



TM

CERTIFICATION



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Technical Evaluation Report

TER 1703-05

Starborn® Structural Screws: Fastener
Properties and Design Values

Starborn® Industries, Inc.

Product:

Starborn® Structural Screws



10/05/2022

Kirk

Grundahl

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

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

1 Product Evaluated¹

- 1.1 Starborn® Structural H19 screws
- 1.2 Starborn® Structural H23 screws
- 1.3 Starborn® Structural F23 screws
- 1.4 Starborn® Structural F23-E screws
- 1.5 Starborn® Structural F23-W screws

2 Applicable Codes and Standards^{2,3}

2.1 Codes

- 2.1.1 *IBC—15, 18, 21: International Building Code®*
- 2.1.2 *IRC—15, 18, 21: International Residential Code®*
- 2.1.3 *FBC-B—17, 20: Florida Building Code – Building⁴ (FL 30525)*
- 2.1.4 *FBC-R—17, 20: Florida Building Code – Residential⁴ (FL 30525)*
- 2.1.5 *LABC—17, 20: City of Los Angeles Building Code⁵*
- 2.1.6 *LARC—17, 20: City of Los Angeles Residential Code⁵*

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 2021 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2018 versions of the referenced codes and the standards referenced therein.

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

⁴ All references to the *FBC-B* and *FBC-R* are the same as the 2018 *IBC* and 2018 *IRC* unless otherwise noted in the Florida Supplement.

⁵ All references to the *LABC* and *LARC* are the same as the 2018 *IBC* unless otherwise noted in the supplement at the end of this document.

2.2 Standards and Referenced Documents

- 2.2.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strengths of Screws*
- 2.2.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 2.2.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
- 2.2.4 *ASTM A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*
- 2.2.5 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*
- 2.2.6 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*

3 Performance Evaluation

- 3.1 Starborn® Structural screws were tested and evaluated to determine their structural resistance properties, which are used to develop reference design values for allowable stress design (ASD). The following conditions 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 strength in accordance with *ASTM D1761*
 - 3.1.5 Withdrawal strength in accordance with *ASTM D1761*
 - 3.1.6 Head pull-through strength in accordance with *ASTM D1761*
 - 3.1.7 Corrosion resistance of fasteners meeting or exceeding the protection afforded hot dipped galvanized fasteners in accordance with *ASTM A153*.
- 3.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 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 General

- 4.1.1 Starborn® Structural screws are alternate dowel-type threaded fasteners designed for use in wood to-wood connections. The fasteners in Table 1 are evaluated in this TER.

Table 1. Starborn® Structural Fastener Designation and Product Name

Product Name	Unthreaded Shank Diameter ¹ (in)	Head Type	Coating Type (Application)
Structural H19	0.19	Hex (5/16 in)	Exterior Use
Structural H23	0.23	Hex (3/8 in)	
Structural F23		Flat (T-40)	
Structural F23-E			
Structural F23-W			
SI: 1 in = 25.4 mm			
1. Unthreaded shank diameter is measured on uncoated parts. Finished part dimensions are larger due to the thickness of the proprietary coating.			

4.2 Fastener Material

- 4.2.1 Starborn® Structural screws are manufactured with heat-treated carbon steel grade 10B21 wire using a standard cold-forming process. All fasteners are produced in accordance with the approved quality control procedures referred to in Section 9.

4.3 Fastener Coatings

- 4.3.1 Starborn® F23-E and F23-W screws are designated for interior, dry use only.
- 4.3.2 Starborn® H19, H23, and F23 screws are designed for exterior use and may be used where fasteners are required to exhibit corrosion resistance when exposed to adverse environmental conditions and/or in preservative treated wood subject to the limitations of Section 9. These fasteners are alternates to hot-dip-zinc galvanized fasteners. They feature a proprietary coating system that meets or exceeds the corrosion protection of hot dipped galvanizing per *ASTM A153* in accordance with *IBC* Section 2304.10 and *IRC* Section R317.3.
- 4.3.2.1 Starborn® H19, H23, and F23 screws were evaluated for use in wood chemically treated with waterborne alkaline copper quaternary, type D (ACQ-D).
- 4.3.2.2 Starborn® H19, H23, and F23 screws are approved for use in fire-retardant-treated lumber, provided the conditions set forth by the fire-retardant-treated lumber manufacturer are met, including appropriate strength reductions.

4.4 Wood Members

- 4.4.1 Solid sawn wood members connected with Starborn® Structural screws shall consist of lumber species or species combinations having a specific gravity of 0.42 to 0.55.
- 4.4.2 Structural composite lumber (LVL, LSL, PSL, etc.) connected with Starborn® Structural screws shall be recognized in evaluation reports having published equivalent specific gravities for lateral and withdrawal resistance. Equivalent specific gravities for structural composite lumber may be used in the design of connections using the specific gravities of the sawn lumber shown in Table 3, Table 4, Table 5, and Table 6.

4.5 Fastener Specifications

- 4.5.1 The fasteners evaluated in this TER are specified in Table 2 and Figure 1 through Figure 5.

Table 2. Starborn® Structural Screw Specifications

Product Name	Head Marking	Fastener Length (in)	Thread Length (in)	Unthreaded Shank Diameter ¹ (in)	Thread Diameter (in)		Nominal Bending Yield (f _y b) (psi)	Allowable Fastener Strength (lb)	
					Minor ²	Major		Tensile	Shear
Structural H19	D19 2.9	2- ⁷ / ₈	1.4	0.189	0.169	0.260	196,700	1,280	1,085
	D19 4	4	2- ¹ / ₄						
	D19 6	6	2- ¹ / ₂						
	D19 8	8							
	D19 10	10							
Structural H23	D23 4	4	2- ³ / ₈	0.229	0.209	0.307	183,155	1,980	1,490
	D23 5	5	3						
Structural F23	D23 2.9	2- ⁷ / ₈	1.4	0.229	0.209	0.307	183,155	1,980	1,490
	D23 4	4	2- ³ / ₈						
	D23 5	5	3						
	D23 6	6	2- ³ / ₄						
	D23 8	8							
	D23 10	10							
Structural F23-E	D23 3.4 XFE	3- ³ / ₈	1- ¹ / ₂	0.229	0.209	0.307	183,155	1,980	1,490
	D23 5 XFE	5							
	D23 6.8 XFE	6- ³ / ₄							
Structural F23-W	D23 2.9 XFW	2- ⁷ / ₈	1.4	0.229	0.209	0.307	183,155	1,980	1,490
	D23 4.4 XFW	4- ³ / ₈							
	D23 5.9 XFW	5- ⁷ / ₈							

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

1. Unthreaded Shank Diameter is measured on uncoated parts. Finished part dimensions are larger due to the thickness of the proprietary coating.
2. Minor thread diameter is calculated as the average value of upper and lower manufacturing tolerances.

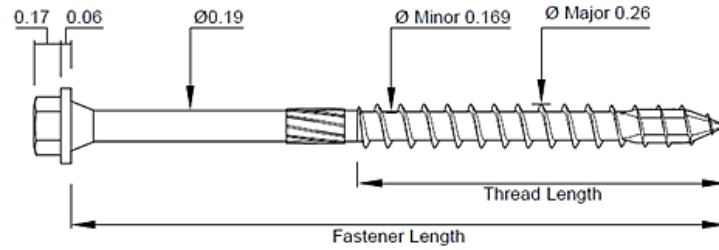
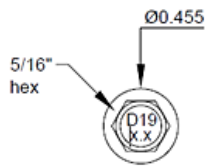


Figure 1. Starborn® Structural H19 Screw

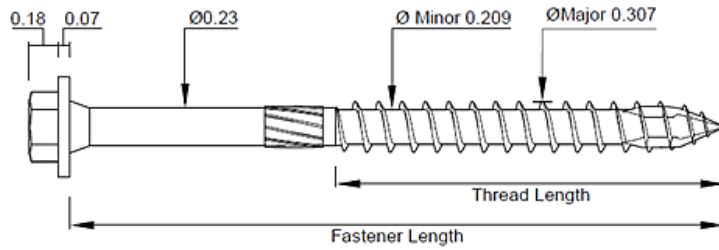
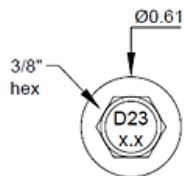


Figure 2. Starborn® Structural H23 Screw

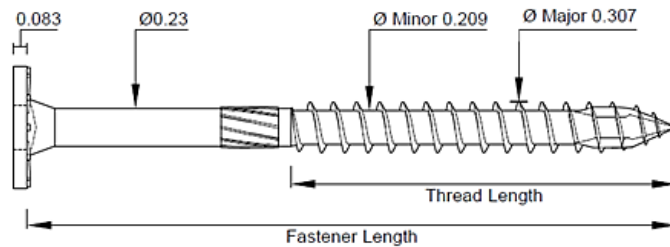
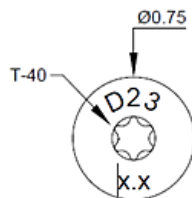


Figure 3. Starborn® Structural F23 Screw

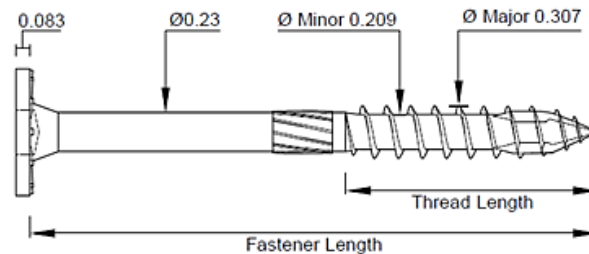
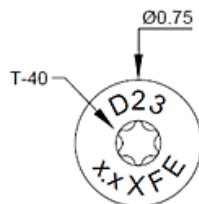


Figure 4. Starborn® Structural F23-E Screw

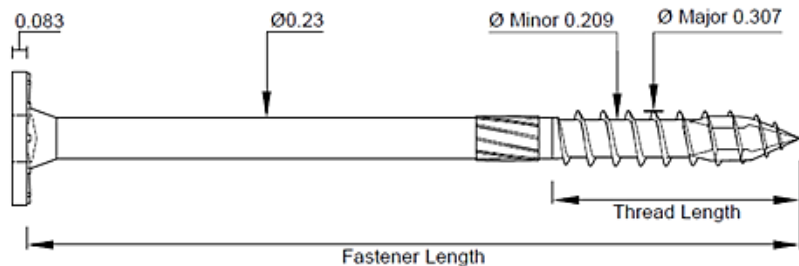
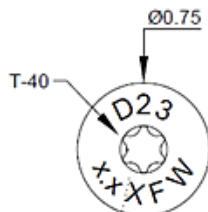


Figure 5. Starborn® Structural F23-W Screw



5 Applications

5.1 General

- 5.1.1 Starborn® Structural screws are self-tapping fasteners for wood-to-wood connections in conventional light frame construction. They provide resistance against withdrawal, head pull-through, axial and shear loads. See Section 6 for installation requirements.
- 5.1.2 Starborn® Structural screws can be used in applications including structural and general timber construction work. Typical uses include: deck ledger attachment, interior framing, staircase and multi-ply beam construction as well as on rafter insulation and façade attachment.
- 5.1.3 Starborn® Structural screws are installed without lead holes, as prescribed in *NDS*.
- 5.1.4 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.
- 5.1.5 *Design:*
 - 5.1.5.1 Design of Starborn® Structural screws is governed by the applicable code and the provisions for dowel type fasteners in *NDS*.
 - 5.1.5.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

5.2 Starborn® Structural Screw Reference Lateral Design Values

5.2.1 The reference lateral design values for shear load perpendicular and parallel to grain for Starborn® Structural screws are specified in Table 3.

Table 3. Starborn® Structural Screw Reference Lateral Design Values^{1,2} (Z)

Product Name	Fastener Length (in)	Thread Length (in)	Minimum Side Member Thickness (in)	Main Member Penetration (in)	Lateral Design Values (lb) by Species (Specific Gravity) and Load Orientation					
					HF/SPF (0.42)		DF/SP (0.50)		SCL (0.50)	
					Z Perp	Z Para	Z Perp	Z Para	Z Perp	Z Para
Structural H19	2- ⁷ / ₈	1.4	1- ¹ / ₂	1- ³ / ₈	230	230	225	245	225	245
	4	2- ¹ / ₄		2- ¹ / ₂	305	230	300	345	300	345
	6	2- ¹ / ₂		4- ¹ / ₂						
	8			6- ¹ / ₂						
	10			8- ¹ / ₂						
Structural H23	4	2- ³ / ₈	1- ¹ / ₂	2- ¹ / ₂	405	280	540	485	540	485
	5	3		3- ¹ / ₂						
Structural F23	2- ⁷ / ₈	1.4	1- ¹ / ₂	1- ³ / ₈	205	250	220	280	220	280
	4	2- ³ / ₈		2- ¹ / ₂	405	280	540	485	540	485
	5	3		3- ¹ / ₂						
	6	2- ³ / ₄		4- ¹ / ₂						
	8			6- ¹ / ₂						
	10			8- ¹ / ₂						
Structural F23-E	3- ³ / ₈		1- ¹ / ₂	1- ³ / ₄	1- ⁵ / ₈	-	-	-	-	220
	5	3- ¹ / ₄			540					485
	6- ³ / ₄	5								
		3- ¹ / ₂								
Structural F23-W	2- ⁷ / ₈	1.4	1- ¹ / ₂	1- ³ / ₈	205	250	220	280	220	280
	4- ³ / ₈			2- ⁷ / ₈	405	280	540	485	540	485
	5- ⁷ / ₈			4- ¹ / ₂						

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

HF = Hemlock-Fir, SPF = Spruce-Pine-Fir, DF = Douglas Fir, SP = Southern Pine, SCL = Structural Composite Lumber, Z Perp = lateral design value for connection with wood members loaded perpendicular to grain, Z Para = lateral design value for connection with wood members loaded parallel to grain.

- 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.
- Values shall be adjusted by all applicable adjustment factors per NDS.

5.3 Starborn® Structural Screw Reference Withdrawal Design Values (W)

5.3.1 The design provisions for withdrawal noted in NDS Table 12.2B apply to Starborn® Structural screws, unless otherwise noted in this TER. Reference withdrawal design values for Starborn® Structural screws in select lumber species are specified in Table 4. Maximum withdrawal design values for Starborn® Structural screws in select lumber species are specified in Table 5.


Table 4. Starborn® Structural Screw Reference Withdrawal Design Values (W) in Side Grain Applications^{1,2,3}

Product Name	Fastener Length (in)	Thread Length (in)	Allowable Withdrawal Design Values by Species (Specific Gravity) (lb/in)		
			HF/SPF (0.42)	DF/SP (0.50)	SCL (0.50)
1" Thread Penetration into Side Grain					
Structural H19	2-7⁄8	1.4	155	195	195
	4	2-1⁄4			
	6	2-1⁄2			
	8				
	10				
Structural H23	4	2-3⁄8	160	175	175
	5	3			
Structural F23	2-7⁄8	1.4	160	175	175
	4	2-3⁄8			
	5	3			
	6	2-3⁄4			
	8				
	10				
Structural F23-E	3-3⁄8				
	5				
	6-3⁄4				
Structural F23-W	2-7⁄8	1.4			
	4-3⁄8				
	5-7⁄8				
2" Thread Penetration into Side Grain					
Structural H19	4	2-1⁄4	165	195	195
	6	2-1⁄2			
	8				
	10				
Structural H23	4	2-3⁄8	225	270	270
	5	3			
Structural F23	4	2-3⁄8	225	270	270
	5	3			
	6	2-3⁄4			
	8				
	10				
SI: 1 in = 25.4 mm, 1 lb = 4.45 N					
1. Values shall be adjusted by all applicable adjustment factors per <i>NDS</i> Section 11.3 for wood screws.					
2. Fastener penetration is the threaded length embedded in the main member, including the tip.					
3. For Maximum Allowable Withdrawal Design Values, see Table 5.					

Table 5. Starborn® Structural Screw Maximum Withdrawal Design Values (W_{MAX}) in Side Grain Applications

Product Name	Fastener Length (in)	Thread Length (in)	Allowable Maximum Withdrawal Design Values by Species ^{1,2} (Specific Gravity) (lb)		
			HF/SPF (0.42)	DF/SP (0.50)	SCL (0.50)
Structural H19	2-7⁄8	1.4	225	275	275
	4	2-1⁄4	375	440	440
	6	2-1⁄2	420	490	490
	8				
	10				
Structural H23	4	2-3⁄8	560	675	675
	5	3	740	905	905
Structural F23	2-7⁄8	1.4	275	320	320
	4	2-3⁄8	560	675	675
	5	3	740	905	905
	6	2-3⁄4	670	815	815
	8				
	10				
Structural F23-E	3-3⁄8	1-1⁄2	305	360	360
	5				
	6-3⁄4				
Structural F23-W	2-7⁄8	1.4	275	320	320
	4-3⁄8				
	5-7⁄8				
SI: 1 in = 25.4 mm, 1 lb = 4.45 N					
1. Values shall be adjusted by all applicable adjustment factors per <i>NDS</i> Section 11.3 for wood screws.					
2. Maximum Withdrawal Design Values are based on full thread engagement, including the tip.					

5.4 Starborn® Structural Screw Head Pull-Through Design Values

5.4.1 The reference design values for head pull-through for Starborn® Structural screws are specified in Table 6.

Table 6. Starborn® Structural Screw Reference Head Pull-Through Design Values (P)

Product Name	Fastener Length (in)	Thread Length (in)	Allowable Head Pull-Through Design Values by Species ¹ (Specific Gravity) (lb)		
			HF/SPF (0.42)	DF/SP (0.50)	SCL (0.50)
Structural H19	2- ⁷ / ₈	1.4	230	255	255
	4	2- ¹ / ₄			
	6	2- ¹ / ₂			
	8				
	10				
Structural H23	4	2- ³ / ₈	365	575	575
	5	3			
Structural F23	2- ⁷ / ₈	1.4	520	490	490
	4	2- ³ / ₈			
	5	3			
	6	2- ³ / ₄			
	8				
	10				
Structural F23-E	3- ³ / ₈	1- ¹ / ₂			
	5				
	6- ³ / ₄				
Structural F23-W	2- ⁷ / ₈	1.4			
	4- ³ / ₈				
	4- ⁷ / ₈				

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

1. Values based on 1-¹/₂" thickness of wood member.

6 Installation

6.1 Installation shall comply with the manufacturer installation instructions and this TER. In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.

6.2 Installation Procedure

- 6.2.1 Starborn® Structural screws shall be installed using a high-torque low speed drill in accordance with the manufacturer installation instructions, applicable code, the approved construction documents, this TER, *NDS*, and standard framing practice as applied to wood fasteners.
- 6.2.2 The fasteners must be installed using a ⁵/₁₆" hex, ³/₈" hex or Torx® driver bit. Pre-drilling of pilot holes is not required but may be used where lumber is prone to splitting.
- 6.2.3 All fastener spacing, edge distance, and end distance shall be per Table 7 and Table 8.

Table 7. Starborn® Structural Screw Edge & End Distance Requirements for 0.19" Screw

Number	Installed Condition	Minimum Distance or Spacing ^{1,2} (in)		
		Face	Edge	End
1	Minimum End Distance	6	3	1-¾
2	Minimum Edge Distance	1-¾	¾	¾
3	Minimum Spacing Between Fasteners in a Row	2-⅞	2-⅞	2-⅞
4	Minimum Spacing Between Non-Staggered Rows	2-⅞	NA	NA
5	Minimum Spacing Between Staggered Rows	½	NA	NA
6	Minimum Stagger Between Fasteners in Adjacent Rows	½	NA	NA
SI: 1 in = 25.4 mm 1. Table values based on 0.19" screw 2. 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.				

Table 8. Starborn® Structural Screw Edge & End Distance Requirements for 0.23" Diameter Screw

Number	Installed Condition	Minimum Distance or Spacing ^{1,2} (in)		
		Face	Edge	End
1	Minimum End Distance	6	3	1-¾
2	Minimum Edge Distance	1-¾	¾	¾
3	Minimum Spacing Between Fasteners in a Row	3-½	3-½	3-½
4	Minimum Spacing Between Non-Staggered Rows	3-½	NA	NA
5	Minimum Spacing Between Staggered Rows	⅝	NA	NA
6	Minimum Stagger Between Fasteners in Adjacent Rows	⅝	NA	NA
SI: 1 in = 25.4 mm 1. Table values based on 0.23" screw 2. 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.				

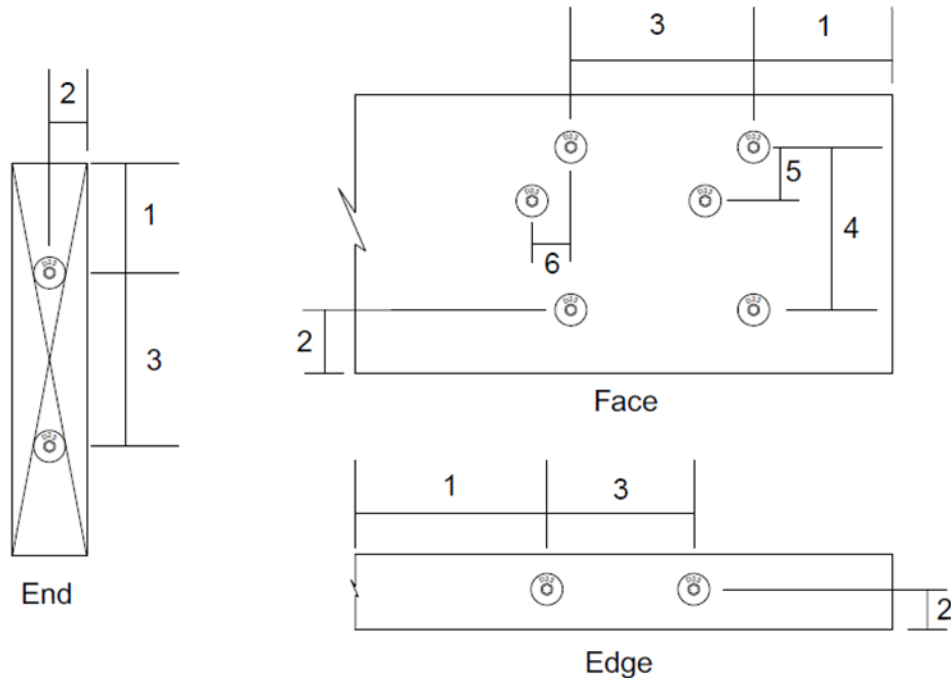


Figure 6. Starborn® Structural Screw Edge & End Distance Requirements

6.2.4 Minimum penetration is 1" unless otherwise stated in this TER. Install fasteners with head flush to the surface of the wood member.

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 Tensile strength testing in accordance with *AISI S904*
 - 7.1.3 Shear strength testing in accordance with *AISI S904*
 - 7.1.4 Lateral strength testing in accordance with *ASTM D1761*
 - 7.1.5 Withdrawal strength testing in accordance with *ASTM D1761*
 - 7.1.6 Head pull-through strength 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 installation instructions, the product(s) listed in Section 1 are approved for the following:
- 8.1.1 Starborn® Structural screws are a suitable alternative to the requirements of the *IBC* Section 1604.8.3 and *IRC* Section R507.9⁶.
- 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 104.10⁷ 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 The Starborn® Structural screws covered in this TER shall be installed in accordance with this TER and the manufacturer installation instructions.
- 9.2 For conditions not covered in this TER, connections shall be designed in accordance with generally accepted engineering practice. When the capacity of a connection is controlled by fastener metal strength rather than wood strength, the metal strength must not be multiplied by the adjustment factors specified in the *NDS*.
- 9.3 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 9.4 Manufacturer installation instructions shall be followed as provided in Section 6.
- 9.5 Starborn® Structural screws are produced by Starborn® Industries, Inc. at its facilities located in Edison, NJ.
- 9.6 Starborn® Structural screws are produced under a quality control program subject to periodic inspections performed by an approved agency in accordance with *IBC* Section 1703.5.2.
- 9.7 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.
- 9.8 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.

⁶ 2015 *IRC* Section R507.2

⁷ 2018 *IFC* Section 104.9



- 9.9 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).
- 9.10 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.11 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.
- 9.12 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.
- 9.13 This TER shall be reviewed for code compliance by the AHJ in concert with *IBC* Section 104.
- 9.14 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(s) listed in Section 1 are identified by a label on the board or packaging material bearing the manufacturer name, product name, TER number, and other information to confirm code compliance.
- 10.2 Individual fasteners are marked with a head stamp indicating fastener diameter and length as shown in Table 2.
- 10.3 Additional technical information can be found at starbornindustries.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.



Issue Date: January 11, 2021
Subject to Renewal: January 1, 2024

FBC Supplement to TER 1703-05

REPORT HOLDER: Starborn® Industries, Inc.

1 Evaluation Subject

- 1.1 Starborn® Structural Screws

2 Purpose and Scope

2.1 Purpose

- 2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show Starborn® Structural Screws, recognized in TER 1703-05, have also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 Applicable Code Editions

- 2.2.1 *FBC-B—17, 20: Florida Building Code – Building (FL 30525)*
- 2.2.2 *FBC-R—17, 20: Florida Building Code – Residential (FL 30525)*

3 Conclusions

- 3.1 Starborn® Structural Screws, described in TER 1703-05, comply with the *FBC-B* and *FBC-R* and are subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the *IBC* and *IRC* and the *FBC-B* and *FBC-R* applicable to this TER, they are listed here.
 - 3.2.1 *FBC-B* Section 104.4 and Section 110.4 are reserved.
 - 3.2.2 *FBC-R* Section R104 and Section R109 are reserved.

4 Conditions of Use

- 4.1 Starborn® Structural Screws, described in TER 1703-05, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in TER 1703-05
 - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of *FBC-B* Chapter 16 and Chapter 17, as applicable.



Issue Date: November 8, 2021
Subject to Renewal: January 1, 2024

LABC and LARC Supplement to TER 1703-05

REPORT HOLDER: Starborn® Industries, Inc.

1 Evaluation Subject

- 1.1 Starborn® Structural Screws

2 Purpose and Scope

2.1 Purpose

- 2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show Starborn® Structural Screws, recognized in TER 1703-05, has also been evaluated for compliance with the codes listed below as adopted by the Los Angeles Department of Building and Safety (LADBS).

2.2 Applicable Code Editions

- 2.2.1 LABC—17, 20: Los Angeles Building Code
- 2.2.2 LARC—17, 20: Los Angeles Residential Code

3 Conclusions

- 3.1 Starborn® Structural Screws, described in TER 1703-05, comply with LABC and LARC and is subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the IBC and IRC and the LABC and LARC applicable to this TER, they are listed here.
 - 3.2.1 LABC Section 91.104.2.6 replaces IBC Section 104.11
 - 3.2.2 LARC Section 91.104.2.6 replaces IRC Section R104.11
 - 3.2.3 LABC Section 91.104.2.2 replaces IBC Section 104.4
 - 3.2.4 LABC Section 91.108 replaces IBC Section 110.4
 - 3.2.5 LARC Section 91.104.2.2 replaces IRC Section R104.4
 - 3.2.6 LARC Section 91.108 replaces IRC Section R109.2
 - 3.2.7 LABC Section 91.108.5 replaces IBC Section 110.3

4 Conditions of Use

- 4.1 Starborn® Structural Screws, described in TER 1703-05, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in TER 1703-05
 - 4.1.2 The design, installation, conditions of use, and identification of Starborn® Structural Screws are in accordance with the 2018 *International Building Code (IBC)* provisions noted in TER 1703-05.
 - 4.1.3 The design, installation, and inspections are in accordance with additional requirements of LABC Chapter 16 and 17, as applicable.