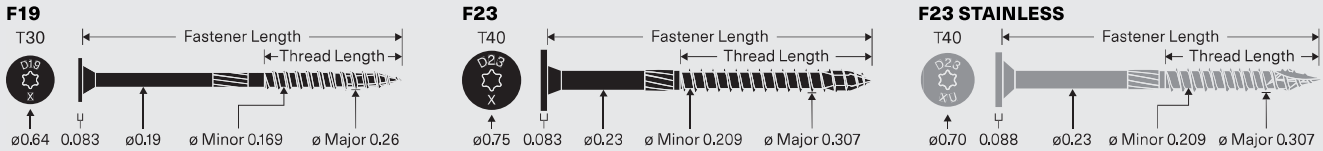


Cladding Over Foam Sheathing

Structural H19, F19, F23, F23 Stainless

Starborn® Structural Multipurpose screws can be used to attach rigid foam insulation to wood structural framing. This connection, with the use of either furring strips or WSP sheathing, is rated to support a wide range of exterior cladding materials.



INSTALLATION INSTRUCTIONS

- Calculate screw spacing using Table 2: (1) Determine stud spacing. (2) Choose foam thickness and screw length to obtain required insulation effect/R-value. (3) Select WSP sheathing or wood furring. (4) Determine cladding weight per manufacturer's specifications.
- Select the proper length screw ensuring it does not penetrate through the backside of the stud.
- Install using a high-torque low-speed drill with a Torx® T30 or T40 driver bit. Pre-drilling is not required, but can be used where lumber is prone to splitting.
- Drive until the washer is drawn firm and flush with no gaps between the layers of materials. Do not overdrive or countersink.
- **Best practice:** Cover and seal screw heads with foam where possible to prevent thermal bridging.
- **Caution:** Map out mechanical systems in the exterior wall prior to installing screws to avoid penetrating wiring, plumbing, and other mechanical systems.

CORROSION RESISTANCE

- Structural F19 and F23 screws feature a high-adhesion exterior grade coating and are a code compliant alternative to hot-dip galvanized fasteners. The coating is approved for use in ACQ, Fire Retardant Treated (FRT), and other pressure treated lumbers.
- Structural F19 and F23 screws are not designed for use in or near saltwater environments.
- Structural F23 Stainless screws are exterior grade and approved for use in ACQ and pressure treated lumber. For salt water or other areas where corrosion is a concern, use Grade 316 Stainless.
- All metal fasteners have the potential to corrode including stainless steel. For more information visit starbornindustries.com/corrosion

For the most up to date version of this Technical Guide and more detailed information contained in the Cladding Through Foam Sheathing code compliance report (DrJ TER 1703-04), visit starbornindustries.com. For applications outside the scope of this Technical Guide, an engineered design is required.

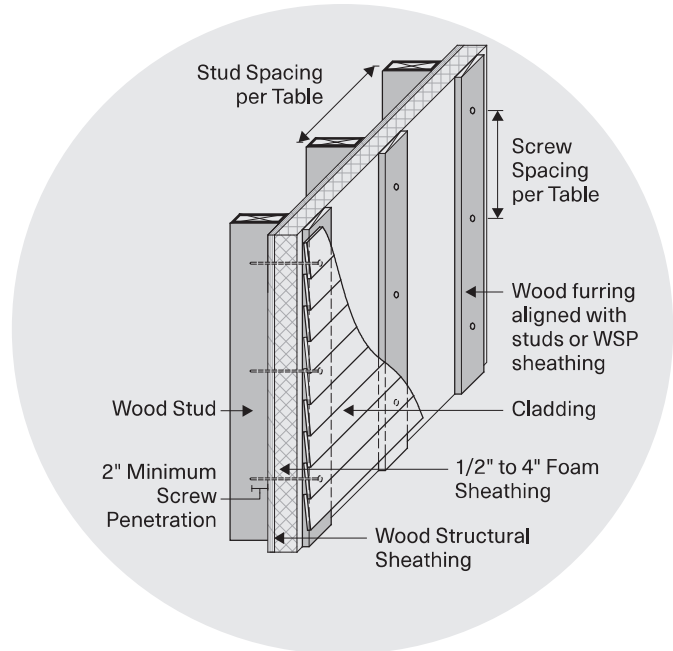


Figure 1—Cladding Over Foam Sheathing

TABLE 1: Screw Properties

PRODUCT NAME	HEAD MARKING	UNTHREADED SHANK DIAMETER (IN)	HEAD TYPE	SCREW LENGTH (IN)	THREAD LENGTH (IN)
Structural H19	D19 2.9	0.19	Hex 5/16"	2-7/8	1.4
	D19 4.5			4	2-1/4
	D19 6			6	2-1/2
	D19 8			8	
Structural F19	D19 2.9	0.19	Flat T30	2-7/8	2
	D19 4.5			4-1/2	
	D19 6			6	
	D19 8			8	
Structural F23	D23 2.9	0.23	Flat T40	2-7/8	1.4
	D23 4			4	2-3/8
	D23 5			5	3
	D23 6			6	2-3/4
Structural F23 Stainless	D23 2.9 XU	0.23	Flat T40	2-7/8	1.4
	D23 4 XU			4	2-3/4
	D23 5 XU			5	3
	D23 6 XU			6	2-3/4

TABLE 2: Recommended Screw Spacing to Support Cladding Over Foam Sheathing With Wood Furring

STUD SPACING (IN O.C.)	MINIMUM SCREW LENGTH (IN)	FOAM THICKNESS (IN)	MAXIMUM VERTICAL OR HORIZONTAL ON-CENTER SPACING (IN) OF SCREWS ALONG EACH STUD																				
			3/8" WSP SHEATHING ¹						3/4" X 3-1/2" WOOD FURRING ¹						1-1/2" X 1-1/2" WOOD FURRING ¹								
			MAXIMUM CLADDING WEIGHT (PSF) ²						MAXIMUM CLADDING WEIGHT (PSF) ²						MAXIMUM CLADDING WEIGHT (PSF) ²								
			5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30			
STRUCTURAL F19																							
16	2-7/8	0.5													—								
		0.5													24								
	4-1/2	1.0													24								
		1.5													24								
	6	2.0	24				20		16		24				20				—				
		1.5					20		16						20				—				
		2.0					20		16						24				20				
		2.5					16		12						24				20				
8	3.0			20		16		12		8				24				20		16			
	4.0	20		12		8		7						20		16		12					
24	2-7/8	0.5													—								
		0.5													24								
	4-1/2	1													24								
		1.5													24								
	6	2.0	24		16		12		8		24		20		16		12		8		20		
		1.5			16		12		8						24				20		16		
		2			16		12		8						24				20		16		
		2.5			16		12		8						24				20		16		
8	3	20		12		8		6		20		12		8		7		20		16			
	4	12		8		7		6		16		12		7		6		16		12			
STRUCTURAL F23																							
16	2-7/8	0.5													—								
		0.5													24								
	4	1.0													24								
		1.5													24								
	5	2.0	24				20				24				20				—				
		2.5					20		16						24				20		16		
	6	2.5					20		16						24				20		16		
		3.0					16		12						24				20		16		
8	4.0	20		16		8				16		12				24				20		16	
										16		12				24				20		16	
24	2-7/8	0.5													—								
		0.5													24								
	4	1.0													24								
		1.5													24								
	5	2.0	24		20		16				24		20		16				24		20		
		2.5			20		16		12						24				20		16		
	6	2.5			20		16		12						24				20		16		
		3.0			16		12		8						24				20		16		
8	4.0	20		12		8		7		20		16		8				24		16		12	
										16		12		8				24		16		12	
STRUCTURAL F23 STAINLESS																							
16	2-7/8	0.5													—								
		0.5													24								
	4	1.0													24								
		1.5													24								
	5	2.0	24		16		12		8		24		20		16		12		8		20		
		2.5			20		16		12						24				20		16		
	6	2.5			20		16		12						24				20		16		
		3.0			16		12		8						24				20		16		
8	4.0	20		16		12		8		20		16		8				24		20		16	
										16		12		8				24		20		16	
24	2-7/8	0.5													—								
		0.5													24								
	4	1.0													24								
		1.5													24								
	5	2.0	24		16		12		8		24		20		16		12		8		20		
		2.5			20		16		12						24				20		16		
	6	2.5			20		16		12						24				20		16		
		3.0			16		12		8						24				20		16		
8	3.0	20		16		12		8		20		16		8				24		20		16	
										16		12		8				24		20		16	

- Wood stud, furring, and sheathing shall be designed by others and be adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
- Select furring type and thickness per cladding manufacturer's installation requirements (e.g., required screw penetration into furring).
- Maximum allowable cladding weight includes weight of furring, sheathing, cladding, and other supported materials.
- Stud minimum of 2x nominal thickness.
- Stud and furring shall be SPF or any species with specific gravity of 0.42 or greater.
- Furring may be installed vertically or horizontally and installed at the same on-center (o.c.) spacing as the studs. Install screws through furring and into studs with a minimum 2" screw penetration.
- Furring may be installed horizontally. When the required screw spacing is 6" o.c., install furring at 12" o.c. using 2 screws at each stud. For 8" o.c. screw spacing, install furring at 16" o.c. using 2 screws at each stud. For 12" o.c. screw spacing, install furring at 24" o.c. using 2 screws at each stud.
- Where multiple screws are used, furring or sheathing shall be of adequate size to provide proper spacing, edge and end distances, as determined in NDS, Section 12.5.
- Best practice: Consider using preservative treated wood for horizontal furring or where moisture between the cladding and sheathing is a concern.

WSP = Wood Structural Panels
 SPF = Spruce-Pine-Fir
 psf = pounds per square foot

TABLE 3: Recommended Screw Spacing to Support Cladding Over Foam Sheathing With 2-Layers of Wood Furring

STUD SPACING (IN O.C.)	MINIMUM SCREW LENGTH (IN)	FOAM THICKNESS (IN)	MAXIMUM VERTICAL OR HORIZONTAL ON-CENTER SPACING (IN) OF SCREWS ALONG EACH STUD					
			2-LAYER 1-1/2"X 1-1/2" WOOD FURRING ¹					
			MAXIMUM CLADDING WEIGHT (PSF) ²					
			5	10	15	20	25	30
STRUCTURAL F19								
6	6	0.5	24	20	16	12	20	16
		1.0						
		1.5						
	8	2.0						
		2.5						
		3.0						
10	4.0							
STRUCTURAL F23								
16	5	0.5	24	20	16	12	8	20
		1.0						
		1.5						
	8	2.0						
		2.5						
		3.0						
10	4.0							
STRUCTURAL F23 STAINLESS								
24	5	0.5	24	20	16	12	20	16
		1						
		1.5						
	8	2						
		2.5						
		3						
10	4							
STRUCTURAL F19								
6	6	0.5	24	20	16	12	20	16
		1.0						
		1.5						
	8	2.0						
		2.5						
		3.0						
10	4.0							

- Wood stud, furring, and sheathing shall be designed by others and be adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
- Select furring type and thickness per cladding manufacturer's installation requirements (e.g., required screw penetration into furring).
- Maximum allowable cladding weight includes weight of furring, sheathing, cladding, and other supported materials.
- Stud minimum of 2x nominal thickness.
- Stud and furring shall be SPF or any species with specific gravity of 0.42 or greater.
- 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 of 1.25" fastener penetration. Wood structural panel sheathing attached directly to the studs may be included in the fastener depth. Alternately, where the second furring layer is installed horizontally, and where the required fasteners 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 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.

- Minimum fastener lengths shown in this table are based on using one fastener to connect both furring layers through FPIS and into the

stud. Furring is permitted to be connected separately. When choosing the length of fastener for the second layer of furring, ensure a minimum penetration into the first layer of furring for 1.00" for H19 and F19 fasteners, or 1.25" for F23 fasteners.

- Where multiple screws are used, furring or sheathing shall be of adequate size to provide proper spacing, edge and end distances, as determined in NDS, Section 12.5/
- Best practice: Consider using preservative treated wood for horizontal furring or where moisture between the cladding and sheathing is a concern.

WSP = Wood Structural Panels
 SPF = Spruce-Pine-Fir
 psf = pounds per square foot

TABLE 4: Recommended Screw Spacing to Support Cladding Over Foam Sheathing With Cold Formed Steel (CFS)

STUD SPACING (IN O.C.)	MINIMUM SCREW LENGTH (IN)	FOAM THICKNESS (IN)	MAXIMUM VERTICAL OR HORIZONTAL ON-CENTER SPACING (IN) OF SCREWS ALONG EACH STUD																			
			USING 20-GAUGE CFS FURRING ¹						USING 18-GAUGE CFS FURRING ¹						USING 16-GAUGE CFS FURRING ¹							
			MAXIMUM CLADDING WEIGHT (PSF) ²						MAXIMUM CLADDING WEIGHT (PSF) ²						MAXIMUM CLADDING WEIGHT (PSF) ²							
			5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30		
STRUCTURAL H19 & F19																						
16	2-7/8	0.5																				
		0.5																				
		1.0																				
	(H19 only)	1.5																				
		1.5																				
		2.0																				
	4-1/2	0.5																				
		1.0																				
		1.5	24							24							24					
	(F19 only)	1.5																				
		2.0																				
		2.5																				
6	1.5																					
	2.0																					
	2.5																					
	3.0																					
	3.0																					
	4.0																					
8	4.0																					
	4.0																					
STRUCTURAL F23																						
16	2-7/8	0.5																				
		0.5																				
		1.0																				
	4	1.5																				
		1.5																				
		2.0																				
	5	2.0																				
		2.5																				
		3.0																				
	6	2.5																				
		3.0																				
		4.0																				
8	4.0																					
	4.0																					
24	2-7/8	0.5																				
		0.5																				
		1.0																				
	(H19 only)	1.5																				
		1.5																				
		2.0																				
	4-1/2	0.5																				
		1.0																				
		1.5	24							24							24					
	(F19 only)	1.5																				
		2.0																				
		2.5																				
6	1.5																					
	2.0																					
	2.5																					
	3.0																					
	3.0																					
	4.0																					
8	4.0																					
	4.0																					
STRUCTURAL F23 STAINLESS																						
16	2-7/8	0.5																				
		0.5																				
		1.0																				
	4	1.5																				
		1.5																				
		2.0																				
	5	2.0																				
		2.5																				
		3.0																				
	6	2.5																				
		3.0																				
		4.0																				
8	4.0																					
	4.0																					
24	2-7/8	0.5																				
		0.5																				
		1.0																				
	(H19 only)	1.5																				
		1.5																				
		2.0																				
	4-1/2	0.5																				
		1.0																				
		1.5	24							24							24					
	(F19 only)	1.5																				
		2.0																				
		2.5																				
6	1.5																					
	2.0																					
	2.5																					
	3.0																					
	3.0																					
	4.0																					
8	4.0																					
	4.0																					

- Wood stud, CFS furring, and sheathing shall be designed by others and be adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
 - Select furring type and thickness per cladding manufacturer's installation requirements (e.g., required screw penetration into furring).
 - Maximum allowable cladding weight includes weight of furring, sheathing, cladding, and other supported materials.
 - Stud minimum of 2x nominal thickness.
 - Stud and furring shall be SPF or any species with specific gravity of 0.42 or greater.
 - Furring may be installed vertically or horizontally and installed at the same on-center (o.c.) spacing as the studs. Install screws through furring and into studs with a minimum 2" screw penetration.
 - Furring may be installed horizontally. When the required screw spacing is 6" o.c., install furring at 12" o.c. using 2 screws at each stud. For 8" o.c. screw spacing, install furring at 16" o.c. using 2 screws at each stud. For 12" o.c. screw spacing, install furring at 24" o.c. using 2 screws at each stud.
 - Where multiple screws are used, furring or sheathing shall be of adequate size to provide proper spacing, edge and end distances, as determined in NDS, Section 12.5.
 - Best practice: Consider using preservative treated wood for horizontal furring or where moisture between the cladding and sheathing is a concern.
- WSP = Wood Structural Panels
 SPF = Spruce-Pine-Fir
 psf = pounds per square foot