

ANSI/SPRI RP-14

SPRI releases its wind design guide for vegetative roof systems

by Mark S. Graham

IN JUNE, SPRI published ANSI/SPRI RP-14, “Wind Design Standard for Vegetative Roofing Systems.” This new standard is intended to provide a method for designing vegetative roof systems’ wind-uplift resistances. If you are involved with vegetative roof systems, I encourage you to be familiar with this standard and NRCA’s concerns with it.

Using RP-14

RP-14 is modeled closely after ANSI/SPRI RP-4, “Wind Design Standard for Ballasted Single-ply Roofing Systems.” Users of RP-14 can determine the maximum allowable wind speeds for vegetative roof systems based on a specific building’s height, roof edge (parapet) height and exposure category.

RP-14 addresses three specific vegetative roof system designs. For RP-14’s System 1, the installed waterproofing membrane is covered with No. 4 ballast. For System 2, the roof’s field is covered with No. 4 ballast and the roof’s perimeter and corner regions are covered with No. 2 ballast. For System 3, the roof’s field is covered with No. 2 ballast and the roof’s perimeter and corner regions feature adhered or mechanically attached roof membranes.

In RP-14, the weight of the inorganic portion of a vegetative roof system’s growth media is considered ballast weight provided there is nominal vegetative coverage, meaning areas of exposed growth media are 5 inches in diameter or less.

For example, in RP-14, SPRI considers growth media spread at a minimum dry weight of 10 pounds per square foot of inorganic material plus organic material to be equivalent to 1,000 pounds of No. 4 aggregate ballast per 100 square feet used in a conventionally ballasted single-ply membrane roof system.

For vegetative roof systems without nominal vegetative coverage, RP-14 provides some commentary regarding the use of wind-erosion mats, soil stabilizers and tackifiers.

NRCA’s concerns

NRCA questions the validity of RP-14 considering vegetative roof systems’ growth media with nominal vegetative coverage to have wind resistances identical to those of ballasted single-ply membrane roof systems using conventional aggregate.

RP-14 defines growth media as engineered formulations of inorganic and organic materials including but not limited to heat-expanded clay, slate, shale, aggregate, sand, perlite vermiculate, compost worm casting, coir, peat and other organic materials. Growth media do not have the same size, gradation or density of large-diameter aggregate ballast.

RP-14 indicates vegetative roof systems’ growth media get the benefit of the wind-break provided by the plants and holding power of the plants’ root systems. However, these assertions are untested and undocumented.

NRCA raised its concern during the American National Standards Institute’s balloting process for RP-14 and cited NRCA’s wind tunnel testing at Southern Illinois University Edwardsville that shows a 90-mph wind resistance for a vegetative roof specimen fitting RP-14’s definition of nominal coverage. RP-14 permits the use of vegetative roof systems up to 140 mph in some instances. (To read more about NRCA’s research, see “Testing vegetative roof systems,” page 28.)

The RP-14 Review Task Force responded to NRCA’s concerns by citing a European study showing lower design uplift pressures, an anecdotal test of a fully vegetative roof system tested to only 110 mph and the following statement: “...Hurricanes and tornados can blow roofs off and fell buildings, but the soil is usually intact with minimal disturbance. People don’t dig holes with a leaf blower.”

Most roofing professionals realize wind loads at buildings’ heights are greater than wind forces at ground level and growth media aren’t topsoil. Also, apparently the 1930s Dust Bowl never occurred, and I have a leaf blower more powerful than most.

Until NRCA’s concerns with RP-14 are properly addressed, NRCA urges its members to not make representations of vegetative roof systems’ wind resistances based on RP-14. 🌀🌪️❄️

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