

Technical Evaluation Report™

TER 1703-02

Starborn® Structural H19 Screws: Truss or Rafter
to Top Plate and Bottom Plate to Rim Board

Starborn® Industries, Inc.

Product:

Starborn® Structural H19 screws

Issue Date:

November 7, 2019

Revision Date:

March 17, 2023

Subject to Renewal:

January 1, 2024



Use the QR code to access the most recent version or a sealed copy of this Technical Evaluation Report (TER) at drjcertification.org.



COMPANY
INFORMATION:

Starborn® Industries, Inc.
45 Mayfield Ave
Edison, NJ 08837-3820

P: 800-596-7747
F: 732-381-9830

info@starbornindustries.com

starbornindustries.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES
SECTION: 06 05 23.13 - Nails

1 Product Evaluated^{1,2}

1.1 Starborn® Structural H19 screws

2 Applicable Codes and Standards³

2.1 Codes

2.1.1 IBC—15, 18, 21: International Building Code®

2.1.2 IRC—15, 18, 21: International Residential Code®

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 D1761: Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials

2.2.5 AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values

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

² This TER is a code defined [research report](#) provided by an [approved source](#) (see [IBC Section 1703.4.2](#)) and an [approved agency](#) (see [IBC Section 1703.1](#)). Given that this TER is for new materials, as defined in [IBC Section 1702](#), for which there are no approved rules or standards, [IBC Section 1707.1](#) states that, "In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports (i.e. [research 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](#)". A professional engineer is approved as an approved source when that professional engineer is properly licensed to transact engineering commerce.

³ 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 Performance Evaluation

- 3.1 Testing and related engineering evaluations are defined as intellectual property and/or trade secrets.
- 3.2 Starborn® Structural H19 screws were evaluated, using assembly tests to derive allowable design values, as an alternate means of attaching metal plate connected wood trusses and rafters to the tops of walls for the purpose of providing uplift and lateral load resistance. Starborn® Structural H19 screws were also evaluated as an alternative means of attaching wall bottom plates to the rim board. The following conditions were evaluated:
 - 3.2.1 Withdrawal strength for use as an alternative to toe-nail connections, metal hurricane and seismic clips/straps, or nails in tension (uplift) loaded applications.
 - 3.2.2 Shear strength for use as an alternative to toe-nail connections, hurricane and seismic clips/straps, or nails in shear (lateral) loaded applications either parallel or perpendicular to wood grain.
 - 3.2.3 Head pull through strength for use as an alternative to toe-nail connections, hurricane and seismic clips/straps or nails in tension (uplift) loaded applications.
- 3.3 Connections other than those addressed in Section 3 are outside the scope of this TER.
- 3.4 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.
- 3.5 Engineering evaluations are conducted with DrJ’s ANAB accredited ICS code scope, which are also its areas of professional engineering competence.
- 3.6 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

4.1 General

- 4.1.1 Starborn® Structural H19 screws are alternate dowel-type threaded fasteners designed for use in wood-to-wood connections. The fasteners evaluated in this TER are specified in Table 1.

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
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 H19 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® H19 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.

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

4.3.1.2 Starborn® H19 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 H19 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 (e.g., LVL, PSL, LSL, etc.) connected with Starborn® Structural H19 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 and Table 4.

4.5 Fastener Specifications

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

Table 2. Fastener Specifications

Product Name	Head Marking	Fastener Length (in)	Thread Length (in)	Unthreaded Shank Diameter ¹ (in)	Thread Diameter (in)		Nominal Bending Yield, f_{yb} (psi)	Allowable Fastener Strength (lbf)	
					Minor ²	Major		Tensile	Shear
Structural H19	D19 4	4	2¼	0.189	0.169	0.260	196,700	1,280	1,085
	D19 6	6	2½						
	D19 8	8							
	D19 10	10							

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.

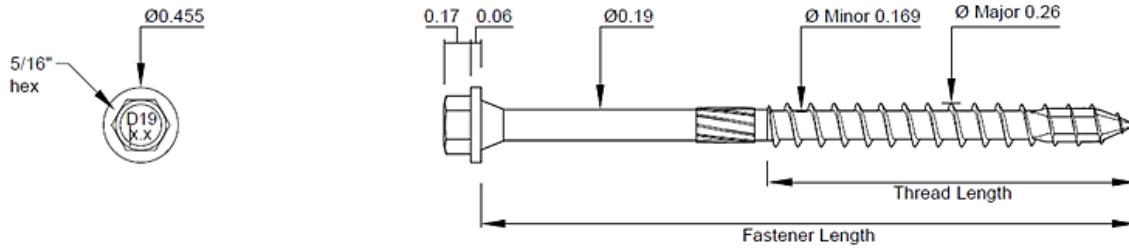


Figure 1. Starborn® Structural H19 Screw

5 Applications

5.1 General

- 5.1.1 Starborn® Structural H19 screws are self-tapping fasteners used for connections in conventional light frame wood construction and provide resistance against withdrawal, head pull-through, axial and shear loads. See Section 6 for installation requirements.
- 5.1.2 Starborn® Structural H19 screws are used to attach minimum 1½" wide wood trusses and sawn lumber rafters to wood wall top plates and wall bottom plates to rim board in the construction of walls that meet the requirements of [IRC Section R602](#) or [IBC Section 2308](#) for wood structural framing members. The fasteners provide resistance to uplift or lateral loads applied parallel and/or perpendicular to the wall or structural framing member.
 - 5.1.2.1 Walls shall consist of a single or double top plate designed in accordance with [IRC Section R602.3.2](#) or [IBC Section 2308.5.3.2](#).
 - 5.1.2.2 See Table 3 and Table 4 for the design procedure and the Starborn® Structural H19 screws allowable design values.
 - 5.1.2.3 See Section 6 for installation requirements.
 - 5.1.2.4 Starborn® Structural H19 screws are used in buildings requiring wind analysis in accordance with [IRC Section R301.2.1](#), or design in accordance with [IBC Section 1609](#).
 - 5.1.2.5 Starborn® Structural H19 screws are used in buildings requiring seismic analysis in accordance with [IRC Section R301.2.2](#), or design in accordance with [IBC Section 1613](#).
- 5.1.3 Starborn® Structural H19 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.

5.2 Design Concepts and Allowable Design Loads

- 5.2.1 Allowable design loads for uplift and lateral resistance (F1 Parallel to Wall and F2 Perpendicular to Wall, Figure 2) are provided in Table 3 for Starborn® Structural H19 screws. Allowable design loads are applicable to fasteners installed in accordance with the procedures described in Section 6. Allowable design loads are applicable for both single and double top plate applications as shown in Figure 3 and Figure 4.

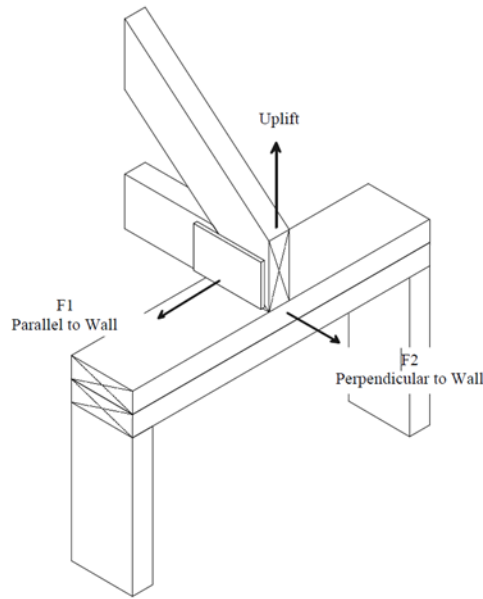


Figure 2. Uplift & Lateral Load (F1 & F2) Orientations

Table 3. Allowable Loads for Uplift & Lateral Resistance for Selected Load Durations & Wood-Specific Gravities^{1,2}

Product Name	Species Group (Specific Gravity) ^{3,4}	Fastener Length (in)	Top Plate	Fastener Angle to Truss ⁶	Uplift (lbf) ⁵	Lateral (lbf) ⁵	
						F1 – Parallel to Wall	F2 – Perpendicular to Wall
Structural H19	Spruce-Pine-Fir (0.42)	4.0	Single Top Plate	22.5°	445	315	500
				90°	470	360	600
		6.0	Double Top Plate	22.5°	515	365	570
				90°	465	445	635

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

1. Wood truss and rafter members shall be a minimum of 2" nominal thickness. Design of truss and rafter members by others.
2. Minimum screw penetration into truss/rafter members is 2".
3. Equivalent specific gravity of structural composite lumber (SCL) shall be equal to or greater than the specific gravities provided in this table. Refer to product information from SCL manufacturer.
4. For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity.
5. Includes 1.6 Duration of Load increase. No further duration of load increases permitted.
6. Install screw at an upward angle from vertical of 20°-30° (22.5° is optimal) or 90° angle and should penetrate the wood truss or rafter within 1/4" of the centerline. For installation between 20°-30°, design values for 22.5° may be used.

5.2.2 For bottom plate to rim board connections, allowable design loads are provided in Table 4 and are applicable for single bottom plates with wood structural sheathing subfloor to blocking/rim board applications as shown in Figure 5.

Table 4. Allowable Design Value in Plate to Rim Board Configurations Using Starborn® Structural H19 Screws (lbs)^{1,2,3}

Product Name	Load Direction	Configuration	Rim Board Species (Specific Gravity)	
			HF/SPF (0.42)	DF/SP (0.50)
Structural H19	Uplift	Single Bottom Plate to Rim Board	505	750
	Lateral – Parallel to Grain		600	705
	Lateral – Perpendicular to Grain		365	395

SI: 1 lb = 4.45 N

- For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity. For EWP rim boards (i.e. OSB, LSL, & LVL), the bottom plates shall be minimum SPF dimensional lumber. Dimensional lumber members shall be minimum of 2" nominal thickness.
- Design values are based on a duration of load of 1.6. No further duration of load increases permitted. Reduce design values for other load durations as applicable.
- Fastener length shall be at least 4" to insure minimum thread penetration of 1.75"

5.2.3 Where it is anticipated that loads will be applied to a single fastener simultaneously in more than one direction, additional evaluation is required to account for the combined effect of these loads using accepted engineering practice.

5.2.3.1 Consult a Registered Design Professional, as needed, for complex design conditions.

5.3 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.

6 Installation

6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER, and the applicable building code.

6.2 In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.

6.3 Installation Procedure

6.3.1 General:

6.3.1.1 Starborn® Structural H19 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.

6.3.1.2 The fasteners must be installed using a 5/16" hex driver bit. Pre-drilling of pilot holes is not required but may be used where lumber is prone to splitting.

6.3.1.3 Minimum penetration is 2" unless otherwise stated in this TER. Install screw head flush to the surface of the connected member.

6.3.1.4 Ensure angle of fastener is such that fastener does not protrude out of the wood truss or rafter.

6.3.2 Top Plate to Truss

- 6.3.2.1 Install one (1) Starborn® Structural H19 screw upward through the wall top plates or wood structural framing member at the bottom corner of the top plate(s) and into the center of the wood truss or rafter. The fastener should be installed at an upward angle from vertical of 20°-30° (22.5° is optimal) and should penetrate the wood truss or rafter within ¼" of the centerline. Fasteners located between studs may be installed at a 90° angle. See Figure 3 and Figure 4. Fastener heads may be countersunk to avoid interfering with interior finishes.
- 6.3.2.1.1 If the wood truss or rafter is located directly over a top plate splice, offset the screw ¼" to one side of the splice and insert the screw upward through the wall top plates or wood structural framing member at the bottom corner of the top plates and into the truss or rafter, as close to the centerline as possible. Note that the splice may be in either top plate.

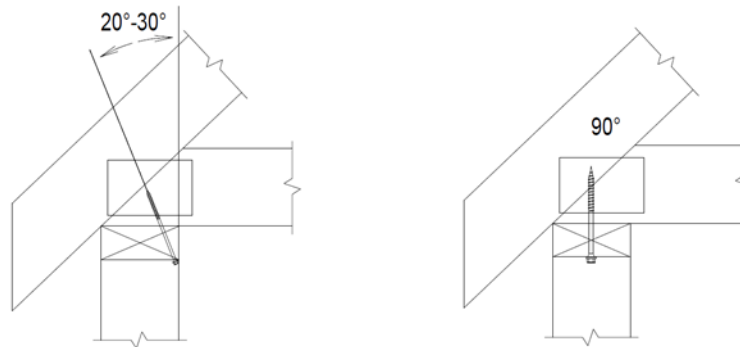


Figure 3. Installation of Starborn® Structural H19 Screw into Wood Truss or Rafter Through Single Top Plate

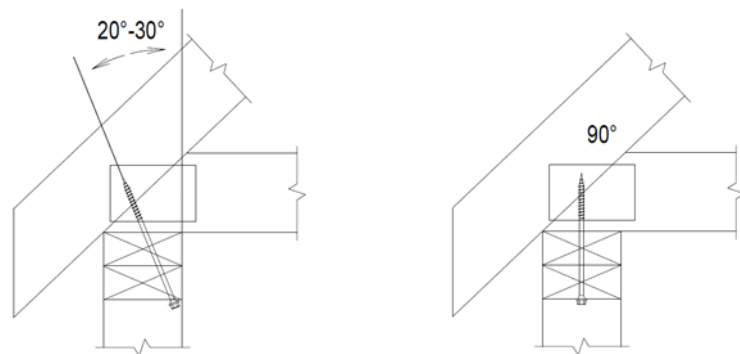


Figure 4. Installation of Starborn® Structural H19 Screw into Wood Truss or Rafter Through Double Top Plate

6.3.3 Bottom Plate to Rim Board

- 6.3.3.1 Install one (1) Starborn® Structural H19 screw downward at a 90° angle, a minimum of ½" from outside face of wall, through the plate and into the rim board (see Figure 5). Do not countersink screw heads.

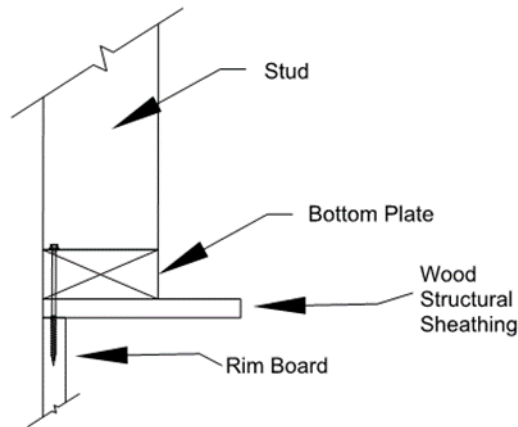


Figure 5. Installation of Starborn® Structural H19 Screw Through Bottom Plate into Rim Board

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 Withdrawal and head pull-through in accordance with ASTM D1761.
 - 7.1.2 Shear strength in accordance with ANSI-AISI S904-13.
 - 7.1.3 ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction
- 7.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., Registered Design Professionals [RDP]), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 7.3 Where pertinent, DrJ's analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 7.4 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, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of any raw materials. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.
- 7.5 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.⁴

⁴ See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.



8 Findings

- 8.1 As delineated in Section 3, the Starborn® Structural H19 screws have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, Starborn® Structural H19 screws shall be approved for the following applications:
- 8.2.1 Alternative to toe-nail connections, metal hurricane and seismic clips/straps, or nails to resist the uplift and lateral loads due to wind and seismic conditions as provided for in Table 3.
 - 8.2.2 Resistance to uplift loads due to wind negative pressure applied from the truss above lifting up on the top plate of the wall, per Table 3.
 - 8.2.3 Resistance to lateral loads due to wind or seismic loads applied parallel or perpendicular to the wall, per Table 3.
 - 8.2.4 Alternative fastening of single bottom plate to blocking/rim board per Table 4.
- 8.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Starborn® Industries, Inc.
- 8.4 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.
- 8.4.1 No known variations
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁵ 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.

- 8.6 Approved:⁶ Building codes require that the building official shall accept duly authenticated reports⁷ or research reports⁸ from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies or methods of construction.
- 8.6.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
 - 8.6.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
 - 8.6.3 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, as denial without written reason deprives a protected right to free and fair competition in the marketplace.

⁵ 2018 IFC Section 104.9

⁶ 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.

⁷ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

⁸ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>



- 8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.
- 8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER 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.*”

9 Conditions of Use

- 9.1 Material properties shall not fall outside the boundaries defined in Section 3.
- 9.2 As defined in Section 3, 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.
- 9.3 When installed in preservative treated wood or fire retardant treated wood, connections shall be designed using the treatment manufacturers reductions for connections.
- 9.4 The Starborn® Structural H19 screws covered in this TER shall be installed in accordance with this TER and the manufacturer installation instructions.
- 9.5 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.
- 9.6 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report
- 9.7 Manufacturer installation instructions shall be followed as provided in Section 6.
- 9.8 Starborn® Structural H19 screws are produced by Starborn® Industries, Inc. at its facilities located in Edison, New Jersey.
- 9.9 Starborn® Structural H19 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.
- 9.10 When required by regulation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
 - 9.10.1 Any calculations, incorporated into the construction documents that are required to show compliance with this TER, shall conform to accepted engineering practice, and shall be approved when requirements of the pertinent regulations are met.
 - 9.10.2 This TER and the installation instructions shall be submitted at the time of permit application.
 - 9.10.3 This product has an internal quality control program and a third-party quality assurance program.
 - 9.10.4 At a minimum, this product shall be installed per Section 6 of this TER.
 - 9.10.5 The review of this TER by the AHJ shall be in compliance with IBC Section 104 and IBC Section 105.4.
 - 9.10.6 This product has 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.
 - 9.10.7 The application of this product in the context of this TER 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.
- 9.11 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).
- 9.12 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.



10 Identification

- 10.1 The product listed in Section 1.1 is 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 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.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 12.1 Starborn® Structural H19 screws is included in this TER 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, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.

1 Appendix A: 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 Starborn® Structural H19 screws 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).
 - 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 materials⁹ that are not specifically provided for in any building code, 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.¹⁰

⁹ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

¹⁰ [IBC 2021, Section 1706.1 Conformance to Standards](#)

- 1.3 **Approved¹¹ 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, which 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.¹² The Superintendent of Building roster of approved testing agencies 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 CBI 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 1707.1.¹³
- 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 NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed¹⁴ 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 agreement¹⁵ (i.e., ANAB, International Accreditation Forum (IAF), etc.).

¹¹ See section 8.3 for the distilled building code definition of Approved.

¹² Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

¹³ https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

¹⁴ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

¹⁵ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. 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) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 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; 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; 5) A statewide product approval issued by the Florida Building Commission. 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).
- 1.7 **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.
- 1.8 **Approved by New Jersey:** Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,¹⁶ 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)”.¹⁷ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) 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. 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 (a) above. 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 (a) above. 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 2 given that the listed entities are no longer in existence and/or do not provide “reports of engineering findings”.

¹⁶ https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

¹⁷ <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>

- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14¹⁸ and Part 3280,¹⁹ the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) “All construction methods shall be in conformance with accepted engineering practices”; 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.”; and 3) “The design stresses of all materials shall conform to accepted engineering practice.”
- 1.10 **Approved by US, Local, and State Jurisdictions in General:** In all other local and state jurisdictions, the regulations require approval per Section 8 above.
- 1.11 **Approved by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country.
 - 1.11.2 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.
 - 1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.
 - 1.11.4 **Approved:** The purpose of the IAF 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, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

¹⁸ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

¹⁹ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>