

ICC-ES Evaluation Report

ESR-2126

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**DIVISION: 06 00 00—WOOD, PLASTICS AND
COMPOSITES****Section: 06 05 23.13—Nails****REPORT HOLDER:****PASLODE, AN ILLINOIS TOOL WORKS COMPANY**
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www.paslode.com**EVALUATION SUBJECT:****PASLODE POSITIVE PLACEMENT NAILS AND DUO-
FAST METAL CONNECTOR FRAMING NAILS****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2012, 2009 and 2006 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)[†]

[†]The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Bending yield strength
- Lateral connection strength
- Withdrawal strength

2.0 USES

Paslode Positive Placement Nails and Duo-Fast Metal Connector Framing Nails are used to fasten metal connectors to lumber in engineered connections or as prescribed in an ICC-ES evaluation report for the metal connector. The nails may also be used under the IRC when an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION**3.1 Nails:**

The nails are formed from steel wire and have hardened diamond-shaped points and smooth shanks. See Table 1 for nail dimensions and additional descriptions, including minimum specified bending yield strength. The nails are available without a coating (bright) or with a mechanically deposited zinc (galvanized) coating complying with ASTM B695, Class 55 Type 1. The nails conform to the dimensional tolerances specified in ASTM F1667.

3.2 Connected Materials:

Wood framing members may be sawn lumber or structural composite lumber (SCL) complying with IBC Section 2303.

Metal connectors (side plates) must be formed from steel complying with Section A2.1 of AISI S100 (AISI-NAS for 2006 IBC and IRC), and must have the applicable thickness and mechanical properties described in Tables 2 through 4.

4.0 DESIGN AND INSTALLATION**4.1 Design:**

4.1.1 Engineered Side Plate Connections: The nails comply with the strength requirements of IBC Section 2303.6. Reference lateral and withdrawal design values for the nails are given in Tables 2 through 5. These design values are based on normal load duration and dry conditions of use. Tabulated reference design values must be multiplied by all applicable adjustment factors in the ANS/AWC National Design Specification for Wood Construction (NDS) to obtain adjusted design values for the nails. Design values for one species of wood are also applicable to other species having the same or higher specific gravity and are applicable to structural composite lumber having an equivalent specific gravity recognized in an ICC-ES evaluation report. Metal side plates or connectors must be designed in accordance with the applicable section of the code, or must be recognized in an ICC-ES evaluation report.

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

4.1.3 Corrosion Resistance: The mechanically galvanized nails comply with the requirements in ASTM F1667 for galvanized nails and may be used in treated wood as indicated in [ESR-3326](#).

4.2 Installation:

The nails must be installed in accordance with this report, the report holder's published installation instructions, and the approved plans. The nails are packaged for use in power tools recommended by the report holder. Individual nails may be manually driven.

Edge distances, end distances, and spacings must be sufficient to prevent splitting of the wood. Installation into sawn lumber must be in accordance with the applicable requirements of Section 11.1.6 of the NDS. When use is in SCL, the minimum end and edge distances and spacings

must be in accordance with the applicable requirements of Section 11.1.6 of the NDS, or in accordance with the ICC-ES evaluation report on the SCL product, whichever is more restrictive.

5.0 CONDITIONS OF USE

The Paslode Positive Placement Nails and the Duo-Fast Metal Connector Framing 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 Installation complies with this report, the manufacturer’s published installation instructions and the applicable code. If there is a conflict between the installation instructions and this report, this report governs.
- 5.2 Drawings and design details verifying compliance with this report must be submitted to the code official for

approval. The drawings and calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Nails and Spikes (AC116), dated February 2013 (editorially revised August 2013).

7.0 IDENTIFICATION

The nails are identified by labels on the cartons bearing the manufacturer’s brand name (Paslode or Duo-Fast), the product name, the nail length and diameter, the finish and the evaluation report number (ESR-2126). The head of each nail is identified by one of the marks noted in Figure 1, depending on the nail size.

TABLE 1—POSITIVE PLACEMENT NAILS

NOMINAL DIAMETER (inch)	LENGTH (inches)	HEAD STYLE	NOMINAL HEAD DIAMETER (inch)	SHANK STYLE	POINT STYLE	MATERIAL	COATING/ FINISH ¹	SPECIFIED F _{yb} (psi)	PACKAGING
0.131	1 1/2	Full Round	0.285	Smooth	Diamond	Carbon Steel	X, MG	100,000	Collated in Strips
	2 1/2						X		
0.148	1 1/2						X, MG	90,000	
	2 1/2						X, MG		
0.162	2 1/2						X, MG		

For SI: 1 inch = 25.4 mm 1 psi = 6.89 kPa.

¹Coatings: X = Bright (no zinc); MG = Mechanically galvanized in accordance with ASTM B695, Class 55 Type 1.

TABLE 2—REFERENCE LATERAL DESIGN VALUES, Z (lbf), FOR PASLODE POSITIVE PLACEMENT NAILS AND DUO-FAST METAL CONNECTOR NAILS FOR METAL SIDE PLATES HAVING F_{es} = 75,625 psi (521 MPa)^{1,2,3}

BASE METAL THICKNESS (inches)	SPECIES OF MAIN MEMBER (Specific Gravity)								
	Southern Pine (0.55)			Douglas Fir - Larch (0.50)			Spruce - Pine - Fir (0.42)		
	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter
0.1345 (10 ga.)	134	158	182	125	146	169	108	126	146
0.1046 (12 ga.)	121	143	167	112	133	155	97	115	134
0.0747(14 ga.)	111	132	156	102	122	144	88	106	124
0.0598 (16 ga.)	107	128	152	99	118	141	85	102	121
0.0478 (18 ga.)	104	126	150	96	116	138	83	100	119
0.0359 (20 ga.)	103	124	149	95	115	137	82	98	118
0.0299 (22 ga.)	103	124	147	95	114	137	81	98	117

For SI: 1 lbf = 4.4 N, 1 inch = 25.4 mm 1 psi = 6.89 kPa.

¹Tabulated lateral design values must be multiplied by all applicable adjustment factors in the NDS.

²Lateral design values are based on: F_{yb} = 100,000 psi for 0.131-inch-diameter nails; F_{yb} = 90,000 psi for 0.148- and 0.162-inch-diameter nails.

³Metal side plate dowel bearing strength, F_{es}, is based on an ultimate tensile strength, F_u, of 55,000 psi (379 MPa).

TABLE 3—REFERENCE LATERAL DESIGN VALUES, Z (lbf), FOR PASLODE POSITIVE PLACEMENT NAILS AND DUO-FAST METAL CONNECTOR NAILS FOR METAL SIDE PLATES HAVING $F_{es} = 61,875$ psi (427 MPa)^{1,2,3}

BASE METAL THICKNESS (inches)	SPECIES OF MAIN MEMBER (Specific Gravity)								
	Southern Pine (0.55)			Douglas Fir - Larch (0.50)			Spruce - Pine - Fir (0.42)		
	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter
0.1345 (10 ga.)	126	148	172	117	138	160	102	120	139
0.1046 (12 ga.)	115	137	161	107	127	149	93	110	129
0.0747(14 ga.)	107	129	152	99	119	141	86	103	122
0.0598 (16 ga.)	104	126	150	96	116	138	83	100	119
0.0478 (18 ga.)	103	124	148	95	115	137	82	99	118
0.0359 (20 ga.)	102	123	147	94	114	136	81	98	117
0.0299 (22 ga.)	102	123	136	94	113	136	80	97	117

For SI: 1 lbf = 4.4 N, 1 inch = 25.4 mm 1 psi = 6.89 kPa.

¹Tabulated lateral design values must be multiplied by all applicable adjustment factors in the NDS.

²Lateral design values are based on: $F_{yb} = 100,000$ psi for 0.131-inch-diameter nails; $F_{yb} = 90,000$ psi for 0.148- and 0.162-inch-diameter nails.

³Metal side plate dowel bearing strength, F_{es} , is based on an ultimate tensile strength, F_u , of 45,000 psi (310 MPa).

TABLE 4—REFERENCE LATERAL DESIGN VALUES, Z (lbf), FOR PASLODE POSITIVE PLACEMENT NAILS AND DUO-FAST METAL CONNECTOR NAILS FOR METAL SIDE PLATES HAVING $F_{es} = 52,250$ psi (360 MPa)^{1,2,3}

BASE METAL THICKNESS (inches)	SPECIES OF MAIN MEMBER (Specific Gravity)								
	Southern Pine (0.55)			Douglas Fir - Larch (0.50)			Spruce - Pine - Fir (0.42)		
	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter	0.131 inch nail diameter	0.148 inch nail diameter	0.162 inch nail diameter
0.1345 (10 ga.)	120	142	165	123	132	154	97	115	134
0.1046 (12 ga.)	111	133	156	103	123	145	90	107	126
0.0747(14 ga.)	105	126	149	97	116	138	84	101	120
0.0598 (16 ga.)	103	124	147	95	114	136	82	99	118
0.0478 (18 ga.)	101	123	147	94	113	135	81	98	117
0.0359 (20 ga.)	101	122	138	93	113	135	80	97	116
0.0299 (22 ga.)	93	105	115	93	105	115	80	97	115

For SI: 1 lbf = 4.4 N, 1 inch = 25.4 mm 1 psi = 6.89 kPa.

¹Tabulated lateral design values must be multiplied by all applicable adjustment factors in the NDS.

²Lateral design values are based on: $F_{yb} = 100,000$ psi for 0.131-inch-diameter nails; $F_{yb} = 90,000$ psi for 0.148- and 0.162-inch-diameter nails.

³Metal side plate dowel bearing strength, F_{es} , is based on an ultimate tensile strength, F_u , of 38,000 psi (262 MPa).

TABLE 5—REFERENCE WITHDRAWAL DESIGN LOADS, W^1 (lbf per inch)

WOOD SPECIES	SPECIFIC GRAVITY	NAIL DIAMETER		
		0.131 inch	0.148 inch	0.162 inch
Spruce-pine-fir	0.42	21	23	26
Douglas fir-larch	0.50	32	36	40
Southern pine	0.55	41	46	50

For SI: 1 inch = 25.4 mm, 1 lbf per inch = 0.175 N/mm.

¹Tabulated withdrawal design values are in lbf per inch of penetration into side grain of main member.

²Tabulated withdrawal design values must be multiplied by all applicable adjustment factors in the NDS.

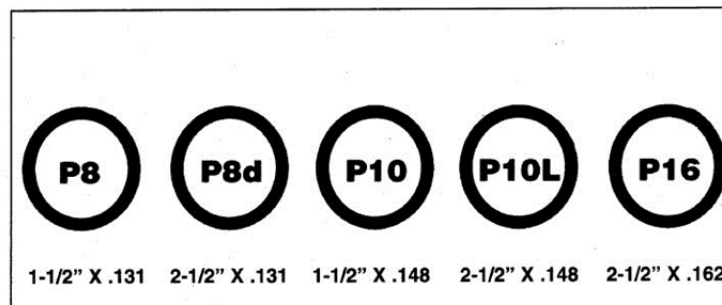


FIGURE 1—NAIL HEAD MARKINGS