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ESR-1539

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Reissued 07/2015
This report is subject to renewal 07/2016.

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

SECTION: 06 05 23.13—NAILS

REPORT HOLDER:

INTERNATIONAL STAPLE NAIL & TOOL ASSOCIATION (ISANTA)

**8735 WEST HIGGINS ROAD, SUITE 300
CHICAGO, ILLINOIS 60631**

EVALUATION SUBJECT:

POWER-DRIVEN STAPLES AND NAILS



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Reissued July 2015

This report is subject to renewal July 2016.www.icc-es.org | (800) 423-6587 | (562) 699-0543

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**DIVISION: 06 00 00—WOOD, PLASTICS AND
COMPOSITES**
Section: 06 05 23.13—Nails

REPORT HOLDER:

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BOSTITCH FASTENING SYSTEMS
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286

“MASTER FASTENERS”—BRAND NAME
BUILDING MATERIAL DISTRIBUTORS, INC.
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“DEWALT”—BRAND NAME
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“HITACHI”—BRAND NAME
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1111 BROADWAY AVENUE
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“NAILPRO”—BRAND NAME
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**“PASLODE,” “LIGHTNING STRIKE” AND “DUO-FAST”—
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888 FOREST EDGE DRIVE
VERNON HILLS, ILLINOIS 60061-3105

**“GRIP-RITE,” “FAS'NERS UNLIMITED” AND “FITS
RITE”—BRAND NAMES**
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“SENCO” BRAND NAME
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4270 IVY POINTE BOULEVARD
CINCINNATI, OHIO 45245

**“SPECIALTY NAIL CO.,” “SPECIALTY FASTENERS”—
BRAND NAMES**
SPECIALTY FASTENING SYSTEMS, INC.
424 SOUTH BAGGETT
PRAIRIE GROVE, ARKANSAS 72753

1.0 EVALUATION SCOPE**Compliance with the following codes:**

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2015, 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
- Compliance with prescriptive requirements of the IBC and IRC.
- Compliance with material requirements, dimensions and tolerances of ASTM F1667.

- Use in diaphragms, shear walls and braced walls
- Fastening schedules which are alternates to those included in the codes.

2.0 USES

The nails and staples described in this report are used for engineered and nonengineered (prescriptive) structural connections.

3.0 DESCRIPTION

3.1 General:

The fasteners recognized in this report are manufactured by and for the additional listees on this report, which are member companies of the International Staple, Nail and Tool Association (ISANTA). Appendix B of this report lists the fasteners recognized for each listee.

3.2 Staples:

Recognized staples are manufactured from plain or zinc-coated carbon steel wire or from stainless steel wire. Recognized staples comply with Table 59 of ASTM F1667 and have the characteristics shown in the table below. The staples have a minimum crown width of $\frac{7}{16}$ inch (11.1 mm) and a minimum leg length of $1\frac{1}{2}$ inches (38 mm). The staples are collated into strips and coated with polymer coatings. Staple crown widths and leg lengths specified in this report are overall dimensions.

TABLE 3.2—STAPLE CHARACTERISTICS

STAPLE GAGE	NOMINAL WIRE DIAMETER (inch)	NOMINAL STAPLE WIDTH (inch)	MINIMUM BENDING MOMENT (lbf.-in.)
14	0.080	0.0855	4.3
15	0.0720	0.073	4.0
16	0.0625	0.064	3.6

For SI: 1 inch = 25.4 mm; 1 lbf-in = 0.113 N-m.

3.3 Nails:

Recognized nails are manufactured from plain steel wire, galvanized steel wire, or stainless steel wire. The nails have full round heads or modified round heads, such as offset heads, clipped heads ("D" heads) and notched heads as shown in Figure 1. Nails have smooth or deformed (threaded) shanks. Deformed shanks may be annularly threaded (ring shank) or helically threaded (screw shank). Dimensional tolerances conform to ASTM F1667.

Nails with coating designated as EG are electro-galvanized in accordance with ASTM A641, Class 1. Nails with coating designated as HDG are hot-dip galvanized and comply with the coating thickness requirement of ASTM A153, Class D. Both EG and HDG nails comply with the requirements of Section 10.1 of ASTM F1667.

Nails are collated and coated into strips or coils for loading into a power driving tool. Typical recognized products are illustrated in Figure 1. The range of nail sizes addressed in this report is described in Table 1. See Appendix B for detailed nail descriptions including bending yield strength for products recognized for each listee.

4.0 DESIGN AND INSTALLATION

4.1 Design for Staples:

4.1.1 Engineered Connections: Reference withdrawal design values for staples recognized in this report may be calculated in accordance with Section A2.2 of Appendix A.

Reference withdrawal design values for select connections are shown in Table 4. The reference lateral design values for staples recognized in this report may be calculated in accordance with Section A2.3 of Appendix A.

4.1.2 Engineered Diaphragms and Shear Walls: The staples recognized in this report may be used in engineered diaphragms and shear walls, in accordance with the diaphragm and shear wall design tables in the IBC and in Tables 5 and 6 of this report, when the staples comply with the requirements in the applicable table for gage, crown width and leg length. Diaphragm and shear wall deflection must be determined in accordance with Section A3.0.

4.1.3 Prescriptive Sheathing Attachments: The staples recognized in this report may be used as to attach sheathing to wood framing as prescribed in the code tables referenced in Table 2, when the staples comply with the code requirements for gage, crown width and leg length.

4.2 Design for Nails:

4.2.1 Engineered Connections: The nails recognized in this report 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) for Wood Construction, using the specified minimum bending yield strength and the nominal diameter shown in Appendix B, as applicable. The formulas for nails from the NDS are shown in Section A1.0 of Appendix A. Reference lateral design values for common connections are shown in Table 3 and reference withdrawal design values for common connections are shown in Table 4. All reference design values must be multiplied by all applicable adjustment factors in accordance with the NDS.

4.2.2 Prescriptive Framing Connections: The nails may be used for prescriptive framing connections when the nails comply with the requirements in the applicable code for diameter and length. In addition, Table 10 shows alternative fastening designs for framing connections under the 2015 and 2012 IBC and IRC. The alternative fastener designs shown in Table 10 are summarized in Table 11.

4.2.3 Engineered Diaphragms and Shear Walls: The nails may be used in shear walls and diaphragms designed in accordance with the ANSI/AWC Special Design Provisions for Wind and Seismic (SDPWS) and the tables in this report when they are of the required diameter and length indicated in the SDPWS or this report and when indicated in Appendix B as meeting the head area requirements for use in lateral force resisting assemblies for the applicable nail size.

Allowable shear values for diaphragms comprised of wood structural panels attached to wood framing are shown in Tables 5 and 6. Design of roof diaphragms must consider uplift due to wind.

Allowable shear values for shear walls comprised of wood structural panels attached directly to wood framing or over gypsum sheathing are shown in Tables 7 and 8. Design of exterior shear walls must also consider transverse (out-of-plane) loads on sheathing due to wind.

Allowable shear values for shear walls comprised of fiberboard sheathing, gypsum lath and plaster, gypsum sheathing, gypsum wallboard, metal or wire lath and plaster, or plywood siding applied directly to wood framing are shown in Table 9.

Diaphragm and shear wall deflection must be determined in accordance with Section A3.0.

4.2.4 Prescriptive Sheathing Attachments: Table 2 references the code tables where nails are prescribed for attaching sheathing to framing. Nails shown in Appendix B as meeting the head area ratio requirements for use in lateral force resisting assemblies may be used where the same nail type and size is prescribed in the referenced code tables.

4.3 Installation:

The nails must be installed in accordance with this report, the listee's published installation instructions, the approved plans, if applicable, and the applicable prescriptions in the code.

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 spacings must be sufficient to prevent splitting of the wood. Installation into sawn lumber must be in accordance with the applicable requirements of 2015 NDS Section 12.1.6 (2012 NDS Section 11.1.6 for the 2012 IBC; 2005 NDS Section 11.1.5 for the 2009 IBC).

Stainless steel nails and nails with coating designated as HDG comply with 2015 IBC Section 2304.10.1 (2012, 2009 and 2006 IBC Section 2304.9.5.1) and IRC Section R317.3 (2006 IRC Section R319.3) and may be used in preservative-treated and fire-retardant treated wood.

4.4 Special Inspection:

Periodic special inspection of nailing used in the construction of main windforce-resisting systems is required by 2015 IBC Section 1705.11.1 (2012 IBC Section 1705.10.1, 2009 IBC Section 1706.2) when the nail spacing is 4 inches (102 mm) or less. Periodic special inspection of nailing used in the construction of seismic force-resisting systems is required by 2015 IBC Section 1705.12.2 (2012 IBC Section 1705.11.2, 2009 and 2006 IBC Section 1707.3) when the nail spacing is 4 inches (102 mm) or less.

5.0 CONDITIONS OF USE

The nails and staples 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** The nails and staples must be installed in accordance with this report, the listee'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.
- 5.2** The fastener dimensions specified in the design tables in this report are minimum nominal dimensions. When fasteners larger than those specified are used for any application, consideration must be given to restrictions on edge distance and close spacing.
- 5.3** Use of fasteners with a bright (non-galvanized) finish in chemically treated wood, such as preservative-treated or fire-retardant-treated wood, or in exterior or exposed conditions, is not permitted. Use of the fasteners with an electrogalvanized finish in chemically treated wood or in exterior or exposed conditions is outside the scope of this report.

6.0 EVIDENCE SUBMITTED

- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Nails (AC116), dated June 2014 (editorially revised April 2015).
- 6.2** Data in accordance with the ICC-ES Acceptance Criteria for Staples (AC201), dated February 2013 (editorially revised February 2015).

7.0 IDENTIFICATION

Containers of nails and staples must be identified with the name of one of the listees identified in this report, fastener size (nail diameter and length or staple gage, width and length), finish/coating designation and the evaluation report number (ESR-1539).

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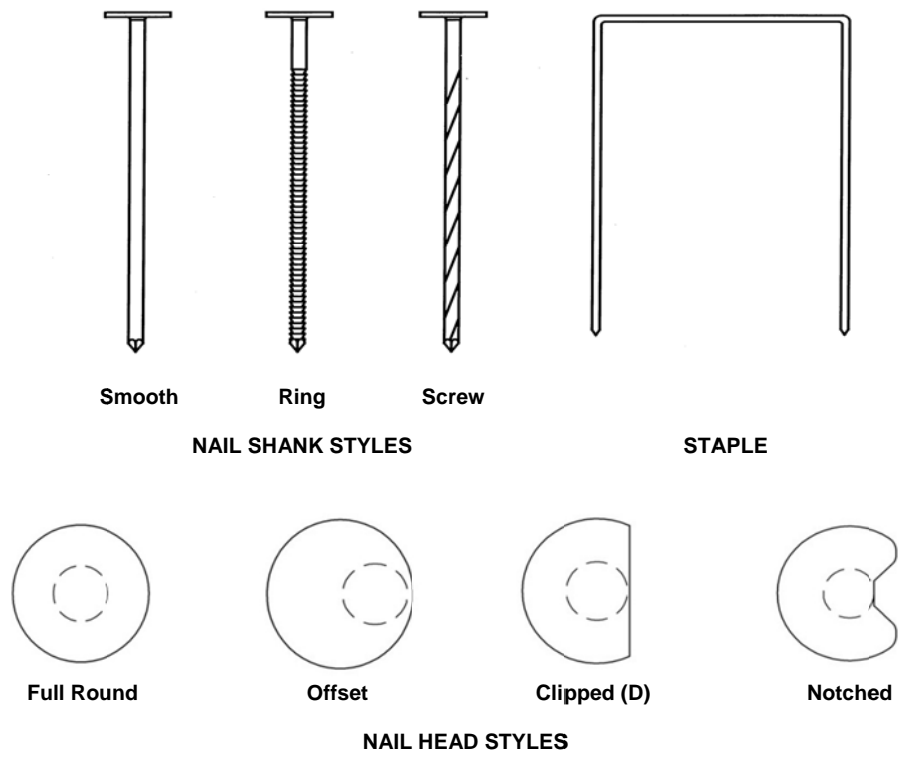


FIGURE 1—BASIC FASTENER STYLES

TABLE 1—SCOPE OF NAIL SIZES ADDRESSED IN THIS REPORT¹

SHANK DIAMETER (inch)	DESCRIBED IN ASTM F1667				OTHERS	
	TYPE AND PENNYWEIGHT	LENGTH (inches)	HEAD DIAMETER (inch)	SHANK STYLE	COMMONLY AVAILABLE LENGTHS (inches)	SHANK STYLES
0.092	6d cooler	1 ⁷ / ₈	0.250	Smooth	2 ¹ / ₄	Smooth, Ring, Screw
0.099	6d box	2	0.266	Smooth	2, 2 ¹ / ₄	Smooth, Ring, Screw
0.113	6d common	2	0.266	Smooth	2, 2 ³ / ₈ , 2 ¹ / ₂	Ring, Screw
	8d box	2 ¹ / ₂	0.297			
	8d cooler	2 ³ / ₈	0.281			
0.120	—	—	—	—	3, 3 ¹ / ₄	Smooth, Ring, Screw
0.128	10d box	3	0.312	Smooth	—	—
0.131	8d common	2 ¹ / ₂	0.281	Smooth	2 ¹ / ₂ , 3, 3 ¹ / ₄	Smooth, Ring, Screw
0.135	16d box	3 ¹ / ₂	0.344	Smooth	3 ¹ / ₂	Ring, Screw
0.148	10d common	3	0.312	Smooth	3, 3 ¹ / ₄	Ring, Screw
	12d common	3 ¹ / ₄	0.312			
0.162	16d common	3 ¹ / ₂	0.344	Smooth	3 ¹ / ₂	Ring, Screw

For SI: 1 inch = 25.4 mm.

¹See Appendix B for recognized nail products for each listee.

TABLE 2—APPLICABLE FASTENING SCHEDULES IN THE CODES FOR ATTACHMENT OF SHEATHING TO FRAMING

CONSTRUCTION	CODE	TABLE NUMBER
Roof Sheathing Attachment	2015 IBC	2304.10.1
	2012, 2009 and 2006 IBC	2304.9.1
	2015, 2012, 2009 and 2006 IRC	R602.3(1), R602.3(2)
Wall Sheathing Attachment	2015 IBC	2304.10.1
	2012, 2009 and 2006 IBC	2304.9.1
	2015, 2012, 2009 and 2006 IRC	R602.3(1), R602.3(2), r602.3(3)
Floor Sheathing Attachment	2015 IBC	2304.10.1
	2012, 2009 and 2006 IBC	2304.9.1
	2015, 2012, 2009 and 2006 IRC	R602.3(1), R602.3(2)

TABLE 3—REFERENCE LATERAL DESIGN VALUES OF FACE NAILED SINGLE SHEAR CONNECTIONS OF “2-BY” MEMBERS TO OTHER MEMBERS OF SAME SPECIES^{1,2,3,4,5,6}

NAIL DIMENSIONS		REFERENCE LATERAL DESIGN VALUES FOR SPECIFIC GRAVITIES OF: (lbf)			
Length (inches)	Nail Shank Diameter (inches)	0.42 (e.g., Spruce-pine-fir)	0.43 (e.g., Hem-fir)	0.50 (e.g., Douglas Fir-larch)	0.55 (e.g., Southern Pine)
3 ¹ / ₂	0.162	111	113	131	143
3 ¹ / ₄	0.148	100	102	118	128
3	0.148	100	102	118	128
3 ¹ / ₂	0.135	88	89	103	113
3 ¹ / ₄	0.131	82	84	97	106
3	0.131	82	84	97	106
2 ¹ / ₂	0.131	63	64	74	81
3 ¹ / ₄	0.120	69	71	81	89
3	0.120	69	71	81	89
2 ¹ / ₂	0.113	54	56	64	70
2 ³ / ₈	0.113	47	49	56	61
2 ¹ / ₄	0.099	36	36	42	46

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

¹Design values are based on a normal load duration.

²Table values must be multiplied by all applicable adjustment factors in the NDS.

³Table is based upon a 1¹/₂-inch actual thickness of both attached member and receiving (“main”) member.

⁴Designed values are for connections in which the nail shank is driven in side grain with shank axis perpendicular to wood fibers. Tabulated values are based on a minimum fastener bending yield strength (F_{yb}) of 100,000 psi for nail diameters of 0.135 inch or less, and a minimum fastener bending yield strength (F_{yb}) of 90,000 psi for nail diameters of 0.148 and 0.162 inch.

⁵Calculations are based on a connection in which both members have the same specific gravity.

⁶Reference lateral design values apply to nails with either a smooth shank or a deformed shank.

TABLE 4—NAIL AND STAPLE REFERENCE WITHDRAWAL DESIGN VALUES^{1,2,3} POUNDS PER INCH OF PENETRATION

SPECIFIC GRAVITY ⁴	SMOOTH SHANK NAILS, DIAMETER IN INCHES								DEFORMED SHANK NAILS, DIAMETER IN INCHES								STAPLE GAGE AND DIAMETER, in inches		
	0.092	0.099	0.113	0.120	0.131	0.135	0.148	0.162	0.092	0.099	0.113	0.120	0.131	0.135	0.148	16 gage	15 gage	14 gage	
																0.063	0.072	0.080	
0.31	7	7	8	9	10	10	11	12	7	8	9	10	11	11	12	9	11	12	
0.35	9	10	11	12	13	14	15	16	10	11	12	13	14	15	16	13	14	16	
0.36	10	10	12	13	14	14	16	17	11	11	13	14	15	16	17	13	15	17	
0.37	10	11	13	14	15	16	17	19	12	12	14	15	17	17	19	14	17	18	
0.38	11	12	14	15	16	17	18	20	12	13	15	16	18	18	20	15	18	20	
0.39	12	13	15	16	17	18	19	21	13	14	16	17	19	19	21	16	19	21	
0.40	13	14	16	17	18	19	21	23	14	15	17	18	20	21	23	17	20	22	
0.41	14	14	17	18	19	20	22	24	15	16	18	20	21	22	24	19	21	24	
0.42	14	15	18	19	21	21	23	26	16	17	20	21	23	23	26	20	23	25	
0.43	15	16	19	20	22	23	25	27	17	18	21	22	24	25	27	21	24	27	
0.44	16	17	20	21	23	24	26	29	18	19	22	23	26	26	29	22	26	28	
0.46	18	19	22	24	26	27	29	32	20	21	25	26	29	29	32	25	29	32	
0.47	19	20	24	25	27	28	31	34	21	22	26	28	30	31	34	26	30	33	
0.49	21	22	26	28	30	31	34	38	23	25	29	31	33	34	38	29	33	37	
0.50	22	24	28	29	32	33	36	40	24	26	30	32	35	36	40	30	35	39	
0.51	23	25	29	31	34	35	38	42	26	27	32	34	37	38	42	32	37	41	
0.55	28	30	35	37	41	42	46	50	31	33	38	41	45	46	50	39	45	50	
0.58	32	34	40	42	46	48	52	57	35	38	44	47	51	53	58	44	51	57	
0.67	46	49	57	61	66	68	75	82	51	54	63	67	73	75	83	63	73	81	
0.68	48	51	59	63	69	71	78	85	53	56	65	69	76	78	86	66	76	84	
0.71	53	57	66	70	77	79	87	95	59	63	73	77	84	87	95	73	84	94	
0.73	57	61	71	75	82	85	93	102	63	67	78	83	91	93	102	79	90	101	

For SI: 1 inch = 25.4 mm, 1 pound per inch = 0.18 N/mm.

¹Design values are based on a normal (10 year) duration of load.

²Table values must be multiplied by all applicable adjustment factors in the NDS.

³Withdrawal strengths are for fasteners driven perpendicular to the grain.

⁴Specific Gravity values must be the assigned specific gravity from Table A or NDS-15 Table 12.3.3A (NDS-12 Table 11.3.3A for the 2012 IBC, NDS-05 Table 11.3.2A for the 2009 and 2006 IBC) or the equivalent specific gravity shown for engineered wood products as shown in an ICC-ES evaluation report.

TABLE 5—ALLOWABLE SHEAR FOR WIND OR SEISMIC LOADING FOR WOOD STRUCTURAL PANEL HORIZONTAL DIAPHRAGMS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE AND STRUCTURAL I SHEATHING (plf)^{1,2,3,4,5,6,7,8,9}

NOMINAL NAIL DIAMETER (inch) OR STAPLE GAGE	MINIMUM REQUIRED FASTENER LENGTH (inches)	MINIMUM WIDTH OF FRAMING MEMBER (inches)	BLOCKED DIAPHRAGMS								UNBLOCKED DIAPHRAGMS			
			FASTENER SPACING (inch) AT DIAPHRAGM BOUNDARIES (ALL CASES), AT CONTINUOUS PANEL EDGES PARALLEL TO LOAD (CASES 3, 4), AND AT ALL PANEL EDGES (CASES 5 & 6)								FASTENERS SPACED 6" MAX. AT SUPPORTED EDGES			
			6		4		2 ¹ / ₂		2		Case 1 (No unblocked edges or continuous joints parallel to load)		All other configurations (Cases 2, 3, 4, 5 & 6)	
			Nail spacing at other panel edges (Cases 1, 2, 3 & 4)											
			6		6		4		3		Seismic	Wind	Seismic	Wind
Seismic	Wind	Seismic	Wind	Seismic	Wind	Seismic	Wind	Seismic	Wind	Seismic	Wind			
³ / ₈ -inch Nominal Panel Thickness														
0.131 smooth or deformed	1 ³ / ₄	2 3	270 300	375 420	360 400	505 560	530 600	740 840	600 675	840 945	240 265	335 370	180 200	255 280
0.120 smooth or deformed	1 ³ / ₄	2 3	230 255	320 360	305 340	435 480	455 510	635 720	515 580	720 810	200 225	290 320	150 170	220 240
0.113 smooth or deformed	1 ³ / ₄	2 3	205 230	290 325	275 305	390 430	410 460	570 645	465 520	645 725	180 205	260 285	135 155	200 215
14, 15, 16 Gage	1 ¹ / ₂ Leg Length	2 3	175 200	175 200	235 265	235 265	350 395	350 395	400 450	400 450	155 175	155 175	115 130	115 130
¹⁵ / ₃₂ -inch Nominal Panel Thickness														
0.148 smooth	2	2 3	320 360	445 505	425 480	595 670	640 720	895 1005	730 820	1025 1150	285 320	400 445	215 240	300 335
0.131 smooth or deformed	2	2 3	270 305	375 425	360 405	505 565	540 605	755 845	610 685	865 970	240 270	340 375	180 200	255 285
0.120 smooth or deformed	2	2 3	230 260	325 370	310 350	435 490	465 520	650 730	525 590	745 835	205 230	290 325	155 175	220 245
0.113 smooth or deformed	2	2 3	210 235	295 335	280 315	395 440	420 470	590 660	475 535	675 755	185 210	265 295	140 155	200 220
14, 15, 16 Gage	1 ¹ / ₂ Leg Length	2 3	175 200	175 200	235 265	235 265	350 395	350 395	400 450	400 450	155 175	155 175	120 130	120 130

See page 9 for footnote explanations and case diagrams.

TABLE 6—ALLOWABLE SHEAR FOR WIND OR SEISMIC LOADING FOR WOOD STRUCTURAL PANEL HORIZONTAL DIAPHRAGMS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE AND RATED SHEATHING (plf)^{1,2,3,4,5,6,7,8,9}

NOMINAL NAIL DIAMETER (inch) or STAPLE GAGE	MINIMUM REQUIRED FASTENER LENGTH (inches)	MINIMUM WIDTH OF FRAMING MEMBER (inches)	BLOCKED DIAPHRAGMS								UNBLOCKED DIAPHRAGMS			
			FASTENER SPACING (inch) AT DIAPHRAGM BOUNDARIES (ALL CASES), AT CONTINUOUS PANEL EDGES PARALLEL TO LOAD (CASES 3, 4), AND AT ALL PANEL EDGES (CASES 5 & 6)								FASTENERS SPACED 6" MAX. AT SUPPORTED EDGES			
			6		4		2 1/2		2		Case 1 (No unblocked edges or continuous joints parallel to load)		All other configurations (Cases 2, 3, 4, 5 & 6)	
			Nail spacing at other panel edges (Cases 1, 2, 3 & 4)											
			6		6		4		3		Seismic	Wind	Seismic	Wind
Seismic	Wind	Seismic	Wind	Seismic	Wind	Seismic	Wind							
³/₈-inch Nominal Panel Thickness														
0.131 smooth or deformed	1 3/4	2 3	240 270	335 375	320 360	445 505	480 540	670 755	545 610	760 855	215 240	300 335	160 180	225 250
0.120 smooth or deformed	1 3/4	2 3	210 235	290 320	280 315	380 435	420 470	575 645	475 530	650 730	185 210	260 290	140 155	195 215
0.113 smooth or deformed	1 3/4	2 3	185 210	260 295	250 280	350 390	375 420	525 585	425 475	585 665	165 185	230 260	125 140	175 195
14, 15, 16 Gage	1 1/2 Leg Length	2 3	160 180	160 180	210 235	210 235	315 355	315 355	360 400	360 400	140 160	140 160	105 120	105 120
⁷/₁₆-inch Nominal Panel Thickness														
0.131 smooth or deformed	2	2 3	255 285	360 400	340 380	475 530	505 570	705 800	575 645	805 900	230 255	320 355	170 190	235 265
0.120 smooth or deformed	2	2 3	215 245	315 345	290 325	410 460	435 485	610 690	490 550	695 780	190 215	280 310	145 160	205 230
0.113 smooth or deformed	2	2 3	195 220	285 315	260 290	375 415	390 435	555 625	440 490	630 705	175 195	250 280	130 145	185 210
14, 15, 16 Gage	1 1/2 Leg Length	2 3	165 190	165 190	225 250	225 250	335 375	335 375	380 425	380 425	150 165	150 165	110 125	110 125
¹⁵/₃₂-inch Nominal Panel Thickness														
0.148 smooth	2	2 3	290 325	405 455	385 430	540 603	575 650	805 910	655 735	918 1030	255 290	355 405	190 215	265 300
0.131 smooth or deformed	2	2 3	265 300	380 420	355 400	505 560	535 600	740 840	605 680	840 945	235 265	335 370	180 200	250 280
0.120 smooth or deformed	2	2 3	230 255	330 365	305 340	440 485	455 510	640 725	515 580	725 815	200 225	290 320	150 170	220 245
0.113 smooth or deformed	2	2 3	205 230	300 330	275 305	395 440	410 460	580 660	465 520	660 740	180 205	265 290	135 155	200 220
14, 15, 16 Gage	1 1/2 Leg Length	2 3	160 180	160 180	210 235	210 235	315 355	315 355	360 405	360 405	140 160	140 160	105 120	105 120
¹⁹/₃₂-inch Nominal Panel Thickness¹⁰														
0.148 smooth	2 1/4	2 3	320 360	445 505	425 480	595 673	640 720	895 1008	730 820	1023 1148	285 320	400 445	215 240	300 335
0.131 smooth or deformed	2 1/4	2 3	270 305	380 430	360 405	510 575	540 605	760 860	610 685	870 975	240 270	340 380	180 200	255 285
0.120 smooth or deformed	2 1/4	2 3	230 260	330 375	310 350	445 500	465 520	665 750	525 590	760 855	205 235	300 330	155 175	225 250
0.113 smooth or deformed	2 1/4	2 3	210 235	305 345	280 315	405 460	420 470	610 685	475 535	695 780	185 210	275 305	140 155	205 230
14, 15, 16 Gage	1 1/2 Leg Length	2 3	175 200	175 200	235 265	235 265	350 395	350 395	400 450	400 450	155 175	155 175	115 130	115 130

FOOTNOTE EXPLANATIONS FOR HORIZONTAL DIAPHRAGM TABLES 5 and 6

¹For **SI**: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

²Diaphragm construction using nails must be in accordance with Section 4.2.6 and 4.2.7 of the 2015 and 2008 AWC Special Design Provisions for Wind and Seismic (SPDWS), and diaphragm construction using staples must be in accordance with 2015 IBC Tables 2306.2(1) and 2306.2(2) (similar for earlier codes), as applicable.

³Tabulated values are for short-time loading due to wind or seismic. The tabulated seismic values must be reduced by 37 percent and 44 percent for normal and permanent load duration, respectively.

⁴The tabulated values are for fasteners installed in Douglas Fir-larch or Southern Pine framing. For framing of other species: (1) Find the assigned specific gravity for the applicable species of lumber (see Section A1.2). (2) For staples find the shear value from Table 5 (regardless of actual grade) and multiply the value by 0.82 for species with specific gravity of 0.42 or greater, or by 0.65 for all other species. (3) For nails find the shear value from the applicable table and multiply value by the Specific Gravity Adjustment Factor = $[1 - (0.5 - G)]$, where G = Specific Gravity of the framing lumber. This adjustment factor must not be greater than 1.

⁵Diaphragm deflection must be determined in accordance with Section A3.0.

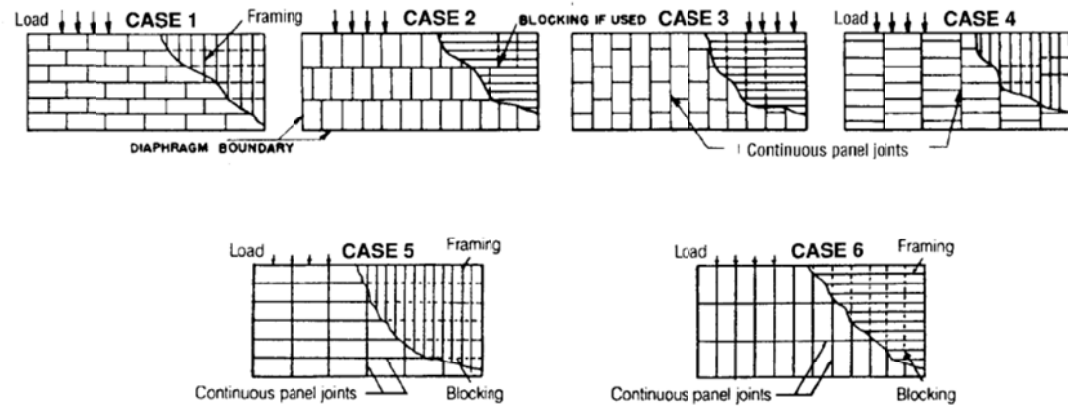
⁶Structural I panels must comply with DOC PS1 or PS2. Rated Sheathing includes Sheathing and Single-Floor grades and must comply with DOC PS1 or PS2.

⁷Nails must be flat head nails denoted in Appendix B as meeting the head area ratio requirements for lateral force resisting assemblies. A deformed shank nail must have either a helical (screw) shank or an annular (ring) shank.

⁸Staples must have a $\frac{7}{16}$ -inch minimum crown width and must be installed with their crowns parallel to the long dimension of the framing members and must be driven flush with the surface of the sheathing.

⁹Space fasteners maximum 12" o.c. along intermediate framing members (6 in. o.c. when supports are spaced 48 inches o.c.).

¹⁰Tabulated values apply to wood structural panels up to $1\frac{1}{8}$ " in thickness, provided the nail penetration is at least $1\frac{1}{2}$ inches and the staple penetration is at least 1 inch.



NOTE: Framing orientation in either direction for diaphragms is permitted provided sheathing is properly designed for vertical loading.

Case Diagrams for Horizontal Diaphragm Tables 5 and 6

TABLE 7—ALLOWABLE SHEAR FOR WIND OR SEISMIC LOADING FOR WOOD STRUCTURAL PANEL SHEAR WALLS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE AND STRUCTURAL I SHEATHING (plf)^{1,2,3,4,5,6,7,8,9,10,11}

NOMINAL NAIL DIAMETER (inch) OR STAPLE GAGE	MINIMUM NOMINAL FASTENER LENGTH (inches)		SEISMIC				WIND			
	Panels Applied Directly to Framing	Panels Applied Over 1/2 inch or 5/8 inch Gypsum Sheathing	Fastener Spacing at Panel Edges (inches)				Fastener Spacing at Panel Edges (inches)			
			6	4	3	2	6	4	3	2
3/8-inch Nominal Panel Thickness										
0.148 smooth	2	—	230	360	460	610	320	505	645	855
	—	2 1/2	280	430	550	730	390	600	770	1020
0.131 smooth or deformed	1 3/4	—	230	360	460	610	320	505	645	855
	—	2 1/2	235	360	460	610	330	505	645	855
0.120 smooth or deformed	1 3/4	—	200	310	395	520	275	435	550	730
	—	2 1/2	200	310	395	520	280	430	550	725
0.113 smooth or deformed	1 3/4	—	180	280	355	470	245	390	495	655
	—	2 1/2	180	275	355	470	250	385	495	655
14, 15, 16 Gage	1 1/2	—	155	235	315	400	155	235	315	400
14, 15, 16 Gage	—	2	155	235	310	400	155	235	310	400
7/16-inch Nominal Panel Thickness										
0.148 smooth	2	—	260	395	505	670	355	550	705	935
	—	2 1/2	280	430	550	730	390	600	770	1020
0.131 smooth or deformed	2	—	260	395	505	670	355	550	705	935
	—	2 1/2	235	365	465	615	330	505	650	860
0.120 smooth or deformed	2	—	225	340	435	580	305	475	610	805
	—	2 1/2	205	310	400	530	285	435	555	735
0.113 smooth or deformed	2	—	205	310	395	520	280	430	550	730
	—	2 1/2	170	260	330	440	235	360	460	610
14, 15, 16 Gage	1 1/2	—	170	260	345	440	170	260	345	440
14, 15, 16 Gage	—	2	155	235	310	400	155	235	310	400
15/32-inch Nominal Panel Thickness										
0.148 smooth	2	—	340	510	665	870	475	715	930	1215
	—	2 1/2	280	430	550	730	390	600	770	1020
0.131 smooth or deformed	2	—	280	430	550	730	390	600	770	1020
	—	2 1/2	240	364	465	615	330	505	650	860
0.120 smooth or deformed	2	—	245	375	475	630	340	520	665	880
	—	2 1/2	205	315	400	530	285	435	560	740
0.113 smooth or deformed	2	—	220	340	430	570	305	470	605	800
	—	2 1/2	185	285	365	480	260	395	510	670
14, 15, 16 Gage	1 1/2	—	185	280	375	475	185	280	375	475
14, 15, 16 Gage	—	2	155	235	300	400	155	235	300	400

See pages 12 for footnote explanations.

TABLE 8—ALLOWABLE SHEAR FOR WIND OR SEISMIC LOADING FOR WOOD STRUCTURAL PANEL SHEAR WALLS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE AND RATED SHEATHING (plf)^{1,2,3,4,5,6,7,8,9,10,11}

NOMINAL NAIL DIAMETER (inch) OR STAPLE GAGE	MINIMUM NOMINAL FASTENER LENGTH (inches)		SEISMIC				WIND			
	PANELS Applied Directly to Framing	PANELS Applied Over 1/2 inch or 5/8 inch Gypsum Sheathing	Fastener Spacing at Panel Edges (inches)				Fastener Spacing at Panel Edges (inches)			
			6	4	3	2	6	4	3	2
³/₈-inch Nominal Panel Thickness										
0.148 smooth	2	—	220	320	410	530	305	445	575	740
	—	2 1/2	260	380	490	640	365	530	685	895
0.131 smooth or deformed	1 3/4	—	220	320	410	530	305	445	575	740
	—	2 1/4	200	300	390	510	280	420	545	715
0.120 smooth or deformed	1 3/4	—	160	230	295	380	220	320	410	530
	—	2 1/2	170	255	330	430	235	355	460	600
0.113 smooth or deformed	1 3/4	—	200	300	390	510	280	420	545	715
	—	2 1/4	150	225	295	380	210	315	410	535
14, 15, 16 Gage	1 1/2	—	140	210	280	360	140	210	280	360
14, 15, 16 Gage	—	2	140	210	280	360	140	210	280	360
⁷/₁₆-inch Nominal Panel Thickness										
0.148 smooth	2 1/2	—	240	350	450	585	335	490	630	820
	—	2 1/2	260	380	490	640	365	530	685	895
0.131 smooth or deformed	2	—	240	350	450	585	335	490	630	820
	—	2 1/2	215	315	405	530	305	440	570	740
0.120 smooth or deformed	2	—	205	295	380	495	285	415	530	690
	—	2 1/2	185	265	340	445	255	370	475	625
0.113 smooth or deformed	2	—	180	265	335	440	250	365	470	615
	—	2 1/2	160	235	305	395	225	330	425	550
14, 15, 16 Gage	1 1/2	—	155	230	310	395	155	230	310	395
14, 15, 16 Gage	—	2	140	210	280	360	140	210	280	360
¹⁵/₃₂-inch Nominal Panel Thickness										
0.148 smooth	2	—	310	460	600	770	435	645	840	1075
	—	2 1/2	260	380	490	640	365	530	685	895
0.131 smooth or deformed	2	—	260	380	490	640	365	530	685	895
	—	2 1/2	215	315	405	530	305	440	570	740
0.120 smooth or deformed	2	—	220	320	415	540	310	445	575	755
	—	2 1/2	185	265	340	445	255	370	475	625
0.113 smooth or deformed	2	—	195	285	365	480	275	395	510	670
	—	2 1/2	160	235	305	395	225	330	425	550
14, 15, 16 Gage	1 1/2	—	170	255	335	430	170	255	335	430
14, 15, 16 Gage	—	2	140	210	280	360	140	210	280	360
¹⁹/₃₂-inch Nominal Panel Thickness										
0.148 smooth	2 1/4	—	340	510	665	870	475	715	930	1215
0.131 smooth or deformed	2 1/4	—	285	425	550	720	395	595	770	1005
0.120 smooth or deformed	2 1/4	—	240	355	465	605	330	500	645	845
0.113 smooth or deformed	2 1/4	—	210	315	410	535	295	440	575	750
14, 15, 16 Gage	1 3/4	—	185	280	375	475	185	280	375	475

See pages 12 for footnote explanations.

FOOTNOTE EXPLANATIONS FOR SHEAR WALL TABLES 7 AND 8

¹For **SI**: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

²Shear wall construction using nails must be in accordance with Section 4.3.6 and 4.3.7 of the 2015 and 2008 AF&PA Special Design Provisions for Wind and Seismic (SPDWS), and shear wall construction using staples must be in accordance with 2015 IBC Table 2306.3(1) (similar for earlier codes), as applicable.

³Tabulated values are for short-time loading due to wind or seismic. The tabulated seismic values must be reduced by 37 percent and 44 percent for normal and permanent load duration, respectively.

⁴The tabulated values are for fasteners installed in Douglas Fir-larch or Southern Pine. For framing of other species: (1) Find the assigned specific gravity for species of lumber (see Section A1.2) (2) For staples find shear value from the Table 7 (regardless of actual grade) and multiply value by 0.82 for species with specific gravity of 0.42 or greater, or 0.65 for all other species. (3) For nails find shear value from the applicable table and multiply by the following Specific Gravity Adjustment Factor = $[1 - (0.5 - G)]$, where G = Assigned Specific Gravity of the framing lumber. This adjustment factor must not be greater than 1.

⁵Shear wall deflection must be determined in accordance with Section A3.0.

⁶Structural I and Rated Sheathing panels must comply with DOC PS1 or PS2. Install panels either horizontally or vertically. All panel edges must be backed by framing members.

⁷In structures assigned to Seismic Design category D, E, or F, where the allowable shear design value exceeds 350 plf, all framing members receiving edge nailing from abutting panels must not be less than a single 3-inch nominal member. Panel joint and sill plate nailing must be staggered in all cases. See Section 4.3.6.4 of SDPWS, or 2006 IBC Section 2305.3.11 for sill plate size and anchorage requirements, as applicable.

⁸Space fasteners maximum 6 inches on center along intermediate framing members - Exception: When panel thickness is greater than $7/16$ -inch or studs are spaced less than 24 inches on center, space fasteners maximum 12 inches on center.

⁹Nails must be flat head nails denoted in Appendix B as meeting the head area ratio requirements for lateral force resisting assemblies. A deformed shank nail must have either a helical (screw) shank or an annular (ring) shank.

¹⁰Staples must have a $7/16$ -inch minimum crown width and must be installed with their crown parallel to the long dimension of the framing members, and must be driven flush with the surface of the sheathing.

¹¹The values for $3/8$ -inch and $7/16$ -inch panels applied directly to framing using nails may be increased to values shown for $15/32$ -inch-thick panels of the same panel grade, provided studs are spaced a maximum of 16 inches on center or panels are applied with long dimension across studs.

TABLE 9—ALLOWABLE SHEAR FOR WIND OR SEISMIC LOADING FOR SHEAR WALLS WITH FIBERBOARD SHEATHING, GYPSUM LATH, GYPSUM SHEATHING, GYPSUM WALLBOARD, LATH AND PLASTER OR PLYWOOD SIDING OVER WOOD FRAMING (plf)^{1,3,4}

SHEATHING MATERIAL	THICKNESS OF MATERIAL	WALL CONSTRUCTION	REQUIRED SPACING (inches on center)		SHEAR VALUE (plf)		FASTENER SPECIFICATIONS	COMMENTS			
			Panel Edges	Field	Seismic	Wind					
Fiberboard Sheathing	1/2"	Blocked	4	6	150		1 1/4" long, 16, 15 & 14 gage staple	Reference 2015 and 2012 IBC Table 2306.3(2) [2009 IBC Table 2306.6] for applicable notes			
			3		200						
			2		225						
			4		220						
			3		290						
	2	325									
	25/32"	Blocked	4	6	150		1 1/2" long, 16, 15 & 14 gage staple				
			3		200						
			2		225						
			4		220						
3			290								
2	325										
Gypsum Lath	3/8" + 1/2" Plaster	Unblocked	5		100		1 1/8" long, 3/4" crown, 16, 15 & 14 gage staple				
Gypsum Sheathing	1/2" x 2' x 8'	Unblocked	4		75		1 3/4" long, 16, 15 & 14 gage staple				
	1/2" x 4'	Blocked	4		175 ²						
1/2" x 4'	Unblocked	7		100							
Gypsum Wallboard	1/2"	Unblocked	7	4	75 ²		1 1/2" long, 16, 15 & 14 gage staple	Reference 2015 and 2012 IBC Table 2306.3(3) [2009 IBC Table 2306.7] for applicable notes			
			4		100						
			4		110 ²						
			4		125						
			4		125						
	5/8"	Blocked	7	4	150						
			4		150						
			7		115 ²						
			4		145 ²						
			7		145						
Blocked two-ply	Base Ply - 9	250		15/8" long, 16, 15 & 14 gage staple							
	Face Ply - 7	250		2 1/4" long, 15 & 14 gage staple							
Expanded metal or woven wire lath and Portland cement plaster	7/8"	Unblocked	6" On Center @ Each Framing Member		180		7/8" long, 3/4" crown, 16, 15 & 14 gage staple				
Plywood Panel Siding Shear Walls with Framing of Douglas Fir-Larch or Southern Pine ²	3/8"	Panels Applied Directly To Framing	6	6	160	225	2 1/2 x 0.113 smooth	Reference SDPWS Table 4.3A for applicable notes			
			4		240	335					
			3		310	435					
			2		410	575					
			6		6	140			1 1/2" long, 16, 15 & 14 gage staple	Reference 2015 and 2012 IBC Table 2306.3(1) [2009 IBC Table 2306.3] for applicable notes	
			4			210					
			3			280					
			2			360					
		Panels Applied Over 1/2" or 5/8" Gypsum Sheathing	6	6	160	225	3 x 0.131 smooth nail	Reference SDPWS Table 4.3B for applicable notes			
			4		240	335					
			3		310	435					
			2		410	575					
			6		6	140			2" long, 16, 15 & 14 gage staple	Reference 2015 and 2012 IBC Table 2306.3(1) [2009 IBC Table 2306.3] for applicable notes	
			4			210					
3	280										
2	360										

For **SI**: 1 inch = 25.4 mm; 1 foot = 305 mm; 1 plf = 14.6 N/m.


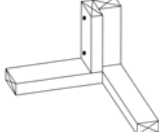

¹Shear values are based on maximum framing spacing of 16 inches on center, unless otherwise noted.

²Shear values are based on maximum framing spacing of 24 inches on center.

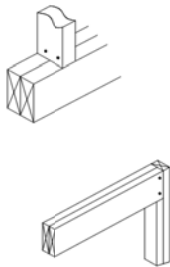
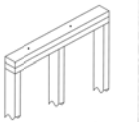
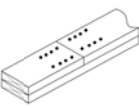
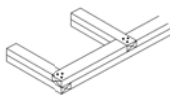
³Staples must have a minimum crown width of 7/16 inch, measured outside the legs, unless otherwise noted.

⁴In addition to requirements presented above for fastening of shear walls all other requirements of the applicable model code (such as, but not limited to, conditions of use and modification of design values for certain Seismic Design Categories) pertaining to shear wall design and construction must be met.


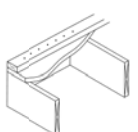
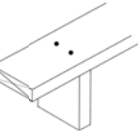
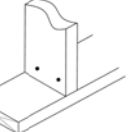
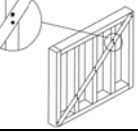
TABLE 10—FASTENING SCHEDULE¹

CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS					
	2012 IBC		2012 IRC		2015 IBC		2015 IRC							
	Table 2304.9.1		Table R602.3(1)		Table 2304.10.1		Table R602.3(1)							
	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)		
WALL FRAMING														
Double Studs (face nail) 	Connection 9		Connection 12		Connection 8		Connection 8							
	@ 24" o.c.		@ 24" o.c.		@ 24" o.c.		@ 24" o.c.		@ 24" o.c.		@ 16" o.c.		@ 8" o.c.	
	1	16d box (3 1/2 x .135)	1	10d box (3 x .128)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	12d com (3 1/4 x .148)	1	8d com (2 1/2 x .131)
	@ 8" o.c.				@ 16" o.c.		@ 16" o.c.				1 10d com (3 x .148)		1 3 1/4 x .120	
	1	3 x .131			1	3 x .131	1	3 x .131			1	16d box (3 1/2 x .135)	1	3 x .120
					1	10d box (3 x .128)	1	10d box (3 x .128)			1	3 1/4 x .131		
											1	3 x .131		
	At Braced Walls													
	Connection 9		Connection 9											
	@ 16" o.c.		@ 16" o.c.						@ 16" o.c.		@ 12" o.c.		@ 8" o.c.	
	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	12d com (3 1/4 x .148)	1	3 1/4 x .120
											1	10d com (3 x .148)	1	3 x .120
	@ 12" o.c.				@ 12" o.c.		@ 12" o.c.				1 16d box (3 1/2 x .135)			
	1	3 x .131			1	3 x .131	1	3 x .131			1	3 1/4 x .131		
1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)			1	3 x .131			
Abutting Studs at Corners and Intersections 	Connection 23		Connection 8		Connection 8		Connection 8							
	@ 24" o.c.		@ 12" o.c.		@ 24" o.c.		@ 24" o.c.		@ 12" o.c.		@ 8" o.c.			
	1	16d com (3 1/2 x .162)	1	16d box (3 1/2 x .135)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	3 1/4 x .131		
									1	12d com (3 1/4 x .148)	1	3 x .131		
	@ 16" o.c.				@ 16" o.c.		@ 16" o.c.				1 8d com (2 1/2 x .131)			
	1	3 x .131			1	3 x .131	1	3 x .131	1	10d com (3 x .148)	1	3 1/4 x .120		
					1	10d box (3 x .128)	1	10d box (3 x .128)	1	16d box (3 1/2 x .135)	1	3 1/4 x .131		
					1	10d box (3 x .128)	1	10d box (3 x .128)			1	3 x .120		
	At Braced Walls													
	Connection 9		Connection 9											
	@ 16" o.c.		@ 16" o.c.						@ 16" o.c.		@ 12" o.c.		@ 8" o.c.	
	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	12d com (3 1/4 x .148)	1	3 1/4 x .120
											1	10d com (3 x .148)	1	3 x .120
	@ 12" o.c.				@ 12" o.c.		@ 12" o.c.				1 16d box (3 1/2 x .135)			
1	3 x .131			1	3 x .131	1	3 x .131			1	3 1/4 x .131			
1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)			1	3 x .131			
Built-up header 2" to 2" w/ 1/2" spacer (face-nail) 	Connection 14		Connection 9		Connection 10		Connection 10							
	@16" o.c.		@16" o.c.		@16" o.c.		@16" o.c.		@12" o.c.		@8" o.c.			
	1	16d com (3 1/2 x .162)	1	16d box (3 1/2 x .135)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	12d com (3 1/4 x .148)		
					@12" o.c.		@12" o.c.		1 16d box (3 1/2 x .135)		1 10d com (3 x .148)			
					1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)			1 3 1/4 x .131			
											1 3 x .131			
										1 3 1/4 x .120				
										1 3 x .120				
	each edge		each edge		each edge		each edge		each edge		each edge			

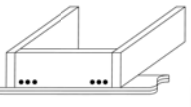
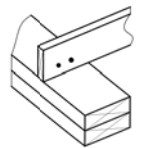
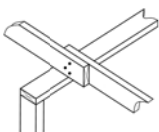
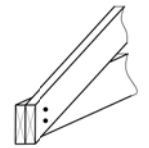
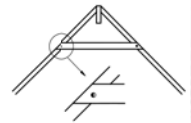
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CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS			
	2012 IBC		2012 IRC		2015 IBC		2015 IRC					
	Table 2304.9.1		Table R602.3(1)		Table 2304.10.1		Table R602.3(1)					
	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)
Continuous header to stud (toe-nail)	Connection 16		Connection 9		Connection 11		Connection 11					
	4	8d com (2 1/2 x .131)	4	8d box (2 1/2 x .113)	4	8d com (2 1/2 x .131)	4	8d com (2 1/2 x .131)	3	16d com (3 1/2 x .162)	4	8d com (2 1/2 x .131)
					4	10d box (3 x .128)	4	10d box (3 x .128)	4	12d com (3 1/4 x .148)	5	3 1/4 x .120
							5	8d box (2 1/2 x .113)	4	10d com (3 x .148)	5	3 x .120
									4	16d box (3 1/2 x .135)	6	8d box (2 1/2 x .113)
									4	3 1/4 x .131	6	2 9/8 x .113
								4	3 x .131			
Double Top Plates to Each Other (face nail)	Connection 10a		Connection 13		Connection 12		Connection 12					
	@ 16" o.c.		@ 24" o.c.		@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 12" o.c.	
	1	16d box (3 1/2 x .135)	1	10d box (3 x .128)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	12d com (3 1/4 x .148)
	@ 12" o.c.				@ 12" o.c.		@ 12" o.c.				1 10d com (3 x .148)	
	1	3 x .131			1	3 x .131	1	3 x .131			1	16d box (3 1/2 x .135)
					1	10d box (3 x .128)	1	10d box (3 x .128)			1	3 1/4 x .131
										1	3 x .131	
Top Plate to Top Plate @ end joint (lap splice)	Connection 10b		Connection 14		Connection 13		Connection 13a					
	8	16d com (3 1/2 x .162)	8	16d box (3 1/2 x .135)	8	16d com (3 1/2 x .162)	8	16d com (3 1/2 x .162)	8	16d com (3 1/2 x .162)	12	16d box (3 1/2 x .135)
	12	3 x .131			12	3 x .131	12	16d box (3 1/2 x .135)	12	12d com (3 1/4 x .148)	12	3 1/4 x .131
					12	10d box (3 x .128)	12	3 x .131	12	10d com (3 x .148)	12	3 x .131
					12	10d box (3 x .128)	12	10d box (3 x .128)				
	each side of joint		each side of joint		each side of joint		each side of joint		each side of joint		each side of joint	
							Connection 13b					
							12	16d box (3 1/2 x .135)	10	16d com (3 1/2 x .162)		
								12	12d com (3 1/4 x .148)			
								12	10d com (3 x .148)			
								each side of joint		each side of joint		
Top Plate Overlap at Corners and Intersections (face nail)	Connection 13		Connection 19		Connection 18		Connection 17					
	2	16d com (3 1/2 x .162)	2	10d box (3 x .128)	2	16d com (3 1/2 x .162)	2	16d com (3 1/2 x .162)	2	16d com (3 1/2 x .162)	3	3 1/4 x .131
	3	3 x .131			3	3 x .131	3	3 x .131	3	12d com (3 1/4 x .148)	3	3 x .131
					3	10d box (3 x .128)	3	10d box (3 x .128)	3	10d com (3 x .148)	4	3 1/4 x .120
									3	16d box (3 1/2 x .135)	4	3 x .120

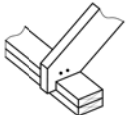
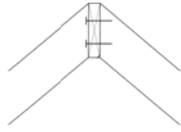


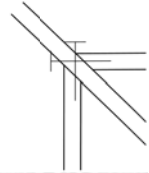
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CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS			
	2012 IBC Table 2304.9.1		2012 IRC Table R602.3(1)		2015 IBC Table 2304.10.1		2015 IRC Table R602.3(1)					
	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)
	Connection 6a		Connection 15		Connection 14		Connection 14					
	@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 12" o.c.	
	1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	16d com (3 1/2 x .162)	1	12d com (3 1/4 x .148)
											1	10d com (3 x .148)
											1	16d box (3 1/2 x .135)
	@ 8" o.c.		@ 12" o.c.		@ 12" o.c.		@ 12" o.c.				@ 8" o.c.	
1	3 x .131			1	3 x .131	1	3 x .131			1	3 1/4 x .131	
				1	16d box (3 1/2 x .135)	1	16d box (3 1/2 x .135)			1	3 x .131	
Sole (Bottom) Plate to Joist, Rim Joist, Band Joist or Blocking at braced panel	Connection 6a		Connection 15		Connection 14		Connection 14					
	@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 16" o.c.		@ 12" o.c.	
	3	16d box (3 1/2 x .135)	3	16d box (3 1/2 x .135)	2	16d com (3 1/2 x .162)	2	16d com (3 1/2 x .162)	3	12d com (3 1/4 x .148)	2	16d com (3 1/2 x .162)
	4	3 x .131			3	16d box (3 1/2 x .135)	3	16d box (3 1/2 x .135)	3	10d com (3 x .148)	4	8d com (2 1/2 x .131)
					4	3 x .131	4	3 x .131	3	16d box (3 1/2 x .135)		
										4	3 1/4 x .131	
										4	3 x .131	
										4	3 1/4 x .120	
										5	3 x .120	
Top or Sole (Bottom) Plate to Stud (end nail)	Connections 7 and 8b		Connection 18		Connections 17 and 16b		Connection 16b					
	2	16d com (3 1/2 x .162)	2	16d box (3 1/2 x .135)	2	16d com (3 1/2 x .162)	2	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	4	3 x .131
	3	3 x .131			3	3 x .131	3	16d box (3 1/2 x .135)	3	12d com (3 1/4 x .148)	4	8d com (2 1/2 x .131)
					3	10d box (3 x .128)	3	3 x .131	3	10d com (3 x .148)	4	3 1/4 x .120
							3	10d box (3 x .128)	3	16d box (3 1/2 x .135)	4	3 x .120
								4	3 1/4 x .131			
Stud to Top or Sole (Bottom) Plate (toe-nail)	Connection 8		Connection 17		Connection 16a		Connection 16a					
	4	8d com (2 1/2 x .131)	3	8d box (2 1/2 x .113)	4	8d com (2 1/2 x .131)	3	16d box (3 1/2 x .135)	3	16d com (3 1/2 x .162)	4	8d com (2 1/2 x .131)
	4	3 x .131	2	16d box (3 1/2 x .135)	4	3 x .131	4	8d com (2 1/2 x .131)	4	12d com (3 1/4 x .148)	5	3 1/4 x .120
					4	10d box (3 x .128)	4	3 x .131	4	10d com (3 x .148)	5	3 x .120
							4	10d box (3 x .128)	4	16d box (3 1/2 x .135)	6	8d box (2 1/2 x .113)
						4	8d box (2 1/2 x .113)	4	3 1/4 x .131	6	2 7/8 x .113	
								4	3 x .131	6	6d com (2 x .113)	
1" Diagonal Bracing to stud/plate (face-nail)	Connection 20		Connection 20		Connection 19		Connection 18					
	2	8d com (2 1/2 x .131)	2	8d box (2 1/2 x .113)	2	8d com (2 1/2 x .131)	2	8d com (2 1/2 x .131)	2	16d com (3 1/2 x .162)	2	8d com (2 1/2 x .131)
	2	3 x .131			2	3 x .131	3	8d box (2 1/2 x .113)	2	12d com (3 1/4 x .148)	3	3 1/4 x .120
					2	10d box (3 x .128)	2	10d box (3 x .128)	2	10d com (3 x .148)	3	3 x .120
									2	16d box (3 1/2 x .135)	3	8d box (2 1/2 x .113)
								2	3 1/4 x .131	3	2 7/8 x .113	
								2	3 x .131	4	2 1/4 x .099	

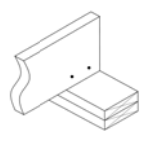
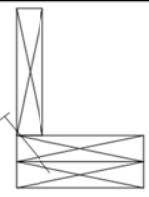
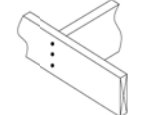
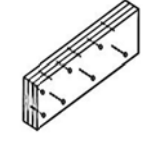
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CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS			
	2012 IBC Table 2304.9.1		2012 IRC Table R602.3(1)		2015 IBC Table 2304.10.1		2015 IRC Table R602.3(1)					
	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)
CEILING AND ROOF FRAMING												
Blocking Between Joists or Rafter to Top Plate (toe-nail)	Connection 11		Connection 1		Connection 1		Connection 1					
	3	8d com (2 1/2 x .131)	3	8d box (2 1/2 x .113)	3	8d com (2 1/2 x .131)	3	8d com (2 1/2 x .131)	3	16d com (3 1/2 x .162)	3	3 x .131
	3	3 x .131			3	3 x .131	3	3 x .131	3	12d com (3 1/4 x .148)	3	8d com (2 1/2 x .131)
					3	10d box (3 x .128)	3	10d box (3 x .128)	3	10d com (3 x .148)	4	3 1/4 x .120
							4	8d box (2 1/2 x .113)	3	16d box (3 1/2 x .135)	4	3 x .120
									3	3 1/4 x .131	5	8d box (2 1/2 x .113)
								each end		each end		each end
Ceiling Joist to Plate (toe-nail)	Connection 15		Connection 2		Connection 2		Connection 2					
	3	8d com (2 1/2 x .131)	3	8d box (2 1/2 x .113)	3	8d com (2 1/2 x .131)	3	8d com (2 1/2 x .131)	3	16d com (3 1/2 x .162)	4	3 1/4 x .120
	5	3 x .131			3	10d box (3 x .128)	3	10d box (3 x .128)	3	12d com (3 1/4 x .148)	4	3 x .120
					3	3 x .131	3	3 x .131	3	10d com (3 x .148)	5	8d box (2 1/2 x .113)
									3	16d box (3 1/2 x .135)	5	2 3/8 x .113
									3	3 1/4 x .131	5	6d com (2 x .113)
									3	3 x .131		
nail thru each side												
Ceiling Joist (not connected to parallel rafter - no thrust), laps over Partition	Connection 17		Connection 3		Connection 3		Connection 3					
	3	16d com (3 1/2 x .162)	3	10d box (3 x .128)	3	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	4	3 1/4 x .131
	4	3 x .131			4	3 x .131	4	3 x .131	4	12d com (3 1/4 x .148)	4	3 x .131
					4	10d box (3 x .128)	4	10d box (3 x .128)	4	10d com (3 x .148)	5	3 1/4 x .120
									4	16d box (3 1/2 x .135)	5	3 x .120
Ceiling Joist to Parallel Rafters and at laps	Connection 18				Connection 4		Connection 4					
	See IBC Section 2308.1.4.1 and Table 2308.1.4.1				See IBC Section 2308.7.3.1 and Table 2308.7.3.1		See IRC Section R802.3.1, R802.3.2 & Table R802.5.1(9)					
Collar Tie to Rafter	Connection 26		Connection 4		Connection 5		Connection 5					
	3	10d com (3 x .148)	3	10d box (3 x .128)	3	10d com (3 x .148)	3	10d com (3 x .148)	3	16d com (3 1/2 x .162)	4	3 x .131
	4	3 x .131			4	10d box (3 x .128)	4	10d box (3 x .128)	3	12d com (3 1/4 x .148)	5	8d com (2 1/2 x .131)
					4	3 x .131	4	3 x .131	3	10d com (3 x .148)	5	3 1/4 x .120
									4	16d box (3 1/2 x .135)	5	3 x .120
									4	3 1/4 x .131	6	8d box (2 1/2 x .113)

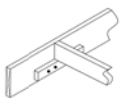
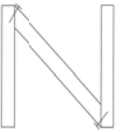
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CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS					
	2012 IBC		2012 IRC		2015 IBC		2015 IRC							
	Table 2304.9.1		Table R602.3(1)		Table 2304.10.1		Table R602.3(1)							
	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)
Roof Rafter to Plate (toe-nail)	Connection 19		Connection 5		Connection 6		Connection 6							
	3	8d com (2 1/2 x .131)	3	10d com (3 x .148)	3	10d com (3 x .148)	3	10d com (3 x .148)	3	16d com (3 1/2 x .162)	4	3 x .131		
	3	3 x .131	3	16d box (3 1/2 x .135)	3	16d box (3 1/2 x .135)	3	16d box (3 1/2 x .135)	3	12d com (3 1/4 x .148)	4	8d com (2 1/2 x .131)		
					4	3 x .131	4	3 x .131	3	10d com (3 x .148)	4	3 1/4 x .120		
					4	10d box (3 x .128)	4	10d box (3 x .128)	3	16d box (3 1/2 x .135)	4	3 x .120		
									4	3 1/4 x .131				
	+ connectors per IBC Section 2308.10.1				+ connectors per IBC Section 2308.7.5				+ connectors per IBC		+ connectors per IBC			
ridge beam (end nail)	Connection 28b		Connection 6		Connection 7a		Connection 7b							
	2	16d com (3 1/2 x .162)	4	16d box (3 1/2 x .135)	2	16d com (3 1/2 x .162)	2	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	4	3 1/4 x .131		
	3	3 x .131			3	3 x .131	3	16d box (3 1/2 x .135)	4	16d com (3 1/2 x .162)	4	3 x .131		
					3	10d box (3 x .128)	3	3 x .131	4	10d com (3 x .148)	5	3 1/4 x .120		
					3	10d box (3 x .128)	3	10d box (3 x .128)	4	16d box (3 1/2 x .135)	5	3 x .120		
Roof Rafter to 2 by ridge beam (toe nail)	Connection 28a		Connection 6		Connection 7b		Connection 7a							
	2	16d com (3 1/2 x .162)	4	16d box (3 1/2 x .135)	3	10 com (3 x .148)	3	10 com (3 x .148)	3	16d com (3 1/2 x .162)	5	8d com (2 1/2 x .131)		
	3	3 x .131			3	16d box (3 1/2 x .135)	4	16d box (3 1/2 x .135)	4	12d com (3 1/4 x .148)	6	3 1/4 x .120		
					4	3 x .131	4	3 x .131	4	10d com (3 x .148)	6	3 x .120		
					4	10d box (3 x .128)	4	10d box (3 x .128)	4	16d box (3 1/2 x .135)	6	8d box (2 1/2 x .113)		
									5	3 1/4 x .131	6	2 3/8 x .113		
									5	3 x .131	6	6d com (2 x .113)		
Jack Rafter to Hip (toe nail)	Connection 27a		Connection 6		Connection 7b		Connection 7a							
	3	10d com (3 x .148)	4	16d box (3 1/2 x .135)	3	10d com (3 x .148)	3	10 com (3 x .148)	3	16d com (3 1/2 x .162)				
	4	3 x .131			3	16d box (3 1/2 x .135)	4	16d box (3 1/2 x .135)	4	12d com (3 1/4 x .148)				
					4	3 x .131	4	3 x .131	4	10d com (3 x .148)				
					4	10d box (3 x .128)	4	10d box (3 x .128)	4	16d box (3 1/2 x .135)				
									5	3 1/4 x .131				
									5	3 x .131				
								5	8d com (2 1/2 x .131)					
Jack Rafter to Hip (end nail)	Connection 27b		Connection 6		Connection 7a		Connection 7b							
	2	16d com (3 1/2 x .162)	4	16d box (3 1/2 x .135)	2	16d com (3 1/2 x .162)	2	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)				
	3	3 x .131			3	3 x .131	3	16d box (3 1/2 x .135)	4	12d com (3 1/4 x .148)				
					3	10d box (3 x .128)	3	3 x .131	4	10d com (3 x .148)				
							3	10d box (3 x .128)	4	16d box (3 1/2 x .135)				

(Continued)

CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS			
	2012 IBC		2012 IRC		2015 IBC		2015 IRC					
	Table 2304.9.1		Table R602.3(1)		Table 2304.10.1		Table R602.3(1)					
	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)
FLOOR FRAMING												
Joist to Sill or Girder (toe-nail)	Connection 1		Connection 24		Connection 22		Connection 21					
	3	8d com (2 1/2 x .131)	3	8d box (2 1/2 x .113)	3	8d com (2 1/2 x .131)	3	8d com (2 1/2 x .131)	3	16d com (3 1/2 x .162)	3	8d com (2 1/2 x .131)
	3	3 x .131			3	3 x .131	3	3 x .131	3	12d com (3 1/4 x .148)	4	3 1/4 x .120
					3	10d box (3 x .128)	3	10d box (3 x .128)	3	10d com (3 x .148)	4	3 x .120
							4	8d box (2 1/2 x .113)	3	16d box (3 1/2 x .135)	5	8d box (2 1/2 x .113)
									3	3 1/4 x .131	5	2 3/8 x .113
								3	3 x .131	5	6d com (2 x .113)	
Rim Joist to Top Plate (toe-nail)	Connection 12		Connection 25		Connection 23		Connection 22					
	6" o.c.		6" o.c.		6" o.c.		4" o.c.		@ 6" o.c..		@ 4" o.c.	
	1	8d com (2 1/2 x .131)	1	8d box (2 1/2 x .113)	1	8d com (2 1/2 x .131)	1	8d box (2 1/2 x .113)	1	16d com (3 1/2 x .162)	1	3 1/4 x .120
	1	3 x .131			1	3 x .131	6" o.c.		1	12d com (3 1/4 x .148)	1	3 x .120
					1	10d box (3 x .128)	1	8d com (2 1/2 x .131)	1	10d com (3 x .148)	1	8d box (2 1/2 x .113)
							1	3 x .131	1	16d box (3 1/2 x .135)	1	2 3/8 x .113
							1	10d box (3 x .128)	1	3 1/4 x .131		
								1	3 x .131			
								1	8d com (2 1/2 x .131)			
Joist to Band Joist (face nail)	Connection 29				Connection 29		Connection 26					
	3	16d com (3 1/2 x .162)			3	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	4	3 1/4 x .131
	4	3 x .131			4	3 x .131	4	3 x .131	4	12d com (3 1/4 x .148)	4	3 x .131
					4	10d box (3 x .128)	4	10d box (3 x .128)	4	10d com (3 x .148)	6	3 1/4 x .120
									4	16d box (3 1/2 x .135)	6	3 x .120
Built up Girder or Beam	Connection 24		Connection 30		Connection 27		Connection 27					
	face nail at top and bottom staggered on opposite side:								face nail at top and bottom staggered on opposite side:			
	@ 32" o.c.		@ 32" o.c.		@ 32" o.c.		@ 32" o.c.		@ 32" o.c.		@ 24" o.c.	
	1	20d com (4 x .192)	1	10d box (3 x .128)	1	20d com (4 x .192)	1	20d com (4 x .192)	1	20d com (4 x .192)	1	16d com (3 x .162)
											1	12d com (3 1/4 x .148)
											1	10d com (3 x .148)
	1	3 x .131			1	3 x .131	1	3 x .131			1	16d box (3 1/2 x .135)
					1	10d box (3 x .128)	1	10d box (3 x .128)			1	3 1/4 x .131
											1	3 x .131
AND at each end or splice (face nail):								AND at each end or splice (face nail):				
2	20d com (4 x 0.192)	2	10d box (3 x .128)	2	20d com (4 x .192)	2	20d com (4 x .192)	2	20d com (4 x .192)	3	3 1/4 x .131	
3	3 x .131			3	3 x .131	3	3 x .131	3	16d com (3 1/2 x .162)	3	3 x .131	
				3	10d box (3 x .128)	3	10d box (3 x .128)	3	12d com (3 1/4 x .148)	3	3 1/4 x .120	
								3	10d com (3 x .148)	4	3 x .120	
								3	16d box (3 1/2 x .135)			

(Continued)

CONNECTION DESCRIPTION	MINIMUM FASTENING REQUIREMENTS PRESCRIBED IN THE CODE								ALTERNATIVE FASTENING REQUIREMENTS						
	2012 IBC		2012 IRC		2015 IBC		2015 IRC								
	Table 2304.9.1		Table R602.3(1)		Table 2304.10.1		Table R602.3(1)								
#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)	#	Nail Size (Type, inch)		
Ledger Strip (face nail)	Connection 30		Connection 31		Connection 28		Connection 28								
	3	16d com (3 1/2 x .162)	3	16d box (3 1/2 x .135)	3	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	3	16d com (3 1/2 x .162)	5	3 x .131			
	4	3 x .131			4	3 x .131	4	16d box (3 1/2 x .135)	4	12d com (3 1/4 x .148)	6	8d com (2 1/2 x .131)			
					4	10d box (3 x .128)	4	3 x .131	4	10d com (3 x .148)	6	3 1/4 x .120			
							4	10d box (3 x .128)	4	16d box (3 1/2 x .135)	6	3 x .120			
									5	3 1/4 x .131					
Bridging to Joist (toe nail)	Connection 2				Connection 30		Connection 29								
	2	8d com (2 1/2 x .131)			2	8d com (2 1/2 x .131)	2	10d box (3 x .128)	2	16d com (3 1/2 x .162)	3	3 1/4 x .120			
	2	3 x .131			2	3 x .131			2	12d com (3 1/4 x .148)	3	3 x .120			
					2	10d box (3 x .128)			2	10d com (3 x .148)	3	8d box (2 1/2 x .113)			
									2	16d box (3 1/2 x .135)	3	2 3/8 x .113			
									2	3 1/4 x .131	3	6d com (2 x .113)			
									2	3 x .131	4	2 1/4 x .099			
									2	8d com (2 1/2 x .131)					
						each end	each end	each end	each end						

For SI: 1 inch = 25.4 mm

¹Alternative fastening requirements shown in this table have been evaluated as alternatives to the 2015 IBC and IRC and the 2012 IBC and IRC. They can be used under earlier editions of the IBC and IRC where the prescriptive fastening requirements are no worse than those shown in the table above for the 2015 and 2012 codes.

TABLE 11—SUMMARY OF ALTERNATIVE FASTENING DESIGNS RECOGNIZED IN TABLE 10^{1,2,3}

CONNECTION	NAIL SIZE (DIAMETER X LENGTH) (inches)												
	3 ¹ / ₂ x 0.162	3 ¹ / ₄ x 0.148	3 x 0.148	3 ¹ / ₂ x 0.135	3 ¹ / ₄ x 0.131	3 x 0.131	2 ¹ / ₂ x 0.131	3 ¹ / ₄ x 0.120	3 x 0.120	2 ¹ / ₂ x 0.113	2 ³ / ₈ x 0.113	2 x 0.113	2 ¹ / ₄ x 0.099
Wall Framing													
Double studs (face nail) Typical	24" o.c.	16" o.c.	16" o.c.	16" o.c.	16" o.c.	16" o.c.	8" o.c.	8" o.c.	8" o.c.				
At braced walls	16" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.		8" o.c.	8" o.c.				
Abutting studs at corners and intersections Typical	12" o.c.	12" o.c.	12" o.c.	12" o.c.	8" o.c.	8" o.c.	8" o.c.	8" o.c.	8" o.c.				
At braced walls	12" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.		8" o.c.	8" o.c.				
Built up header 2" to 2" w/ 1/2" spacer	12" o.c.	8" o.c.	8" o.c.	12" o.c.	8" o.c.	8" o.c.		8" o.c.	8" o.c.				
Continuous header to stud (toe nail)	3	4	4	4	4	4	4	5	5	6	6		
Double top plates to each other (face nail)	16" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.	8" o.c.	8" o.c.	8" o.c.				
Top plate to top plate at end joint (lap splice) (each side of joint)	8	12	12	12	12	12							
For 2015 IRC Connection 13b	10	12	12										
Top plate overlap at corners and intersections (face nail)	2	3	3	3	3	3		4	4				
Sole plate to joist or blocking not at braced wall panels	16" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.	12" o.c.	8" o.c.	8" o.c.	8" o.c.				
Sole Plate to joist or blocking at braced wall panel	2 @ 16" o.c.	3 @ 16" o.c.	3 @ 16" o.c.	3 @ 16" o.c.	4 @ 16" o.c.	4 @ 16" o.c.	4 @ 16" o.c.	4 @ 16" o.c.	5 @ 16" o.c.				
Top or sole plate to stud (end nail)	3	3	3	3	4	4	4	4	4				
Stud to top or sole plate (toe-nail)	3	4	4	4	4	4	4	5	5	6	6	6	
Diagonal bracing to stud/plate	2	2	2	2	2	2	2	3	3	3	3		4
Ceiling and Roof Framing													
Blocking Between Joists or Rafter to Top Plate (toe-nail) (each end)	3	3	3	3	3	3	3	4	4	5			
Ceiling joist to plate	3	3	3	3	3	3	3	4	4	5	5	5	
Ceiling joists laps over partitions (no thrust)	3	4	4	4	4	4		5	5				
Ceiling joist to parallel rafter	See Table 10												
Collar tie to rafter	3	3	3	4	4	4	5	5	5	6			
Roof rafter to plate (toe-nail) (+ connectors per IBC)	3	3	3	3	4	4	4	4	4				
Roof rafter to 2-by ridge beam (end-nail rafter to beam)	3	4	4	4	4	4		5	5				
Roof rafter to 2-by ridge beam (toe-nail rafter to beam)	3	4	4	4	5	5	5	6	6	6	6	6	
Jack rafter to hip (toe-nail)	3	4	4	4	5	5	5						
Jack rafter to hip (end nail)	3	4	4	4									
Floor Framing													
Joist to sill or girder (toe-nail)	3	3	3	3	3	3	3	4	4	5	5	5	
Rim joist to top plate(Toe-nail)	6" o.c.	6" o.c.	6" o.c.	6" o.c.	6" o.c.	6" o.c.	6" o.c.	4" o.c.	4" o.c.	4" o.c.	4" o.c.	3" o.c.	3" o.c.
Joist to band Joist (face nail)	3	4	4	4	4	4		6	6				
Built-up girders & beams Face-nail @ top and bottom PLUS # at ends or splice	24" o.c.	24" o.c.	24" o.c.	24" o.c.	24" o.c.	24" o.c.		16" o.c.	16" o.c.				
Ledger Strip	3	3	3	3	3	3		3	4				
Bridging to Joist (toe-nail)	3	4	4	4	5	5	6	6	6				
	2	2	2	2	2	2	2	3	3	3	3	3	4

For SI: 1 inch = 25.4 mm

¹Alternative fastening requirements shown in this table have been evaluated as alternatives to the 2015 IBC and IRC and the 2012 IBC and IRC. They can be used under earlier editions of the IBC and IRC where the prescriptive fastening requirements are no worse than those shown in the Table 10 for the 2015 and 2012

²This fastening schedule applies to framing members having an actual thickness of 1 1/2" (nominal "2-by" lumber).

³Fastening schedule only applies to buildings of conventional wood frame construction where wind or seismic analysis is not required by the applicable code. In areas where wind or seismic analysis is required, required fastening must be determined by structural analysis.

APPENDIX A—REFERENCE DESIGN INFORMATION

A1.0 Reference Design Values for Nailed Connections:

A1.1 Source:

The equations shown here for nailed connections are found in the 2015, 2012 and 2005 ANSI/AWC National Design Specification (NDS) for Wood Construction.

A1.2 Reference Withdrawal Design Values:

For normal load duration (10 year), the reference withdrawal design value per inch of penetration of a smooth shank nail driven into the side grain (perpendicular to the fiber) of seasoned wood, or unseasoned wood which will remain wet, is calculated by the following formula:

$$W = 1380 G^{5/2} D$$

Where:

W = the reference withdrawal design value per lineal inch of penetration into the member holding the nail point.

D = the diameter of the nail shank in inches.

G = the assigned specific gravity of the wood found in Table A or the tables indicated below, as applicable:

Code	Sawn Lumber	Wood Structural Panels
2015 IBC	2015 NDS Table 12.3.3A	2015 NDS Table 12.3.3B
2012 IBC	2012 NDS Table 11.3.3A	2012 NDS Table 11.3.3B
2009 and 2006 IBC	2005 NDS Table 11.3.2A	2005 NDS Table 11.3.2B

Ring shank and screw shank nails have reference withdrawal design values 10% greater than smooth shank nails of the same diameter.

A1.3 Reference Lateral Design Values:

Reference lateral design values are based on the yielding of connections as wood fibers are crushed and/or fastener shanks are bent. Figure A shows yield modes anticipated for nailed connections. Reference lateral design values are determined from the lowest resulting value from six yield limit equations. These equations are shown below:

For Mode I_m

$$Z = \frac{Dl_m F_{em}}{R_d}$$

For Mode III_m

$$Z = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d}$$

For Mode I_s

$$Z = \frac{Dl_s F_{es}}{R_d}$$

For Mode III_s

$$Z = \frac{k_3 D l_s F_{es}}{(2 + R_e) R_d}$$

For Mode II

$$Z = \frac{k_1 D l_s F_{es}}{R_d}$$

For Mode IV

$$Z = \frac{D^2}{R_d} \sqrt{\frac{2F_{em} F_{yb}}{3(1 + R_e)}}$$

where:

- $K_1 = \frac{\sqrt{R_e + 2R_e^2(1 + R_i + R_i^2) + R_i^2 R_e^3} - R_e(1 + R_i)}{(1 + R_e)}$
- $K_2 = -1 + \sqrt{2(1 + R_e) + \frac{2F_{yb}(1 + 2R_e)D^2}{3F_{em}l_m^2}}$
- $K_3 = -1 + \sqrt{\frac{2(1 + R_e)}{R_e} + \frac{2F_{yb}(2 + R_e)D^2}{3F_{em}l_s^2}}$
- Z* = Reference lateral design value, lbf
- R_e* = *F_{em}* / *F_{es}*
- l_m* = Length of nail in main member (member holding point), inches
- l_s* = Length of nail in side member, inches
- F_{em}* = Dowel bearing strength of main member (member holding point), psi [See 2015 NDS Table 12.3.3 (2012 NDS Table 11.3.3, 2005 NDS Table 11.3.2)]
- F_{es}* = Dowel bearing strength of side member, psi [See 2015 NDS Table 12.3.3 (2012 NDS Table 11.3.3, 2005 NDS Table 11.3.2)]
- F_{yb}* = Bending yield strength of nail, psi (see Appendix B)
- D* = Nail diameter, inch (When annularly threaded nails are used with threads at the shear plane, *D* = root diameter of threaded portion of nail)
- R_d* = 2.2 for *D* ≤ 0.17"

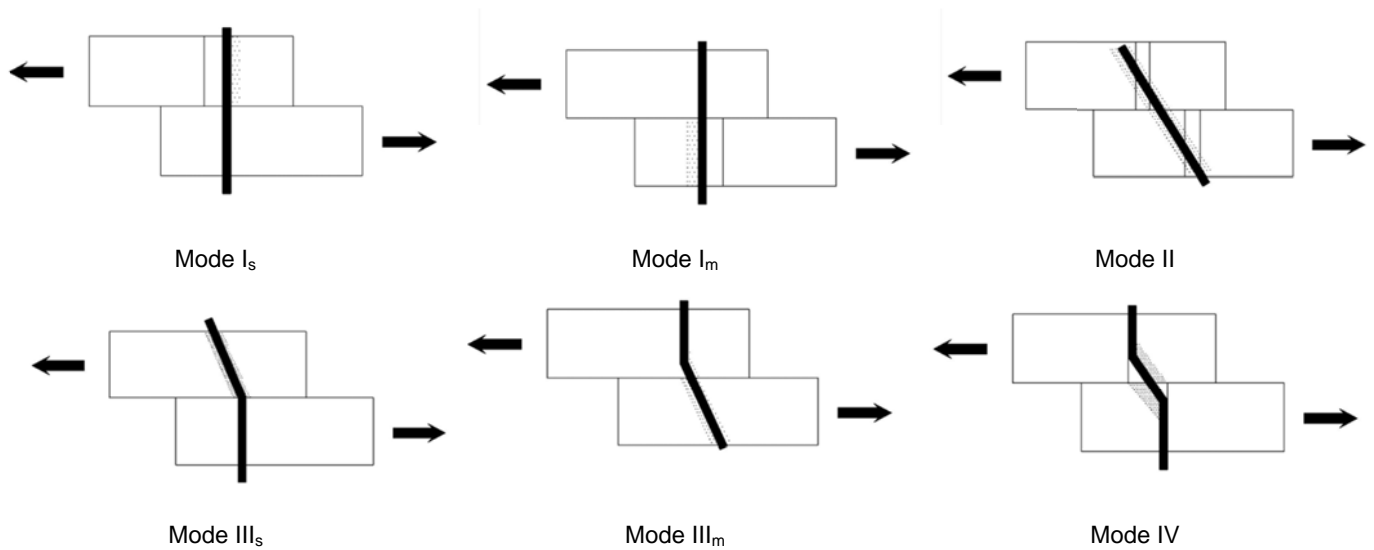


Figure A—Connection Yield Modes for Two-Member, Single Shear Connections

TABLE A—ASSIGNED SPECIFIC GRAVITY AND DOWEL BEARING STRENGTH FOR SELECT WOOD SPECIES

SPECIES	SPECIFIC GRAVITY ¹	DOWEL-BEARING STRENGTH F_e (psi)	
		Nailed Connections	Stapled Connections
Aspen	0.39	2,950	3,850
Balsam Fir	0.36	2,550	3,450
Beech-birch-hickory	0.71	8,850	9,750
Coast Sitka Spruce	0.39	2,950	3,850
Douglas Fir-larch	0.50	4,650	5,550
Douglas Fir-south	0.46	4,000	4,900
Eastern Hemlock	0.41	3,200	4,100
Eastern Hemlock-tamarack	0.41	3,200	4,100
Eastern Hemlock-tamarack (north)	0.47	4,150	5,050
Eastern softwoods	0.36	2,550	3,450
Eastern Spruce	0.41	3,200	4,100
Eastern White Pine	0.36	2,550	3,450
Hem-Fir	0.43	3,500	4,400
Mountain Hemlock	0.47	4,150	5,050
Northern Pine	0.42	3,350	4,250
Northern Species	0.35	2,400	3,300
Northern White Cedar	0.31	1,900	2,800
Ponderosa Pine	0.43	3,500	4,400
Red Oak	0.67	7,950	8,850
Red Pine	0.44	3,650	4,550
Sitka Spruce	0.43	3,500	4,400
Southern Pine	0.55	5,550	6,450
Spruce-Pine-Fir	0.42	3,350	4,250
Western Cedars	0.36	2,550	3,450
Western Cedars (North)	0.35	2,400	3,300
Western Hemlock	0.47	4,150	5,050
Western White Pine	0.40	3,100	4,000
White Oak	0.73	9,300	10,200
Yellow Poplar	0.43	3,500	4,400
WOOD STRUCTURAL PANELS			
Plywood: Structural 1, Marine	0.50	4,650	5,550
Plywood: Other Grades	0.42	3,350	4,250
Oriented Strand Board All Grades	0.50	4,650	5,550

For SI: 1 psi = 6.89 kN/m².

¹Specific gravity based on weight and volume when oven dry.

A2.0 Reference Design Values for Stapled Connections:**A2.1 Source:**

The equations shown here for nailed connections are found in the ICC-ES Acceptance Criteria for Staples (AC201) dated February 2013 (editorially revised February 2015).

A2.2 Reference Withdrawal Design Values:

Reference withdrawal design values (W) for staples installed in side grain of wood for use in must be calculated using the following equation:

$$W = 2760 G^{5/2} D$$

For **SI**: $W = 486.8 G^{5/2} D$

where:

- W = Staple reference withdrawal design value, in pounds per inch (N/mm) of penetration in the member holding both staple legs.
- G = the assigned specific gravity of the wood (see Section A1.2).
- D = Nominal wire diameter, in inches (mm), from Table 3.2.

A2.3 Reference Lateral Design Values:

Reference lateral design values for stapled connections must be determined using the minimum result from the equations shown below. These equations are relevant to wood-to-wood connections and to connections in which steel sheet metal is stapled to wood. The steel side member shall have sufficient thickness to prevent tearing of the steel sheet when loaded. Determination of dowel bearing strength of the sheet metal must consider Section I.2 of Appendix I of the NDS. Reference lateral design values are for normal load duration and must be multiplied by all applicable adjustment factors in accordance

Yield Mode I:

$$Z = 2F_{es}l_s d / K_D$$

Yield Mode II:

$$Z = \frac{2dF_{em}}{K_D} \left(\frac{l_m}{1 + \frac{F_{es}}{F_{em}}} \right) \left[\sqrt{\frac{F_{es}}{F_{em}} + 2 \left(\frac{F_{es}}{F_{em}} \right)^2 \left[1 + \frac{l_s}{l_m} + \left(\frac{l_s}{l_m} \right)^2 \right] + \left(\frac{F_{es}}{F_{em}} \right)^3 \left(\frac{l_s}{l_m} \right)^2} - \frac{F_{es}}{F_{em}} \left(1 + \frac{l_s}{l_m} \right) \right]$$

Yield Mode III:

$$Z = \frac{2}{K_D} \left[\frac{-l_s F_{es} d}{2 \frac{F_{es}}{F_{em}} + 1} + F_{es} d \sqrt{\frac{l_s^2}{\left(2 \frac{F_{es}}{F_{em}} + 1 \right)^2} + \frac{l_s^2}{2 \frac{F_{es}}{F_{em}} + 1} + \frac{4M}{F_{es} d \left(2 \frac{F_{es}}{F_{em}} + 1 \right)}} \right]$$

Yield Mode IV:

$$Z = \frac{4F_{em}d}{K_D} \sqrt{\frac{M}{F_{em}d \left(1 + \frac{F_{em}}{F_{es}} \right)}}$$

where:

- Z = Reference lateral design value for staple (2 legs), lbf.
- F_{em} = Dowel bearing strength of the main member, psi = 900 psi + F_e from Table 11.3.3 of the NDS for $D < 1/4$ "
- F_{es} = Dowel bearing strength of the side member, psi = 900 psi + F_e from Table 11.3.3 of the NDS for $D < 1/4$ "
- d = Nominal wire diameter, inch, from Table 1.
- M = Minimum staple bending moment, in-lbs, from Table 1.
- l_s = Length of staple in side member, inches.
- l_m = Length of staple in main member, inches, (minimum of 12D, where D is the nominal wire diameter from Table 3.2).
- K_D = Diameter coefficient for staple connections = 2.2

with the NDS.

A3.0 DESIGN INFORMATION FOR DEFLECTION CALCULATIONS FOR DIAPHRAGMS AND SHEAR WALLS

A3.1 NAILS:

To determine the deflection of diaphragms and shear walls constructed as described in Tables 5 through 9, refer to Sections 4.2.2 and 4.3.2 of the AWC Special Design Provisions for Wind and Seismic (SDPWS), respectively. For 0.120 inch nails, use the G_a values for the 6d common nails.

A3.2 STAPLES:

The staple deformation values shown in Table B must be used to determine diaphragm deflection in accordance with the IBC Section 2305.2 or shear wall deflection in accordance with the IBC Section 2305.3, as applicable.

TABLE B—STAPLE DEFORMATION VALUES, e_n , FOR USE IN HORIZONTAL DIAPHRAGM AND SHEAR WALL DEFLECTION ANALYSIS^{1,4}

Staple Gage	16		15		14	
	1 ¹ / ₂	2	1 ³ / ₄	2 ¹ / ₂	2	2 ¹ / ₂
Length (Inches)	1 ¹ / ₂	2	1 ³ / ₄	2 ¹ / ₂	2	2 ¹ / ₂
Load Per Fastener ² (Pounds)	Connection Deflection ³ (Inches)					
60	0.008	0.003	0.008	0.005	0.005	0.003
80	0.016	0.006	0.016	0.010	0.011	0.006
100	0.032	0.008	0.028	0.015	0.019	0.009
120	0.055	0.010	0.048	0.025	0.032	0.014
140	0.087	0.024	0.077	0.040	0.050	0.021
160	0.135	0.037	0.118	0.060	0.077	0.031
180	0.205	0.052	0.173	0.088	0.113	0.044
200	—	0.092	0.244	0.127	0.157	0.060
220	—	0.198	0.299	0.178	0.219	0.080
240	—	—	0.346	0.220	0.287	0.097

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

¹Increase deformation value by 20% for plywood grades other than Structural I sheathing.

²Load per fastener is the diaphragm's maximum shear per foot divided by the number of fasteners per foot at interior panel edges.

³Values must be doubled for unseasoned lumber.

⁴Values are for e_n in equations found in the IBC.

APPENDIX B
RECOGNIZED FASTENERS BY LISTEE

INDEX TO LISTEE PRODUCT DESCRIPTIONS:

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General Notes for Appendix B:

1. For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa.
2. Nails having the indicated diameter, shank type and finish type are recognized for any length. Staples having the indicated diameter and finish are recognized for any leg length greater than 1½ inches.
3. All nails are formed from carbon steel wire, unless designated in the tables below as stainless steel.
4. For a depiction of the various head styles, see Figure 1.

Terminology

LFRA = Lateral force resisting assembly: A diaphragm, shear wall or braced wall.

Head Area Ratio Requirements

- Y =6d = Meets the head requirements for use in LFRAs where an 6d common nail is prescribed in the code.
- Y =8d = Meets the head requirements for use in LFRAs where an 8d common nail is prescribed in the code.
- Y =10d = Meets the head requirements for use in LFRAs where an 10d common nail is prescribed in the code.
- Y =16d = Meets the head requirements for use in LFRAs where an 16d common nail is prescribed in the code.
- Y ### = Meets the head requirements for a 0.### diameter nail for use in shear walls and diaphragms in accordance with Tables 5 through 8 of this report.
- N = Not recognized for use in LFRAs.
- n/a = Nail size is not prescribed in the code or listed in the diaphragm tables in this report for use in LFRAs.

Shank Type

- S = Smooth shank nail
- R = Ring shank nail
- Sc = Screw shank nail

Finish/ Coating Types

- X = The fasteners are "bright" (nongalvanized), or galvanized to levels other than levels described by the HDG or EG designations below.
- HDG = Hot-dipped galvanized, complying with ASTM A153 Class D.
- EG = Electrogalvanized, complying with ASTM A641, Class 1.
- SS = Stainless Steel
- H = Hardened / Heat treated
- P# = Denotes a proprietary coating recognized in an ICC-ES evaluation report, as follows:
P1 = ThickCoat™ recognized in ESR-1482.

BLUELINX CORPORATION							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire	0.092	Full round	Y*	n/a	S, R, Sc	X, HDG, EG	100,000
	0.099		Y	n/a	S, R, Sc	X, HDG, EG	100,000
Wire, plastic	0.113		Y	Y =6d	S, R, Sc	X, HDG, EG	100,000
	0.120		Y	Y 120	S, R, Sc	X, HDG, EG	100,000
	0.131		Y	Y =8d	S, R, Sc	X, HDG, EG	100,000
Plastic	0.148		Y	N	S, R, Sc	X, HDG, EG	90,000
	0.162		Y	N	S, R, Sc	X, HDG, EG	90,000
Paper	0.113		Clipped	Y	Y =6d	S, R, Sc	X, HDG, EG
	0.120	Y		Y 120	S, R, Sc	X, HDG, EG	100,000
	0.131	Y		Y =8d	S, R, Sc	X, HDG, EG	100,000
Paper	0.113	Offset	Y	Y =6d	S, R, Sc	X, HDG, EG	100,000
	0.120		Y	Y 120	S, R, Sc	X, HDG, EG	100,000
	0.131		Y	Y =8d	S, R, Sc	X, HDG, EG	100,000

*Recognition is limited to use in connections subjected to tension only.

BOSTITCH FASTENING SYSTEMS							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic	0.092	Full Round	Y*	n/a	S, R	X, HDG, P1	100,000
			Y*	n/a	Sc	X	
	0.099		Y	n/a	S, R, Sc	X, HDG, P1	100,000
			0.113	Y	Y =6d	S, R	X, HDG, EG, P1
	Y			Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
			Y	Y =8d	Sc	X, HDG, P1	
	0.135		Y	n/a	S	X	100,000
	0.148		Y	Y =10d	S, Sc	X	90,000
0.162	Y	N	S	X, P1	90,000		
Paper	0.113	Clipped	Y	Y =6d	S, R	X, HDG, EG, P1	100,000
			Y	Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
Y		Y =8d	Sc	X, HDG, P1			
Wire, paper	0.113	Offset	Y	Y =6d	S, R	X, HDG, EG, P1	100,000
			Y	Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
Y		Y =8d	Sc	X, HDG, P1			
Wire	0.113	Notched	Y	Y =6d	S, R	X, HDG, EG, P1	100,000
			Y	Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
			Y	Y =8d	Sc	X, HDG, P1	
STAPLES							
	GAGE	NOMINAL CROWN WIDTH (inch)			FINISH/ COATING		
	16	$\frac{7}{16}$			X, EG		
	16	$\frac{1}{2}$			X, EG		
	16	1			X, EG		
	15	$\frac{1}{2}$			X		
*Recognition is limited to use in connections subjected to tension only.							

BUILDING MATERIAL DISTRIBUTORS, INC.							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic, paper	0.113	Full Round	Y	Y =6d	S	X, HDG, EG	100,000
					R	X, EG	
	0.120		Y	Y 120	S, Sc	X	100,000
					R	X, EG	
	0.131		Y	Y =8d	S	X	100,000
					R	X, EG	
0.135	Y	n/a	S	X	100,000		
0.148	Y	Y	S	X, HDG	90,000		
			R	X			
Plastic	0.162	Y	Y =16d	S	X, HDG	90,000	
Paper	0.113	Clipped	Y	Y =6d	S	X, HDG, EG	100,000
					R	X, EG	
	0.120		Y	Y 120	S, Sc	X	100,000
					R	X, EG	
	0.131		Y	Y	S	X, HDG, EG	100,000
					R	X, EG	

DEWALT INDUSTRIAL TOOL CO.							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRA _s	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic	0.092	Full Round	Y*	n/a	S, R	X, HDG	100,000
			Y*	n/a	Sc	X	
	0.099		Y	n/a	S, R, Sc	X, HDG	100,000
			Y	Y =6d	S, R	X, HDG, EG, P1	100,000
	0.113		Y	Y =6d	Sc	X, HDG	
			0.120	Y	Y 120	S, R	X, HDG, EG, P1
	Y			Y 120	Sc	X, HDG	
	0.131		Y	Y =8d	S	X, HDG, EG, P1	100,000
			Y	Y =8d	R	X, HDG, EG	
			Y	Y =8d	Sc	X, HDG	
			Y	n/a	S	X	
	0.135		Y	Y =10d	S, Sc	X	90,000
Y		N	S	X	90,000		
Paper	0.113	Clipped	Y	Y =6d	S, R	X, HDG, EG, P1	100,000
			Y	Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
			Y	Y =8d	Sc	X, HDG, P1	
Wire, paper	0.113	Offset	Y	Y =6d	S, R	X, HDG, EG, P1	100,000
			Y	Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
			Y	Y =8d	Sc	X, HDG, P1	
Wire	0.113	Notched	Y	Y =6d	S, R	X, HDG, EG, P1	100,000
			Y	Y =6d	Sc	X, HDG, P1	
	0.120		Y	Y 120	S, R	X, HDG, EG, P1	100,000
			Y	Y 120	Sc	X, HDG, P1	
	0.131		Y	Y =8d	S, R	X, HDG, EG, P1	100,000
			Y	Y =8d	Sc	X, HDG, P1	
STAPLES							
	GAGE	NOMINAL CROWN WIDTH (inch)			FINISH/ COATING		
	16	$\frac{7}{16}$			X, EG		
	16	$\frac{1}{2}$			X, EG		
	16	1			X, EG		
	15	$\frac{1}{2}$			X		
*Recognition is limited to use in connections subjected to tension only.							

FALCON FASTENERS REG'D							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire	0.092	Full round	Y*	n/a	S, R, Sc	X	100,000
	0.099		Y	n/a	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
Wire, plastic, paper	0.113		Y	Y =6d	Sc	X, HDG	100,000
					S	X, HDG, SS, H	
					R	X, HDG, SS	
	0.120		Y	Y 120	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
0.131	Y		Y =8d	S	X, HDG, SS, H	100,000	
				R	X, HDG, SS		
				Sc	X, HDG		
0.148	Y	Y =10d	S	X, HDG, SS, H	90,000		
			R	X, HDG, SS			
			S	X, HDG, H		90,000	
0.162	Y	Y =16d	S	X, HDG, SS, H	100,000		
			R	X, HDG, SS			
			Sc	X, HDG, SS			
Paper MCN	0.131	Y	Y =8d	S	X, HDG, SS, H	90,000	
				R	X, HDG, SS		
	0.148	Y	Y =10d	S	X, HDG, SS, H	90,000	
0.162	Y	N	R	X, HDG, SS			
Paper, wire	0.113	Notched	Y	Y =6d	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
	0.120		Y	Y 120	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
0.131	Y	Y =8d	S	X, HDG, SS, H	100,000		
			R	X, HDG, SS			
			Sc	X, HDG			
Paper	0.113	Clipped	Y	Y =6d	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
	0.120		Y	Y 120	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
0.131	Y	Y =8d	S	X, HDG, SS, H	100,000		
			R	X, HDG, SS			
			Sc	X, HDG			
0.148	Y	Y =10d	S	X, HDG, SS, H	90,000		
			R	X, HDG, SS			
			S	X, HDG, SS, H		100,000	
Paper, wire	0.120	Offset	Y	Y 120	R		X, HDG, SS
					Sc		X, HDG
					S	X, HDG, SS, H	100,000
0.131	Y		Y =8d	R	X, HDG, SS		
				Sc	X, HDG		
				S	X, HDG, SS, H		
Paper	0.148	Y	Y =10d	R	X, HDG, SS	90,000	
				S	X, HDG, SS, H		

*Recognition is limited to use in connections subjected to tension only.

FASCO AMERICA, INC.							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRASs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic, paper	0.092	Full round	Y*	n/a	S, R	X, HDG, EG, SS	100,000
					Sc	X, HDG, EG	
	0.099		Y	n/a	S, R	X, HDG, EG,SS	100,000
					Sc	X, HDG, EG	
	0.113		Y	Y =6d	S, Sc	X, HDG, EG	100,000
					R	X, HDG, EG,SS	
	0.120		Y	Y 120	S	X, HDG, EG	100,000
					R, Sc	X, HDG, EG,SS	
0.131	Y	Y =8d	S	X, HDG, EG	100,000		
			R, Sc	X			
0.135	Y	n/a	S, R, Sc	X	100,000		
0.148	Y	Y =10d	S, R	X, HDG, EG	90,000		
			Sc	X, HDG			
Wire, plastic	0.162	Y	N	S, Sc	X, HDG	90,000	
				R	X		
Wire, plastic, paper	0.092	Clipped	Y*	n/a	S, R	X, HDG, EG, SS	100,000
					Sc	X, HDG, EG	
	0.113		Y	Y =6d	S, Sc	X, HDG, EG	100,000
					R	X, HDG, EG,SS	
	0.120		Y	Y 120	S	X, HDG, EG	100,000
					R, Sc	X, HDG, EG,SS	
0.131	Y	N	S	X, HDG, EG	100,000		
			R, Sc	X			
0.135	Y	n/a	S, R, Sc	X	100,000		
Wire, plastic, paper	0.113	Offset	Y	Y =6d	S, Sc	X, HDG, EG	100,000
					R	X, HDG, EG,SS	
	0.120		Y	N	S	X, HDG, EG	100,000
					R, Sc	X, HDG, EG,SS	
STAPLES							
	GAGE	NOMINAL CROWN WIDTH (inch)			FINISH/ COATING		
	16	$\frac{7}{16}$			X		
	15	$\frac{7}{16}$			X		
	14	1			X		
*Recognition is limited to use in connections subjected to tension only.							

HITACHI KOKI U.S.A., LTD.							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic, paper	0.092	Full round	Y*	n/a	S, R, Sc	X, EG HDG, SS	100,000
					Sc	X, EG, HDG	
	0.099		Y	n/a	S, R, Sc	X, EG, HDG	100,000
	0.113		Y	Y =6d	S	X, EG, HDG, SS, H	100,000
					R	X, EG, HEG, SS	
					Sc	X, EG, HDG	
	0.120		Y	Y 120	S	X, EG, HDG, SS, H	100,000
					R	X, EG, HDG, SS	
					Sc	X, HDG	
	0.131		Y	Y =8d	S	X, EG, HDG, SS, H	100,000
					R	X, EG, HDG, SS	
					Sc	X, HDG	
0.148	Y	Y	S	X, EG, HDG, SS, H	90,000		
			R	X, EG, EG, SS			
			Sc	X, HDG			
0.162	Y	N	S	X, EG, HDG	90,000		
Paper	0.148	Full round (joist hanger)	Y	N	S	X, H	90,000
Paper	0.113	Clipped	Y	Y =6d	S, R, Sc	X, EG, HDG	100,000
	0.120		Y	Y 120	S, R, Sc	X, EG, HDG	100,000
	0.131		Y	Y =8d	S, R, Sc	X, EG, HDG	100,000
Wire, paper	0.113	Offset	Y	Y =6d	S, R, Sc	X, EG, HDG	100,000
	0.120		Y	Y 120	S, R, Sc	X, EG, HDG	100,000
	0.131		Y	Y =8d	S, R, Sc	X, EG, HDG	100,000

*Recognition is limited to use in connections subjected to tension only.

JAACO CORPORATION							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic	0.113	Full Round	Y	Y =6d	S	X	100,000
	0.120		Y	Y 120	S, R	X	100,000
Wire, plastic, paper	0.131		Y	Y =8d	S	X	100,000
Wire, plastic	0.135		Y	n/a	S	X	100,000
Paper	0.148		Y	N	S	X	90,000
	0.162		Y	N	S	X	90,000

PASLODE, AN ILLINOIS TOOL WORKS COMPANY							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE (Applicable Brand Name)	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Plastic, paper	0.113	Full Round	Y	Y =6d	S	X	100,000
	0.120		Y	Y 120	R, Sc	X, HDG	
	0.131		Y	Y =8d	S	X, HDG	100,000
	0.148		Y	Y =10d	Sc	HDG	
Paper	0.113	Offset (RoundDrive™)	Y	Y =6d	S, R	X, HDG	100,000
	0.120		Y	Y 120	S	X	100,000
	0.131		Y	Y =8d	R	HDG	
	0.135		Y	n/a	S	X, HDG	100,000
Paper	0.120	Clipped (Paslode)	Y	Y 120	S, R	X	100,000
	0.131		Y	N	S, R	X	100,000
Paper	0.113	Clipped (Duo-Fast)	Y	Y 6d	S	X	100,000
	0.120		Y	Y 120	R	X, HDG	
	0.131		Y	Y 8d	S	X	100,000
			Y	Y 8d	S	HDG	

PRIMESOURCE BUILDING PRODUCTS							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAs	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Wire, plastic	0.113	Full Round	Y	Y =6d	S, R, Sc	X	100,000
	0.120		Y	Y 120	S, R, Sc	X	100,000
	0.131		Y	Y =8d	S, R, Sc	X	100,000
	0.135		Y	n/a	S, R, Sc	X	100,000
	0.148		Y	Y =10d	S, R, Sc	X	90,000
	0.162		Y	Y =16d	S, R, Sc	X	90,000
Plastic	0.113	D head (clipped)	Y	Y =6d	S, R	X	100,000
	0.120		Y	Y 120	S, R	X	100,000
	0.131		Y	Y =8d	S, R	X	100,000
Wire, paper	0.113	D head (clipped)	Y	Y =6d	S, R	X	100,000
	0.120		Y	Y 120	S, R	X	100,000
	0.131		Y	Y =8d	S, R	X	100,000
Wire	0.113	Offset	Y	Y =6d	S	X	100,000
	0.120		Y	Y 120	S	X	100,000
	0.131		Y	Y =8d	S	X	100,000
Paper	0.113	Offset	Y	Y =6d	S	X	100,000
	0.120		Y	Y 120	S	X	100,000
	0.131		Y	Y =8d	S	X	100,000

SENCO BRANDS, INC.							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAS	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Plastic, wire	0.113	Full Round	Y	Y =6d	S, R	X, EG, HDG	100,000
	0.120		Y	Y 120	S, Sc R	X, EG, HDG X, HDG	100,000
Plastic, paper, wire	0.131		Y	Y =8d	S R	X, EG, HDG X, HDG	100,000
	0.135		Y	n/a	S	X	100,000
Plastic, paper	0.148		Y	Y =10d	S	X, HDG	90,000
Paper	0.162		Y	Y =16d	S	X, HDG, H	90,000
Paper	0.113		Clipped	Y	Y =6d	S, R	X, EG, HDG
	0.120	Y		Y 120	S R	X, EG, HDG X, HDG	100,000
	0.131	Y		Y =8d	S R	X, EG, HDG X, HDG	100,000
	0.135	Y		n/a	S	X	100,000
Paper	0.113	Offset	Y	Y =6d	S, R	X, HDG	100,000
	0.120		Y	Y 120	S R	X, HDG X, HDG	100,000
	0.131		Y	Y =8d	S R	X, HDG X, HDG	100,000

STAPLES			
	GAGE	NOMINAL CROWN WIDTH (inch)	FINISH/ COATING
	14	$\frac{7}{16}$	X
	15	$\frac{7}{16}$	X, EG
	16	$\frac{7}{16}, 1$	X, EG

SPECIALTY FASTENING SYSTEMS, INC.							
NAILS							
TYPE OF COLLATION	NOMINAL DIAMETER (inch)	HEAD STYLE	RECOGNIZED FOR USE IN FRAMING	MEETS HEAD AREA RATIO REQUIREMENTS FOR USE IN LFRAS	SHANK TYPE	FINISH/ COATING	SPECIFIED BENDING YIELD STRENGTH F_{yb} (psi)
Plastic	0.092	Full round	Y*	n/a	S, R, Sc	X	100,000
	0.099		Y	n/a	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
	0.113		Y	Y =6d	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
	0.120		Y	Y 120	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
	0.131		Y	Y =8d	S	X, HDG, SS, H	100,000
					R	X, HDG, SS	
					Sc	X, HDG	
	0.148		Y	Y =10d	S	X, HDG, SS, H	90,000
R		X, HDG, SS					
0.162	Y	Y =16d	S	X, HDG, H	90,000		

*Recognition is limited to use in connections subjected to tension only.