



# ICC-ES Evaluation Report

## ESR-3201

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

**REPORT HOLDER:**

**GRK FASTENERS, A DIVISION OF ILLINOIS TOOL WORKS, INC.**

**EVALUATION SUBJECT:**

**R4™ MULTI-PURPOSE SCREW, FIN/TRIM™ SCREW, KAMELEON™ SCREW, RT COMPOSITE™ SCREW AND CLIMATEK™ COATING**

**1.0 EVALUATION SCOPE**

**Compliance with the following codes:**

- 2024, 2021, 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2024, 2021, 2018, 2015 and 2012 *International Residential Code*® (IRC)

**Properties evaluated:**

- Structural
- Corrosion resistance

**2.0 USES**

The R4™ Multi-Purpose Screw, Fin/Trim™ Screw, Kameleon™ Screw and RT Composite™ Screw are used in wood-to-wood connections that are designed in accordance with the IBC. For structures regulated under the IRC, the screws may be used where an engineered design is submitted in accordance with IRC Section R301.1.3. Climatek™ coated screws are intended for use in the Exposure Conditions shown in Table 6. PHEinox™ screws may be used where stainless steel fasteners are prescribed in the code.

**3.0 DESCRIPTION**

**3.1 Notation and Symbols:**

- $a$  = Connection geometry parameter (See Table 5 and Figures 2 and 3.)
- $C_M$  = Wet-service factor
- $D$  = Outside thread diameter

- $D_H$  = Diameter of fastener head or integral washer
- $D_{nom}$  = Fastener size designation used by the applicant
- $D_r$  = Minor thread (root) diameter
- $D_s$  = Unthreaded shank diameter
- $F_{yb,spec}$  = Minimum specified bending yield strength, determined in accordance with ASTM F1575 using  $D_r$ .
- $L$  = Fastener length measured from bottom of screw head to tip. See Figure 1.
- $L_{emb,l}$  = Minimum required embedded thread length in holding member, including tip, applicable to tabulated lateral design values
- $L_{emb,w}$  = Minimum required embedded thread length in holding member, including tip, applicable to tabulated withdrawal 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 3.4.)
- $t_{s,w}$  = Thickness of wood side member
- $V_a$  = Allowable shear strength of the fastener for use in ASD
- $W$  = Reference unit 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
- $Z_{||}$  = Reference lateral design value for fasteners loaded parallel to the wood grain
- $Z_{\perp}$  = Reference lateral design value for fasteners loaded perpendicular to the wood grain

### 3.2 Screws:

**3.2.1 General:** The screws addressed in this report are self-tapping screws which have star shaped driving recesses in the heads. The carbon steel screws are made from steel wire, hardened after forming and then coated with a proprietary coating (Climatek™). PHEinox™ screws are formed from Grade 305 stainless steel wire. See Tables 1A and 1B and Figure 1 for screw dimensions and descriptions.

**3.2.2 R4™ Multi-Purpose Screw:** The R4™ Multi-Purpose Screws are partially threaded and have a countersunk head with cutting pockets and teeth on the underside of the head. The screws have a CEE-Thread™ (reamer knurl) between the smooth portion of the shank and the threads, rolled threads, rolled W-Cut™ threads at the point end of the screw and a Type 17 point (Zip-Tip™). Carbon steel and PHEinox™ versions of the R4 screws have been evaluated.

**3.2.3 Fin/Trim™ Screw:** The Fin/Trim™ Screws are partially threaded. The screws have a finish head, rolled threads, rolled W-Cut™ threads at the point end of the screw and a Type 17 point (Zip-Tip™). Carbon steel and PHEinox™ versions of the Fin/Trim™ screws have been evaluated.

**3.2.4 RT Composite™ Screw:** The RT Composite™ Screws are the same as the Fin/Trim™ screws described in Section 3.1.3, except they have a reversed thread beneath the head. Only the PHEinox™ version of the RT Composite screw has been evaluated.

**3.2.5 Kameleon™ Screw:** The Kameleon™ Screws are fully threaded screws. The screws have a pan framer head with saw-blade-like cutting teeth under the head. The screw shank has ring style deformations with three indented fiber traps on each ring, a CEE-Thread™ (reamer knurl), standard threads, W-Cut™ threads at the point end of the screw and a Type 17 point (Zip-Tip™). Only the carbon steel version of the Kameleon™ Screw has been evaluated.

### 3.3 Climatek™ Coating:

The proprietary Climatek™ coating is gold in color and consists of multiple layers of various materials, including layers of zinc and polymer.

### 3.4 Wood Members:

Wood members may be sawn lumber or structural glued laminated timber (glulam). The screws may also be used in the face of cross-laminated timber (CLT) panels. Use of the screws in engineered wood products (EWP) other than those addressed above is outside the scope of this report.

For purposes of connection design, sawn lumber, glulam and CLT members must have an  $SG_{NDS}$  as indicated in the tables in this report and the moisture content must be less than or equal to 19 percent at the time of screw installation and while in service, unless otherwise noted.  $SG_{NDS}$  for sawn lumber is the assigned specific gravity for the applicable grade mark, which must be determined in accordance with Table 12.3.3A of the ANSI/AWC National Design Specification for Wood Construction® (NDS) or the latest NDS Supplement.  $SG_{NDS}$  for glulam members is the Specific Gravity for Fastener Design addressed in Tables 5A through 5D of the NDS Supplement. When designing connections with screws installed into CLT panels, all of the laminations must have a minimum  $SG_{NDS}$  as indicated in the tables in this report.

For wood-to-wood connections, the tabulated side member thickness is an absolute value (not a minimum or maximum value). 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.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

**4.1.1 General:** The design values in this report are intended to aid the designer in meeting the requirements of IBC Section 1604.2. For connections not completely described in this report, determination of the suitability of the screws for the specific application is the responsibility of the designer and is outside the scope of this report. The designer is responsible for determining the available strengths for the connection, considering all applicable limit states, and for considering serviceability issues. The designer is responsible for determining the required spacing, edge distance and end distance for the screws, based on the characteristics of the connected building materials.

**4.1.2 Screw Strength:** Allowable screw shear and tension strengths (ASD) and minimum specified bending yield strength for the screws are shown in Tables 1A and 1B.

**4.1.3 Adjustments to Reference Design Values:** The reference design values must be adjusted in accordance with the NDS provisions for dowel-type fasteners, to determine allowable strengths for use in ASD and design strengths for use with LRFD.

**4.1.4 Connections with Multiple Screws:** See Sections 11.1.2, 11.2.2 and 12.6 of the NDS (Sections 10.1.2, 10.2.2 and 11.6 of the NDS for the 2012 IBC) regarding multiple fastener connections and consideration of local stresses in the wood members.

**4.1.5 Combined Loading:** Where the screws are subjected to combined lateral and withdrawal loads, connections must be designed in accordance with Section 12.4.1 of the NDS (Section 11.4.1 of the NDS for the 2012 IBC).

**4.1.6 Reference Withdrawal and Head Pull-through Design Values:** Reference withdrawal ( $W$ ) design values in pounds per inch of thread penetration, for screws installed perpendicular to the wood member, are shown in Table 2. Reference head pull-through ( $W_H$ ) design values are given in Table 3.

**4.1.7 Lateral Design Values Based on Testing:** Reference lateral ( $Z$ ) design values for single shear wood-to-wood connections loaded perpendicular and parallel to grain, based on testing, are shown in Table 4A for the Climatek™ coated screws and Table 4B for the PHEinox™ screws.

### 4.2 Corrosion Resistance:

The Climatek™ coated screws may be used in treated lumber, as alternates to hot-dip galvanized fasteners prescribed in IBC Section 2304.10.6 (2018 and 2015 IBC Section 2304.10.5, 2012 IBC Section 2304.9.5) and IRC Section R304.3 (2021, 2018, 2015 and 2012 IRC Section R317.3), when subject to the Exposure Conditions shown in Table 6. Climatek coated screws have been evaluated for use in wood treated with copper azole (CA-C) preservatives with a maximum retention of 0.15 pcf (2.4 kg/m<sup>3</sup>). Applicable wood species are Southern Pine and other species commercially available in the United States.

The PHEinox™ stainless steel screws may be used in the applications described in IBC Section 2304.10.6 (2018 and 2015 IBC Section 2304.10.5, 2012 IBC Section 2304.9.5) and IRC Section R304.3 (2021, 2018, 2015 and 2012 IRC Section R317.3) where stainless steel fasteners are prescribed.

#### 4.3 Installation:

Screws must be installed in accordance with the report holder's published installation instructions and this report. The screws must be installed perpendicular to the plane of the wood side member. The top of the screw head must be flush with the surface of the wood side member. Screws must not be overdriven. Screws must be installed with the minimum spacing, end distances, and edge distances needed to prevent splitting of the wood, or as noted in Table 5, whichever is more restrictive.

Installation of the R4 screws may be performed without predrilling in wood species with assigned specific gravity of 0.58 or less. In all other cases, the screws must be installed with pilot holes that meet the requirements shown in the applicable load tables. The screws must be installed by turning with Star drive bits, not by driving with a hammer.

#### 5.0 CONDITIONS OF USE

The R4™ Multi-Purpose Screw, Fin/Trim™ Screw, Kameleon™ Screw and RT Composite™ Screw fasteners described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report, the report holder's published instructions and the applicable code. A copy of the report holder's published installation instructions must be available at the jobsite at all times during installation. In the event of a conflict between the published installation instructions and this report, this report governs.
- 5.2 Design loads for the screws must not exceed the available strengths described in Section 4.1.
- 5.3 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.
- 5.4 Connection design for lateral loading applications using inclined fasteners is outside the scope of this report.
- 5.5 The screws have only been evaluated for use in dry service conditions. Use in wet service conditions is outside the scope of this report.

- 5.6 Use of Climatek coated screws in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 5.7 The screws are manufactured 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 Dowel-type Threaded Fasteners Used in Wood (AC233), dated June 2023 (editorially revised June 2024).
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Corrosion-resistant Fasteners and Evaluation of Corrosion Effects of Wood Treatments (AC257), dated June 2023 (editorially revised April 2024).

#### 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3201) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 Individual screws are identified with a mark indicating the manufacturer. In addition, some R4 screws are identified by the letters "GRK" on the head. Packages of screws are identified with the screw designation (R4™ Multi-Purpose Screw, Fin/Trim™ Screw, Kameleon™ Screw or RT Composite™ Screw), fastener size and length, material/coating designation (PHEinox™ or Climatek™), production date and lot number and a reference to this report for the compatible treated wood types, where applicable.
- 7.3 The report holder's contact information is the following:

**GRK FASTENERS, A DIVISION OF ILLINOIS TOOL WORKS, INC.**

**155 HARLEM AVENUE BUILDING N3E  
GLENVIEW, ILLINOIS 60025  
(877) 489-2726**

[www.grkfasteners.com](http://www.grkfasteners.com)  
[grk@grkfasteners.com](mailto:grk@grkfasteners.com)

TABLE 1A—CARBON STEEL SCREW SPECIFICATIONS

SCREW DESIGNATION	L <sup>1</sup> (inches)	L <sup>thread 2</sup> (inches)	D <sub>H</sub> (inch)	HEAD RECESS	D <sub>r</sub> (inch)	D <sub>s</sub> (inch)	D (inch)	F <sub>yb,spec</sub> (psi)	ALLOWABLE STEEL STRENGTHS	
									N <sub>a</sub> (lbf)	V <sub>a</sub> (lbf)
R4	9x2"	2	0.329	Star drive T-25	0.112	0.128	0.173	158,800	564	385
	9x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>3</sup> / <sub>8</sub>								
	9x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>								
	9x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>								
	10x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>3</sup> / <sub>8</sub>	0.368	Star drive T-25	0.124	0.142	0.193	143,590	761	488
	10x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>								
	10x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>								
	10x3 <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub>								
	10x4"	3 <sup>7</sup> / <sub>8</sub>	0.439	Star drive T-25	0.148	0.171	0.234	134,280	1021	590
	10x4 <sup>3</sup> / <sub>4</sub> "	4 <sup>5</sup> / <sub>8</sub>								
	12x4 <sup>3</sup> / <sub>4</sub> "	4 <sup>5</sup> / <sub>8</sub>								
	12x5 <sup>5</sup> / <sub>8</sub> "	5 <sup>1</sup> / <sub>2</sub>								
	12x6 <sup>3</sup> / <sub>8</sub> "	6 <sup>1</sup> / <sub>4</sub>								
	12x7 <sup>1</sup> / <sub>4</sub> "	7								
	12x8"	7 <sup>7</sup> / <sub>8</sub>								
12x10"	9 <sup>3</sup> / <sub>4</sub>									
12x12"	11 <sup>3</sup> / <sub>4</sub>									
FIN/TRIM	8x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>3</sup> / <sub>8</sub>	0.197	Star drive T-10	0.100	0.111	0.156	148,410	449	324
	8x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>								
	8x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>								
	9x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>3</sup> / <sub>8</sub>	0.230	Star drive T-15	0.112	0.128	0.175	147,280	518	383
	9x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>								
9x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>									
KAMELEON	9x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>3</sup> / <sub>8</sub>	0.258	Star drive T-20	0.112	0.134	0.173	160,210	634	437
	9x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>								
	9x3"	3								

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

<sup>1</sup>Overall length of the screw is measured from the top of the head to bottom of the tip. See Figure 1.

<sup>2</sup>Length of thread includes tip. Where two thread lengths are shown, the first refers to thread length of screws marked with "GRK" on the screw head, and the one in parentheses refers to screws which do not have this marking on the head. See detailed illustrations in Figure 1.

TABLE 1B—PHEINOX™ SCREW SPECIFICATIONS

SCREW DESIGNATION		L <sup>1</sup> (inches)	L <sup>thread 2</sup> (inches)	D <sub>H</sub> (inch)	DRIVER SIZE	D <sub>r</sub> (inch)	D <sub>s</sub> (inch)	D (inch)	F <sub>yb,spec</sub> (psi)	ALLOWABLE STEEL STRENGTHS	
										N <sub>a</sub> (lbf)	V <sub>a</sub> (lbf)
R4	9x2"	2	1 <sup>1</sup> / <sub>4</sub>	0.329	Star drive T-25	0.112	0.128	0.173	113,340	467	334
	10x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	0.368	Star drive T-25	0.124	0.142	0.193	170,220	490	424
	10x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>	1 <sup>7</sup> / <sub>8</sub>								
	10x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>								
	10x4"	3 <sup>7</sup> / <sub>8</sub>	2 <sup>5</sup> / <sub>8</sub>								
FIN/TRIM, RT COMPOSITE	8x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	0.197	Star drive T-10	0.100	0.111	0.156	117,540	350	267
	8x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>	1 <sup>7</sup> / <sub>8</sub>								
	8x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>								
	9x2 <sup>1</sup> / <sub>2</sub> "	2 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	0.230	Star drive T-15	0.112	0.128	0.175	66,340	394	319
	9x2 <sup>3</sup> / <sub>4</sub> "	2 <sup>3</sup> / <sub>4</sub>	1 <sup>7</sup> / <sub>8</sub>								
9x3 <sup>1</sup> / <sub>8</sub> "	3 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>									

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

<sup>1</sup>Overall length of the screw is measured from the top of the head to bottom of the tip. See Figure 1.

<sup>2</sup>Length of thread includes tip. See detailed illustrations in Figure 1.

<sup>3</sup>Bending yield strength determined in accordance with ASTM F1575 using the root diameter.

TABLE 2—REFERENCE WITHDRAWAL DESIGN VALUES (W) FOR CLIMATEK AND PHEINOX SCREWS INSTALLED INTO THE FACE OF THE WOOD MEMBER<sup>1,2</sup>

SCREW SIZE	L <sub>emb,w</sub> (inches)	REFERENCE WITHDRAWAL DESIGN VALUE, W, (lbf/in.)			
		SG <sub>NDS</sub> ≥ 0.67 <sup>3</sup>	0.58 ≥ SG <sub>NDS</sub> ≥ 0.55	0.55 > SG <sub>NDS</sub> ≥ 0.49	0.49 > SG <sub>NDS</sub> ≥ 0.42
<b>R4</b>					
9	1 <sup>1</sup> / <sub>4</sub>	213	218	176	125
10	1 <sup>5</sup> / <sub>8</sub>	249	234	174	139
12	3	255	217	209	141
<b>FIN/TRIM, RT COMPOSITE</b>					
8	1 <sup>5</sup> / <sub>8</sub>	175	–	–	–
9	1 <sup>5</sup> / <sub>8</sub>	221	–	–	–
<b>KAMELEON</b>					
9	1 <sup>5</sup> / <sub>8</sub>	186	–	–	–

For SI: 1 inch = 25.4 mm, 1 lbf/in = 175N/m; 1 lbf = 4.45 N.

<sup>1</sup>Tabulated values are applicable to screws installed perpendicular to the faces of the wood members.

<sup>2</sup>The tabulated reference withdrawal design value is in pounds-force per inch of thread embedment into the main member.

<sup>3</sup>Pilot holes equal to 70% of the root diameter of the screw are required, and the tabulated values are applicable to connections subject to tension load only, due to differing pilot hole requirements for lateral connections.

**TABLE 3—REFERENCE PULL-THROUGH DESIGN VALUES ( $W_H$ ) FOR CLIMATEK AND PHEINOX SCREWS<sup>1</sup>**

SCREW SIZE	SIDE MEMBER THICKNESS (inch)	REFERENCE PULL-THROUGH DESIGN VALUE, $W_H$ (lbf)			
		$SG_{NDS} \geq 0.67^2$	$0.58 \geq SG_{NDS} \geq 0.55$	$0.55 > SG_{NDS} \geq 0.49$	$0.49 > SG_{NDS} \geq 0.42$
<b>R4</b>					
#9	3/4	184	119	107	83
#10	3/4	220	140	126	103
#12	3/4	407	176	171	126
<b>FIN/TRIM</b>					
#8	3/4	61	—	—	—
#9	3/4	124	—	—	—
<b>KAMELEON</b>					
#9	3/4	143	—	—	—

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

<sup>1</sup> Tabulated values are applicable to screws installed perpendicular to the faces of the wood members.

<sup>2</sup> Pilot holes equal to 90% of the root diameter of the screw are required, and the tabulated values are applicable to connections subject to tension load only.

**TABLE 4A—REFERENCE LATERAL DESIGN VALUES ( $Z$ ) FOR TWO-MEMBER WOOD-TO-WOOD CONNECTIONS USING CLIMATEK™ COATED SCREWS<sup>1,2,3</sup>**

SCREW SIZE	L (inches)	$t_{s,w}$ (inch)	$L_{emb,l}$ (inches)	REFERENCE LATERAL DESIGN VALUE, $Z$ (lbf)			
				$SG_{NDS} \geq 0.67^4$	$0.58 \geq SG_{NDS} \geq 0.55$	$0.55 > SG_{NDS} \geq 0.49$	$0.49 > SG_{NDS} \geq 0.42$
<b>R4</b>							
#9	2	3/4	1 1/4	175	103	89	75
#10	2 1/2	3/4	1 3/4	203	121	97	95
#12	4 3/4	3/4	4	242	122	119	110
<b>FIN/TRIM</b>							
#8	2 1/2	3/4	1 3/4	84	—	—	—
#9	2 1/2	3/4	1 3/4	104	—	—	—
<b>KAMELEON</b>							
#9	2 1/2	3/4	1 3/4	159	—	—	—

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

<sup>1</sup> Tabulated values are applicable to screws installed perpendicular to the faces of the wood members.

<sup>2</sup> The wood main member thickness must be equal to or greater than the screw length less the thickness of the wood side member so that the screw is fully embedded in the wood.

<sup>3</sup> The tabulated lateral design values are based on both wood members having the same specific gravity.

<sup>4</sup> Pilot holes equal to 90% of the root diameter of the screw are required, and the tabulated values are applicable to connections subject to lateral load only, due to differing pilot hole requirements for tension connections.

**TABLE 4B—REFERENCE LATERAL DESIGN VALUES (Z) FOR TWO-MEMBER WOOD-TO-WOOD CONNECTIONS USING PHEINOX™ STAINLESS STEEL SCREWS<sup>1,2,3</sup>**

SCREW SIZE	L (inches)	t <sub>s,w</sub> (inch)	L <sub>emb,l</sub> (inches)	REFERENCE LATERAL DESIGN VALUE, Z (lbf)			
				SG <sub>NDS</sub> ≥ 0.67 <sup>(4)</sup>	0.58 ≥ SG <sub>NDS</sub> ≥ 0.55	0.55 > SG <sub>NDS</sub> ≥ 0.49	0.49 > SG <sub>NDS</sub> ≥ 0.42
<b>R4</b>							
#9	2	3/4	1 1/4	212	128	110	87
#10	2 1/2	3/4	1 3/4	235	135	110	102
<b>FIN/TRIM</b>							
#8	2 1/2	3/4	1 3/4	78	—	—	—
#9	2 1/2	3/4	1 3/4	108	—	—	—
<b>RT COMPOSITE</b>							
#8	2 1/2	3/4	1 3/4	107	—	—	—
#9	2 1/2	3/4	1 3/4	151	—	—	—

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

<sup>1</sup> Tabulated values are applicable to screws installed perpendicular to the faces of the wood members.

<sup>2</sup> The wood main member thickness must be equal to or greater than the screw length less the thickness of the wood side member.

<sup>3</sup> The tabulated lateral design values are based on both wood members having the same specific gravity.

<sup>4</sup> Pilot holes equal to 90% of the root diameter of the screw are required, and the tabulated values are applicable to connections subject to lateral load only, due to differing pilot hole requirements for tension connections.

**TABLE 5—CONNECTION GEOMETRY REQUIREMENTS FOR SCREWS INSTALLED PERPENDICULAR TO THE FACE OF WOOD MEMBERS<sup>1,2,3</sup>**

CONDITION		MINIMUM DISTANCE OR SPACING		
		Self-drilled		Predrilled Hole <sup>4</sup>
		SG <sub>NDS</sub> < 0.50	0.50 ≤ SG <sub>NDS</sub>	
End distance (see Figure 2)	Loading toward end, a <sub>end,1</sub>	15D	20D	12D
	Loading perpendicular to grain or away from end, a <sub>end,2</sub>	10D	15D	7D
	Axial loading, a <sub>end,2</sub>	10D	10D	7D
Edge distance (see Figure 2)	Loading toward edge, a <sub>edge,1</sub>	10D	12D	7D
	Loading parallel to grain or away from edge, a <sub>edge,2</sub>	5D	7D	3D
	Axial Loading, a <sub>edge,2</sub>	4D	4D	3D
Spacing between fasteners, parallel to grain (see Figure 3)	Loading parallel to grain, a <sub>1</sub>	15D	15D	10D
	Loading perpendicular to grain, a <sub>1</sub>	10D	10D	5D
	Axial loading, a <sub>1</sub>	7D	7D	7D
Spacing between fasteners, perpendicular to grain (see Figure 3)	Loading parallel to grain, a <sub>2</sub>	5D	7D	4D
	Loading perpendicular to grain, a <sub>2</sub>	5D	7D	4D
	Axial loading, a <sub>2</sub>	4D	4D	3D

<sup>1</sup> End distances, edge distances and fastener 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> For CLT products, parallel and perpendicular-to-grain descriptions apply to the grain orientation at the shear plane for lateral loading and to the face grain orientation for withdrawal loading.

<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<sub>s</sub> and 0.75D<sub>s</sub>.
- For installation in SPF and other species of similar density, the hole must have a diameter between 0.40D<sub>s</sub> and 0.70D<sub>s</sub>.
- The hole diameter must not exceed 0.9D<sub>r</sub>.



TABLE 6—EVALUATED EXPOSURE CONDITIONS AND LIMITATIONS FOR CLIMATEK COATED SCREWS<sup>1</sup>

EXPOSURE CONDITION	TYPICAL APPLICATIONS	EVALUATION LIMITATIONS
1	Treated wood in dry use applications	Limited to use where equilibrium moisture content of the chemically treated wood meets the dry service conditions as described in the NDS with occasional exposure to high humidity.
3	General construction	Limited to freshwater and chemically treated wood exposure, without saltwater exposure.

<sup>1</sup>Treated wood refers to the specific wood treatments and retention levels described in Section 4.2.

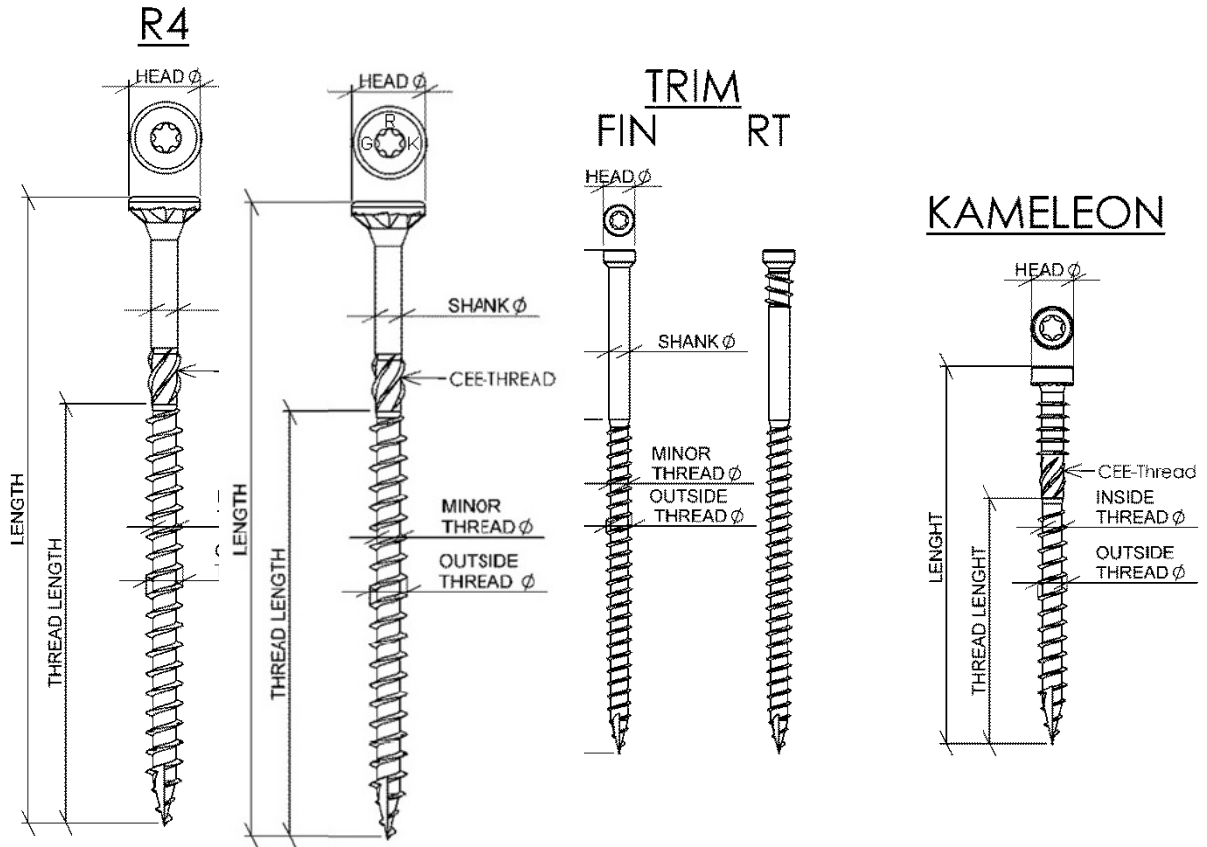


FIGURE 1—GRK SCREWS



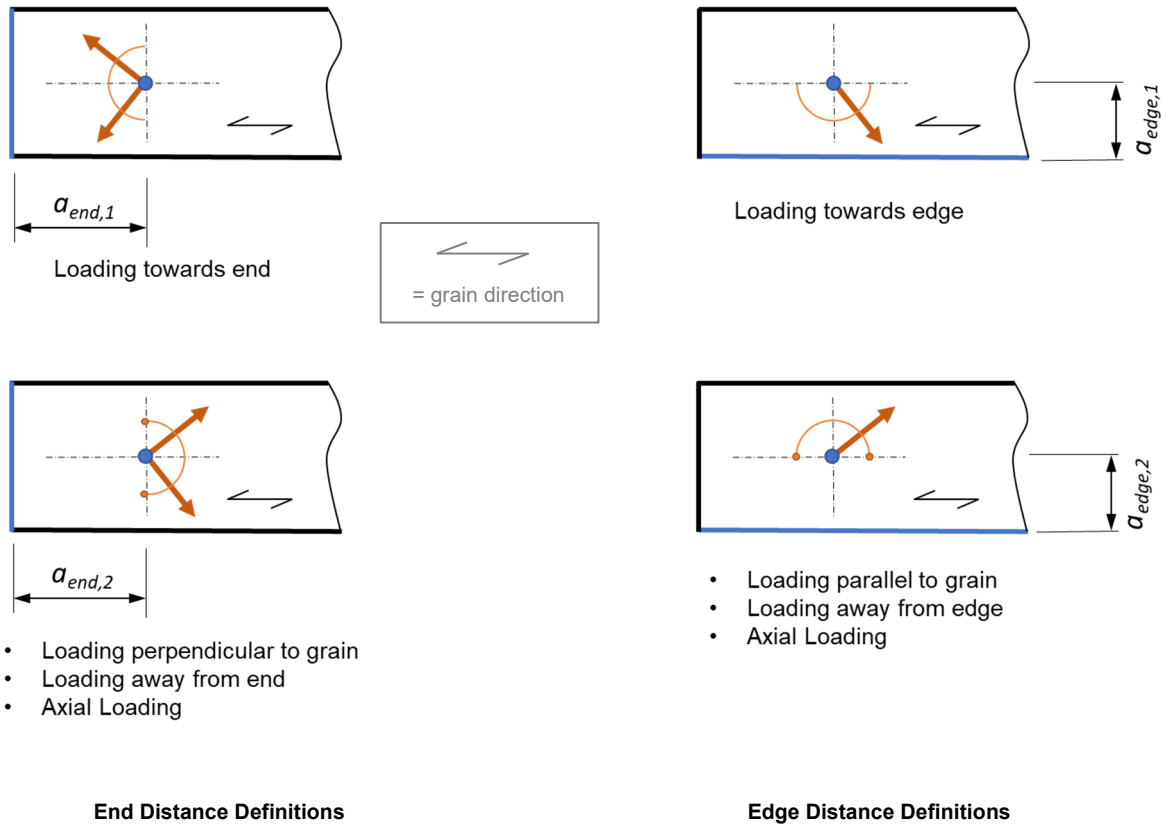


FIGURE 2—END AND EDGE DISTANCE DEFINITIONS FOR SCREWS INSTALLED PERPENDICULAR TO GRAIN

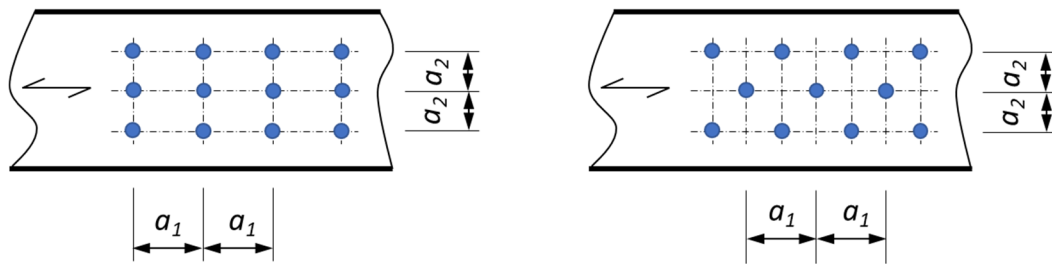


FIGURE 3—SPACING DEFINITIONS FOR SCREWS INSTALLED PERPENDICULAR TO GRAIN

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

**REPORT HOLDER:**

**GRK FASTENERS, A DIVISION OF ILLINOIS TOOL WORKS, INC.**

**EVALUATION SUBJECT:**

**R4™ MULTI-PURPOSE SCREW, FIN/TRIM™ SCREW, KAMELEON™ SCREW, RT COMPOSITE™ SCREW AND CLIMATEK™ COATING**

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that R4™ Multi-Purpose Screw, Fin/Trim™ Screw, Kameleon™ Screw, RT Composite™ Screw and Climatek™ coating, described in ICC-ES evaluation report ESR-3201, have also been evaluated for compliance with the code(s) noted below.

**Applicable code edition(s):**

- 2022 California Building Code (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)

**2.0 CONCLUSIONS****2.1 CBC:**

The R4™ Multi-Purpose Screw, Fin/Trim™ Screw, Kameleon™ Screw, RT Composite™ Screw and Climatek™ coating, described in Sections 2.0 through 7.0 of the evaluation report ESR-3201, comply with CBC Chapter 23, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 23, as applicable.

**2.1.1 OSHPD:**

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.1.2 DSA:**

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.2 CRC:**

The R4™ Multi-Purpose Screw, Fin/Trim™ Screw, Kameleon™ Screw, RT Composite™ Screw and Climatek™ coating, described in Sections 2.0 through 7.0 of the evaluation report ESR-3201, comply with CRC Chapter 3, provided the design and installation are in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued July 2023 and revised December 2024.