



1



2



3

Ballast

1504.4 – Ballasted low-slope (roof slop < 2:12) single-ply roof system coverings installed in accordance with [Sections 1507.12 and 1507.13](#) shall be designed in accordance with [Section 1504.8](#) and [ANSI/SPRI RP-4](#)

1507.12 – Thermoset Single-ply Roofing ballasted with stone that complies with ASTM D448 or ASTM D7655

1507.13 – Thermoplastic Single-ply Roofing ballasted with stone that complies with ASTM D448 or ASTM D7655

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Ballast

Standard sizes of coarse aggregate – Based on ASTM D7655

Size Number	#1	#2	#3	#4
4"	100			
3-1/2"	90 to 100			
3"		100		
2-1/2"	25 to 60	90 to 100	100	
2"		35 to 70	90 to 100	100
1-1/2"	0 to 15	0 to 15	35 to 70	90 to 100
1"			0 to 15	20 to 55
3/4"	0 to 5	0 to 5		0 to 15
1/2"			0 to 5	
3/8"				0 to 5

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Ballast Limitation

1504.8

Surfacing and ballast materials in hurricane-prone regions

For a building located in a hurricane-prone region as defined in [Section 202](#), or on any other building with a mean roof height exceeding the permitted by [Table 1504.8](#) based on the exposure category and basic wind speed at the site, the following material shall not be used on the roof:

- Aggregate used as surfacing for roof coverings.
- Aggregate, gravel or stone used as ballast

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ASCE 7-10 & 7-16 Wind Maps

Vult to Vasd

1609.3.1 Wind speed conversion. When required, the ultimate design wind speeds of Figures 1609A, 1609B and 1609C shall be converted to nominal design wind speeds, V_{asd} , using Table 1609.3.1 or Equation 16-33.

$$V_{asd} = V_{ult} \sqrt{0.6} \quad \text{(Equation 16-33)}$$

V_{ult}	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	100	108	115	121	132	139	147	155

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Table 1504.8


Maximum Allowable Mean Roof Height Permitted for Buildings with Aggregate on the Roof in Areas Outside Hurricane-Prone Regions

Nominal Design Wind Speed, V_{asd} mph	Maximum Mean Roof Height (ft)		
	Exposure Category		
	B	C	D
85	170	60	30
90	110	35	15
95	75	20	NP
100	55	15	NP
105	40	NP	NP
110	30	NP	NP
115	20	NP	NP
120	15	NP	NP
Greater than 120	NP	NP	NP

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Wind Design Standards

Once this has been completed the ANSI/SPRI Wind Design Standard RP-4 would be used to determine final enhancements if any.



As of IBC 2021, previous 6 steps to this point unnecessary

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ANSI/SPRI RP-4

Ballast Requirements

System 1

The installed membrane shall be ballasted with #4 ballast.

System 2

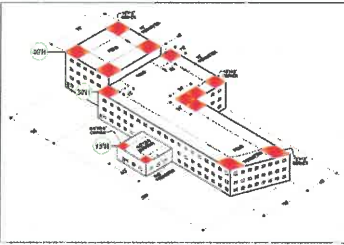
- Corner Zone shall be ballasted with #2 ballast
- Perimeter Zone shall be ballasted with #2 ballast
- Field shall be ballasted with #4 ballast

System 3

- Corner zone, an adhered or mechanically attached roof system designed
- Perimeter Zone, an adhered or mechanically attached roof system designed
- Field shall be ballasted with #2 ballast

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Roof Layout System 2



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Wind Resistance of Vegetative Roofs

- ANSI/SPRI RP-14 Wind Design Standard for Vegetative Roofing Systems
- Similar to ANSI/SPRI RP-4 Ballast Design Guide
- Defines design parameters that prevent scour of the vegetation and growing media

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Vegetative Roofing Systems Wind Performance



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Wind Resistance of Vegetative Roofs

ANSI/SPRI RP-14 was revised in 2016

- Now for use only with adhered membrane assemblies
- Requirements are designed to keep the vegetative roof components in place

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ANSI/SPRI RP-14 Ballast Designs

System #2 (Field same as System 1)

Perimeters and corners ballasted as follows:

- Growth media installed (minimum rate of 13 lbs/ft²)
- Independently set modular pre-planted or pre-grown vegetative roof trays containing 22 lbs/ft² dry weight inorganic material plus organic material or
- Modular pre-planted or pre-grown vegetative roof trays; which are interlocking, contoured fit or strapped together containing 13 lbs/ft² dry weight inorganic material plus organic material
- Gravel ballast or concrete pavers may also be used

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ANSI/SPRI RP-14 Ballast Designs

System #3 (Field same as System 2)

Perimeter and corner areas ballasted as follows:

- Mechanically attached or adhered assembly designed to resist the uplift force
- No soil media, modular vegetative roof trays or gravel may be used in these areas
- If a protective covering is desired, minimum 22 psf pavers over an adhered assembly no mechanically attached systems permitted

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