



Project Number: U5197-001-221

December 20, 2022

SnapNrack
 775 Fiero Lane, Ste. 200
 San Luis Obispo, CA 93401

Attn: SnapNrack – Engineering Department

The SnapNrack MightyMount Comp-S system directly mounts modules to composition shingle roofs with either 2 or 3 mounts per side, screwed directly to a wood deck. Modules are attached to the mount using mid and end clamps from the UltraRail system. The SnapNrack MightyMount Comp-S shall be installed per the manufacturer’s installation manual for the attached span tables to be applicable.

Design Criteria:

Vector Structural Engineering has reviewed SnapNrack’s MightyMount Comp-S system material properties, FEA report, and component performance-based testing. All information, data, and analysis contained within the SnapNrack MightyMount Comp-S installation tables are based on the following codes and the information provided by SnapNrack.

- Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16
- 2006-2021 International Building Code, by International Code Council, Inc.
- 2006-2021 International Residential Code, by International Code Council, Inc.
- AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels; November 1, 2012 by ICC-ES
- 2018 National Design Specification for Wood Construction (NDS), by the American Wood Council

The following are typical specifications to meet the above code requirements:

Ground Snow Load = 0 - 45 (psf)
 Basic Wind Speeds (ASCE 7-16 V_{ult}) = 95 - 170 (mph)
 $K_{zt}=1.0, K_d = 0.85, K_e=1.0$
 Mean Roof Height = 0 - 60 (ft)
 Roof Slope = 0 - 90 (degrees)
 Exposure Category = B, C, D
 PV Panel Sizes:

- Solar Panel 1 – 68” x 45”
- Solar Panel 2 – 76” x 42”
- Solar Panel 3 – 88” x 44”

Installation Tables:

The attached installation tables provide the number of clamps required per side of the PV panel. The number of clamps required are given based on the components and cladding roof zones in the following configuration: Zone 1/Zone 2/Zone 3. If no number is provided, the capacity of the clamp is exceeded for that installation configuration. Use of these tables should be done by a registered design professional experienced in the use of such tables, and familiar with the codes and methods listed in this letter.

Cantilever:

PV panels shall not cantilever more than 1/4 of the length of the panel.

Clearance:

Clearance between the PV panels and the roof surface is less than 6". Therefore, the internal pressure (GC_{pi}) equals 0.

Tolerance(s):

A tolerance of $\pm 1"$ for the PV panel length and width is allowable with the use of these tables.

Installation Orientation:

SnapNrack MightyMount Comp-S can mount in any orientation on the roof. See Design Criteria for PV panel dimensions. PV panels are assumed to weigh approximately 2.54 psf

Array Geometry:

PV panels must be 12" min. away from roof edges, ridges, and hip ridges.

Attachment to Roof:

MightyMount Comp-S utilizes (4) #14 fully threaded S.S. wood screws fully embedded into a minimum 15/32" plywood or minimum 7/16" OSB roof deck. S.S. EPDM bonded sealing washer and sealant dam are utilized between the screw and roof deck. Waterproofing provided here is a recommendation only. Waterproofing of roof penetrations shall be completed by a professional experienced in such methods.

Mount Capacity:

The system uses the following maximum capacities based on testing report SNC-DC-01323 (dated 10/31/2022) by SnapNrack. These capacities are provided with a minimum factor of safety of 1.5.

Allowable Load Limits for MightyMount Comp-S	
Load Direction	Design Load (lb)
Uplift	448
Down Force	1000
Lateral	233

Snow Loads:

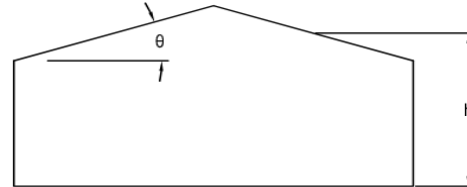
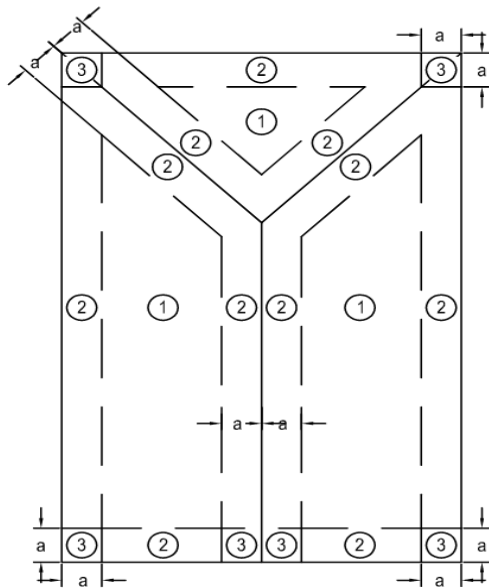
Snow loads are calculated for each exposure category, assuming that the building is partially exposed. The PV panels are assumed to provide a condition similar to a cold roof ($C_t = 1.1$) with an unobstructed slippery surface. Snow drifts and unbalanced snow loading have not been considered in this packet.

Components and Cladding Roof Zones:

Roof zones have been simplified into three zones and the worst case pressure coefficient (GC_p) from that zone and its sub zones has been utilized. Worst case GC_p coefficients were taken for gable roofs and hip roofs for each respective roof slope. Roof edge zones shall be determined from the building's least horizontal dimension (LHD). The edge zone width, "a", shall be 10% of the LHD ($0.1 * LHD$), but not less than 3 ft. For further information see Detail 1 and ASCE 7-16.

Panel with Support Mounts in Multiple Roof Zones:

Spacing between mounts located in edge or corner zones (Zone 2 & 3, respectively) is applicable only to mounts located in those zones, not for the entire panel.

DETAIL 1**Structural Details:**

Part Number:	Description:
SNR-DC-00700	MightyMount Comp-S, System Overview
SNR-DC-00701	MightyMount Comp-S, Roof Attachment

Design Responsibility:

The enclosed tables are to be used under the direction of a registered design professional. The registered design professional should use the site design criteria (as required by the local building code) to determine which values from the table are applicable to the project.

It is our conclusion that the SnapNrack 'MightyMount Comp-S' mounting system is adequate to support environmental loading when installed as indicated in this letter and the attached spacing tables. The review of the existing building structure to support the loads imposed by the array is not within the scope of this letter. Extreme load scenarios (i.e., seismic, snow drift, wind borne debris, tornado, etc.) have not been considered as part of this letter as those are structure and location specific. A registered design professional should be consulted if any load conditions that are not included in this letter apply.

Addendums:

- Span Table – PV 68"x45", $h \leq 30$ ft (2022-12-20)
- Span Table – PV 68"x45", $30 \text{ ft} < h < 60$ ft (2022-12-20)
- Span Table – PV 76"x42", $h \leq 30$ ft (2022-12-20)
- Span Table – PV 76"x42", $30 \text{ ft} < h < 60$ ft (2022-12-20)
- Span Table – PV 88"x44", $h \leq 30$ ft (2022-12-20)
- Span Table – PV 88"x44", $30 \text{ ft} < h < 60$ ft (2022-12-20)

We hope this meets your needs. If you have any further questions regarding this matter, please call this office at your convenience.

Prepared by:
VECTOR STRUCTURAL ENGINEERING, LLC
Draper, UT



JOB NO.: U5197.001.221

Roof Height: 0'-30'

PROJECT: Mighty Mount Comp-S

PV Module Dimensions: 68" x 45"

SUBJECT: Span Tables

Ground Snow Load [psf]	Exposure Category	Roof Slope [deg]	Basic Wind Speed [mph] 3-sec gust																
			95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	
45	B	θ<7	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	3/3/-	
		7<θ≤20	2/2/2	2/2/2	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/3	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	
		20<θ≤27	2/2/2	2/2/2	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-
		27<θ≤45	2/2/2	2/2/2	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	
	C	θ<7	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	3/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
		7<θ≤20	2/2/2	2/2/3	2/2/3	2/3/3	2/3/3	2/3/3	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-
		20<θ≤27	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-
		27<θ≤45	2/2/2	2/2/3	2/2/3	2/3/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	2/3/3	2/3/3
	D	θ<7	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	3/3/-	3/3/-	3/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
		7<θ≤20	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
		20<θ≤27	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
		27<θ≤45	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	2/3/3	2/3/3	3/3/3	3/3/3



JOB NO.: U5197.001.221

Roof Height: 30'-60'

PROJECT: Mighty Mount Comp-S

PV Module Dimensions: 68" x 45"

SUBJECT: Span Tables

Ground Snow Load [psf]	Exposure Category	Roof Slope [deg]	Basic Wind Speed [mph] 3-sec gust																
			95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	
45	B	θ<7	2/2/2	2/2/2	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	3/3/-	3/-/-	3/-/-	3/-/-	
		7<θ≤20	2/2/2	2/2/2	2/2/3	2/2/3	2/3/3	2/3/3	2/3/3	2/3/3	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	
		20<θ≤27	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	2/-/-	3/-/-	3/-/-
		27<θ≤45	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	
	C	θ<7	2/2/2	2/2/3	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	3/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-
		7<θ≤20	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-
		20<θ≤27	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
		27<θ≤45	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	2/3/3	2/3/3	3/3/3	3/3/3
	D	θ<7	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	3/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-
		7<θ≤20	2/3/3	2/3/3	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-
		20<θ≤27	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-
		27<θ≤45	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	2/3/3	2/3/3	3/3/3	3/3/3	3/-/-	3/-/-



JOB NO.: U5197.001.221

Roof Height: 30'-60'

PROJECT: Mighty Mount Comp-S

PV Module Dimensions: 76" x 42"

SUBJECT: Span Tables

Ground Snow Load [psf]	Exposure Category	Roof Slope [deg]	Basic Wind Speed [mph] 3-sec gust																	
			95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170		
45	B	θ<7	2/2/2	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	3/3/-	3/3/-	3/-/-	3/-/-	3/-/-	
		7<θ≤20	2/2/2	2/2/2	2/2/3	2/2/3	2/3/3	2/3/3	2/3/3	2/3/-	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	
		20<θ≤27	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	2/-/-	3/-/-	3/-/-	3/-/-
		27<θ≤45	2/2/2	2/2/2	2/2/3	2/2/3	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	
	C	θ<7	2/2/3	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	3/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	
		7<θ≤20	2/2/3	2/3/3	2/3/3	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	
		20<θ≤27	2/2/3	2/2/3	2/2/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	
		27<θ≤45	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	2/3/3	3/3/3	3/3/3	3/3/3	
	D	θ<7	2/2/3	2/2/3	2/3/3	2/3/-	2/3/-	3/3/-	3/3/-	3/3/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	
		7<θ≤20	2/3/3	2/3/3	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	
		20<θ≤27	2/2/3	2/3/3	2/3/-	2/3/-	2/3/-	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	
		27<θ≤45	2/3/3	2/3/3	2/3/-	2/3/-	2/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	3/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	
	45<θ≤90	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/2/2	2/3/3	2/3/3	2/3/3	3/3/3	3/3/3	3/3/3	3/-/-	3/-/-	

