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ICC-ES Evaluation Report

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ESR-3071

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This report is subject to renewal 12/2020.

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

REPORT HOLDER:

PASLODE, AN ILLINOIS TOOL WORKS COMPANY

EVALUATION SUBJECT:

PASLODE tetraGRIP™ NAILS

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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2015, 2012 and 2009 *International Residential Code®* (IRC)

Properties evaluated:

- Compliance with requirements of ASTM F1667
- Bending yield strength
- Use in diaphragms
- Use in prescriptive fastening

2.0 USES

Paslode tetraGRIP™ nails are used in engineered horizontal wood structural sheathing panel / sawn lumber floor diaphragm applications under the IBC as alternatives to the code-prescribed 10d common nails addressed in Tables 4.2A, 4.2B and 4.2C of the AWC (AF&PA) Special Design Provisions for Wind and Seismic (SDPWS).

Paslode tetraGRIP™ nails are used as substitutes for 8d common nails in prescriptive designs for attachment of wood structural panel sheathing to framing in accordance with the IBC and IRC, as described in Section 4.1.2.

Paslode tetraGRIP™ nails are used as substitutes for the 10d common nails used in wood structural panel floor diaphragms supported on prefabricated wood I-joists recognized in ICC-ES evaluation reports.

Paslode tetraGRIP™ nails are used prescriptively for the specific connections described in Section 4.1.5.

3.0 DESCRIPTION

3.1 Paslode tetraGRIP™ Nails:

Paslode tetraGRIP™ nails are nominally 0.113 inch (2.9 mm) in diameter and $2^{3}/_{8}$ inches (64 mm) long. The nails have a proprietary, helically threaded shank geometry having barbed features on the helix. The head is a full round head 0.272 inch (6.9 mm) in diameter. See Figure 1 for an image of the fastener. The nails comply with the material requirements, physical properties, dimensional tolerances, workmanship, protective coating and finishes, and packaging requirements of ASTM F1667. The nails are manufactured from low-carbon steel wire, grade 1022. The nails are supplied in coils.

The Paslode tetraGRIP™ nails described in this report have a specified minimum bending yield strength, F_{yb}, of 120,000 psi (827 MPa).

3.2 Wood Structural Panels:

The wood structural panel subflooring used in the diaphragms must be Structural 1, Sheathing or Single-Floor grade panels complying with DOC PS-2.

3.3 Sawn Lumber Framing:

Sawn lumber framing must comply with the ANSI/AWC National Design Specification for Wood Construction (NDS).

3.4 I-joist Framing:

I-joist framing must be recognized in an ICC-ES evaluation report for use in diaphragms, with flange material complying with the following: LVL with minimum equivalent specific gravity of 0.50 and a minimum thickness of $1^{1}/_{8}$ inches (29 mm), or sawn lumber with an assigned specific gravity of 0.42 and a minimum thickness of $1^{1}/_{2}$ inches (38 mm); or must be Boise Cascade BCI joists, recognized in ESR-1336 for use in diaphragms.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Framing members and wood structural panel floor sheathing must be selected based on the spacing of the framing and the anticipated loads in accordance with the applicable code. Diaphragms described in this report are recognized for use in all Seismic Design Categories.

4.1.2 Prescriptive Attachment of Floor Sheathing: tetraGRIP™ nails may be directly substituted for the 8d common and 8d deformed nails prescribed in Items 32 and 33, respectively, of 2015 IBC Table 2304.10.1 (Item 31 of 2012 and 2009 IBC Table 2304.9.1) and Items 31, 37 and 38 of 2015 IRC Table R602.3(1) [Items 33, 39 and 40 of 2012 IRC Table R602.3(1); Items 41, 37 and 39 of 2009 IRC Table R602.3(1)] for attaching wood structural panel sheathing to sawn lumber framing. The wood structural panel thickness must be a minimum of $^{23}/_{32}$ inch (18.3 mm) and a maximum of $^{7}/_{8}$ inch (22.2 mm).

4.1.3 Engineered Sawn Lumber Floor Diaphragms: tetraGRIP™ nails may be used to attach wood structural panel sheathing to sawn lumber framing to create floor diaphragms. Allowable shear strengths for diaphragms consisting of wood structural sheathing panels attached to Douglas fir-larch or Southern pine lumber framing are shown in Tables 1 and 2, based on the values in SDPWS for 10d common nails and the thickest wood structural panels which are addressed. Allowable shear values for use with other wood species must be adjusted by factors noted in the corresponding footnote to each table.

Diaphragm deflection must be determined in accordance with Section 4.2.2 of SDPWS, using the applicable G_a value given in Tables 1 and 2, as applicable.

4.1.4 Engineered I-joist Floor Diaphragms: tetraGRIP™ nails may be used to attach sheathing to I-joist framing to create floor diaphragms, provided the I-joists meet the requirements of Section 3.4. Allowable shear values for these diaphragms are shown in Table 1 for nail spacing of 6 inches at diaphragm boundaries and panel edges, subject to the limitations shown in the ICC-ES evaluation report on the I-joists.

Diaphragm deflection must be determined in accordance with Section 4.2.2 of SDPWS, using the applicable G_a value given in Table 1.

4.1.5 Miscellaneous Prescriptive Connections:

4.1.5.1 Attachment of Bottom Plate to Joist, Rim Joist Band Joist or Blocking: Following the report holder's recommendations, the tetraGRIP™ nails may be used to fasten bottom plates (sole plates) to the subfloor, in addition to using the nails prescribed in 2015 IBC Table 2304.10.1 [2012 and 2009 IBC Table 2304.9.1] and 2015 and 2009 IRC Table R602.3(1), as applicable (or nails recognized in an ICC-ES report as alternates to the code prescribed nails) for attachment of the bottom plates to joists, rim joists, band joists or blocking.

4.1.5.2 Stair Treads: As there are no specific code requirements for attachment of stair treads to risers, tetraGRIP™ nails may be used to fasten stair treads to risers.

4.2 Installation:

The nails must be installed in accordance with this evaluation report. Nail installation must also comply with applicable requirements in Section 12.1.5 of the 2015 NDS (Section 11.1.5 of the 2012 and 2005 NDS for the 2012 and 2009 IBC, respectively). The nails are driven either pneumatically or manually. The nails must be installed with minimum panel edge and end distances of $^{3}/_{8}$ inch (9.5 mm). Unless noted otherwise in an applicable I-joist evaluation report, use of glue between the sheathing panels and the floor framing is not required.

4.3 Special Inspection:

Special inspection of high-load diaphragms is required in accordance with IBC Section 1705.5.1. Periodic inspections of diaphragms used for wind resistance may be required in accordance with 2015 IBC Section 1705.11.1 (2012 IBC Section 1705.10.1, 2009 IBC Section 1706.2). Periodic inspection of diaphragms used for seismic resistance may be required in accordance with 2015 IBC Section 1705.12.2 (2012 IBC Section 1705.11.2, 2009 IBC Section 1707.3).

5.0 CONDITIONS OF USE

The Paslode tetraGRIP™ 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 Fasteners are installed in accordance with this report and the manufacturer's installation instructions. In the event of a conflict between this report and the manufacturer's installation instructions, this report governs.

5.2 For engineered diaphragms, calculations showing that the applied loads are less than the allowable loads described in Section 4.1.3 and 4.1.4, as applicable, must be submitted to the code official. The calculations must be signed and sealed by a registered design professional when required by the statutes in the jurisdiction in which the project is to be constructed.

5.3 Use of tetraGRIP™ nails in diaphragms with I-joist framing, where the I-joist framing has not been recognized by ICC-ES for use in diaphragms, is outside the scope of this report.

5.4 tetraGRIP™ nails are produced at the Paslode manufacturing facility in Pocahontas, Arkansas, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Nails (AC116), dated March 2018.

6.2 Report of small scale screening test, full scale diaphragm tests, and analyses, in general accordance with the ICC-ES Acceptance Criteria for Prefabricated Wood I-joists (AC14), dated October 2017 (editorially revised May 2018).

7.0 IDENTIFICATION

7.1 The nails are packaged in cartons bearing labels that provide the manufacturer name (Paslode); the product name (tetraGRIP™); nail description (length and nominal diameter); the minimum bending yield strength (120,000 psi); and the evaluation report number (ESR-3071).

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

PASLODE, AN ILLINOIS TOOL WORKS COMPANY
155 HARLEM AVENUE
GLENVIEW, ILLINOIS 60025
(800) 222-6990
www.paslode.com

TABLE 1—ALLOWABLE UNIT SHEAR STRENGTH, v_a, AND APPARENT DIAPHRAGM SHEAR STIFFNESS, G_a, FOR WIND OR SEISMIC LOADING (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL HORIZONTAL DIAPHRAGMS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE[1,2,3]

SHEATHING THICKNESS (inch) AND TYPE	NAIL	MINIMUM NOMINAL WIDTH OF FRAMING MEMBERS (inches)	BLOCKED DIAPHRAGMS								UNBLOCKED DIAPHRAGMS			
			Nail 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 inches maximum at supported edges			
			6[4]		4		$2^1/_2$		2		Case 1 (No unblocked edges or continuous joints parallel to load)		All other configurations (Cases 2, 3, 4, 5 and 6)	
			Nail spacing at other panel edges (Cases 1, 2, 3 and 4)											
			6[4]		6		4		3					
			v_a	G_a OSB	v_a	G_a OSB	v_a	G_a OSB	v_a	G_a OSB	v_a	G_a OSB	v_a	G_a OSB
$^{23}/_{32}$" and $^3/_4$" Sheathing and Single Floor OSB	tetraGRIP™	2	320	15.8	425	26.3	640	44.2	730	59.0	285	17.9	215	13.5
		3	360	13.9	480	23.2	720	39.2	820	52.7	320	15.8	240	11.8

See Notes below Table 2.

TABLE 2—ALLOWABLE UNIT SHEAR STRENGTH, v_a, AND APPARENT DIAPHRAGM SHEAR STIFFNESS , G_a, FOR WIND OR SEISMIC LOADING (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL HORIZONTAL DIAPHRAGMS WITH FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE AND MULTIPLE ROWS OF FASTENERS (HIGH LOAD DIAPHRAGMS)[1,2,3,5]

SHEATHING THICKNESS (inch) AND TYPE	NAIL	MINIMUM NOMINAL WIDTH OF NAILED FACE AT ADJOINING PANEL EDGES AND BOUNDARIES (inches)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBERS (inches)	BLOCKED DIAPHRAGMS							
				Nail 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)							
				4		4		$2^1/_2$		$2^1/_2$	
				Nail spacing at other panel edges (Cases 1, 2, 3 and 4)							
				6		4		4		3	
				v_a	G_a OSB	v_a	G_a OSB	v_a	G_a OSB	v_a	G_a OSB
$^{23}/_{32}$" and $^3/_4$" Structural I OSB	tetraGRIP™	3	2	730	23.9	955	35.8	1,050	58.3	1,365	50.3
		4	2	855	20.4	1,070	32.5	1,210	54.0	1,565	46.0
		4	3	1,050	16.4	1,430	25.0	1,525	46.8	1,800	41.7
$^{23}/_{32}$" and $^3/_4$" Sheathing and Single Floor OSB	tetraGRIP™	3	2	710	24.4	935	36.0	1,020	58.0	1,335	50.1
		4	2	825	21.0	1,050	32.7	1,175	53.9	1,445	47.7
		4	3	1,020	16.9	1,400	25.3	1,480	47.0	1,565	45.3

Notes for Tables 1 and 2:

For **SI**: 1 inch = 25.4 mm, 1 pound per foot = 14.6 N/m.

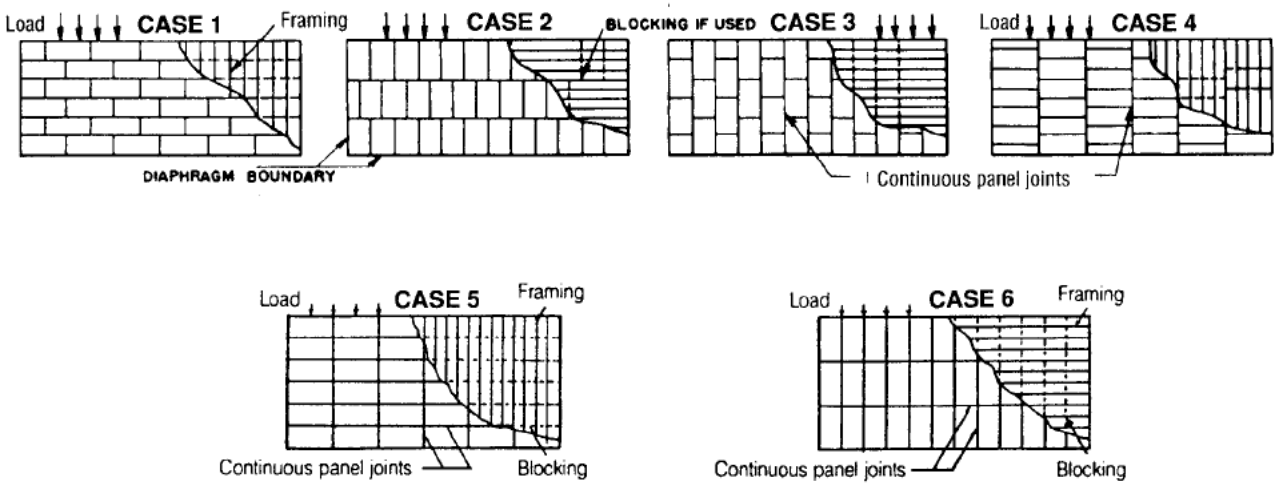
[1]Diaphragms must be constructed in general accordance with the requirements of Section 4.2 of ANSI/AF&PA SDPWS-08.

[2]Tabulated values are for short-time loading due to wind or seismic. For use with the IBC, the tabulated values must be reduced by 37 percent and 44 percent for normal and permanent load duration, respectively, and may be increased by 40 percent for wind design.

[3]The tabulated values are for fasteners installed in Douglas Fir-larch or Southern Pine. For other species, the allowable unit shear values must be reduced by multiplying value by the following adjustment factor: Specific Gravity Adjustment Factor = [1- (0.5 – G)], where *G* = Specific Gravity of the framing lumber from Table 11.3.3A of the NDS-12 (Table 11.3.2A of the NDS-05). This adjustment factor must not be greater than 1.

[4]Values are applicable to I-joist diaphragm, as described in Section 4.1.4.

[5]Cases are described below:



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

FIGURE 1—tetraGRIP™ NAIL

ICC-ES Evaluation Report

ESR-3071 FBC Supplement

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EVALUATION SUBJECT:

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1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Paslode tetraGRIP™ nails, recognized in ICC-ES master evaluation report ESR-3071, 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 Paslode tetraGRIP™ nails, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3071, comply with the *Florida Building Code—Building* and *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2015 *International Building Code®* provisions noted in the master report and the following condition:

Use of the Paslode tetraGRIP™ nails for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this supplemental 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 December 2018.