

Truss and Wall Tiedown Installations

The MiTek Pro Series WSTS Truss Screw can be used to resist uplift and lateral loads for truss/rafter-to-plate and stud-to-plate connections. The WSTS screws are evaluated in accordance with ICC-ES AC233 and AC13 and meet 2018 IRC and IBC code requirements.

This bulletin provides design values for a variety of installation conditions:

- Double Top Plate to Truss for 2 conditions:
 - Truss aligned directly over wall stud
 - Truss located between studs
- Double Top Plate-to-Stud (End Grain)
- Top Plate-to-End Wall Truss (Gable End)
- Stud-to-Single Bottom Plate (Narrow Face)
- Stud-to-Single Bottom Plate (Wide Face)

Code Reports: IBC, FL, LA

Patents: U.S. Patent No. 10,823,218 (WSTS Screw);
U.S. Patent No. 10,639,769 (Angle Tool)

Installation:

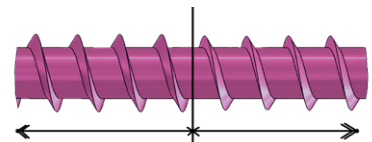
- The WSTS angle tool ensures proper installation at 22° and 90° angles. The guide is easy to use and attaches to the drill. See the following pages for specific installation instructions.
- WSTS screws are color coded by length for easy identification after installation.



WSTS6-EXT



WSTS45-EXT



U.S. Patent No. 10,823,218

Both WSTS45 and WSTS6 products feature a reversing asymmetrical thread angle, adding withdrawal capacity



Allows for installation to bottom plate at 22°

T30 Driver Bit



U.S. Patent No. 10,639,769

Angle Tool (included in WSTS packaging)



Allows for installation to top plate/truss at 22°

Angle tool shall be adjusted until ball bearing is centered in the embossed circle marked "22"

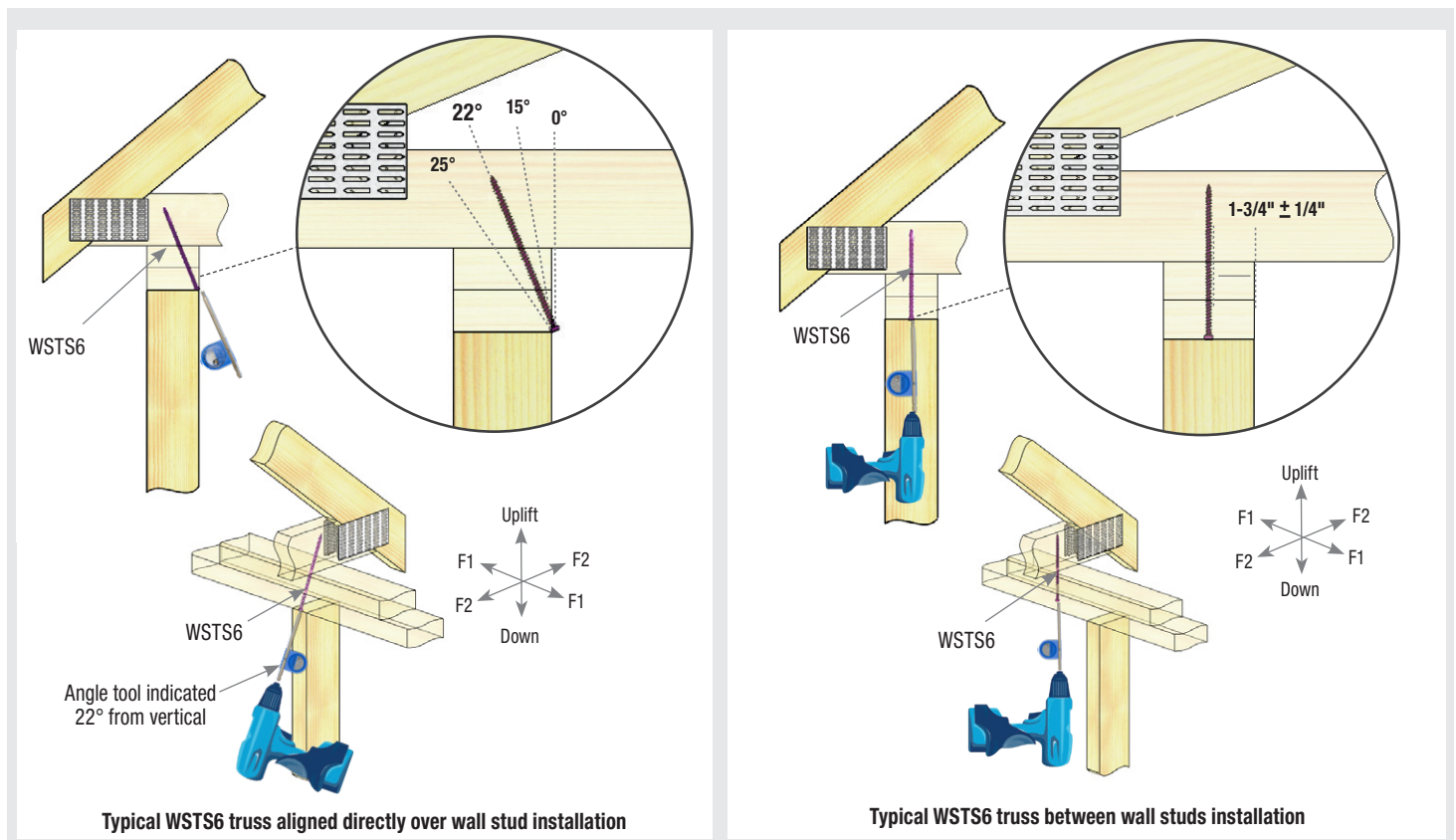
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Double Top Plate-to-Truss

Installation instructions:

- The removable angle tool comes attached to the bit. Install bit into drill.
- **Truss Aligned Directly Over Wall Stud:** Position screw point where bottom of top plate and top of stud meet. Install screw at 22° angle using the angle tool.
- **Truss Between Two Wall Studs:** On the underside of the top plate, position screw in the center of the top plate and truss bottom chord. Install the screw perpendicular through the double top plate to the truss bottom chord. Drive the WSTS screw head flush to the wood surface.



Size (in)	MiTek Stock No.	Ref. No.	Length (in)	Finish ¹	DF Allowable Loads (Lbs.) ^{2,3,4,8}				SP Allowable Loads (Lbs.) ^{2,3,4,8}				S-P-F Allowable Loads (Lbs.) ^{2,3,4,8}			
					Down 100%	Uplift ⁷ 160%	F1 ⁶ 160%	F2 ⁶ 160%	Down 100%	Uplift ⁷ 160%	F1 ⁶ 160%	F2 ⁶ 160%	Down 100%	Uplift ⁷ 160%	F1 ⁶ 160%	F2 ⁶ 160%
0.152 x 6	WSTS6	SDWC15600	6	EXT	268	715	225	443	274	802	263	496	268	573	177	355

- 1) EXT = Exterior Coat.
- 2) Allowable loads have been increased by 60% for wind or seismic loads; no further increase shall be permitted.
- 3) Allowable loads are for WSTS screws installed in accordance with either set of installation instructions shown above.
- 4) When the screw is to be loaded in multiple directions simultaneously, refer to note 1 in *Design Notes* of MiTek's current product catalog.
- 5) Double top plates should be independently fastened together as required by applicable code.
- 6) F1 loading is parallel to the top plate, F2 loading is perpendicular to the top plate.
- 7) Designer must ensure that a continuous load path transfers the uplift loads to the foundation.
- 8) Wood species shall have a minimum NDS referenced specific gravity of 0.50 for DF, 0.55 for SP, and 0.42 for SPF.
- 9) Table loads do not apply to installations into end grain truss members.

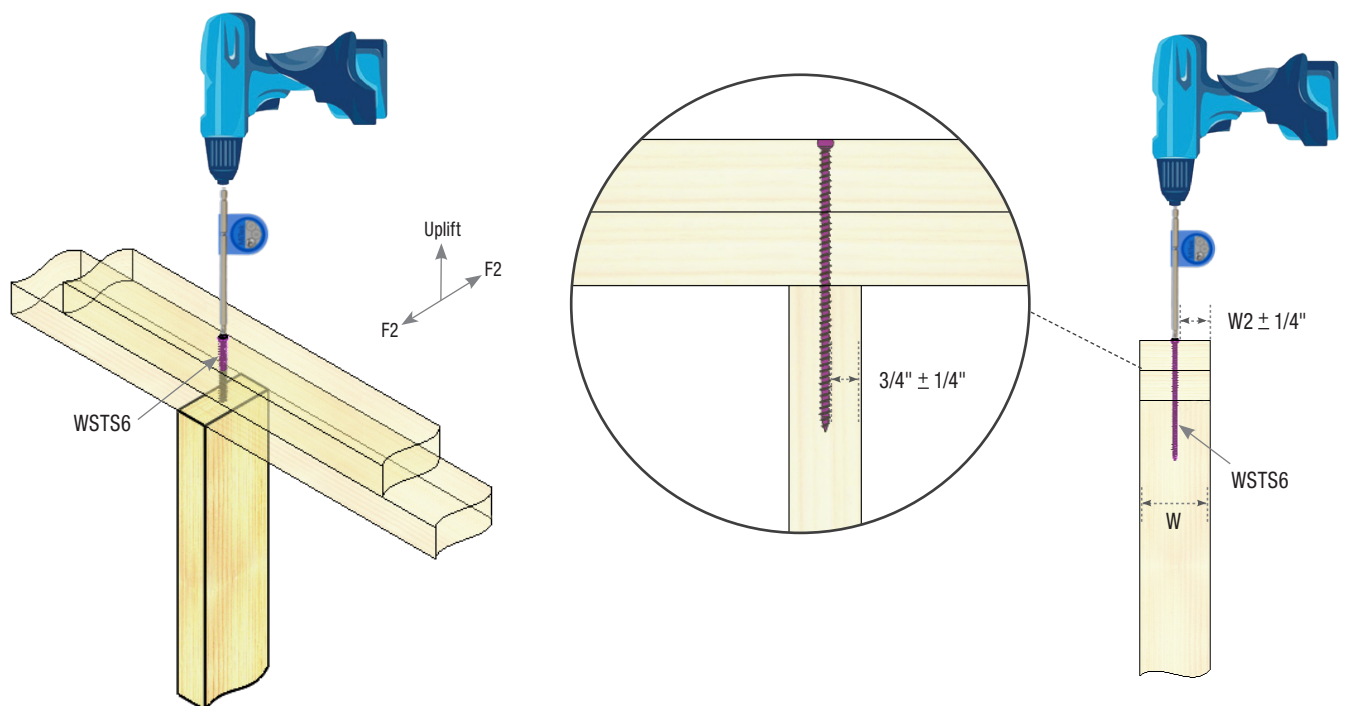
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Double Top Plate-to-Stud (End Grain)

Installation:

- The removable angle tool comes attached to the bit. Install bit into drill.
- Position screw in center of the top plate and wall stud.
- Align screw parallel to wall stud and perpendicular to top plate.
- Drive screw through double top plate into the end grain of wall stud.
- May be installed on the ground prior to raising wall into place for easier installation.



Typical WSTS6 double top plate-to-stud installation

Size (in)	MiTek Stock No.	Ref. No.	Length (in)	Finish ¹	DF		SP		S-P-F	
					Allowable Loads (Lbs.) ^{2,3,4,8}		Allowable Loads (Lbs.) ^{2,3,4,8}		Allowable Loads (Lbs.) ^{2,3,4,8}	
					Uplift ⁷ 160%	F2 ⁶ 160%	Uplift ⁷ 160%	F2 ⁶ 160%	Uplift ⁷ 160%	F2 ⁶ 160%
0.152 x 6	WSTS6	SDWC15600	6	EXT	616	228	637	257	616	228

- 1) EXT = Exterior Coat.
- 2) Allowable loads have been increased by 60% for wind or seismic loads; no further increase shall be permitted.
- 3) Allowable loads are for WSTS screws installed in accordance with installation instructions.
- 4) When the screw is to be loaded in multiple directions simultaneously, refer to note 1 in *Design Notes* of MiTek's current product catalog.
- 5) Double top plates should be independently fastened together as required by applicable code.
- 6) F2 loading is perpendicular to the top plate.
- 7) Designer must ensure that a continuous load path transfers the uplift loads to the foundation.
- 8) Wood species shall have a minimum NDS referenced specific gravity of 0.50 for DF, 0.55 for SP, and 0.42 for SPF.

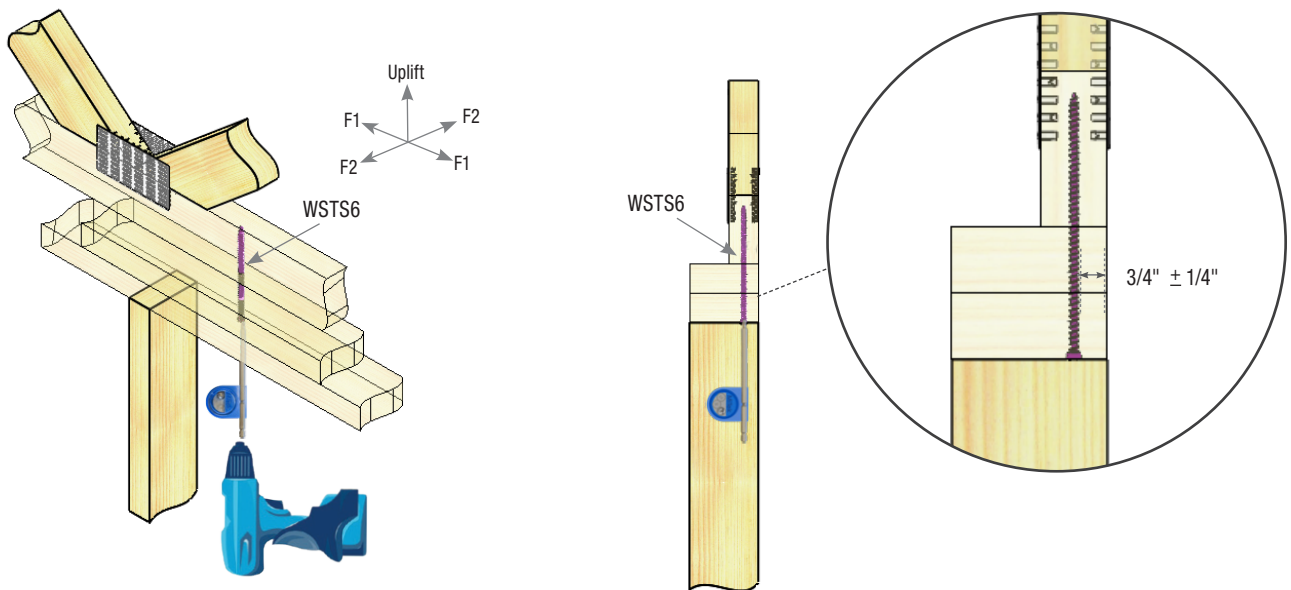
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Top Plate-to-End Wall Truss (Gable End)

Installation:

- The removable angle tool comes attached to the bit. Install bit into drill.
- On the underside of the top plate, position screw along the centerline of the truss bottom chord.
- Align screw parallel to end wall truss and perpendicular to top plate.
- Install screw through top plate into end wall truss.



Typical WSTS6 top plate-to-end wall truss installation

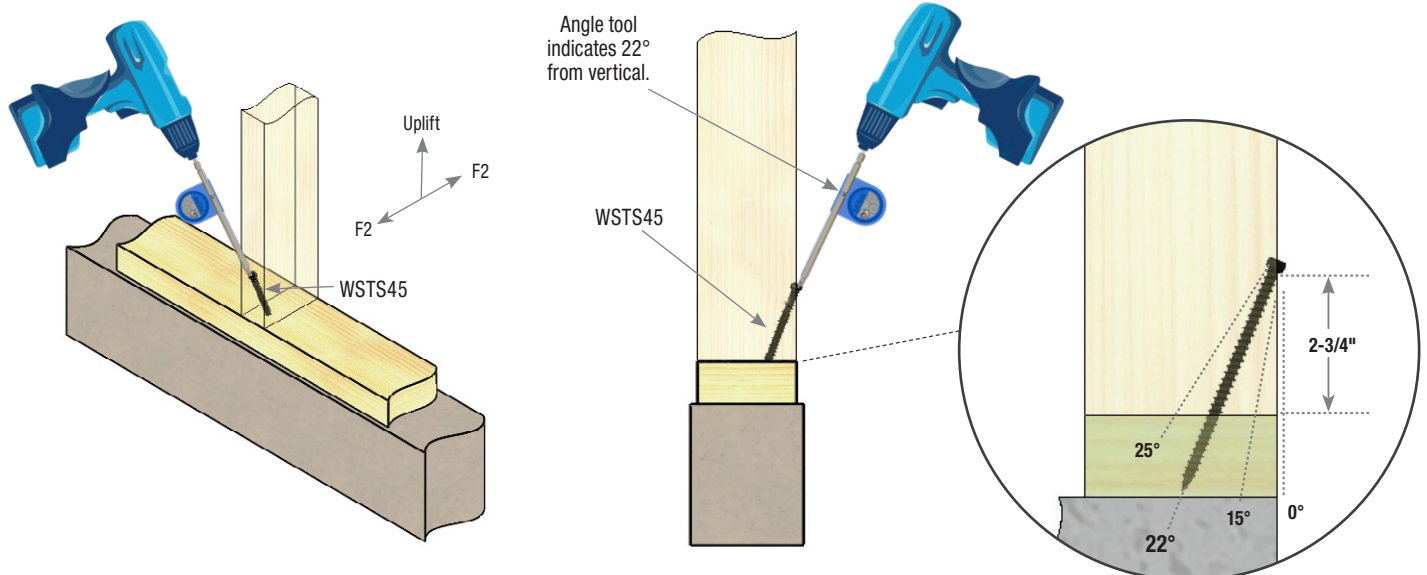
Size (in)	MiTek Stock No.	Ref. No.	Length (in)	Finish ¹	DF			SP			S-P-F			
					Allowable Loads (Lbs.) ^{2,3,4,8}			Allowable Loads (Lbs.) ^{2,3,4,8}			Allowable Loads (Lbs.) ^{2,3,4,8}			
					Uplift ⁷	F1 ⁶	F2 ⁶	Uplift ⁷	F1 ⁶	F2 ⁶	Uplift ⁷	F1 ⁶	F2 ⁶	
0.152 x 6	WSTS6	SDWC15600	6	EXT	160%	160%	160%	160%	160%	160%	160%	160%	160%	160%
					847	547	336	876	547	373	662	519	235	

1) EXT = Exterior Coat.
 2) Allowable loads have been increased by 60% for wind or seismic loads; no further increase shall be permitted.
 3) Allowable loads are for WSTS screws installed in accordance with installation instructions.
 4) When the screw is to be loaded in multiple directions simultaneously, refer to note 1 in *Design Notes* of MiTek's current product catalog.
 5) Double top plates should be independently fastened together as required by applicable code.
 6) F1 loading is parallel to the top plate, F2 loading is perpendicular to the top plate.
 7) Designer must ensure that a continuous load path transfers the uplift loads to the foundation.
 8) Wood species shall have a minimum NDS referenced specific gravity of 0.50 for DF, 0.55 for SP, and 0.42 for SPF.
 9) Table loads to do not apply to installations into end grain truss members.

Stud-to-Single Bottom Plate (Narrow Face)

Installation:

- The removable angle tool comes attached to the bit. Install bit into drill.
- Position screw point approximately 2-3/4" from the end of the stud in the center of the narrow face. Install the screw in the center of the narrow face within a tolerance of ± 1/4".
- Install screw at 22° using the angle tool.
- Drive the WSTS screw head flush to the wood surface.



Typical WSTS45 stud-to-single bottom plate installation

Narrow Face Installation

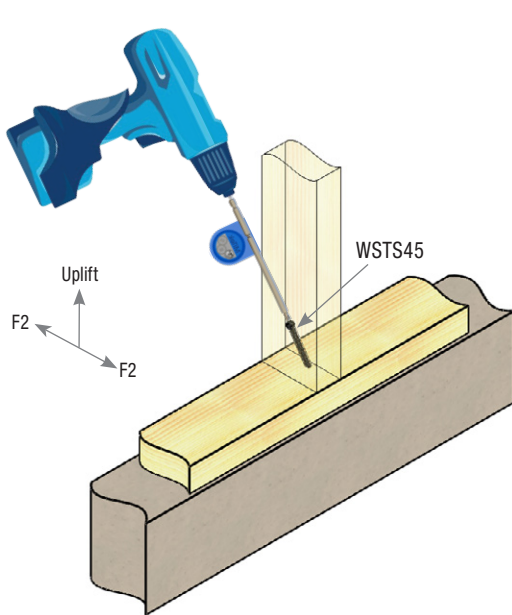
Size (in)	MiTek Stock No.	Ref. No.	Length (in)	Finish ¹	DF Allowable Loads (Lbs.) ^{2,3,4,7}		SP Allowable Loads (Lbs.) ^{2,3,4,7}		S-P-F Allowable Loads (Lbs.) ^{2,3,4,7}	
					Uplift ⁶	F2 ⁵	Uplift ⁶	F2 ⁵	Uplift ⁶	F2 ⁵
					160%	160%	160%	160%	160%	160%
0.152 x 4-1/2	WSTS45	SDWC15450	4-1/2	EXT	372	277	493	334	296	231

1) EXT = Exterior Coat.
 2) Allowable loads have been increased by 60% for wind or seismic loads; no further increase shall be permitted.
 3) Allowable loads are for WSTS screws installed in accordance with installation instructions.
 4) When the screw is to be loaded in multiple directions simultaneously, refer to note 1 in *Design Notes* of MiTek's current product catalog.
 5) F2 loading is perpendicular to the top plate.
 6) Designer must ensure that a continuous load path transfers the uplift loads to the foundation.
 7) Wood species shall have a minimum NDS referenced specific gravity of 0.50 for DF, 0.55 for SP, and 0.42 for SPF.

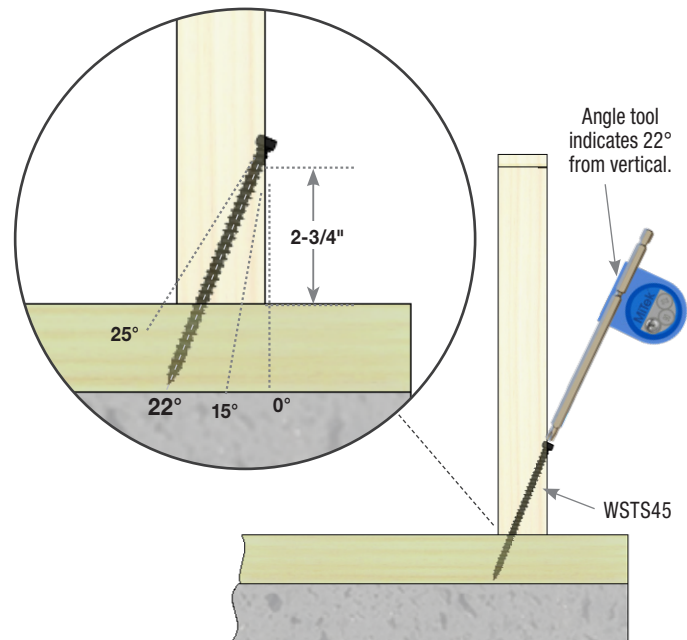
Stud-to-Single Bottom Plate (Wide Face)

Installation:

- The removable angle tool comes attached to the bit. Install bit into drill.
- Position screw point approximately 2-3/4" from the end of the stud, in the center of the wide face with a tolerance of ± 1".
- Install screw at 22° angle using the angle tool.
- Drive the WSTS screw head flush to the wood surface.



Typical WSTS45 stud-to-single bottom plate installation



Wide Face Installation

Size (in)	MiTek Stock No.	Ref. No.	Length (in)	Finish ¹	DF		SP		S-P-F	
					Allowable Loads (Lbs.) ^{2,3,4,7}		Allowable Loads (Lbs.) ^{2,3,4,7}		Allowable Loads (Lbs.) ^{2,3,4,7}	
					Uplift ⁶ 160%	F2 ⁵ 160%	Uplift ⁶ 160%	F2 ⁵ 160%	Uplift ⁶ 160%	F2 ⁵ 160%
0.152 x 4-1/2	WSTS45	SDWC15450	4-1/2	EXT	313	251	380	266	281	161

1) EXT = Exterior Coat.
 2) Allowable loads have been increased by 60% for wind or seismic loads; no further increase shall be permitted.
 3) Allowable loads are for WSTS screws installed in accordance with installation instructions.
 4) When the screw is to be loaded in multiple directions simultaneously, refer to note 1 in *Design Notes* of MiTek's current product catalog.
 5) F2 loading is perpendicular to the top plate.
 6) Designer must ensure that a continuous load path transfers the uplift loads to the foundation.
 7) Wood species shall have a minimum NDS referenced specific gravity of 0.50 for DF, 0.55 for SP, and 0.42 for SPF.