

ICC-ES Evaluation Report**ESR-1768**

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**DIVISION: 06 00 00—WOODS, PLASTICS AND
COMPOSITES****Section: 06 05 23.13—Nails****REPORT HOLDER:****TREE ISLAND INDUSTRIES, LTD.
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www.treeisland.com****EVALUATION SUBJECT:****PNEUMATICALLY, MECHANICALLY AND MANUALLY
DRIVEN ROUND-HEAD NAILS, ROOFING NAILS AND
NAILS FOR APPLICATION OF GYPSUM BOARD****ADDITIONAL LISTEES:****INDUSTRIAL WIRE PRODUCTS - TREE ISLAND WIRE
(U.S.A.), INC.
12459 ARROW ROUTE
ETIWANDA, CALIFORNIA 91739****HALSTEEL - TREE ISLAND WIRE (U.S.A.), INC.
4190 EAST SANTA ANA
ONTARIO, CALIFORNIA 91761****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

Property evaluated:

Structural and nonstructural connections

2.0 USES

The nails described in this report are used for structural and nonstructural connections.

3.0 DESCRIPTION**3.1 General:**

The nails are formed from plain steel wire complying with ASTM A 853-93, Grades SAE 1006 through 1020, Hard Drawn; or stainless steel complying with ASTM A 580, Grade 304 or 316. All nail dimensions are shown in Table 1 of this report. The nails have smooth, ring (annularly threaded) or screw (helically threaded) shanks.

3.2 Roofing Nails:

Roofing nails are either hot-dipped galvanized, or bright (nongalvanized), and are manufactured with $\frac{7}{16}$ -inch-diameter (11.1 mm) heads.

3.3 Nails for Application of Gypsum Board:

The nails used for attachment of gypsum boards to wood framing members have $\frac{5}{16}$ -inch-diameter (7.9 mm) cupped heads. The nails comply with the material, ductility, withdrawal resistance and dimensional tolerances of ASTM C 514. The nails are manufactured with zinc-phosphate etched surface treatment.

3.4 Diaphragms and Shear Walls:

The 0.135-inch-diameter (3.4 mm) screw shank nail, having a minimum nail penetration into framing of $1\frac{5}{8}$ inches (41 mm), may be substituted, in the same nailing patterns, to attach wood-based sheathing, where 10d common nails [0.148 inch diameter by 3 inches long (3.8 mm by 76 mm)] are prescribed in Tables 2306.3.1 and 2306.4.1 of the IBC and Tables 23-II-H and 23-II-I of the UBC.

Diaphragm and shear wall deflections must be calculated in accordance with Sections 2305.2.2 and 2305.3.2 of the IBC. The nail slip values, e_n , of the 0.135-inch screw shank nail must be established from the tabulated values for 10d common nails provided in Table 2305.2.2 (1) of the IBC.

3.5 Finish:

The plain steel nails are supplied either “bright” (nongalvanized), with zinc or zinc phosphate coating, or with a thin film of plastic polymer (vinyl coating). Where corrosion-resistant coating is required, the nail can be supplied with a hot dipped galvanized coating complying with ASTM A 153, Class D (1.0 oz/ft²).

3.6 Dimensions and Fastener Tolerances:

The nails recognized in this report, other than the gypsum wallboard nails described in Section 3.3, conform to minimum dimensions and tolerances specified in ASTM F 1667.

3.7 Nail Bending Yield Strength (F_{yb}):

Nails used for structural applications and having a nominal diameter of 0.142 inch (3.58 mm) or less have a minimum bending yield strength, F_{yb} , of 100,000 psi (689 MPa); nails with diameters greater than 0.142 inch (3.58 mm), and up to 0.162 inch (4.1 mm), have a minimum bending yield strength, F_{yb} , of 90,000 psi (620 MPa); and nails with a diameter of 0.192 inch (4.87 mm) have a minimum bending yield strength, F_{yb} , of 80,000 psi (551 MPa).

4.0 INSTALLATION

4.1 General:

Edge distances, end distances, and spacings must be sufficient to prevent splitting of the wood, and must conform to design requirements (under the IBC and IRC) in Part 11.1.5 of the ANSI/AF&PA National Design Specification (NDS)-2005 or (under the UBC) in Section 12.4 of the ANSI/NFoPA NDS-1991, as well as requirements of the applicable code. The ANSI/AF&PA NDS-2005 is referenced in Section 2306.1 of the IBC, and in Sections R502.2, R602.3 and R802.2 of the IRC. The ANSI/NFoPA NDS-1991 is referenced in Section 2316 of the UBC. Roofing nails are designed for installation of roof coverings, insulation board and felts, and are limited to nonstructural connections specified in Chapter 15 of the IBC or UBC, or Chapter 9 of the IRC. When used in roofing applications, roofing nails must be hot-dipped galvanized in accordance with ASTM A 153, Class D. Nails used to attach gypsum board to wood framing members must be installed in accordance with ASTM C 840, GA-216, or IRC Section 702.3. The nails for fire-resistance-rated construction where gypsum board is applied must be used in accordance with IBC Table 720.1(2) and Section 2506, IRC Table R702.3.5 and Section R702.3.5, or UBC Tables 7-B, 25-G, 25-H and 25-I, as applicable. With proper application, the nail heads are deformed to a level surface.

Fasteners that are larger in diameter than specified for the intended use may be used for shear and diaphragm applications, provided consideration is given to avoiding wood splitting, and to restrictions on edge distance and spacing of the large-diameter fasteners.

4.2 Allowable Loads:

Allowable withdrawal and lateral loads for nails are as specified in the NDS or in UBC Chapter 23, Division III, for nails having the same dimensions, or as described in Table 2 of this report for recognition under the IBC and IRC.

5.0 CONDITIONS OF USE

The nails described in this report comply the codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Use of the nails must comply with this report and the applicable code.
- 5.2 When required by the code official, calculations demonstrating that the applied loads are less than the design values specified by this report must be submitted for approval. Calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 Tree Island nails having a minimum hot-dipped galvanization conforming to ASTM A 153, Class D (1.0 oz/ft²), or stainless steel nails may be used with pressure-preservative-treated wood and fire-retardant-treated wood in accordance with IBC Section 2304.9.5, IRC Section 319.3 or UBC Section 2304.3.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Nails and Spikes (AC116), dated October 2006 (editorially revised July 2010).
- 6.2 Reports of tests in accordance with ASTM C 514.

7.0 IDENTIFICATION

- 7.1 Containers of nails must be identified with the company name (Tree Island Industries, Ltd., Industrial Wire Products or Halsteel) and address, part identification, nail type (type, length, and diameter or gage), quantity, and the evaluation report number (ESR-1768). Containers must also be labeled to indicate compliance with ASTM F 1667, except for nails for gypsum board application.
- 7.2 Coated nails must be identified on the nail carton or other packaging by the word "coated," or by language indicating "vinyl-coated."
- 7.3 Fasteners recognized in Table 1 for corrosion resistance must be labeled "Hot-dip galvanized ASTM A 153" or must be marked with the coating weight.

TABLE 1—RECOGNIZED NAILS¹

DIAMETER (inch)	SHANK TYPE
0.095	Smooth
0.099	Smooth
0.099	Ring
0.113 stainless	Smooth
0.113	Smooth
0.113	Screw
0.113	Ring
0.120	Smooth
0.120	Screw
0.120	Ring
0.120 thermally treated	Smooth
0.124S (roofing)	Smooth
0.131 stainless	Smooth
0.131	Smooth
0.131	Screw
0.131	Ring
0.131 thermally treated	Smooth
0.135	Smooth
0.135	Screw
0.135	Ring
0.135 thermally treated	Smooth
0.148 stainless	Smooth
0.148	Smooth
0.148	Screw
0.148	Ring
0.148 thermally treated	Smooth
0.162 stainless	Smooth
0.162	Smooth
0.162	Screw
0.162	Ring
0.162 thermally treated	Smooth
0.192	Smooth
0.192	Screw
0.192	Ring

¹When corrosion resistance is required, all nail types can be supplied with hot-dipped galvanized coating complying with ASTM A 153, Class D, and have a minimum coating weight of 1.0 oz/ft². Electro-galvanized (electro-plated), vinyl-coated and zinc-phosphate coated fasteners are not equivalent to hot-dip galvanized and must not be used where corrosion resistance is required.

TABLE 2—IBC AND IRC CODE: SINGLE FASTENER CONNECTIONS—NOMINAL DESIGN VALUES (SHEAR LOAD AND WITHDRAWAL)⁵

NAIL SHAFT DIAMETER (inch)	LATERAL STRENGTH NOMINAL VALUE (pounds) ^{1,2}		WITHDRAWAL NOMINAL VALUE FOR SMOOTH NAILS (pounds per inch) ^{1,3}		WITHDRAWAL NOMINAL VALUE FOR THREADED NAILS (pounds per inch) ^{1,3,4}	
	Southern Pine	Douglas Fir–Larch	Southern Pine	Douglas Fir–Larch	Southern Pine	Douglas Fir–Larch
0.099	61	55	31	24	-	-
0.113	79	72	35	28	-	-
0.120	89	81	37	29	41	32
0.128	101	93	40	31	-	-
0.131	106	97	41	32	-	-
0.135	113	103	42	33	46	36
0.148	128	118	46	36	50	40
0.162	154	141	50	40	-	-
0.192	183	159	59	47	-	-

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

¹Tabulated nominal values must be multiplied by all applicable adjustment factors (in accordance with Table 10.3.1 of the NDS).

²Tabulated lateral design values are for nails inserted in side grain with nail axis perpendicular to wood fibers; minimum nail penetration into the main member must equal 10 diameters (inch). The side member thickness must correspond to the tabulated value referenced in Table 11N of the NDS-2005.

³Tabulated nominal withdrawal values are for nails driven in the side grain of the main member, with the nail axis perpendicular to the wood fibers.

⁴For diameters other than those noted, withdrawal values must be for the smooth nails.

⁵Reference: NDS 2005 edition. Lateral strength—Table 11N. Withdrawal formula—para. 11.2.3.