



Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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Starborn® Structural Screws: Cladding Attachment Through Foam Sheathing

Trade Secret Report Holder:

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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 Evaluated¹

- 1.1 Starborn Structural Screws (Wood):
 - 1.1.1 Starborn Structural H19 Screws
 - 1.1.2 Starborn Structural F19 Screws
 - 1.1.3 Starborn Structural F23 Screws
 - 1.1.4 Starborn Structural F23 Stainless Screws
- 1.2 Starborn Structural Screws (Metal):
 - 1.2.1 Starborn Structural SDP18 Self-Drilling Screws

2 Product Description and Materials

2.1 The innovative products evaluated in this report are shown in **Figure 1** through **Figure 5**, and are described in **Table 1**.

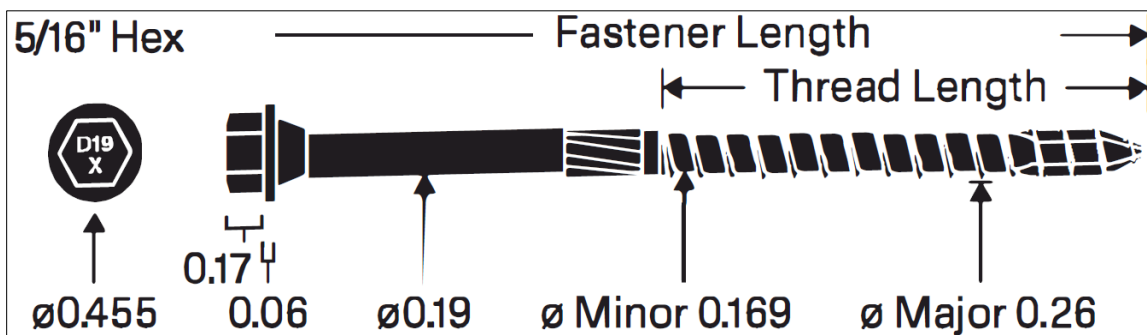


Figure 1. Starborn Structural H19 Screw

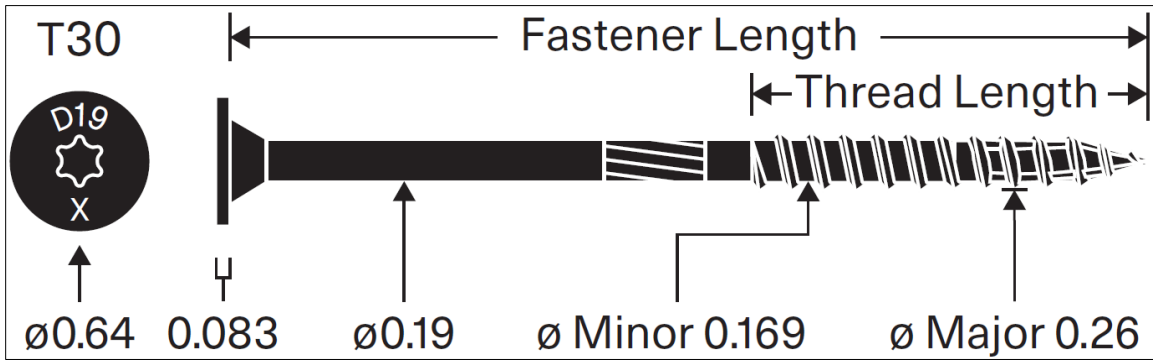


Figure 2. Starborn Structural F19 Screw

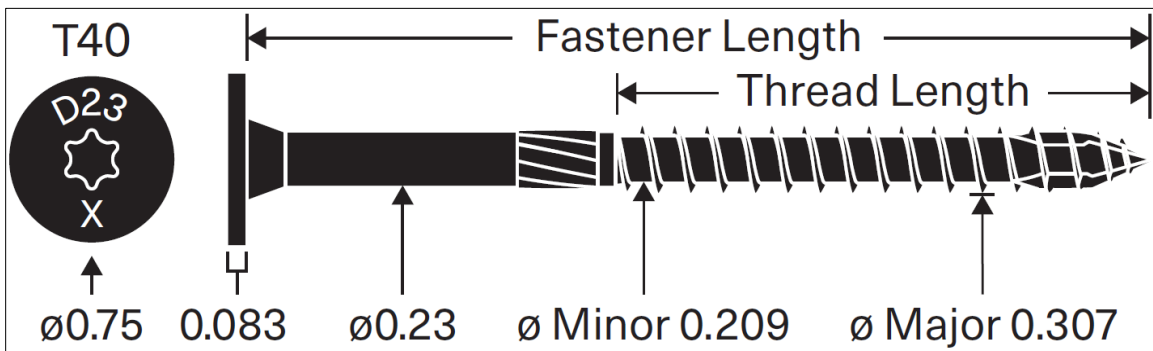


Figure 3. Starborn Structural F23 Screw

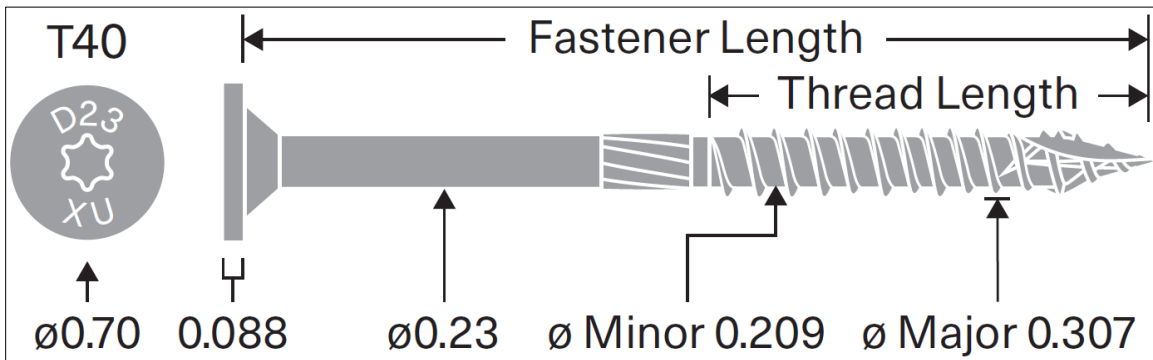


Figure 4. Starborn Structural F23 Stainless Screw

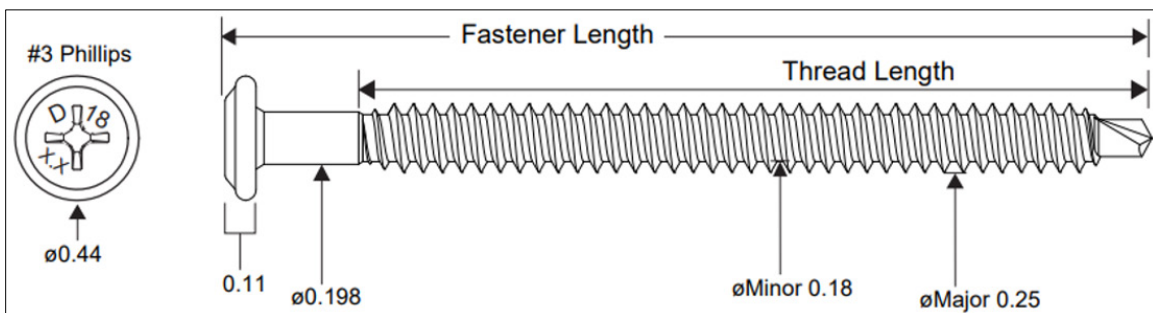


Figure 5. Starborn Structural SDP18 Self-Drilling Screw



Table 1. Starborn Structural Screws Descriptions

Product Name	Unthreaded Shank Diameter ¹ (in)	Head Type	Coating Type (Application)
Structural H19	0.190	Hex (⁵ / ₁₆ "	Exterior Use
Structural F19		Flat (T-30)	
Structural F23	0.230	Flat (T-40)	
Structural F23 Stainless			
Structural SDP18	0.198	Pan Head (Phillips)	

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 H19, F19, and F23 are partially threaded, self-drilling, dowel-type fasteners designed for use in wood-to-wood connections.
- 2.2.2 Starborn Structural SDP18 Screws are self-drilling, dowel-type fasteners designed for connecting wood or Cold-Formed Steel (CFS) furring to CFS framing.

2.3 Fastener Material

- 2.3.1 With the exception of Starborn Structural F23 Stainless Screws, Starborn Structural Screws are manufactured with heat-treated carbon steel grade 10B21 wire using a standard cold-forming process.
 - 2.3.1.1 Starborn Structural H19, F19, F23, and SDP18 Screws are coated with a proprietary black exterior coating.
 - 2.3.1.2 Starborn Structural F23-E screws are coated with a proprietary gray exterior coating.
 - 2.3.1.3 Starborn Structural F23-W screws are coated with a proprietary gray epoxy coat finish with lubricated topcoat for interior-use.
 - 2.3.1.4 Starborn Structural F23 Stainless Screws are manufactured with Grade 316 Stainless Steel (SS).
- 2.3.2 Starborn Structural Screws are produced in accordance with the approved quality control procedures referred to in **Section 12**.

2.4 Corrosion Resistance

- 2.4.1 Starborn H19, F19, F23, and SDP18 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 Starborn H19, F19, F23, and SDP18 Screws are zinc-plated and overcoated with a proprietary epoxy coating.
 - 2.4.1.1.1 Starborn H19, F19, F23, and SDP18 Screws were evaluated for use in wood that is chemically treated with waterborne Alkaline Copper Quaternary, type D (ACQ-D).
 - 2.4.1.1.2 Starborn Structural Screws 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 2304.10.6²](#) and [IRC Section R304.3³](#).
- 2.4.2 Starborn F23 Stainless Screws meet the material requirements in ASTM F1667 per [IBC Section 2304.10.6⁴](#) and [IRC Section R304.3⁵](#) and are recognized for use in untreated, preservative-treated, and fire-retardant treated wood in interior and exterior applications.



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

- 2.5.1 Starborn Structural Screws, with the proprietary coating, are recognized for use in PPT lumber provided the conditions set forth by the PPT lumber manufacturer be met, including appropriate strength reductions.

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

- 2.6.1 Starborn Structural Screws, with the proprietary coating, are recognized for use in FRT lumber provided the conditions set forth by the FRT lumber manufacturer be 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 (e.g., 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** through **Table 8**.

2.8 *Steel Members*

- 2.8.1 Steel framing members must comply with one of the material standards provided in Section A3.1 of AISI S100.
- 2.8.2 At a minimum, steel framing members must comply with the requirements set forth in this report.
 - 2.8.2.1 20-gauge and 18-gauge CFS framing members shall have a minimum ultimate tensile strength, F_u , of 45-ksi (e.g., ASTM A653, SS Grade 33).
 - 2.8.2.2 16-gauge CFS framing members shall have a minimum ultimate tensile strength, F_u , of 65-ksi (e.g., ASTM A653, SS Grade 50).



2.9 Fastener Specifications

2.9.1 **Table 2** lists the dimensions and mechanical properties of the products that are evaluated in this report.

Table 2. Starborn Structural Screws Specifications

Product Name	Head Marking	Fastener Length ¹ (in.)	Thread Length ² (in.)	Unthreaded Shank Diameter ³ (in.)	Thread Diameter (in)		Nominal Bending Yield, ⁵ F _{yb} (psi)	Allowable Fastener Strength ⁶ (lb)	
					Minor ⁴	Major		Tensile	Shear
Structural H19	D19 2.9	2 ⁷ / ₈	1.4	0.19	0.169	0.260	196,700	1,280	1,085
	D19 4	4	2 ¹ / ₄						
	D19 6	6	2 ¹ / ₂						
	D19 8	8							
Structural F19	D19 2.9	2 ⁷ / ₈	2	0.19	0.169	0.260	192,880	1,495	1,016
	D19 4.5	4 ¹ / ₂							
	D19 6	6							
	D19 8	8							
	D19 10	10							
	D19 12	12							
	D19 14	14							
Structural F23	D23 2.9	2 ⁷ / ₈	1.4	0.23	0.209	0.307	183,155	1,980	1,490
	D23 4	4	2 ³ / ₈						
	D23 5	5	3						
	D23 6	6	2 ³ / ₄						
	D23 8	8							
Structural F23 Stainless	D23, 2.9 XU	2 ⁷ / ₈	1.4	0.23	0.209	0.307	107,000	695	970
	D23, 4 XU	4	2 ³ / ₈						
	D23, 5 XU	5	3						
	D23, 6 XU	6	2 ³ / ₄						
Structural SDP18	SDP18, 2	2	1 ¹ / ₂	0.198	0.180	0.250	190,075	1,565	985
	SDP18, 3	3	2 ¹ / ₂						
	SDP18, 4.5	4 ¹ / ₂	4						
	SDP18, 6	6	5 ¹ / ₂						

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

2. Fastener length measured from the underside of the head to the tip.
3. Thread length includes tip.
4. Unthreaded shank diameter is measured on uncoated parts. Finished part dimensions are larger due to the thickness of the proprietary coating.
5. Minor thread diameter is calculated as the average value of upper and lower manufacturing tolerances.
6. Bending yield strength is determined in accordance with ASTM F1575 and based on the minor diameter.
7. Allowable fastener tensile strength and shear strength evaluated at the threaded region.

2.10 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.



3 Definitions⁶

- 3.1 New Materials⁷ 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.⁸ The design strength and permissible stresses shall be established by tests⁹ and/or engineering analysis.¹⁰
- 3.2 Duly authenticated reports¹¹ and research reports¹² are test reports and related engineering evaluations that are written by an approved agency¹³ and/or an approved source.¹⁴
- 3.2.1 This report utilizes intellectual property and/or trade secrets to create public domain material properties for commercial end-use.
- 3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.U.S.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).¹⁵
- 3.3 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.
- 3.4 An approved source is “approved” when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.¹⁶
- 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 ANAB¹⁷ ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce¹⁸ 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 writing¹⁹ 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.²⁰
- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.²¹ Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,²² and can be used in any country that is an MLA signatory found at this link: <https://iaf.nu/en/recognised-abs/>
- 3.9 Approval equity is a fundamental commercial and legal principle.²³

4 Applicable Local, State, and Federal Approvals; Standards; Regulations²⁴

- 4.1 *Local, State, and Federal*
- 4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.²⁵
- 4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.²⁶



4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14²⁷ and Part 3280²⁸ pursuant to the use of ISO/IEC 17065 duly authenticated reports.

4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 Regulations

4.2.1 *IBC – 18, 21, 24: International Building Code*[®]

4.2.2 *IRC – 18, 21, 24: International Residential Code*[®]

4.3 Standards

4.3.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strengths of Screws*

4.3.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*

4.3.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*

4.3.4 *ASTM A370: Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

4.3.5 *ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*

4.3.6 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

4.3.7 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*

4.3.8 *AWC Technical Report 12: General Dowel Equations for Calculating Lateral Connection Values with Appendix A*

5 Listed²⁹

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or and approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has 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 H19, F19, F23, and F23 Stainless, are self-tapping fasteners used to attach wall sheathing, furring and/or cladding to the wall framing through an intermediate layer of foam sheathing to provide resistance to transverse loads in conventional light-frame wood construction.

6.1.2 Starborn Structural Screws SDP18 are self-drilling fasteners used to attach wall sheathing, furring and/or cladding to the wall framing through an intermediate layer of foam sheathing to provide resistance to transverse loads in conventional light-frame CFS construction

6.1.3 Starborn Structural Screws can be used to support the dead load of wall sheathing, furring, and/or cladding when connected to the wall framing through an intermediate layer of foam sheathing.

6.1.4 Starborn Structural Screws can be used in applications including structural and general timber construction work.

6.1.5 Starborn Structural Screws H19, F19, F23, and F23 Stainless are installed without lead holes as prescribed by the NDS.



6.1.6 Design:

- 6.1.6.1 Design of Starborn Structural Screws is governed by the applicable code and the provisions for dowel type fasteners in the NDS.
- 6.1.6.2 For Starborn Structural SDP18 Screws used in CFS connections, design is governed by the applicable code and the provisions in AISI S100.
- 6.1.6.3 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

6.2 Fastening Cladding Over Foam Sheathing

- 6.2.1 Refer to **Table 3** through **Table 8** for the recommended fastener spacing for cladding over foam supported by wood framing members.
- 6.2.2 Refer to **Table 9** through **Table 15** for the recommended fastener spacing for cladding over foam supported by CFS framing members.

6.3 Design Procedure

- 6.3.1 Calculate the fastener spacing:
 - 6.3.1.1 *Step 1:* Determine the spacing between studs or framing members, either 16" or 24" o.c.
 - 6.3.1.2 *Step 2:* Calculate the correct thickness of rigid foam, up to 4", needed to obtain the required insulation effect or R-value.
 - 6.3.1.3 *Step 3:* Choose the furring or sheathing (substrate) material to which the cladding will be affixed:
 - 6.3.1.3.1 Single layer 3/4" x 3 1/2" or nominal 2 x 2 wood furring members
 - 6.3.1.3.2 Double layer nominal 2 x 2 wood furring members
 - 6.3.1.3.3 Minimum 3/8" or Wood Structural Panel (WSP) sheathing
 - 6.3.1.3.4 CFS furring members (20-gauge, 18-gauge, 16-gauge)
 - 6.3.1.4 Ensure that the substrate allows for cladding connections that are compliant with the cladding manufacturer installation and connection instructions and meet the applicable building code. See **Figure 5** for an illustration of a wall assembly.
 - 6.3.1.5 *Step 4:* Determine the actual weight for the cladding materials being installed per square foot, as given by the cladding manufacturer specifications.
 - 6.3.1.5.1 *Note:*
 - 6.3.1.5.1.1 Typical cladding weights are 1.3-psf for vinyl siding, 2.5-psf for cement board siding, 9-psf for hardwood and composite cladding boards, 11-psf for Portland cement stucco and 25-psf for adhered masonry veneer. Use actual weights for materials installed.
 - 6.3.1.5.1.2 Wood or CFS furring may add up to 1-psf of additional weight; wood sheathing may add up to 1.5-psf, depending on thickness.
 - 6.3.1.6 *Step 5:* Using these four values together, find the proper fastening pattern of between 6" and 24" o.c. using:
 - 6.3.1.6.1 **Table 3** through **Table 5** for Structural H19 and F19 screws installed into wood studs,
 - 6.3.1.6.2 **Table 6** through **Table 8** for Structural F23 screws installed into wood studs,
 - 6.3.1.6.3 **Table 9** through **Table 15** for Structural SDP18 screws installed into CFS studs.

6.3.1.6.4 Note:

- 6.3.1.6.4.1 The spacing values in **Table 3** through **Table 15** are limited to wind speeds (V_{ult}) up to 130 mph, Exposure C.
- 6.3.1.6.4.2 These wind speeds were based on the following assumptions:
 - 6.3.1.6.4.2.1 A building height of 60 feet, $GC_p = -1.4$ for Zone 5 and an Effective Wind Area of 10ft²
 - 6.3.1.6.4.2.2 Topographic Factor, $K_{zt} = 1.0$
 - 6.3.1.6.4.2.3 Ground Elevation Factor, $K_e = 1.0$
 - 6.3.1.6.4.2.4 Internal Pressure Coefficient, $GC_{pi} = +/-0.18$ for an enclosed building
 - 6.3.1.6.4.2.5 Wind Directionality Factor, $K_d = 0.85$ for Component and Cladding

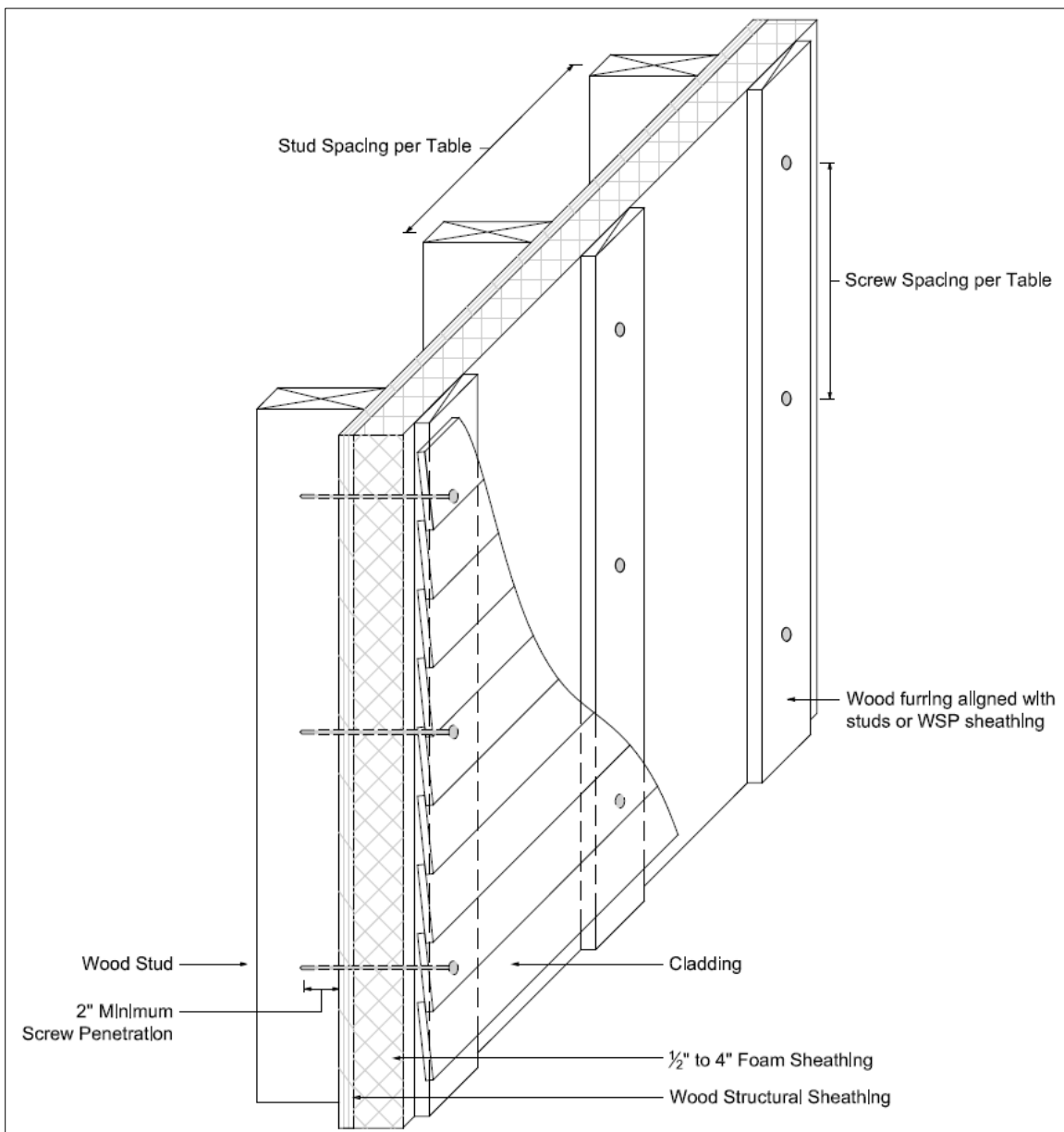


Figure 6. Illustration of Exterior Wall Covering Assembly with Vertically Oriented Wood Furring



6.3.2 Starborn Structural H19 and F19 Screws Wood-to-Wood Connection Tables:

Table 3. Starborn Structural H19 and F19 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁹ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,8,9} (in)																		
				Using 3/8" WSP Sheathing ³						Using 3/4" x 3 1/2" Wood Furring ³						Using 1 1/2" x 1 1/2" Wood Furring ³						
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30	
Structural H19 and F19	16	2 7/8	0.5	24	24	24	24	23	21	24	24	24	24	24	24	-	-	-	-	-	-	
		4 (H19 only)	0.5	24	24	24	24	23	21	24	24	24	24	24	24	24	24	24	24	24	24	24
			1.0	24	24	23	20	18	16	24	24	24	24	24	21	-	-	-	-	-	-	-
			1.5	24	23	19	16	14	12	24	24	24	23	19	17	-	-	-	-	-	-	-
		4 1/2 (F19 only)	0.5	24	24	24	24	23	21	24	24	24	24	24	24	24	24	24	24	24	24	24
			1.0	24	24	23	20	18	16	24	24	24	24	24	21	24	24	24	24	24	24	24
			1.5	24	23	19	16	14	12	24	24	24	23	19	17	-	-	-	-	-	-	-
			2.0	24	20	16	13	11	10	24	24	23	19	16	13	-	-	-	-	-	-	-
		6	1.5	24	23	19	16	14	12	24	24	24	23	19	17	24	24	24	24	24	24	23
			2.0	24	20	16	13	11	10	24	24	23	19	16	13	24	24	24	24	24	21	18
			2.5	24	17	14	11	9	8	24	24	20	16	13	11	24	24	24	24	21	18	15
			3.0	22	15	12	10	8	7	24	24	17	14	11	10	-	-	-	-	-	-	-
	8	4.0	19	13	9	7	6	5	24	19	14	11	9	8	24	24	18	14	11	10		
	24	2 7/8	0.5	24	22	19	17	15	14	24	24	24	24	21	19	-	-	-	-	-	-	
		4 (H19 only)	0.5	24	22	19	17	15	14	24	24	24	24	21	19	24	24	24	24	24	24	
			1.0	22	18	15	13	12	10	24	24	22	19	16	14	-	-	-	-	-	-	
			1.5	20	15	12	10	9	8	24	23	18	15	13	11	-	-	-	-	-	-	
		4 1/2 (F19 only)	0.5	24	22	19	17	15	14	24	24	24	24	21	19	24	24	24	24	24	24	
			1.0	22	18	15	13	12	10	24	24	22	19	16	14	24	24	24	24	22	20	
			1.5	20	15	12	10	9	8	24	23	18	15	13	11	-	-	-	-	-	-	
			2.0	18	13	10	9	7	6	24	20	15	12	10	9	-	-	-	-	-	-	
		6	1.5	20	15	12	10	9	8	24	23	18	15	13	11	24	24	24	21	17	15	
			2.0	18	13	10	9	7	6	24	20	15	12	10	9	24	24	21	17	14	12	
			2.5	16	11	9	7	6	5	24	17	13	10	9	7	24	24	18	14	12	10	
3.0			15	10	8	6	5	4	24	16	11	9	7	6	-	-	-	-	-	-		
8	4.0	13	8	6	5	4	3	20	13	9	7	6	5	24	17	12	9	7	6			



Table 3. Starborn Structural H19 and F19 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁹ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,8,9} (in)																	
				Using 3/8" WSP Sheathing ³						Using 3/4" x 3 1/2" Wood Furring ³						Using 1 1/2" x 1 1/2" Wood Furring ³					
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m ² 1. Wood framing (studs) shall be a minimum of 2" nominal thickness. 2. Wood framing and furring shall be minimum Spruce-Pine-Fir (SPF) or any species with specific gravity of 0.42 or greater. 3. Wood framing, furring and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code. 4. For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth. 5. For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice. 6. Maximum allowable cladding weight shall include weight of furring, sheathing, cladding and other supported materials. 7. Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring). 8. When using horizontal furring, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative-treated furring. 9. When choosing the length of fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.																					



Table 4. Starborn Structural H19 and F19 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – 2-Layer Wood Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ^{9,10} (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7,8} (in.)					
				2-Layer 1 1/2" x 1 1/2" Wood Furring ³					
				Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30
Structural H19 and F19	16	6	0.5	24	24	24	24	24	24
			1.0	24	24	24	24	24	24
		8	1.5	24	24	24	24	24	23
			2.0	24	24	24	24	21	18
			2.5	24	24	24	21	18	15
			3.0	24	24	23	18	15	13
		10	4.0	24	24	18	14	11	10
Structural H19 and F19	24	6	0.5	24	24	24	24	24	24
			1.0	24	24	24	24	22	20
		8	1.5	24	24	24	21	17	15
			2.0	24	24	21	17	14	12
			2.5	24	24	18	14	12	10
			3.0	24	21	15	12	10	8
		10	4.0	24	17	12	9	7	6

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- Wood framing (studs) shall be a minimum of 2" nominal thickness.
- Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity of 0.42 or greater.
- Wood framing, furring and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
- For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring as the first layer, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative-treated furring.
- When choosing the length of a fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.
- Minimum fastener lengths shown in this table are based on using one fastener to connect both furring layers through the FPIS and into the stud. Furring is permitted to be connected separately. When choosing the length of fastener for the first layer of furring, ensure a minimum fastener penetration of six (6) diameters per the NDS through the FPIS and into the stud. Similarly, when choosing the length of fastener for the second layer of furring, ensure a minimum fastener penetration of six (6) diameters per the NDS into the first layer of furring.



6.3.3 Starborn Structural H19 and F19 Screws Metal-to-Wood Connection Table:

Table 5. Starborn Structural H19 and F19 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – CFS Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁸ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7} (in.)																		
				Using 20-gauge CFS Furring ³						Using 18-gauge CFS Furring ³						Using 16-gauge CFS Furring ³						
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30	
Structural H19 and F19	16	2 ⁷ / ₈	0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
			1.0	24	24	24	24	21	18	24	24	24	24	22	18	24	24	24	24	22	19	
		4 (H19 only)	1.5	24	24	23	18	15	13	24	24	24	19	15	13	24	24	24	20	16	14	
			2.0	24	24	18	14	12	10	24	24	19	14	12	10	24	24	20	15	12	10	
		4 ¹ / ₂ (F19 only)	2.0	24	24	18	14	12	10	24	24	19	14	12	10	24	24	20	15	12	10	
			2.5	24	21	15	11	9	8	24	22	15	12	9	8	24	23	16	12	10	8	
		6	2.5	24	21	15	11	9	8	24	22	15	12	9	8	24	24	16	12	10	8	
			3.0	24	18	13	10	8	6	24	19	13	10	8	7	24	20	14	10	8	7	
			4.0	24	14	10	7	6	5	24	14	10	7	6	5	24	15	10	8	6	5	
		24	2 ⁷ / ₈	0.5	24	24	24	24	22	19	24	24	24	24	23	20	24	24	24	24	24	21
				1.0	24	24	21	17	14	12	24	24	22	17	14	12	24	24	23	18	15	13
			4 (H19 only)	1.5	24	20	15	12	10	8	24	22	16	12	10	8	24	24	17	13	11	9
	2.0			24	16	12	9	8	6	24	17	12	9	8	6	24	18	13	10	8	7	
	4 ¹ / ₂ (F19 only)		2.0	24	16	12	9	8	6	24	17	12	9	8	6	24	19	13	10	8	7	
			2.5	23	14	10	7	6	5	24	14	10	8	6	5	24	15	11	8	6	5	
	6		2.5	23	14	10	7	6	5	24	14	10	8	6	5	24	16	11	8	6	5	
			3.0	20	12	8	6	5	4	22	12	8	6	5	4	24	13	9	7	5	4	
			4.0	16	9	6	5	4	3	17	9	6	5	4	3	18	10	7	5	4	3	

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- Wood framing (studs) shall be a minimum of 2" nominal thickness.
- Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity of 0.42 or greater.
- Wood framing, CFS furring and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of 6 diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
- For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When choosing the length of fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.



6.3.4 Starborn Structural F23 Screws Wood-to-Wood Connection Tables:

Table 6. Starborn Structural F23 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁹ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7,8} (in.)																	
				Using 3/8" WSP Sheathing ³						Using 3/4" x 3 1/2" Wood Furring ³						Using 1 1/2" x 1 1/2" Wood Furring ³					
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural F23	16	2 7/8	0.5	24	24	24	24	24	24	-	-	-	-	-	-	-	-	-	-	-	-
		4	0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
			1.0	24	24	24	24	24	23	24	24	24	24	24	24	-	-	-	-	-	-
			1.5	24	24	24	24	21	18	-	-	-	-	-	-	-	-	-	-	-	-
		5	1.5	24	24	24	24	21	18	24	24	24	24	24	22	24	24	24	24	24	24
			2.0	24	24	24	20	17	14	24	24	24	24	21	18	-	-	-	-	-	-
			2.5	24	24	21	17	14	12	-	-	-	-	-	-	-	-	-	-	-	-
		6	2.5	24	24	21	17	14	12	24	24	24	22	18	15	24	24	24	24	24	23
			3.0	24	24	18	14	12	10	24	24	24	19	16	13	-	-	-	-	-	-
			4.0	24	20	14	11	9	8	24	24	19	15	12	10	24	24	24	22	18	15
8	0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		
Structural F23	24	2 7/8	0.5	24	24	24	24	23	21	-	-	-	-	-	-	-	-	-	-	-	-
		4	0.5	24	24	24	24	23	21	24	24	24	24	24	24	24	24	24	24	24	24
			1.0	24	24	24	20	17	15	24	24	24	24	22	19	-	-	-	-	-	-
			1.5	24	24	19	16	14	12	-	-	-	-	-	-	-	-	-	-	-	-
		5	1.5	24	24	19	16	14	12	24	24	24	21	17	15	24	24	24	24	24	22
			2.0	24	21	16	13	11	9	24	24	21	17	14	12	-	-	-	-	-	-
			2.5	24	18	14	11	9	8	-	-	-	-	-	-	-	-	-	-	-	-
		6	2.5	24	18	14	11	9	8	24	24	18	14	12	10	24	24	24	22	18	15
			3.0	24	16	12	9	8	7	24	22	16	12	10	9	-	-	-	-	-	-
		8	4.0	20	13	9	7	6	5	24	18	13	10	8	7	24	24	19	14	12	10
Structural F23 Stainless	16	2 7/8	0.5	24	24	24	24	24	21	-	-	-	-	-	-	-	-	-	-	-	-
		4	0.5	24	24	24	24	24	21	24	24	24	24	24	24	24	24	24	24	24	24
			1.0	24	24	23	20	17	15	24	24	24	24	24	21	-	-	-	-	-	-
			1.5	24	24	19	15	13	11	-	-	-	-	-	-	-	-	-	-	-	-
		5	1.5	24	24	19	15	13	11	24	24	24	22	19	16	24	24	24	24	24	21
			2.0	24	20	15	13	11	9	24	24	23	18	15	13	-	-	-	-	-	-
			2.5	24	17	13	10	9	7	-	-	-	-	-	-	-	-	-	-	-	-
		6	2.5	24	17	13	10	9	7	24	24	20	16	13	11	24	24	24	20	16	14
			3.0	23	15	11	9	7	6	24	24	17	14	11	9	-	-	-	-	-	-



Table 6. Starborn Structural F23 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁹ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7,8} (in.)																	
				Using 3/8" WSP Sheathing ³						Using 3/4" x 3 1/2" Wood Furring ³						Using 1 1/2" x 1 1/2" Wood Furring ³					
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural F23 Stainless	24	2 7/8	0.5	24	23	20	18	16	14	-	-	-	-	-	-	-	-	-	-	-	
		4	0.5	24	23	20	18	16	14	24	24	24	24	21	19	24	24	24	24	24	24
			1.0	24	19	15	13	11	10	24	24	23	19	16	14	-	-	-	-	-	-
			1.5	21	16	12	10	9	7	-	-	-	-	-	-	-	-	-	-	-	-
		5	1.5	21	16	12	10	9	7	24	24	18	15	12	11	24	24	24	20	16	14
			2.0	18	13	10	8	7	6	24	20	15	12	10	9	-	-	-	-	-	-
			2.5	17	11	9	7	6	5	-	-	-	-	-	-	-	-	-	-	-	-
		6	2.5	17	11	9	7	6	5	24	18	13	10	8	7	24	23	17	13	11	9
			3.0	15	10	7	6	5	4	24	16	11	9	7	6	-	-	-	-	-	-

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- Wood framing (studs) shall be a minimum of 2" nominal thickness.
- Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity of 0.42 or greater.
- Wood framing, furring, and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
- For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative treated furring.
- When choosing the length of fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.



Table 7. Starborn Structural F23 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thickness of Foam Sheathing – 2-Layer Wood Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ^{9,10} (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7,8} (in.)					
				2-Layer 2 x 2 Wood Furring ³					
				Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30
Structural F23	16	6	0.5	24	24	24	24	24	24
			1.0	24	24	24	24	24	24
		8	1.5	24	24	24	24	24	24
			2.0	24	24	24	24	24	24
			2.5	24	24	24	24	24	23
			3.0	24	24	24	24	23	19
		10	4.0	24	24	24	22	18	15
Structural F23	24	6	0.5	24	24	24	24	24	24
			1.0	24	24	24	24	24	24
		8	1.5	24	24	24	24	24	23
			2.0	24	24	24	24	21	18
			2.5	24	24	24	22	18	15
			3.0	24	24	24	18	15	13
		10	4.0	24	24	19	14	12	10
Structural F23 Stainless	16	6	0.5	24	24	24	24	24	24
			1.0	24	24	24	24	24	24
	24	6	0.5	24	24	24	24	24	24
			1.0	24	24	24	24	22	19

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- Wood framing (studs) shall be a minimum of 2" nominal thickness.
- Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity of 0.42 or greater.
- Wood framing, furring, and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- The first furring layer may be installed vertically or horizontally. Furring shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the double furring layers and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
- Alternately, where the second furring layer is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c., respectively, provided two (2) fasteners are installed at stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring as the first layer or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative treated furring.
- When choosing the length of fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.
- Minimum fastener lengths shown in this table are based on using one fastener to connect both furring layers through the FPIS and into the stud. Furring is permitted to be connected separately. When choosing the length of a fastener for the first layer of furring, ensure a minimum fastener penetration of six (6) diameters per the NDS through the FPIS and into the stud. Similarly, when choosing the length of fastener for the second layer of furring, ensure a minimum fastener penetration of six (6) diameters per the NDS into the first layer of furring.



6.3.5 Starborn Structural F23 Screws Metal-to-Wood Connection Table:

Table 8. Starborn Structural F23 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – CFS Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁸ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7} (in.)																	
				Using 20-gauge CFS Furring ³						Using 18-gauge CFS Furring ³						Using 16-gauge CFS Furring ³					
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural F23	16	2 ⁷ / ₈	0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
		4	1.0	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
			1.5	24	24	24	24	23	19	24	24	24	24	23	20	24	24	24	24	24	20
			2.0	24	24	24	21	18	15	24	24	24	22	18	15	24	24	24	22	18	15
		5	2.0	24	24	24	21	18	15	24	24	24	22	18	15	24	24	24	23	19	16
			2.5	24	24	23	18	14	12	24	24	23	18	14	12	24	24	24	19	15	13
		3.0	24	24	19	15	12	10	24	24	20	15	12	10	24	24	20	15	12	10	
6	4.0	24	21	15	11	9	7	24	22	15	11	9	8	24	22	15	12	9	8		
Structural F23	24	2 ⁷ / ₈	0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
		4	1.0	24	24	24	24	21	18	24	24	24	24	21	18	24	24	24	24	22	19
			1.5	24	24	23	18	15	13	24	24	24	19	15	13	24	24	24	19	16	13
			2.0	24	24	18	14	12	10	24	24	19	14	12	10	24	24	19	15	12	10
		5	2.0	24	24	18	14	12	10	24	24	19	14	12	10	24	24	20	15	12	10
			2.5	24	21	15	12	9	8	24	22	15	12	9	8	24	23	16	12	10	8
		3.0	24	18	13	10	8	7	24	19	13	10	8	7	24	19	13	10	8	7	
6	4.0	24	14	10	7	6	5	24	14	10	7	6	5	24	15	10	8	6	5		
Structural F23 Stainless	16	2 ⁷ / ₈	0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
		4	0.5	24	24	24	24	20	17	24	24	24	24	20	17	24	24	24	24	21	18
			1.0	24	24	22	17	14	12	24	24	23	17	14	12	24	24	24	18	15	12
			1.5	24	24	17	13	10	9	24	24	17	13	11	9	24	24	18	14	11	9
		5	1.5	24	20	14	10	8	7	24	21	14	11	9	7	24	22	15	11	9	7
			2.0	24	17	12	9	7	6	24	17	12	9	7	6	24	18	12	9	7	6
		6	2.5	24	17	12	9	7	6	24	17	12	9	7	6	24	19	13	9	7	6
3.0	24		13	9	7	5	4	24	13	9	7	5	4	24	14	9	7	6	5		



Table 8. Starborn Structural F23 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – CFS Furring

Product Name	Wood Stud Spacing (in. o.c.)	Minimum Fastener Length ⁸ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,2,4,5,7} (in.)																	
				Using 20-gauge CFS Furring ³						Using 18-gauge CFS Furring ³						Using 16-gauge CFS Furring ³					
				Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)						Maximum Cladding Weight ⁶ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural F23 Stainless	24	2 ⁷ / ₈	0.5	24	24	24	24	21	18	24	24	24	24	22	19	24	24	24	24	23	19
		4	1.0	24	24	20	16	13	11	24	24	21	16	13	11	24	24	22	17	14	12
			1.5	24	20	14	11	9	8	24	21	15	11	9	8	24	22	16	12	10	8
			2.0	24	16	11	8	7	6	24	16	11	9	7	6	24	17	12	9	7	6
		5	2.5	23	13	9	7	5	4	24	14	9	7	6	5	24	14	10	7	6	5
			3.0	20	11	8	6	4	4	20	11	8	6	5	4	21	12	8	6	5	4
		6	3.0	20	11	8	6	4	4	21	11	8	6	5	4	23	12	8	6	5	4
			4.0	16	8	6	4	3	3	16	9	6	4	3	3	17	9	6	4	4	3

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

1. Wood framing (studs) shall be a minimum of 2" nominal thickness.
2. Wood framing shall be minimum Spruce-Pine-Fir or any species with specific gravity of 0.42 or greater.
3. Framing, furring, and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
4. For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
5. For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
6. Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
7. Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
8. When choosing the length of a fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.



6.3.6 Starborn Structural SDP18 Screw Metal-to-Metal Connection Tables

Table 9. Starborn Structural SDP18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – CFS Furring and 20-gauge CFS Studs

Product Name	CFS Stud Spacing (in. o.c.)	Minimum Fastener Length (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,3,4,6} (in.)					
				Using Minimum 20-gauge Thick CFS Furring ²					
				Maximum Cladding Weight ⁵ (psf)					
				5	10	15	20	25	30
Structural SDP18	16	2	0.5	24	20	15	12	10	9
			1.0	24	19	14	11	9	8
		3	1.5	24	18	13	10	9	7
			2.0	24	16	12	10	8	7
		4 1/2	2.5	24	15	11	9	7	6
			3.0	22	14	10	8	6	5
		6	3.5	20	12	9	7	5	5
			4.0	18	11	7	6	5	4
Structural SDP18	24	2	0.5	19	13	10	8	7	6
			1.0	18	12	9	7	6	5
		3	1.5	18	12	9	7	6	5
			2.0	17	11	8	6	5	4
		4 1/2	2.5	16	10	7	6	5	4
			3.0	14	9	6	5	4	3
		6	3.5	13	8	6	4	3	3
			4.0	12	7	5	4	3	2

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

1. CFS framing (studs) shall be a minimum of 0.0329" nominal thickness.
2. Framing, furring, and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
3. For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
4. For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
5. Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
6. Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).



Table 10. Starborn Structural SDP18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – CFS Furring and 18-gauge CFS Studs

Product Name	CFS Stud Spacing (in. o.c.)	Minimum Fastener Length (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,3,4,6} (in.)											
				Using 20-gauge CFS Furring ²						Using 18-gauge CFS Furring ²					
				Maximum Cladding Weight ⁵ (psf)						Maximum Cladding Weight ⁵ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30
Structural SDP 18	16	2	0.5	24	24	23	19	16	14	24	24	23	19	17	14
		3	1.0	24	24	22	18	15	13	24	24	22	18	16	14
			1.5	24	24	20	17	14	12	24	24	21	17	15	13
		4 1/2	2.0	24	24	19	15	13	11	24	24	20	16	14	12
			2.5	24	23	17	14	12	10	24	24	18	15	12	11
			3.0	24	21	16	13	11	9	24	22	17	13	11	10
		6	3.5	24	19	14	11	9	8	24	20	15	12	10	9
			4.0	24	17	13	10	8	7	24	18	13	11	9	7
Structural SDP 18	24	2	0.5	24	19	15	12	10	9	24	20	15	13	11	9
		3	1.0	24	18	14	12	10	8	24	19	15	12	10	9
			1.5	24	17	13	11	9	8	24	18	14	11	10	8
		4 1/2	2.0	23	16	12	10	8	7	24	17	13	11	9	8
			2.5	22	15	11	9	8	7	23	16	12	10	8	7
			3.0	21	14	10	8	7	6	22	15	11	9	7	6
		6	3.5	19	13	9	7	6	5	20	13	10	8	7	6
			4.0	18	11	8	6	5	4	19	12	9	7	6	5

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- CFS framing (studs) shall be a minimum of 0.0428" nominal thickness.
- Framing, furring, and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
- For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).



Table 11. Starborn Structural SDP18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – CFS Furring and 16-gauge CFS Studs

Product Name	CFS Stud Spacing (in. o.c.)	Minimum Fastener Length ⁸ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,3,4,6} (in.)																	
				Using 20-gauge CFS Furring ²						Using 18-gauge CFS Furring ²						Using 16-gauge CFS Furring ²					
				Maximum Cladding Weight ⁵ (psf)						Maximum Cladding Weight ⁵ (psf)						Maximum Cladding Weight ⁵ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural SDP18	16	2	0.5	24	24	24	24	24	21	24	24	24	24	24	24	24	24	24	24	24	24
			1.0	24	24	24	24	23	20	24	24	24	24	24	24	24	24	24	24	24	24
		3	1.5	24	24	24	24	21	18	24	24	24	24	24	24	24	24	24	24	24	24
			2.0	24	24	24	24	20	17	24	24	24	24	24	23	24	24	24	24	24	23
		4 1/2	2.5	24	24	24	22	18	16	24	24	24	24	24	21	24	24	24	24	24	22
			3.0	24	24	24	20	17	14	24	24	24	24	23	20	24	24	24	24	24	21
		6	3.5	24	24	23	18	15	13	24	24	24	24	21	18	24	24	24	24	22	19
			4.0	24	24	21	17	14	12	24	24	24	23	19	16	24	24	24	24	20	18
Structural SDP18	24	2	0.5	24	24	23	19	16	14	24	24	24	24	21	18	24	24	24	24	21	18
			1.0	24	24	22	18	15	13	24	24	24	24	20	17	24	24	24	24	20	17
		3	1.5	24	24	21	17	14	12	24	24	24	22	19	16	24	24	24	22	19	16
			2.0	24	24	19	16	13	11	24	24	24	21	18	15	24	24	24	21	18	15
		4 1/2	2.5	24	24	18	15	12	10	24	24	24	19	16	14	24	24	24	20	17	15
			3.0	24	22	17	13	11	9	24	24	22	18	15	13	24	24	23	19	16	14
		6	3.5	24	21	15	12	10	9	24	24	21	16	14	12	24	24	22	18	15	13
			4.0	24	19	14	11	9	8	24	24	19	15	12	10	24	24	20	16	13	12

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- CFS framing (studs) shall be a minimum of 0.0538" nominal thickness.
- Framing, furring, and sheathing shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- For vertical furring installation, members shall be installed directly over the studs at the same spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum fastener penetration of six (6) diameters per the NDS. Wood structural panel sheathing attached directly to the studs may be included in the fastener penetration depth.
- For horizontal furring installation, members shall be installed directly over the studs and attached at each stud location. A maximum specified fastener spacing of 12" o.c. for the furring member is permitted to be installed at 24" o.c. with two fasteners per stud location. A maximum specified fastener spacing of 8" o.c. for the furring member is permitted to be installed at 16" o.c. with two fasteners per stud location. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances. For all tabulated fastener spacings, the horizontal furring shall not exceed the listed value unless justified by accepted engineering practice.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).



6.3.7 Starborn Structural SDP18 Screw Wood-to-Metal Connection Tables:

Table 12. Starborn Structural SDP18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring and 20-gauge CFS Studs

Product Name	Stud Spacing (in. o.c.)	Minimum Fastener Length (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,3,5,6} (in.)																	
				Using 3/8" WSP Sheathing ²						Using 3/4" x 3 1/2" Wood Furring ²						Using 1 1/2" x 1 1/2" Wood Furring ²					
				Maximum Cladding Weight ⁴ (psf)						Maximum Cladding Weight ⁴ (psf)						Maximum Cladding Weight ⁴ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural SDP18	16	3	0.5	20	15	12	11	9	8	24	20	16	13	11	9	-	-	-	-	-	-
			1.0	19	15	12	10	9	7	-	-	-	-	-	-	-	-	-	-	-	-
	4 1/2	0.5	20	15	12	11	9	8	24	20	16	13	11	9	24	20	16	13	11	9	
		1.0	19	15	12	10	9	7	24	19	15	12	10	8	24	19	15	12	10	8	
		1.5	19	14	11	9	8	7	24	18	13	11	9	8	24	18	13	11	9	8	
		2.0	18	13	11	9	7	6	24	17	12	10	8	7	-	-	-	-	-	-	
	6	2.0	18	13	11	9	7	6	24	17	12	10	8	7	24	17	12	10	8	7	
		2.5	17	13	10	8	7	6	23	15	11	9	7	6	23	15	11	9	7	6	
		3.0	16	12	9	7	6	5	21	14	10	8	6	6	21	14	10	8	6	6	
		3.5	15	11	8	6	5	5	19	12	9	7	6	5	-	-	-	-	-	-	
Structural SDP18	24	3	0.5	13	10	8	7	6	5	20	14	10	8	7	6	-	-	-	-	-	-
			1.0	13	10	8	7	6	5	-	-	-	-	-	-	-	-	-	-	-	-
	4 1/2	0.5	13	10	8	7	6	5	20	14	10	8	7	6	20	14	10	8	7	6	
		1.0	13	10	8	7	6	5	19	13	10	8	7	6	19	13	10	8	7	6	
		1.5	13	9	7	6	5	5	18	12	9	7	6	5	18	12	9	7	6	5	
		2.0	12	9	7	6	5	4	17	11	8	7	5	5	-	-	-	-	-	-	
	6	2.0	12	9	7	6	5	4	17	11	8	7	5	5	17	11	8	7	5	5	
		2.5	12	8	7	5	5	4	16	10	7	6	5	4	16	10	7	6	5	4	
		3.0	11	8	6	5	4	4	14	9	7	5	4	4	14	9	7	5	4	4	
		3.5	10	7	5	4	4	3	13	8	6	5	4	3	-	-	-	-	-	-	
			4.0	9	6	5	4	3	3	-	-	-	-	-	-	-	-	-	-	-	-

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m2

- CFS framing (studs) shall be a minimum of 0.0329" nominal thickness.
- Wood furring shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- Furring may be installed vertically or horizontally and shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the furring and into the studs ensuring a minimum of three (3) full threads are exposed past the interior face of the stud. Alternately, where the furring is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c., respectively, provided two (2) fasteners are installed at the stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end and fastener spacing distances.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative-treated furring.



Table 13. Starborn Structural SDP18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring and 18-gauge CFS Studs

Product Name	Stud Spacing (in. o.c.)	Minimum Fastener Length (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,3,5,6} (in.)																	
				Using 3/8" WSP Sheathing ²						Using 3/4" x 3 1/2" Wood Furring ²						Using 1 1/2" x 1 1/2" Wood Furring ²					
				Maximum Cladding Weight ⁴ (psf)						Maximum Cladding Weight ⁴ (psf)						Maximum Cladding Weight ⁴ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural SDP18	24	3	0.5	15	13	11	10	9	8	24	19	16	13	11	10	-	-	-	-	-	-
			1.0	15	12	11	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-
		4 1/2	0.5	15	13	11	10	9	8	24	19	16	13	11	10	24	20	16	13	11	10
			1.0	15	12	11	9	8	7	24	19	15	12	11	9	24	19	15	13	11	9
			1.5	15	12	10	9	8	7	24	18	14	12	10	9	24	18	14	12	10	9
			2.0	14	12	10	8	7	7	23	17	13	11	9	8	-	-	-	-	-	-
	2.5	14	11	9	8	7	6	-	-	-	-	-	-	-	-	-	-	-	-		
	6	2.5	14	11	9	8	7	6	22	16	12	10	8	7	23	16	13	10	9	7	
		3.0	14	11	9	7	6	6	21	15	11	9	8	7	22	15	12	9	8	7	
		3.5	13	10	8	7	6	5	20	13	10	8	7	6	-	-	-	-	-	-	
		4.0	12	9	7	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- CFS framing (studs) shall be a minimum of 0.0428" nominal thickness.
- Wood furring shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- Furring may be installed vertically or horizontally and shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the furring and into the studs ensuring a minimum of three (3) full threads are exposed past the interior face of the stud. Alternately, where the furring is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c., respectively, provided two (2) fasteners are installed at the stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end and fastener spacing distances.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative-treated furring.



Table 14. Starborn Structural SDP18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – Wood Furring and 16-gauge CFS Studs

Product Name	Stud Spacing (in. o.c.)	Minimum Fastener Length (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{1,3,5,6} (in.)																	
				Using 3/8" WSP Sheathing ²						Using 3/4" x 3 1/2" Wood Furring ²						Using 1 1/2" x 1 1/2" Wood Furring ²					
				Maximum Cladding Weight ⁴ (psf)						Maximum Cladding Weight ⁴ (psf)						Maximum Cladding Weight ⁴ (psf)					
				5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30
Structural SDP18	16	3	0.5	24	23	20	19	17	16	24	24	24	24	24	22	-	-	-	-	-	-
			1.0	24	22	20	18	17	16	-	-	-	-	-	-	-	-	-	-	-	-
		4 1/2	0.5	24	23	20	19	17	16	24	24	24	24	24	22	24	24	24	24	24	24
			1.0	24	22	20	18	17	16	24	24	24	24	24	21	24	24	24	24	24	24
			1.5	24	22	20	18	16	15	24	24	24	24	23	20	24	24	24	24	24	24
			2.0	24	21	18	16	15	14	24	24	24	24	22	19	-	-	-	-	-	-
	6	2.5	23	20	17	15	13	12	-	-	-	-	-	-	-	-	-	-	-	-	
		2.5	23	20	17	15	13	12	24	24	24	22	19	17	24	24	24	24	24	22	
		3.0	23	19	16	14	12	11	24	24	24	20	17	15	24	24	24	24	24	21	
		3.5	22	18	15	13	11	10	24	24	22	18	16	14	-	-	-	-	-	-	
Structural SDP18	24	3	0.5	17	15	14	12	12	11	24	24	21	19	16	15	-	-	-	-	-	
			1.0	17	15	13	12	11	10	-	-	-	-	-	-	-	-	-	-	-	-
		4 1/2	0.5	17	15	14	12	12	11	24	24	21	19	16	15	24	24	24	24	21	18
			1.0	17	15	13	12	11	10	24	24	21	18	16	14	24	24	24	23	20	17
			1.5	17	15	13	12	11	10	24	24	20	17	15	14	24	24	24	22	19	16
			2.0	16	14	12	11	10	9	24	23	19	17	14	13	-	-	-	-	-	-
	6	2.5	16	13	11	10	9	8	-	-	-	-	-	-	-	-	-	-	-	-	
		2.5	16	13	11	10	9	8	24	21	17	15	13	11	24	24	24	20	17	15	
		3.0	15	12	11	9	8	7	24	20	16	13	12	10	24	24	23	19	16	14	
		3.5	15	12	10	9	8	7	24	19	15	12	11	9	-	-	-	-	-	-	
6	4.0	14	11	9	8	7	6	-	-	-	-	-	-	-	-	-	-	-	-		

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- CFS framing (studs) shall be a minimum of 0.0538" nominal thickness.
- Wood furring shall be designed by others and shall be of adequate size, species and grade to resist design loads and requirements in accordance with the applicable building code.
- Furring may be installed vertically or horizontally and shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the furring and into the studs ensuring a minimum of three (3) full threads are exposed past the interior face of the stud. Alternately, where the furring is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c., respectively, provided two (2) fasteners are installed at the stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end and fastener spacing distances.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative-treated furring.



Table 15. Starborn Structural SDP 18 Screws: Recommended Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing – 2-Layer Wood Furring with CFS Studs

Product Name	CFS Stud Gauge	Stud Spacing (in. o.c.)	Minimum Fastener Length ⁷ (in.)	Foam Thickness (in.)	Maximum Spacing of Fasteners ^{2,3,5,6} (in.)					
					2-Layer 2 x 2 Wood Furring ¹					
					Maximum Cladding Weight ⁴ (psf)					
					5	10	15	20	25	30
Structural SDP18	20-gauge	16	6	0.5	24	20	16	13	11	9
				1.0	24	19	15	12	10	8
				1.5	24	18	13	11	9	8
		24		0.5	20	14	10	8	7	6
				1.0	19	13	10	8	7	6
				1.5	18	12	9	7	6	5
Structural SDP18	18-gauge	16	6	0.5	24	24	24	20	17	15
				1.0	24	24	23	19	16	14
				1.5	24	24	22	18	15	13
		24		0.5	24	20	16	13	11	10
				1.0	24	19	15	13	11	9
				1.5	24	18	14	12	10	9
Structural SDP18	16-gauge	16	6	0.5	24	24	24	24	24	24
				1.0	24	24	24	24	24	24
				1.5	24	24	24	24	24	24
		24		0.5	24	24	24	24	21	18
				1.0	24	24	24	23	20	17
				1.5	24	24	24	22	19	16

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

- Wood furring shall be designed by others and shall be of adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
- The first furring layer may be installed vertically or horizontally. Furring shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the furring and into the studs ensuring a minimum of three (3) full threads are exposed past the interior face of the stud.
- Alternately, where the second furring layer is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c., respectively, provided two (2) fasteners are installed at stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
- When using horizontal furring as the first layer, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative treated furring.
- Minimum fastener lengths shown in this table are based on using one fastener to connect both furring layers through the FPIS and into the stud. The second furring layer is permitted to be connected separately.

6.4 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.



7 Certified Performance³⁰

- 7.1 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.³¹
- 7.2 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.³²

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 Starborn Structural Screws were evaluated for their ability to support the gravity and transverse loads in the application of cladding attachment over foam sheathing in wood-frame construction in accordance with AWC TR12.
 - 8.1.2 Starborn Structural Screws were evaluated for their ability to support the gravity and transverse loads in the application of cladding attachment over foam sheathing in CFS-frame construction in accordance with AISI S100 and the findings from NYSERDA report and AWC TR12.
- 8.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 8.3 Any building code, regulation and/or accepted engineering evaluations (e.g., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified³³ to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,³⁴ respectively.
- 8.4 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which is also its areas of professional engineering competence.

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, contact the manufacturer for counsel on the proper installation method.
- 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, applicable code, the approved construction documents, this report, the NDS, and standard framing practice as applied to wood fasteners.
 - 9.3.2 The fasteners must be installed using a 5/16" hex, Torx® T-30 or Torx® T-40 star drive bit or Philips 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 Starborn Structural Screws should be aligned perpendicular to the face of the wall stud so that the point engages the center of the wall stud and at a minimum distance of 3" from the end of the stud or furring material.
 - 9.3.4 Fasteners must be installed in a manner to avoid overdriving yet snug enough to remove any gaps between the layers of materials being fastened.
 - 9.3.5 For applications outside the scope of this report, an engineered design is required.



9.4 All fastener spacing, edge distance, and end distance shall be as determined in **Table 16** through **Table 18**, and the distance locations shown in **Figure 6**.

Table 16. Fastener Spacing Requirements for Starborn Structural Screws - Wood-Side Member

Fastener	Figure 7 Number	Installed Condition	Minimum Distance or Spacing ^{1,2} (in.)	
			Face	Edge
Structural H19 and F19	1	Minimum End Distance	6	3 ⁷ / ₈
	2	Minimum Edge Distance	1 ³ / ₄	3/ ₄
	3	Minimum Spacing Between Fasteners in a Row	3 ⁷ / ₈	3 ⁷ / ₈
	4	Minimum Spacing Between Non-Staggered Rows	2 ⁷ / ₈	N/A
	5	Minimum Spacing Between Staggered Rows	5/ ₈	
	6	Minimum Stagger Between Fasteners in Adjacent Rows	5/ ₈	
Structural F23 and F23 Stainless	1	Minimum End Distance	6	4 ⁵ / ₈
	2	Minimum Edge Distance	1 ³ / ₄	3/ ₄
	3	Minimum Spacing Between Fasteners in a Row	4 ⁵ / ₈	4 ⁵ / ₈
	4	Minimum Spacing Between Non-Staggered Rows	3 ¹ / ₂	N/A
	5	Minimum Spacing Between Staggered Rows	3/ ₄	
	6	Minimum Stagger Between Fasteners in Adjacent Rows	3/ ₄	
Structural SDP18	1	Minimum End Distance	6	N/A
	2	Minimum Edge Distance	3/ ₄	
	3	Minimum Spacing Between Fasteners in a Row	3 ⁵ / ₈	
	4	Minimum Spacing Between Non-Staggered Rows	1 ¹ / ₄	
	5	Minimum Spacing Between Staggered Rows	3/ ₄	
	6	Minimum Stagger Between Fasteners in Adjacent Rows	3/ ₄	

SI: 1 in = 25.4 mm

- 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.
- Values for "Spacing between Rows of Fasteners-Staggered" apply where the screws in adjacent rows are offset by one-half of the "Spacing between Fasteners in a Row".



Table 17. Fastener Spacing Requirements for Starborn Structural Screws - Steel-to-Wood Connections

Fastener	Figure 7 Number	Installed Condition	Minimum Distance or Spacing ^{1,2} (in.)	
			Face	Edge
Structural H19 and F19	1	Minimum End Distance	6	3
	2	Minimum Edge Distance	1 ³ / ₄	3/4
	3	Minimum Spacing Between Fasteners in a Row	2 ⁷ / ₈	2 ⁷ / ₈
	4	Minimum Spacing Between Non-Staggered Rows	2 ⁷ / ₈	N/A
	5	Minimum Spacing Between Staggered Rows	5/8	
	6	Minimum Stagger Between Fasteners in Adjacent Rows	5/8	
Structural F23 and F23 Stainless	1	Minimum End Distance	6	3 ¹ / ₂
	2	Minimum Edge Distance	1 ³ / ₄	3/4
	3	Minimum Spacing Between Fasteners in a Row	3 ¹ / ₂	3 ¹ / ₂
	4	Minimum Spacing Between Non-Staggered Rows	3 ¹ / ₂	N/A
	5	Minimum Spacing Between Staggered Rows	3/4	
	6	Minimum Stagger Between Fasteners in Adjacent Rows	3/4	

SI: 1 in = 25.4 mm

3. 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.

4. Values for "Spacing between Rows of Fasteners-Staggered" apply where the screws in adjacent rows are offset by one-half of the "Spacing between Fasteners in a Row".

Table 18. Fastener Spacing Requirements for Starborn Structural Screws - Steel-to-Steel Connections

Fastener	Figure 7 Number	Installed Condition	Minimum Distance or Spacing (in.)
Structural SDP18	1	Minimum End Distance	3/8
	2	Minimum Edge Distance	3/8
	3	Minimum Spacing Between Fasteners in a Row	3/4
	4	Minimum Spacing Between Non-Staggered Rows	3/4
	5	Minimum Spacing Between Staggered Rows	3/4
	6	Minimum Stagger Between Fasteners in Adjacent Rows	3/4

SI: 1 in = 25.4 mm

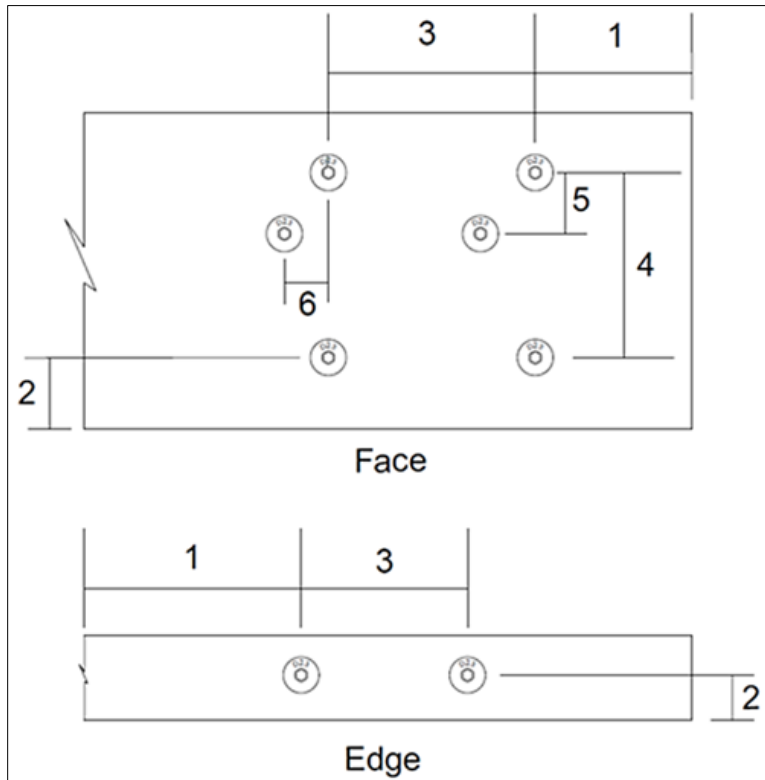


Figure 7. Starborn Structural Screws Spacing Diagram

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 ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction
 - 10.1.2 AISI S100: North American Specification for the Design of Cold-Formed Steel Structural Members
 - 10.1.3 Testing conducted for the Foam Sheathing Committee,³⁵ the Steel Framing Alliance and the New York State Energy Research and Development Authority (NYSERDA).
 - 10.1.4 Testing conducted for the Foam Sheathing Committee by Progressive Engineering, Inc., Evaluation of Siding Attachment Methods Using Various Materials.
 - 10.1.5 Material properties and design values in accordance with Report Number [1703-05](#).
 - 10.1.6 Cladding weight design value calculations by DrJ Engineering, LLC.
- 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 an [RDP](#). Accuracy of external test data and resulting analysis is relied upon.
- 10.3 Where applicable, 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*
- 10.5.1 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.³⁶
- 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 6**, Starborn Structural Screws have performance characteristics that were tested and/or meet applicable regulations. In addition, they 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 acceptable for use as an alternative material, design, and method of construction for the attachment of furring, sheathing, or cladding over foam sheathing and into wood framing or steel framing:
- 11.2.1.1 Starborn Structural Screws installed in accordance with this report, meet the requirements of the listed editions of the IBC/IRC for positive and negative wind pressure resistance. See **Section 6.3.1** for wind load parameters.
- 11.2.1.2 Starborn Structural Screws installed in accordance with this report, meet the requirements of the listed editions of the IBC/IRC for lateral shear strength to support cladding materials installed over foam sheathing.
- 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 104.2.3³⁷ (IRC Section R104.2.2³⁸ and IFC Section 104.2.3³⁹ are similar) in pertinent part state:
- 104.2.3 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, provided that any such alternative is not specifically prohibited by this code and has been approved.
- 11.5 **Approved:**⁴⁰ Building regulations require that the building official shall accept duly authenticated reports.⁴¹
- 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 Arrangement (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.⁴²

12 Conditions of Use

- 12.1 As defined in **Section 6**, 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.
- 12.2 As listed herein, Starborn Structural Screws shall be:
- 12.2.1 Installed in accordance with this report and the manufacturer installation instructions.
- 12.3 For conditions not covered in this report, 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.
- 12.4 Use of Starborn Structural Screws in locations exposed to saltwater or saltwater spray is outside the scope of this report.
- 12.5 Starborn Structural Screws are produced by Starborn Industries, Inc. at its facilities located in Edison, New Jersey.
- 12.6 Starborn Structural Screws are produced under a quality control program subject to periodic inspections performed by an approved agency in accordance with IBC Section 1703.5.2.
- 12.7 Install Starborn Structural Screws prior to utility installations. Install in exterior walls to avoid accidental penetration of utilities (e.g., electrical wiring, plumbing, etc.).
- 12.8 Foam sheathing shall be minimum Type II (expanded polystyrene) or Type X (extruded polystyrene) per ASTM C578 or Type 1 (polyiso) per ASTM C1289. Types with greater compressive strength are acceptable.
- 12.9 Connections made with Starborn SDP18 Screws into CFS studs are limited to the following:
- 12.9.1 CFS studs shall be minimum 16-gauge, 18-gauge, or 20-gauge, with minimum steel strengths as specified in **Section 2.8**.
- 12.9.2 Starborn SDP18 Screws shall be installed to penetrate the CFS stud with a minimum of three (3) full threads exposed past the interior face of the stud.
- 12.10 Ensure furring or sheathing material provides adequate substrate and thickness for the application of the siding fastener per the code requirements for siding application, in addition to the siding manufacturer installation instructions.
- 12.10.1 For example, if the siding manufacturer requires the fastener for the siding to penetrate more than $\frac{3}{4}$ " into the furring, a 1" x 4" furring strip (actual dimension of $\frac{3}{4}$ " x $3\frac{1}{2}$ ") would not be adequate, and a thicker furring strip, such as a 2" x 4", would be required.
- 12.11 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:
- 12.11.1 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.
- 12.11.2 This report and the installation instructions shall be submitted at the time of permit application.
- 12.11.3 These innovative products have an internal quality control program and a third-party quality assurance program.
- 12.11.4 At a minimum, these innovative products shall be installed per **Section 9**.



- 12.11.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.
- 12.11.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.
- 12.11.7 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.
- 12.12 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *“the building official shall make, or cause to be made, the necessary tests and investigations; or 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 Section 104.2.3”*, all of IBC Section 104, and IBC Section 105.3.
- 12.13 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).
- 12.14 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 Starborn Structural Screws (H19 Screws, F19 Screws, F23 Screws, F23 Stainless Screws and SDP18 Self-Drilling Screws), as listed in **Section 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 starbornindustries.com/structural-connections.

14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.
- 14.2 For information on the status of this report, please contact DrJ Certification.



Notes

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

2 [2018 IBC Section 2304.10.5](#)

3 [2021 IRC Section R317.3](#)

4 [2018 IBC Section 2304.10.5](#)

5 [2021 IRC Section R317.3](#)

6 Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of [TPI 1](#), the [NDS](#), [AISI S202](#), [US professional engineering law](#), [Canadian building code](#), [Canada professional engineering law](#), [Qualitm External Appendix A: Definitions/Commentary](#), [Qualitm External Appendix B: Project/Deliverables](#), [Qualitm External Appendix C: Intellectual Property and Trade Secrets](#), definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

7 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702>

8 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/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3>

9 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2>:-:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

10 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/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1>:-:text=Conformance%20to%20Standards-.The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

11 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20make%20or%20cause%20to%20be%20made%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%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%20104.2.3.

12 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2>

13 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

14 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

15 <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](#).

16 <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/>

17 <https://www.cbiteest.com/accreditation/>

18 <https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1>:-:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

19 <https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3> AND <https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1>

20 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1>

21 <https://iaf.nu/en/about-iaf-mia/#>:-:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%20it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%20with%20the%20appropriate%20scope

22 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

23 <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>

24 Unless otherwise noted, the links referenced herein use un-amended versions of the [2024 International Code Council \(ICC\) 2024 International Code Council \(ICC\) model codes](#) as foundation references. Mississippi versions of the [IBC 2024](#) and the [IRC 2024](#) are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

25 See [Adoptions by Publisher](#) for the latest adoption of a non-amended or amended model code by the local jurisdiction. <https://up.codes/codes/general>

26 See [Adoptions by Publisher](#) for the latest adoption of a non-amended or amended model code by state. <https://up.codes/codes/general>

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

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

29 <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2>(Listed%20or%20certified); <https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed> AND <https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled>

30 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4>

31 <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%20livable%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades



32 <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>

33 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.

34 <https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH>

35 Formerly the Foam Sheathing Coalition

36 See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

37 [2021 IBC Section 104.11](#)

38 [2021 IRC Section R104.11](#)

39 2018: <https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9> AND 2021: <https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11>

40 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 (<https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4>) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

41 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1>

42 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.