



CAMPUS FIRE SAFETY CODE TALK

Campus Fire Safety e-NewZone

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Safeguarding the benefits of a vegetative (green) roof by addressing fire and life safety risks

For the last few decades, campuses have pursued opportunities to promote their commitment to environmental responsibility and sustainability. First there was a push to recycle more, then there were green buildings, often in the form of LEED certified buildings, which sparked an interest in vegetative (green) roofs. While vegetative roofs have numerous benefits, it is important that they are installed and maintained properly to avoid fire and life safety hazards. The 2018 Edition of [NFPA 5000: Building Construction and Safety Code](#) has new material in Chapter 38 (section 38.9.15) addressing three major concerns of vegetative roofs: the potential fire risk; the additional load on the roof; and the risk of flying debris.

One of the main goals of the new vegetative roof section is to minimize the increased fire risk associated with these types of roofs. The provisions identify a variety of ways to do this. NFPA 5000 references two documents, ANSI/FM 4477 and ANSI/SPRI VF-1, for guidance on vegetative roof design. Both documents provide recommendations for reducing the fire risk, but they do it differently. ANSI/FM 4477 addresses the combustibility of vegetative roofs. It looks at evaluating the combustibility from above the roof deck, as well as, below the roof deck. The other referenced document, ANSI/SPRI VF-1, relies on firebreaks to reduce the fire risk. Firebreaks are breaks in the vegetation that are intended to limit the area of involvement during fire conditions.

Prior to construction, potential vegetation needs to be researched to ensure it is a viable option for the given climate. The USDA creates a Plant Hardiness Zone Map that should be consulted when selecting vegetation. The map creates zones based on the average annual extreme minimum temperature which can be used to determine what vegetation will thrive in a given climate. The amount of water the vegetation will require also needs to be carefully considered. Prior to selecting and planting



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vegetation, a plan needs to be developed outlining how water will be made available at the roof. There are a variety of solutions ranging from natural options, such as rain water harvesting, to man-made solutions, such as installing irrigation. Even when a natural option is chosen, an alternative system should be installed that can be used during draught conditions. Choosing the right vegetation and providing sufficient water can minimize the fire risk by ensuring the vegetation remains alive and moist. The maintenance of a vegetative roof needs to continue throughout the building life cycle. It should be regularly monitored and inspected to ensure dead debris is removed and vegetation is sufficiently watered at all times.

The new requirements in NFPA 5000 on vegetative roofs mentions dead, live, wind, rain, snow, and earthquake loads without specifically telling designers how to include vegetative roofs in these calculations. Chapter 35, Structural Design should be used to evaluate those loads. This section serves as a reminder to the designer that the presence of vegetation on the roof is going to change these loads and needs to be considered during the design phase to ensure the structure is capable of handling the added weight. The evaluation of loads is especially important during a retrofit because the loads associated with the new vegetative roof would not have been included in the original calculations. Additional work may be required for the building to safely accommodate the new vegetative roof.

The other major issue the code addresses is the possibility of growth media becoming windborne debris. Growth media that becomes windborne debris poses a serious threat to pedestrians below and surrounding buildings. Growth media is essentially soil; it is the material the vegetation is planted in and what the vegetation receives water through. The new language recommends looking at the density and size of the particles. In areas prone to high winds, even with careful consideration to the size of the particles that make up the growth media, it may not be possible to keep the growth media from becoming windborne. In these cases, a vegetative roof may not be a safe option.

Prior to installing a vegetative roof, the fire and life safety risk needs to be evaluated. Reducing the risk begins during the planning phase by choosing vegetation that will thrive in the given climate, evaluating the additional loads, choosing an appropriately sized growth media, and considering how the vegetation will be watered. The



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mitigation of fire and life safety risks needs to continue throughout the building's life, by ensuring the vegetative roof is properly maintained with sufficient water and dead vegetation is promptly removed. Vegetative roofs can be a great addition to a building, but proper planning is required to minimize the fire and life safety risks associated with them.



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