100T200-68	1.052	3.58	15.888	2.889	3.887	0.288	0.523	13.964	1.811	54.23	3021	1.782	6.571	-0.771	0.510	3.997	0.963
1100T200-97	1.491	5.07	22.321	4.058	3.869	0.402	0.519	21.710	3.287	98.40	8852	5.140	9.120	-0.764	0.504	3.978	0.963
1100T200-118	1.814	6.17	27.001	4.909	3.858	0.482	0.516	26.891	4.465	133.68	16191	9.326	10.914	-0.758	0.501	3.966	0.963
1100T200-142	2.174	7.40	32.153	5.846	3.846	0.569	0.512	32.153	5.697	170.56	23522	16.197	12.838	-0.752	0.496	3.952	0.964
1100T200-156	2.385	8.12	35.133	6.388	3.838	0.619	0.509	35.133	6.353	190.21	28445	21.485	13.927	-0.748	0.494	3.943	0.964
1100T200-170	2.594	8.83	38.073	6.922	3.831	0.667	0.507	38.073	6.922	207.25	33834	27.803	14.983	-0.744	0.491	3.935	0.964
1100T200-185	2.804	9.54	40.993	7.453	3.823	0.715	0.505	40.993	7.453	223.15	37857	35.292	16.014	-0.740	0.489	3.927	0.964
1100T250-33[3]	0.548	1.86	8.870	1.613	4.023	0.270	0.702					0.219	6.027	-1.104	0.715	4.230	0.932
1100T250-43[1]	0.713	2.43	11.514	2.093	4.018	0.350	0.700	7.813	0.819	24.53		0.484	7.794	-1.101	0.713	4.225	0.932
1100T250-54	0.893	3.04	14.385	2.615	4.013	0.436	0.698	10.874	1.233	36.91	1507	0.954	9.697	-1.098	0.711	4.218	0.932
1100T250-68	1.123	3.82	18.017	3.276	4.006	0.544	0.696	14.970	1.855	55.53	3021	1.903	12.081	-1.094	0.709	4.210	0.932
1100T250-97	1.592	5.42	25.341	4.607	3.989	0.762	0.692	23.594	3.407	101.99	8852	5.490	16.839	-1.086	0.703	4.192	0.933
1100T250-118	1.938	6.59	30.673	5.577	3.978	0.918	0.688	29.411	4.673	139.91	16191	9.965	20.216	-1.080	0.699	4.179	0.933
1100T250-142	2.324	7.91	36.553	6.646	3.966	1.088	0.684	36.057	6.059	181.41	23522	17.311	23.868	-1.073	0.695	4.166	0.934
1100T250-156	2.549	8.67	39.958	7.265	3.959	1.186	0.682	39.958	6.798	203.53	28445	22.966	25.948	-1.069	0.692	4.157	0.934
1100T250-170	2.774	9.44	43.321	7.877	3.952	1.282	0.680	43.321	7.543	225.83	33834	29.724	27.977	-1.065	0.689	4.149	0.934
1100T250-185	2.999	10.20	46.664	8.484	3.945	1.376	0.677	46.664	8.294	248.33	37857	37.737	29.969	-1.061	0.687	4.141	0.934
1100T300-33[3]	0.583	1.98	9.910	1.802	4.124	0.449	0.878					0.232	9.843	-1.453	0.925	4.460	0.894
1100T300-43[1,3]	0.758	2.58	12.867	2.339	4.119	0.583	0.877					0.514	12.741	-1.450	0.923	4.454	0.894
1100T300-54	0.950	3.23	16.080	2.924	4.114	0.727	0.875	13.128	1.290	38.61	1507	1.015	15.869	-1.447	0.921	4.448	0.894
1100T300-68	1.194	4.06	20.146	3.663	4.107	0.909	0.873	16.886	2.022	60.53	3021	2.024	19.796	-1.443	0.918	4.440	0.894
1100T300-97	1.694	5.76	28.361	5.157	4.091	1.277	0.868	24.956	3.927	117.58	8852	5.841	27.671	-1.435	0.913	4.422	0.895
1100T300-118	2.062	7.02	34.346	6.245	4.081	1.542	0.865	31.492	5.031	150.63	16191	10.604	33.290	-1.429	0.908	4.409	0.895
1100T300-142	2.473	8.42	40.953	7.446	4.069	1.832	0.861	38.981	6.340	189.82	23522	18.425	39.397	-1.421	0.904	4.396	0.895
1100T300-156	2.714	9.23	44.784	8.142	4.062	1.999	0.858	43.411	7.138	213.70	28445	24.447	42.892	-1.417	0.901	4.387	0.896
1100T300-170	2.953	10.05	48.570	8.831	4.056	2.164	0.856	47.825	7.950	238.02	33834	31.646	46.313	-1.413	0.898	4.379	0.896
1100T300-185	3.193	10.87	52.336	9.516	4.049	2.327	0.854	52.227	8.779	262.84	37857	40.182	49.682	-1.409	0.896	4.371	0.896

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1150T150-33[3]	0.496	1.69	7.612	1.324	3.917	0.063	0.358					0.198	1.661	-0.477	0.324	3.962	0.985
1150T150-43[1]	0.646	2.20	9.877	1.718	3.912	0.082	0.356	7.612	0.827	24.77		0.438	2.140	-0.475	0.322	3.956	0.986
1150T150-54	0.809	2.75	12.333	2.145	3.905	0.102	0.355	10.469	1.235	36.97	1440	0.863	2.651	-0.472	0.321	3.950	0.986
1150T150-68	1.016	3.46	15.435	2.684	3.898	0.126	0.352	14.223	1.837	55.00	2886	1.722	3.285	-0.469	0.318	3.942	0.986
1150T150-97	1.440	4.90	21.664	3.768	3.879	0.174	0.348	21.623	3.284	98.33	8452	4.964	4.527	-0.462	0.314	3.922	0.986
1150T150-118	1.752	5.96	26.192	4.555	3.867	0.208	0.345	26.192	4.408	131.98	15457	9.007	5.388	-0.457	0.310	3.909	0.986
1150T150-142	2.099	7.14	31.172	5.421	3.853	0.244	0.341	31.172	5.421	162.31	23522	15.640	6.299	-0.451	0.306	3.895	0.987
1150T150-156	2.303	7.84	34.049	5.922	3.845	0.264	0.339	34.049	5.922	177.29	28445	20.745	6.808	-0.448	0.304	3.886	0.987
1150T150-170	2.505	8.52	36.886	6.415	3.837	0.284	0.337	36.886	6.415	192.06	33834	26.842	7.297	-0.444	0.302	3.878	0.987
1150T150-185	2.707	9.21	39.701	6.904	3.829	0.303	0.334	39.701	6.904	206.72	39679	34.069	7.770	-0.441	0.299	3.869	0.987
1150T200-33[3]	0.531	1.81	8.749	1.522	4.060	0.145	0.522					0.212	3.652	-0.761	0.505	4.164	0.967
1150T200-43[1]	0.691	2.35	11.356	1.975	4.055	0.187	0.521	8.164	0.846	25.34		0.468	4.716	-0.759	0.503	4.158	0.967
1150T200-54	0.865	2.94	14.186	2.467	4.049	0.233	0.519	11.318	1.270	38.03	1440	0.924	5.859	-0.756	0.501	4.152	0.967
1150T200-68	1.087	3.70	17.763	3.089	4.042	0.291	0.517	15.512	1.904	57.01	2886	1.842	7.285	-0.752	0.499	4.144	0.967
1150T200-97	1.542	5.25	24.967	4.342	4.024	0.405	0.513	24.313	3.468	103.84	8452	5.315	10.114	-0.744	0.494	4.125	0.967
1150T200-118	1.876	6.38	30.210	5.254	4.013	0.486	0.509	30.113	4.727	141.52	15457	9.646	12.105	-0.739	0.490	4.112	0.968
1150T200-142	2.249	7.65	35.987	6.259	4.000	0.574	0.505	35.987	6.103	182.73	23522	16.754	14.242	-0.732	0.486	4.098	0.968
1150T200-156	2.467	8.39	39.330	6.840	3.993	0.624	0.503	39.330	6.804	203.71	28445	22.226	15.452	-0.728	0.483	4.090	0.968
1150T200-170	2.684	9.13	42.630	7.414	3.985	0.673	0.501	42.630	7.414	221.98	33834	28.764	16.625	-0.725	0.481	4.081	0.968
1150T200-185	2.902	9.87	45.909	7.984	3.978	0.721	0.498	45.909	7.984	239.05	39679	36.514	17.772	-0.721	0.478	4.073	0.969
1150T250-33[3]	0.565	1.92	9.886	1.719	4.182	0.272	0.694					0.226	6.684	-1.079	0.701	4.374	0.939
1150T250-43[1]	0.736	2.50	12.836	2.232	4.177	0.353	0.693	8.630	0.859	25.71		0.499	8.645	-1.076	0.700	4.368	0.939
1150T250-54	0.922	3.14	16.039	2.789	4.171	0.440	0.691	12.035	1.293	38.73	1440	0.984	10.757	-1.073	0.698	4.362	0.940
1150T250-68	1.159	3.94	20.092	3.494	4.164	0.549	0.689	16.604	1.949	58.34	2886	1.963	13.403	-1.069	0.695	4.354	0.940
1150T250-97	1.643	5.59	28.270	4.917	4.148	0.769	0.684	26.336	3.592	107.54	8452	5.666	18.687	-1.061	0.690	4.336	0.940
1150T250-118	2.000	6.81	34.229	5.953	4.137	0.927	0.681	32.882	4.941	147.94	15457	10.284	22.438	-1.055	0.686	4.323	0.940
1150T250-142	2.398	8.16	40.802	7.096	4.125	1.099	0.677	40.254	6.484	194.14	23522	17.868	26.498	-1.048	0.681	4.309	0.941
1150T250-156	2.631	8.95	44.611	7.759	4.117	1.197	0.674	44.611	7.271	217.70	28445	23.707	28.812	-1.044	0.679	4.301	0.941
1150T250-170	2.863	9.74	48.375	8.413	4.110	1.294	0.672	48.375	8.065	241.46	33834	30.685	31.069	-1.040	0.676	4.293	0.941
1150T250-185	3.096	10.53	52.118	9.064	4.103	1.389	0.670	52.118	8.866	265.44	39679	38.959	33.286	-1.036	0.673	4.284	0.942

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1150T300-33[3]	0.600	2.04	11.024	1.917	4.287	0.454	0.870					0.239	10.920	-1.422	0.909	4.599	0.904
1150T300-43[1,3]	0.781	2.66	14.315	2.490	4.282	0.589	0.868					0.529	14.137	-1.419	0.907	4.594	0.905
1150T300-54	0.978	3.33	17.892	3.112	4.276	0.735	0.867	14.413	1.349	40.39	1440	1.045	17.609	-1.416	0.905	4.587	0.905
1150T300-68	1.230	4.19	22.420	3.899	4.270	0.919	0.864	18.915	2.111	63.19	2886	2.084	21.970	-1.412	0.902	4.579	0.905
1150T300-97	1.745	5.94	31.574	5.491	4.254	1.290	0.860	27.850	4.210	126.05	8452	6.016	30.719	-1.404	0.897	4.561	0.905
1150T300-118	2.124	7.23	38.247	6.652	4.243	1.558	0.856	35.120	5.387	161.28	15457	10.923	36.964	-1.398	0.893	4.549	0.906
1150T300-142	2.548	8.67	45.617	7.933	4.231	1.852	0.852	43.452	6.781	203.01	23522	18.982	43.756	-1.391	0.888	4.535	0.906
1150T300-156	2.796	9.51	49.893	8.677	4.224	2.021	0.850	48.382	7.629	228.42	28445	25.188	47.645	-1.386	0.886	4.527	0.906
1150T300-170	3.043	10.35	54.120	9.412	4.217	2.187	0.848	53.296	8.494	254.30	33834	32.606	51.451	-1.382	0.883	4.518	0.906
1150T300-185	3.290	11.20	58.327	10.144	4.210	2.352	0.846	58.200	9.376	280.71	39679	41.404	55.202	-1.378	0.880	4.510	0.907
1200T150-33[3]	0.513	1.75	8.497	1.416	4.068	0.064	0.353					0.205	1.830	-0.464	0.316	4.110	0.987
1200T150-43[1]	0.668	2.27	11.026	1.838	4.063	0.082	0.351					0.453	2.358	-0.462	0.315	4.104	0.987
1200T150-54[1]	0.837	2.85	13.770	2.295	4.056	0.102	0.350	11.572	1.294	38.73		0.894	2.922	-0.459	0.313	4.097	0.987
1200T150-68	1.052	3.58	17.238	2.873	4.049	0.127	0.347	15.758	1.928	57.71	2763	1.782	3.621	-0.456	0.311	4.089	0.988
1200T150-97	1.491	5.07	24.206	4.034	4.030	0.176	0.343	24.033	3.460	103.61	8087	5.140	4.990	-0.449	0.306	4.069	0.988
1200T150-118	1.814	6.17	29.275	4.879	4.018	0.209	0.340	29.275	4.660	139.51	14787	9.326	5.940	-0.444	0.303	4.056	0.988
1200T150-142	2.174	7.40	34.854	5.809	4.004	0.246	0.336	34.854	5.809	173.92	23522	16.197	6.946	-0.439	0.299	4.042	0.988
1200T150-156	2.385	8.12	38.079	6.347	3.996	0.266	0.334	38.079	6.347	190.02	28445	21.485	7.508	-0.435	0.296	4.033	0.988
1200T150-170	2.594	8.83	41.260	6.877	3.988	0.286	0.332	41.260	6.877	205.89	33834	27.803	8.048	-0.432	0.294	4.025	0.988
1200T150-185	2.804	9.54	44.419	7.403	3.980	0.305	0.330	44.419	7.403	221.65	39732	35.292	8.571	-0.429	0.292	4.016	0.989
1200T200-33[3]	0.548	1.86	9.736	1.623	4.215	0.146	0.516					0.219	4.029	-0.743	0.494	4.311	0.970
1200T200-43[1]	0.713	2.43	12.638	2.106	4.210	0.189	0.515					0.484	5.204	-0.740	0.492	4.305	0.970
1200T200-54[1]	0.893	3.04	15.789	2.631	4.204	0.235	0.513	12.488	1.330	39.82		0.954	6.465	-0.737	0.491	4.299	0.971
1200T200-68	1.123	3.82	19.774	3.296	4.196	0.293	0.511	17.153	1.997	59.78	2763	1.903	8.039	-0.733	0.488	4.290	0.971
1200T200-97	1.592	5.42	27.806	4.634	4.179	0.408	0.506	26.977	3.650	109.29	8087	5.490	11.163	-0.726	0.483	4.271	0.971
1200T200-118	1.938	6.59	33.655	5.609	4.167	0.490	0.503	33.574	4.989	149.37	14787	9.965	13.363	-0.720	0.479	4.259	0.971
1200T200-142	2.324	7.91	40.102	6.684	4.154	0.579	0.499	40.102	6.522	195.26	23522	17.311	15.726	-0.714	0.475	4.245	0.972
1200T200-156	2.549	8.67	43.836	7.306	4.147	0.629	0.497	43.836	7.269	217.62	28445	22.966	17.064	-0.710	0.473	4.236	0.972
1200T200-170	2.774	9.44	47.524	7.921	4.139	0.678	0.494	47.524	7.921	237.14	33834	29.724	18.362	-0.706	0.470	4.228	0.972

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1200T200-185	2.999	10.20	51.189	8.531	4.132	0.726	0.492	51.189	8.531	255.43	39732	37.737	19.631	-0.703	0.468	4.220	0.972
1200T250-33[3]	0.583	1.98	10.974	1.829	4.340	0.275	0.687					0.232	7.380	-1.055	0.688	4.519	0.946
1200T250-43[1]	0.758	2.58	14.249	2.375	4.335	0.356	0.685					0.514	9.545	-1.052	0.687	4.513	0.946
1200T250-54[1]	0.950	3.23	17.807	2.968	4.329	0.444	0.683	13.261	1.354	40.55		1.015	11.878	-1.049	0.685	4.507	0.946
1200T250-68	1.194	4.06	22.311	3.718	4.322	0.554	0.681	18.332	2.043	61.16	2763	2.024	14.802	-1.045	0.682	4.499	0.946
1200T250-97	1.694	5.76	31.405	5.234	4.305	0.776	0.677	29.173	3.777	113.09	8087	5.841	20.642	-1.037	0.677	4.480	0.946
1200T250-118	2.062	7.02	38.034	6.339	4.295	0.935	0.673	36.604	5.210	155.99	14787	10.604	24.791	-1.031	0.673	4.468	0.947
1200T250-142	2.473	8.42	45.351	7.559	4.282	1.108	0.669	44.763	6.893	206.37	23522	18.425	29.282	-1.024	0.668	4.454	0.947
1200T250-156	2.714	9.23	49.594	8.266	4.275	1.208	0.667	49.594	7.758	232.29	28445	24.447	31.843	-1.020	0.666	4.445	0.947
1200T250-170	2.953	10.05	53.787	8.965	4.268	1.305	0.665	53.787	8.602	257.55	33834	31.646	34.342	-1.016	0.663	4.437	0.948
1200T250-185	3.193	10.87	57.959	9.660	4.260	1.402	0.663	57.959	9.453	283.03	39732	40.182	36.797	-1.012	0.661	4.429	0.948
1200T300-33[3]	0.617	2.10	12.212	2.035	4.448	0.459	0.862					0.246	12.061	-1.393	0.894	4.740	0.914
1200T300-43[1,3]	0.803	2.73	15.861	2.643	4.443	0.595	0.860					0.545	15.615	-1.390	0.892	4.734	0.914
1200T300-54[1]	1.007	3.43	19.826	3.304	4.438	0.742	0.858	15.661	1.409	42.17		1.075	19.452	-1.386	0.890	4.728	0.914
1200T300-68	1.266	4.31	24.847	4.141	4.431	0.928	0.856	21.091	2.200	65.86	2763	2.145	24.273	-1.382	0.887	4.720	0.914
1200T300-97	1.796	6.11	35.004	5.834	4.415	1.303	0.852	30.948	4.502	134.78	8087	6.192	33.948	-1.374	0.882	4.702	0.915
1200T300-118	2.186	7.44	42.413	7.069	4.404	1.573	0.848	39.001	5.753	172.24	14787	11.242	40.857	-1.368	0.878	4.689	0.915
1200T300-142	2.623	8.92	50.600	8.433	4.392	1.870	0.844	48.232	7.234	216.58	23522	19.539	48.375	-1.361	0.873	4.675	0.915
1200T300-156	2.878	9.79	55.351	9.225	4.385	2.041	0.842	53.695	8.135	243.56	28445	25.928	52.680	-1.357	0.870	4.667	0.915
1200T300-170	3.132	10.66	60.051	10.008	4.378	2.209	0.840	59.143	9.052	271.03	33834	33.567	56.896	-1.353	0.868	4.659	0.916
1200T300-185	3.387	11.53	64.729	10.788	4.371	2.376	0.837	64.582	9.988	299.06	39732	42.627	61.052	-1.349	0.865	4.651	0.916
1250T150-33[3]	0.531	1.81	9.446	1.511	4.219	0.064	0.348					0.212	2.008	-0.452	0.309	4.257	0.989
1250T150-43[2]	0.691	2.35	12.260	1.962	4.213	0.083	0.346					0.468	2.588	-0.450	0.307	4.251	0.989
1250T150-54[1]	0.865	2.94	15.313	2.450	4.207	0.103	0.345	12.736	1.352	40.49		0.924	3.206	-0.447	0.305	4.245	0.989
1250T150-68	1.087	3.70	19.172	3.068	4.199	0.128	0.343	17.382	2.018	60.43	2649	1.842	3.974	-0.444	0.303	4.236	0.989
1250T150-97	1.542	5.25	26.935	4.310	4.180	0.177	0.338	26.592	3.637	108.88	7752	5.315	5.478	-0.437	0.299	4.216	0.989
1250T150-118	1.876	6.38	32.585	5.214	4.168	0.211	0.335	32.585	4.912	147.06	14173	9.646	6.522	-0.432	0.295	4.204	0.989
1250T150-142	2.249	7.65	38.807	6.209	4.154	0.247	0.331	38.807	6.165	184.59	23522	16.754	7.627	-0.427	0.292	4.189	0.990
1250T150-156	2.467	8.39	42.407	6.785	4.146	0.268	0.329	42.407	6.785	203.15	28445	22.226	8.245	-0.424	0.289	4.181	0.990

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1250T150-170	2.684	9.13	45.959	7.354	4.138	0.287	0.327	45.959	7.354	220.16	33834	28.764	8.840	-0.420	0.287	4.172	0.990
1250T150-185	2.902	9.87	49.488	7.918	4.130	0.306	0.325	49.488	7.918	237.07	39732	36.514	9.414	-0.417	0.285	4.164	0.990
1250T200-33[3]	0.565	1.92	10.790	1.726	4.369	0.147	0.510					0.226	4.426	-0.725	0.484	4.458	0.974
1250T200-43[2]	0.736	2.50	14.009	2.241	4.364	0.190	0.508					0.499	5.717	-0.722	0.482	4.452	0.974
1250T200-54[1]	0.922	3.14	17.504	2.801	4.358	0.237	0.507	13.723	1.390	41.62		0.984	7.104	-0.719	0.480	4.446	0.974
1250T200-68	1.159	3.94	21.926	3.508	4.350	0.295	0.504	18.888	2.089	62.56	2649	1.963	8.835	-0.716	0.478	4.437	0.974
1250T200-97	1.643	5.59	30.843	4.935	4.332	0.411	0.500	29.802	3.832	114.74	7752	5.666	12.270	-0.708	0.473	4.418	0.974
1250T200-118	2.000	6.81	37.341	5.975	4.321	0.493	0.497	37.282	5.252	157.24	14173	10.284	14.691	-0.703	0.469	4.406	0.975
1250T200-142	2.398	8.16	44.508	7.121	4.308	0.583	0.493	44.508	6.894	206.40	23522	17.868	17.291	-0.697	0.465	4.392	0.975
1250T200-156	2.631	8.95	48.661	7.786	4.300	0.633	0.491	48.661	7.747	231.94	28445	23.707	18.764	-0.693	0.463	4.383	0.975
1250T200-170	2.863	9.74	52.764	8.442	4.293	0.683	0.488	52.764	8.442	252.76	33834	30.685	20.194	-0.689	0.460	4.375	0.975
1250T200-185	3.096	10.53	56.843	9.095	4.285	0.732	0.486	56.843	9.095	272.30	39732	38.959	21.591	-0.686	0.458	4.367	0.975
1250T250-33[3]	0.600	2.04	12.134	1.941	4.497	0.277	0.680					0.239	8.113	-1.031	0.676	4.664	0.951
1250T250-43[2]	0.781	2.66	15.758	2.521	4.492	0.359	0.678					0.529	10.495	-1.029	0.674	4.658	0.951
1250T250-54[1]	0.978	3.33	19.695	3.151	4.487	0.447	0.676	14.552	1.415	42.36		1.045	13.061	-1.026	0.672	4.652	0.951
1250T250-68	1.230	4.19	24.679	3.949	4.480	0.559	0.674	20.157	2.137	63.97	2649	2.084	16.278	-1.022	0.669	4.644	0.952
1250T250-97	1.745	5.94	34.752	5.560	4.463	0.782	0.670	32.178	3.963	118.64	7752	6.016	22.707	-1.014	0.664	4.625	0.952
1250T250-118	2.124	7.23	42.097	6.735	4.452	0.943	0.666	40.587	5.479	164.04	14173	10.923	27.274	-1.008	0.660	4.613	0.952
1250T250-142	2.548	8.67	50.209	8.034	4.439	1.118	0.662	49.603	7.270	217.66	23522	18.982	32.222	-1.001	0.656	4.599	0.953
1250T250-156	2.796	9.51	54.915	8.786	4.432	1.218	0.660	54.915	8.259	247.28	28445	25.188	35.043	-0.997	0.653	4.590	0.953
1250T250-170	3.043	10.35	59.568	9.531	4.425	1.316	0.658	59.568	9.154	274.08	33834	32.606	37.798	-0.993	0.651	4.582	0.953
1250T250-185	3.290	11.20	64.199	10.272	4.417	1.413	0.655	64.199	10.057	301.11	39732	41.404	40.504	-0.989	0.648	4.574	0.953
1250T300-33[3]	0.635	2.16	13.478	2.157	4.609	0.463	0.854					0.253	13.266	-1.364	0.879	4.882	0.922
1250T300-43[2,3]	0.826	2.81	17.507	2.801	4.604	0.600	0.852					0.560	17.177	-1.361	0.877	4.876	0.922
1250T300-54[1]	1.035	3.52	21.886	3.502	4.599	0.749	0.851	15.279	1.432	42.89		1.105	21.400	-1.358	0.875	4.870	0.922
1250T300-68	1.301	4.43	27.433	4.389	4.592	0.936	0.848	21.279	2.170	64.98	2649	2.205	26.706	-1.354	0.872	4.862	0.922
1250T300-97	1.847	6.28	38.660	6.186	4.575	1.315	0.844	34.278	4.058	121.49	7752	6.367	37.359	-1.346	0.867	4.843	0.923
1250T300-118	2.249	7.65	46.852	7.496	4.565	1.588	0.840	43.514	5.646	169.04	14173	11.562	44.970	-1.340	0.863	4.831	0.923
1250T300-142	2.697	9.18	55.910	8.946	4.553	1.887	0.836	53.436	7.548	226.00	23522	20.095	53.255	-1.333	0.859	4.817	0.923
1250T300-156	2.960	10.07	61.169	9.787	4.546	2.060	0.834	59.361	8.654	259.11	28445	26.669	58.002	-1.329	0.856	4.809	0.924

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1250T300-170	3.222	10.96	66.373	10.620	4.539	2.229	0.832	65.372	9.626	288.21	33834	34.528	62.651	-1.325	0.853	4.801	0.924
1250T300-185	3.484	11.86	71.555	11.449	4.532	2.398	0.830	71.385	10.618	317.89	39732	43.849	67.235	-1.321	0.851	4.792	0.924
1400T150-33[3]	0.583	1.98	12.700	1.814	4.669	0.065	0.335					0.232	2.596	-0.419	0.288	4.700	0.992
1400T150-43[3]	0.758	2.58	16.488	2.355	4.663	0.084	0.333					0.514	3.345	-0.417	0.287	4.694	0.992
1400T150-54[1]	0.950	3.23	20.603	2.943	4.657	0.104	0.332	16.606	1.529	45.77		1.015	4.146	-0.414	0.285	4.687	0.992
1400T150-68	1.194	4.06	25.809	3.687	4.649	0.130	0.329	22.801	2.290	68.56	2359	2.024	5.139	-0.411	0.283	4.679	0.992
1400T150-97	1.694	5.76	36.303	5.186	4.629	0.179	0.325	35.187	4.166	124.72	6896	5.841	7.088	-0.405	0.279	4.658	0.992
1400T150-118	2.062	7.02	43.953	6.279	4.617	0.214	0.322	43.730	5.670	169.77	12602	10.604	8.442	-0.400	0.276	4.645	0.993
1400T150-142	2.473	8.42	52.393	7.485	4.603	0.251	0.318	52.393	7.188	215.20	22060	18.425	9.877	-0.395	0.272	4.631	0.993
1400T150-156	2.714	9.23	57.283	8.183	4.594	0.272	0.316	57.283	8.077	241.84	28445	24.447	10.680	-0.392	0.270	4.622	0.993
1400T150-170	2.953	10.05	62.114	8.873	4.586	0.292	0.314	62.114	8.873	265.67	33834	31.646	11.452	-0.389	0.268	4.613	0.993
1400T150-185	3.193	10.87	66.919	9.560	4.578	0.311	0.312	66.919	9.560	286.22	39732	40.182	12.200	-0.386	0.266	4.605	0.993
1400T200-33[3]	0.617	2.10	14.387	2.055	4.828	0.150	0.493					0.246	5.742	-0.676	0.456	4.900	0.981
1400T200-43[3]	0.803	2.73	18.684	2.669	4.823	0.194	0.491					0.545	7.418	-0.674	0.454	4.894	0.981
1400T200-54[1]	1.007	3.43	23.354	3.336	4.817	0.241	0.489	17.815	1.570	47.00		1.075	9.219	-0.671	0.453	4.888	0.981
1400T200-68	1.266	4.31	29.267	4.181	4.809	0.300	0.487	24.662	2.367	70.87	2359	2.145	11.468	-0.668	0.450	4.879	0.981
1400T200-97	1.796	6.11	41.214	5.888	4.791	0.419	0.483	39.273	4.378	131.09	6896	6.192	15.936	-0.661	0.445	4.860	0.982
1400T200-118	2.186	7.44	49.931	7.133	4.779	0.503	0.480	49.919	6.042	180.89	12602	11.242	19.087	-0.655	0.442	4.847	0.982
1400T200-142	2.623	8.92	59.563	8.509	4.766	0.594	0.476	59.563	7.996	239.41	22060	19.539	22.476	-0.649	0.438	4.833	0.982
1400T200-156	2.878	9.79	65.150	9.307	4.758	0.645	0.474	65.150	9.151	273.99	28445	25.928	24.397	-0.646	0.435	4.825	0.982
1400T200-170	3.132	10.66	70.676	10.097	4.750	0.696	0.471	70.676	10.097	302.29	33834	33.567	26.264	-0.642	0.433	4.816	0.982
1400T200-185	3.387	11.53	76.177	10.882	4.742	0.745	0.469	76.177	10.882	325.82	39732	42.627	28.089	-0.639	0.431	4.808	0.982
1400T250-33[3]	0.652	2.22	16.074	2.296	4.966	0.283	0.659					0.260	10.549	-0.968	0.641	5.102	0.964
1400T250-43[3]	0.848	2.89	20.880	2.983	4.961	0.367	0.658					0.575	13.648	-0.965	0.639	5.096	0.964
1400T250-54[1]	1.063	3.62	26.105	3.729	4.955	0.457	0.656	18.825	1.597	47.81		1.135	16.989	-0.962	0.637	5.090	0.964
1400T250-68	1.337	4.55	32.725	4.675	4.948	0.571	0.654	26.224	2.419	72.41	2359	2.265	21.179	-0.959	0.634	5.082	0.964
1400T250-97	1.898	6.46	46.125	6.589	4.930	0.800	0.649	42.232	4.519	135.31	6896	6.542	29.560	-0.951	0.629	5.063	0.965
1400T250-118	2.311	7.86	55.910	7.987	4.919	0.963	0.646	54.128	6.287	188.24	12602	11.881	35.521	-0.945	0.626	5.050	0.965
1400T250-142	2.772	9.43	66.732	9.533	4.906	1.142	0.642	66.107	8.406	251.67	22060	20.652	41.985	-0.939	0.621	5.036	0.965

TABLE 3 – TRACK SECTION PROPERTIES AT LOCATION 2 [4,5,6,7,8]

SECTION	GROSS PROPERTIES							EFFECTIVE PROPERTIES (Based on F_y = 50 ksi)				TORSIONAL PROPERTIES					
	Area	Weight	I_{xx}	S_{xx}	R_x	I_{yy}	R_y	I_{xx}	S_{xx}	M_a	V_a	Jx1000	C_w	X_o	m	R_o	β
	(in^2)	(lb/ft)	(in^4)	(in^3)	(in)	(in^4)	(in)	(in^4)	(in^3)	(in-k)	(lb)	(in^4)	(in^6)	(in)	(in)	(in)	
1400T250-156	3.042	10.35	73.018	10.431	4.899	1.245	0.640	73.018	9.681	289.84	28445	27.410	45.674	-0.935	0.619	5.028	0.965
1400T250-170	3.312	11.27	79.238	11.320	4.892	1.345	0.637	79.238	10.900	326.36	33834	35.488	49.279	-0.931	0.616	5.020	0.966
1400T250-185	3.582	12.19	85.435	12.205	4.884	1.445	0.635	85.435	11.966	358.26	39732	45.072	52.822	-0.927	0.614	5.012	0.966
1400T300-33[3]	0.686	2.34	17.761	2.537	5.087	0.474	0.831					0.274	17.272	-1.286	0.838	5.312	0.941
1400T300-43[3]	0.894	3.04	23.075	3.296	5.082	0.615	0.829					0.606	22.368	-1.283	0.836	5.306	0.942
1400T300-54[1]	1.120	3.81	28.856	4.122	5.076	0.767	0.828	19.708	1.616	48.39		1.196	27.873	-1.280	0.834	5.300	0.942
1400T300-68	1.408	4.79	36.184	5.169	5.069	0.959	0.825	27.591	2.455	73.52	2359	2.386	34.795	-1.276	0.831	5.292	0.942
1400T300-97	1.999	6.80	51.036	7.291	5.052	1.347	0.821	44.826	4.622	138.37	6896	6.893	48.704	-1.269	0.826	5.274	0.942
1400T300-118	2.435	8.29	61.888	8.841	5.042	1.627	0.817	57.766	6.467	193.63	12602	12.519	58.652	-1.262	0.822	5.261	0.942
1400T300-142	2.922	9.94	73.902	10.557	5.029	1.934	0.814	70.976	8.706	260.67	22060	21.766	69.493	-1.256	0.818	5.247	0.943
1400T300-156	3.207	10.91	80.885	11.555	5.022	2.111	0.811	78.735	10.070	301.51	28445	28.891	75.709	-1.252	0.815	5.239	0.943
1400T300-170	3.491	11.88	87.801	12.543	5.015	2.285	0.809	86.510	11.438	342.45	33834	37.410	81.802	-1.248	0.812	5.231	0.943
1400T300-185	3.776	12.85	94.693	13.528	5.008	2.457	0.807	94.450	12.603	377.33	39732	47.517	87.812	-1.244	0.810	5.223	0.943

For **SI:** 1 lbf = 4.448 N, 1 kip = 4448 N, 1 inch = 25.4 mm, 1 lb/lin ft = 14.5939 N/m, 1 inch-kip = 12.8 N-m

[1] Web height-to-thickness ratio, h/t, exceeds 200 and is less than or equal to 260. Web stiffeners are required at all support points and concentrated loads.
[2] Web height-to-thickness ratio, h/t, exceeds 260 and is less than or equal to 300. Bearing and intermediate stiffeners are required.
[3] Web height-to-thickness ratio, h/t, exceeds 300 or flange width-to-thickness ratio (b/t or d/t), exceeds 60. Effective section properties are outside the scope of this evaluation report and must be determined by a registered design professional. Bearing and intermediate stiffeners are required for members with web height-to-thickness ratio exceeding 260.
[4] Gross and torsional properties are based on the full-unreduced cross section of the studs, away from web punch-outs.
[5] Use the effective moment of inertia for deflection calculations.
[6] Cold-work of forming has not been considered.
[7] M_{al} is based on the compression flange fully braced. For other conditions of compression flange bracing, the allowable moment must be determined in accordance with AISI S100.
[8] For definition of symbols, see page 2.

TABLE 4 – ALLOWABLE WEB CRIPPLING VALUES (lbs)
(Based on Fy = 50 ksi) [2,3]

STUD		FLANGE IS FASTENED TO SUPPORTS															
Depth	Thick.	Condition 1 – End One-Flange Loading or Reaction				Condition 2 – Interior One-Flange Loading or Reaction				Condition 3 - End Two-Flange Loading or Reaction				Condition 4 - Interior Two-Flange Loading or Reaction			
(in.) x 100	(mils)	Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
200	33	262	411	[1]	[1]	483	664	[1]	[1]	242	325	[1]	[1]	640	807	[1]	[1]
200	43	433	[1]	[1]	[1]	842	[1]	[1]	[1]	425	[1]	[1]	[1]	1110	[1]	[1]	[1]
200	54	663	[1]	[1]	[1]	1345	[1]	[1]	[1]	684	[1]	[1]	[1]	1774	[1]	[1]	[1]
200	68	1022	[1]	[1]	[1]	2154	[1]	[1]	[1]	1102	[1]	[1]	[1]	2847	[1]	[1]	[1]
200	97	1952	[1]	[1]	[1]	4285	[1]	[1]	[1]	2268	[1]	[1]	[1]	5815	[1]	[1]	[1]
250	33	256	402	423	[1]	478	657	683	[1]	225	302	314	[1]	615	777	800	[1]
250	43	424	654	689	[1]	834	1123	1166	[1]	401	527	546	[1]	1075	1331	1369	[1]
250	54	652	990	1040	[1]	1334	1765	1829	[1]	650	840	868	[1]	1724	2102	2158	[1]
250	68	1006	1503	1577	[1]	2139	2779	2874	[1]	1056	1341	1383	[1]	2777	3335	3417	[1]
250	97	1927	2805	2935	[1]	4259	5391	5558	[1]	2190	2711	2789	[1]	5696	6691	6838	[1]
300	33	251	393	415	[1]	474	651	677	[1]	210	282	293	[1]	594	749	772	[1]
300	43	417	643	677	[1]	828	1114	1157	[1]	379	498	516	[1]	1043	1291	1328	[1]
300	54	642	975	1024	[1]	1325	1752	1816	[1]	620	801	828	[1]	1679	2047	2102	[1]
300	68	993	1483	1556	[1]	2125	2762	2856	[1]	1014	1288	1329	[1]	2715	3260	3340	[1]
300	97	1905	2773	2902	[1]	4236	5362	5529	[1]	2121	2626	2701	[1]	5590	6567	6712	[1]
300	118	2775	3980	4158	[1]	6353	7925	8159	[1]	3209	3919	4025	[1]	8426	9784	9985	[1]
300	142	3933	5561	5802	[1]	9234	11372	11689	[1]	4702	5672	5816	[1]	12312	14150	14423	[1]
300	156	4703	6600	6881	[1]	11180	13678	14049	[1]	5714	6851	7019	[1]	14946	17091	17410	[1]
300	170	5536	7718	8041	[1]	13308	16188	16615	[1]	6825	8138	8333	[1]	17837	20306	20672	[1]
300	185	6439	8921	9289	[1]	15636	18918	19405	[1]	8044	9543	9765	[1]	21007	23817	24234	[1]
350	33	246	386	407	479	470	645	671	762	197	264	274	308	574	724	747	824
350	43	410	633	666	780	822	1106	1148	1295	359	472	489	547	1014	1255	1291	1416
350	54	633	961	1010	1179	1316	1741	1804	2023	593	766	792	881	1639	1998	2051	2237
350	68	980	1465	1536	1786	2113	2746	2839	3166	977	1240	1279	1415	2658	3191	3270	3546
350	97	1885	2744	2872	3315	4215	5335	5501	6079	2058	2548	2621	2874	5495	6454	6597	7092
350	118	2749	3942	4119	4735	6324	7890	8122	8930	3126	3817	3920	4277	8297	9634	9832	10522
350	142	3900	5513	5752	[1]	9197	11326	11642	[1]	4592	5539	5680	[1]	12141	13954	14223	[1]
350	156	4664	6546	6825	[1]	11136	13625	13994	[1]	5588	6699	6864	[1]	14749	16865	17179	[1]
350	170	5493	7657	7978	[1]	13258	16127	16553	[1]	6682	7966	8157	[1]	17612	20049	20410	[1]

TABLE 4 – ALLOWABLE WEB CRIPPLING VALUES (lbs)
(Based on Fy = 50 ksi) [2,3]

STUD		FLANGE IS FASTENED TO SUPPORTS															
Depth	Thick.	Condition 1 – End One-Flange Loading or Reaction				Condition 2 – Interior One-Flange Loading or Reaction				Condition 3 - End Two-Flange Loading or Reaction				Condition 4 - Interior Two-Flange Loading or Reaction			
(in.) x 100	(mils)	Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
350	185	6391	8854	9219	[1]	15579	18850	19335	[1]	7882	9350	9568	[1]	20752	23528	23939	[1]
362	33	245	384	405	477	469	644	670	760	193	259	269	303	569	718	740	817
362	43	409	630	663	777	820	1104	1146	1292	355	466	483	540	1007	1247	1282	1406
362	54	631	958	1006	1175	1314	1738	1801	2020	587	758	783	872	1629	1986	2039	2224
362	68	977	1460	1532	1781	2110	2742	2835	3162	968	1229	1268	1402	2644	3175	3254	3528
362	97	1881	2738	2865	3307	4210	5329	5495	6072	2043	2530	2602	2853	5472	6427	6569	7062
362	118	2743	3934	4110	4724	6318	7882	8114	8921	3106	3793	3895	4249	8267	9598	9796	10483
362	142	3892	5502	5741	6572	9188	11315	11630	12728	4566	5508	5648	6134	12101	13907	14175	15108
362	156	4655	6533	6812	7781	11126	13612	13981	15265	5558	6663	6827	7398	14702	16812	17125	18214
362	170	5483	7643	7964	9079	13246	16113	16538	18017	6648	7926	8115	8775	17558	19988	20348	21603
362	185	6379	8838	9203	10472	15566	18834	19318	21005	7843	9305	9522	10276	20691	23459	23870	25298
400	33	242	379	399	470	466	640	666	756	184	247	256	288	556	701	723	798
400	43	404	623	655	768	816	1098	1140	1286	341	448	464	519	987	1222	1257	1378
400	54	624	948	996	1163	1308	1730	1793	2010	568	734	758	844	1601	1952	2004	2186
400	68	969	1447	1518	1765	2101	2731	2824	3149	942	1196	1234	1365	2605	3128	3206	3476
400	97	1867	2718	2844	3283	4196	5311	5476	6052	2000	2477	2547	2793	5406	6350	6490	6978
400	118	2725	3908	4083	4694	6298	7857	8089	8894	3049	3723	3823	4171	8178	9496	9691	10371
400	142	3869	5470	5707	6533	9162	11283	11598	12692	4491	5418	5555	6033	11984	13773	14038	14962
400	156	4629	6497	6774	7738	11096	13576	13944	15224	5472	6560	6721	7283	14567	16658	16968	18047
400	170	5453	7602	7921	9030	13212	16071	16495	17971	6550	7809	7996	8646	17405	19813	20170	21413
400	185	6346	8792	9155	10418	15528	18787	19270	20953	7733	9174	9388	10131	20518	23262	23669	25086
500	33	234	367	386	455	459	631	656	745	161	216	224	252	522	659	680	750
500	43	393	606	637	747	806	1084	1126	1270	308	404	419	469	938	1161	1194	1310
500	54	609	925	972	1135	1293	1711	1773	1988	522	675	697	776	1533	1869	1919	2093
500	68	948	1416	1486	1728	2080	2704	2796	3118	878	1115	1151	1273	2510	3014	3088	3348
500	97	1834	2670	2794	3225	4161	5267	5431	6002	1896	2347	2414	2647	5246	6163	6299	6772
500	118	2682	3846	4019	4619	6251	7799	8028	8827	2909	3553	3648	3981	7963	9246	9436	10099
500	142	3813	5391	5625	6439	9100	11206	11519	12606	4309	5198	5330	5788	11700	13447	13706	14608
500	156	4566	6408	6681	7632	11024	13487	13853	15125	5263	6309	6464	7005	14240	16284	16587	17642

TABLE 4 – ALLOWABLE WEB CRIPPLING VALUES (lbs)
(Based on Fy = 50 ksi) [2,3]

STUD		FLANGE IS FASTENED TO SUPPORTS															
Depth	Thick.	Condition 1 – End One-Flange Loading or Reaction				Condition 2 – Interior One-Flange Loading or Reaction				Condition 3 - End Two-Flange Loading or Reaction				Condition 4 - Interior Two-Flange Loading or Reaction			
(in.) x 100	(mils)	Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
500	170	5382	7502	7817	8912	13130	15971	16392	17859	6312	7526	7706	8332	17032	19389	19738	20955
500	185	6267	8682	9040	10287	15434	18674	19155	20827	7465	8856	9063	9781	20097	22785	23184	24571
550	33	230	361	380	448	456	626	652	740	150	202	209	236	507	640	660	728
550	43	387	597	629	737	801	1078	1119	1262	292	384	398	445	915	1134	1166	1278
550	54	602	914	961	1122	1287	1702	1763	1978	501	647	669	745	1502	1831	1880	2050
550	68	939	1402	1471	1710	2071	2691	2783	3103	849	1079	1113	1231	2466	2961	3034	3290
550	97	1819	2648	2771	3199	4146	5247	5410	5979	1848	2288	2353	2581	5173	6077	6211	6677
550	118	2662	3818	3989	4585	6229	7772	8001	8797	2846	3475	3568	3893	7865	9132	9320	9974
550	142	3788	5355	5587	6396	9071	11171	11482	12566	4226	5097	5226	5676	11570	13298	13554	14445
550	156	4537	6367	6639	7583	10991	13447	13811	15079	5167	6194	6347	6877	14090	16112	16412	17456
550	170	5349	7457	7770	8858	13092	15925	16345	17807	6203	7396	7573	8189	16861	19194	19540	20745
550	185	6230	8631	8988	10227	15392	18622	19102	20769	7343	8711	8914	9621	19904	22567	22962	24336
600	33	227	355	374	441	453	622	647	735	140	188	195	220	493	622	641	707
600	43	383	590	621	728	796	1072	1113	1255	278	365	378	423	894	1107	1139	1249
600	54	595	904	950	1109	1280	1693	1755	1968	481	621	642	715	1472	1795	1843	2009
600	68	929	1389	1457	1694	2062	2679	2771	3090	822	1043	1076	1191	2424	2911	2983	3234
600	97	1805	2627	2749	3173	4130	5228	5390	5957	1803	2232	2295	2517	5103	5995	6127	6587
600	118	2644	3791	3961	4553	6209	7746	7974	8768	2785	3401	3492	3810	7771	9023	9208	9855
600	142	3764	5321	5552	6355	9044	11137	11448	12528	4146	5001	5128	5570	11447	13156	13409	14291
600	156	4509	6328	6598	7537	10959	13409	13772	15036	5076	6085	6235	6756	13948	15950	16247	17280
600	170	5318	7414	7725	8806	13056	15881	16300	17759	6100	7273	7447	8052	16699	19010	19353	20545
600	185	6195	8583	8938	10170	15351	18573	19051	20715	7227	8574	8773	9468	19721	22360	22751	24113
800	43	365	562	591	693	780	1050	1090	1229	225	296	306	343	816	1011	1040	1140
800	54	571	867	911	1064	1257	1663	1723	1932	408	528	545	607	1364	1663	1708	1862
800	68	897	1339	1405	1634	2029	2637	2727	3040	721	916	945	1045	2273	2729	2797	3033
800	97	1753	2551	2670	3082	4076	5158	5319	5878	1638	2028	2086	2287	4852	5699	5825	6262
800	118	2576	3693	3859	4436	6135	7654	7879	8663	2566	3133	3218	3511	7433	8630	8808	9426
800	142	3676	5197	5423	6208	8946	11017	11324	12393	3860	4657	4775	5186	11002	12644	12888	13735
800	156	4410	6189	6453	7371	10846	13270	13630	14881	4748	5692	5832	6319	13435	15363	15649	16645

TABLE 4 – ALLOWABLE WEB CRIPPLING VALUES (lbs)
(Based on Fy = 50 ksi) [2,3]

STUD		FLANGE IS FASTENED TO SUPPORTS															
Depth	Thick.	Condition 1 – End One-Flange Loading or Reaction				Condition 2 – Interior One-Flange Loading or Reaction				Condition 3 - End Two-Flange Loading or Reaction				Condition 4 - Interior Two-Flange Loading or Reaction			
(in.) x 100	(mils)	Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
800	170	5206	7258	7562	8621	12927	15724	16139	17583	5728	6830	6993	7561	16116	18346	18677	19828
800	185	6071	8411	8758	9965	15205	18397	18870	20518	6809	8078	8266	8921	19064	21614	21992	23308
1000	54	550	835	877	1024	1237	1636	1695	1901	345	446	460	512	1270	1548	1589	1733
1000	68	868	1296	1360	1581	2000	2599	2688	2997	633	804	830	918	2141	2571	2634	2856
1000	97	1707	2485	2601	3002	4028	5098	5257	5809	1494	1850	1902	2086	4631	5440	5560	5978
1000	118	2516	3608	3770	4334	6070	7573	7796	8572	2374	2900	2978	3249	7137	8287	8457	9051
1000	142	3600	5090	5311	6079	8860	10911	11215	12274	3611	4356	4466	4850	10613	12197	12432	13250
1000	156	4323	6068	6326	7227	10747	13149	13505	14745	4462	5349	5481	5938	12988	14852	15128	16090
1000	170	5109	7122	7421	8460	12814	15587	15999	17430	5404	6443	6597	7133	15607	17767	18087	19202
1000	185	5962	8260	8601	9787	15078	18243	18713	20346	6445	7646	7824	8444	18490	20964	21331	22607
1050	54	545	827	869	1015	1232	1630	1689	1894	330	426	441	490	1248	1521	1562	1703
1050	68	861	1286	1349	1569	1993	2590	2679	2987	613	778	803	888	2110	2534	2596	2815
1050	97	1697	2470	2584	2983	4017	5084	5242	5793	1460	1808	1860	2039	4580	5380	5499	5911
1050	118	2502	3588	3749	4310	6055	7554	7777	8550	2330	2845	2922	3188	7068	8207	8376	8963
1050	142	3582	5065	5284	6049	8840	10886	11190	12246	3553	4285	4394	4772	10522	12093	12326	13137
1050	156	4303	6039	6297	7193	10724	13121	13476	14714	4395	5269	5399	5850	12884	14733	15007	15961
1050	170	5086	7090	7388	8422	12788	15555	15966	17394	5328	6353	6505	7034	15488	17632	17950	19056
1050	185	5937	8225	8564	9746	15048	18207	18676	20306	6360	7545	7721	8333	18357	20813	21177	22444
1100	54	540	820	862	1006	1227	1623	1682	1887	316	408	421	469	1226	1495	1535	1674
1100	68	854	1277	1339	1557	1987	2582	2670	2977	593	753	777	859	2080	2497	2559	2775
1100	97	1686	2455	2569	2965	4006	5070	5228	5777	1428	1768	1818	1993	4530	5321	5438	5847
1100	118	2489	3569	3729	4287	6040	7536	7758	8530	2286	2792	2867	3128	7001	8129	8296	8878
1100	142	3565	5040	5259	6020	8821	10862	11165	12219	3496	4217	4324	4696	10434	11992	12223	13027
1100	156	4283	6012	6268	7160	10702	13093	13448	14683	4330	5191	5319	5763	12782	14617	14889	15835
1100	170	5064	7060	7356	8386	12763	15524	15934	17359	5255	6265	6415	6936	15373	17500	17816	18914
1100	185	5912	8191	8529	9705	15020	18172	18640	20267	6277	7447	7620	8224	18227	20665	21027	22285
1150	54	535	813	854	997	1223	1618	1676	1880	301	389	402	448	1205	1469	1509	1645
1150	68	848	1267	1329	1545	1980	2574	2662	2968	573	728	751	831	2050	2462	2523	2736
1150	97	1676	2440	2553	2947	3995	5057	5214	5762	1396	1728	1777	1949	4481	5264	5380	5784

TABLE 4 – ALLOWABLE WEB CRIPPLING VALUES (lbs)
(Based on Fy = 50 ksi) [2,3]

STUD		FLANGE IS FASTENED TO SUPPORTS															
Depth	Thick.	Condition 1 – End One-Flange Loading or Reaction				Condition 2 – Interior One-Flange Loading or Reaction				Condition 3 - End Two-Flange Loading or Reaction				Condition 4 - Interior Two-Flange Loading or Reaction			
(in.) x 100	(mils)	Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)				Bearing Length (inches)			
		1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
1150	118	2476	3550	3709	4264	6026	7518	7739	8509	2244	2740	2814	3070	6935	8053	8218	8795
1150	142	3548	5016	5234	5992	8802	10839	11141	12193	3441	4150	4255	4622	10348	11893	12122	12919
1150	156	4264	5985	6240	7128	10680	13067	13421	14653	4266	5115	5241	5679	12683	14503	14773	15713
1150	170	5042	7030	7324	8350	12738	15494	15903	17325	5183	6179	6327	6842	15260	17372	17685	18775
1150	185	5888	8158	8494	9666	14991	18138	18605	20229	6197	7351	7522	8118	18100	20521	20880	22130
1200	68	842	1258	1319	1534	1974	2565	2653	2958	554	704	726	803	2022	2428	2488	2697
1200	97	1666	2426	2538	2930	3985	5043	5200	5747	1364	1689	1737	1905	4433	5207	5322	5722
1200	118	2463	3532	3690	4242	6012	7500	7721	8489	2202	2689	2762	3013	6871	7978	8142	8714
1200	142	3532	4993	5210	5964	8783	10816	11118	12167	3386	4085	4188	4549	10264	11796	12023	12814
1200	156	4245	5958	6212	7096	10658	13040	13394	14623	4204	5041	5165	5596	12586	14392	14660	15592
1200	170	5021	7000	7294	8315	12713	15464	15872	17292	5112	6096	6241	6749	15150	17246	17557	18639
1200	185	5865	8125	8460	9627	14964	18105	18571	20192	6118	7258	7427	8015	17976	20380	20737	21978
1250	68	836	1248	1310	1523	1968	2557	2645	2949	536	680	702	776	1993	2394	2453	2660
1250	97	1657	2412	2524	2913	3975	5031	5187	5732	1334	1651	1698	1862	4386	5152	5266	5661
1250	118	2450	3513	3671	4220	5998	7483	7703	8470	2162	2640	2711	2958	6808	7905	8068	8634
1250	142	3515	4970	5186	5936	8765	10794	11095	12142	3333	4021	4123	4478	10181	11701	11927	12711
1250	156	4227	5933	6185	7066	10637	13015	13367	14595	4144	4968	5090	5515	12491	14284	14550	15475
1250	170	5001	6971	7264	8281	12689	15435	15842	17260	5044	6014	6157	6658	15042	17124	17432	18507
1250	185	5842	8093	8427	9589	14937	18072	18537	20156	6040	7166	7333	7914	17854	20242	20597	21830
1400	68	818	1222	1282	1491	1950	2534	2621	2923	482	612	631	698	1912	2296	2353	2551
1400	97	1629	2371	2481	2864	3945	4993	5149	5690	1246	1542	1586	1739	4251	4994	5104	5487
1400	118	2414	3461	3617	4157	5959	7434	7653	8414	2045	2497	2564	2797	6627	7695	7854	8405
1400	142	3469	4904	5117	5858	8712	10729	11029	12070	3181	3837	3934	4273	9944	11428	11648	12414
1400	156	4174	5858	6108	6977	10577	12941	13291	14512	3969	4758	4875	5283	12218	13971	14231	15136
1400	170	4941	6888	7177	8182	12621	15351	15757	17166	4846	5777	5916	6397	14731	16770	17072	18125
1400	185	5775	8001	8331	9480	14859	17978	18441	20051	5818	6902	7063	7623	17504	19846	20193	21402

For **SI:** 1 pound = 4.4482 N

[1] Bearing length to web height (N/h) exceeds 2.0 per AISI S100 Table G5-2.
[2] Values are based on full-unreduced cross section of the member away from punch-outs.
[3] See AISI S100 for definitions of Conditions 1, 2, 3, and 4.

TABLE 5 – HAT SECTION PROPERTIES

Section Designation	Depth (in)	Fy (ksi)	Design Thickness	Gross Properties						Effective Properties			
				Area	Weight	I_x	R_x	I_y	R_y	I_x	S_x	M_a	V_a
			(in)	(in^2)	(lb/ft)	(in^4)	(in)	(in^4)	(in)	(in^4)	(in^3)	(Ft-lb)	(lb)
50H125-18	0.50	50	0.0188	0.056	0.19	0.0025	0.211	0.0234	0.643	0.0023	0.0070	17.3	199.1
50H125-27	0.50	50	0.0283	0.084	0.28	0.0036	0.207	0.0347	0.644	0.0036	0.0119	29.8	279.5
50H125-33	0.50	50	0.0346	0.101	0.34	0.0042	0.204	0.0420	0.644	0.0042	0.0153	38.1	325.4
50H125-43	0.50	50	0.0451	0.130	0.44	0.0051	0.199	0.0538	0.644	0.0051	0.0191	47.5	388.6
50H125-54	0.50	50	0.0566	0.160	0.54	0.0060	0.194	0.0663	0.645	0.0060	0.0222	55.5	438.9
875H125-18	0.875	50	0.0188	0.071	0.24	0.0089	0.355	0.0289	0.640	0.0082	0.0150	37.4	463.5
875H125-27	0.875	50	0.0283	0.105	0.36	0.0129	0.351	0.0430	0.640	0.0129	0.0254	63.3	677.5
875H125-33	0.875	50	0.0346	0.127	0.43	0.0154	0.348	0.0521	0.640	0.0154	0.0325	81.0	812.0
875H125-43	0.875	50	0.0451	0.164	0.56	0.0193	0.343	0.0670	0.640	0.0193	0.0413	103.1	1022.9
875H125-54	0.875	50	0.0566	0.202	0.69	0.0231	0.338	0.0829	0.640	0.0231	0.0496	123.6	1234.9

For **SI:** 1 lbf = 4.448 N, 1 kip = 4448 N, 1 inch = 25.4 mm, 1 lb/lin ft = 14.5939 N/m, 1 inch-kip = 12.8 N-m

[1] See Figure 2 for section profiles.
[2] Effective properties based on AISI S100-16.
[3] Effective properties are listed as the minimum of positive and negative bending.
[4] For deflection determination, use effective moment of inertia.
[5] Hems in bottom flanges are ignored for property calculations.

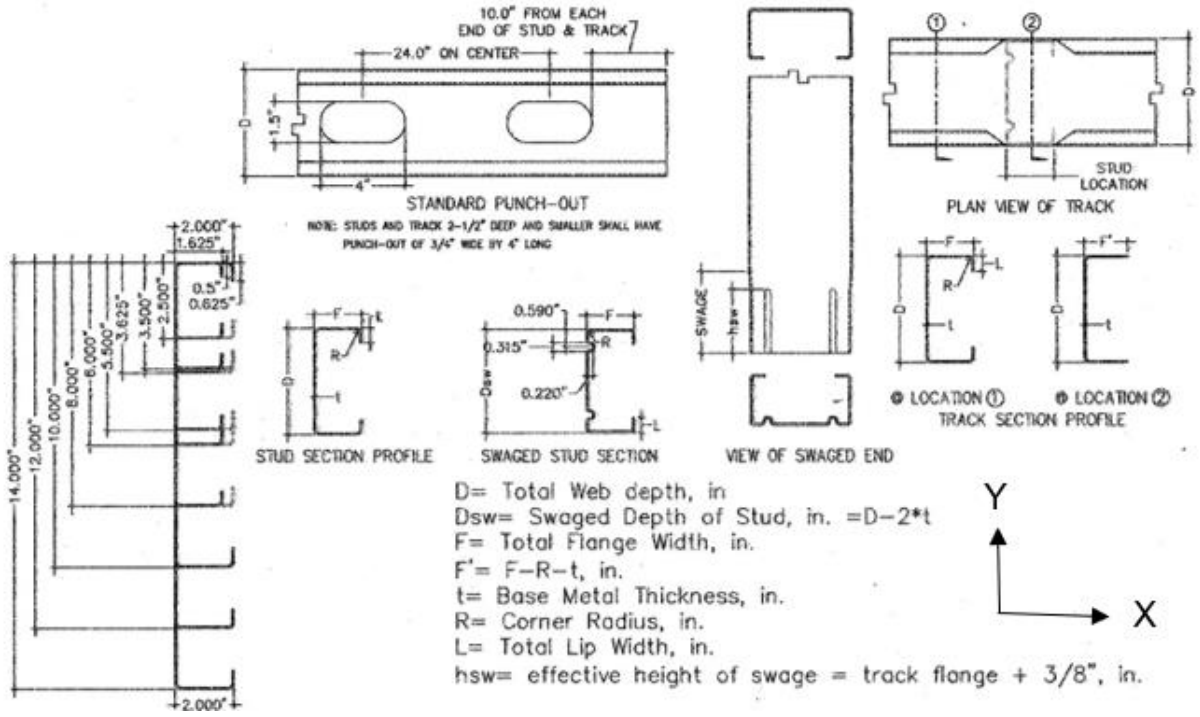
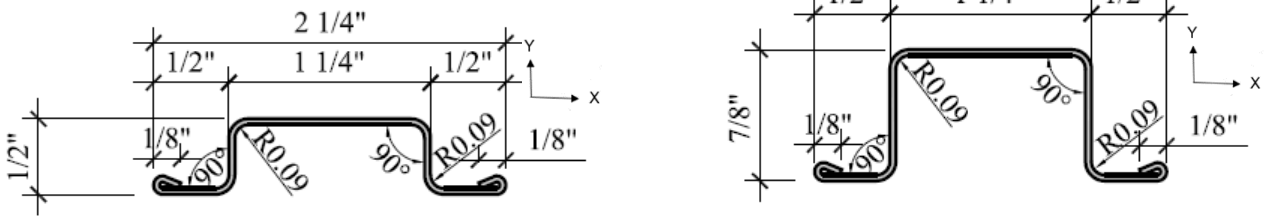


FIGURE 1 – STUD AND TRACK SECTION PROFILES



50H125-XX **875H125-XX**

FIGURE 2 – HAT SECTION PROFILES

(XX is the minimum base metal thickness in mils)

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 16.13—Non-Structural Metal Studs

REPORT HOLDER:

PINNACLELGS INC.

EVALUATION SUBJECT:

PINNACLELGS COLD-FORMED STEEL FRAMING

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the PinnacleLGS Cold-formed Steel Framing members, described in ICC-ES evaluation report ESR-4114, have also been evaluated for compliance with the code noted below.

Applicable code edition:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of the State Architect (DSA), see Sections 2.1 and 2.2 below.

2.0 CONCLUSIONS

The PinnacleLGS Cold-formed Steel Framing members, described in Sections 2.0 through 7.0 of the evaluation report ESR-4114, comply with CBC Chapter 22, provided the design and installation are in accordance with the 2018 *International Building Code®* (IBC) provisions noted in the evaluation report, and the additional requirements of CBC Chapters 16, and 17 as applicable.

2.1 OSHPD:

The PinnacleLGS Cold-formed Steel Framing members, described in Sections 2.0 through 7.0 of the evaluation report ESR-4114, comply with CBC amended Sections in Chapters 16, 17 and 22, and Chapters 16A, 17A and 22A, provided the design and installation are in accordance with the 2018 *International Building Code®* (IBC) provisions noted in the evaluation report, and the additional requirements in Sections 2.1.1 to 2.1.3 of this supplement:

2.1.1 Conditions of Use:

1. All loads applied to the cold-formed steel studs shall be determined by the registered design professional and shall comply with applicable loads from CBC amended sections in Chapter 16 and Chapter 16A.
2. Cold-formed steel members shall not be part of the lateral resisting elements in light-framed wall with shear panels of all other materials and cold-formed steel-special bolted moment frames, unless allowed by the exceptions, in accordance with CBC Section 1617A1.4 [OSPHD 1 & 4].
3. Prescriptive framing is not permitted in accordance with CBC Section 2211A.1.2 [OSPHD 1 & 4].
4. In accordance with CBC Section 2210.2, cold formed steel structures shall be designed and detailed in accordance with the requirements of AISI S100 and AISI S400 [OSHPD 1R, 2 and 5].
5. In accordance with CBC Section 2211.1.1.1, the design of cold-formed steel light-frame construction to resist seismic forces in Seismic Design Categories B and C shall be in accordance with the requirements of AISI S400, with the exception of “Steel systems not specifically detailed for seismic resistance, excluding cantilever columns” as designated in ASCE 7, Table 12.2-1, in which design and detailing in accordance with AISI 240 is permitted [OSHPD 1R, 2 & 5].

6. In accordance with CBC Section 2211A.1.1.1, the design of cold-formed steel light-frame construction to resist seismic forces in Seismic Design Categories B and C is not permitted [OSHPD 1 & 4].
7. In accordance with CBC Section 2211.1.1.2 and 2211A.1.1.2, the design of cold-formed steel light-frame construction to resist seismic forces in Seismic Design Categories D through F, shall be designed and detailed in accordance with AISI S400 and comply with the following requirements [OSHPD 1, 1R, 2, 4 and 5]:
   - Cold-formed steel stud foundation plates or sills shall be bolted or fastened to the foundation or foundation wall in accordance with Section 2304.3.4, Item 2.
   - Shear wall assemblies in accordance with Sections E5, E6 and E7 of AISI 400 are not permitted within the seismic force-resisting system of the buildings.
8. In accordance with CBC Section 2211.2 and 2211A.2, for cold-formed steel light-frame construction, the design and installation of nonstructural members and connections shall be in accordance with AISI S220 for noncomposite assembly design. Where nonstructural members do not qualify for design under AISI 220, the design and installation of nonstructural members and connections, shall be in accordance with AISI S240 or S100 [OSHPD 1, 1R, 2, 4 and 5].

2.1.2 Verification Test Requirements: In accordance with CBC Section 2213A.2 and CBC Section 2213.2, end-welded studs shall be tested in accordance with the requirements of the AWS D1.1, Sections 7.7 and 7.8 [OSHPD 1, 1R, 2, 4 & 5].

2.1.3 Special Inspection Requirements:

1. In accordance with CBC Section 1704.2 Exception 3, special inspection is required for portions of structures designed and constructed in accordance with the cold-formed steel light frame construction provisions of Section 2211.1.2 [OSPHD 1R, 2 & 5].
2. Periodic special inspections shall be required in accordance with CBC Section 1705A.12.3 and 1705A.12.5 [OSHPD 1 & 4].

2.2 DSA:

The PinnacleLGS Cold-formed Steel Framing members, described in Sections 2.0 through 7.0 of the evaluation report ESR-4114, comply with CBC amended Sections in Chapters 16and 22, and Chapters 16A, 17A and 22A, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report, and the additional requirements in Sections 2.2.1 to 2.2.3 of this supplement:

2.2.1 Conditions of Use:

1. All loads applied to the cold-formed steel studs shall be determined by the registered design professional and shall comply with applicable loads from CBC amended sections in Chapters 16, and Chapter 16A.
2. Cold-formed steel members shall not be part of the lateral resisting elements in light-framed wall with shear panels of all other materials and cold-formed steel-special bolted moment frames, unless allowed by the exceptions, in accordance with CBC Sections 1617.11.3 [DSA-SS/CC] and 1617A.1.4 [DSA-SS].
3. In accordance with CBC Section 2212.5.2 [DSA-SS/CC], cold-formed steel stud foundation plates or sills shall be bolted or fastened to the foundation or foundation wall in accordance with CBC Section 2304.3.4, Item 2.
4. In accordance with CBC Section 2212.5.3, cold-formed steel stud shear wall assemblies in accordance with Sections E5, E6 and E7 of AISI-400 are not permitted within the seismic force resisting system of buildings or structures assigned to Occupancy Category II, III, IV, or buildings designed to be relocatable [DSA-SS/CC].
5. In accordance with CBC Section 2211A.1.1.1, the design of cold-formed steel light-frame construction to resist seismic forces in Seismic Design Categories B and C is not permitted [DSA-SS].
6. In accordance with CBC Section 2211A.1.1.2, the design of cold-formed steel light-frame construction to resist seismic forces in Seismic Design Categories D through F, shall be designed and detailed in accordance with AISI S400 and comply with the following requirements [DSA-SS]:
   - Cold-formed steel stud foundation plates or sills shall be bolted or fastened to the foundation or foundation wall in accordance with Section 2304.3.4, Item 2.
   - Shear wall assemblies in accordance with Sections E5, E6 and E7 of AISI 400 are not permitted within the seismic force-resisting system of the buildings.
7. Prescriptive framing is not permitted in accordance with CBC Section 2211A.1.2 [DSA-SS].
8. In accordance with CBC Section 2211A.2, for cold-formed steel light-frame construction, the design and installation of nonstructural members and connections shall be in accordance with AISI S220 for noncomposite assembly design. Where nonstructural members do not qualify for design under AISI 220, the design and installation of nonstructural members and connections, shall be in accordance with AISI S240 or S100 [DSA-SS].

2.2.2 Verification Test Requirements: In accordance with Sections 2212.6.2 [DSA-SS/CC] or 2213A.2 [DSA-SS], end-welded studs shall be tested in accordance with the requirements of the AWS D1.1, (Sections 7.7 and 7.8 [DSA-SS]).

2.2.3 Special Inspection Requirements: Periodic special inspections shall be required in accordance with CBC Section 1705A.12.3 and 1705A.12.5 [DSA-SS/CC].

This supplement expires concurrently with the evaluation report, reissued July 2024.