

# Listing and Technical Evaluation Report™

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## Starborn® Structural Screws: Fastener Properties and Design Values

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### CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

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

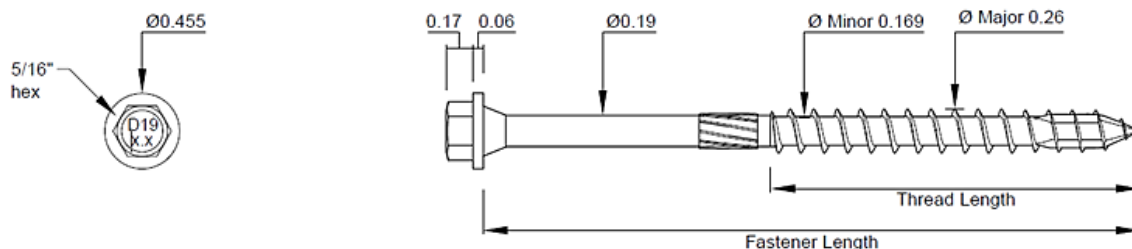
## 1 Innovative Products Evaluated<sup>i</sup>

### 1.1 Starborn® Structural Screws

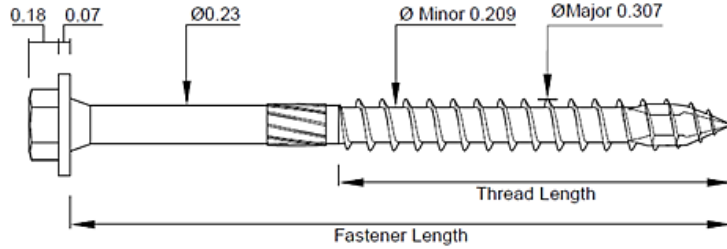
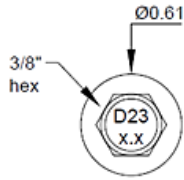
- 1.1.1 Starborn® Structural H19 Screws
- 1.1.2 Starborn® Structural F19 Screws
- 1.1.3 Starborn® Structural H23 Screws
- 1.1.4 Starborn® Structural F23 Screws
- 1.1.5 Starborn® Structural F23-E Screws
- 1.1.6 Starborn® Structural F23-W Screws

## 2 Product Description and Materials

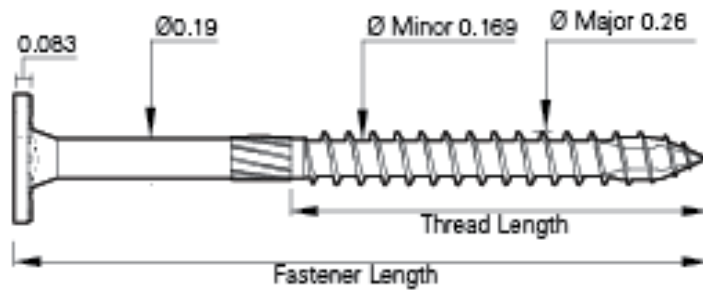
2.1 The innovative products evaluated in this report are shown in **Figure 1** through **Figure 6**, and listed in **Table 1**.



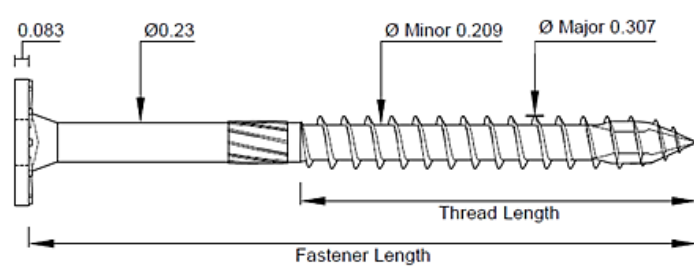
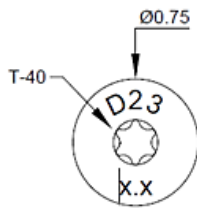
**Figure 1.** Starborn® Structural H19 Screw



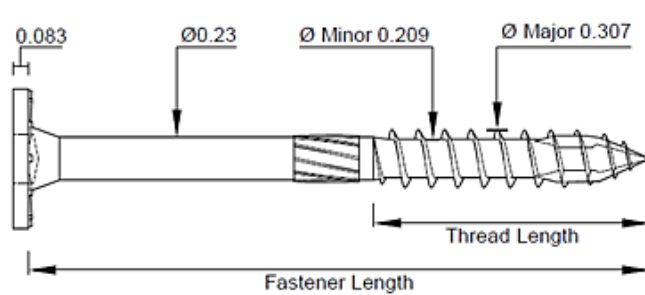
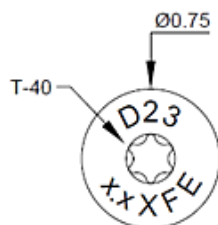
**Figure 2.** Starborn® Structural H23 Screw



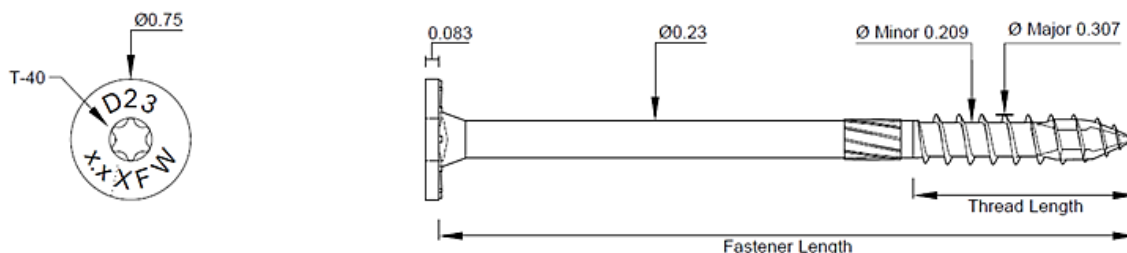
**Figure 3.** Starborn® Structural F19 Screw



**Figure 4.** Starborn® Structural F23 Screw



**Figure 5.** Starborn® Structural F23-E Screw



**Figure 6.** Starborn® Structural F23-W Screw

**Table 1.** Starborn® Structural Fastener Designation and Product Name

Product Name	Unthreaded Shank Diameter <sup>1</sup> (in)	Head Type	Coating Type (Application)
Structural H19	0.19	Hex ( <sup>5</sup> / <sub>16</sub> in)	Exterior Use
Structural F19		Flat (T-30)	
Structural H23	0.23	Hex ( <sup>3</sup> / <sub>8</sub> in)	
Structural F23		Flat (T-40)	
Structural F23-E			
Structural F23-W			
Interior Use			

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.

## 2.2 General

2.2.1 Starborn® Structural Screws are partially-threaded, self-drilling, dowel-type fasteners designed for use in wood-to-wood connections.

2.2.1.1 Starborn® Structural H19 Screws are hex-driven (<sup>5</sup>/<sub>16</sub>" ) screws with an integrated washer.

2.2.1.2 Starborn® Structural F19 Screws are Torx-driven flat head screws.

2.2.1.3 Starborn® Structural H23 Screws are hex-driven (<sup>3</sup>/<sub>8</sub>" ) screws with an integrated washer.

2.2.1.4 Starborn® Structural F23 Screws are Torx-driven flat head screws.

2.2.1.5 Starborn® Structural F23-E Screws are Torx-driven flat head screws.

2.2.1.6 Starborn® Structural F23-W Screws are Torx-driven flat head screws.

## 2.3 Fastener Material

2.3.1 Starborn® Structural Screws are manufactured with heat-treated carbon steel grade 10B21 wire using a standard cold-forming process.

2.3.2 All fasteners are produced in accordance with the approved quality control procedures referred to in Section 12.

## 2.4 Corrosion Resistance

2.4.1 Starborn® Structural Screws are zinc plated and overcoated with a proprietary epoxy coating.

2.4.1.1 Starborn® H19, F19, 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 12.

2.4.1.1.1 Starborn® H19, F19, H23, and F23 screws were evaluated for use in wood chemically treated with waterborne alkaline copper quaternary, type D (ACQ-D).

- 2.4.1.1.2 These fasteners are alternates to hot-dip-zinc galvanized fasteners.
- 2.4.1.1.3 The proprietary coating system 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.

2.4.1.2 Starborn® F23-E and F23-W screws are designated for interior, dry use only.

## 2.5 Pressure-Preservative Treated (PPT) Wood Applications

- 2.5.1 Starborn® H19, F19, H23, and F23 screws having the proprietary coating are recognized for use in PPT lumber provided the conditions set forth by the PPT lumber manufacturer are met, including appropriate strength reductions.

## 2.6 Fire-Retardant Treated (FRT) Wood Applications

- 2.6.1 Starborn® H19, F19, H23, and F23 screws having the proprietary coating are recognized for use in FRT lumber provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

## 2.7 Wood Members

- 2.7.1 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.
- 2.7.2 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**.

## 2.8 Fastener Specifications

- 2.8.1 **Table 2** lists the dimensions and mechanical properties of Starborn® Structural Screws that are evaluated in this report.

**Table 2.** Starborn® Structural Screw Specifications

Product Name	Head Marking	Fastener Length <sup>1</sup> (in)	Thread Length <sup>2</sup> (in)	Unthreaded Shank Diameter <sup>3</sup> (in)	Thread Diameter (in)		Nominal Bending Yield, F <sub>yb</sub> (psi)	Allowable Fastener Strength (lb)	
					Minor <sup>4</sup>	Major		Tensile	Shear
Structural H19	D19 2.9	2 <sup>7</sup> / <sub>8</sub>	1.4	0.189	0.169	0.260	196,700	1,280	1,085
	D19 4	4	2 <sup>1</sup> / <sub>4</sub>						
	D19 6	6	2 <sup>1</sup> / <sub>2</sub>						
	D19 8	8							
	D19 10	10							
Structural F19	D19 2.9	2 <sup>7</sup> / <sub>8</sub>	2	0.189	.169	.260	192,880	1,495	1,016
	D19 4	4 <sup>1</sup> / <sub>2</sub>	2						
	D19 6	6	2						

**Table 2.** Starborn® Structural Screw Specifications

Product Name	Head Marking	Fastener Length <sup>1</sup> (in)	Thread Length <sup>2</sup> (in)	Unthreaded Shank Diameter <sup>3</sup> (in)	Thread Diameter (in)		Nominal Bending Yield, F <sub>yb</sub> (psi)	Allowable Fastener Strength (lb)	
					Minor <sup>4</sup>	Major		Tensile	Shear
	D19 8	8							
	D19 10	10							
	D19 12	12							
	D19 14	14							
	D19 16	16							
Structural H23	D23 4	4	2 <sup>3</sup> / <sub>8</sub>	0.229	0.209	0.307	183,155	1,980	1,490
	D23 5	5	3						
Structural F23	D23 2.9	2 <sup>7</sup> / <sub>8</sub>	1.4	0.229	0.209	0.307	183,155	1,980	1,490
	D23 4	4	2 <sup>3</sup> / <sub>8</sub>						
	D23 5	5	3						
	D23 6	6	2 <sup>3</sup> / <sub>4</sub>						
	D23 8	8							
	D23 10	10							
Structural F23-E	D23 3.4 XFE	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	0.229	0.209	0.307	183,155	1,980	1,490
	D23 5 XFE	5							
	D23 6.8 XFE	6 <sup>3</sup> / <sub>4</sub>							
Structural F23-W	D23 2.9 XFW	2 <sup>7</sup> / <sub>8</sub>	1.4	0.229	0.209	0.307	183,155	1,980	1,490
	D23 4.4 XFW	4 <sup>3</sup> / <sub>8</sub>							
	D23 5.9 XFW	5 <sup>7</sup> / <sub>8</sub>							

**Table 2.** Starborn® Structural Screw Specifications

Product Name	Head Marking	Fastener Length <sup>1</sup> (in)	Thread Length <sup>2</sup> (in)	Unthreaded Shank Diameter <sup>3</sup> (in)	Thread Diameter (in)		Nominal Bending Yield, F <sub>yb</sub> (psi)	Allowable Fastener Strength (lb)	
					Minor <sup>4</sup>	Major		Tensile	Shear
SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa									
1. Measured from the underside of the head to the tip.									
2. Includes tip.									
3. Unthreaded Shank Diameter is measured on uncoated parts. Finished part dimensions are larger due to the thickness of the proprietary coating.									
4. Minor thread diameter is calculated as the average value of upper and lower manufacturing tolerances.									

2.9 As needed, review material properties for design in Section 6 and to regulatory evaluation in Section 8.

### 3 Definitions

- 3.1 New Materials<sup>ii</sup> are defined as building materials, equipment, appliances, systems, or methods of construction not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.<sup>iii</sup> The design strengths and permissible stresses shall be established by tests<sup>iv</sup> and/or engineering analysis.<sup>v</sup>
- 3.2 Duly Authenticated Reports<sup>vi</sup> and Research Reports<sup>vii</sup> are test reports and related engineering evaluations, which are written by an approved agency<sup>viii</sup> and/or an approved source.<sup>ix</sup>
- 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).<sup>x</sup>
- 3.3 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory.
- 3.4 An approved source is “approved” when a professional engineer (i.e., Registered Design Professional [RDP]) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.<sup>xi</sup>
- 3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.
- 3.5.1 The Center for Building Innovation (CBI) is ANAB<sup>xii</sup> ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce<sup>xiii</sup> the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing<sup>xiv</sup> stating the nonconformance and the path to its cure.
- 3.7 The regulatory authority shall accept Duly Authenticated Reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.<sup>xv</sup>
- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.<sup>xvi</sup> Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.<sup>xvii</sup>
- 3.9 Approval equity is a fundamental commercial and legal principle.<sup>xviii</sup>



## 4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation<sup>xix</sup>

### 4.1 Standards

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

### 4.2 Regulations

- 4.2.1 *IBC – 15, 18, 21: International Building Code®*
- 4.2.2 *IRC – 15, 18, 21: International Residential Code®*
- 4.2.3 *FBC-B—20, 23: Florida Building Code – Building<sup>xx</sup> (FL 30525)*
- 4.2.4 *FBC-R—20, 23: Florida Building Code – Residential<sup>xxi</sup> (FL 30525)*
- 4.2.5 *LABC—17, 20: City of Los Angeles Building Code<sup>xxii</sup>*
- 4.2.6 *LARC—17, 20: City of Los Angeles Residential Code<sup>xxiii</sup>*

## 5 Listed<sup>xxiv</sup>

- 5.1 A nationally recognized testing laboratory such as CBI, states that the materials, designs, methods of construction and/or equipment have met nationally recognized standards and/or have been tested and found suitable for use in a specified manner.

## 6 Tabulated Properties Generated from Nationally Recognized Standards

### 6.1 General

- 6.1.1 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 9 for installation requirements.
- 6.1.2 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.
- 6.1.3 Starborn® Structural Screws are installed without lead holes, as prescribed in NDS.

### 6.2 Design

- 6.2.1 Design of Starborn® Structural Screws is governed by the applicable code and the provisions for dowel type fasteners in NDS.
- 6.2.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

### 6.3 Starborn® Structural Screw Reference Lateral Design Values

- 6.3.1 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<sup>1,2</sup> (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 <sup>7</sup> / <sub>8</sub>	1.4	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	300	375	375	440	375	440
	4	2 <sup>1</sup> / <sub>4</sub>		2 <sup>1</sup> / <sub>2</sub>	305	270	435	415	435	415
	6	2 <sup>1</sup> / <sub>2</sub>		4 <sup>1</sup> / <sub>2</sub>						
	8			6 <sup>1</sup> / <sub>2</sub>						
	10			8 <sup>1</sup> / <sub>2</sub>						
Structural F19	2 <sup>7</sup> / <sub>8</sub>		2	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	290	315	380	335	380
	4 <sup>1</sup> / <sub>2</sub>	2	2 <sup>1</sup> / <sub>2</sub>		290	315	380	335	380	335
	6	2	4 <sup>1</sup> / <sub>2</sub>		315	350	425	370	425	370
	8		6 <sup>1</sup> / <sub>2</sub>		340	305	425	375	425	375
	10		8 <sup>1</sup> / <sub>2</sub>		370	325	465	365	465	365
	12		10 <sup>1</sup> / <sub>2</sub>							
	14		12 <sup>1</sup> / <sub>2</sub>							
	16		14 <sup>1</sup> / <sub>2</sub>							
Structural H23	4	2 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	420	420	560	560	560	560
	5	3		3 <sup>1</sup> / <sub>2</sub>						
Structural F23	2 <sup>7</sup> / <sub>8</sub>	1.4	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	365	415	405	540	405	540
	4	2 <sup>3</sup> / <sub>8</sub>		2 <sup>1</sup> / <sub>2</sub>	420	420	560	560	560	560
	5	3		3 <sup>1</sup> / <sub>2</sub>						
	6	2 <sup>3</sup> / <sub>4</sub>		4 <sup>1</sup> / <sub>2</sub>						
	8			6 <sup>1</sup> / <sub>2</sub>						
	10			8 <sup>1</sup> / <sub>2</sub>						
Structural F23-E	3 <sup>3</sup> / <sub>8</sub>		1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>8</sub>	-	-	-	-	405
	5	3 <sup>1</sup> / <sub>4</sub>			560					560
	6 <sup>3</sup> / <sub>4</sub>	5								
				3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>					
Structural F23-W	2 <sup>7</sup> / <sub>8</sub>	1.4	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	365	415	405	540	405	540
	4 <sup>3</sup> / <sub>8</sub>			2 <sup>7</sup> / <sub>8</sub>	420	420	560	560	560	560
	5 <sup>7</sup> / <sub>8</sub>			4 <sup>1</sup> / <sub>2</sub>						

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.



#### 6.4 Starborn® Structural Screw Reference Withdrawal Design Values (W)

- 6.4.1 The design provisions for withdrawal noted in NDS Table 12.2B apply to Starborn® Structural Screws, unless otherwise noted in this report.
- 6.4.2 Reference withdrawal design values for Starborn® Structural Screws in select lumber species are specified in **Table 4**.
- 6.4.3 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<sup>1,2,3</sup>

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 <sup>7</sup> / <sub>8</sub>	1.4	255	340	340			
	4	2 <sup>1</sup> / <sub>4</sub>						
	6	2 <sup>1</sup> / <sub>2</sub>						
	8							
	10							
Structural H23	4	2 <sup>3</sup> / <sub>8</sub>	280	360	360			
	5	3						
Structural F19	2 <sup>7</sup> / <sub>8</sub>	2	255	340	340			
	4 <sup>1</sup> / <sub>2</sub>	2						
	6	2						
	8							
	10							
	12							
	14							
	16							
Structural F23	2 <sup>7</sup> / <sub>8</sub>	1.4	280	360	360			
	4	2 <sup>3</sup> / <sub>8</sub>						
	5	3						
	6	2 <sup>3</sup> / <sub>4</sub>						
	8							
	10							
Structural F23-E	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	280	360	360			
	5							
	6 <sup>3</sup> / <sub>4</sub>							
Structural F23-W	2 <sup>7</sup> / <sub>8</sub>	1.4				280	360	360
	4 <sup>3</sup> / <sub>8</sub>							
	5 <sup>7</sup> / <sub>8</sub>							

**Table 4.** Starborn® Structural Screw Reference Withdrawal Design Values (W) in Side Grain Applications<sup>1,2,3</sup>

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)
2" Thread Penetration into Side Grain					
Structural H19	4	2 <sup>1</sup> / <sub>4</sub>	300	395	395
	6	2 <sup>1</sup> / <sub>2</sub>			
	8				
	10				
Structural F19	4 <sup>1</sup> / <sub>2</sub>	2	300	395	395
	6	2			
	8				
	10				
	12				
	14				
	16				
Structural H23	4	2 <sup>3</sup> / <sub>8</sub>	380	445	445
	5	3			
Structural F23	4	2 <sup>3</sup> / <sub>8</sub>	380	445	445
	5	3			
	6	2 <sup>3</sup> / <sub>4</sub>			
	8				
	10				

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

1. Values shall be adjusted by all applicable adjustment factors per NDS 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 <sup>1,2</sup> (Specific Gravity) (lb)		
			HF/SPF (0.42)	DF/SP (0.50)	SCL (0.50)
Structural H19	2 <sup>7</sup> / <sub>8</sub>	1.4	395	520	520
	4	2 <sup>1</sup> / <sub>4</sub>	685	905	905
	6	2 <sup>1</sup> / <sub>2</sub>	775	1,015	1,015
	8				
	10				
Structural F19	2 <sup>7</sup> / <sub>8</sub>	2	395	520	520
	4 <sup>1</sup> / <sub>2</sub>	2	685	905	905
	6	2	775	1,015	1015
	8				
	10				
	12				
	14				
Structural H23	4	2 <sup>3</sup> / <sub>8</sub>	940	1,090	1,090
	5	3	1,240	1,420	1,420
Structural F23	2 <sup>7</sup> / <sub>8</sub>	1.4	470	570	570
	4	2 <sup>3</sup> / <sub>8</sub>	940	1,090	1,090
	5	3	1,240	1,420	1,420
	6	2 <sup>3</sup> / <sub>4</sub>	1,120	1,290	1,290
	8				
	10				
Structural F23-E	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	520	625	625
	5				
	6 <sup>3</sup> / <sub>4</sub>				
Structural F23-W	2 <sup>7</sup> / <sub>8</sub>	1.4	470	570	570
	4 <sup>3</sup> / <sub>8</sub>				
	5 <sup>7</sup> / <sub>8</sub>				

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

1. Values shall be adjusted by all applicable adjustment factors per NDS Section 11.3 for wood screws.
2. Maximum Withdrawal Design Values are based on full thread engagement, including the tip.

## 6.5 Starborn® Structural Screw Head Pull-Through Design Values

6.5.1 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)

Fastener Type:	Structural H19		Structural H23		Structural F19		Structural F23	
Side Member Thickness	HF/SPF (0.42)	DF/SP (0.50)	HF/SPF (0.42)	DF/SP (0.50)	HF/SPF (0.42)	DF/SP (0.50)	HF/SPF (0.42)	DF/SP (0.50)
1 1/2"	405	600	775	1,075	855	975	970	1,210
1 1/8"	400	595	580	805	640	730	730	905
1"	355	525	515	715	570	650	645	805
3/4"	265	395	385	540	430	490	485	605
23/32"	255	380	370	515	410	465	465	580
5/8"	225	330	325	450	355	405	405	505
19/32"	210	315	305	425	340	385	385	480
1/2"	180	265	260	360	285	325	325	405
15/32"	165	245	240	335	265	305	305	380
7/16"	155	230	225	315	250	285	285	355
3/8"	135	200	195	270	215	245	245	305
5/16"	110	165	160	225	180	205	200	250

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

- Tabulated values are for a standard load duration. Values shall be factored by all applicable modification factors per NDS for wood screws.
- For structural composite lumber and wood structural panels, use the assigned specific gravity for the product and use the corresponding lumber design value shown above.

6.6 Where the application falls outside of the performance evaluation, conditions of use, and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

## 7 Certified Performance<sup>xxv</sup>

- All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.<sup>xxvi</sup>
- The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.<sup>xxvii</sup>

## 8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 Starborn® Structural Screws comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
- 8.1.1 Bending yield in accordance with ASTM F1575
  - 8.1.2 Tensile strength in accordance with AISI S904
  - 8.1.3 Shear strength in accordance with AISI S904
  - 8.1.4 Lateral strength in accordance with ASTM D1761
  - 8.1.5 Withdrawal strength in accordance with ASTM D1761
  - 8.1.6 Head pull-through strength in accordance with ASTM D1761
  - 8.1.7 Corrosion resistance of fasteners meeting or exceeding the protection afforded hot dipped galvanized fasteners in accordance with ASTM A153
- 8.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this report.
- 8.3 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this report were performed by DrJ Engineering, LLC (DrJ), an [ISO/IEC 17065 accredited certification body](#) and a professional engineering company operated by [RDP/approved sources](#). DrJ is qualified<sup>xxviii</sup> to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.
- 8.4 Engineering evaluations are conducted with DrJ's ANAB [accredited ICS code scope](#) of expertise, which are also its areas of professional engineering competence.
- 8.5 Any regulation specific issues not addressed in this section are outside the scope of this report.

## 9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.
- 9.3 *Installation Procedure*
- 9.3.1 Starborn® Structural Screws shall be installed using a high-torque, low-speed drill in accordance with the [manufacturer installation instructions](#).
  - 9.3.2 The fasteners must be installed using a  $\frac{5}{16}$ " hex,  $\frac{3}{8}$ " hex, T-30 Torx®, or T-40 Torx® driver bit depending on the fastener used. Pre-drilling of pilot holes is not required but may be used where lumber is prone to splitting.

9.3.3 All fastener spacing, edge distance, and end distance shall be per **Table 7** and **Table 8**.

9.3.3.1 Location of the distances are shown in **Figure 7**.

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

Number	Installed Condition	Minimum Distance or Spacing <sup>1,2</sup> (in)		
		Face	Edge	End
1	Minimum End Distance	6	3	1 <sup>3</sup> / <sub>4</sub>
2	Minimum Edge Distance	1 <sup>3</sup> / <sub>4</sub>	3/4	3/4
3	Minimum Spacing Between Fasteners in a Row	2 <sup>7</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>
4	Minimum Spacing Between Non-Staggered Rows	2 <sup>7</sup> / <sub>8</sub>	NA	NA
5	Minimum Spacing Between Staggered Rows	1/2	NA	NA
6	Minimum Stagger Between Fasteners in Adjacent Rows	1/2	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.

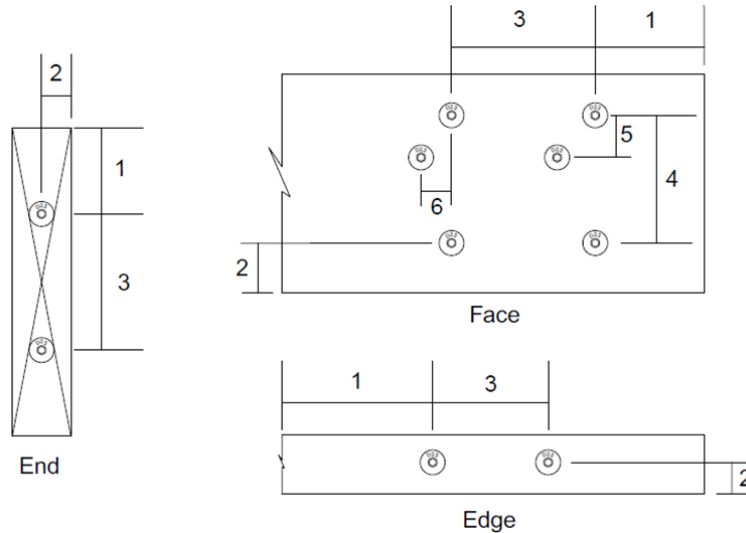
**Table 8.** Starborn® Structural Screw Edge & End Distance Requirements for 0.23" Diameter Screw

Number	Installed Condition	Minimum Distance or Spacing <sup>1,2</sup> (in)		
		Face	Edge	End
1	Minimum End Distance	6	3	1 <sup>3</sup> / <sub>4</sub>
2	Minimum Edge Distance	1 <sup>3</sup> / <sub>4</sub>	3/4	3/4
3	Minimum Spacing Between Fasteners in a Row	3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>
4	Minimum Spacing Between Non-Staggered Rows	3 <sup>1</sup> / <sub>2</sub>	NA	NA
5	Minimum Spacing Between Staggered Rows	5/8	NA	NA
6	Minimum Stagger Between Fasteners in Adjacent Rows	5/8	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 7.** Starborn® Structural Screw Spacing Diagram

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

## 10 Substantiating Data

- 10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
- 10.1.1 Bending yield testing in accordance with ASTM F1575
  - 10.1.2 Tensile strength testing in accordance with AISI S904
  - 10.1.3 Shear strength testing in accordance with AISI S904
  - 10.1.4 Lateral strength testing in accordance with ASTM D1761
  - 10.1.5 Withdrawal strength testing in accordance with ASTM D1761
  - 10.1.6 Head pull-through strength testing in accordance with ASTM D1761
- 10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.
- 10.3 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability and safety.
- 10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.





- 10.5 Testing and engineering analysis: The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.<sup>xxix</sup>
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Starborn® Structural Screws on the [DrJ Certification](#) website.

## 11 Findings

- 11.1 As outlined in Section 8, Starborn® Structural Screws have performance characteristics that were tested and/or meet applicable regulations and are suitable for use pursuant to its specified purpose.
- 11.2 When used and installed in accordance with this [duly authenticated report](#) and the manufacturer installation instructions, Starborn® Structural Screws shall be approved for the following applications:
- 11.2.1 Starborn® Structural Screws are a suitable alternative to the requirements of [IBC Section 1604.8.3](#) and [IRC Section R507.9](#).<sup>xxx</sup>
- 11.2.2 These products have been evaluated in the context of the codes listed in Section 2 and are 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:
- 11.2.2.1 No known variations.
- 11.3 Any application specific issues not addressed herein can be engineered by an [RDP](#). Assistance with engineering is available from Starborn® Industries, Inc.
- 11.4 [IBC Section 104.11](#) ([IRC Section R104.11](#) and [IFC Section 104.10](#)<sup>xxxi</sup> are similar) in pertinent part 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.
- 11.5 **Approved:**<sup>xxxii</sup> Building regulations require that the [building official](#) shall accept [duly authenticated reports](#).<sup>xxxiii</sup>
- 11.5.1 An [approved agency](#) is “approved” when it is [ANAB ISO/IEC 17065 accredited](#).
- 11.5.2 An [approved source](#) is “approved” when an [RDP](#) is properly licensed to transact engineering commerce.
- 11.5.3 Federal law, [Title 18 US Code Section 242](#), requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 11.6 DrJ is a licensed engineering company, employs licensed RDPs and is an [ANAB-Accredited Product Certification Body – Accreditation #1131](#).
- 11.7 Through the [IAF Multilateral Agreements](#) (MLA), this [Duly Authenticated Report](#) can be used to obtain product approval in any [jurisdiction](#) or [country](#) because all ANAB ISO/IEC 17065 [Duly Authenticated Reports](#) are equivalent.<sup>xxxiv</sup>

## 12 Conditions of Use

- 12.1 Material properties shall not fall outside the boundaries defined in Section 8.
- 12.2 As defined in Section 8, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 12.3 As listed herein, Starborn® Structural Screws shall be:
- 12.3.1 Installed in accordance with this report and the [manufacturer installation instructions](#).



- 12.4 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.
- 12.5 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 12.6 Manufacturer installation instructions shall be followed as provided in Section 9.
- 12.7 Starborn® Structural Screws are produced by Starborn® Industries, Inc. at its facilities located in Edison, New Jersey.
- 12.8 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.
- 12.9 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
- 12.9.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.
  - 12.9.2 This report and the installation instructions shall be submitted at the time of permit application.
  - 12.9.3 These innovative products have an internal quality control program and a third-party quality assurance program.
  - 12.9.4 At a minimum, these innovative products shall be installed per Section 9 of this report.
  - 12.9.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
  - 12.9.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.
  - 12.9.7 The application of these innovative products in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.
- 12.10 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11,"* all of IBC Section 104, and IBC Section 105.4.
- 12.11 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 12.12 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.



### 13 Identification

- 13.1 The innovative products listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.
- 13.2 Additional technical information can be found at [www.starbornindustries.com](http://www.starbornindustries.com).

### 14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit [drjcertification.org](http://drjcertification.org).
- 14.2 For information on the status of this report, please contact [DrJ Certification](#).

### 15 Approved for Use Pursuant to U.S. and International Legislation Defined in Appendix A

- 15.1 Starborn® Structural Screws are included in this report published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report meets the legislative intent and definition of being acceptable to the AHJ.



## Appendix A

### 1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
  - 1.1.1 Advance Innovation,
  - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
  - 1.1.3 Benefit consumers through lower prices, better quality and greater choice.
- 1.2 **Adopted Legislation:** The following local, state and federal regulations affirmatively authorize these innovative products to be approved by AHJs, delegates of building departments and/or delegates of an agency of the federal government:
  - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to “protect economic freedom and opportunity by promoting free and fair competition in the marketplace.”
  - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
  - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),<sup>xxxv</sup> where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years<sup>xxxvi</sup> and/or a \$5,000,000 fine or 3 times the value of<sup>xxxvii</sup> the Intellectual Property (IP) and Trade Secrets (TS).
    - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
  - 1.2.4 For new materials<sup>xxxviii</sup> that are not specifically provided for in any regulation, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
  - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.<sup>xxxix</sup>
  - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation has been violated by an individual registered PE.
  - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.<sup>xl</sup>

- 1.3 **Approved<sup>xli</sup> by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards that apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.<sup>xlii</sup> The Superintendent of Building Approved Testing Agency Roster is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a DrJ Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.<sup>xliii</sup>
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed<sup>xliv</sup> an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement<sup>xlv</sup> (i.e., ANAB, International Accreditation Forum (IAF), etc.).
- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:
- 1.6.1 A certification mark or listing of an approved certification agency,
  - 1.6.2 A test report from an approved testing laboratory,
  - 1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or
  - 1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.
- 1.7 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods;
- 1.7.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
  - 1.7.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
  - 1.7.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,
  - 1.7.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or
  - 1.7.5 A statewide product approval issued by the Florida Building Commission.

- 1.8 The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642) and as a Florida Registered Engineer (i.e., ANE13741).
- 1.9 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.
- 1.10 **Approved by New Jersey:** Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,<sup>xvi</sup> it states: *"In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)"*.<sup>xvii</sup> Furthermore N.J.A.C 5:23-3.7 states: *"Municipal approvals of alternative materials, equipment, or methods of construction."*
- 1.10.1 **Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations.
- 1.10.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.
- 1.10.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC) and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.
- 1.10.2 The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide *"reports of engineering findings"*.
- 1.11 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14<sup>xlviii</sup> and Part 3280,<sup>xlix</sup> the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:
- 1.11.1 *"All construction methods shall be in conformance with accepted engineering practices"*
- 1.11.2 *"The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."*
- 1.11.3 *"The design stresses of all materials shall conform to accepted engineering practice."*



- 1.12 **Approval by US, Local and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.12.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.<sup>i</sup>
  - 1.12.2 For innovative alternatives and/or methods of construction, the building official shall accept duly authenticated reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.<sup>ii</sup>
    - 1.12.2.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.
    - 1.12.2.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.<sup>iii</sup>
  - 1.12.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.<sup>iii</sup>
- 1.13 **Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, designs, services and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.13.1 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
  - 1.13.2 **Approved:** The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services and/or methods of construction.
  - 1.13.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.<sup>iv</sup>
  - 1.13.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.<sup>iv</sup>
- 1.14 Approval equity is a fundamental commercial and legal principle.<sup>vi</sup>





Issue Date: January 11, 2021  
Subject to Renewal: January 1, 2025

## FBC Supplement to Report Number: 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 Report Supplement is to show Starborn® Structural Screws, recognized in Report Number 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—20, 23: Florida Building Code – Building (FL 30525)
- 2.2.2 FBC-R—20, 23: Florida Building Code – Residential (FL 30525)

### 3 Conclusions

- 3.1 Starborn® Structural Screws, described in Report Number 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 report, 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 Report Number 1703-05, must comply with all of the following conditions:
  - 4.1.1 All applicable sections in Report Number 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, 2025

## LABC and LARC Supplement to Report Number 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 Report Supplement is to show Starborn® Structural Screws, recognized in Report Number 1703-05, have 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 Report Number 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 report, 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 Report Number 1703-05, must comply with all of the following conditions:
  - 4.1.1 All applicable sections in Report Number 1703-05
  - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of LABC Chapter 16 and 17, as applicable.



## Notes

- i For more information, visit [drjcertification.org](http://drjcertification.org) or call us at 608-310-6748.
- ii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>
- iii Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review <https://www.justice.gov/atr/mission> and <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>
- iv <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as
- v The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:~:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice
- vi <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies
- vii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>
- viii [https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved\\_agency](https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency)
- ix [https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved\\_source](https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source)
- x <https://www.law.cornell.edu/uscode/text/18/1832> (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a [public records act](#). To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: [Intellectual Property and Trade Secrets](#).
- xi <https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional> AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- xii <https://www.cbiteest.com/accreditation/>
- xiii <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:~:text=to%20enforce%20the%20provisions%20of%20this%20code
- xiv <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:~:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1>:~:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore
- xv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11
- xvi <https://iaf.nu/en/about-iaf-mla/#>:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope
- xvii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xviii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- xix Unless otherwise noted, all references in this report are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.
- xx All references to the FBC-B are the same as the 2021 IBC and 2020 IRC unless otherwise noted in the Florida Supplement.
- xxi All references to FBC-R are the same as the 2021 IRC unless otherwise noted in the Florida Supplement.
- xxii All references to the LABC are the same as the 2018 IBC unless otherwise noted in the supplement at the end of this document.
- xxiii All references to the LARC are the same as the 2018 IBC unless otherwise noted in the supplement at the end of this document.
- xxiv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2>(Listed%20or%20certified); <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#listed> AND <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled>
- xxv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>
- xxvi <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades
- xxvii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur



- xxviii Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.
- xxix See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.
- xxx 2015 IRC Section R507.2
- xxxi 2018 IFC Section 104.9
- xxxii Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
- xxxiii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
- xxxiv Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xxxv <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
- xxxvi <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
- xxxvii <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>
- xxxviii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
- xxxix IBC 2021, Section 1706.1 Conformance to Standards
- xl IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General
- xli See **Section 11.6** for the distilled building code definition of **Approved**.
- xlii Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES
- xliii <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
- xliv New York City, The Rules of the City of New York, § 101-07 Approved Agencies
- xlv New York City, The Rules of the City of New York, § 101-07 Approved Agencies
- xlvi <https://up.codes/viewer/new-jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1>
- xlvii <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
- xlviii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
- xlxi <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
- i IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.
- ii IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.
- iii <https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional> AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- iiii IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.
- liv <https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope>
- lv True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- lvi <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>