National Research Council of Canada Wind Test Platform.
Photo courtesy of Next Level Stormwater Management

UPDATE ON WIND STANDARDS

BY RICHARD HAYDEN, GRP, RLA, ASLA, CLARB, A.M. ASCE

Vegetated (green) roofs continue to be incorporated into an ever-increasing array of buildings across North America. The architecture and landscape architecture communities continually push the envelope on the design of vegetated roof assemblies on these buildings.

Wind is a natural force that affects every part of a building. Architects and engineers use wind data to design building façades and window assemblies to be sure that those elements are properly fastened to the building structure. Fortunately there has not been a documented incident of a vegetated roof assembly being damaged by wind to the point where it comes off the building. One reason for this is the vegetated roof industry is fortunate to have certain guidelines to aid the designers in good vegetated roof practices. ANSI/SPRI RP-14 "Wind Design Standard for Vegetative Roofing Systems" was created in a partnership between GRHC and Single Ply Roofing Industry (SPRI) to be one of those guidelines.

Up until 2015, however, there was never an actual test protocol for testing vegetated roofing assemblies. In early 2015, the Canadian Standards Association (CSA) adopted a new standard (CSA 123.24-15) entitled "Standard Test Method For Wind Resistance Of Modular Vegetated Roof Assembly". This protocol was developed at the National Research Council of Canada (NRCC) facility with a group of pre-vegetated tray and mat manufacturers and addresses the wind uplift resistance of modular roof assemblies (trays) and mats only.

In 2016, the NRCC and the Canadian Roofing Contractors' Association (CRCA) pulled together a group of commercial companies to fund and begin work on refinement of this standard so that it would also to include built-up (loose laid) vegetated roofing assemblies. This group includes: Bioroof Systems, Inc.; Hydrotech Membrane Corporation; Sedum Master, Inc.; Soprema, Inc. and ZinCo Canada, Inc.

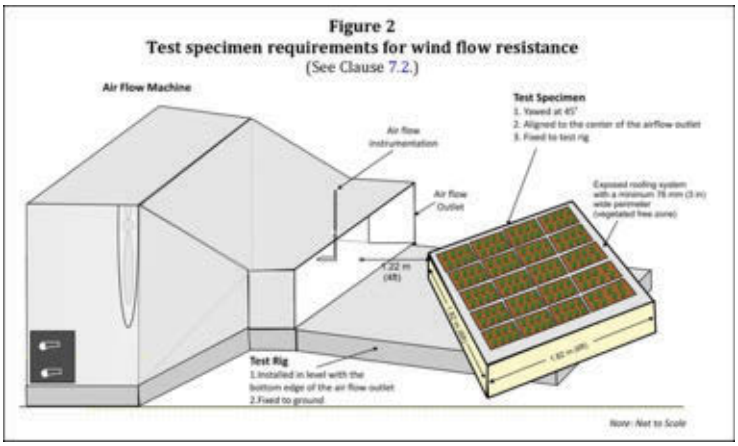
These individual companies have agreed to fund the research and testing, provide materials, and work together to develop a set of wind uplift design standards that are appropriate for built-up (loose laid) vegetated roofing assemblies. These new standards could reside in one of two places: within the existing CSA 123.24 standards or within a new, stand-alone standard. That decision will be determined as the testing protocols are developed this year.

Current Schedule: There will be two rounds of wind testing that would occur in May and August 2017. The first set of

tests will evaluate installations at Day-One. The second set of tests would be of identical assemblies that have grown in to some degree. The members of the group will be able to test their own assemblies within a range of common vegetated roof parameters. The goal of this testing is to determine any potential modes of failure such as loss of media, loss of plant material coverage, failure of any erosion control techniques, etc. In the fall of 2017 and into 2018, these results will be reviewed to determine correlations and applicability for development into a standard that would be included in a revised CSA A123.24 or a new standard.

The NRC is adapting significant technologies to these testing procedures including the inclusion of load cells to measure weight changes in the test sample with a very high degree of accuracy. These very sensitive weighing devices will be placed under the test pad to measure minute differences in assembly weights before, during and after the wind testing. This data will be used in the evaluation of how the assemblies perform under the various test wind conditions.

Conceptually, the test platform will look somewhat like the image below (from the current CSA A123.24 standard). Wind will be generated in the air flow machine and funneled through the narrow air flow outlet that increases its velocity. The test sample is grown on essentially large platforms and placed in position on the test rig where it is subjected to a range of wind speeds. The goal is to develop data that can be used to determine the mode of failure at a particular wind speed.



Source: CSA 123.24

Under the agreements for all of these companies, the results of the testing cannot be published until the actual new standards are published. This is to prevent any pre-empting by individual companies from releasing data favoring their assemblies. As this activity advances, more information will be forthcoming.

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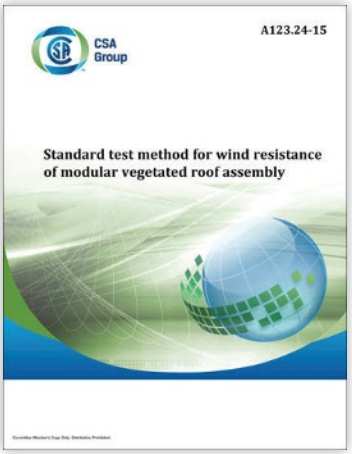

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