

UL Evaluation Report

UL ER38320-01

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UL Category Code: ULFE

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DIVISION: 05 00 00 METALS

Sub-level 2: 05 40 00 – Cold-Formed Metal Framing

Sub-level 3: 05 41 00 – Structural Metal Stud Framing

COMPANY:

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1. SUBJECT:

SPX STRUCTURAL PANELS

2. SCOPE OF EVALUATION

Compliance with the following codes:

- 2015, 2012 *International Building Code*® (IBC)*
- 2010 National Building Code of Canada
- 2012 Ontario Building Code

* The products and engineered design described in this report may also be considered to be in compliance with the "2015 and 2012 International Residential Code (IRC), based on compliance with the IBC and permissibility language in [R301.1.3](#) of the IRC.

The product was evaluated for the following properties:

- Fire-resistance rated wall construction
- Structural performance

3. REFERENCED DOCUMENTS

- ANSI/UL 263, 14th Ed. (ASTM E119), Fire Tests of Building Construction and Materials



- CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials
- AISI S100-07/SI-10, North American Specification for the Design of Cold-Formed Steel Structural Members, with Supplement No. 1, American Iron and Steel Institute, Washington, DC (“AISI S100-10”)
- AISI S100-12, North American Specification for the Design of Cold-formed Steel Structural Members, American Iron and Steel Institute, Washington, DC (“AISI S100-12”)
- AISI S200-07, North American Standard for Cold-Formed Steel Framing – General Provisions, American Iron and Steel Institute, Washington, DC.
- AISI S200-12, North American Standard for Cold-Formed Steel Framing – General Provisions, American Iron and Steel Institute, Washington, DC.
- CAN/CSA-S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members (using the Appendix B provisions applicable to Canada), Canadian Standards Association, Mississauga, Ontario, Canada (“CSA S136”).
- ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- ASTM A1003/A1003M-05, Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
- ASTM C1513-13, Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections
- ICC-ES Acceptance Criteria for Cold-Formed Steel Framing Members (AC46), dated June 2012
- ICC-ES Acceptance Criteria for ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
- NRC User’s Guide - NBC 2005 Structural Commentaries (Part 4, of Division B)
- NFPA 5000, Building Construction and Safety Code, 2015 Edition

4. USES

SPX structural panels are used for horizontal floor, roof, or deck framing and vertical wall applications. Structural strength is determined in accordance with AISI S100 or CSA S136 as applicable with the minimum dimensions as specified herein. Fire resistance is determined in accordance with ANSI/UL 263 and CAN/ULC S101.

SPX structural panels can resist vertical (gravity) loads as a component of floor, roof, or deck framing. SPX structural panels can resist vertical (gravity) axial loads and lateral out-of-plane loads, resulting from wind or horizontal pressure, as a component of load-bearing wall applications.

SPX structural panels can resist lateral in-plane loads, resulting from wind, as a component of floor or roof diaphragms. Panels are not intended to resist seismic in-plane loads. Design for in-plane loads are beyond the scope of this report, and require additional independent analysis and justification of the capacities of the components listed herein.

5. PRODUCT DESCRIPTION

5.1 General:

SPX structural panels are comprised of a web section with an integrated diaphragm section. The panel provides resistance to axial loads, out-of-plane loads, combined axial and out-of-plane loads. Panels are assembled in a nested arrangement where the panel free edge is screw fastened to the shoulder of the preceding panel to provide a composite structural system. Panels are manufactured with ribs in the top flange. Panels include ribs in the web section where the panel is principally designed to resist out-of-plane loads. The panels are assembled using cold-formed steel components installed with fasteners.

SPX structural panels shall be fastened according to manufacturer's instructions to supporting structural members designed in conformance with applicable building code requirements. SPX structural panels designed to resist in-plane loads need not be located in-line with joist, trusses, or rafters, provided panel supports are designed in conformance with applicable building code requirements to transmit loads to the lateral load resisting system.

5.2 Materials:

SPX structural panels are manufactured as a field (Z-profile) panel and end (C-profile) panel in minimum design steel thicknesses of 0.043in (18ga), 0.054 in. (16ga), and 0.068 in. (14ga). System components are made from sheet steel conforming to ASTM A1003/A1003M with a minimum yield strength of 50 ksi, and with a minimum G90 weight of galvanized coating conforming to ASTM A653/A653M-98. Panels are manufactured cold-formed from coils of light gage steel by Evolutiondeck Inc. at 130 Harry Walker Parkway N, Newmarket, Ontario, Canada.

5.3 Components:

SPX structural panels are assembled in a nested arrangement from a combination of components as shown in Figure 1. System components include the following:

5.3.1 Starter C-Channel:

The starter c-channels conform to AISI S100 and CSA S136 and are manufactured from cold-formed steel according to SSMA 575S162 (CSSBI 575S162) with a design thickness equivalent to the thickness of the SPX structural panel.

5.3.2 Field Panel:

The SPX field (Z-profile) panel is designated as SPXZ 600S1200 with design thicknesses and section properties given in Table 1. Panels include a web with an overall depth of 6.00 in. and a web-to-web spacing of 10-12 in. Panel dimensions are shown in Figure 2.

5.3.3 End Panel:

The SPX end (C-profile) panel is designated as SPXC 600S1200 with design thickness and section properties given in Table 2. Panels include a web with an overall depth of 6.00 in. and a web-to-web spacing from 10-12 in. Panel dimension are shown in Figure 3.

5.3.4 Blocking:

Joist blocking is optional to increase rigidity and may be installed every other bay at joist mid-span for joist spans greater than 10 feet. Joist blocking members are manufactured from cold-formed steel c-channels conforming to AISI S100 or CSA S136 and fastened to the panel webs using angle brackets.

5.3.5 Upper/Lower Track (Fascia Cap):

Upper and lower tracks for walls conform to AISI S100 or CSA S136 and are manufactured from cold-formed steel track according to SSMA 632T200 (CSSBI 632T200) with an equal or greater design thickness to the SPX structural panel. Tracks are fastened to the panel upper and lower flange using modified truss head screws (M8x1).

Fascia cap for floors conform to AISI S100 or CSA S136 and are manufactured from cold-formed steel track according to SSMA 632T200 (CSSBI 632T200) with equal design thickness to the SPX structural panel. Fascia cap is fastened to the panel upper and lower flange using modified truss head screws (M8x1).

5.3.6 Fasteners:

SPX structural panels are assembled using all-weather M12 x 1 self-drilling tapping screws at a maximum spacing of 12 in. on center complying with the material, process, and performance requirements of ASTM C1513. Non-structural components may be fastened with alternative fasteners.

6. DESIGN AND INSTALLATION

6.1 General:

SPX structural panels must be designed and installed in accordance with this report and the applicable design code referenced in Section 2. Structural elements supporting SPX structural panels must be designed in accordance with the standards referenced in the applicable building code.

6.2 Structural Design:

The structural properties for SPX structural panels are shown in Tables 1 and 2. The maximum allowable strengths are calculated in accordance with AISI S100 or CSA S136 based on the Appendix 1 Direct Strength Method for use with Allowable Strength Design (ASD) in the United States and Limit States Design (LSD) in Canada.

The maximum allowable loads for a given span are shown in Table 3 for floor, roof, or deck applications.

The maximum allowable out-of-plane loads for a given span are shown in Table 4 for load-bearing wall applications.

6.2.1 Web Crippling

The minimum bearing length of SPX structural panels on supporting structural members shall be 3 in. For bearing lengths less than 3 in. design panels for web crippling in accordance with the applicable AISI S100 provisions.

6.2.2 Serviceability

AISI S100 does not stipulate serviceability limit states. However, the International Building Code sets forth deflection limits in Sections [1604.3](#) and the NFPA 5000, 2015 Edition sets forth similar provisions in Section 37.1.2.8 for use in the United States and Mexico. Likewise, the User's Guide - NBC 2005 Structural Commentaries (Part 4, of Division B) (NRC, 2005) sets forth deflection limits for use in Canada.

6.3 Fire-Resistance Rating:

SPX structural panels used in walls are UL Certified and ULC Listed for fire-resistance in UL Fire-Resistance Design No. [W446](#) in accordance with ANSI/UL 263 and ULC Fire-resistance Design No. U417 in accordance with CAN/ULC-S101. Refer to the UL Fire Resistance Certification information for File R38320 ([CJFS](#)) and ([CIZTC](#)) for applicable design coverage and details of the fire-resistance rated assemblies covered by this report. Fire-resistance ratings are only applicable when the assemblies are constructed in accordance with the published designs.

6.4 Installation:

SPX structural panels 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.

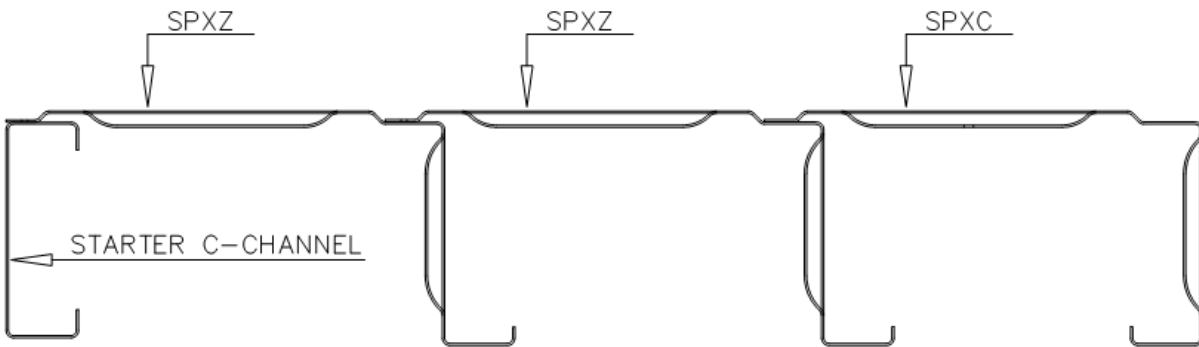


Figure 1a: SPX structural panel components in floor, roof, and deck applications.

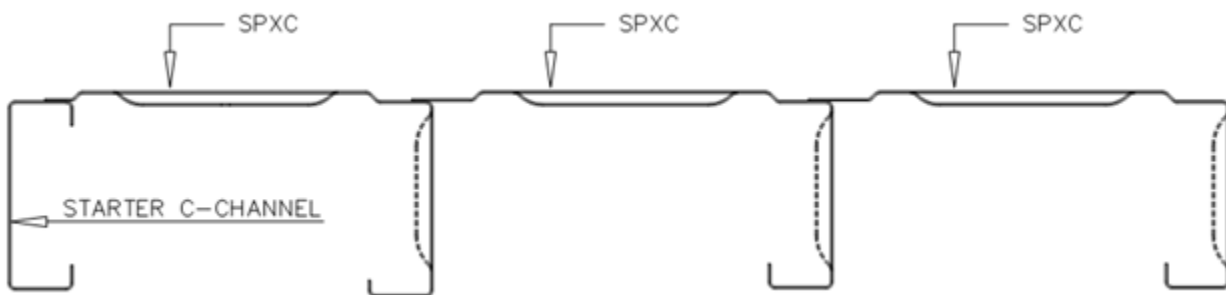


Figure 1b: SPX structural panel components in wall applications.

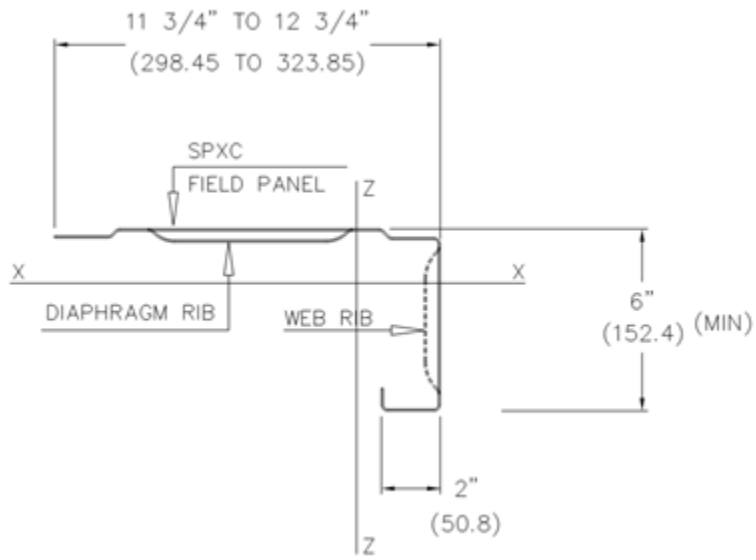


Figure 2: SPXC (field panel) configuration.

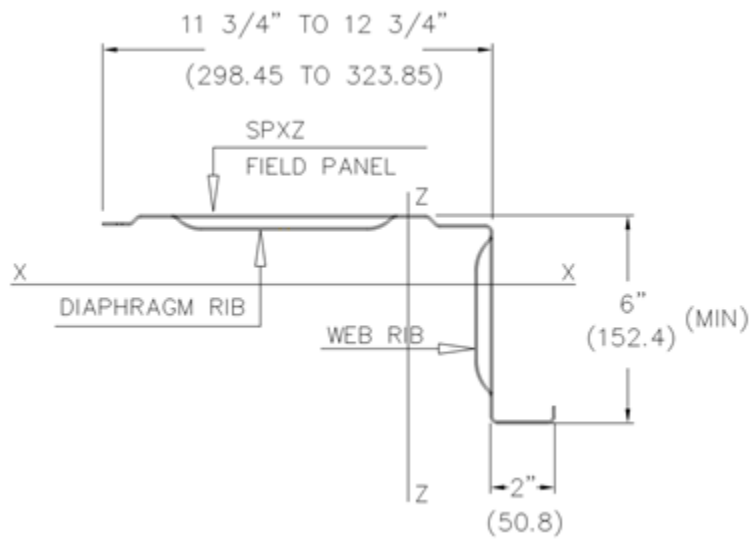


Figure 3: SPXC (end panel) configuration.

Table 1 – Field Panel Structural Properties

Panel Properties	SPXZ 600S1200-43		SPXZ 600S1200-54		SPXZ 600S1200-68	
Min. design thickness (in)	0.043		0.054		0.068	
Minimum Yield Strength (ksi)	50		50		50	
Area (in ²)	-		1.3		1.5	
I _{xx} , (in ⁴)	-		6.0		7.3	
Z _{cg} (in)	-		4.7		4.6	
I _{zz} (in ⁴)	-		20.8		25.1	
Criteria	ASD	LSD	ASD	LSD	ASD	LSD
Axial Strength, P (kip/ft)	-	-	-	-	-	-
Out-of-Plane Strength, M _{xx} (kip-in/ft)	-	-	29.1	43.6	38.2	57.4
In-Plane Strength, M _{zz} (kip-in/ft)	-	-	45.5	68.3	64.2	96.2

Table 2 – End Panel Structural Properties

Panel Properties	SPXC 600S1200-43		SPXC 600S1200-54		SPXC 600S1200-68	
Min. design thickness (in)	0.043		0.054		0.068	
Minimum Yield Strength (ksi)	50		50		50	
Area (in ²)	1.2		1.4		1.7	
I _{xx} , (in ⁴)	5.2		6.3		7.7	
Z _{cg} (in)	4.8		4.7		4.6	
I _{zz} (in ⁴)	15.8		19.1		23.3	
Criteria	ASD	LSD	ASD	LSD	ASD	LSD
Axial Strength, P (kip/ft)	13.9	20.8	19.5	29.2	26.9	40.4
Out-of-Plane Strength, M _{xx} (kip-in/ft)	25.6	38.5	33.6	50.4	42.1	63.1
In-Plane Strength, M _{zz} (kip-in/ft)	29.8	44.7	42.3	63.5	59.8	89.7

Notes on Tables 1 and 2:

1. Per AISI S100 / CSA S136 Section A1.2: ASD values based on a factor of safety, $\Omega = 2.0$; LSD values based on a resistance factor of $\Phi = 0.75$.
2. Structural properties are based on minimum member dimensions shown in Figures 2 and 3.

Table 3 – Maximum total (factored) uniform load for floor, roof, deck (psf)

Field (Z-profile) panel						
	SPXZ 600S1200-43		SPXZ 600S1200-54		SPXZ 600S1200-68	
Span Length	ASD	LSD	ASD	LSD	ASD	LSD
8 ft	-	-	303	454	398	598
10 ft.	-	-	194	291	255	383
12 ft.	-	-	135	202	177	266
14 ft.	-	-	99	148	130	195
16 ft.	-	-	76	114	99	149
End (C-profile) panel						
	SPXC 600S1200-43		SPXC 600S1200-54		SPXC 600S1200-68	
Span Length	ASD	LSD	ASD	LSD	ASD	LSD
8 ft.	267	401	350	525	439	657
10 ft.	171	257	224	336	281	421
12 ft.	119	178	156	233	195	292
14 ft.	87	131	114	171	143	215
16 ft.	67	100	88	131	110	164

Table 4 – Maximum total (factored) out-of-plane uniform load for walls (psf)

End (C-profile) panel						
Axial Load, P = 5 klf for ASD (8 klf for LSD)						
	SPXC 600S1200-43		SPXC 600S1200-54		SPXC 600S1200-68	
Span Length	ASD	LSD	ASD	LSD	ASD	LSD
8 ft	170	246	260	381	356	526
10 ft.	109	157	166	244	228	337
12 ft.	76	109	116	169	158	234
14 ft.	56	80	85	124	116	172
16 ft.	43	62	65	95	89	132
Axial Load, P = 10 klf for ASD (16 klf for LSD)						
	SPXC 600S1200-43		SPXC 600S1200-54		SPXC 600S1200-68	
Span Length	ASD	LSD	ASD	LSD	ASD	LSD
8 ft	74	92	170	237	275	396
10 ft.	47	59	109	152	176	253
12 ft.	33	41	75	105	122	176
14 ft.	24	30	55	77	90	129
16 ft.	19	23	42	59	69	99
Axial Load, P = 15 klf for ASD (24 klf for LSD)						
	SPXC 600S1200-43		SPXC 600S1200-54		SPXC 600S1200-68	
Span Length	ASD	LSD	ASD	LSD	ASD	LSD
8 ft	-	-	80	93	193	266
10 ft.	-	-	51	60	124	170
12 ft.	-	-	36	41	86	118
14 ft.	-	-	26	30	63	87
16 ft.	-	-	20	23	48	66

7. CONDITIONS OF USE

7.1 General:

The SPX structural panels described in this report comply with, or are suitable alternatives to, what is specified in those codes listed in Section 2 of this report, subject to the following conditions:

- 7.2** The products in this report must be installed in accordance with the manufacturer's published installation instructions, industry requirements, the applicable code, and this report. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern.
- 7.3** Complete construction documents must be submitted to the code official for each project. Where required, calculations verifying compliance with this report must be submitted to the code official. The calculations and construction documents must be prepared by a registered design professional where required by authorities having jurisdiction.
- 7.4** Installation is limited to simple span conditions.
- 7.4** Framing members shall not be cut, notched, or otherwise modified except as permitted in this report.
- 7.4** A minimum G90 galvanization coating designation is required for all applications under the IRC.
- 7.5** See UL Online Certifications Directory for products evaluated as a part of the fire-resistance rated assemblies in accordance with UL 263, Structural Steel Members, File R38320 (CJFS) and CAN/ULC S101, Structural Components, File R38320 (CIZTC).
- 7.6** The SPX structural panels are manufactured under the UL LLC Classification and Follow-Up Service Program and ULC Listing program, which includes inspections in accordance with the quality elements of ICC-ES Acceptance Criteria for Quality Documentation (AC10).

8. SUPPORTING EVIDENCE

- 8.1 Manufacturer's documentation and factory quality control manual.
- 8.2 UL Classification reports and ULC Listing reports in accordance with ANSI/UL 263 (ASTM E119) and CAN/ULC-S101. See UL and ULC Product Certification Category for Structural Steel Members, [\(CJFS\)](#) and Structural Components, [\(CIZTC\)](#), respectively, under File R38320.
- 8.3 Innovative Testing Solutions, 1229 Ringwell Drive, Newmarket, Ontario. Report CT2769.02 PJT Design Validation Testing.
- 8.7 Data in accordance with ICC-ES Acceptance Criteria for Cold-Formed Steel Framing Members (AC46).
- 8.8 Data in accordance with ICC-ES Acceptance Criteria for Quality Documentation (AC 10).

9. IDENTIFICATION

The SPX structural panels described in this evaluation report are identified by a mark, label, stamp or embossment bearing the report holder's name (EvolutionDeck, Inc.), the plant identification, the UL Classification Mark, and the evaluation report number UL ER38320-01. The validity of the evaluation report is contingent upon this identification appearing on the product.

10. USE OF UL EVALUATION REPORT

- 10.1 The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.
- 10.2 UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.
- 10.3 The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via our On-Line Certifications Directory:

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