

# ICC-ES Evaluation Report

ESR-3164

Reissued September 2024

Revised January 2025



Subject to renewal September 2025

This report also contains:

- [FL Supplement w/ HVHZ](#)

ICC-ES Evaluation Reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, LLC, express or implied, as to any finding or other matter in this report, or as to any product covered by the report.

Copyright © 2025 ICC Evaluation Service, LLC. All rights reserved.

<p><b>DIVISION: 06 00 00 - WOOD, PLASTICS, AND COMPOSITES</b></p> <p><b>Section: 06 05 23— Wood, Plastic, and Composite Fastenings</b></p>	<p><b>REPORT HOLDER:</b> DEWALT</p> <p><b>ADDITIONAL LISTEE:</b> THE HILLMAN GROUP</p> 	<p><b>EVALUATION SUBJECT:</b> WOODWORM™ SCREWS (DEWALT)</p>	
--	--	---	---

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2024, 2021, 2018, and 2015 [International Building Code® \(IBC\)](#)
- 2024, 2021, 2018, and 2015 [International Residential Code \(IRC\)](#)

**Property evaluated:**

- Structural

## 2.0 USES

Woodworm screws are used for wood-to-wood connections that are designed in accordance with the IBC. For structures regulated under the IRC, the screws may be used when an engineered design is submitted in accordance with IRC Section R301.1.3.

## 3.0 DESCRIPTION

### 3.1 Notation and Symbols

- $a$  = Connection geometry parameter (See [Table 6](#) and [Figures 2](#) and [3](#).)
- $C_M$  = Wet-service factor
- $D$  = Outside thread diameter
- $D_r$  = Minor thread (root) diameter
- $D_s$  = Unthreaded shank diameter
- $F_{yb,test}$  = Bending yield strength, determined from testing in accordance with ASTM F1575 using  $D_r$ .
- $L$  = Fastener length, measured from bottom of screw head to tip. See [Figures 1A](#) through [1D](#).
- $L_{emb,l}$  = Minimum required embedded thread length in holding member, including tip, applicable to tabulated lateral design values

$L_{thread}$	=	Length of thread including tip
$N_a$	=	Allowable tension strength of the fastener for use in ASD
$SG_{NDS}$	=	Assigned specific gravity (See Section 3.3.2.)
$t_{s,w}$	=	Thickness of wood side member
$V_a$	=	Allowable shear strength of the fastener for use in ASD
$W_t$	=	Total reference withdrawal design value for fasteners installed perpendicular to face of the wood
$W_H$	=	Reference head pull-through design value
$Z$	=	Reference lateral design value

### 3.2 General:

Woodworm screws are self-drilling, self-tapping screws comprised of a one-piece anchor body. The fastener body and thread designs differ from ANSI B18.2 and B18.6 standards, and the fasteners are not required to be installed with lead (pilot) or predrilled holes. The four models of Woodworm screws addressed in this evaluation report are the Woodworm Ledger Screw, the Woodworm Truss Screw, the Woodworm Waferhead Screw (labeled as the Woodworm Lumber Screw), and the Woodworm Timber Screw. These four screw models are described in Sections 3.1.1 through 3.1.4, respectively. Corresponding product names for the report holder and the additional listee are presented in [Table 1](#) of this report. See [Table 2](#) for typical dimensions for the screws.

**3.2.1 Woodworm Ledger Screw:** The Woodworm Ledger Screw is available in lengths of  $3\frac{5}{8}$  inches and 5 inches (92 mm and 127 mm). It has a Type 17 gimlet point,  $\frac{5}{16}$ -inch (7.9 mm) hex head and integrated washer as shown in [Figure 1A](#) of this report.

**3.2.2 Woodworm Truss Screw:** The Woodworm Truss Screw is available in lengths of  $3\frac{5}{8}$  inches, 5 inches, and  $6\frac{3}{4}$  inches (92 mm, 127 mm, and 171 mm). It has a gimlet point,  $\frac{3}{8}$ -inch (9.5 mm) hex head and integrated washer as shown in [Figure 1B](#) of this report.

**3.2.3 Woodworm Waferhead (Lumber) Screw:** The Woodworm Waferhead (Lumber) Screw is available in various lengths ranging from  $2\frac{7}{8}$  inches to 12 inches (73 mm to 305 mm). It has a Type 17 gimlet point and a proprietary -0.615 inch-diameter (15.6 mm) wafer head with a Torx® T-30 driving recess as shown in [Figure 1C](#) of this report.

**3.2.4 Woodworm Timber Screw:** The Woodworm Timber Screw is available in various lengths ranging from  $2\frac{1}{2}$  inches to 12 inches (64 mm to 305 mm). It has a Type 17 gimlet point,  $\frac{5}{16}$ -inch (7.9 mm) hex head and integrated washer as shown in [Figure 1D](#) of this report.

### 3.3 Materials:

**3.3.1 Woodworm Screws:** The fastener body and heads are manufactured from low-carbon steel wire conforming to ASTM A510, Grade 1022 or 10B21, and are case hardened to a Rockwell C hardness of 40 to 45 after forming. They are coated with a proprietary Perma-Seal® coating available in various colors.

**3.3.2 Wood Members:** For purposes of connection design, wood side and main members must have a moisture content less than or equal to 19 percent at the time of screw installation and in service. Wood members must be either solid-sawn lumber or boards having an assigned specific gravity,  $SG_{NDS}$ , as specified in Table 12.3.3A of the ANSI/AWC National Design Specification (NDS) for Wood Construction or wood structural panels having an assigned specific gravity,  $SG_{NDS}$ , as specified in Table 12.3.3B of the NDS within the ranges given in [Tables 3, 4](#) and [5](#) of this report. The thickness of the wood main member,  $t_m$ , must be sufficient to ensure that the tip of the screw is fully embedded in the wood. For the purposes of resisting lateral loads, the side member must have a minimum thickness,  $t_{s,w}$ , as specified in [Table 3](#). For the purposes of resisting pull-through loads, the side member must have a minimum thickness,  $t_{s,w}$ , of 1.5 inches (38 mm).

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

Reference lateral ( $Z$ ), withdrawal ( $W_t$ ), and head pull-through ( $W_H$ ) design values for connections with Woodworm screws in wood members are given, respectively, in [Tables 3, 4](#) and [5](#). Reference design values must be multiplied by all applicable adjustment factors. Adjustment factors must be as specified for dowel-type fasteners and wood screws in the NDS. Allowable tensile and shear loads for the Woodworm screws, based on fastener strength, along with bending yield strengths determined from testing, are given in [Table 2](#).

Connections containing multiple Woodworm screws must be designed in accordance with Sections 11.1.2, 11.2.2 and 12.6 of the NDS. Where Woodworm screws are subjected to combined lateral and withdrawal loads, connections must be designed in accordance with Section 12.4.1 of the NDS.

#### 4.2 Installation:

Woodworm screws must be installed in accordance with the report holder's published installation instructions and this report. Screws must be installed such that their main axis is oriented perpendicular to the wood grain. An appropriate screw length must be used, such that the screw will penetrate into the main member as specified in [Table 3](#). The side member must be in direct contact with the main member, such that no gap exists between the wood members. End distances, edge distances and spacing of the screws must be sufficient to prevent splitting of the wood, or as required by [Table 6](#), whichever is greater. The screw is driven into the wood members without predrilled holes or lead (pilot) holes. The screw must be driven with a low RPM, high-torque electric drill, using the manufacturer-recommended driver bit. Upon installation, the underside of the screw head must be flush with the surface of the side member. The screws must not be overdriven.

### 5.0 CONDITIONS OF USE:

The Woodworm screws 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 screws must be installed in accordance with the manufacturer's published installation instructions and this report. In case of a conflict between this report and the manufacturer's installation instructions, this report governs.
- 5.2 Calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details 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 Woodworm screws must be installed and used in dry in-service conditions where the moisture content of the wood members does not exceed 19 percent.
- 5.4 See ESR-3213 for use of Woodworm screws in locations exposed to saltwater or saltwater spray.
- 5.5 See [ESR-3213](#) for installations in which Woodworm screws are used in contact with treated wood.
- 5.6 Woodworm screws 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 Dowel-type Threaded Fasteners Used in Wood \(AC233\)](#), dated June 2023 (editorially revised June 2024).

### 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3164) along with the name, registered trademark, or registered logo of the report holder or listee must be included in the product label.
- 7.2 In addition, woodworm screws are identified in the field by dimensional characteristics and packaging. A manufacturer identification letter, "P", along with a length designation is stamped on each screw head, as shown in [Figures 1A](#) through [1D](#). Head markings corresponding to each fastener are indicated in [Table 2](#). Packages are identified with the company name and product name (see [Table 1](#)); part number; head type; and screw size and length.
- 7.3 The report holder's contact information is the following:  
**DEWALT**  
**701 EAST JOPPA ROAD**  
**TOWSON, MARYLAND 21286**  
**800-524-3244**  
[www.DEWALT.com](http://www.DEWALT.com)  
[anchors@DEWALT.com](mailto:anchors@DEWALT.com)
- 7.4 The additional listee's contact information is the following:  
**THE HILLMAN GROUP**  
**10590 HAMILTON AVENUE**  
**CINCINNATI, OHIO 45231**  
[info@hillmangroup.com](mailto:info@hillmangroup.com)

TABLE 1—PRODUCT NAMES BY COMPANY

COMPANY NAME	PRODUCT NAMES			
DEWALT	Woodworm Ledger Screw	Woodworm Truss Screw	Woodworm Waferhead (Lumber) Screw	Woodworm Timber Screw
The Hillman Group	Ledger Tite	Truss Tite	Lumber Tite	Timber Tite

TABLE 2—FASTENER SPECIFICATIONS AND STRENGTHS— WOODWORM SCREWS

FASTENER DESIGNATION	HEAD MARKING	L <sup>1</sup> (inches)	L <sub>thread</sub> <sup>2</sup> (inches)	THREADS PER INCH	D <sub>r</sub> (inch)	D <sub>s</sub> (inch)	D (inch)	F <sub>yb,test</sub> (psi)	ALLOWABLE STEEL STRENGTHS	
									N <sub>a</sub> (lbf)	V <sub>a</sub> (lbf)
Woodworm™ Ledger Screw	P3.6	3 <sup>5</sup> / <sub>8</sub>	2	7.5	0.202	0.229	0.305	190,000	2,175	1,300
	P5.0	5	3							
Woodworm™ Truss Screw	P3.3	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	9.0	0.215	0.228	0.284	190,000	2,270	1,215
	P5.0	5	1 <sup>1</sup> / <sub>2</sub>							
	P6.7	6 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>							
Woodworm™ Waferhead (Lumber) Screw	P2.9	2 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	7.5	0.172	0.188	0.260	170,000	1,080	705
	P4.5	4 <sup>1</sup> / <sub>2</sub>	2							
	P6.0	6	2							
	P7.0	7	2							
	P8.0	8	2							
	P9.0	9	2							
	P10.0	10	2							
	P12.0	12	2							
Woodworm™ Timber Screw	P2.5	2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	7.5	0.172	0.188	0.260	170,000	1,080	705
	P4.0	4	2							
	P6.0	6	2							
	P8.0	8	2							
	P10.0	10	2							
	P12.0	12	2							

For SI: 1 inch = 25.4 mm; 1 lbf = 4.45 N; 1 psi = 6.9 kPa.

<sup>1</sup>For purposes of measuring overall fastener length, fasteners are measured from underside of head to tip of point.

<sup>2</sup>Length of thread includes tip. See detailed illustrations in [Figures 1A](#) through [1D](#).

TABLE 3—REFERENCE LATERAL DESIGN VALUES (Z) FOR SINGLE SHEAR (TWO-MEMBER) WOOD-TO-WOOD CONNECTIONS BASED ON TESTING<sup>1,2,3</sup>

FASTENER DESIGNATION	HEAD MARKING (Length)	t <sub>s,w</sub> <sup>4</sup> (inches)	L <sub>emb,l</sub> <sup>5</sup> (inches)	REFERENCE LATERAL DESIGN VALUES, (Z) (lbf), BASED ON SG <sub>NDS</sub>															
				0.67	0.55	0.5	0.46	0.43	0.42	0.36	0.31								
Ledger Screw	P3.6	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	323	246	206	177	155	148	113	84								
	P5.0	1 <sup>1</sup> / <sub>8</sub>																	
Truss Screw	P3.6	1 <sup>3</sup> / <sub>8</sub>	2	376	285	241	208	182	174	132	99								
	P5.0, P6.7	3										391	320	278	247	224	217	179	147
Waferhead (Lumber) Screw	P2.9	7/ <sub>8</sub>	2	248	191	170	154	141	137	117	99								
	P4.5 – P12.0	2 <sup>1</sup> / <sub>2</sub>										283	236	216	201	188	184	160	128
Timber Screw	P2.5	1/2	2	206	169	154	142	133	130	99	74								
	P4.0	2										283	236	216	201	188	184	160	122
	P6.0 – P12.0	2 <sup>1</sup> / <sub>2</sub>																	

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

<sup>1</sup>Tabulated reference lateral design values, Z, apply to single shear (two-member) connections with wood main and side members having specific gravity as shown, in which the screw is oriented perpendicular to the grain and loaded laterally at any angle with respect to the grain. For connections in which the main and side members have different specific gravities, use the lower of the two for design. Gaps are not permitted between the main and side members.

<sup>2</sup>Values must be multiplied by all applicable adjustment factors, as applicable to dowel-type fasteners, in accordance with the NDS.

<sup>3</sup>Woodworm screws must be installed and used in dry in-service conditions, such that the wet service factor, C<sub>m</sub>, is 1.0 in accordance with the NDS.

<sup>4</sup>Side members with thicknesses greater than the tabulated minimum side member thickness may be used, provided the corresponding tabulated minimum main member penetration is still achieved for the given screw length.

<sup>5</sup>L<sub>emb,l</sub> is the minimum length of the screw (including threaded, unthreaded and tip length) that must be embedded within the main member.

**TABLE 4—REFERENCE WITHDRAWAL DESIGN VALUES ( $W_i$ )<sup>1,2,3,4</sup>  
(Minimum Penetration into Main Member = 1.0 inch)**

FASTENER DESIGNATION	HEAD MARKING <sup>5</sup>	$W_i$ (lbf)	
		$SG_{NDS} \geq 0.56$	$0.56 > SG_{NDS} \geq 0.42$
Ledger Screw	All	214	141
Truss Screw	All	193	149
Waferhead (Lumber) Screw	All	180	125
Timber Screw	All	180	125

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

<sup>1</sup>Tabulated reference withdrawal design values,  $W_i$ , apply to screws driven into the side grain of the main member, such that the screws are oriented perpendicular to the grain and loaded in direct withdrawal.

<sup>2</sup>Values must be multiplied by all applicable adjustment factors, as applicable to wood screws, in accordance with the NDS, but must not be multiplied by thread penetration length (see footnote 4).

<sup>3</sup>Woodworm screws must be installed and used in dry in-service conditions, such that the wet service factor,  $C_M$ , is 1.0 in accordance with the NDS.

<sup>4</sup>Reference withdrawal design values are absolute values, based on a minimum 1.0-inch thread penetration into the main member (including the tapered tip), and are not permitted to be multiplied by the length of thread penetration into the main member.

<sup>5</sup>Refer to [Table 2](#) for head markings.

**TABLE 5—REFERENCE HEAD PULL-THROUGH DESIGN VALUES ( $W_H$ )<sup>1,2,3</sup>**

FASTENER DESIGNATION	HEAD MARKING <sup>4</sup>	$t_{s,w}$ (inches)	$W_H$ (lbf) FOR
			$SG_{NDS} \geq 0.50$
Ledger Screw	All	1 <sup>1</sup> / <sub>2</sub>	430
Truss Screw	All	1 <sup>1</sup> / <sub>2</sub>	280
Waferhead (Lumber) Screw	All	1 <sup>1</sup> / <sub>2</sub>	430
Timber Screw	All	1 <sup>1</sup> / <sub>2</sub>	280

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

<sup>1</sup>Tabulated head pull-through design values,  $W_H$ , must be multiplied by all applicable adjustment factors, as applicable to wood screw withdrawal, in accordance with the NDS.

<sup>2</sup>Design values apply to connections with minimum side member thicknesses,  $t_{s,w}$ , as given above.

<sup>3</sup>Woodworm screws must be installed and used in dry in-service conditions, such that the wet service factor,  $C_M$ , is 1.0 in accordance with the NDS.

<sup>4</sup>Refer to [Table 2](#) for head markings.

**TABLE 6—CONNECTION GEOMETRY REQUIREMENTS FOR FASTENERS INSTALLED PERPENDICULAR TO THE FACE OF WOOD MEMBERS<sup>1,2,3</sup>**

CONDITION <sup>4</sup>		MINIMUM DISTANCE OR SPACING	
		Self-drilled	Predrilled Hole <sup>4</sup>
End distance (see <a href="#">Figure 2</a> )	Loading toward end, $a_{end,1}$	20D	12D
	Loading perpendicular to grain or away from end, $a_{end,2}$	15D	7D
	Axial loading, $a_{end,2}$	10D	7D
Edge distance (see <a href="#">Figure 2</a> )	Loading toward edge, $a_{edge,1}$	12D	7D
	Loading parallel to grain or away from edge, $a_{edge,2}$	7D	3D
	Axial Loading, $a_{edge,2}$	4D	3D
Spacing between fasteners, parallel to grain (see <a href="#">Figure 3</a> )	Loading parallel to grain, $a_1$	15D	10D
	Loading perpendicular to grain, $a_1$	10D	5D
	Axial loading, $a_1$	7D	7D
Spacing between fasteners, perpendicular to grain (see <a href="#">Figure 3</a> )	Loading parallel to grain, $a_2$	7D	4D
	Loading perpendicular to grain, $a_2$	7D	4D
	Axial loading, $a_2$	4D	3D

For SI: 1 inch = 25.4 mm.

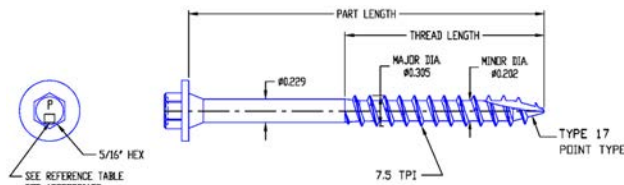
<sup>1</sup>End distances, edge distances and screw spacing must be sufficient to prevent splitting of the wood, or as required by this table, whichever is the more restrictive.

<sup>2</sup>Wood member stresses must be checked in accordance with Section 11.1.2 and Appendix E of the NDS, and end distances, edge distances and fastener spacing may need to be increased accordingly.

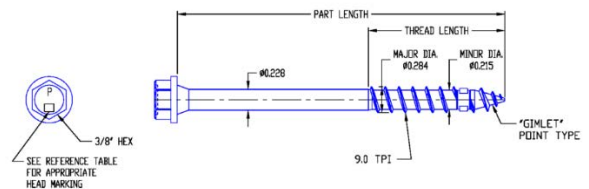
<sup>3</sup>Tabulated values are applicable to wood-to-wood connections.

<sup>4</sup>Tabulated geometry is applicable to fasteners installed in predrilled holes that meet the following requirements:

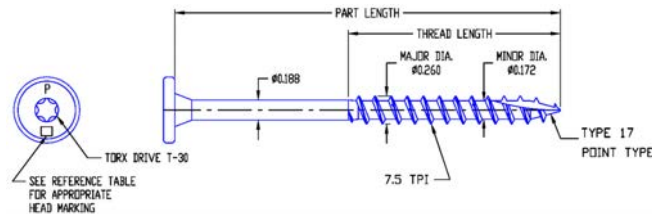
- For installation in Douglas Fir and other species of similar or greater density, the hole must have a diameter between  $0.60D_s$  and  $0.75D_s$ .
- For installation in SPF and other species of similar density, the hole must have a diameter of between  $0.40D_s$  and  $0.70D_s$ .
- The hole diameter must not exceed  $0.9D_s$ .



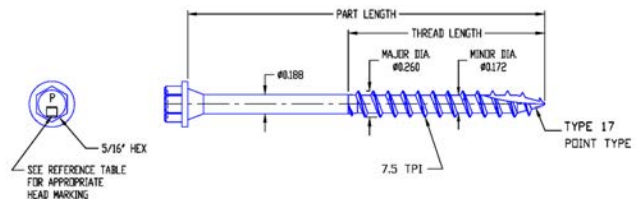
**FIGURE 1A—FASTENER SPECIFICATIONS FOR WOODWORM LEDGER SCREW**



**FIGURE 1B—FASTENER SPECIFICATIONS FOR WOODWORM TRUSS SCREW**



**FIGURE 1C—FASTENER SPECIFICATIONS FOR WOODWORM WAFERHEAD (LUMBER) SCREW**



**FIGURE 1D—FASTENER SPECIFICATIONS FOR WOODWORM TIMBER SCREW**

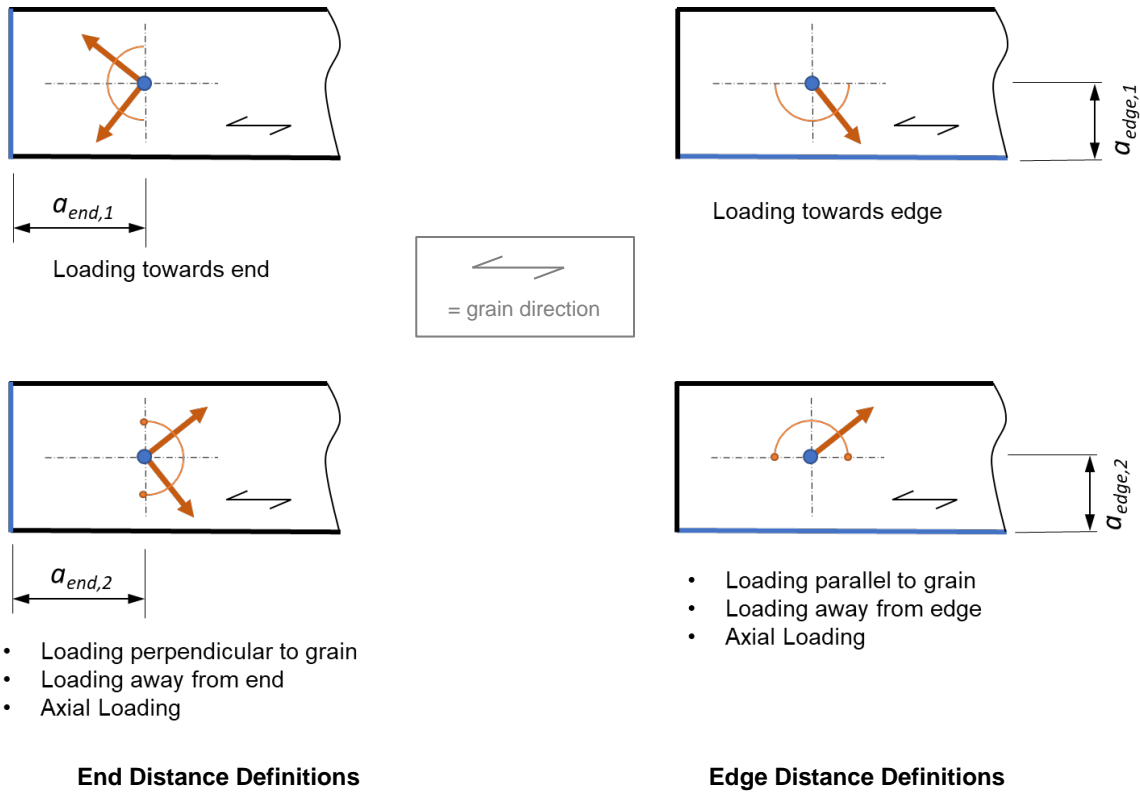


FIGURE 2—END AND EDGE DISTANCE DEFINITIONS FOR SCREWS INSTALLED PERPENDICULAR TO GRAIN

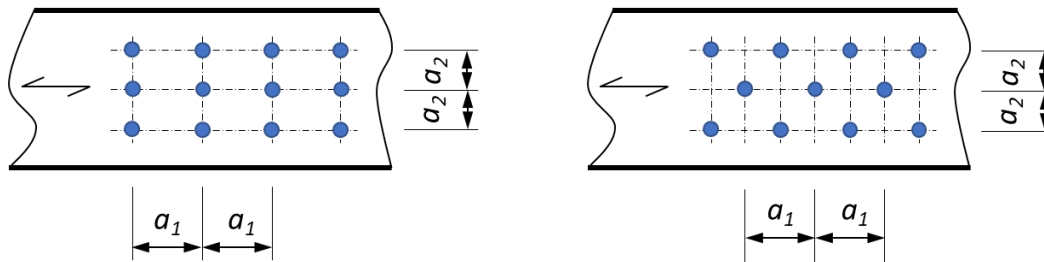


FIGURE 3—SPACING DEFINITIONS FOR SCREWS INSTALLED PERPENDICULAR TO GRAIN

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 05 23—Wood, Plastic and Composite Fastenings**

**REPORT HOLDER:**

DEWALT

**EVALUATION SUBJECT:**

WOODWORM™ SCREWS (DEWALT)

**1.0 REPORT PURPOSE AND SCOPE**

**Purpose:**

The purpose of this evaluation report supplement is to indicate that the Woodworm™ screws, described in ICC-ES evaluation report ESR-3164, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2023 Florida Building Code—Building
- 2023 Florida Building Code—Residential

**2.0 CONCLUSIONS**

The Woodworm™ screws, described in Sections 2.0 through 7.0 of the evaluation report ESR-3164, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-3164 for the 2021 *International Building Code*® meet the requirements of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable.

Use of the Woodworm™ screws have also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, with the following condition:

- a. For anchorage of wood members, the connections subject to uplift must be designed for no less than 700 pounds (3114 N).

For products falling under Florida Rule 61G20-3, 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 evaluation report, reissued September 2024 and revised January 2025.