

Flat Roof Mounting Component Selection based on Load Conditions

Engineering
Submittal
Sheet



BOSCH

Engineering Specification

The requirements for the design loads shall be specified using the American Society of Civil Engineers Standard 7-05. The wind load requirements shall be carried out as both an uplift and

downward force. The mounting system shall be calculated and shown by PE approval to resist the following design loads:

1. Portrait collectors mounted on a flat roof mounting system including ___ basic roof mounting set(s) and ___ extension roof mounting set(s) installed at a 45 degree angle, on a 30 ft high building, with a wind speed of 90 mph, occupancy category "II", importance factor of 1.0, and exposure category "C", shall resist a wind load of 23 psf, ground snow load of 40 psf, and ice load of 5 psf.
2. Portrait collectors mounted on a flat roof mounting system including ___ basic roof mounting set(s) and ___ extension roof mounting set(s) installed at a 60 degree angle, on a 30 ft high building, with a wind speed of 90 mph, occupancy category "II", importance factor of 1.0, and exposure category "C", shall resist a wind load of 27 psf, ground snow load of 40 psf, and ice load of 5 psf.
3. Portrait collectors mounted on a flat roof mounting system including ___ basic roof mounting set(s), ___ extension roof mounting set(s), ___ auxiliary basic roof mounting set(s), ___ auxiliary extension roof mounting set(s) and ___ auxiliary mounting bracket(s) installed at a 45 degree angle, on a 30 ft high building, with a wind speed of 120 mph, occupancy category "II", importance factor of 1.0, and exposure category "C", shall resist a wind load of 40 psf, ground snow load of 40 psf, and ice load of 5 psf.
4. Portrait collectors mounted on a flat roof mounting system including ___ basic roof mounting set(s), ___ extension roof mounting set(s), ___ auxiliary basic roof mounting set(s), ___ auxiliary extension roof mounting set(s) and ___ auxiliary mounting bracket(s) installed at a 60 degree angle, on a 30 ft high building, with a wind speed of 120 mph, occupancy category "II", importance factor of 1.0, and exposure category "C", shall resist a wind load of 48 psf, ground snow load of 40 psf, and ice load of 5 psf.

Disclaimer:

This document is only to be used as a reference and does not replace a PE stamped calculation. It is recommended to check with local building authority as to the specific parameters that may apply to a specific installation location such as force

loadings, gust factor, importance factor, category of exposure, category of occupancy, wind directionality factor, topographical factor, and other calculation assumptions. Please contact Bosch if further calculation details are required.

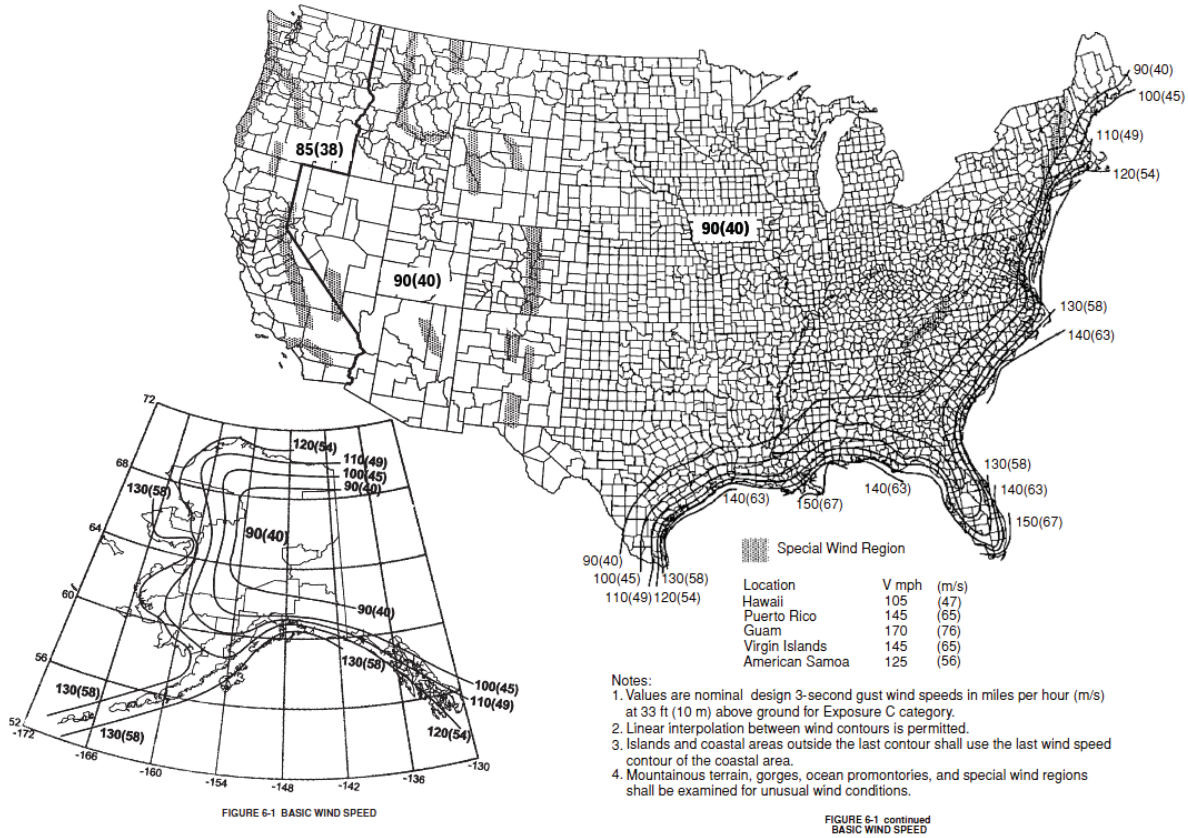


**The following states are PE approved to meet the applicable design loads at the parameters tabulated:
AZ, CA, CO, FL, MA, NC, NJ, NM, NY, OR, PA, WI**

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Basic Wind Speeds



*The above map is used with permission from ASCE

Calculation Parameters (Portrait, Flat Roof)

Mounting Angle	45 Degrees		60 Degrees	
	90 MPH	120 MPH	90 MPH	120 MPH
Wind Speed	90 MPH	120 MPH	90 MPH	120 MPH
Wind Load*				
Occupancy Category	II	II	II	II
Importance Factor	1	1	1	1
Exposure	"C"	"C"	"C"	"C"
Mean Roof Height	30 ft	30 ft	30 ft	30 ft
Wind Load (Pw)	23 psf	40 psf	27 psf	48 psf
Snow Load				
Ground Snow Load (Pg)	40 psf	40 psf	40 psf	40 psf
Ice Load				
Ice Load (Di)	5 psf	5 psf	5 psf	5 psf

*Using ASCE 7-05 Method 2 Section 6.5

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Importance Factor, Surface Roughness and Exposure Categories outlined below are referenced from American Society of Civil

Engineers (ASCE) Standard 7-05, Minimum Design Loads for Buildings and Other Structures.

Importance Factor		
Category	Non-Hurricane Prone Regions and Hurricane Prone Regions with V = 85-100 mph and Alaska	Hurricane Prone Regions with V > 100 mph
I	0.87	0.77
II	1.00	1.00
III	1.15	1.15
IV	1.15	1.15

Note:

- The building and structure classification categories are listed in Table 1-1 of ASCE Standard 7-05.

Surface Roughness

Surface Roughness B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.

Surface Roughness C: Open terrain with scattered obstructions having heights generally less than 30 ft (9.1 m). This category includes flat open country, grasslands, and all water surfaces in hurricane prone regions.

Surface Roughness D: Flat, unobstructed areas and water surfaces outside hurricane prone regions. This category includes smooth mud flats, salt flats, and unbroken ice.

Exposures

Exposure B: Exposure B shall apply where the ground surface roughness condition, as defined by Surface Roughness B, prevails in the upwind direction for a distance of at least 2,600 ft (792 m) or 20 times the height of the building, whichever is greater.

Exposure C: Exposure C shall apply for all cases where Exposures B or D do not apply.

Exposure D: Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance greater than 5,000 ft (1,524 m) or 20 times the building height, whichever is greater. Exposure D

shall extend into downwind areas of Surface Roughness B or C for a distance of 600 ft (200 m) or 20 times the height of the building, whichever is greater.

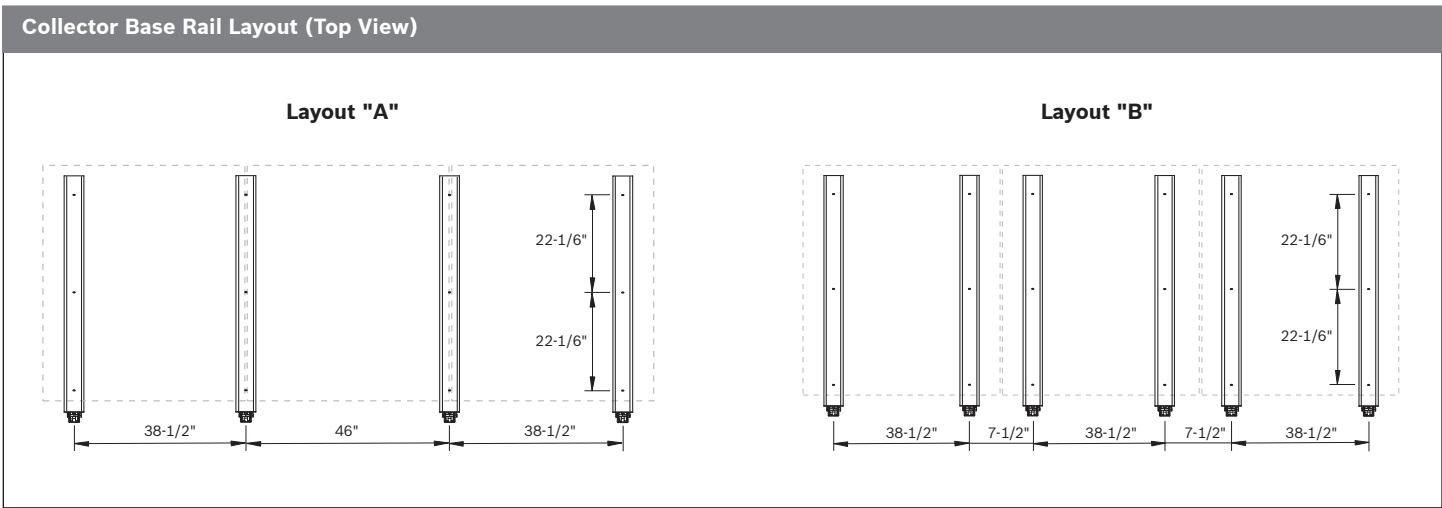
For a site located in the transition zone between exposure categories, the category resulting in the largest wind forces shall be used.

EXCEPTION: An intermediate exposure between the preceding categories is permitted in a transition zone provided that it is determined

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Mounting Hardware based on Wind Load Requirements for Building Height of Maximum 30 Feet																										
Number of Collectors		2	3	4	5	6	7	8	9	10																
Number of Rows		1	2	1	2	3	1	2	1	2	1	2	3	1	2											
Number of Collectors per Row		2	1	3	2	1	4	2	5	3	6	3	2	7	4	8	4	9	5	3	10	5				
Wind Speed	Tilt Angle	Connection of Base to Stl Bms	Components	Part Number																			Collector Base Rail Layout			
90 MPH	45°	2 Anchor Points (M8/8.8)	Basic roof mounting set	7739300454	1	2	1	2	3	1	2	1	2	1	2	3	1	2	1	2	1	2	3	1	2	A
			Extension roof mounting set	7739300455	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
	60°	3 Anchor Points (M8/8.8)	Basic roof mounting set	7739300454	1	2	1	2	3	1	2	1	2	1	2	3	1	2	1	2	1	2	3	1	2	A
			Extension roof mounting set	7739300455	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
120 MPH	45°	2 Anchor Points (M8/8.8)	Basic roof mounting set	7739300454	1	2	1	2	3	1	2	1	2	1	2	3	1	2	1	2	1	2	3	1	2	B
			Extension roof mounting set	7739300455	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
			Auxiliary basic roof mounting set	7739300444	1	2	1	2	3	1	2	1	2	1	2	3	1	2	1	2	1	2	3	1	2	
			Auxiliary extension roof mounting set	7739300445	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
			Auxiliary mounting bracket	7739300459	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
	60°	2 Anchor Points (M8/8.8)	Basic roof mounting set	7739300454	1	2	1	2	3	1	2	1	2	1	2	3	1	2	1	2	1	2	3	1	2	B
			Extension roof mounting set	7739300455	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
			Auxiliary basic roof mounting set	7739300444	1	2	1	2	3	1	2	1	2	1	2	3	1	2	1	2	1	2	3	1	2	
			Auxiliary extension roof mounting set	7739300445	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	
			Auxiliary mounting bracket	7739300459	1	-	2	1	-	3	2	4	3	5	4	3	6	5	7	6	8	7	6	9	8	



*Layouts are schematics and not drawn to scale.