ICC-ES Evaluation Report

ESR-5574

Issued August 2025

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES **Section: 06 05 23.13—Nails**	**REPORT HOLDER:** **CRYSTAL FASTENERS INDUSTRY**	**EVALUATION SUBJECT:** **COLLATED NAILS**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018 and 2015 *International Building Code®* (IBC)
- 2024, 2021, 2018 and 2015 *International Residential Code®* (IRC)

Properties evaluated:

- Bending yield strength
- Compliance with material requirements and tolerances of ASTM F1667
- Compliance with prescriptive requirements of the IBC and IRC
- Use in diaphragms, shear walls and braced walls

2.0 USES

The nails described in this report are used for engineered and prescriptive structural connections between wood members.

3.0 DESCRIPTION

The nails have full round heads and smooth or deformed (ring or screw) shanks. Nails formed from carbon steel wire are available without any zinc coating (bright), with an electrogalvanized coating complying with ASTM A641 Class 1 or with a hot-dip galvanized coating complying with the coating weight requirement of ASTM A153 Class D. The galvanized coatings comply with Section 10.1 of ASTM F1667. The nails comply with the dimensional tolerance requirements of ASTM F1667. See Table 1 for nail sizes, shank types, finish/coating, bending yield strength and packaging information.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 Engineered Structural Connections:

4.1.1.1 Lateral Design: The nails described in Table 1, with a nominal diameter of 0.099 inch or larger (2.51 mm) comply with the requirements of IBC Section 2303.6 and may be used in connections designed in accordance with the ANSI/AWC National Design Specification (NDS), using the bending yield strengths and nail diameters shown in Table 1, as applicable. Convert lateral design values determined in accordance with the NDS from lbf to N by multiplying by 4.45. The reference lateral design values for nails with a nominal diameter of 0.092 inch (2.34 mm) or less have been determined through testing, and are shown in Table 2.

4.1.1.2 Withdrawal Design: The reference withdrawal design values for bright or galvanized carbon steel nails with a nominal diameter of 0.092 inch (2.34 mm) or larger must be determined in accordance with the NDS. For stainless steel nails with a nominal diameter of 0.092 inch (2.34 mm) or larger, the reference withdrawal design value must be determined in accordance with the 2024 or 2018 NDS. Convert withdrawal design values determined in accordance with the NDS from lbf/inch to N/mm by multiplying by 0.175. The reference withdrawal design values for nails with a nominal diameter of less than 0.092 inch (2.34 mm) have been determined through testing, and are shown in Table 3.

4.1.1.3 Pull-through Design: For the full round head nails described in Table 1 and within the range of fastener head diameters and side member thicknesses specified in Table 12.2F of the 2024 and 2018 NDS, the reference head pull-through design values must be determined in accordance with Section 12.2.5 of the 2024 or 2018 NDS. Reference head pull-through design values for other nails and conditions are outside the scope of this report. Convert pull-through design values from lbf to N by multiplying by 4.45.

4.1.2 Engineered Diaphragms and Shear Walls: The nails listed in Table 4 comply with the requirements of IBC Section 2303.6 and head area requirements defined in the ICC-ES Acceptance Criteria for Nails (AC116) and are equivalent to the code-prescribed nails listed in Table 4 for use in engineered diaphragms and shear walls designed in accordance with the AWC Special Design Provisions for Wind and Seismic (SDPWS) which is referenced in the IBC.

4.1.3 Prescriptive Framing Connections: The bright or galvanized carbon steel nails described in Table 1, with a nominal diameter of 0.099 inch (2.51 mm) or larger comply with the requirements of IBC Section 2303.6 and may be used in framing connections where the nail type and size are prescribed in IBC Table 2304.10.2 (2018 and 2015 IBC Table 2304.10.1) or IRC Table R602.3(1), as applicable.

4.1.4 Prescriptive Attachment of Sheathing: The nails listed in Table 4 comply with the requirements of IBC Section 2303.6 and head area requirements defined in AC116, and are equivalent to the code-prescribed nails listed in Table 4 for attachment of sheathing to wood framing in accordance with IBC Table 2304.10.2 (2018 and 2015 IBC Table 2304.10.1) or IRC Tables R602.3(1) and R602.3(3), as applicable.

4.1.5 Prescriptive Use with Metal Connectors: The nails may be used where nails of the same material and dimension and the same or lesser bending yield strength are prescribed in an ICC-ES evaluation report on the metal connector.

4.2 Installation:

The nails must be installed in accordance with this report, the report holder's published installation instructions, the approved plans, if applicable, and the applicable prescriptions in the code. In the case of a conflict amongst these documents, the most restrictive requirements govern.

The nails described in this report are packaged for use in power tools recommended by the report holder. Individual nails may be manually driven.

Edge distances, end distances, and spacing must be sufficient to prevent splitting of the wood. Installation must be in accordance with the applicable requirements of NDS Section 12.1.6.

The hot-dip galvanized and stainless steel nails may be used in preservative-treated and fire-retardant-treated wood in accordance with IBC Section 2304.10.6 (2018 and 2015 IBC Section 2304.10.5) and 2024 IRC Section R304.3 (2021, 2018 and 2015 IRC Section R317.3).

5.0 CONDITIONS OF USE:

The Crystal Fasteners Industry Nails 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 Use of bright nails in chemically treated wood, such as preservative-treated or fire-retardant-treated wood, or in exterior or exposed conditions is not allowed.

5.2 Use of electrogalvanized nails in chemically treated wood, such as preservative-treated or fire-retardant-treated wood, or in exterior or exposed conditions is outside the scope of this report.

5.3 The nails are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Nails (AC116), dated September 2024.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5574) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, packages of nails are identified with the nail description including shank type, diameter, length and finish or coating.

7.3 The report holder's contact information is the following:

CRYSTAL FASTENERS INDUSTRY
PLOT NO. NS-116(P), INDUSTRIAL AREA PHASE 6
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TABLE 1—NAIL DESCRIPTIONS

COLLATION	NOMINAL DIAMETER (inch)	HEAD CONFIGURATION[1]	NOMINAL HEAD DIAMETER (inch)	SHANK TYPE	FINISH[2]	BENDING YIELD STRENGTH, F_{yb} (psi)
Paper	0.113	D Head	0.285	Smooth, Ring, Screw	X, HDG, EG	100,000
	0.120		0.285			
	0.131		0.291			
Paper	0.113	Offset	0.266	Smooth, Ring, Screw	X, HDG, EG	100,000
	0.120		0.266			
	0.131		0.275			
Plastic, Wire	0.080	Full round	0.211	Smooth, Ring, Screw	X, HDG, EG, SS	100,000
	0.086		0.213			
	0.092		0.213			
	0.099		0.238			
	0.113		0.280			
	0.120		0.280			
	0.131		0.280			
	0.148		0.293			90,000
	0.162		0.325			
Metal Hardware Nails						
Paper	0.131	Full round	0.280	Smooth, Ring, Screw	X, HDG, EG	100,000
	0.148		0.293			90,000
	0.162		0.325			

For SI: 1 inch = 25.4 mm

[1]See Figure 1.
[2]X = Bright (uncoated), HDG = Hot dip galvanized, EG = Electrogalvanized, SS = Stainless Steel

TABLE 2—REFERENCE LATERAL DESIGN VALUES FOR NAILS WITH SHANK DIAMETERS LESS THAN 0.099 INCH[1,2]

NOMINAL SHANK DIA. (in.)	MIN. NOMINAL LENGTH (in.)	FINISH/ COATINGS[3]	SIDE MEMBER THICKNESS (in.)	MIN. ASSIGNED SPECIFIC GRAVITY	REFERENCE DESIGN VALUE (lbf)
0.080	1 3/4	X, HD, EG, SS	3/4	0.38	16.1
0.086	1 3/4	X, HD, EG, SS	3/4	0.37	20.2
0.092	1 3/4	X, HD, EG, SS	3/4	0.37	22.9

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Reference design values must be adjusted in accordance with Section 11.3 of the NDS.
[2]Values apply to smooth shank, ring shank and screw shank nails.
[3]Finish/coatings: X = Bright (no zinc) carbon steel, EG = Electro-galvanized carbon steel, HD = Hot dipped galvanized carbon steel, SS = Stainless steel nails.

TABLE 3—REFERENCE WITHDRAWAL DESIGN VALUES FOR NAILS WITH SHANK DIAMETERS LESS THAN 0.092 INCH[1,2]

NOMINAL SHANK DIA. (in.)	NOMINAL LENGTH (in.)	FINISH/ COATINGS[3]	MIN. ASSIGNED SPECIFIC GRAVITY	MIN. EMBEDMENT (in.)	REFERENCE DESIGN VALUE (lbf/in)
0.080	1 3/4	X, HD, EG	0.38	1	7.3
		SS	0.38	1	6.5
0.086	1 3/4	X, HD, EG	0.37	1	9.3
		SS	0.37	1	8.5

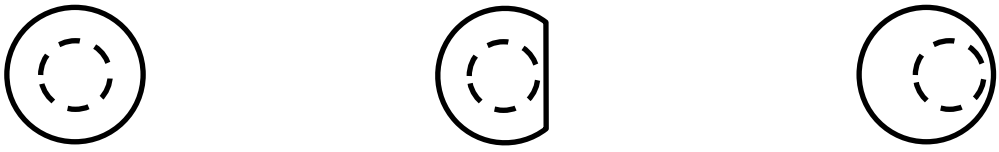
For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Reference design values must be adjusted in accordance with Section 11.3 of the NDS.
[2]Values apply to smooth shank, ring shank and screw shank nails.
[3]Finish/coatings: X = Bright (no zinc) carbon steel, EG = Electro-galvanized carbon steel, HD = Hot dipped galvanized carbon steel, SS = Stainless steel nails.

TABLE 4—NAILS FOR USE IN ENGINEERED DIAPHRAGMS AND SHEAR WALLS AND PRESCRIPTIVE SHEATHING ATTACHMENT

NAIL TYPE AND SIZE PRESCRIBED IN THE CODE	NAIL DESCRIPTION
6d common (2" x 0.113")	2 to 2 3/8" x 0.113" Full Round Head
8d common (2 1/2" x 0.131")	2 1/2" to 3" x 0.131" Full Round Head
10d common (3" x 0.148")	3" to 3 1/2" x 0.148" Full Round Head

For **SI:** 1 inch = 25.4 mm.



Full Round **Clipped** **Offset**

FIGURE 1—NAIL HEAD STYLES