

SOLARHOOK FLAT TILE
004AT1H

SOLARHOOK UNIVERSAL
W/ ADJUSTABLE BASE
004CT5H

SOLARHOOK SPANISH
7" FIXED BASE
004CT1H

SOLARHOOK SPANISH
9" FIXED BASE
004CT2H

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HOOK CAPACITIES AND ENGINEERING

Refer to engineering report tables for tested allowable loads. Refer to local AHJ to determine the correct code (ASCE 7-05, 7-10 or 7-16) and environmental loads. It is the responsibility of the installer to ensure these mounting attachments are appropriate for the application. Please contact your 3rd party engineer for more information.

ENGINEERING GUIDE LIMITATIONS

- Flush roof installations only
- Roof slope must be 0-45 degrees (0/12 - 12/12 pitch)
- Surrounding ground area must not slope more than 10 degrees
- Location must fall into Exposure Category B or C

Please refer to the Solarmount Installation Manual for proper installation of the Solarmount system. SOLARHOOKS are intended to replace L-feet in the system and connected to SOLARMOUNT or NXT Horizon rail according to the SOLARMOUNT Installation GUIDE or NXT Horizon Installation Guide respectively.

Please refer to www.unirac.com in the Technical Support section for the applicable D&E guide which should be used in installations that do not comply with the limitations above.

Follow all local and OSHA safety guidelines when installing.

RECOMMENDED TOOLS FOR HOOK INSTALL

- Drill, Impact Driver
- 3/16" drill bit
- Sealant
- Marking crayon/ chalk
- Rafter locator

RECOMMENDED TOOLS FOR OPTIONAL 3-COURSE FLASHING

- Roof cement
- Roof repair fabric
- Margin trowel
- Scrub brush
- Scissors

FIGURE 1: Lag pull-out (withdrawal) capacities (lbs) in typical roof lumber (ASD)

	Specific Gravity	Lag Screw Specifications 5/16" shaft, per inch thread depth
Douglas Fir, Larch	0.50	266
Douglas Fir, South	0.46	235
Engelmann Spruce, Lodgepole Pine (MSR 1650f & higher)	0.46	235
Hem. Fir, Redwood (Close Grain)	0.43	212
Southern Pine	0.55	307
Spruce, Pine, Fir	0.42	205
Spruce, Pine, Fir (E of 2million PSI & higher grades of MSR & MEL)	0.50	266

SOURCES: AMERICAN WOOD COUNCIL, NDS 2005, TABLE 1

NOTES:

- (1) Thread must be embedded in the side grain of a rafter or other structural member integral with the building structure.
- (2) Lag bolts must be located in the middle third of the structural member.
- (3) This table does not include shear capacities. If necessary, contact a local engineer to specify lag bolt size with regard to shear forces.
- (4) Install lag bolts with head and washer flush to surface (no gap). Do not over torque.
- (5) Withdrawal design values for lag screw connections shall be multiplied by applicable adjustment factors if necessary. See table 10.3 in the American Wood Council NDS for Wood Construction

FIGURE 1 AND ASSOCIATED NOTES (for reference only)

Refer to latest AWC, NDS data to select a lag bolt embedment depth to satisfy your Uplift Point Load Force (lbs), requirements. It is the installer's responsibility to verify that the substructure and attachment method is strong enough to support the maximum point loads calculated.



1. Remove tiles around installation area.



2. Locate and mark rafters.



3. Position hook, adjusting arm-base bolt position as needed. Use 3/16" bit to drill 2 pilot holes.

Torque arm-base nut to 16 ft. lbs.



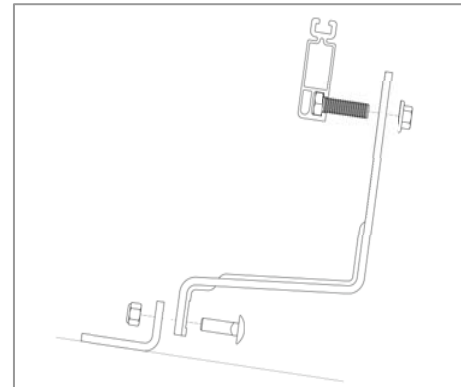
4. Remove hook, clean debris and fill pilot holes with roofing sealant.



5. Reposition hook, secure with included lag screws.



6. Replace tiles, if necessary notch with grinder to ensure proper fit.



Install components as shown above.



Install components as shown above.

NOTE: SOLARHOOKS UNIVERSAL CT5 is compatible with all tile profiles. Installation process is the same for all tile profiles.
NOTE: Refer to the SOLARMOUNT or NXT HORIZON Installation Guide for the remaining system installation.



1. Remove tiles around installation area.



2. Locate and mark rafters.



3. Position hook. Use 3/16" bit to drill 2 pilot holes.



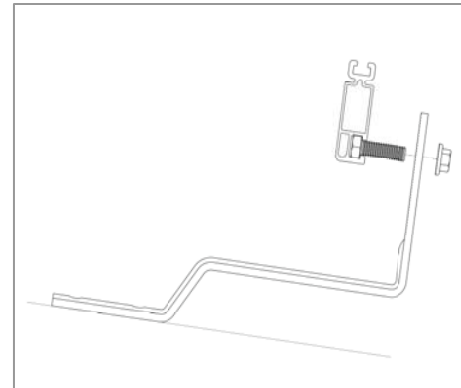
4. Remove hook, clean debris, then fill pilot holes and rib on back of hook with roofing sealant.



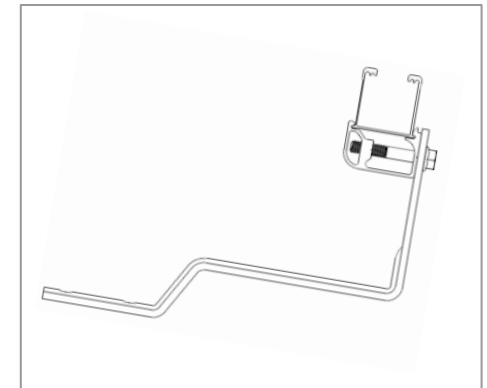
5. Reposition hook, secure with included lag screws.



6. Replace tiles, if necessary notch with grinder to ensure proper fit.



Install components as shown above.



Install components as shown above.

NOTE: SOLARHOOKS FLAT AT1 is compatible with flat tile profiles.
NOTE: Refer to the SOLARMOUNT or NXT HORIZON Installation Guide for the remaining system installation.



1. Remove tiles around installation area.



2. Locate and mark rafters.



3. Position hook. Use 3/16" bit to drill 2 pilot holes.



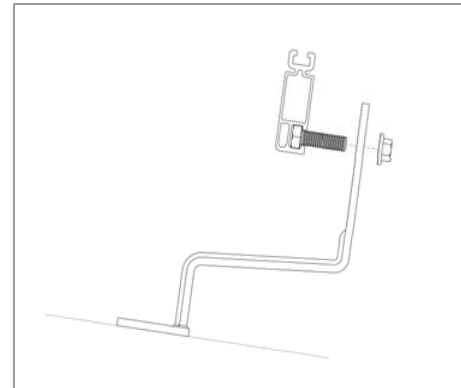
4. Remove hook, clean debris and fill pilot holes with roofing sealant.



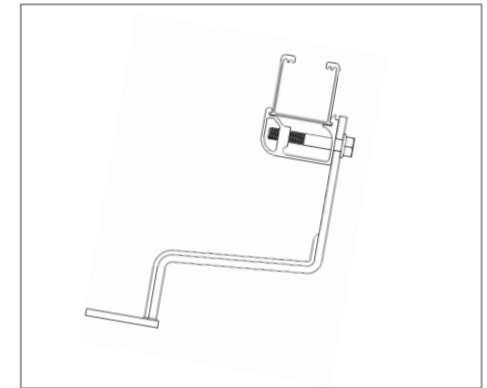
5. Reposition hook, secure with included lag screws.



6. Replace tiles, if necessary notch with grinder to ensure proper fit.



Install components as shown above.



Install components as shown above.

NOTE: SOLARHOOKS SPANISH CT1 and CT2 are compatible with W and S tile profiles. Installation process is the same for both tile profiles and hook models.
NOTE: Refer to SOLARMOUNT or NXT HORIZON Installation Guide for the remaining system installation.



1. Clean underlay.



2. Using Margin Trowel, apply base coat of roofing cement.



3. Cut roof repair fabric size, lay into roofing cement.



4. Apply top coat of roof cement.

NOTE: 3-Course flashing is not required, but may be applied when required by AHJ or when additional protection is desired.

These images show the 3-Course method applied to a replacement tile mount. The process is the same for Solarhooks, with the roof cement being applied over the base.

ASSUMPTIONS AND USE DETAILS

- Pressure limits refer to Up, Down, Downslope, and Lateral PSF.
- See Design Pressure table appendix for representative geographic pressures or refer to Pressure Tables for Flush Mounted Systems at unirac.com.
- For each load direction, index the Allowable span for which the Allowable Pressure does not exceed the Design Pressure.
- The Allowable Span shall be the minimum of that for each load direction
- Pressure limits apply to all roof zones.
- Solarhooks are not recommended for use in hurricane zones.
- Tabulated allowable pressures assume continuous rail spans and may need to be divided by 1.25 for some rail span configurations.
- Pressure limits were calculated from the allowable Solarhooks loads, which are provided below for reference.

PRESSURE LIMIT MODIFICATION GUIDELINES

- Portrait Module Height 65 inches
- Landscape Module Width 39.4 inches
- Tabulated Pressure limits were calculated using a module size of 39.4in x 65in
- These pressure limits may be increased or decreased linearly.
- To modify pressure limits provided, follow these simple steps:
 1. For portrait modules, multiply the given pressure limit by (65" / New Module Length)
 2. For landscape modules, multiply the given pressure limit by (39.5" / New Module Width)

• Allowable Loads (LBS):

HOOK TYPE	UP/DOWN	DOWNSLOPE	LATERAL
AT1	218	120	210
CT5	270	93	39
CT1	270	120	210
CT2	228	120	210

Allowable Spans (in.)	AT1 Allowable Pressure (psf)					
	Up / Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	13.4	22.1	12.2	12.2	12.9	21.3
60	16.1	26.6	8.9	14.6	15.5	25.6
48	20.1	33.2	11.1	18.3	19.4	32.0
36	26.8	44.3	14.8	24.4	25.8	42.6
24	40.2	66.4	22.2	36.5	38.8	64.0
12	80.5	132.8	44.3	73.1	77.5	127.9

Allowable Spans (in.)	CT1 Allowable Pressure (psf)					
	Up / Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	16.6	27.4	7.4	12.2	12.9	21.3
60	19.9	32.9	8.9	14.6	15.5	25.6
48	24.9	41.1	11.1	18.3	19.4	32.0
36	33.2	54.8	14.8	24.4	25.8	42.6
24	49.8	82.2	22.2	36.5	38.8	64.0
12	99.7	164.5	44.3	73.1	77.5	127.9

Allowable Spans (in.)	CT2 Allowable Pressure (psf)					
	Up / Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	14.0	23.1	7.4	12.2	12.9	21.3
60	16.8	27.8	8.9	14.6	15.5	25.6
48	21.0	34.7	11.1	18.3	19.4	32.0
36	28.1	46.3	14.8	24.4	25.8	42.6
24	42.1	69.4	22.2	36.5	38.8	64.0
12	84.2	138.9	44.3	73.1	77.5	127.9

Allowable Spans (in.)	CT5 Allowable Pressure (psf)					
	Up / Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	16.6	27.4	5.7	9.4	2.4	4.0
60	19.9	32.9	6.9	11.3	2.9	4.8
48	24.9	41.1	8.6	14.2	3.6	5.9
36	33.2	54.8	11.4	18.9	4.8	7.9
24	49.8	82.2	17.2	28.3	7.2	11.9
12	99.7	164.5	34.3	56.6	14.4	23.8

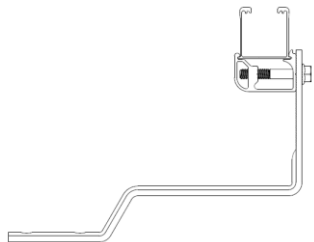
ASSUMPTIONS AND USE DETAILS

- Pressure limits refer to Up, Down, Downslope, and Lateral PSF.
- See design pressure table index for representative geographic pressures or refer to Pressure tables for Flush Mounted Systems at Unirac.com.
- For each load direction, index the Allowable span for which the Allowable Pressure does not exceed the Design Pressure.
- The Allowable Span shall be the minimum of that for each load direction. Pressure limits apply to all roof zones.
- Solar hooks not recommended for use in hurricane zones.
- Tabulated allowable pressures assume continuous rail spans and may need to be divided by 1.25 for some rail span configurations.
- Pressure limits were calculated from the allowable Solar hooks loads, which are provided below for reference.

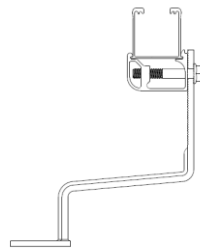
PRESSURE LIMIT MODIFICATION GUIDELINES

- Portrait Module Height 65 in
- Landscape Module Width 39.4 in
- Tabulated Pressure were calculated using a module size of 39.4 in X65 in
- These pressure limits may be increased or decreased linearly
- To modify pressure limits provided, follow these simple steps:
 - For portrait modules, multiply the given pressure limit by $(65''/\text{New module length})$
 - For Landscape modules, multiply the given pressure limit by $(39.4''/\text{New module width})$
- Allowable loads (lbs)

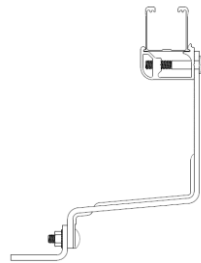
HOOK TYPE	UP	DOWNLOAD	DOWNSLOPE	LATERAL
AT1	341	317	196	242
CT5	658	317	177	75
CT1	412	317	239	113
CT2	368	317	244	98



AT1 Flat Tile solar Hook with NH



CT1/CT2 Spanish Fixed Hook Plate with NH



CT5 Universal Solar Hook W/Adjustable base with NH

Allowable Spans (in.)	AT1 Allowable Pressure (psf)							
	UP		Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	21.0	34.6	19.5	32.2	19.9	19.9	14.9	24.6
60	25.2	41.5	23.4	38.6	14.5	23.9	17.9	29.5
48	31.5	51.9	29.3	48.3	18.1	29.8	22.3	36.9
36	42.0	69.2	39.0	64.4	24.1	39.8	29.8	49.1
24	63.0	103.9	58.5	96.5	36.2	59.7	44.7	73.7
12	125.9	207.7	117.0	193.1	72.4	119.4	89.4	147.4

Allowable Spans (in.)	CT1 Allowable Pressure (psf)							
	UP		Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	25.4	41.8	19.5	32.2	14.7	24.3	7.0	11.5
60	30.4	50.2	23.4	38.6	17.6	29.1	8.3	13.8
48	38.0	62.7	29.3	48.3	22.1	36.4	10.4	17.2
36	50.7	83.7	39.0	64.4	29.4	48.5	13.9	22.9
24	76.1	125.5	58.5	96.5	44.1	72.8	20.9	34.4
12	152.1	251.0	117.0	193.1	88.2	145.6	41.7	68.8

Allowable Spans (in.)	CT2 Allowable Pressure (psf)							
	UP		Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	22.6	37.4	19.5	32.2	15.0	24.8	6.0	9.9
60	27.2	44.8	23.4	38.6	18.0	29.7	7.2	11.9
48	34.0	56.0	29.3	48.3	22.5	37.2	9.0	14.9
36	45.3	74.7	39.0	64.4	30.0	49.5	12.1	19.9
24	67.9	112.1	58.5	96.5	45.0	74.3	18.1	29.8
12	135.9	224.2	117.0	193.1	90.1	148.6	36.2	59.7

Allowable Spans (in.)	CT5 Allowable Pressure (psf)							
	UP		Down		DownSlope		Lateral	
	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules	Portrait Modules	Landscape Modules
72	40.5	66.8	19.5	32.2	10.9	18.0	4.6	7.6
60	48.6	80.2	23.4	38.6	13.1	21.6	5.5	9.1
48	60.7	100.2	29.3	48.3	16.3	27.0	6.9	11.4
36	81.0	133.6	39.0	64.4	21.8	35.9	9.2	15.2
24	121.5	200.4	58.5	96.5	32.7	53.9	13.8	22.8
12	243.0	400.8	117.0	193.1	65.4	107.8	27.7	45.7



Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
1:12	-9.7	-18.5	-29.5	15.1	-9.7	-18.5	-29.5	15.1	-12.1	-22.8	-36.1	15.1
2:12	-8.7	-17.4	-27.3	14.7	-8.7	-17.4	-27.3	14.7	-10.8	-21.5	-33.5	14.7
3:12	-8.8	-17.5	-27.4	14.3	-8.8	-17.5	-27.4	14.3	-10.8	-21.5	-33.5	14.3
4:12	-8.8	-17.5	-27.4	13.6	-8.8	-17.5	-27.4	13.6	-10.8	-21.5	-33.5	13.6
5:12	-8.8	-17.5	-27.4	13.6	-8.8	-17.5	-27.4	13.6	-10.8	-21.5	-33.6	13.6
6:12	-8.9	-17.6	-27.5	13.4	-8.9	-17.6	-27.5	13.4	-10.9	-21.6	-33.6	13.4
7:12	-9.9	-12.1	-12.1	13.3	-9.9	-12.1	-12.1	13.3	-12.3	-14.9	-14.9	15.4
8:12	-9.9	-12.1	-12.1	13.2	-9.9	-12.1	-12.1	13.2	-12.3	-15.0	-15.0	15.2
9:12	-10.0	-12.2	-12.2	13.1	-10.0	-12.2	-12.2	13.1	-12.3	-15.0	-15.0	15.1
10:12	-10.0	-12.2	-12.2	13.0	-10.0	-12.2	-12.2	13.0	-12.4	-15.0	-15.0	15.0
11:12	-10.1	-12.3	-12.3	12.8	-10.1	-12.3	-12.3	12.8	-12.4	-15.1	-15.1	14.9
12:12	-10.1	-12.3	-12.3	12.7	-10.1	-12.3	-12.3	12.7	-12.5	-15.1	-15.1	14.7
1:12	-12.1	-22.8	-36.1	15.1	-14.1	-26.5	-41.9	15.1	-16.5	-30.7	-48.5	15.1
2:12	-10.8	-21.5	-33.5	14.7	-12.6	-24.9	-38.8	14.7	-14.7	-28.9	-44.9	14.7
3:12	-10.8	-21.5	-33.5	14.3	-12.6	-24.9	-38.8	14.3	-14.7	-29.0	-44.9	14.3
4:12	-10.8	-21.5	-33.5	13.6	-12.6	-25.0	-38.8	13.6	-14.8	-29.0	-45.0	13.6
5:12	-10.8	-21.5	-33.6	13.6	-12.7	-25.0	-38.9	13.6	-14.8	-29.0	-45.0	13.6
6:12	-10.9	-21.6	-33.6	13.4	-12.7	-25.0	-38.9	13.4	-14.8	-29.1	-45.0	13.4
7:12	-12.3	-14.9	-14.9	15.4	-14.3	-17.4	-17.4	17.2	-16.7	-20.2	-20.2	19.3
8:12	-12.3	-15.0	-15.0	15.2	-14.3	-17.4	-17.4	17.1	-16.7	-20.2	-20.2	19.2
9:12	-12.3	-15.0	-15.0	15.1	-14.4	-17.5	-17.5	16.9	-16.7	-20.3	-20.3	19.1
10:12	-12.4	-15.0	-15.0	15.0	-14.4	-17.5	-17.5	16.8	-16.8	-20.3	-20.3	18.9
11:12	-12.4	-15.1	-15.1	14.9	-14.5	-17.5	-17.5	16.7	-16.8	-20.4	-20.4	18.8
12:12	-12.5	-15.1	-15.1	14.7	-14.5	-17.6	-17.6	16.6	-16.9	-20.4	-20.4	18.7
1:12	-14.9	-27.9	-44.1	15.1	-17.0	-31.5	-49.8	15.1	-19.3	-35.8	-56.4	15.1
2:12	-13.3	-26.3	-40.8	14.7	-15.1	-29.7	-46.1	14.7	-17.3	-33.7	-52.3	14.9
3:12	-13.3	-26.3	-40.9	14.3	-15.2	-29.8	-46.2	14.3	-17.3	-33.8	-52.3	14.5
4:12	-13.4	-26.3	-40.9	13.6	-15.2	-29.8	-46.2	13.6	-17.3	-33.8	-52.3	13.9
5:12	-13.4	-26.3	-40.9	13.6	-15.2	-29.8	-46.2	13.6	-17.4	-33.8	-52.4	13.8
6:12	-13.4	-26.4	-41.0	13.4	-15.3	-29.9	-46.3	13.4	-17.4	-33.9	-52.4	13.7
7:12	-15.1	-18.3	-18.3	17.9	-17.1	-20.8	-20.8	19.7	-19.5	-23.6	-23.6	21.9
8:12	-15.1	-18.4	-18.4	17.8	-17.2	-20.8	-20.8	19.6	-19.5	-23.6	-23.6	21.7
9:12	-15.2	-18.4	-18.4	17.7	-17.2	-20.9	-20.9	19.5	-19.6	-23.7	-23.7	21.6
10:12	-15.2	-18.4	-18.4	17.5	-17.3	-20.9	-20.9	19.4	-19.6	-23.7	-23.7	21.5
11:12	-15.2	-18.5	-18.5	17.4	-17.3	-20.9	-20.9	19.2	-19.6	-23.8	-23.8	21.4
12:12	-15.3	-18.5	-18.5	17.3	-17.3	-21.0	-21.0	19.1	-19.7	-23.8	-23.8	21.3

Roof Pitch	Down Slope			
	Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3
1:12	0.7	0.8	1.0	1.1
2:12	1.4	1.4	1.6	1.7
3:12	1.9	1.9	2.0	2.2
4:12	2.0	2.0	2.2	2.4
5:12	2.4	2.4	2.5	2.7
6:12	2.7	2.7	2.8	2.9
7:12	2.9	2.9	3.0	3.1
8:12	3.0	3.0	3.1	3.3
9:12	3.2	3.2	3.3	3.4
10:12	3.3	3.3	3.4	3.5
11:12	3.3	3.3	3.5	3.6
12:12	3.4	3.4	3.5	3.7

Roof Pitch	Basic Wind Speed			
	Ss = 0.5		Ss = 1.0	
	Zone 1	Zone 2	Zone 3	Zone 3
1:12	2.5	2.5	2.5	2.5
2:12	2.9	2.9	2.9	2.9
3:12	3.4	3.4	3.4	3.4
4:12	3.5	3.5	3.5	3.5
5:12	3.8	3.8	3.8	3.8
6:12	4.0	4.0	4.0	4.0
7:12	4.2	4.2	4.2	4.2
8:12	4.4	4.4	4.4	4.4
9:12	4.5	4.5	4.5	4.5
10:12	4.6	4.6	4.6	4.6
11:12	4.6	4.6	4.6	4.6
12:12	4.7	4.7	4.7	4.7

California*

ASCE 7-05

85 mph
Basic Wind Speed

5 psf
Ground Snow Load

* This table is not inclusive of all areas within the state or region. The local wind speeds and snow loads should be independently verified for the specific install location.



Roof Pitch	Bldg. Height = 15 ft.						Bldg. Height = 30 ft.						Bldg. Height = 60 ft.											
	Up Pressures (psf)			Down (psf)			Up Pressures (psf)			Down (psf)			Up Pressures (psf)			Down (psf)								
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 2	Zone 1	Zone 1	Zone 2	Zone 3	Zone 3	Zone 2	Zone 1	Zone 1	Zone 2	Zone 3	Zone 3	Zone 2	Zone 1						
Exposure Category B																								
1:12	-11.1	-20.9	-33.3	15.1	-11.1	-20.9	-33.3	15.1	-13.7	-25.7	-40.7	15.1	-13.7	-25.7	-40.7	15.1	-13.7	-25.7	-40.7					
2:12	-9.8	-19.7	-30.8	14.7	-9.8	-19.7	-30.8	14.7	-12.2	-24.2	-37.7	14.7	-12.2	-24.2	-37.7	14.7	-12.2	-24.2	-37.7					
3:12	-9.9	-19.7	-30.8	14.3	-9.9	-19.7	-30.8	14.3	-12.2	-24.2	-37.7	14.3	-12.2	-24.2	-37.7	14.3	-12.2	-24.2	-37.7					
4:12	-9.9	-19.8	-30.9	13.6	-9.9	-19.8	-30.9	13.6	-12.3	-24.3	-37.8	13.6	-12.3	-24.3	-37.8	13.6	-12.3	-24.3	-37.8					
5:12	-9.9	-19.8	-30.9	13.6	-9.9	-19.8	-30.9	13.6	-12.3	-24.3	-37.8	13.6	-12.3	-24.3	-37.8	13.6	-12.3	-24.3	-37.8					
6:12	-10.0	-19.8	-30.9	13.4	-10.0	-19.8	-30.9	13.4	-12.3	-24.3	-37.8	13.4	-12.3	-24.3	-37.8	13.4	-12.3	-24.3	-37.8					
7:12	-11.2	-13.7	-13.7	14.4	-11.2	-13.7	-13.7	14.4	-13.9	-16.9	-16.9	16.8	-13.9	-16.9	-16.9	16.8	-13.9	-16.9	-16.9					
8:12	-11.3	-13.7	-13.7	14.3	-11.3	-13.7	-13.7	14.3	-13.9	-16.9	-16.9	16.7	-13.9	-16.9	-16.9	16.7	-13.9	-16.9	-16.9					
9:12	-11.3	-13.8	-13.8	14.2	-11.3	-13.8	-13.8	14.2	-14.0	-17.0	-17.0	16.6	-14.0	-17.0	-17.0	16.6	-14.0	-17.0	-17.0					
10:12	-11.4	-13.8	-13.8	14.1	-11.4	-13.8	-13.8	14.1	-14.0	-17.0	-17.0	16.4	-14.0	-17.0	-17.0	16.4	-14.0	-17.0	-17.0					
11:12	-11.4	-13.9	-13.9	13.9	-11.4	-13.9	-13.9	13.9	-14.0	-17.0	-17.0	16.3	-14.0	-17.0	-17.0	16.3	-14.0	-17.0	-17.0					
12:12	-11.4	-13.9	-13.9	13.8	-11.4	-13.9	-13.9	13.8	-14.1	-17.1	-17.1	16.2	-14.1	-17.1	-17.1	16.2	-14.1	-17.1	-17.1					
Exposure Category C																								
1:12	-13.7	-25.7	-40.7	15.1	-16.0	-29.8	-47.1	15.1	-18.6	-34.6	-54.5	15.1	-18.6	-34.6	-54.5	15.1	-18.6	-34.6	-54.5					
2:12	-12.2	-24.2	-37.7	14.7	-14.3	-28.1	-43.6	14.7	-16.7	-32.6	-50.5	14.7	-16.7	-32.6	-50.5	14.7	-16.7	-32.6	-50.5					
3:12	-12.2	-24.2	-37.7	14.3	-14.3	-28.1	-43.7	14.3	-16.7	-32.6	-50.5	14.3	-16.7	-32.6	-50.5	14.3	-16.7	-32.6	-50.5					
4:12	-12.3	-24.3	-37.7	13.6	-14.3	-28.1	-43.7	13.6	-16.7	-32.6	-50.6	13.6	-16.7	-32.6	-50.6	13.6	-16.7	-32.6	-50.6					
5:12	-12.3	-24.3	-37.8	13.6	-14.4	-28.2	-43.7	13.6	-16.7	-32.7	-50.6	13.6	-16.7	-32.7	-50.6	13.6	-16.7	-32.7	-50.6					
6:12	-12.3	-24.3	-37.8	13.4	-14.4	-28.2	-43.8	13.4	-16.8	-32.7	-50.6	13.4	-16.8	-32.7	-50.6	13.4	-16.8	-32.7	-50.6					
7:12	-13.9	-16.9	-16.9	16.8	-16.2	-19.6	-19.6	18.9	-18.8	-22.8	-22.8	21.2	-18.8	-22.8	-22.8	21.2	-18.8	-22.8	-22.8					
8:12	-13.9	-16.9	-16.9	16.7	-16.2	-19.7	-19.7	18.7	-18.8	-22.8	-22.8	21.1	-18.8	-22.8	-22.8	21.1	-18.8	-22.8	-22.8					
9:12	-14.0	-17.0	-17.0	16.6	-16.2	-19.7	-19.7	18.6	-18.9	-22.9	-22.9	21.0	-18.9	-22.9	-22.9	21.0	-18.9	-22.9	-22.9					
10:12	-14.0	-17.0	-17.0	16.4	-16.3	-19.7	-19.7	18.5	-18.9	-22.9	-22.9	20.9	-18.9	-22.9	-22.9	20.9	-18.9	-22.9	-22.9					
11:12	-14.0	-17.0	-17.0	16.3	-16.3	-19.8	-19.8	18.4	-19.0	-23.0	-23.0	20.8	-19.0	-23.0	-23.0	20.8	-19.0	-23.0	-23.0					
12:12	-14.1	-17.1	-17.1	16.2	-16.4	-19.8	-19.8	18.3	-19.0	-23.0	-23.0	20.6	-19.0	-23.0	-23.0	20.6	-19.0	-23.0	-23.0					
Exposure Category D																								
1:12	-16.9	-31.4	-49.6	15.1	-19.2	-35.5	-56.0	15.1	-21.8	-40.3	-63.4	15.1	-21.8	-40.3	-63.4	15.1	-21.8	-40.3	-63.4					
2:12	-15.1	-29.6	-45.9	14.7	-17.1	-33.5	-51.9	14.9	-19.5	-38.0	-58.8	15.9	-19.5	-38.0	-58.8	15.9	-19.5	-38.0	-58.8					
3:12	-15.1	-29.6	-46.0	14.3	-17.2	-33.5	-51.9	14.4	-19.5	-38.0	-58.8	15.4	-19.5	-38.0	-58.8	15.4	-19.5	-38.0	-58.8					
4:12	-15.1	-29.6	-46.0	13.6	-17.2	-33.5	-51.9	13.9	-19.6	-38.0	-58.8	15.2	-19.6	-38.0	-58.8	15.2	-19.6	-38.0	-58.8					
5:12	-15.2	-29.7	-46.0	13.6	-17.2	-33.6	-52.0	13.8	-19.6	-38.1	-58.8	15.1	-19.6	-38.1	-58.8	15.1	-19.6	-38.1	-58.8					
6:12	-15.2	-29.7	-46.1	13.4	-17.3	-33.6	-52.0	13.7	-19.6	-38.1	-58.9	15.0	-19.6	-38.1	-58.9	15.0	-19.6	-38.1	-58.9					
7:12	-17.0	-20.7	-20.7	19.7	-19.3	-23.4	-23.4	21.7	-22.0	-26.6	-26.6	24.1	-22.0	-26.6	-26.6	24.1	-22.0	-26.6	-26.6					
8:12	-17.1	-20.7	-20.7	19.5	-19.4	-23.5	-23.5	21.6	-22.0	-26.6	-26.6	24.0	-22.0	-26.6	-26.6	24.0	-22.0	-26.6	-26.6					
9:12	-17.1	-20.8	-20.8	19.4	-19.4	-23.5	-23.5	21.5	-22.1	-26.7	-26.7	23.9	-22.1	-26.7	-26.7	23.9	-22.1	-26.7	-26.7					
10:12	-17.2	-20.8	-20.8	19.3	-19.5	-23.5	-23.5	21.4	-22.1	-26.7	-26.7	23.7	-22.1	-26.7	-26.7	23.7	-22.1	-26.7	-26.7					
11:12	-17.2	-20.8	-20.8	19.2	-19.5	-23.6	-23.6	21.2	-22.1	-26.8	-26.8	23.6	-22.1	-26.8	-26.8	23.6	-22.1	-26.8	-26.8					
12:12	-17.2	-20.9	-20.9	19.1	-19.5	-23.6	-23.6	21.1	-22.2	-26.8	-26.8	23.5	-22.2	-26.8	-26.8	23.5	-22.2	-26.8	-26.8					
Down Slope																								
Roof Pitch	Ss = 0.0	Ss = 0.1	Ss = 0.2	Ss = 0.3	Ss = 0.4	Ss = 0.5	Ss = 1.0	Ss = 1.25	Ss = 1.5	Ss = 2.0	Ss = 2.5	Ss = 3.1	Ss = 0.0	Ss = 0.1	Ss = 0.2	Ss = 0.3	Ss = 0.4	Ss = 0.5	Ss = 1.0	Ss = 1.25	Ss = 1.5	Ss = 2.0	Ss = 2.5	Ss = 3.1
1:12	0.7	0.8	1.0	1.1	1.3	1.4	1.9	2.1	2.5	3.2	4.0	4.8	0.7	0.8	1.0	1.1	1.3	1.4	1.9	2.1	2.5	3.2	4.0	4.8
2:12	1.4	1.4	1.6	1.7	1.9	2.0	2.4	2.6	2.9	3.6	4.3	5.2	1.4	1.4	1.6	1.7	1.9	2.0	2.4	2.6	2.9	3.6	4.3	5.2
3:12	1.9	1.9	2.0	2.2	2.4	2.5	2.9	3.1	3.4	3.9	4.6	5.5	1.9	1.9	2.0	2.2	2.4	2.5	2.9	3.1	3.4	3.9	4.6	5.5
4:12	2.0	2.0	2.2	2.4	2.5	2.6	3.1	3.2	3.5	4.2	4.9	5.8	2.0	2.0	2.2	2.4	2.5	2.6	3.1	3.2	3.5	4.2	4.9	5.8
5:12	2.4	2.4	2.5	2.7	2.8	2.9	3.4	3.5	3.8	4.4	5.1	6.0	2.4	2.4	2.5	2.7	2.8	2.9	3.4	3.5	3.8	4.4	5.1	6.0
6:12	2.7	2.7	2.8	2.9	3.1	3.2	3.6	3.8	4.0	4.6	5.3	6.2	2.7	2.7	2.8	2.9	3.1	3.2	3.6	3.8	4.0	4.6	5.3	6.2
7:12	2.9	2.9	3.0	3.1	3.3	3.4	3.8	4.0	4.2	4.8	5.5	6.3	2.9	2.9	3.0	3.1	3.3	3.4	3.8	4.0	4.2	4.8	5.5	6.3
8:12	3.0	3.0	3.1	3.3	3.4	3.5	4.0	4.1	4.4	4.9	5.6	6.5	3.0	3.0	3.1	3.3	3.4	3.5	4.0	4.1	4.4	4.9	5.6	6.5
9:12	3.2	3.2	3.3	3.4	3.6	3.7	4.1	4.2	4.5	5.0	5.7	6.5	3.2	3.2	3.3	3.4	3.6	3.7	4.1	4.2	4.5	5.0	5.7	6.5
10:12	3.3	3.3	3.4	3.5	3.7	3.8	4.2	4.3	4.6	5.1	5.8	6.6	3.3	3.3	3.4	3.5	3.7	3.8	4.2	4.3	4.6	5.1	5.8	6.6
11:12	3.3	3.3	3.5	3.6	3.7	3.8	4.2	4.4	4.6	5.2	5.9	6.6	3.3	3.3	3.5	3.6	3.7	3.8	4.2	4.4	4.6	5.2	5.9	6.6
12:12	3.4	3.4	3.5	3.7	3.8	3.9	4.3	4.4	4.7	5.3	5.9	6.7	3.4	3.4	3.5	3.7	3.8	3.9	4.3	4.4	4.7	5.3	5.9	6.7

Southwest*

ASCE 7-05

90 mph
Basic Wind Speed

5 psf
Ground Snow Load

* This table is not inclusive of all areas within the state or region. The local wind speeds and snow loads should be independently verified for the specific install location.

Up and Down (psf)

Side Load (psf)

Lateral



Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
Exposure Category B												
1:12	-17.2	-31.9	-50.3	18.8	-17.2	-31.9	-50.3	18.8	-21.1	-39.0	-61.4	18.8
2:12	-15.3	-30.1	-46.7	18.1	-15.3	-30.1	-46.7	18.1	-18.9	-36.8	-56.9	19.0
3:12	-15.3	-30.1	-46.7	17.3	-15.3	-30.1	-46.7	17.3	-18.9	-36.8	-56.9	18.2
4:12	-15.4	-30.1	-46.7	14.9	-15.4	-30.1	-46.7	14.9	-18.9	-36.8	-57.0	15.8
5:12	-15.4	-30.1	-46.7	14.3	-15.4	-30.1	-46.7	14.3	-19.0	-36.9	-57.0	15.2
6:12	-15.4	-30.2	-46.8	13.7	-15.4	-30.2	-46.8	13.7	-19.0	-36.9	-57.0	14.6
7:12	-17.3	-21.0	-21.0	19.9	-17.3	-21.0	-21.0	19.9	-21.3	-25.7	-25.7	23.5
8:12	-17.4	-21.0	-21.0	19.8	-17.4	-21.0	-21.0	19.8	-21.3	-25.8	-25.8	23.3
9:12	-17.4	-21.1	-21.1	19.7	-17.4	-21.1	-21.1	19.7	-21.4	-25.8	-25.8	23.2
10:12	-17.4	-21.1	-21.1	19.5	-17.4	-21.1	-21.1	19.5	-21.4	-25.9	-25.9	23.1
11:12	-17.5	-21.2	-21.2	19.4	-17.5	-21.2	-21.2	19.4	-21.4	-25.9	-25.9	23.0
12:12	-17.5	-21.2	-21.2	19.3	-17.5	-21.2	-21.2	19.3	-21.5	-25.9	-25.9	22.9
Exposure Category C												
1:12	-21.1	-39.0	-61.4	18.8	-24.5	-45.2	-71.0	18.8	-28.5	-52.3	-82.0	18.8
2:12	-18.9	-36.8	-56.9	19.0	-22.0	-42.6	-65.8	20.3	-25.5	-49.3	-76.1	21.7
3:12	-18.9	-36.8	-56.9	18.2	-22.0	-42.6	-65.8	19.5	-25.5	-49.3	-76.1	21.0
4:12	-18.9	-36.8	-57.0	15.8	-22.0	-42.6	-65.9	17.1	-25.6	-49.4	-76.1	18.6
5:12	-19.0	-36.9	-57.0	15.2	-22.0	-42.7	-65.9	16.5	-25.6	-49.4	-76.2	18.4
6:12	-19.0	-36.9	-57.0	14.6	-22.1	-42.7	-65.9	16.3	-25.6	-49.4	-76.2	18.3
7:12	-21.3	-25.7	-25.7	23.5	-24.7	-29.9	-29.9	26.5	-28.6	-34.6	-34.6	30.1
8:12	-21.3	-25.8	-25.8	23.3	-24.7	-29.9	-29.9	26.4	-28.7	-34.6	-34.6	30.0
9:12	-21.4	-25.8	-25.8	23.2	-24.8	-29.9	-29.9	26.3	-28.7	-34.7	-34.7	29.9
10:12	-21.4	-25.9	-25.9	23.1	-24.8	-30.0	-30.0	26.2	-28.8	-34.7	-34.7	29.7
11:12	-21.4	-25.9	-25.9	23.0	-24.9	-30.0	-30.0	26.1	-28.8	-34.8	-34.8	29.6
12:12	-21.5	-25.9	-25.9	22.9	-24.9	-30.1	-30.1	25.9	-28.8	-34.8	-34.8	29.5
Exposure Category D												
1:12	-25.8	-47.5	-74.7	18.8	-29.3	-53.7	-84.2	18.8	-33.2	-60.8	-95.3	19.0
2:12	-23.1	-44.8	-69.2	20.8	-26.2	-50.7	-78.1	22.0	-29.8	-57.4	-88.4	23.5
3:12	-23.2	-44.9	-69.3	20.0	-26.2	-50.7	-78.2	21.3	-29.8	-57.4	-88.4	22.7
4:12	-23.2	-44.9	-69.3	17.2	-26.3	-50.7	-78.2	18.9	-29.8	-57.4	-88.5	20.9
5:12	-23.2	-44.9	-69.3	17.1	-26.3	-50.7	-78.2	18.8	-29.9	-57.5	-88.5	20.8
6:12	-23.3	-45.0	-69.4	17.0	-26.3	-50.8	-78.3	18.7	-29.9	-57.5	-88.5	20.7
7:12	-26.0	-31.4	-31.4	27.7	-29.4	-35.5	-30.8	30.8	-33.4	-40.3	-40.3	34.4
8:12	-26.1	-31.5	-31.5	27.6	-29.5	-35.6	-30.7	30.7	-33.4	-40.3	-40.3	34.2
9:12	-26.1	-31.5	-31.5	27.5	-29.5	-35.6	-30.6	30.6	-33.5	-40.4	-40.4	34.1
10:12	-26.1	-31.6	-31.6	27.4	-29.6	-35.7	-30.4	30.4	-33.5	-40.4	-40.4	34.0
11:12	-26.2	-31.6	-31.6	27.2	-29.6	-35.7	-30.3	30.3	-33.5	-40.4	-40.4	33.9
12:12	-26.2	-31.6	-31.6	27.1	-29.6	-35.7	-30.2	30.2	-33.6	-40.5	-40.5	33.8

Roof Pitch	Down Slope											
	Ss = 0.0			Ss = 0.1			Ss = 0.2			Ss = 0.3		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
1:12	1.1	1.1	1.3	1.5	1.6	1.7	2.1	2.1	2.3	2.6	2.6	3.2
2:12	2.1	2.1	2.3	2.4	2.5	2.5	3.0	3.1	3.1	3.4	3.4	4.0
3:12	3.0	3.0	3.0	3.1	3.2	3.2	3.7	3.8	3.8	4.1	4.1	4.7
4:12	2.9	2.9	2.9	3.0	3.1	3.2	3.7	3.9	3.9	4.1	4.1	4.7
5:12	3.3	3.3	3.3	3.4	3.5	3.6	4.0	4.2	4.2	4.5	4.5	5.0
6:12	3.6	3.6	3.6	3.6	3.8	3.9	4.3	4.5	4.5	4.7	4.7	5.3
7:12	3.8	3.8	3.8	3.8	4.0	4.1	4.5	4.7	4.7	4.9	4.9	5.5
8:12	3.9	3.9	3.9	4.0	4.1	4.2	4.6	4.8	4.8	5.1	5.1	5.6
9:12	4.0	4.0	4.0	4.1	4.2	4.3	4.7	4.9	4.9	5.1	5.1	5.6
10:12	4.1	4.1	4.1	4.1	4.3	4.4	4.8	4.9	4.9	5.2	5.2	5.7
11:12	4.1	4.1	4.1	4.2	4.3	4.4	4.8	4.9	4.9	5.2	5.2	5.7
12:12	4.1	4.1	4.1	4.2	4.3	4.4	4.8	4.9	4.9	5.2	5.2	5.6

East Coast (Low Snow)*

ASCE 7-05

110 mph

Basic Wind Speed

10 psf

Ground Snow Load

* This table is not inclusive of all areas within the state or region. The local wind speeds and snow loads should be independently verified for the specific install location.

Up and Down (psf)

Side Load (psf)

Lateral

Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
1:12	-9.8	-18.6	-29.7	14.8	-9.8	-18.6	-29.7	14.8	-12.1	-22.9	-36.3	14.8
2:12	-8.7	-17.5	-27.5	14.4	-8.7	-17.5	-27.5	14.4	-10.8	-21.6	-33.6	14.4
3:12	-8.7	-17.6	-27.5	14.0	-8.7	-17.6	-27.5	14.0	-10.8	-21.6	-33.7	14.0
4:12	-8.7	-17.6	-27.5	13.2	-8.7	-17.6	-27.5	13.2	-10.9	-21.6	-33.7	13.2
5:12	-8.8	-17.6	-27.6	13.2	-8.8	-17.6	-27.6	13.2	-10.9	-21.6	-33.7	13.2
6:12	-8.8	-17.7	-27.6	13.0	-8.8	-17.7	-27.6	13.0	-10.9	-21.7	-33.8	13.0
7:12	-9.9	-12.2	-12.2	13.3	-9.9	-12.2	-12.2	13.3	-12.3	-15.0	-15.0	15.4
8:12	-10.0	-12.2	-12.2	13.2	-10.0	-12.2	-12.2	13.2	-12.4	-15.0	-15.0	15.3
9:12	-10.0	-12.2	-12.2	13.0	-10.0	-12.2	-12.2	13.0	-12.4	-15.1	-15.1	15.2
10:12	-10.1	-12.3	-12.3	12.9	-10.1	-12.3	-12.3	12.9	-12.4	-15.1	-15.1	15.0
11:12	-10.1	-12.3	-12.3	12.8	-10.1	-12.3	-12.3	12.8	-12.5	-15.2	-15.2	14.9
12:12	-10.2	-12.4	-12.4	12.7	-10.2	-12.4	-12.4	12.7	-12.5	-15.2	-15.2	14.8
1:12	-12.1	-22.9	-36.3	14.8	-14.2	-26.6	-42.1	14.8	-16.6	-30.9	-48.7	14.8
2:12	-10.8	-21.6	-33.6	14.4	-12.7	-25.1	-39.0	14.4	-14.8	-29.1	-45.1	14.4
3:12	-10.8	-21.6	-33.7	14.0	-12.7	-25.1	-39.0	14.0	-14.8	-29.1	-45.2	14.0
4:12	-10.9	-21.6	-33.7	13.2	-12.7	-25.1	-39.1	13.2	-14.8	-29.1	-45.2	13.2
5:12	-10.9	-21.6	-33.7	13.2	-12.7	-25.1	-39.1	13.2	-14.9	-29.2	-45.2	13.2
6:12	-10.9	-21.7	-33.8	13.0	-12.8	-25.2	-39.1	13.0	-14.9	-29.2	-45.3	13.0
7:12	-12.3	-15.0	-15.0	15.4	-14.4	-17.5	-17.5	17.3	-16.7	-20.3	-20.3	19.4
8:12	-12.4	-15.0	-15.0	15.3	-14.4	-17.5	-17.5	17.1	-16.8	-20.4	-20.4	19.3
9:12	-12.4	-15.1	-15.1	15.2	-14.5	-17.6	-17.6	17.0	-16.8	-20.4	-20.4	19.1
10:12	-12.4	-15.1	-15.1	15.0	-14.5	-17.6	-17.6	16.9	-16.9	-20.4	-20.4	19.0
11:12	-12.5	-15.2	-15.2	14.9	-14.5	-17.6	-17.6	16.8	-16.9	-20.5	-20.5	18.9
12:12	-12.5	-15.2	-15.2	14.8	-14.6	-17.7	-17.7	16.7	-16.9	-20.5	-20.5	18.8
1:12	-15.0	-28.0	-44.3	14.8	-17.0	-31.7	-50.0	14.8	-19.4	-36.0	-56.7	14.8
2:12	-13.4	-26.4	-41.0	14.4	-15.2	-29.9	-46.4	14.4	-17.4	-33.9	-52.5	15.0
3:12	-13.4	-26.4	-41.1	14.0	-15.2	-29.9	-46.4	14.0	-17.4	-33.9	-52.6	14.5
4:12	-13.4	-26.4	-41.1	13.2	-15.3	-29.9	-46.4	13.2	-17.4	-34.0	-52.6	14.0
5:12	-13.5	-26.5	-41.1	13.2	-15.3	-30.0	-46.5	13.2	-17.4	-34.0	-52.6	13.9
6:12	-13.5	-26.5	-41.2	13.0	-15.3	-30.0	-46.5	13.0	-17.5	-34.0	-52.7	13.8
7:12	-15.2	-18.4	-18.4	18.0	-17.2	-20.9	-20.9	19.8	-19.6	-23.7	-23.7	21.9
8:12	-15.2	-18.5	-18.5	17.8	-17.3	-20.9	-20.9	19.7	-19.6	-23.8	-23.8	21.8
9:12	-15.2	-18.5	-18.5	17.7	-17.3	-21.0	-21.0	19.6	-19.7	-23.8	-23.8	21.7
10:12	-15.3	-18.5	-18.5	17.6	-17.3	-21.0	-21.0	19.4	-19.7	-23.8	-23.8	21.6
11:12	-15.3	-18.6	-18.6	17.5	-17.4	-21.0	-21.0	19.3	-19.7	-23.9	-23.9	21.5
12:12	-15.4	-18.6	-18.6	17.4	-17.4	-21.1	-21.1	19.2	-19.8	-23.9	-23.9	21.3

Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
1:12	0.7	0.8	1.0	1.1	1.3	1.4	1.9	2.1	2.5	3.2	4.0	4.8
2:12	1.4	1.4	1.6	1.7	1.9	2.0	2.4	2.6	2.9	3.6	4.3	5.2
3:12	1.9	1.9	2.0	2.2	2.4	2.5	2.9	3.1	3.4	3.9	4.6	5.5
4:12	2.0	2.0	2.2	2.4	2.5	2.6	3.1	3.2	3.5	4.2	4.9	5.8
5:12	2.4	2.4	2.5	2.7	2.8	2.9	3.4	3.5	3.8	4.4	5.1	6.0
6:12	2.7	2.7	2.8	2.9	3.1	3.2	3.6	3.8	4.0	4.6	5.3	6.2
7:12	2.9	2.9	3.0	3.1	3.3	3.4	3.8	4.0	4.2	4.8	5.5	6.3
8:12	3.0	3.0	3.1	3.3	3.4	3.5	4.0	4.1	4.4	4.9	5.6	6.5
9:12	3.2	3.2	3.3	3.4	3.6	3.7	4.1	4.2	4.5	5.0	5.7	6.5
10:12	3.3	3.3	3.4	3.5	3.7	3.8	4.2	4.3	4.6	5.1	5.8	6.6
11:12	3.3	3.3	3.5	3.6	3.7	3.8	4.2	4.4	4.6	5.2	5.9	6.6
12:12	3.4	3.4	3.5	3.7	3.8	3.9	4.3	4.4	4.7	5.3	5.9	6.7

Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
1:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
2:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
3:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
4:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
5:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
6:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
7:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
8:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
9:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
10:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
11:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6
12:12	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.6	1.8	2.2	2.9	3.6

California*

ASCE 7-10

110 mph
Basic Wind Speed

5 psf
Ground Snow Load

* This table is not inclusive of all areas within the state or region. The local wind speeds and snow loads should be independently verified for the specific install location.

Up and Down (psf)

Side Load (psf)

Lateral

Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
Exposure Category B												
1:12	-10.8	-20.5	-32.6	14.8	-10.8	-20.5	-32.6	14.8	-13.4	-25.1	-39.8	14.8
2:12	-9.6	-19.3	-30.2	14.4	-9.6	-19.3	-30.2	14.4	-11.9	-23.7	-36.9	14.4
3:12	-9.6	-19.3	-30.2	14.0	-9.6	-19.3	-30.2	14.0	-12.0	-23.7	-36.9	14.0
4:12	-9.7	-19.3	-30.2	13.2	-9.7	-19.3	-30.2	13.2	-12.0	-23.7	-36.9	13.2
5:12	-9.7	-19.4	-30.2	13.2	-9.7	-19.4	-30.2	13.2	-12.0	-23.8	-37.0	13.2
6:12	-9.7	-19.4	-30.3	13.0	-9.7	-19.4	-30.3	13.0	-12.1	-23.8	-37.0	13.0
7:12	-11.0	-13.4	-13.4	14.2	-11.0	-13.4	-13.4	14.2	-13.6	-16.5	-16.5	16.5
8:12	-11.0	-13.4	-13.4	14.1	-11.0	-13.4	-13.4	14.1	-13.6	-16.5	-16.5	16.4
9:12	-11.1	-13.5	-13.5	14.0	-11.1	-13.5	-13.5	14.0	-13.6	-16.6	-16.6	16.3
10:12	-11.1	-13.5	-13.5	13.8	-11.1	-13.5	-13.5	13.8	-13.7	-16.6	-16.6	16.2
11:12	-11.1	-13.6	-13.6	13.7	-11.1	-13.6	-13.6	13.7	-13.7	-16.7	-16.7	16.0
12:12	-11.2	-13.6	-13.6	13.6	-11.2	-13.6	-13.6	13.6	-13.8	-16.7	-16.7	15.9
Exposure Category C												
1:12	-13.4	-25.1	-39.8	14.8	-15.6	-29.2	-46.1	14.8	-18.2	-33.8	-53.4	14.8
2:12	-11.9	-23.7	-36.9	14.4	-14.0	-27.5	-42.7	14.4	-16.3	-31.9	-49.5	14.5
3:12	-12.0	-23.7	-36.9	14.0	-14.0	-27.5	-42.7	14.0	-16.3	-31.9	-49.5	14.1
4:12	-12.0	-23.7	-36.9	13.2	-14.0	-27.5	-42.8	13.2	-16.3	-32.0	-49.5	13.4
5:12	-12.0	-23.8	-37.0	13.2	-14.0	-27.6	-42.8	13.2	-16.4	-32.0	-49.6	13.2
6:12	-12.1	-23.8	-37.0	13.0	-14.1	-27.6	-42.8	13.0	-16.4	-32.0	-49.6	13.2
7:12	-13.6	-16.5	-16.5	16.5	-15.8	-19.2	-19.2	18.6	-18.4	-22.3	-22.3	20.9
8:12	-13.6	-16.5	-16.5	16.4	-15.9	-19.2	-19.2	18.4	-18.4	-22.3	-22.3	20.8
9:12	-13.6	-16.6	-16.6	16.3	-15.9	-19.3	-19.3	18.3	-18.5	-22.4	-22.4	20.6
10:12	-13.7	-16.6	-16.6	16.2	-15.9	-19.3	-19.3	18.2	-18.5	-22.4	-22.4	20.5
11:12	-13.7	-16.7	-16.7	16.0	-16.0	-19.4	-19.4	18.1	-18.6	-22.5	-22.5	20.4
12:12	-13.8	-16.7	-16.7	15.9	-16.0	-19.4	-19.4	17.9	-18.6	-22.5	-22.5	20.3
Exposure Category D												
1:12	-16.5	-30.7	-48.5	14.8	-18.7	-34.8	-54.8	14.8	-21.3	-39.4	-62.1	14.8
2:12	-14.7	-29.0	-45.0	14.4	-16.8	-32.8	-50.8	14.7	-19.1	-37.2	-57.5	15.7
3:12	-14.8	-29.0	-45.0	14.0	-16.8	-32.8	-50.8	14.3	-19.1	-37.2	-57.6	15.3
4:12	-14.8	-29.0	-45.0	13.2	-16.8	-32.8	-50.9	13.7	-19.1	-37.2	-57.6	15.0
5:12	-14.8	-29.0	-45.1	13.2	-16.8	-32.9	-50.9	13.6	-19.2	-37.3	-57.6	14.9
6:12	-14.9	-29.1	-45.1	13.0	-16.9	-32.9	-50.9	13.5	-19.2	-37.3	-57.7	14.8
7:12	-16.7	-20.2	-20.2	19.3	-18.9	-22.9	-22.9	21.3	-21.5	-26.0	-26.0	23.7
8:12	-16.7	-20.3	-20.3	19.2	-19.0	-23.0	-23.0	21.2	-21.6	-26.1	-26.1	23.6
9:12	-16.8	-20.3	-20.3	19.1	-19.0	-23.0	-23.0	21.1	-21.6	-26.1	-26.1	23.4
10:12	-16.8	-20.4	-20.4	19.0	-19.0	-23.0	-23.0	21.0	-21.6	-26.2	-26.2	23.3
11:12	-16.8	-20.4	-20.4	18.8	-19.1	-23.1	-23.1	20.9	-21.7	-26.2	-26.2	23.2
12:12	-16.9	-20.4	-20.4	18.7	-19.1	-23.1	-23.1	20.7	-21.7	-26.2	-26.2	23.1
Down Slope												
Roof Pitch	Ss = 0.0	Ss = 0.1	Ss = 0.2	Ss = 0.3	Ss = 0.4	Ss = 0.5	Ss = 1.0	Ss = 1.25	Ss = 1.5	Ss = 2.0	Ss = 2.5	Ss = 3.1
1:12	0.7	0.8	1.0	1.1	1.3	1.4	1.9	2.1	2.5	3.2	4.0	4.8
2:12	1.4	1.4	1.6	1.7	1.9	2.0	2.4	2.6	2.9	3.6	4.3	5.2
3:12	1.9	1.9	2.0	2.2	2.4	2.5	2.9	3.1	3.4	3.9	4.6	5.5
4:12	2.0	2.0	2.2	2.4	2.5	2.6	3.1	3.2	3.5	4.2	4.9	5.8
5:12	2.4	2.4	2.5	2.7	2.8	2.9	3.4	3.5	3.8	4.4	5.1	6.0
6:12	2.7	2.7	2.8	2.9	3.1	3.2	3.6	3.8	4.0	4.6	5.3	6.2
7:12	2.9	2.9	3.0	3.1	3.3	3.4	3.8	4.0	4.2	4.8	5.5	6.3
8:12	3.0	3.0	3.1	3.3	3.4	3.5	4.0	4.1	4.4	4.9	5.6	6.5
9:12	3.2	3.2	3.3	3.4	3.6	3.7	4.1	4.2	4.5	5.0	5.7	6.5
10:12	3.3	3.3	3.4	3.5	3.7	3.8	4.2	4.3	4.6	5.1	5.8	6.6
11:12	3.3	3.3	3.5	3.6	3.7	3.8	4.2	4.4	4.6	5.2	5.9	6.6
12:12	3.4	3.4	3.5	3.7	3.8	3.9	4.3	4.4	4.7	5.3	5.9	6.7

Southwest*

ASCE 7-10

115 mph

Basic Wind Speed

5 psf

Ground Snow Load

* This table is not inclusive of all areas within the state or region. The local wind speeds and snow loads should be independently verified for the specific install location.

Up and Down (psf)

Side Load (psf)

Lateral

Roof Pitch	Bldg. Height = 15 ft.				Bldg. Height = 30 ft.				Bldg. Height = 60 ft.			
	Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)		Up Pressures (psf)		Down (psf)	
	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3	Zone 1	Zone 2	Zone 3	Zone 3
1:12	-14.2	-26.5	-42.0	18.5	-14.2	-26.5	-42.0	18.5	-17.5	-32.5	-51.2	18.5
2:12	-12.6	-25.0	-38.9	17.8	-12.6	-25.0	-38.9	17.8	-15.6	-30.6	-47.5	17.8
3:12	-12.7	-25.0	-38.9	17.0	-12.7	-25.0	-38.9	17.0	-15.6	-30.6	-47.5	17.0
4:12	-12.7	-25.0	-38.9	14.6	-12.7	-25.0	-38.9	14.6	-15.7	-30.7	-47.5	14.6
5:12	-12.7	-25.1	-39.0	14.0	-12.7	-25.1	-39.0	14.0	-15.7	-30.7	-47.6	14.0
6:12	-12.8	-25.1	-39.0	13.4	-12.8	-25.1	-39.0	13.4	-15.7	-30.7	-47.6	13.4
7:12	-14.3	-17.4	-17.4	17.2	-14.3	-17.4	-17.4	17.2	-17.6	-21.4	-21.4	20.2
8:12	-14.4	-17.5	-17.5	17.1	-14.4	-17.5	-17.5	17.1	-17.7	-21.4	-21.4	20.1
9:12	-14.4	-17.5	-17.5	17.0	-14.4	-17.5	-17.5	17.0	-17.7	-21.5	-21.5	20.0
10:12	-14.5	-17.5	-17.5	16.9	-14.5	-17.5	-17.5	16.9	-17.8	-21.5	-21.5	19.8
11:12	-14.5	-17.6	-17.6	16.7	-14.5	-17.6	-17.6	16.7	-17.8	-21.6	-21.6	19.7
12:12	-14.5	-17.6	-17.6	16.6	-14.5	-17.6	-17.6	16.6	-17.8	-21.6	-21.6	19.6
1:12	-17.5	-32.5	-51.2	18.5	-20.3	-37.6	-59.3	18.5	-23.7	-43.6	-68.5	18.5
2:12	-15.6	-30.6	-47.5	17.8	-18.2	-35.5	-55.0	18.7	-21.2	-41.1	-63.6	19.9
3:12	-15.6	-30.6	-47.5	17.0	-18.2	-35.5	-55.0	17.9	-21.2	-41.1	-63.6	19.2
4:12	-15.7	-30.7	-47.5	14.6	-18.2	-35.5	-55.0	15.5	-21.2	-41.2	-63.6	16.7
5:12	-15.7	-30.7	-47.6	14.0	-18.3	-35.6	-55.0	14.9	-21.3	-41.2	-63.6	16.2
6:12	-15.7	-30.7	-47.6	13.4	-18.3	-35.6	-55.1	14.4	-21.3	-41.2	-63.7	15.9
7:12	-17.6	-21.4	-21.4	20.2	-20.5	-24.8	-24.8	22.8	-23.8	-28.8	-28.8	25.8
8:12	-17.7	-21.4	-21.4	20.1	-20.6	-24.9	-24.9	22.7	-23.9	-28.9	-28.9	25.6
9:12	-17.7	-21.5	-21.5	20.0	-20.6	-24.9	-24.9	22.5	-23.9	-28.9	-28.9	25.5
10:12	-17.8	-21.5	-21.5	19.8	-20.6	-25.0	-25.0	22.4	-23.9	-28.9	-28.9	25.4
11:12	-17.8	-21.6	-21.6	19.7	-20.7	-25.0	-25.0	22.3	-24.0	-29.0	-29.0	25.3
12:12	-17.8	-21.6	-21.6	19.6	-20.7	-25.0	-25.0	22.2	-24.0	-29.0	-29.0	25.2
1:12	-21.4	-39.6	-62.4	18.5	-24.3	-44.8	-70.4	18.5	-27.6	-50.7	-79.7	18.5
2:12	-19.2	-37.4	-57.8	19.1	-21.8	-42.2	-65.3	20.2	-24.7	-47.9	-73.9	21.4
3:12	-19.2	-37.4	-57.8	18.3	-21.8	-42.3	-65.3	19.4	-24.8	-47.9	-73.9	20.6
4:12	-19.2	-37.4	-57.9	15.5	-21.8	-42.3	-65.3	16.6	-24.8	-47.9	-73.9	18.1
5:12	-19.3	-37.4	-57.9	15.0	-21.9	-42.3	-65.4	16.3	-24.8	-48.0	-74.0	18.0
6:12	-19.3	-37.5	-57.9	14.8	-21.9	-42.4	-65.4	16.2	-24.9	-48.0	-74.0	17.9
7:12	-21.6	-26.2	-26.2	23.8	-24.5	-29.6	-29.6	26.4	-27.8	-33.6	-33.6	29.3
8:12	-21.7	-26.2	-26.2	23.7	-24.5	-29.6	-29.6	26.2	-27.8	-33.6	-33.6	29.2
9:12	-21.7	-26.2	-26.2	23.5	-24.6	-29.7	-29.7	26.1	-27.9	-33.7	-33.7	29.1
10:12	-21.7	-26.3	-26.3	23.4	-24.6	-29.7	-29.7	26.0	-27.9	-33.7	-33.7	29.0
11:12	-21.8	-26.3	-26.3	23.3	-24.6	-29.8	-29.8	25.9	-28.0	-33.7	-33.7	28.9
12:12	-21.8	-26.4	-26.4	23.2	-24.7	-29.8	-29.8	25.8	-28.0	-33.8	-33.8	28.7

Roof Pitch	Ss = 0.0		Ss = 0.1		Ss = 0.2		Ss = 0.3		Ss = 0.4		Ss = 0.5		Ss = 1.0		Ss = 1.25		Ss = 1.5		Ss = 2.0		Ss = 2.5		Ss = 3.1			
	Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)		Side Load (psf)	
	0.0	0.2	0.5	0.7	1.0	1.6	2.2	2.9	3.6	4.5	5.2	6.2	7.1	8.1	9.1	10.1	11.1	12.1	13.1	14.1	15.1	16.1	17.1	18.1	19.1	20.1
1:12	1.1	1.1	1.3	1.5	1.6	1.7	2.1	2.3	2.6	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8	13.6	14.4	15.2	16.0
2:12	2.1	2.1	2.1	2.3	2.4	2.5	3.0	3.1	3.4	4.0	4.5	5.2	5.9	6.6	7.3	8.0	8.7	9.4	10.1	10.8	11.5	12.2	12.9	13.6	14.3	15.0
3:12	3.0	3.0	3.0	3.0	3.1	3.2	3.7	3.8	4.1	4.7	5.2	5.9	6.6	7.3	8.0	8.7	9.4	10.1	10.8	11.5	12.2	12.9	13.6	14.3	15.0	15.7
4:12	2.9	2.9	2.9	3.0	3.1	3.2	3.7	3.9	4.1	4.7	5.2	5.9	6.6	7.3	8.0	8.7	9.4	10.1	10.8	11.5	12.2	12.9	13.6	14.3	15.0	15.7
5:12	3.3	3.3	3.3	3.4	3.5	3.6	4.0	4.2	4.5	5.0	5.6	6.2	6.9	7.6	8.3	9.0	9.7	10.4	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0
6:12	3.6	3.6	3.6	3.6	3.8	3.9	4.3	4.5	4.7	5.3	5.8	6.5	7.2	7.9	8.6	9.3	10.0	10.7	11.4	12.1	12.8	13.5	14.2	14.9	15.6	16.3
7:12	3.8	3.8	3.8	3.8	4.0	4.1	4.5	4.7	4.9	5.5	6.0	6.6	7.3	8.0	8.7	9.4	10.1	10.8	11.5	12.2	12.9	13.6	14.3	15.0	15.7	16.4
8:12	3.9	3.9	3.9	4.0	4.1	4.2	4.6	4.8	5.1	5.6	6.1	6.7	7.4	8.1	8.8	9.5	10.2	10.9	11.6	12.3	13.0	13.7	14.4	15.1	15.8	16.5
9:12	4.0	4.0	4.0	4.1	4.2	4.3	4.7	4.9	5.1	5.6	6.2	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6
10:12	4.1	4.1	4.1	4.1	4.3	4.4	4.8	4.9	5.2	5.7	6.2	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6
11:12	4.1	4.1	4.1	4.1	4.3	4.4	4.8	4.9	5.2	5.7	6.2	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6
12:12	4.1	4.1	4.1	4.1	4.3	4.4	4.8	4.9	5.2	5.7	6.2	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6

East Coast (Low Snow)*

ASCE 7-10

130 mph

Basic Wind Speed

10 psf

Ground Snow Load

* This table is not inclusive of all areas within the state or region. The local wind speeds and snow loads should be independently verified for the specific install location.

Up and Down (psf)

Side Load (psf)

Lateral