



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 2010-03

**#14, #16, and #18 Nova and Yukon
Fastener Properties**

Screw Products Inc.

Products:

Nova and Yukon Fasteners

Issue Date:

April 26, 2021

Revision Date:

May 11, 2021

Subject to Renewal:

April 1, 2022



COMPANY
INFORMATION:

Screw Products Inc.

9401 Bujacich Rd Unit 1B
Gig Harbor, WA 98332-8467

(877) 844-8880

info@screw-products.com

screw-products.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 05 23 - Wood, Plastic, and Composite Fastenings

1 PRODUCTS EVALUATED¹

1.1 Nova and Yukon Fasteners

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IRC—12, 15, 18: International Residential Code®*
- 2.1.3 *FBC-B—17, 20: Florida Building Code – Building*
- 2.1.4 *FBC-R—17, 20: Florida Building Code – Residential*

2.2 Standards and Referenced Documents

- 2.2.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strength of Screws*
- 2.2.2 *ANSI / AWC NDS: National Design Specification (NDS) for Wood Construction*
- 2.2.3 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*
- 2.2.4 *ASTM D2395: Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials*
- 2.2.5 *ASTM D2915: Standard Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products*
- 2.2.6 *ASTM D4442: Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials*
- 2.2.7 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*

¹ For more information, visit drjcertification.org or call us at 608-310-6748.

² Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

³ All terms defined in the applicable building codes are italicized.

3 PERFORMANCE EVALUATION

- 3.1 Screw Products, Inc. Nova and Yukon fasteners were tested and evaluated to determine their structural resistance properties, which were used to develop reference design values for allowable stress design (ASD). The following properties were evaluated:
- 3.1.1 Bending yield in accordance with *ASTM F1575*
 - 3.1.2 Tensile strength in accordance with *AISI S904*
 - 3.1.3 Shear strength in accordance with *AISI S904*
 - 3.1.4 Lateral shear in accordance with *ASTM D1761* and *NDS*
 - 3.1.5 Withdrawal strength in accordance with *ASTM D1761*
 - 3.1.6 Head pull-through in accordance with *ASTM D1761*
- 3.2 Corrosion resistance of Nova and Yukon fasteners is outside the scope of this TER.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.4 Any engineering evaluation conducted for this TER was performed within DrJ's ANAB "accredited ICS code scope" and/or the defined professional engineering scope of work on the dates provided herein.

4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 The products evaluated in this TER are shown in Figure 1, Figure 2, and Figure 3.



FIGURE 1. NOVA FASTENER



FIGURE 2. #16 YUKON FASTENER



FIGURE 3. #18 YUKON FASTENER

- 4.2 Nova fasteners are partially threaded screws with a coin head and star drive.
- 4.3 Yukon fasteners are partially threaded screws with a hex head.
- 4.4 Nova and Yukon fasteners are construction lag screws intended for structural use in timber construction.
- 4.5 The fasteners evaluated in this TER are set forth in Table 1 and Table 2.



TABLE 1. FASTENER SPECIFICATIONS – NOVA

Fastener Name	Designation	Head (in)		Nominal Length ¹ (in)	Thread Length ² (in)	Shank Diameter ³ (in)	Thread Diameter (in)		Nominal Bending Yield, f_{yb} (psi)	Allowable Fastener Strength (lb)	
		Diameter	Drive Type				Minor	Major		Tensile	Shear ⁴
#14 Nova	14 x 1"	0.531	TX30	1	¾	0.173	0.152	0.246	175,900	1,130	855
	14 x 1½"			1½	1						
	14 x 2"			2	1½						
	14 x 2½"			2½	1½						
	14 x 3"			3	1½						
	14 x 4"			4	2						
	14 x 5"			5	3						
	14 x 6"			6	3						
#16 Nova	16 x 2"	0.630	TX30	2	1½	0.205	0.177	0.283	178,200	1,520	1,105
	16 x 2½"			2½	1½						
	16 x 3"			3	1½						
	16 x 3½"			3½	1½						
	16 x 4"			4	2						
	16 x 4½"			4½	2						
	16 x 5"			5	3						
	16 x 6"			6	3						
	16 x 6"			6	5						
#18 Nova	18 x 3¾"	0.728	TX40	3¾	1½	0.226	0.205	0.315	161,000	1,800	1,465
	18 x 4"			4	2						
	18 x 5"			5	1½						
	18 x 6"			6	3						
	18 x 6¾"			6¾	1½						
	18 x 7"			7	3½						
	18 x 8"			8	4						
	18 x 10"			10	4						
	18 x 12"			12	5						
	18 x 14"			14	6						
	18 x 16"			16	6						

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

1. Fastener length is measured from the top of the head to the tip.
2. Thread length excludes the knurl. The #14x1", #14x1½", #14x2", #16x2" and #16x6" (with 5" thread length) screws have no knurl.
3. Shank diameter based on manufactured thickness with coating.
4. Shear determined at thread diameter for #14 and #16 screws and at smooth shank diameter for #18 screws.

TABLE 2. FASTENER SPECIFICATIONS – YUKON

Fastener Name	Designation	Head (in)		Nominal Length ¹ (in)	Thread Length ² (in)	Shank Diameter ³ (in) Minor	Thread Diameter (in)		Nominal Bending Yield, f_{yb} (psi)	Allowable Fastener Strength (lb)	
		Diameter	Drive Type				Major	Major		Tensile	Shear ⁴
#16 Yukon	16 x 4"	0.472	5/16" Hex	4	2	0.205	0.177	0.284	178,200	1,520	1,105
	16 x 6"			6	2						
	16 x 6"			6	5						
	16 x 8"			8	2						
	16 x 10"			10	2						
	16 x 12"			12	2						
	16 x 14"			14	2						
#18 Yukon	18 x 4"	0.630	5/16" Hex	4	2	0.226	0.205	0.315	161,000	1,800	1,465
	18 x 5"			5	2 ³ / ₄						
	18 x 6"			6	2 ³ / ₄						
	18 x 7"			7	2 ³ / ₄						
	18 x 9"			9	2 ³ / ₄						
	18 x 11"			11	2 ³ / ₄						

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

- Fastener length is measured from the underside of the head to the tip.
- Thread length excludes the knurl. The #16x6" screw with 5" thread length has no knurl.
- Shank diameter based on manufactured thickness with coating.
- Shear determined at thread diameter for #14 and #16 screws and at smooth shank diameter for #18 screws.

5 APPLICATIONS

5.1 General

- 5.1.1 Nova and Yukon fasteners are used to attach wood framing members in conventional light-frame construction and provide resistance against withdrawal, head pull-through, axial, and shear loads. See Section 6 for installation requirements.
- 5.1.2 Nova and Yukon fasteners are installed without lead holes, as prescribed in *NDS*.
- 5.1.3 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.2 Design

- 5.2.1 Design of Nova and Yukon fasteners is governed by the applicable code and provisions for dowel-type fasteners in *NDS*.
- 5.2.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

5.3 Nova and Yukon Fasteners Reference Lateral Design Values (Z)

- 5.3.1 Reference lateral design values (lb) for shear load perpendicular to grain and parallel to grain for Nova and Yukon fasteners are specified in Table 3 and Table 4, respectively.

TABLE 3. NOVA FASTENER REFERENCE LATERAL DESIGN VALUES (Z), LB^{3,4}

Fastener Name	Designation	Nominal Length (in)	Thread Length (in)	Minimum Side Member Thickness (in)	Minimum Main Member Penetration ⁵ (in)	Wood Species (Specific Gravity) ^{1,2}					
						HF/SPF (0.42)		DF (0.50)		SP (0.55)	
						Z _⊥	Z _∥	Z _⊥	Z _∥	Z _⊥	Z _∥
#14 Nova	14 x 1½"	1½	1	½	1	60	60	85	85	105	105
	14 x 2"	2	1½	¾	1¼	85	85	120	120	140	140
	14 x 2½"	2½	1½	¾	1½	110	110	135	135	150	150
	14 x 3"	3	1½	1½	1½	205	155	205	170	205	190
	14 x 4"	4	2						175		
	14 x 5"	5	3								
	14 x 6"	6	3								
#16 Nova	16 x 2"	2	1½	¾	1¼	75	95	105	130	125	155
	16 x 2½"	2½	1½	¾	1½	105	130	135	170	150	190
	16 x 3"	3	1½	1½	1½	185	170	185	200	225	245
	16 x 3½"	3½	1½						245		
	16 x 4"	4	2								
	16 x 4½"	4½	2								
	16 x 5"	5	3	1½	1½	185	170	185	225	245	245
	16 x 6"	6	3								
16 x 6"	6	3									
16 x 6"	6	5									
#18 Nova	18 x 3¾"	3¾	1½	1½	1½	135	170	185	230	220	275
	18 x 4"	4	2		2½	410	335	410	335	410	335
	18 x 5"	5	1½								
	18 x 6"	6	3								
	18 x 6¾"	6¾	1½								
	18 x 7"	7	3½								
	18 x 8"	8	4								
	18 x 10"	10	4								
	18 x 12"	12	5								
	18 x 14"	14	6								
	18 x 16"	16	6								

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/in = 0.175 kN/m

- Reference lateral design values apply to two-member single shear connections where both members are of the same specific gravity, and the fastener is oriented perpendicular to grain. Where the members are of different specific gravities, use the lower of the two.
- For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.
- Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_∥ = Lateral Design Values Parallel to Grain.
- Fastener main member penetration is the length embedded in the main member, including the tip.

TABLE 4. YUKON FASTENER REFERENCE LATERAL DESIGN VALUES (Z), LB^{3,4}

Fastener Name	Designation	Nominal Length (in)	Thread Length (in)	Minimum Side Member Thickness (in)	Minimum Main Member Penetration ⁵ (in)	Wood Species (Specific Gravity) ^{1,2}					
						HF/SPF (0.42)		DF (0.50)		SP (0.55)	
						Z _⊥	Z	Z _⊥	Z	Z _⊥	Z
#16 Yukon	16 x 4"	4	2	1½	1½	130	165	180	225	200	250
	16 x 6"	6	2	1½	3½	140	175	180	225	200	250
	16 x 6"	6	5								
	16 x 8"	8	2	3½	3½	155	195	185	230	200	250
	16 x 10"	10	2								
	16 x 12"	12	2	5½	5½	155	195	185	230	200	250
	16 x 14"	14	2								
#18 Yukon	18 x 4"	4	2	1½	1½	135	170	185	230	220	275
	18 x 5"	5	2¾	1½	3½	150	190	195	245	225	280
	18 x 6"	6	2¾								
	18 x 7"	7	2¾	3½	3½	175	220	210	260	225	285
	18 x 9"	9	2¾								
	18 x 11"	11	2¾								

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/in = 0.175 kN/m

- Reference lateral design values apply to two-member single shear connections where both members are of the same specific gravity, and the fastener is oriented perpendicular to grain. Where the members are of different specific gravities, use the lower of the two.
- For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.
- Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_{||} = Lateral Design Values Parallel to Grain.
- Fastener main member penetration is the length embedded in the main member, including the tip.

5.4 *Withdrawal Design Values*

5.4.1 The reference withdrawal design values (lb/in) in Table 5 apply to the screws listed in Table 1 and Table 2.

TABLE 5. REFERENCE WITHDRAWAL DESIGN VALUES (W) – SIDE GRAIN APPLICATIONS, LB/IN¹

Fastener Designation	Minimum Penetration Length ⁴ (in)	Wood Species (Specific Gravity) ^{2,3}		
		HF/SPF (0.42)	DF (0.50)	SP (0.55)
#14 Nova	1	125	175	210
	2	160		
#16 Nova and Yukon	1	145	200	245
	2	180		
#18 Nova and Yukon	1	160	225	270
	2			

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/in = 0.175 kN/m

1. Tabulated withdrawal values (W) shall be adjusted by all applicable factors per *NDS*, Table 11.3.1.
2. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.
3. The full design withdrawal value is equal to the reference withdrawal value multiplied by the length of the threaded portion of the fastener embedded in the main member.
4. Fastener penetration is the threaded length embedded in the main member, including the tip. For penetrations equal to or greater than 2", use the tabulated value for 2" penetration.

5.5 Head Pull-Through Design Values

5.5.1 The reference head pull-through design values (lb) in Table 6 apply to the screws listed in Table 1 and Table 2.

TABLE 6. REFERENCE HEAD PULL-THROUGH DESIGN VALUES (P), LB¹

Fastener Name	Wood Member Thickness ³ (in)	Wood Species (Specific Gravity) ²		
		HF/SPF (0.42)	DF (0.50)	SP (0.55)
#14 Nova	¾	150	215	260
	1½	275	380	460
	2	275	380	460
#16 Yukon	¾	135	190	230
	1½	220	300	365
	2	220	300	365
#16 Nova	¾	180	255	310
	1½	365	515	620
	2	380	540	655
#18 Yukon	¾	180	255	310
	1½	365	515	620
	2	380	540	655
#18 Nova	¾	210	295	360
	1½	420	590	715
	2	505	720	870

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

1. Tabulated pull-through values (P) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
2. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.
3. Pull-through design values apply to connections having a minimum wood member thickness provided in the table.

6 INSTALLATION

- 6.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.
- 6.2 Minimum penetration is 1”, unless otherwise stated in this TER. Install fasteners with head flush to the surface of the wood member.
- 6.3 Lead holes are not required.
- 6.4 Screws shall be installed with the appropriate rotating powered driver.
- 6.5 Minimum requirements for screw spacing, edge distance, and end distance shall be in accordance with Table 7.

TABLE 7. NOVA AND YUKON FASTENER SPACING, EDGE DISTANCE, AND END DISTANCE REQUIREMENTS¹, INCH

Connection Geometry	#14	#16	#18
Edge Distance – Load in any direction	½	⅝	
End Distance – Load parallel to grain, towards end	2⅝	3⅛	3½
End Distance – Load parallel to grain, away from end	1¾	2⅛	2⅜
End Distance – Load perpendicular to grain	1¾	2⅛	2⅜
Spacing between Fasteners in a Row – Parallel to grain	2⅝	3⅛	3½
Spacing between Fasteners in a Row – Perpendicular to grain	1¾	2⅛	2⅜
Spacing between Rows of Fasteners – In-line	⅞	1⅛	1¼
Spacing between Rows of Fasteners – Staggered ²	½	⅝	

SI: 1 in = 25.4 mm

1. Edge distances, end distances, and spacing of fasteners shall be sufficient to prevent splitting of the wood or as shown in this table, whichever is the more restrictive.
2. Values for “Spacing between Rows of Fasteners-Staggered” apply where the screws in adjacent rows are offset by one-half of the “Spacing between Fasteners in a Row”.

7 SUBSTANTIATING DATA

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
 - 7.1.1 Bending yield testing in accordance with *ASTM F1575*
 - 7.1.2 Shear and tensile testing in accordance with *ASTM S904*
 - 7.1.3 Lateral strength testing in accordance with *ASTM D1761*
 - 7.1.4 Withdrawal strength testing in accordance with *ASTM D1761*
 - 7.1.5 Head pull-through testing in accordance with *ASTM D1761*
- 7.2 Information contained herein is the result of testing and/or data analysis by sources which conform to IBC Section 1703 and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.
- 7.3 Where appropriate, DrJ’s analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.



8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product listed in Section 1.1 is approved for the following:
- 8.1.1 The reference design value properties defined herein for use in accordance with the applicable code
- 8.2 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.
- 8.2.1 No known variations
- 8.3 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
- 8.3.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 8.4 Agencies who are accredited through ISO/IEC 17065 have met the code requirements for approval by the building official. DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs RDPs.
- 8.5 Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “certified once, accepted everywhere.”
- 8.6 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code...Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

9 CONDITIONS OF USE

- 9.1 Moisture content shall be less than or equal to 19% for sawn lumber.
- 9.2 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.3 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.4 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (e.g., owner or RDP).
- 9.5 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.6 This product has an internal quality control program and a third-party quality assurance program in accordance with IBC Section 104.4 and Section 110.4 and IRC Section R104.4 and Section R109.2.
- 9.7 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.
- 9.8 This TER shall be reviewed for code compliance by the AHJ in concert with IBC Section 104.
- 9.9 The implementation of this TER for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by IBC Section 110.3, and any other code or regulatory requirements that may apply.



10 IDENTIFICATION

- 10.1 The product listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at screw-products.com.

11 REVIEW SCHEDULE

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact [DrJ Certification](#).