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ESR-2648

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
SECTION: 06 05 23.13—NAILS

REPORT HOLDER:

HY-TEK FASTENERS INC.

EVALUATION SUBJECT:

HY-TEK NAILS

ICC-ES ICC-ES PMG ICC-ES LISTED

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

REPORT HOLDER:

HY-TEK FASTENERS INC.

EVALUATION SUBJECT:

HY-TEK NAILS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012 and 2009 *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.

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see the ESR-2648 LABC and LARC Supplement.

Properties evaluated:

- Compliance with requirements of ASTM F1667
- Bending yield strength
- Lateral connection strength
- Withdrawal strength
- Use in diaphragms and shear walls
- Use as alternates to the nails prescribed in fastening schedules in the codes.

2.0 USES

Hy-Tek nails are used in engineered wood framing connections and engineered connections of wood structural panels to wood framing. They are also used for prescriptive wood framing connections.

Hy-Tek nails are used in engineered horizontal wood structural sheathing panel / sawn lumber floor diaphragm applications under the IBC as alternatives to the code prescribed nails addressed in Tables 4.2A, 4.2B and 4.2C of the ANSI/AWC Special Design Provisions for Wind and Seismic (AWC SDPWS). The Hy-Tek nails are also used in engineered shear wall applications under the IBC as alternatives to the code prescribed nails addressed in Table 4.3A of the AWC SDPWS.

Hy-Tek nails are used as substitutes for the nails prescribed in the IBC and IRC for use in attaching floor sheathing to framing.

3.0 DESCRIPTION

3.1 Nails:

Hy-Tek nails have full round heads and are available in lengths from $1^1/_2$ to 6 inches (38 to 152 mm). The top third of the nail length has a smooth shank and the bottom two-thirds have a helical screw shank. Refer to Table 1 for Hy-Tek nail designations and descriptions, including bending yield strength, head and shank diameters, and tip styles. See Figure 1 for a depiction of the nails.

The nails are manufactured from SAE J403 low-carbon steel wire, grade 1015-1030. The nails are available with a bright finish, a galvanized coating complying with ASTM A641 Class 1, or a hot-dip galvanized coating complying with ASTM A153, Class D. Hy-Tek nails are supplied in strips, coils or in bulk.

3.2 Connected Materials:

Wood framing members must be sawn lumber complying with the ANSI/AWC National Design Specification for Wood Construction (NDS) and must have an assigned specific gravity in accordance with Table 12.3.3A of the NDS (Table 11.3.3A of NDS-12 for the 2012 IBC, Table 11.3.2A of NDS-05 for the 2009 IBC) as shown in the tables in this report.

Wood structural panel sheathing must be Structural I, Sheathing or Single-Floor grade panels complying with DOC PS-1 or PS-2.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 Engineered Framing Connections: The Hy-Tek nails comply with the strength requirements of IBC Section 2303.6. Reference lateral and withdrawal design values for the Hy-Tek nails are given in Tables 2 and 3, respectively. 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 NDS to obtain adjusted design values for the nails. Reference head pull-through design values must be determined in accordance with Section 12.2.5 of the 2018 NDS.

4.1.2 Prescribed Framing Connections: The Hy-Tek nails listed in Table 4 comply with the bending yield

strength requirements of IBC Section 2303.6, and have been compared to the indicated code-prescribed nails on the basis of lateral connection strength and withdrawal resistance. The Hy-Tek nails listed in Table 4 may be used as direct substitutes for the code-prescribed nails indicated in Table 4, in framing connections prescribed in 2018 and 2015 IBC Table 2304.10.1 (2012 and 2009 IBC Table 2304.9.1) and IRC Table R602.3(1).

4.1.3 Engineered Sawn Lumber Floor Diaphragms: Diaphragms described in this report are recognized for use in all Seismic Design Categories. See Tables 6, 7 and 8 for nominal unit shear capacities for the diaphragms. Diaphragm deflection may be determined in accordance with Section 4.2.2 of the AWC SDPWS, using the G_a value given in Tables 6, 7 and 8, as applicable.

4.1.4 Engineered Shear Walls: Shear walls described in this report are recognized for use in all Seismic Design Categories. See Table 9 for nominal unit shear capacities for the shear walls. Shear wall deflection may be determined in accordance with Section 4.3.2 of the AWC SDPWS, using the G_a value given in Table 9. Shear wall aspect ratio (height-to-length ratio) must not exceed 2:1.

The shear walls must be designed using the coefficients and factors and structural system limitations assigned to System A.15 in Table 12.2-1 of ASCE 7-16 (System A.15 in Table 12.2-1 of ASCE 7-10 for the 2015 and 2012 IBC, System A.13 in Table 12.2-1 of ASCE 7-05 for the 2009 IBC).

4.1.5 Prescriptive Sheathing Attachment: Hy-Tek nails may be directly substituted for common nails prescribed in 2018 and 2015 IBC Table 2304.10.1 (2012 and 2009 IBC Table 2304.9.1) and IRC Table R602.3(1) for attachment of floor sheathing and wall sheathing to framing, as shown in Table 5.

4.2 Installation:

The nails must be installed in accordance with the Hy-Tek Fasteners published installation instructions and this evaluation report. Edge distances, end distances, and spacings must be sufficient to prevent splitting of the wood and must not be less than the minimum edge and end distances specified in the ICC-ES evaluation report for the applicable engineered lumber products. Nail installation must also comply with applicable requirements in Section 12.1.6 of the 2018 and 2015 NDS (Section 11.1.6 of the NDS-12 for the 2012 IBC, Section 11.1.5 of the NDS-05 for the 2009 IBC). The nails are driven either pneumatically or manually.

4.3 Special Inspection:

Special inspection of high-load diaphragms is required in accordance with IBC Section 1705.5.1. Periodic inspection of shear walls and diaphragms for wind resistance may be required in accordance with 2018 and 2015 IBC Section 1705.11.1 (2012 IBC Section 1705.10.1). Periodic inspection of shear walls and diaphragms for seismic resistance may be required in accordance with 2018 and 2015 IBC Section 1705.12.2 (2012 IBC Section 1705.11.2).

5.0 CONDITIONS OF USE

The Hy-Tek 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 Design of the connections and installation of Hy-Tek nails must comply with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.

5.2 Calculations demonstrating that the applied loads do not exceed the adjusted design values specified in this report must be submitted to the code official for approval. Calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 Use of the fasteners to construct shear walls which resist combined shear and uplift from wind in accordance with SDPWS Section 4.4 is outside the scope of this report.

5.4 Nails which have a bright finish or have a coating complying with ASTM A641 Class 1 must not be used in preservative-treated or fire-retardant treated wood.

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

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Nails (AC116), dated March 2018, including data in accordance with the ICC-ES Acceptance Criteria for Wood-frame Horizontal Diaphragms, Vertical Shear Walls and Braced Walls with Alternative Fasteners (AC120), dated February 2017 (editorially revised July 2018).

7.0 IDENTIFICATION

7.1 The nails are packaged in cartons bearing labels that provide the manufacturer name (Hy-Tek Fasteners); nail designation, nail description (type, length, and smooth-shank diameter); the minimum bending yield strength; and the evaluation report number (ESR-2648). Packages of galvanized nails must be labeled "ASTM A153, Class D".

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

HY-TEK FASTENERS INC.
415 MOUNTAIN VISTA PARKWAY
LIVERMORE, CALIFORNIA 94551
(925) 443-3065
www.hytekfasteners.com

TABLE 1—HY-TEK SCREW SHANK NAILS

NAIL DESIGNATION	SMOOTH SHANK DIAMETER (inch)	SCREW MAJOR SHANK DIAMETER (inch)	HEAD DIAMETER (inch)	TIP STYLE	SPECIFIED F_{yb} (psi)
0.120	0.120	0.130	0.280	Diamond tapered	100,000
0.120M	0.120	0.135	0.280	Blunt diamond	100,000
0.135	0.135	0.141	0.280	Diamond tapered	100,000
0.148	0.148	0.156	0.280	Diamond tapered	90,000

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

TABLE 2—REFERENCE LATERAL DESIGN VALUES (Z) FOR SINGLE FASTENER CONNECTIONS[1,2]

SIDE MEMBER THICKNESS (inches)	SIDE MEMBER MATERIAL	HY-TEK NAIL DESIGNATION	FOR WOOD MAIN MEMBER WITH A SPECIFIC GRAVITY OF 0.50 (lbf)	MINIMUM APPLICABLE NAIL LENGTH (inches)
$^{15}/_{32}$	OSB[3]	0.120	76	2
		0.120M	91	2
		0.135	103	2
$^{25}/_{32}$	Plywood[3]	0.120	82	2
		0.135	112	$2^1/_8$
		0.148	180	$2^1/_4$
$1^1/_2$	Wood member	0.120M	131	3
		0.148	180	3

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

[1]Tabulated lateral design values (Z) must be multiplied by all applicable adjustment factors in accordance with the NDS.
[2]Tabulated lateral design values are for nails inserted in side grain with axis perpendicular to wood fiber.
[3]Wood structural panel side members with specific gravity (G) = 0.50 or greater.

TABLE 3—REFERENCE WITHDRAWAL DESIGN VALUES (W) IN POUNDS PER INCH FOR SINGLE FASTENER CONNECTIONS[1,2]

HY-TEK NAIL DESIGNATION	FOR SPECIFIC GRAVITY OF 0.50 (lbf/in)
0.120	35
0.120M	44
0.135	50
0.148	45

For **SI:** 1 inch = 25.4 mm, 1 lbf/in = 175 N/m.

[1]Tabulated withdrawal values must be multiplied by all applicable adjustment factors in accordance with the NDS.
[2]Tabulated withdrawal values are for nails driven into the side grain of the main member, with the nail axis perpendicular to the wood fibers.

TABLE 4—SUBSTITUTION OF HY-TEK NAILS FOR NAILS PRESCRIBED FOR USE IN FRAMING CONNECTIONS IN IBC TABLE 2304.10.1 (2012 and 2009 IBC TABLE 2304.9.1) AND IRC TABLE R602.3(1)

CODE PRESCRIBED NAIL	HY-TEK NAILS WHICH MAY BE DIRECTLY SUBSTITUTED	APPLICABLE RANGE OF HY-TEK NAIL LENGTHS (inches)
8d box ($2^1/_2$" x 0.113")	0.120	$2^1/_2$ - 3
8d common ($2^1/_2$" x 0.131")	0.120	$2^1/_2$ - 3
3" x 0.131"	0.120	3 - $3^1/_4$
10d box (3" x 0.128")	0.120	3 - $3^1/_4$
10d common (3" x 0.148")	0.120M, 0.135	3 - $3^1/_4$

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

TABLE 5—SUBSTITUTION OF HY-TEK NAILS FOR NAILS PRESCRIBED FOR SHEATHING ATTACHMENT IN IBC TABLE 2304.10.1 (2012 AND 2009 IBC TABLE 2304.9.1) AND IRC TABLE R602.3(1)

CODE PRESCRIBED NAIL	SHEATHING THICKNESS (inch)	HY-TEK NAILS WHICH MAY BE DIRECTLY SUBSTITUTED	MINIMUM APPLICABLE NAIL LENGTH (inches)
8d common ($2^1/_2$" x 0.131")	$^3/_8$ to $^1/_2$	0.120	$2^1/_8$
10d common (3" x 0.148")	$^1/_2$	0.120M	$2^1/_4$
		0.135, 0.148	2
10d common (3" x 0.148")	$^3/_4$	0.120M	$2^1/_4$
		0.135, 0.148	$2^1/_4$

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

TABLE 6—NOMINAL UNIT SHEAR CAPACITIES (plf) FOR BLOCKED WOOD DIAPHRAGMS CONSTRUCTED WITH HY-TEK NAILS[1,2,3,4,5]

PANEL GRADE	HY-TEK NAIL DESIGNATION [Minimum Nail Length (inches)]	MINIMUM NOMINAL PANEL THICKNESS (inch)	NOMINAL WIDTH OF FRAMING MEMBERS AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	SEISMIC												WIND			
				Nail Spacing (inches) at Diaphragm Boundaries (all cases), at Continuous Panel Edges Parallel to Load (Cases 3 and 4), and at All Panel Edges (Cases 5 and 6)												Nail Spacing (inches) at Diaphragm Boundaries (all cases), at Continuous Panel Edges Parallel to Load (Cases 3 and 4), and at All Panel Edges (Cases 5 and 6)			
				6			4			$2^1/_2$			2			6	4	$2^1/_2$	2
				Nail Spacing (inches) at Other Panel Edges (Cases 1,2,3,4)												Nail Spacing (inches) at Other Panel Edges (Cases 1,2,3,4)			
				6			6			4			3			6	6	4	3
				v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_w (plf)	v_w (plf)	v_w (plf)	v_w (plf)
					OSB	PLY		OSB	PLY		OSB	PLY		OSB	PLY				
Structural 1	0.120 [$2^1/_8$]	$^3/_8$	2	540	14	11	720	9.0	7.5	1,060	13	10	1,200	21	15	755	1,010	1,485	1,680
			3	600	12	10	800	7.5	6.5	1,200	10	9.0	1,350	18	13	840	1,120	1,680	1,890
	0.120M [$2^1/_4$] 0.135 [2] 0.148 [2]	$^{15}/_{32}$	2	640	24	17	850	15	12	1,280	20	15	1,460	31	21	895	1,190	1,790	2,045
			3	720	20	15	960	12	9.5	1,440	16	13	1,640	26	18	1,010	1,345	2,015	2,295
Sheathing and Single-Floor	0.120 [$2^1/_8$]	$^3/_8$	2	480	15	11	640	9.5	7.5	960	13	9.5	1,090	21	13	670	895	1,345	1,525
			3	540	12	9.5	720	7.5	6.0	1,080	11	8.5	1,220	18	12	755	1,010	1,510	1,710
	0.120 [$2^1/_8$]	$^7/_{16}$	2	510	14	10	680	8.5	7.0	1,010	12	9.5	1,150	20	13	715	950	1,415	1,610
			3	570	11	9.0	760	7.0	6.0	1,140	10	8.0	1,290	17	12	800	1,065	1,595	1,805
	0.120 [$2^1/_8$]	$^{15}/_{32}$	2	540	13	9.5	720	7.5	6.5	1,060	11	8.5	1,200	19	13	755	1,010	1,485	1,680
			3	600	10	8.5	800	6.0	5.5	1,200	9.0	7.5	1,350	15	11	840	1,120	1,680	1,890
	0.120M [$2^1/_4$] 0.135 [2] 0.148 [2]	$^{15}/_{32}$	2	580	25	15	770	15	11	1,150	21	14	1,310	33	18	810	1,080	1,610	1,835
			3	650	21	14	860	12	9.5	1,300	17	12	1,470	28	16	910	1,205	1,820	2,060
	0.120M [$2^1/_4$] 0.135 [$2^1/_8$] 0.148 [$2^1/_8$]	$^{19}/_{32}$	2	640	21	14	850	13	9.5	1,280	18	12	1,460	28	17	895	1,190	1,790	2,045
			3	720	17	12	960	10	8.0	1,440	14	11	1,640	24	15	1,010	1,345	2,015	2,295

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 kip/in. = 0.175 N/mm.

[1]Diaphrgms must be constructed in general accordance with the requirements of Section 4.2 of the AWC SDPWS. Available strengths for use in ASD and LRFD must be determined in accordance with Section 4.2.3 of the AWC SDPWS.
[2]Values in the table apply to framing of Douglas-Fir-Larch or Southern Pine. For framing of other species, the allowable diaphragm shear capacity is found by (1) Determining the specific gravity for the applicable species of lumber in the NDS, (2) Finding the allowable diaphragm shear value from the table above, and (3) multiplying this 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.
[3]Framing at adjoining panel edges must be 3 inches nominal or wider, and nails must be staggered where both of the following conditions are met: (1) 0.120M, 0.135-inch or 0.148 screw shank nails having penetration into framing of more than $1^1/_2$ inches and (2) panel edge nail spacing is 3 inches o.c. or less.
[4]For shear loads of normal or permanent load duration as defined by the NDS, the seismic values in the table above must be multiplied by 0.63 or 0.56, respectively.
[5]See Figure 2 for case patterns.

TABLE 7—NOMINAL UNIT SHEAR CAPACITIES (plf) FOR BLOCKED, HIGH LOAD WOOD DIAPHRAGMS UTILIZING MULTIPLE ROWS OF FASTENERS (HIGH LOAD DIAPHRAGMS) WITH FRAMING OF DOUGLAS FIR–LARCH OR

SOUTHERN PINE FOR WIND OR SEISMIC LOADINGCONSTRUCTED WITH HY-TEK NAILS[1,2,3,4,5]PANEL GRADE	HY-TEK NAIL DESIGNATION [Minimum Nail Length (inches)]	MINIMUM NOMINAL PANEL THICKNESS (inch)	MIIMUM NOMINAL WIDTH OF NAILED FACE AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	NOMINAL WIDTH OF FRAMING MEMBERS AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	SEISMIC												WIND			
					Nail Spacing (inches) at Diaphragm Boundaries (all cases), at Continuous Panel Edges Parallel to Load (Cases 3 and 4), and at All Panel Edges (Cases 5 and 6)												Nail Spacing (inches) at Diaphragm Boundaries (all cases), at Continuous Panel Edges Parallel to Load (Cases 3 and 4), and at All Panel Edges (Cases 5 and 6)			
					4			4			$2^1/_2$			$2^1/_2$			4	4	$2^1/_2$	$2^1/_2$
					Nail Spacing (inches) at Other Panel Edges (Cases 1,2,3,4)												Nail Spacing (inches) at Other Panel Edges (Cases 1,2,3,4)			
					6			4			4			3			6	4	4	3
					v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_w (plf)	v_w (plf)	v_w (plf)	v_w (plf)
						OSB	PLY		OSB	PLY		OSB	PLY		OSB	PLY				
Structural 1	0.120M [$2^1/_4$] 0.135 [2] 0.148 [2]	$^{15}/_{32}$	3	2	1,210	40	24	1,630	53	28	1,750	50	27	2,300	56	29	1,695	2,280	2,450	3,220
			4	2	1,400	33	21	1,830	48	27	2,010	44	25	2,580	51	28	1,960	2,560	2,815	3,610
			4	3	1,750	50	27	2,440	61	30	2,570	59	30	2,790	70	32	2,450	3,415	3,600	3,905
	0.120M [$2^1/_4$] 0.135 [$2^1/_8$] 0.148 [$2^1/_8$]	$^{19}/_{32}$	3	2	1,340	36	23	1,760	52	29	1,930	47	27	2,510	54	29	1,875	2,465	2,700	3,515
			4	2	1,560	29	20	1,980	46	27	2,220	40	25	2,880	48	27	2,185	2,770	3,110	4,030
			4	3	1,930	47	27	2,640	60	31	2,810	57	30	3,580	64	32	2,700	3,695	3,935	5,010
	0.120M [$2^1/_4$] 0.135 [$2^1/_4$] 0.148 [$2^1/_4$]	$^{23}/_{32}$	3	2	1,460	33	22	1,910	50	29	2,100	45	27	2,730	53	30	2,045	2,675	2,940	3,820
			4	2	1,710	26	19	2,140	43	27	2,420	37	24	3,130	45	27	2,395	2,995	3,390	4,380
			4	3	2,100	45	27	2,860	59	32	3,050	56	31	3,600	68	34	2,940	4,005	4,270	5,040
Sheathing and Single Floor	0.120M [$2^1/_4$] 0.135 [2] 0.148 [2]	$^{15}/_{32}$	3	2	1,050	43	21	1,450	55	23	1,530	53	23	2,020	58	24	1,470	2,030	2,140	2,830
			4	2	1,210	36	19	1,630	50	22	1,750	46	21	2,210	55	23	1,695	2,280	2,450	3,095
			4	3	1,530	53	23	2,170	62	24	2,260	61	24	2,390	72	26	2,140	3,040	3,165	3,345
	0.120M [$2^1/_4$] 0.135 [$2^1/_8$] 0.148 [$2^1/_8$]	$^{19}/_{32}$	3	2	1,300	34	19	1,720	49	23	1,870	45	22	2,450	52	23	1,820	2,410	2,620	3,430
			4	2	1,510	27	16	1,930	43	21	2,160	37	20	2,740	46	22	2,115	2,700	3,025	3,835
			4	3	1,870	45	22	2,580	57	24	2,730	55	24	2,970	68	26	2,620	3,610	3,820	4,160
	0.120M [$2^1/_4$] 0.135 [$2^1/_4$] 0.148 [$2^1/_4$]	$^{23}/_{32}$	3	2	1,420	30	18	1,870	46	23	2,040	42	22	2,670	50	24	1,990	2,620	2,855	3,740
			4	2	1,650	24	16	2,100	40	21	2,350	34	20	2,890	45	23	2,310	2,940	3,290	4,045
			4	3	2,040	42	22	2,800	56	25	2,960	53	25	3,130	71	28	2,855	3,920	4,145	4,380

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 kip/in. = 0.175 N/mm.

[1]Diaphrgms must be constructed in general accordance with the requirements of Section 4.2 of the AWC SDPWS. Available strengths for use in ASD and LRFD must be determined in accordance with Section 4.2.3 of the AWC SDPWS.[2]Values in the table apply to framing of Douglas-Fir-Larch or Southern Pine. For framing of other species, the allowable diaphragm shear capacity is found by (1) Determining the specific gravity for the applicable species of lumber in the NDS, (2) Finding the allowable diaphragm shear value from the table above, and (3) multiplying this 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.

[3]For shear loads of normal or permanent load duration as defined by the NDS, the seismic values in the table above must be multiplied by 0.63 or 0.56, respectively.

[4]High load diaphragms are subject to special inspection in accordance with IBC Section 1705.5.1 (2009 IBC Section 1704.6.1).

[5]See Figure 3 for nailing requirements.

TABLE 8—NOMINAL UNIT SHEAR CAPACITIES (plf) FOR UNBLOCKED WOOD DIAPHRAGMS CONSTRUCTED WITH HY-TEK NAILS[1,2,3,4]

PANEL GRADE	HY-TEK NAIL DESIGNATION [Minimum Nail Length (inches)]	MINIMUM NOMINAL PANEL THICKNESS (inch)	NOMINAL WIDTH OF FRAMING MEMBERS AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	SEISMIC						WIND	
				6 inch Nail Spacing at Diaphragm Boundaries and Supported Panel Edges						6 inch Nail Spacing at Diaphragm Boundaries and Supported Panel Edges	
				Case 1			Cases 2,3,4,5,6			Case 1	Cases 2,3,4,5,6
				v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_w (plf)	v_w (plf)
					OSB	PLY		OSB	PLY		
Structural 1	0.120 [$2^1/_8$]	$^3/_8$	2	480	8.5	7.0	360	6.0	4.5	670	505
			3	530	7.5	6.0	400	5.0	4.0	740	560
	0.120M [$2^1/_4$] 0.135 [2] 0.148 [2]	$^{15}/_{32}$	2	570	14	10	430	9.5	7.0	800	600
			3	640	12	9.0	480	8.0	6.0	895	670
Sheathing and Single-Floor	0.120 [$2^1/_8$]	$^3/_8$	2	430	9.0	6.5	320	6.0	4.5	600	450
			3	480	7.5	5.5	360	5.0	3.5	670	505
	0.120 [$2^1/_8$]	$^7/_{16}$	2	460	8.5	6.0	340	5.5	4.0	645	475
			3	510	7.0	5.5	380	4.5	3.5	715	530
	0.120 [$2^1/_8$]	$^{15}/_{32}$	2	480	7.5	5.5	360	5.0	4.0	670	505
			3	530	6.5	5.0	400	4.0	3.5	740	560
	0.120M [$2^1/_4$] 0.135 [2] 0.148 [2]	$^{15}/_{32}$	2	510	15	9.0	380	10	6.0	715	530
			3	580	12	8.0	430	8.0	5.5	810	600
	0.120M [$2^1/_4$] 0.135 [$2^1/_8$] 0.148 [$2^1/_8$]	$^{19}/_{32}$	2	570	13	8.5	430	8.5	5.5	800	600
			3	640	10	7.5	480	7.0	5.0	895	670

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 kip/in. = 0.175 N/mm.

[1]Diaphragms must be constructed in general accordance with the requirements of Section 4.2 of the AWC SDPWS. Available strengths for use in ASD and LRFD must be determined in accordance with Section 4.2.3 of the AWC SDPWS.
[2]Values in the table apply to framing of Douglas-Fir-Larch or Southern Pine. For framing of other species, the allowable diaphragm shear capacity is found by (1) Determining the specific gravity for the applicable species of lumber in the NDS, (2) Finding the allowable diaphragm shear value from the table above, and (3) multiplying this 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.
[3]For shear loads of normal or permanent load duration as defined by the NDS, the seismic values in the table above must be multiplied by 0.63 or 0.56, respectively.
[4]See Figure 2 for case patterns.

TABLE 9—NOMINAL UNIT SHEAR CAPACITIES (plf) FOR WOOD STRUCTURAL PANEL SHEAR WALLS WITH WOOD FRAMING CONSTRUCTED WITH HY-TEK NAILS[1,2,5,6]

PANEL GRADE	HY-TEK NAIL DESIGNATION [Minimum Nail Length (inches)]	MINIMUM NOMINAL PANEL THICKNESS (inch)	SEISMIC												WIND			
			Panel Edge Fastener Spacing (inches)												Panel Edge Fastener Spacing (inches)			
			6			4			3			2			6	4	3	2
			v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_w (plf)	v_w (plf)	v_w (plf)	v_w (plf)
				OSB	PLY		OSB	PLY		OSB	PLY		OSB	PLY				
Structural 1	0.120 [$2^1/_8$]	$^3/_8{}^3$	460	19	14	720	24	17	920	30	20	1,220	43	24	645	1,010	1,290	1,710
		$^7/_{16}{}^3$	510	16	13	790	21	16	1,010	27	19	1,340	40	24	715	1,105	1,415	1,875
		$^{15}/_{32}$	560	14	11	860	18	14	1,100	24	17	1,460	37	23	785	1,205	1,540	2,045
	0.120M [$2^1/_4$]	$^{15}/_{32}$	680	22	16	1,020	29	20	1,330	36	22	1,740	51	28	950	1,430	1,860	2,435
Sheathing and Single-Floor	0.120 [$2^1/_8$]	$^3/_8{}^3$	440	17	12	640	25	15	820	31	17	1,060	45	20	615	895	1,150	1,485
		$^7/_{16}{}^3$	480	15	11	700	22	14	900	28	17	1,170	42	21	670	980	1,260	1,640
		$^{15}/_{32}$	520	13	10	760	19	13	980	25	15	1,280	39	20	730	1,065	1,370	1,790
	0.120M [$2^1/_4$]	$^{15}/_{32}$	620	22	14	920	30	17	1,200[4]	37	19	1,540	52	23	870	1,290	1,680	2,155

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 kip/in. = 0.175 N/mm.

[1]Shear walls must be constructed in general accordance with the requirements of Section 4.3 of the AWC SDPWS. Available strengths for use in ASD and LRFD must be determined in accordance with Section 4.3.3 of the AWC SDPWS.

[2]Values in the table apply to framing of Douglas-Fir-Larch or Southern Pine. For framing of other species, the allowable diaphragm shear capacity is found by (1) Determining the specific gravity for the applicable species of lumber in the NDS, (2) Finding the allowable diaphragm shear value from the table above, and (3) multiplying this 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.

[3]Allowable shear values are permitted to be increased to values shown for $^{15}/_{32}$-inch sheathing with same nailing provided (a) studs are spaced a maximum of 16 inches on center, or (b) panels are applied with long dimension across studs.

[4]Framing at adjoining panel edges must be 3 inches nominal or wider, and nails must be staggered where both of the following conditions are met: (1) 0.120M nails having penetration into framing of more than $1^1/_2$ inches and (2) panel edge nail spacing is 3 inches o.c. or less.

[5]For shear loads of normal or permanent load duration as defined by the NDS, the seismic values in the table above must be multiplied by 0.63 or 0.56, respectively.

[6]See Figure 3 for nailing requirements.

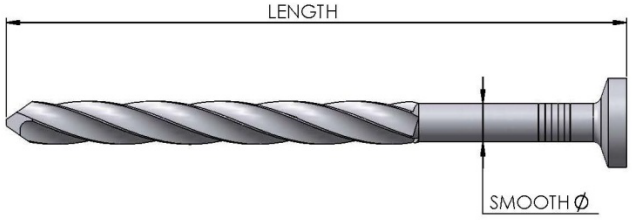

FIGURE 1—HY-TEK SCREW SHANK NAILS

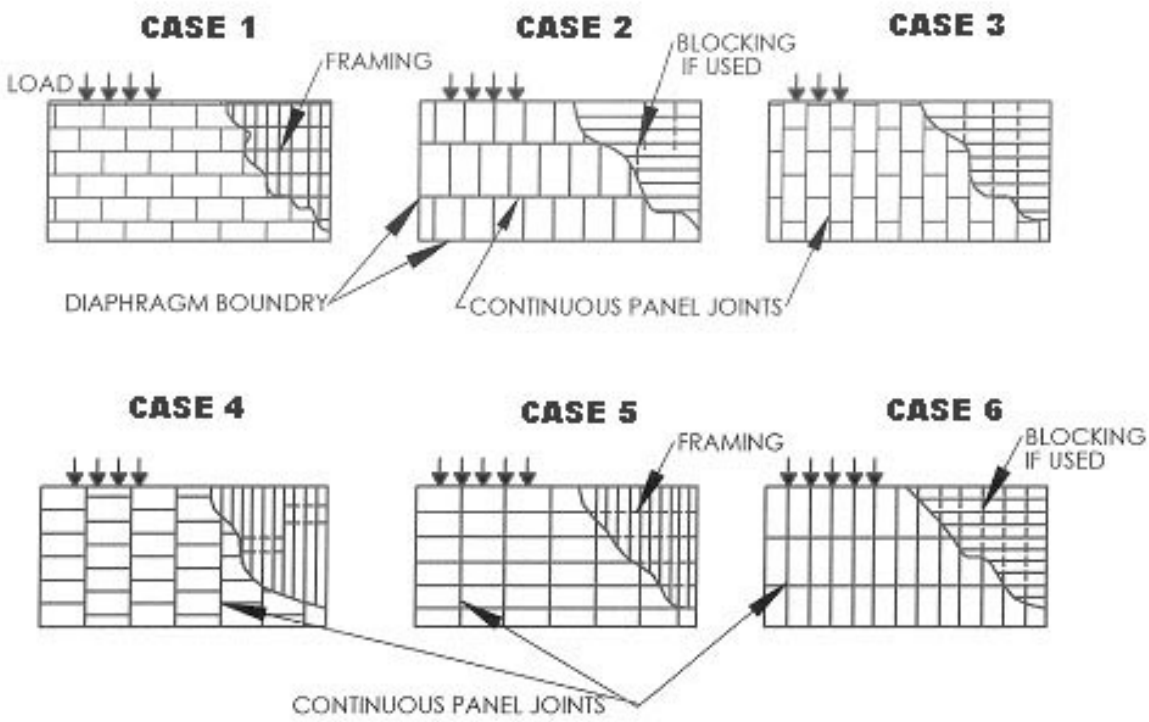

FIGURE 2—DIAPHRAGM CASES

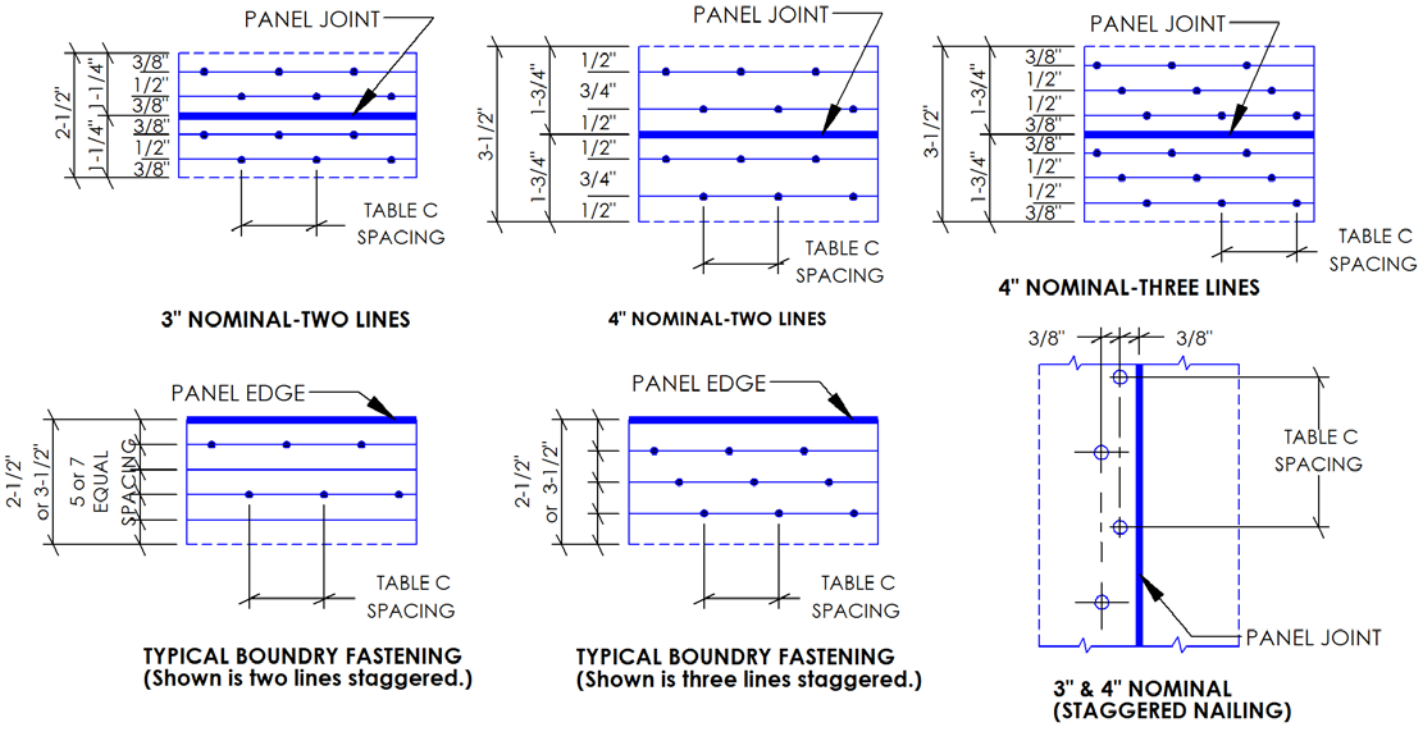

FIGURE 3—NAILING PATTERNS FOR HIGH-LOAD DIAPHRAGMS AND STAGGERED NAILING

ICC-ES Evaluation Report ESR-2648 LABC and LARC Supplement

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This report is subject to renewal June 2020.

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

REPORT HOLDER:

HY-TEK FASTENERS INC.

EVALUATION SUBJECT:

HY-TEK NAILS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Hy-Tek Nails described in ICC-ES master evaluation report ESR-2648 have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Hy-Tek Nails, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2648, comply with the LABC Chapter 23 and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Hy-Tek Nails described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-2648.
- The design, installation, conditions of use and identification of the nails and staples are in accordance with the 2015 *International Building Code®* (2015 IBC) provisions noted in the master evaluation report ESR-2648.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, and Sections 2304.10, 2305, 2306 and 2308, and LARC Sections R502, R503, R602, R802 and R803, as applicable.
- Nails made from bright steel wire must not be used in exterior or exposed conditions.
- The hillside building provisions in LABC Section 2301.1 are excluded from this supplement.

This supplement expires concurrently with the master report, reissued June 2018 and revised October 24, 2018.

ICC-ES Evaluation Report

ESR-2648 FBC Supplement

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1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Hy-Tek Nails recognized in ICC-ES master evaluation report ESR-2648 have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2017 *Florida Building Code—Building*
- 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Hy-Tek Nails, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2648, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2015 *International Building Code®* provisions noted in the master report under the following condition:

- Reference head pull-through values must be determined in accordance with Section 12.2.5 of the 2018 NDS.

Use of the Hy-Tek Nails in accordance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this evaluation report.

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, reissued June 2018 and revised October 24, 2018.