

# ICC-ES Evaluation Report


**ESR-5724P**

*Issued August 2025*

*Subject to renewal August 2026*

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<b>DIVISION: 05 00 00—METALS</b>  <b>Section: 05 40 00—Cold-Formed Metal Framing</b>  <b>Section: 05 41 00—Structural Metal Stud Framing</b>  <b>DIVISION: 09 00 00—FINISHES</b>  <b>Section: 09 22 16.13—Non-Structural Metal Stud Framing</b>	<b>REPORT HOLDER:</b>  <b>REFINED METALS</b>	<b>EVALUATION SUBJECT:</b>  <b>SMART JOISTS, SMART STUDS AND SMART TRACKS</b>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

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

**Property evaluated:**

- Structural.

## 2.0 USES

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.

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).

## 3.0 DESCRIPTION

The cold-formed steel joists, studs, and tracks framing members are factory-formed from the steel coils specified in Table 1. Minimum thickness and bend radius of evaluated members are provided in Table 2. The members are categorized as structural and nonstructural studs, structural joists, and structural and nonstructural tracks. Table 3 shows the designations of the evaluated members and their dimensions. The actual web height for the tracks (measured from the outside-to-outside of flanges) is equal to the value provided in Table 3 plus twice the nominal thickness plus a tolerance of  $\frac{1}{32}$ – $\frac{1}{16}$  inch (0.79–1.59 mm). The studs and joists are manufactured with and without web punchouts. The punchouts are located along the centerline of the webs of the studs with a minimum center-to-center spacing of 24 inches (610 mm). The minimum distance

between the end of the stud and the near edge of the web punchout is 12 inches (305 mm). Punchout dimensions for different members are shown in Table 4. The tracks are manufactured without punchouts.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

The joists, studs, and tracks members and their connections must be designed and installed in accordance with IBC Section 2204 (2021 IBC Section 2210), using the section properties referenced in Section 4.2.

### 4.2 Design:

The joists, studs, and tracks properties and design values are detailed in the Plans document, which is distributed with this report. The following Pages from the Plans document are part of this report:

- Gross section properties, effective section properties, and torsional section properties of the nonstructural studs are provided in Page 2.
- Gross section properties, effective section properties, and torsional section properties of the structural studs are provided in Pages 4 through 6.
- Gross section properties, net section properties, and gross torsional section properties of the structural joists are provided in Pages 8 and 9.
- Gross section properties, effective section properties, and torsional section properties of the tracks are provided in Pages 11 through 15.

All properties for all members, except net section properties, were determined for the full, unreduced cross sections, away from punchouts. Design values have been determined in accordance with the North American Specification for the Design of Cold-Formed Steel Structural Members [AISI S100-16 (2020) w/S2-20]. The allowable moments are for use with Allowable Strength Design (ASD) and are for flexural members installed with the compression flange continuously braced. For other conditions of compression flange bracing, the allowable moment must be determined in accordance with AISI S100. The design of members must address other aspects such as web crippling, combined bending and web crippling, and combined bending and shear, as applicable, in accordance with the AISI S100.

The structural studs and tracks listed in Table 5 qualify for use with prescriptive requirements of the IRC. For use of all other members under the IRC, the cold-formed steel members must be limited to engineered structures, in accordance with IRC Section R301.1.3.

### 4.3 Installation:

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

- 5.1** Minimum base steel thickness of cold-formed steel members, as delivered to the jobsite, must be as specified in Table 2.
- 5.2** The construction documents prepared or reviewed by a registered design professional, where required by the statutes of the jurisdiction in which the project is to be constructed specifying the cold-formed steel framing members, must indicate compliance with this evaluation report and applicable codes and must be submitted to the code official for approval.
- 5.3** Connections evaluation, including members at supports and near ends, are outside the scope of the evaluation report and must be designed by a registered design professional.
- 5.4** Non-structural members that are cold-formed from ASTM A1003 NS or ASTM A653 CS steel are limited to purlins, girts and curtain wall studs, with the limitations specified in AISI S100, Section A3.2.1.1.
- 5.5** Framing members with a height-to-thickness (h/t) ratio of more than 200 must be provided with web stiffeners in accordance with Section B4.1 of AISI S100. Holes or punchouts in the web for members with h/t ratio of more than 200 are outside the scope of this report.
- 5.6** The cold-formed steel framing members are manufactured under approved quality control programs with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the **ICC-ES Acceptance Criteria for Cold-Formed Steel Framing Members (AC46)**, dated October 2024.

## 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5724P) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, a spacing not exceeding 96 inches (2440 mm) on center, each cold-formed steel member recognized in this report must be stamped, stenciled or embossed with the report holder's name, the section identification as described in Table 3; the minimum yield strength; and the coating grade (for all structural members and if other than G40 for nonstructural members). Nonstructural members must have the designation "NS".
- 7.3 The report holder's contact information is the following:

### REFINED METALS

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TABLE 1—MATERIALS SPECIFICATIONS OF THE FRAMING MEMBERS<sup>1</sup>

MEMBER TYPE	THICKNESS IN GAUGES	MATERIAL		MINIMUM MECHANICAL PROPERTIES				MIN. COATING
		Standard	Grade	F <sub>y</sub> (ksi)	F <sub>u</sub> (ksi)	Min. F <sub>u</sub> /F <sub>y</sub>	% Elong.	
Nonstructural Studs	25, 22, 20	A653	CS Type B	33	45	1.08	20	G40
		A1003	NS50	50	-	-	-	
Structural Studs	20S, 18	A653	SS Gr.33	33	45	1.08	20	G60
	16, 14, 12	A653 or A1003	SS Gr.50 or ST50H	50	65	1.08	12	G60, G90
Structural Joists	18	A653	SS Gr.33	33	45	1.08	20	G60
	16, 14, 12	A653 or A1003	SS Gr.50 or ST50H	50	65	1.08	12	G60, G90
Nonstructural Tracks	25, 22, 20	A653	CS Type B	33	45	1.08	20	G40
		A1003	NS50	50	-	-	-	
Structural Tracks	20S, 18	A653	SS Gr.33	33	45	1.08	20	G60
	16, 14, 12	A653 or A1003	SS Gr.50 or ST50H	50	65	1.08	12	G60, G90

For SI Units: 1 ksi = 6.895 MPa.

<sup>1</sup> F<sub>y</sub> is the minimum yield stress and F<sub>u</sub> is the minimum tensile strength of the steel coils used to manufacture the cold-formed steel framing members.

TABLE 2—THICKNESSES AND INSIDE BEND RADIUS OF FRAMING MEMBERS

Thickness		Minimum Thickness (in.)	Design Thickness (in.)	Inside Bend Radius (in.)
Mils	Gauge			
18	25	0.0179	0.0188	0.0843
27	22	0.0269	0.0283	0.0796
30	20 (Nonstructural)	0.0296	0.0312	0.0781
33	20S (Structural)	0.0329	0.0346	0.0764
43	18	0.0428	0.0451	0.0712
54	16	0.0538	0.0566	0.0849
68	14	0.0677	0.0713	0.1069
97	12	0.0966	0.1017	0.1525

For SI Units: 1 inch = 25.4 mm

TABLE 3—DESIGNATIONS AND DIMENSIONS OF FRAMING MEMBERS

MEMBER			DIMENSIONS (in.)		
Type	Designation <sup>1</sup>	Thickness (Mils)	Web	Flange	Lip
Nonstructural Studs	162S125-XX	18, 27, 30	1.625	1.25	0.1875
	250S125-XX		2.5		
	350S125-XX		3.5		
	362S125-XX		3.625		
	400S125-XX		4		
	550S125-XX		5.5		
Structural Studs	600S125-XX	33, 43, 54, 68, 97	6		
	250S137-XX		2.5	1.375	0.375
	250S162-XX			1.625	
	250S200-XX			2	
	350S137-XX	33, 43, 54, 68, 97	3.5	1.375	
	350S162-XX			1.625	
	350S200-XX			2	
	362S137-XX	33, 43, 54, 68, 97	3.625	1.375	
	362S162-XX			1.625	
	362S200-XX			2	
	400S137-XX	33, 43, 54, 68, 97	4	1.375	
	400S162-XX			1.625	
	400S200-XX			2	
	600S137-XX	33, 43, 54, 68, 97	6	1.375	
	600S162-XX			1.625	
	600S200-XX			2	
	600S250-XX			2.5	
Structural Joists	725J175-XX	43, 54, 68, 97	7.25	1.75	0.625
	800J175-XX		8		
	925J175-XX		9.25		
	1000J200-XX	54, 68, 97	10	2	
	1125J175-XX		11.25	1.75	
	1200J200-XX		12	2	
	1400J200-XX		14	2	
Nonstructural Tracks <sup>2</sup>	162T125-XX	18, 27, 30	1.625	1.25	0

For SI Units: 1 inch = 25.4 mm

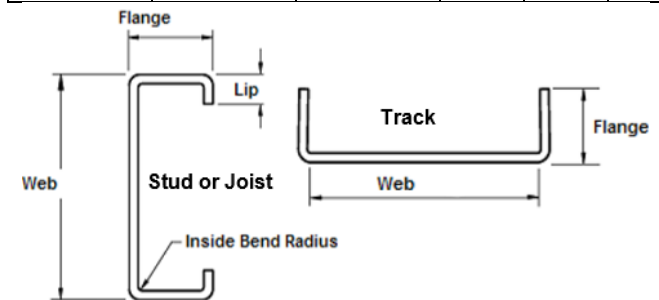
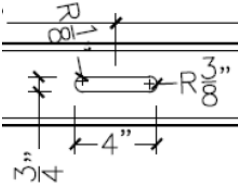
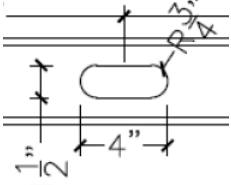
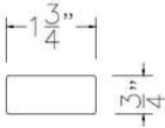
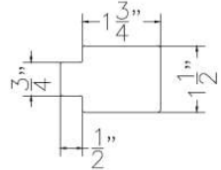
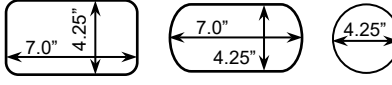
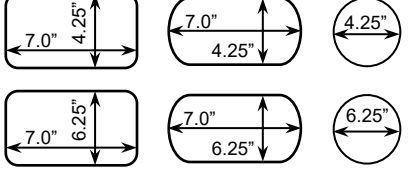
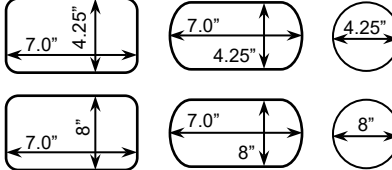
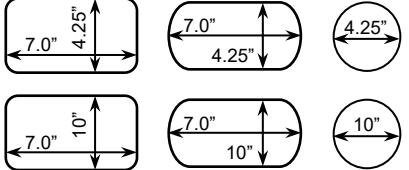
<sup>1</sup> "XX" denotes the thickness in mils.<sup>2</sup> The provided web depth of tracks is measured from the inside-to-inside flanges. In addition to the provided web values in the table for tracks, there is a tolerance of  $1/32 - 1/16$  inch.

TABLE 4—PUNCHOUT DETAILS FOR JOISTS AND STUDS

MEMBER TYPE	PUNCHOUTS	
Structural Studs	 <p>Web Depth is 2.5 in.</p>	 <p>Web Depth ranges from 3.5 to 6 in.</p>
Nonstructural Studs	 <p>Web Depth ranges from 1.625 to 2.5 in.</p>	 <p>Web Depth ranges from 3.5 to 6 in.</p>
Structural Joists	 <p>Web Depth is 7.25 or 8 in.</p>	 <p>Web Depth is 9.25, 10, or 11.25 in.</p>
	 <p>Web Depth is 12 in.</p>	 <p>Web Depth is 14 in.</p>

For SI Units: 1 inch = 25.4 mm

TABLE 5—STRUCTURAL STUDS AND TRACKS FOR USE WITH THE IRC<sup>1</sup>

IRC MEMBER DESIGNATION	EQUIVALENT REFINED METALS STRUCTURAL STUD AND TRACK DESIGNATION				
	t = 33 mils	t = 43 mils	t = 54 mils	t = 68 mils	t = 97 mils
350S162-t	350S162-33	350S162-43	350S162-54	350S162-68	350S162-97
	350S200-33	350S200-43	350S200-54	350S200-68	350S200-97
350T125-t	350T125-33	350T125-43	350T125-54	---	---
	350T150-33	350T150-43	350T150-54	---	---
	350T200-33	350T200-43	350T200-54	---	---

<sup>1</sup> Under the IRC: Minimum Grade 33 ksi steel must be used, wherever 33 and 43 mil thicknesses are specified, and Minimum Grade 50 ksi steel must be used wherever 54, 68, and 97 mil thicknesses are specified.