Listing Report: **HOCK032015-80**

PRODUCT: ***Cold-Formed Steel Load-Bearing and Nonload-Bearing Studs, Joists and Tracks***
DIVISION: **Metals (05)**
SECTION: **Cold-Formed Metal Framing (05400)**
DIVISION: **Finishes (09)**
SECTION: **Non-Load Bearing Wall Framing (09110)**

Report Holder
Howick
Unit 5
1680 Illinois Avenue
Perris, CA 92571

Manufacturing Locations

None at this time

1. SUBJECT

1.1. **Cold-formed steel non-load bearing and load bearing framing (studs, tracks, and slip tracks).**

2. SCOPE

NTA, Inc. has evaluated the above product(s) for compliance with the applicable sections of the following codes:

2.1. 2006, 2009, 2012 International Building Code (IBC)
2.2. 2006, 2009, 2012 International Residential Code (IRC)
2.3. AISI S100 North American Specification for the Design of Cold-Formed Steel Structural Members, 2007 Edition, with Supplement 2, dated 2010

NTA, Inc. has evaluated the above product(s) in accordance with:

2.4. NTA IM036 Quality System Requirements
2.5. NTA IM015.1 Light Gauge and Cold-Formed Steel Structural Components

NTA, Inc. has evaluated the following properties of the above product(s):

2.6. Gross Properties
2.7. Effective Section Properties
2.8. Torsional Properties
2.9. Deflection (Slip) Track Properties

To obtain the most current NTA Listing Report visit https://online.ntainc.com/public/certification/reports/

3. USES

3.1. General

Howick's cold-formed steel components are recognized for use in framing of non-load bearing interior walls, curtain walls, and load bearing walls. The steel components described in this report comply with Section 2210 of the IBC and Section R301.1.3, R505, R603 and R804 of the IRC.

Howick's deflection track is a top track that is recognized for use in non-load-bearing, cold-formed steel framed wall assemblies where vertical movements between the top of the wall and supporting structure must be accommodated. The deflection track may accommodate up to +/-3/4-inch of vertical movement.

4. DESCRIPTION

4.1. General

The structural components recognized in this report are limited to those products noted in Table 2, Table 5, and Table 6, as fabricated at the manufacturing facility(ies) noted herein. The components are formed from coils of steel and have been designed in accordance with Section 2210 of the IBC. See Figure 1 for component cross sections. Material thickness, yield strength and section properties are provided in Table 1, Table 2, Table 5, and Table 6.

4.2. Materials

4.2.1 Structural Members

Structural members are cold-formed from steel coils conforming to ASTM A1003 Structural Grade 33 Type H (ST33H), Structural Grade 55 Type H (ST50H) or Structural Grade 80 Type H (ST80H). Structural members have a minimum protective coating of G60 or AZ50 as described in ASTM A653 and ASTM A792, respectively.

4.2.2 Non-Structural Members

Non-Structural members are cold-formed from steel coils conforming to ASTM A1003 Structural Grade 33 Type L (ST33L), Structural Grade 55 Type L (ST50L), Structural Grade 80 Type L (ST80L). Structural members have a minimum protective coating of G40 or AZ50 as described in ASTM A653 and ASTM A792, respectively.

4.3. Construction

4.3.1 Available Sections

The section evaluated in this report are identified in Table 2. Gross, effective, and torsional section properties are set forth in Table 2 through Table 5.

4.3.2 Web Punch-Outs

The studs may be manufactured with or without web punch-outs. When punch outs are provided, they are located along the center of the web and have a maximum width of 1-1/2 inches (64 mm) and maximum length of 4-1/2 inches (114 mm) in members having an out-to-out flange width of 1.625-inches. Members having out-to-out flange widths of 2-inches have stiffened circular holes having a 3-inch diameter for 8-inch deep members and 5.5-inch diameter for deeper members. The holes are spaced a minimum of 24 inches on center and not less than 12 inches (254 mm) from each end of the member. Punch-outs in sections having an *h/t* ratio exceeding 200, as identified in Table 3, shall not be provided unless evaluated independently from this report.

4.3.3 Track Members

Tracks are provided with a stiffening lip that is removed at the stud locations (Figure 1).

4.3.4 Deflection Track (DT) Members

Deflection tracks consist of an unstiffened C-shape with flanges having ¼-inch wide by 1-1/2 inches long vertical slots spaced every 1-inch to 24-inch on-center along the length of the section.

5. DESIGN

5.1. General

The scope of this report is limited to the cold-formed steel products specified herein. Details related to incorporation of the product beyond that scope are the responsibility of the designer of record.

5.2. International Building Code (IBC)

Analysis and design under the IBC shall be in accordance with IBC Section 2210. Structural capacities shall be determined in accordance with the applicable edition of AISI S100 based on structural properties provided in this report.

5.3. International Residential Code (IRC)

The S-sections lists in this report qualify for use with the prescriptive requirements of the IRC Sections R505, R603 and R804. Use of other sections or non-prescriptive design and detailing must conform to IRC Section R301.1.3.

6. INSTALLATION

The cold-formed steel components shall be fabricated, identified and erected in accordance with this report, the approved construction documents and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern. Approved construction documents shall be available at all times on the jobsite during installation.

7. CONDITIONS OF USE

The steel components described in this report comply with the codes listed in Section 2.0, subject to the following conditions:

7.1. Components shall be installed in accordance with this report, applicable code(s), Howick's installation instructions, and the approved design document prepared by a registered design professional.

7.2. Uncoated minimum steel thickness of cold-formed steel members, as delivered to the jobsite, shall not be less than the specified minimum in Table 1.

7.3. Complete plans and calculations verifying compliance with this report must be submitted to the code official for each project. The calculations and drawings shall be prepared and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is constructed.

7.4. Stud member end reactions, resulting from allowable heights and loads, as noted in the accompanying tables, shall be checked with the web crippling tables noted in this report.

8. EVIDENCE SUBMITTED

NTA, Inc. has examined the following evidence to evaluate this product:

8.1. Qualification Calculations in accordance with AISI S100 North American Specification for the Design of Cold-Formed Steel Structural Members, 2007 Edition, with Supplement 2, dated 2010.

8.2. Review of plant quality assurance manual in accordance with NTA IM 036 and NTA IM 015.1.

8.3. Plant certification inspection of manufacturer's production facilities, test procedures, frequency and quality control sampling methods, test equipment and equipment calibration procedures, test records, dates and causes of failures when applicable in accordance with NTA IM 036 and NTA IM 015.1.

8.4. Periodic quality assurance audits of the production facility.

Evaluation evidence and data are on file with NTA, Inc. NTA, Inc.is accredited by the International Accreditation Service (IAS) as follows:

ISO17020 Inspection Agency (AA-682)
ISO17025 Testing Laboratory (TL-259)
ISO Guide 65 Product Certification Agency (PCA-102)

The scope of accreditation related to testing, inspection or product certification pertain only to the test methods and/or standard referenced therein. Design parameters and the application of building code requirements, such as special inspection, have not been reviewed by IAS and are not covered in the accreditation. Product evaluations are performed under the direct supervision of Professional Engineers licensed in all jurisdictions within the United States as required by the building code and state engineering board rules.

9. FINDINGS

All products referenced herein are manufactured under an in-plant Quality Assurance program to insure that the production quality meets or exceeds the requirements of the codes noted herein and the criteria as established by NTA, Inc. Furthermore, product must comply with the conditions of this report.

This report is subject to annual review.

10. IDENTIFICATION

Each eligible product shall be permanently marked to provide the following information:

10.1. Name, logo, or initials of the manufacturer
10.2. At a maximum of every 96 inches material is to be marked with:
  10.2.1. Material minimum base-metal thickness (un-coated) in decimal thickness or mils
  10.2.2. Minimum specified yield strength
10.3. In addition, each lift or bundle of studs and tracks that is not assembled into a truss, wall panel, or other structural assembly prior to leaving the production facility, shall indicate the ASTM or other specification designation by painting, decal, tagging or other suitable means.
10.4. NTA's Listing No. HOCK032015-80
10.5. The NTA, Inc. listing mark, shown below

LISTED
HOCK032015-80

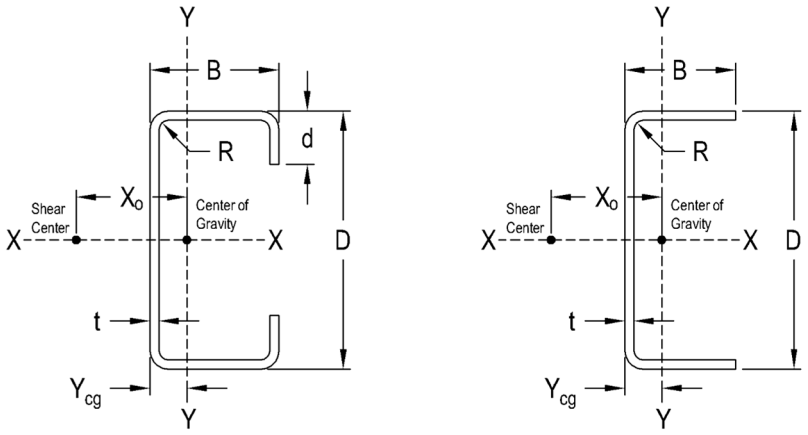
11. STORAGE

All material shall be stored dry and shall be kept free of excessive corrosion.

Table 1: Typical Base Metal Thicknesses

Thickness (mils)	Minimum Thickness[1] (in.)	Design Thickness (in.)	Reference Gage[2]
27	0.0269	0.0283	22
30	0.0296	0.0312	20 - Drywall
33	0.0329	0.0346	20 - Structural
43	0.0428	0.0451	18
54	0.0538	0.0566	16
68	0.0677	0.0713	14
97	0.0966	0.1017	12

[1] Minimum thickness represents 95% of the design thickness and is the minimum acceptable thickness delivered to the job site in accordance with AISI S100, Section A2.4.
[2] U.S. standard gage for uncoated hot- and cold-rolled sheets. Gage numbers are only provided as a reference and should not be used to order, design or specify steel studs, joists or tracks.



Stud (S) Section

Deflection Track (DT) Section

Figure 1: Stud and Track Geometry

Table 2: Section Designations and Gross Properties

Designation	Section Geometry					Gross Section Properties[1, 2]							
	Web Depth D (in.)	Flange Width B (in.)	Design Thickness t (in.)	Lip Length d (in.)	Bend Radius R (in.)	Area ($in.^2$)	Weight (lbf/ft)	I_{xx} ($in.^4$)	S_{xx} ($in.^3$)	R_x (in.)	I_{yy} ($in.^4$)	S_{yy} ($in.^3$)	R_y (in.)
STUD (S) GROSS SECTION PROPERTIES													
300S162-54	3.000	1.625	0.0566	0.500	0.0625	0.389	1.32	0.568	0.379	1.209	0.146	0.140	0.612
300S162-43	3.000	1.625	0.0451	0.500	0.0625	0.312	1.06	0.460	0.307	1.214	0.119	0.115	0.618
300S162-33	3.000	1.625	0.0346	0.500	0.0625	0.241	0.821	0.359	0.239	1.219	0.0936	0.0899	0.623
300S162-27	3.000	1.625	0.0283	0.500	0.0625	0.198	0.675	0.296	0.197	1.222	0.0776	0.0746	0.626
350S162-54	3.500	1.625	0.0566	0.500	0.0625	0.417	1.42	0.811	0.464	1.395	0.154	0.143	0.608
350S162-43	3.500	1.625	0.0451	0.500	0.0625	0.335	1.14	0.657	0.375	1.400	0.126	0.117	0.613
350S162-33	3.500	1.625	0.0346	0.500	0.0625	0.259	0.880	0.511	0.292	1.406	0.0987	0.0916	0.618
350S162-27	3.500	1.625	0.0283	0.500	0.0625	0.212	0.723	0.421	0.241	1.409	0.0819	0.0759	0.621
362S162-54	3.625	1.625	0.0566	0.500	0.0625	0.424	1.44	0.880	0.485	1.440	0.156	0.143	0.606
362S162-43	3.625	1.625	0.0451	0.500	0.0625	0.340	1.16	0.712	0.393	1.446	0.127	0.117	0.612
362S162-33	3.625	1.625	0.0346	0.500	0.0625	0.263	0.895	0.554	0.306	1.451	0.0999	0.0919	0.617
362S162-27	3.625	1.625	0.0283	0.500	0.0625	0.216	0.735	0.457	0.252	1.455	0.0829	0.0762	0.619
400S162-54	4.000	1.625	0.0566	0.500	0.0625	0.445	1.52	1.11	0.553	1.576	0.161	0.145	0.601
400S162-43	4.000	1.625	0.0451	0.500	0.0625	0.357	1.22	0.895	0.447	1.582	0.132	0.118	0.607
400S162-33	4.000	1.625	0.0346	0.500	0.0625	0.276	0.939	0.695	0.348	1.588	0.103	0.0929	0.612
400S162-27	4.000	1.625	0.0283	0.500	0.0625	0.227	0.771	0.573	0.287	1.591	0.0856	0.0770	0.615
550S162-54	5.500	1.625	0.0566	0.500	0.0625	0.530	1.80	2.34	0.851	2.101	0.178	0.150	0.579
550S162-43	5.500	1.625	0.0451	0.500	0.0625	0.425	1.45	1.89	0.687	2.108	0.145	0.122	0.585
550S162-33	5.500	1.625	0.0346	0.500	0.0625	0.328	1.12	1.46	0.533	2.114	0.114	0.0958	0.590
550S162-27	5.500	1.625	0.0283	0.500	0.0625	0.269	0.915	1.21	0.439	2.117	0.0945	0.0794	0.593
600S162-54	6.000	1.625	0.0566	0.500	0.0625	0.559	1.90	2.88	0.960	2.271	0.182	0.151	0.571
600S162-43	6.000	1.625	0.0451	0.500	0.0625	0.448	1.52	2.32	0.774	2.278	0.149	0.123	0.577
600S162-33	6.000	1.625	0.0346	0.500	0.0625	0.345	1.17	1.80	0.600	2.284	0.117	0.0965	0.582
600S162-27	6.000	1.625	0.0283	0.500	0.0625	0.283	0.963	1.48	0.494	2.288	0.0969	0.0800	0.585
800S162-54	8.000	1.625	0.0566	0.500	0.0625	0.672	2.29	5.77	1.443	2.931	0.196	0.154	0.541
800S162-43	8.000	1.625	0.0451	0.500	0.0625	0.538	1.83	4.64	1.161	2.939	0.160	0.126	0.546
800S162-33	8.000	1.625	0.0346	0.500	0.0625	0.414	1.41	3.60	0.899	2.946	0.126	0.0986	0.551
800S162-27	8.000	1.625	0.0283	0.500	0.0625	0.340	1.16	2.96	0.739	2.950	0.104	0.0817	0.554
800S200-97	8.000	2.000	0.1017	0.500	0.0625	1.26	4.29	11.15	2.789	2.974	0.541	0.352	0.655
800S200-68	8.000	2.000	0.0713	0.500	0.0625	0.895	3.04	8.02	2.004	2.994	0.402	0.261	0.670
800S200-54	8.000	2.000	0.0566	0.500	0.0625	0.714	2.43	6.44	1.610	3.003	0.328	0.213	0.678
1000S200-97	10.000	2.000	0.1017	0.500	0.0625	1.46	4.98	19.23	3.846	3.624	0.571	0.359	0.625
1000S200-68	10.000	2.000	0.0713	0.500	0.0625	1.04	3.53	13.78	2.756	3.645	0.424	0.266	0.640
1000S200-54	10.000	2.000	0.0566	0.500	0.0625	0.827	2.82	11.05	2.211	3.655	0.346	0.217	0.647
1200S200-97	12.000	2.000	0.1017	0.500	0.0625	1.67	5.67	30.23	5.039	4.258	0.594	0.363	0.597
1200S200-68	12.000	2.000	0.0713	0.500	0.0625	1.18	4.01	21.62	3.603	4.281	0.441	0.269	0.612
1200S200-54	12.000	2.000	0.0566	0.500	0.0625	0.941	3.20	17.32	2.887	4.292	0.360	0.219	0.619
1400S200-97	14.000	2.000	0.1017	0.500	0.0625	1.87	6.37	44.57	6.367	4.881	0.612	0.366	0.572
1400S200-68	14.000	2.000	0.0713	0.500	0.0625	1.32	4.50	31.81	4.545	4.905	0.455	0.271	0.586
1400S200-54	14.000	2.000	0.0566	0.500	0.0625	1.05	3.59	25.47	3.639	4.917	0.371	0.221	0.593
DEFLECTION TRACK (DT) GROSS SECTION PROPERTIES													
362DT225-43	3.625	2.250	0.0451	--	0.0712	0.359	1.22	0.804	0.444	1.497	0.193	0.120	0.733
600DT225-54	12.000	2.250	0.0566	--	0.0849	0.922	3.14	16.81	2.801	4.270	0.329	0.172	0.597

[1] Definitions of structural properties:

- Area — The cross sectional area of the full un-reduced cross-section of the studs, away from any punch outs.
- Weight — The weight per foot of the full un-reduced cross-section of the studs, away from any punch outs.
- I_{xx} — Moment of inertia of the gross section about the strong axis (X-X)
- S_{xx} — Section modulus of the gross section about the strong axis (X-X)
- R_x — Radius of gyration of the gross section about the strong axis (X-X)
- I_{yy} — Moment of inertia of the gross section about the weak axis (Y-Y)
- S_{yy} — Section modulus of the gross section about the weak axis (Y-Y)
- R_y — Radius of gyration of the gross section about the weak axis (Y-Y)

[2] Tabulated gross properties are based on the full un-reduced cross section of the studs, away from any pushouts.

Table 3: Web Depth-to-Thickness Ratios[1, 2, 3] (h/t)

Designation	Web Depth, D (in.)	27 mil 0.0283"	33 mil 0.0346"	43 mil 0.0451"	54 mil 0.0566"	68 mil 0.0713"	97 mil 0.1017"
300S	3.000	100	81	62	49	38	26
350S	3.500	117	96	73	58	45	31
362S	3.625	122	99	76	60	47	32
400S	4.000	135	110	84	66	52	36
550S	5.500	188	153	117	93	73	51
600S	6.000	206[2]	168	128	102	80	56
800S	8.000	-	226[2]	173	137	108	75
1000S	10.000	-	-	217[2]	172	136	95
1200S	12.000	-	-	-	208[2]	165	115
1400S	14.000	-	-	-	243[2]	193	134

[1] *h* value used for *h/t* calculations is the flat width of the web, which is the out-to-out size, minus twice the thickness, minus twice the inside bend radius.
[2] Where *h/t* values exceed 200, bearing stiffeners satisfying the requirements of AISI S100, Section C3.7.1, must be provided and holes in the web are not permitted unless evaluated independently.
[3] *h/t* values exceeding 260 are marked with a dash (-), such members shall not be as structural members.

Table 4: Torsional Properties[1]

Designation	Design Thickness (in.)	J ($in.^4$)	C_w ($in.^6$)	r_o (in.)	x_o (in.)	m (in.)	j (in.)	β
STUD (S) TORSIONAL PROPERTIES								
300S162-54	0.0566	0.000415	0.314	1.93	-1.367	0.812	1.91	0.495
300S162-43	0.0451	0.000212	0.259	1.94	-1.381	0.819	1.92	0.493
300S162-33	0.0346	0.0000963	0.205	1.95	-1.393	0.826	1.93	0.491
300S162-27	0.0283	0.0000529	0.171	1.96	-1.401	0.830	1.93	0.490
350S162-54	0.0566	0.000445	0.426	2.00	-1.300	0.782	2.05	0.578
350S162-43	0.0451	0.000227	0.350	2.02	-1.313	0.789	2.06	0.575
350S162-33	0.0346	0.000103	0.277	2.03	-1.325	0.796	2.07	0.573
350S162-27	0.0283	0.0000567	0.230	2.04	-1.332	0.800	2.07	0.572
362S162-54	0.0566	0.000453	0.457	2.02	-1.284	0.774	2.10	0.597
362S162-43	0.0451	0.000231	0.376	2.04	-1.297	0.782	2.10	0.594
362S162-33	0.0346	0.000105	0.297	2.05	-1.309	0.789	2.11	0.592
362S162-27	0.0283	0.0000576	0.247	2.06	-1.316	0.793	2.11	0.591
400S162-54	0.0566	0.000476	0.560	2.09	-1.239	0.754	2.24	0.650
400S162-43	0.0451	0.000242	0.460	2.11	-1.252	0.761	2.24	0.647
400S162-33	0.0346	0.000110	0.363	2.12	-1.264	0.768	2.24	0.644
400S162-27	0.0283	0.0000605	0.302	2.13	-1.271	0.772	2.25	0.643
550S162-54	0.0566	0.000566	1.10	2.44	-1.091	0.684	3.01	0.800
550S162-43	0.0451	0.000288	0.905	2.45	-1.103	0.691	3.01	0.797
550S162-33	0.0346	0.000131	0.713	2.46	-1.115	0.697	3.00	0.795
550S162-27	0.0283	0.0000718	0.592	2.47	-1.121	0.701	3.00	0.794
600S162-54	0.0566	0.000596	1.34	2.57	-1.050	0.663	3.34	0.833
600S162-43	0.0451	0.000303	1.10	2.58	-1.062	0.670	3.33	0.830
600S162-33	0.0346	0.000138	0.861	2.59	-1.073	0.677	3.33	0.828
600S162-27	0.0283	0.0000756	0.715	2.60	-1.080	0.681	3.32	0.827
800S162-54	0.0566	0.000717	2.54	3.12	-0.916	0.594	5.05	0.914
800S162-43	0.0451	0.000365	2.08	3.13	-0.927	0.601	5.01	0.912
800S162-33	0.0346	0.000165	1.63	3.14	-0.937	0.607	4.99	0.911
800S162-27	0.0283	0.0000907	1.35	3.15	-0.943	0.610	4.97	0.910
800S200-97	0.1017	0.004347	6.81	3.25	-1.147	0.733	4.72	0.876
800S200-68	0.0713	0.001516	5.07	3.29	-1.178	0.751	4.67	0.872
800S200-54	0.0566	0.000763	4.14	3.30	-1.193	0.760	4.65	0.870
1000S200-97	0.1017	0.005048	11.32	3.82	-1.026	0.670	6.64	0.928
1000S200-68	0.0713	0.001758	8.41	3.85	-1.055	0.687	6.53	0.925
1000S200-54	0.0566	0.000884	6.86	3.86	-1.069	0.696	6.49	0.923
1200S200-97	0.1017	0.005750	17.18	4.40	-0.930	0.617	9.05	0.955
1200S200-68	0.0713	0.001999	12.74	4.43	-0.957	0.634	8.87	0.953
1200S200-54	0.0566	0.001004	10.39	4.44	-0.970	0.642	8.80	0.952
1400S200-97	0.1017	0.006451	24.43	4.99	-0.851	0.572	11.95	0.971
1400S200-68	0.0713	0.002241	18.10	5.02	-0.876	0.588	11.70	0.969
1400S200-54	0.0566	0.001125	14.75	5.03	-0.889	0.596	11.58	0.969
DEFLECTION TRACK (DT) TORSIONAL PROPERTIES								
362DT225-43	0.0451	0.000243	0.435	2.24	-1.502	0.878	2.32	0.552
600DT225-54	0.0566	0.000985	8.92	4.40	-0.889	0.586	8.75	0.959

[1] Definitions of torsional properties:

- J — St. Venant torsional constant
- C_w — Torsional warping constant
- r_o — Polar radius of gyration about the shear center
- x_o — Distance from the shear center to the centroid along the principal X-Axis
- m — Distance from the shear center to the mid-plane of the web
- j — Section property for torsional-flexural buckling
- β — $1 - (x_o/r_o)^2$

Table 5: Effective Section Properties (33 ksi)[1, 2, 3]

Designation	Design Thickness (in.)	F_y = 33 ksi, F_u = 45 ksi							
		I_{xe} (in.^{4})	S_{xe} (in.^{3})	F_{ya} (ksi)	M_{al} (kip-in.)	M_{ad} (kip-in.)	L_u (in.)	V_a (lb)	V_{aPO} (lb)
STUD (S) EFFECTIVE SECTION PROPERTIES									
300S162-54	0.0566	0.568	0.379	36.9	8.36	8.74	40.5	1934	399
300S162-43	0.0451	0.460	0.305	36.2	6.62	6.57	41.1	1554	410
300S162-33	0.0346	0.359	0.227	35.6	4.83	4.65	41.7	1024	358
300S162-27	0.0283	0.293	0.176	35.2	3.71	3.55	42.2	685	295
350S162-54	0.0566	0.811	0.464	36.9	10.2	10.5	40.7	2285	658
350S162-43	0.0451	0.657	0.373	36.2	8.10	7.85	41.2	1739	637
350S162-33	0.0346	0.511	0.277	35.6	5.92	5.53	41.9	1024	495
350S162-27	0.0283	0.419	0.215	35.2	4.55	4.21	42.4	608	362
362S162-54	0.0566	0.880	0.485	36.9	10.7	11.0	40.7	2372	732
362S162-43	0.0451	0.712	0.391	36.2	8.48	8.18	41.2	1739	682
362S162-33	0.0346	0.554	0.291	35.6	6.20	5.75	41.9	1024	529
362S162-27	0.0283	0.454	0.226	35.2	4.76	4.38	42.4	586	372
400S162-54	0.0566	1.11	0.553	36.9	12.2	12.3	40.7	2635	975
400S162-43	0.0451	0.895	0.445	36.2	9.65	9.16	41.3	1739	816
400S162-33	0.0346	0.695	0.331	35.6	7.06	6.42	41.9	969	598
400S162-27	0.0283	0.571	0.258	35.2	5.44	4.88	42.4	528	401
550S162-54	0.0566	2.34	0.851	36.9	18.8	17.9	40.4	2739	1686
550S162-43	0.0451	1.89	0.683	36.2	14.8	13.2	41.1	1545	1200
550S162-33	0.0346	1.46	0.510	35.6	10.9	9.11	41.7	695	695
550S162-27	0.0283	1.21	0.378	33.0	7.47	6.59	43.8	379	379
600S162-54	0.0566	2.88	0.960	36.9	21.2	19.8	40.3	2739	1910
600S162-43	0.0451	2.32	0.770	36.2	16.7	14.5	40.9	1411	1241
600S162-33	0.0346	1.80	0.567	35.6	12.1	9.99	43.2	635	635
600S162-27	0.0283	1.48	0.410	33.0	8.11	7.21	43.7	347	347
800S162-54	0.0566	5.75	1.34	33.0	26.4	25.1	41.8	2079	2079
800S162-43	0.0451	4.53	1.02	33.0	20.2	18.4	42.3	1049	1049
800S162-33	0.0346	3.42	0.715	33.0	14.1	12.7	42.8	472	472
800S162-27	0.0283	2.75	0.523	33.0	10.3	9.51	43.2	258	258
800S200-97	0.1017	10.32	2.77	38.2	63.2	64.4	46.2	8843	4470
800S200-68	0.0713	8.02	1.96	36.8	43.3	39.2	47.9	4171	3040
800S200-54	0.0566	6.43	1.45	33.0	28.6	26.6	51.2	2079	1919
1000S200-97	0.1017	19.2	3.68	33.0	72.8	75.2	48.7	8843	4657
1000S200-68	0.0713	13.6	2.55	33.0	50.3	46.3	49.7	3314	2516
1000S200-54	0.0566	10.8	1.86	33.0	36.7	33.3	50.4	1653	1589
1200S200-97	0.1017	30.2	4.63	33.0	91.6	92.0	47.6	8020	5684
1200S200-68	0.0713	20.8	3.14	33.0	62.0	55.3	48.7	2749	2749
1200S200-54	0.0566	16.5	2.27	33.0	44.8	39.4	49.4	1372	1372
1400S200-97	0.1017	44.5	5.59	33.0	110.4	107.5	46.5	6846	6099
1400S200-68	0.0713	29.8	3.73	33.0	73.6	63.3	47.6	2349	2349
1400S200-54	0.0566	23.7	2.68	33.0	52.9	44.6	48.3	1172	1172

[1] Definitions of structural properties:

- I_{xe} Moment of inertia for deflection calculations about the strong axis (X-X)
- S_{xe} Effective section modulus about the strong axis (X-X) Stress = F_{ya} based on local buckling
- F_{ya} Average yield stress of section considering the cold work of forming
- M_{al} Allowable bending moment limited by local buckling only about the X-X axis
- M_{ad} Allowable bending moment limited by distortional buckling, assuming $K\phi = 0$ (no bracing from sheathing) and $\beta = 1.0$ (no moment gradient)
- L_u Maximum unbraced length for lateral-torsional buckling. Members are considered fully braced when the unbraced length is less than L_u. If the unbraced length exceeds L_u then lateral-torsional buckling must be evaluated independently.
- V_a Allowable strong axis (X-X) shear load, away from punch-out
- V_{aPO} Allowable strong axis (X-X) shear at the punch-out, see limitations in note 3

[2] For deflection calculations, use the effective moment of inertia

[3] Where h/t values exceed 200, bearing stiffeners satisfying the requirements of AISI S100, Section C3.7.1, must be provided and the shear strengths provided do not apply.

Table 5: Effective Section Properties, Continued (50 ksi)[1, 2, 3]

Designation	Design Thickness (in.)	F_y = 50 ksi, F_u = 65 ksi							
		I_{xe} (in.^{4})	S_{xe} (in.^{3})	F_{ya} (ksi)	M_{al} (kip-in.)	M_{ad} (kip-in.)	L_u (in.)	V_a (lb)	V_{aPO} (lb)
STUD (S) EFFECTIVE SECTION PROPERTIES									
300S162-54	0.0566	0.568	0.363	55.1	12.0	11.8	33.3	2931	605
300S162-43	0.0451	0.460	0.271	54.2	8.81	8.72	35.3	2141	565
300S162-33	0.0346	0.358	0.207	53.4	6.62	6.09	35.4	1260	440
300S162-27	0.0283	0.287	0.164	50.0	4.92	4.46	35.6	716	309
350S162-54	0.0566	0.811	0.444	55.1	14.6	14.1	33.4	3372	972
350S162-43	0.0451	0.657	0.333	54.2	10.8	10.4	35.4	2141	784
350S162-33	0.0346	0.511	0.254	53.4	8.13	7.22	35.6	1115	539
350S162-27	0.0283	0.410	0.202	50.0	6.05	5.27	35.7	608	362
362S162-54	0.0566	0.880	0.465	55.1	15.3	14.7	33.4	3372	1041
362S162-43	0.0451	0.712	0.349	54.2	11.3	10.8	35.4	2141	839
362S162-33	0.0346	0.554	0.266	53.4	8.52	7.50	35.6	1074	555
362S162-27	0.0283	0.445	0.212	50.0	6.35	5.47	35.7	586	372
400S162-54	0.0566	1.11	0.529	55.1	17.5	16.4	33.4	3372	1248
400S162-43	0.0451	0.895	0.398	54.2	12.9	12.1	35.4	2141	1004
400S162-33	0.0346	0.695	0.304	53.4	9.73	8.36	35.6	969	598
400S162-27	0.0283	0.560	0.235	50.0	7.02	6.09	35.9	528	401
550S162-54	0.0566	2.34	0.816	55.1	26.9	23.6	33.2	3066	1887
550S162-43	0.0451	1.89	0.617	54.2	20.0	17.1	35.1	1545	1200
550S162-33	0.0346	1.46	0.445	50.0	13.3	11.3	35.5	695	695
550S162-27	0.0283	1.19	0.320	50.0	9.59	8.52	35.9	379	379
600S162-54	0.0566	2.88	0.921	55.1	30.4	26.0	33.0	2800	1952
600S162-43	0.0451	2.32	0.689	54.2	22.4	18.8	35.0	1411	1241
600S162-33	0.0346	1.80	0.483	50.0	14.5	12.4	35.5	635	635
600S162-27	0.0283	1.47	0.349	50.0	10.5	9.30	35.9	347	347
800S162-54	0.0566	5.66	1.23	50.0	36.8	33.0	34.1	2079	2079
800S162-43	0.0451	4.46	0.866	50.0	25.9	23.9	34.6	1049	1049
800S162-33	0.0346	3.36	0.617	50.0	18.5	16.3	35.0	472	472
800S162-27	0.0283	2.65	0.456	50.0	13.7	12.2	35.3	258	258
800S200-97	0.1017	10.82	2.71	56.8	92.3	85.7	37.9	10885	5502
800S200-68	0.0713	8.02	1.87	55.0	61.7	51.1	39.2	4171	3040
800S200-54	0.0566	6.35	1.24	50.0	37.1	34.7	42.0	2079	1919
1000S200-97	0.1017	18.25	3.67	50.0	110.0	100.8	39.6	9678	5097
1000S200-68	0.0713	13.55	2.28	50.0	68.3	60.5	40.6	3314	2516
1000S200-54	0.0566	10.63	1.58	50.0	47.3	43.1	41.2	1653	1589
1200S200-97	0.1017	28.03	4.56	50.0	136.6	121.7	38.7	8020	5684
1200S200-68	0.0713	20.78	2.79	50.0	83.5	71.6	39.8	2749	2749
1200S200-54	0.0566	16.21	1.92	50.0	57.5	50.5	40.4	1372	1372
1400S200-97	0.1017	40.12	5.45	50.0	163.2	140.6	37.9	6846	6099
1400S200-68	0.0713	29.87	3.30	50.0	98.7	81.4	38.9	2349	2349
1400S200-54	0.0566	23.17	2.26	50.0	67.6	56.9	39.5	1172	1172

[1] Definitions of structural properties:

- I_{xe} Moment of inertia for deflection calculations about the strong axis (X-X)
- S_{xe} Effective section modulus about the strong axis (X-X) Stress = F_{ya} based on local buckling
- F_{ya} Average yield stress of section considering the cold work of forming
- M_{al} Allowable bending moment limited by local buckling only about the X-X axis
- M_{ad} Allowable bending moment limited by distortional buckling, assuming $K\phi = 0$ (no bracing from sheathing) and $\beta = 1.0$ (no moment gradient)
- L_u Maximum unbraced length for lateral-torsional buckling. Members are considered fully braced when the unbraced length is less than L_u. If the unbraced length exceeds L_u then lateral-torsional buckling must be evaluated independently.
- V_a Allowable strong axis (X-X) shear load, away from punch-out
- V_{aPO} Allowable strong axis (X-X) shear at the punch-out, see limitations in note 3

[2] For deflection calculations, use the effective moment of inertia

[3] Where h/t values exceed 200, bearing stiffeners satisfying the requirements of AISI S100, Section C3.7.1, must be provided and the shear strengths provided do not apply.

Table 5: Effective Section Properties, Continued (80 ksi)[1, 2, 3]

Designation	Design Thickness (in.)	F_y = 80 ksi, F_u = 90 ksi							
		I_{xe} (in.^{4})	S_{xe} (in.^{3})	F_{ya} (ksi)	M_{al} (kip-in.)	M_{ad} (kip-in.)	L_u (in.)	V_a (lb)	V_{aPO} (lb)
STUD (S) EFFECTIVE SECTION PROPERTIES									
300S162-54	0.0566	0.568	0.320	80.0	15.3	15.2	27.9	4265	880
300S162-43	0.0451	0.458	0.249	80.0	12.0	11.2	28.0	2708	714
300S162-33	0.0346	0.349	0.187	80.0	8.96	7.85	28.2	1314	459
300S162-27	0.0283	0.277	0.145	80.0	6.95	5.95	28.4	716	309
350S162-54	0.0566	0.811	0.394	80.0	18.9	18.1	27.9	4265	1229
350S162-43	0.0451	0.656	0.307	80.0	14.7	13.3	28.1	2485	911
350S162-33	0.0346	0.499	0.228	80.0	10.9	9.28	28.3	1115	539
350S162-27	0.0283	0.398	0.170	80.0	8.12	7.02	28.6	608	362
362S162-54	0.0566	0.880	0.413	80.0	19.8	18.8	27.9	4265	1316
362S162-43	0.0451	0.712	0.322	80.0	15.4	13.9	28.1	2394	939
362S162-33	0.0346	0.542	0.236	80.0	11.3	9.64	28.4	1074	555
362S162-27	0.0283	0.432	0.176	80.0	8.42	7.28	28.7	586	372
400S162-54	0.0566	1.11	0.472	80.0	22.6	21.1	27.9	4265	1578
400S162-43	0.0451	0.895	0.369	80.0	17.7	15.5	28.1	2157	1012
400S162-33	0.0346	0.682	0.260	80.0	12.4	10.7	28.4	969	598
400S162-27	0.0283	0.544	0.194	80.0	9.30	8.09	28.7	528	401
550S162-54	0.0566	2.34	0.738	80.0	35.3	30.0	27.7	3066	1887
550S162-43	0.0451	1.89	0.529	80.0	25.4	21.8	28.0	1545	1200
550S162-33	0.0346	1.45	0.356	80.0	17.0	15.0	28.5	695	695
550S162-27	0.0283	1.15	0.268	80.0	12.8	11.2	28.7	379	379
600S162-54	0.0566	2.88	0.829	80.0	39.7	33.0	27.5	2800	1952
600S162-43	0.0451	2.32	0.575	80.0	27.6	23.9	28.0	1411	1241
600S162-33	0.0346	1.79	0.388	80.0	18.6	16.4	28.4	635	635
600S162-27	0.0283	1.38	0.292	80.0	14.0	12.3	28.7	347	347
800S162-54	0.0566	5.57	1.01	80.0	48.4	44.1	27.2	2079	2079
800S162-43	0.0451	4.38	0.735	80.0	35.2	31.6	27.6	1049	1049
800S162-33	0.0346	3.25	0.509	80.0	24.4	21.4	27.9	472	472
800S162-27	0.0283	2.49	0.387	80.0	18.6	15.9	28.1	258	258
800S200-97	0.1017	11.13	2.64	80.0	126.5	107.7	32.0	12201	6167
800S200-68	0.0713	8.02	1.65	80.0	79.1	64.6	32.7	4171	3040
800S200-54	0.0566	6.13	1.05	80.0	50.5	46.1	33.5	2079	1919
1000S200-97	0.1017	18.94	3.28	80.0	157.1	136.9	31.5	9678	5097
1000S200-68	0.0713	13.31	1.89	80.0	90.6	80.6	32.4	3314	2516
1000S200-54	0.0566	10.26	1.34	80.0	64.0	57.0	32.9	1653	1589
1200S200-97	0.1017	29.01	4.03	80.0	193.0	163.6	30.8	8020	5684
1200S200-68	0.0713	20.32	2.30	80.0	110.2	94.7	31.7	2749	2749
1200S200-54	0.0566	15.71	1.62	80.0	77.5	66.3	32.1	1372	1372
1400S200-97	0.1017	41.50	4.78	80.0	229.0	187.4	30.1	6846	6099
1400S200-68	0.0713	29.10	2.71	80.0	129.7	106.9	30.9	2349	2349
1400S200-54	0.0566	22.56	1.90	80.0	91.0	74.2	31.4	1172	1172

[1] Definitions of structural properties:

- I_{xe} Moment of inertia for deflection calculations about the strong axis (X-X)
- S_{xe} Effective section modulus about the strong axis (X-X) Stress = F_{ya} based on local buckling
- F_{ya} Average yield stress of section considering the cold work of forming
- M_{al} Allowable bending moment limited by local buckling only about the X-X axis
- M_{ad} Allowable bending moment limited by distortional buckling, assuming $K\phi = 0$ (no bracing from sheathing) and $\beta = 1.0$ (no moment gradient)
- L_u Maximum unbraced length for lateral-torsional buckling. Members are considered fully braced when the unbraced length is less than L_u. If the unbraced length exceeds L_u then lateral-torsional buckling must be evaluated independently.
- V_a Allowable strong axis (X-X) shear load, away from punch-out
- V_{aPO} Allowable strong axis (X-X) shear at the punch-out, see limitations in note 3

[2] For deflection calculations, use the effective moment of inertia

[3] Where h/t values exceed 200, bearing stiffeners satisfying the requirements of AISI S100, Section C3.7.1, must be provided and the shear strengths provided do not apply.

Table 6: Deflection Track (DT) Allowable Stud Lateral End Reaction (lbf)[1]

Designation	Max. Gap[2] (in.)	F_y = 33 ksi Stud Spacing (inches on-center)			F_y = 50 ksi Stud Spacing (inches on-center)			F_y = 80 ksi Stud Spacing (inches on-center)		
		12	16	24	12	16	24	12	16	24
362DT175-43	0.50	144	163	163	218	247	247	349	396	396
600DT175-54	0.50	213	213	213	323	323	323	516	516	516
362DT175-43	0.75	96	123	123	145	187	187	232	299	299
600DT175-54	0.75	151	158	158	229	240	240	366	384	384

[1] The allowable reaction I the point load allowed into the deflection track imposed by a single stud.
[2] Values apply where the distance between the stud web at the end of the stud and the track web does not exceed stated maximum gap.