

ICC-ES Evaluation Report**ESR-2361**

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DIVISION: 05 00 00—METAL**Section: 05 40 00—Cold-Formed Metal Framing****Section: 05 41 00—Structural Metal Stud Framing****DIVISION: 09—FINISHES****Section: 09 22 16.13—Non-Structural Metal Stud Framing****REPORT HOLDER:****FRAMECAD SOLUTIONS LTD.**

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www.framecad.com**EVALUATION SUBJECT:****COLD-FORMED STEEL C-SHAPES AND TRACKS****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The FRAMECAD Solutions C-shapes and tracks are recognized for use in interior and exterior, nonload-bearing and load-bearing applications.

3.0 DESCRIPTION**3.1 General:**

The products that are recognized in this report are limited to those products noted in Table 1. The C-shapes and tracks are factory-formed from coils of light gage steel at the FRAMECAD Solutions Glenn Innes, Auckland, New Zealand, facility. See Figures 1 and 2 for C-shape and track configurations and Table 1 for steel minimum yield strengths, steel thicknesses, and dimensional details. The C-shapes are manufactured with and without web punch-outs. When punch-outs are provided, they are located along the center of the web, with a maximum width of 1½ inches (38 mm) and a maximum length of 4 inches (102 mm) (see Figure 3). The punch-outs are spaced a minimum of 24 inches (610 mm) on center. The edge of

the punch-outs must be a minimum of 10 inches (254 mm) from each end of the stud. The tracks have the same shape as the C-shapes, except the stiffener lip of the track is removed at the location of each stud. Gross, effective, and torsional section properties are set forth in Tables 2 through 7.

3.2 Material:

The C-shapes and tracks are formed from galvanized steel coils. The steel complies with ASTM A653 SS Grade 33, ASTM A1003 Structural Grade 33 Type H (ST33H) or ASTM A1003 Nonstructural Grade 33 (NS33) [for nonload-bearing studs with a 5 psf (239 Pa) maximum transverse load only]; except for 0.0538-inch-thick [54 mils (1.366 mm)] and greater C-shapes and tracks, which are formed from steel complying with ASTM A653 SS Grade 50, Class 1 or 3, or ASTM A1003 Structural Grade 50 Type H (ST50H). The steel is hot-dipped galvanized with a minimum G60 or G40 galvanized coating designation. Members with less than a G60 galvanized coating are limited to interior nonload-bearing wall applications with 5 psf (240 Pa) maximum transverse load.

4.0 INSTALLATION**4.1 General:**

The C-shapes and tracks must be installed in accordance with the approved plans and this report. The approved plans must be available at the jobsite at all times during installation.

4.2 Design:

Structural capacities are determined in accordance with AISI-NAS based on structural properties in Tables 1 through 7 of this report. Web crippling details and maximum web crippling loads are described in Tables 8 and 9. As an alternative, structural uses may be determined in accordance with Section 4.3 or 4.4.

C-shapes listed in Table 14 and tracks with a thickness greater than 27 mils qualify for use with the prescriptive requirements of the IRC. For use under the IRC of all other sections, the cold-formed steel framing members must be limited to engineered structures, in accordance with IRC Section R301.1.3.

4.3 Nonload-bearing Wall Heights:

Allowable wall heights for interior nonload-bearing walls are shown in Table 10. The allowable end reactions of the studs based on web crippling effects for the applicable bearing lengths in Tables 8 and 9 must equal, or exceed, the applied load end reaction.

4.4 Load-bearing Wall Studs:

Allowable axial loads combined with transverse loads for various heights and stud spacings, based on mechanical bracing at a maximum of 48 inches (1219 mm) on center and sheathing on both sides of the studs for lateral stability, with the design complying with Section C5 in the AISI-NAS, are shown in Tables 11, 12 and 13. The allowable end reactions of the studs based on web crippling effects for the applicable bearing lengths in Tables 8 and 9 must equal, or exceed, the end reactions based on the applied transverse loads.

5.0 CONDITIONS OF USE

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

- 5.1 C-shapes and tracks must be installed in accordance with this report, the applicable code and the approved plans. If there is a conflict between this report and the submitted plans, this report governs.
- 5.2 Minimum base steel thickness of cold-formed steel members, as delivered to the jobsite, must be at least 95 percent of the design thickness specified in Tables 2 through 7.
- 5.3 Complete plans and calculations verifying compliance with this report must be submitted to the code official

for each project. 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 constructed.

- 5.4 Stud member end reactions, resulting from allowable heights and loads, as noted in the accompanying tables, must be checked with the web crippling tables noted in this report.
- 5.5 C-shapes and tracks having a galvanized coating weight of less than G60 must be limited to use as nonload-bearing interior wall framing subject to a maximum transverse load of 5 psf (240 Pa).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Cold-formed Steel Framing Members (AC46), dated February 2007 (editorially revised April 2008).

7.0 IDENTIFICATION

Each C-shape and track must have a legible label, stamp or embossment, at a maximum of 48 inches (1219 mm) on center, indicating the FRAMECAD Solutions name or initials (FS); the evaluation report number (ESR-2361); the acronym "ICC-ES"; material minimum base-metal thickness (uncoated) in decimal thickness or mils; minimum specified yield strength [if greater than 33 ksi (228 Mpa)]; and coating grade (if G60 or greater).

TABLE 1—SECTION DESIGNATION

SECTION DESIGNATION	THICKNESS DESIGNATION (mils)	DESIGN BASE METAL THICKNESS (inch)	MINIMUM BASE METAL THICKNESS (inch)	WEB DEPTH ¹ (inch)	FLANGE WIDTH (inch)	LIP SIZE ² (inch)	INSIDE BEND RADIUS (inch)	STEEL MINIMUM YIELD STRENGTH (ksi)
350S162-27 ³	27	0.0283	0.0269	3.50	1.625	0.50	0.0938	33
350S162-33	33	0.0346	0.0329				0.0938	33
350S162-43	43	0.0451	0.0428				0.0938	33
350S162-54	54	0.0566	0.0538				0.0938	50
350S162-68	68	0.0713	0.0677				0.1070	50
550S162-33	33	0.0346	0.0329	5.50	1.625	0.50	0.0938	33
550S162-43	43	0.0451	0.0428				0.0938	33
550S162-54	54	0.0566	0.0538				0.0938	50
550S162-68	68	0.0713	0.0677				0.1070	50
600S162-33	33	0.0346	0.0329	6.00	1.625	0.50	0.0938	33
600S162-43	43	0.0451	0.0428				0.0938	33
600S162-54	54	0.0566	0.0538				0.0938	50
600S162-68	68	0.0713	0.0677				0.1070	50
350T162-27 ³	27	0.0283	0.0269	3.50	1.625	0.50	0.0938	33
350T162-33	33	0.0346	0.0329				0.0938	33
350T162-43	43	0.0451	0.0428				0.0938	33
350T162-54	54	0.0566	0.0538				0.0938	50
350T162-68	68	0.0713	0.0677				0.1070	50
550T162-33	33	0.0346	0.0329	5.50	1.625	0.50	0.0938	33
550T162-43	43	0.0451	0.0428				0.0938	33
550T162-54	54	0.0566	0.0538				0.0938	50
550T162-68	68	0.0713	0.0677				0.1070	50
600T162-33	33	0.0346	0.0329	6.00	1.625	0.50	0.0938	33
600T162-43	43	0.0451	0.0428				0.0938	33
600T162-54	54	0.0566	0.0538				0.0938	50
600T162-68	68	0.0713	0.0677				0.1070	50

For **SI**: 1 inch = 25.4 mm, 1 ksi = 6.89 Mpa.

¹Web depth for both stud and track sections is measured from outside of flange to outside of flange.

²Track flange stiffeners (lips) are removed at stud locations.

³For applications in accordance with the IRC, use of the 350S162-27 and 350T162-27 is applicable only for engineered designs in accordance with IRC Section R301.1.3.

Notes for Section Property Tables (Tables 2 through 7):

- When provided, factory punch-outs must be located along the centerline of the webs of the members, have a minimum center-to-center spacing of 24", a maximum width of half the member depth or 1 1/2", whichever is less, and a maximum length of 4". The minimum distance between the end of the member and the near edge of the web punch-out must be no less than 10".
- The strength increase due to cold work of forming was incorporated for flexural strength as applicable in accordance with Section A7.2 of the AISI-NAS.
- Minimum base metal thickness must be 95% of the design thickness in accordance with Section A2.4 of the AISI-NAS.
- The centerline bend radius is the greater of 2 times the design thickness or 3/32".
- Tabulated gross properties are based on the full unreduced cross section of the studs, away from the punch-outs.
- For deflection calculations, use the effective moment of inertia.
- Definitions of structural property symbols:

Gross Properties

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

Effective Properties

- A_e: The effective cross sectional area of the cross-section of the studs, away from the punch-outs.
- I_{xx}: Moment of inertia for deflection calculations based on "Procedure 1 for Serviceability Determination" of the AISI-NAS.
- S_{xx}: Effective section modulus about the strong axis (X-X) at stress = F_y.
- M_a: Allowable bending moment based on the effective section modulus and the allowable stress including the strength increase due to cold work of forming where applicable and full lateral bracing of the compression flange.
- V_a: Allowable shear load for unpunched section.
- Y_{cg}: Maximum distance from the outside of the compression flange to the neutral axis of the effective section.

Torsional Properties

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

TABLE 2—C-SHAPE (S) GROSS SECTION PROPERTIES

MEMBER DESIGNATION	GROSS SECTION PROPERTIES						
	Area (in ²)	Weight (lb/ft)	I _{xx} (in ⁴)	S _{xx} (in ³)	R ^x (in)	I _{yy} (in ⁴)	R _y (in)
350S162-27	0.211	0.72	0.417	0.196	1.406	0.081	0.619
350S162-33	0.258	0.88	0.508	0.290	1.404	0.098	0.617
350S162-43	0.334	1.14	0.654	0.374	1.400	0.125	0.612
350S162-54	0.415	1.41	0.804	0.460	1.392	0.152	0.606
350S162-68	0.515	1.75	0.985	0.563	1.383	0.184	0.597
550S162-33	0.327	1.11	1.458	0.530	2.112	0.113	0.589
550S162-43	0.424	1.44	1.883	0.685	2.107	0.145	0.584
550S162-54	0.528	1.80	2.324	0.845	2.098	0.176	0.577
550S162-68	0.528	1.80	2.324	0.845	2.098	0.176	0.577
600S162-33	0.344	1.17	1.793	0.598	2.282	0.116	0.581
600S162-43	0.447	1.52	2.316	0.772	2.276	0.148	0.576
600S162-54	0.556	1.89	2.860	0.953	2.267	0.180	0.570
600S162-68	0.693	2.36	3.525	1.175	2.255	0.218	0.560

For SI: 1 inch = 25.4 mm, 1 lb/ft = 14.5939 N/m.

TABLE 3—C-SHAPE (S) EFFECTIVE SECTION PROPERTIES

MEMBER DESIGNATION	33 KSI					50 KSI				
	I _{xx} (in ⁴)	S _{xx} (in ³)	M _a (in-k)	V _a (lb)	Y _{cg} (in)	I _{xx} (in ⁴)	S _{xx} (in ³)	M _a (in-k)	V _a (lb)	Y _{cg} (in)
350S162-27	0.417	0.196	3.87	594	1.906	---	---	---	---	---
350S162-33	0.508	0.279	5.50	1046	1.779	---	---	---	---	---
350S162-43	0.654	0.372	7.20	1736	1.755	---	---	---	---	---
350S162-54	---	---	---	---	---	0.804	0.447	13.37	3446	1.773
350S162-68	---	---	---	---	---	0.985	0.557	18.89	4483	1.758
550S162-33	1.458	0.512	10.11	670	2.787	---	---	---	---	---
550S162-43	1.883	0.681	14.79	1487	2.757	---	---	---	---	---
550S162-54	---	---	---	---	---	2.324	0.821	24.59	2967	2.782
550S162-68	---	---	---	---	---	2.861	1.031	34.94	5468	2.761
600S162-33	1.793	0.577	11.41	612	3.039	---	---	---	---	---
600S162-43	2.316	0.767	16.87	1358	3.007	---	---	---	---	---
600S162-54	---	---	---	---	---	2.860	0.927	27.76	2708	3.034
600S162-68	---	---	---	---	---	3.525	1.164	39.46	54.68	3.011

For SI: 1 inch = 25.4 mm, 1 in-k = 12.8 N-m, 1 lb = 4.448 N.

TABLE 4—C-SHAPE (S) TORSIONAL PROPERTIES

MEMBER DESIGNATION	TORSIONAL PROPERTIES				
	J x1000 (in ⁴)	C _w (in ⁶)	X _o (in)	R _o (in)	β
350S162-27	0.056	0.243	-1.362	2.052	0.560
350S162-33	0.103	0.273	-1.351	2.044	0.563
350S162-43	0.227	0.345	-1.339	2.031	0.565
350S162-54	0.443	0.418	-1.331	2.019	0.566
350S162-68	0.872	0.503	-1.321	2.004	0.565
550S162-33	0.130	0.704	-1.134	2.468	0.789
550S162-43	0.288	0.894	-1.123	2.458	0.791
550S162-54	0.564	1.088	-1.114	2.445	0.792
550S162-68	1.114	1.316	-1.103	2.427	0.793
600S162-33	0.137	0.851	-1.091	2.595	0.823
600S162-43	0.303	1.082	-1.081	2.585	0.825
600S162-54	0.594	1.318	-1.072	2.572	0.826
600S162-68	1.174	1.596	-1.061	2.554	0.828

For SI: 1 inch = 25.4 mm.

TABLE 5—TRACK (T) GROSS SECTION PROPERTIES

MEMBER DESIGNATION	GROSS SECTION PROPERTIES						
	Area (in ²)	Weight (lb/ft)	I _{xx} (in ⁴)	S _{xx} (in ³)	R _x (in)	I _{yy} (in ⁴)	R _y (in)
350T162-27	0.180	0.64	0.345	0.197	1.399	0.050	0.517
350T162-33	0.228	0.78	0.446	0.255	1.397	0.061	0.516
350T162-43	0.297	1.01	0.575	0.329	1.392	0.076	0.514
350T162-54	0.370	1.26	0.712	0.407	1.387	0.097	0.513
350T162-68	0.462	1.57	0.972	0.518	1.450	0.099	0.462
550T162-33	0.298	1.01	1.280	0.467	2.074	0.069	0.481
550T162-43	0.387	1.32	1.658	0.603	2.070	0.089	0.480
550T162-54	0.483	1.65	2.058	0.748	2.064	0.110	0.478
550T162-68	0.605	2.06	2.699	0.939	2.112	0.110	0.427
600T162-33	0.311	1.06	1.590	0.517	2.260	0.057	0.426
600T162-43	0.405	1.38	2.072	0.673	2.261	0.073	0.424
600T162-54	0.509	1.73	2.611	0.843	2.266	0.091	0.422
600T162-68	0.641	2.18	3.309	1.059	2.273	0.113	0.419

For SI: 1 inch = 25.4 mm, 1 lb/ft = 14.5939 N/m.

TABLE 6—TRACK (T) EFFECTIVE SECTION PROPERTIES

MEMBER DESIGNATION	33 KSI					50 KSI				
	I _{xx} (in ⁴)	S _{xx} (in ³)	M _a (in-k)	V _a (lb)	Y _{cg} (in)	I _{xx} (in ⁴)	S _{xx} (in ³)	M _a (in-k)	V _a (lb)	Y _{cg} (in)
350T162-27	0.272	0.125	2.50	613	2.071	---	---	---	---	---
350T162-33	0.358	0.164	3.24	1024	2.034	---	---	---	---	---
350T162-43	0.494	0.231	4.57	1739	1.979	---	---	---	---	---
350T162-54	---	---	---	---	---	0.678	0.291	8.71	3372	1.968
350T162-68	---	---	---	---	---	0.919	0.428	12.81	4838	2.007
550T162-33	1.076	0.302	5.96	699	3.185	---	---	---	---	---
550T162-43	1.456	0.455	8.99	1550	3.019	---	---	---	---	---
550T162-54	---	---	---	---	---	1.823	0.572	17.14	3093	3.007
550T162-68	---	---	---	---	---	2.569	0.804	24.07	5468	3.029
600T162-33	1.385	0.335	6.61	597	3.569	---	---	---	---	---
600T162-43	1.868	0.534	10.55	1321	3.321	---	---	---	---	---
600T162-54	---	---	---	---	---	2.374	0.678	20.30	2617	3.327
600T162-68	---	---	---	---	---	3.154	0.913	27.34	5251	3.282

For SI: 1 inch = 25.4 mm, 1 in-k = 12.8 N-m, 1 lb = 4.448 N.

TABLE 7—TRACK (T) TORSIONAL PROPERTIES

MEMBER DESIGNATION	TORSIONAL PROPERTIES				
	J x1000 (in ⁴)	C _w (in ⁶)	X _o (in)	R _o (in)	β
350T162-27	0.050	0.106	-0.996	1.793	0.692
350T162-33	0.091	0.129	-0.994	1.791	0.692
350T162-43	0.201	0.165	-0.991	1.785	0.692
350T162-54	0.395	0.203	-0.991	1.780	0.692
350T162-68	0.799	0.256	-0.852	1.779	0.771
550T162-33	0.119	0.372	-0.822	2.283	0.870
550T162-43	0.262	0.478	-0.819	2.277	0.870
550T162-54	0.516	0.591	-0.818	2.271	0.870
550T162-68	1.025	0.652	-0.710	2.269	0.902
600T162-33	0.124	0.389	-0.691	2.401	0.917
600T162-43	0.275	0.503	-0.687	2.400	0.918
600T162-54	0.543	0.630	-0.684	2.404	0.919
600T162-68	1.086	0.794	-0.680	2.409	0.920

For SI: 1 inch = 25.4 mm.

TABLE 8—ALLOWABLE WEB CRIPPLING LOAD (lbs)—SINGLE MEMBERS^{1,2,3}

SECTION DESIGNATION	YIELD STRENGTH (ksi)	CONDITION 1 BEARING LENGTH (in)		CONDITION 2 BEARING LENGTH (in)		CONDITION 3 BEARING LENGTH (in)		CONDITION 4 BEARING LENGTH (in)	
		1	3.5	1	3.5	1	3.5	1	3.5
350S162-33	33	166	260	324	445	175	175	384	484
350S162-43	33	278	428	571	768	315	315	680	842
350S162-54	50	637	967	1331	1761	768	768	1645	2005
350S162-68	50	965	1441	2047	2660	970	1232	2631	3159
550S162-33	33	155	243	315	432	100	134	339	428
550S162-43	33	262	405	556	749	195	256	614	760
550S162-54	50	606	920	1302	1722	502	649	1508	1838
550S162-68	50	923	1380	2007	2608	844	1071	2441	2931
600S162-33	33	153	240	313	430	93	125	329	416
600S162-43	33	259	400	553	745	185	243	600	743
600S162-54	50	599	909	1295	1713	482	623	1478	1802
600S162-68	50	914	1366	1998	2596	816	1036	2399	2881

For SI: 1 inch = 25.4mm, 1 lb = 4.448 N.

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

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

³Condition 1 - End Reaction - One Flange Loading

Condition 2 - Interior Reaction - One Flange Loading

Condition 3 - End Reaction - Two Flange Loading

Condition 4 - Interior Reaction - Two Flange Loading

See Figure 4 for Conditions 1, 2, 3 and 4.

TABLE 9—ALLOWABLE WEB CRIPPLING LOAD (lbs)—BACK-TO-BACK MEMBERS^{1,2,3}

SECTION DESIGNATION	YIELD STRENGTH (ksi)	CONDITION 1 BEARING LENGTH (in)		CONDITION 2 BEARING LENGTH (in)		CONDITION 3 BEARING LENGTH (in)		CONDITION 4 BEARING LENGTH (in)	
		1	3.5	1	3.5	1	3.5	1	3.5
350S162-33	33	776	1182	917	1086	463	585	984	1241
350S162-43	33	1272	1901	1590	1854	838	1037	1808	2239
350S162-54	50	2867	4217	3749	4316	2062	2514	4459	5436
350S162-68	50	4286	6196	5853	6657	3346	4018	7236	8689
550S162-33	33	774	1179	909	1077	384	484	815	1028
550S162-43	33	1269	1897	1579	1841	721	893	1556	1927
550S162-54	50	2861	4208	3725	4289	1818	2217	3933	4794
550S162-68	50	4278	6185	5820	6619	3008	3612	6506	7812
600S162-33	33	774	1178	908	1075	366	462	778	982
600S162-43	33	1268	1896	1576	1838	696	862	1501	1859
600S162-54	50	2860	4207	3720	4283	1765	2152	3818	4654
600S162-68	50	4276	6182	5812	6611	2935	3524	6347	7621

For SI: 1 inch = 25.4mm, 1 lb = 4.448 N.

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

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

³Condition 1 - End Reaction - One Flange Loading

Condition 2 - Interior Reaction - One Flange Loading

Condition 3 - End Reaction - Two Flange Loading

Condition 4 - Interior Reaction - Two Flange Loading

See Figure 4 for Conditions 1, 2, 3 and 4.

TABLE 10—LIMITING WALL HEIGHTS—NONLOAD-BEARING WALLS—NON-COMPOSITE^{1,2,3}

MEMBER DESIGNATION	F _y (ksi)	STUD SPACING (in) o.c.	LATERAL LOAD					
			5 psf		7.5 psf		10 psf	
			Deflection Limit					
			L/120	L/240	L/120	L/240	L/120	L/240
350S162-27	33	16	16' 0"	16' 0"	13' 1"	13' 1"	11' 4"	11' 4"
		24	13' 1"	13' 1"	10' 8"	10' 8"	9' 3"	9' 3"
350S162-33	33	16	21' 6"	17' 1"	18' 9"	16' 5"	17' 1"	14' 11"
		24	18' 9"	14' 11"	14' 11"	13' 0"	13' 6"	11' 10"
350S162-43	33	16	23' 5"	18' 7"	20' 5"	16' 2"	18' 7"	14' 9"
		24	20' 5"	16' 2"	17' 10"	14' 2"	16' 2"	12' 10"
550S162-33	33	16	30' 7"	24' 3"	26' 8"	21' 2"	24' 3"	19' 3"
		24	26' 8"	21' 2"	23' 4"	18' 6"	21' 2"	16' 10"
550S162-43	33	16	33' 3"	26' 5"	29' 1"	23' 1"	26' 5"	20' 11"
		24	29' 1"	23' 1"	25' 5"	20' 2"	23' 1"	18' 4"
600S162-33	33	16	32' 9"	26' 0"	27' 6"	22' 8"	22' 11"	20' 7"
		24	27' 6"	22' 8"	20' 4"	19' 10"	15' 3"	15' 3"
600S162-43	33	16	35' 8"	28' 4"	31' 2"	24' 9"	28' 4"	22' 5"
		24	31' 2"	24' 9"	27' 2"	21' 7"	23' 6"	19' 7"

For **SI**: 1 inch = 25.4 mm, 1 psf = 48 Pa.

¹Limiting wall heights based on continuous support of each flange over the full length of the stud.

²Heights based on steel properties only.

³Exterior walls must be designed for transverse load of 10 psf minimum.

Notes for combined Axial and Lateral Load Tables (Tables 11, 12, and 13):

1. Allowable loads are based on weak axis and torsional bracing of 48 inches o.c. maximum for axial load calculation and continuous support of each flange for flexural calculation.
2. Exterior walls must be designed for transverse load of 10 psf minimum.
3. End reactions must be checked for web crippling.
4. All 33 and 43 mil studs are 33 ksi steel while 54 and 68 mil studs are 50 ksi steel.
5. Allowable axial loads in kips per stud.
If not noted, deflection is less than L/720.

For **Si**: 1 inch = 25.4 mm, 1 lb = 4.448 N, 1 psf = 48 Pa.

TABLE 11—COMBINED LATERAL AND AXIAL LOADS—ALLOWABLE AXIAL LOAD (kips) FOR 350S162

WALL HEIGHT (ft)	MAX. STUD SPACING (in)	350S162-																													
		5 psf						15 psf						20 psf						25 psf						30 psf					
		33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68						
8		2.03	2.76		5.14	1.49 ⁹	2.51 ¹⁰	4.09	5.14	1.14 ⁹	2.15 ⁹	3.96 ⁹	5.14	0.80 ⁸	1.82 ⁹	3.63 ⁹	5.14 ⁷	0.49 ⁸	1.50 ⁸	3.31 ⁹	4.87 ⁶										
9		1.95	2.66	3.83	4.80	1.13 ⁹	2.09 ⁹	3.71 ⁹	4.80 ⁷	0.73 ⁸	1.68 ⁸	3.31 ⁹	4.73 ⁶	0.36 ⁷	1.30 ⁸	2.93 ⁸	4.37 ⁶	---	0.94 ⁷	2.58 ⁷	4.02 ³										
10	24	1.82	2.54	3.53	4.43	0.78 ⁸	1.68 ⁸	3.11 ⁹	4.40 ⁶	0.35 ⁷	1.23 ⁸	2.67 ⁹	3.98 ⁶	---	0.81 ⁷	2.27 ⁸	3.58 ³	---	0.42 ⁷	1.89 ⁷	3.21 ³										
12		1.34 ⁹	2.13 ⁹	2.62	3.64	0.18 ⁷	0.91 ⁷	2.03 ⁸	3.07 ³	---	0.43 ⁷	1.57 ⁷	2.61 ²	---	---	1.15 ⁷	2.20 ²	---	---	0.77 ⁷	1.82 ²										
14		0.91 ⁸	1.56 ⁸	2.35 ⁹	2.97 ⁶	---	0.32 ⁷	1.22 ⁷	2.05 ²	---	---	0.78 ⁸	1.61 ²	---	---	0.38 ⁶	1.21 ¹	---	---	---	0.84 ¹										
16		0.56 ⁷	1.07 ⁸	1.73 ⁸	2.40 ⁶	---	---	0.35 ⁶	1.32 ²	---	---	0.24 ⁶	0.90 ¹	---	---	---	0.52 ¹	---	---	---	0.18 ¹										

TABLE 12—COMBINED LATERAL AND AXIAL LOADS—ALLOWABLE AXIAL LOAD (kips) FOR 550S162

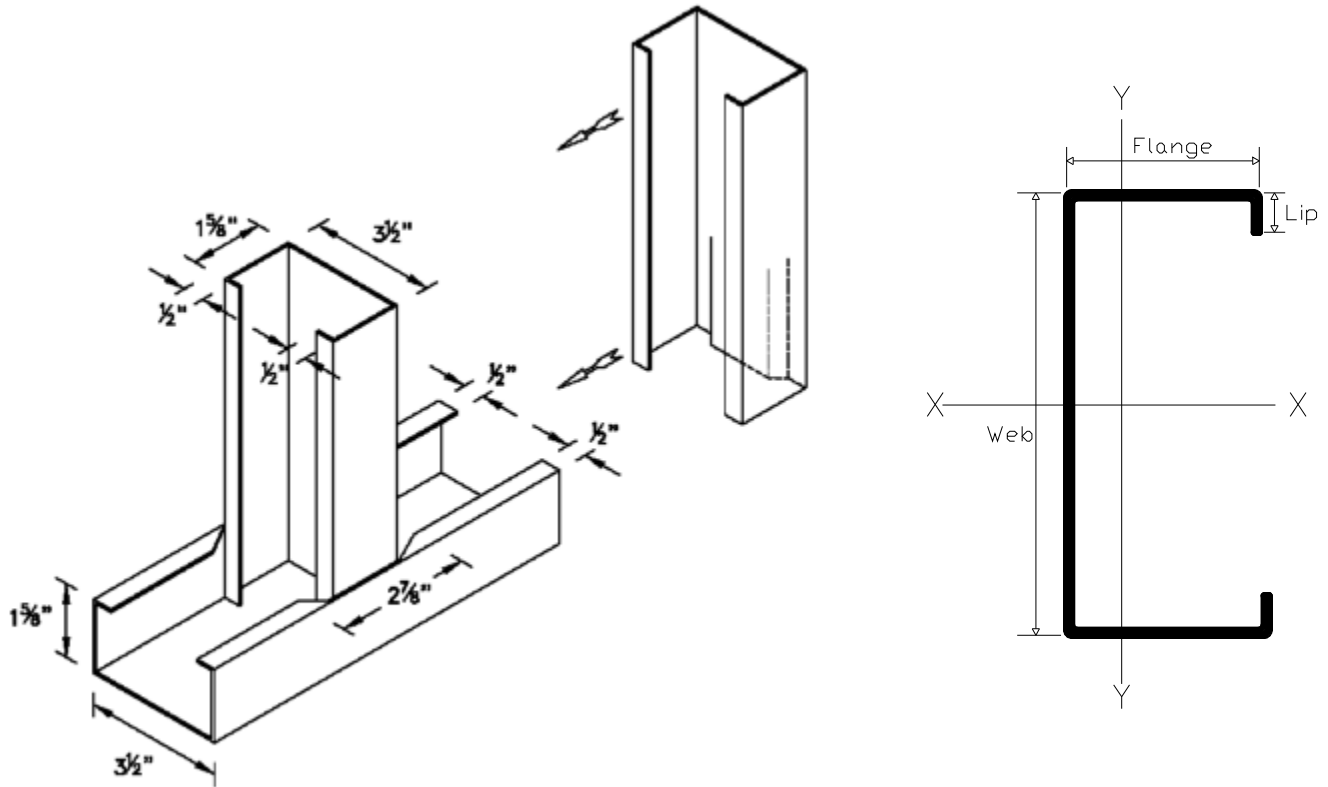
WALL HEIGHT (ft)	MAX. STUD SPACING (in)	550S162-																													
		5 psf						15 psf						20 psf						25 psf						30 psf					
		33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68						
8		2.53	3.49	5.74	7.58	2.53	3.49	5.74	7.58	2.34	3.49	5.74	7.58	2.09	3.43	5.74	7.58	1.85	3.19	5.74	7.58										
9		2.51	3.47	5.67	7.58	2.35	3.47	5.67	7.58	2.04	3.36	5.67	7.58	1.73 ¹⁰	3.06	5.67	7.58	1.43 ⁹	2.70 ¹⁰	5.62	7.58										
10	24	2.48	3.43	5.58	7.47	2.08	3.39	5.58	7.47	1.71 ⁹	3.01	5.58	7.47	1.34 ⁹	2.65 ⁹	5.42	7.47	0.99 ⁸	2.30 ⁹	5.05 ¹⁰	7.47										
12		2.40	3.32	5.32	7.13	1.49 ⁹	2.74 ⁹	5.30 ¹⁰	7.13	1.00 ⁸	2.24 ⁹	4.76 ⁹	7.13 ⁷	0.54 ⁸	1.76 ⁸	4.26 ⁸	6.66 ⁸	---	1.31 ⁸	3.77 ⁸	6.17 ⁶										
14		2.22	3.18	4.96	6.64	0.88 ⁸	2.03 ⁹	4.27 ⁹	6.47 ⁶	0.31 ⁸	1.43 ⁷	3.63 ⁸	5.80 ⁶	---	0.87 ⁷	3.04 ⁸	5.19 ³	---	0.35 ⁷	2.48 ⁷	4.60 ³										
16		1.83 ⁹	2.92	4.51	6.02	0.32 ⁷	1.33 ⁸	3.24 ⁸	5.16 ⁶	---	0.67 ⁷	2.54 ⁷	4.43 ³	---	---	1.91 ⁷	3.76 ²	---	---	1.33 ⁷	3.14 ²										

TABLE 13—COMBINED LATERAL AND AXIAL LOADS—ALLOWABLE AXIAL LOAD (kips) FOR 600S162

WALL HEIGHT (ft)	MAX. STUD SPACING (in)	600S162-																													
		5 psf						15 psf						20 psf						25 psf						30 psf					
		33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68	33	43	54	68						
8		2.55	3.52	5.72	7.56	2.55	3.52	5.72	7.56	2.49	3.52	5.72	7.56	2.27	3.52	5.72	7.56	2.05	3.39	5.72	7.56										
9		2.55	3.52	5.72	7.56	2.52	3.52	5.72	7.56	2.24	3.52	5.72	7.56	1.96	3.30	5.72	7.56	1.68 ⁷	3.03	5.72	7.56										
10	24	2.55	3.52	5.72	7.56	2.49	3.52	5.72	7.56	1.95 ⁷	3.29	5.72	7.56	1.61 ⁶	2.96	5.72	7.56	1.28 ⁶	2.63 ⁷	5.50	7.56										
12		2.49	3.44	5.60	7.52	1.75 ⁶	3.06 ⁷	5.72	7.56	1.29 ⁶	2.59 ⁶	5.60	7.52	.085 ³	2.14 ⁶	4.86 ⁶	7.44 ⁷	0.42 ³	1.71 ³	4.40 ⁶	6.97 ⁶										
14		2.40	3.33	5.32	7.13	1.17 ³	2.40 ⁶	4.91 ⁶	7.13 ⁷	0.61 ³	1.82 ³	5.32	7.13	---	1.27 ³	3.70 ³	6.08 ⁶	---	0.76 ²	3.14 ³	5.50 ³										
16		2.09 ⁷	3.17	4.94	6.62	0.60 ²	1.72 ³	3.91 ⁶	6.08 ⁶	---	1.06 ²	4.94	6.62	---	0.45 ²	2.55 ²	4.66 ³	---	---	1.94 ²	4.02 ²										

TABLE 14—STUDS FOR USE WITH THE IRC

IRC MEMBER DESIGNATION		
t	350S162-t	550S162-t
EQUIVALENT METAL FORMING TECHNOLOGIES MEMBER DESIGNATION		
33	350S162-33	550S162-33
43	350S162-43	550S162-43
54	350S162-54	550S162-54
68	350S162-68	550S162-68



TYPICAL STUD AND TRACK DETAILS

FIGURE 1—TYPICAL STUD AND TRACK DETAILS

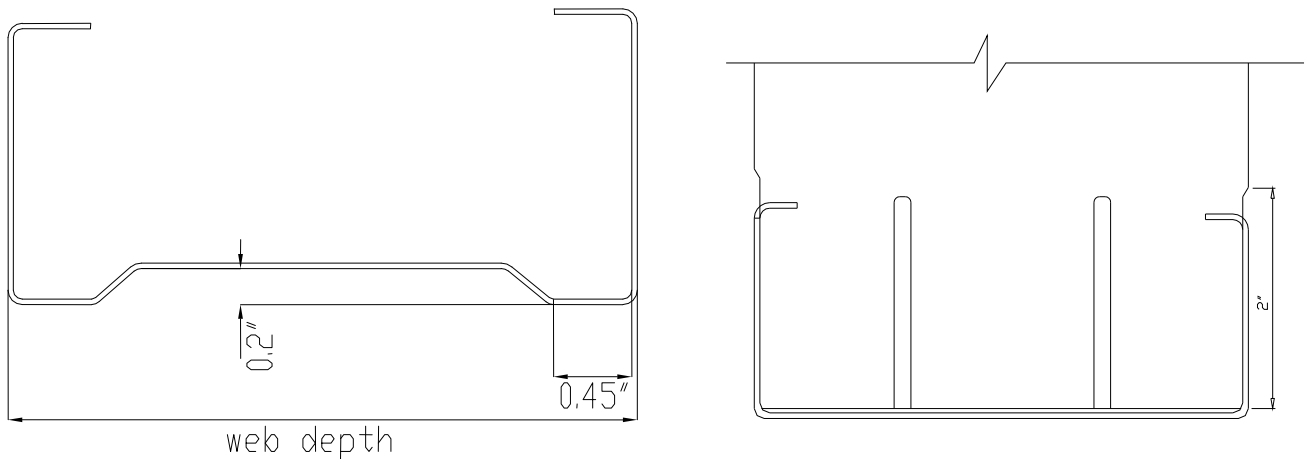


FIGURE 2—SWAGED END DETAILS

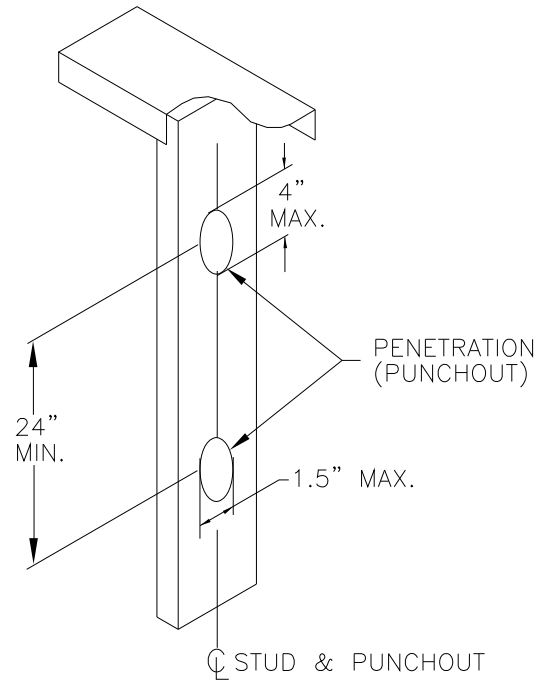


FIGURE 3—PUNCH-OUTS

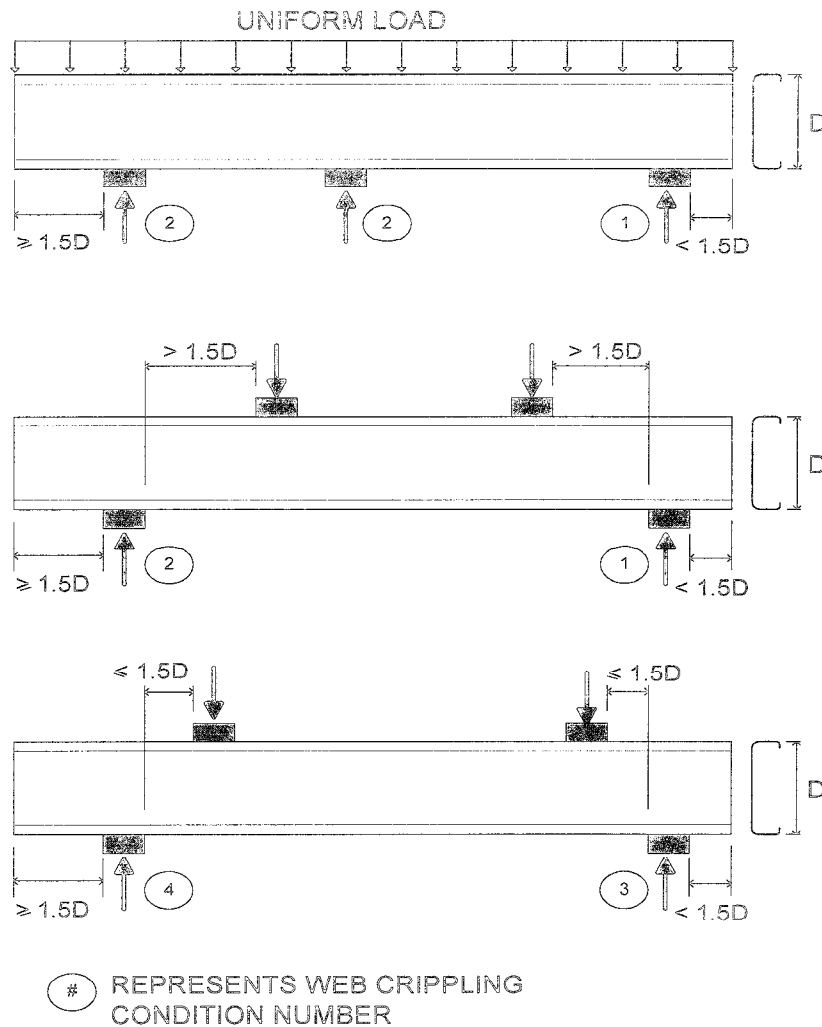


FIGURE 4—WEB CRIPPLING FIGURE