

[Submit a comment](#)

## Proposed Change 1754

---

<b>Code Reference(s):</b>	<b>NBC20 Div.B 5.2.2.2. (first printing)</b>
Subject:	Vegetated Roof Assemblies
Title:	Requirements for Wind Resistance of Vegetated Roof Assemblies
Description:	This proposed change introduces a requirement for the testing of the dynamic wind uplift resistance and wind flow resistance of vegetated roof assemblies in accordance with the CAN/CSA-A123.24:21 standard.
Related Code Change Request(s):	CCR 1151

This change could potentially affect the following topic areas:

- |  |   |
|--|---|
| <input type="checkbox"/> Division A                                | <input checked="" type="checkbox"/> Division B              |
| <input type="checkbox"/> Division C                                | <input checked="" type="checkbox"/> Design and Construction |
| <input type="checkbox"/> Building operations                       | <input type="checkbox"/> Housing                            |
| <input type="checkbox"/> Small Buildings                           | <input checked="" type="checkbox"/> Large Buildings         |
| <input type="checkbox"/> Fire Protection                           | <input type="checkbox"/> Occupant safety in use             |
| <input type="checkbox"/> Accessibility                             | <input type="checkbox"/> Structural Requirements            |
| <input checked="" type="checkbox"/> Building Envelope              | <input type="checkbox"/> Energy Efficiency                  |
| <input type="checkbox"/> Heating, Ventilating and Air Conditioning | <input type="checkbox"/> Plumbing                           |
|  | <input type="checkbox"/> Construction and Demolition Sites  |

---

### Problem

---

The use of vegetated roof assemblies is becoming more and more common in building design and construction as they provide for more sustainable buildings. The code, as it stands, provides very limited guidance and requirements with regard to the determination of adequate wind loads for vegetated roof assemblies. This situation does not prevent the possibility of under- or over-designed solutions and concepts.

---

## Justification

---

The addition of a reference to CAN/CSA-A123.24:21, "Standard Test Method For Wind Resistance Of Modular Vegetated Roof Assembly," would rectify the problems described above by providing an acceptable means of establishing the required wind loads for vegetated roof assemblies.

Referencing this standard in the NBC would provide a way for the industry to meet the code's intent through the use of uniform and reproducible testing methods.

---

## PROPOSED CHANGE

---

### [5.2.2.2.] 5.2.2.2. Determination of Wind Load

(See Note A-5.2.2.2.)

- [1] 1) This Article applies to the determination of wind load to be used in the design of materials, components and assemblies, including their connections, that separate dissimilar environments or are exposed to the exterior, where these are
  - [a] a) subject to wind load, and
  - [b] b) required to be designed to resist wind load.
- [2] 2) Except as provided in Sentence (3), the wind load referred to in Sentence (1) shall be 100% of the specified wind load determined in accordance with Article 4.1.7.1.
- [3] 3) Where it can be shown by test or analysis that a material, component, assembly or connection referred to in Sentence (1) will be subject to less than 100% of the specified wind load, the wind load referred to in Sentence (1) shall be not less than the load determined by test or analysis.
- [4] 4) Except as provided in Sentences (5) and (6), the wind uplift resistance of membrane roofing assemblies shall be determined in accordance with the requirements of CAN/CSA-A123.21, "Standard test method for the dynamic wind uplift resistance of membrane-roofing systems". (See Note A-5.2.2.2.(4).)
- [5] 5) Membrane roofing assemblies with proven past performance for the anticipated wind loads need not comply with Sentence (4). (See Note A-5.1.4.1.(5).)
- [6] --) The wind resistance of vegetated roof assemblies shall
  - [a] --) conform to existing provincial or territorial regulations, or
  - [b] --) in the absence of the regulations referred to in Clause (a), be determined in accordance with the requirements of CAN/CSA-A123.24:21, "Standard test method for wind resistance of vegetated roof assembly" (see Note A-5.2.2.2.(6)(b)).

**Note A-5.2.2.2.(6)(b) Vegetated Roof Assemblies.**

When a vegetated system is added on the top of a membrane roofing assembly, a vegetated roof assembly (VRA) is formed. The test methods described in CAN/CSA-A123.24:21, "Standard test method for wind resistance of vegetated roof assembly," determine both the wind uplift resistance and the wind flow resistance of the VRA. If the wind uplift resistance of the membrane roofing assembly used in the VRA has already been determined in accordance with the requirements of CAN/CSA-A123.21, "Standard test method for the dynamic wind uplift resistance of membrane-roofing systems," as required by Sentence 5.2.2.2.(4), then this resistance can be used as an acceptable conservative wind uplift resistance of the VRA; in such cases, only the wind flow resistance of the VRA has to be determined in accordance with CAN/CSA-A123.24:21. If, however, any variations in the components or methods of construction of the membrane roofing assembly used in the VRA are made after the wind uplift resistance was determined in accordance with the requirements of CAN/CSA-A123.21, then the wind uplift resistance of the VRA must be determined in accordance with CAN/CSA-A123.24:21.

---

## Impact analysis

---

As the proposed changes are performance-based and the cost of vegetated roof assemblies is less than 0.5% of the total cost of the construction of a building, a qualitative cost analysis is provided.

The testing of the wind flow resistance of a vegetated roof assembly costs on average between \$2500 and \$4000 per system, depending on the number of configurations evaluated. The cost of testing is per system and not per project. However, test results can be reused (without retesting) for other systems under similar conditions. The cost of testing would be absorbed by the industry sector that provides the vegetated roof assemblies.

The cost of construction would not be impacted as systems are already being built.

Direct benefits include the reduction of under- or over-designed vegetated roof assemblies and the provision of an appropriate method to determine the wind resistance of vegetated roof assemblies and their compliance with specific building requirements.

Indirect benefits include the reduction of safety issues related to the overturning of roofs in under-designed assemblies and unnecessary roof loading in over-designed assemblies.

---

## Enforcement implications

---

This proposed change can be enforced by existing means and resources involved in the acceptance and verification of roofing design.

---

## Who is affected

---

Designers, specification writers, manufacturers, roofing contractors, building owners and building officials.

---

## OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

---

[5.2.2.2.] 5.2.2.2. ([1] 1) no attributions

[5.2.2.2.] 5.2.2.2. ([2] 2) [F20-OS2.1] [F22-OS2.3,OS2.4]

[5.2.2.2.] 5.2.2.2. ([2] 2) [F20,F22-OH1.1,OH1.2,OH1.3]

[5.2.2.2.] 5.2.2.2. ([2] 2) [F20,F22-OH4]

[5.2.2.2.] 5.2.2.2. ([3] 3) [F20-OS2.1] [F22-OS2.3,OS2.4]

[5.2.2.2.] 5.2.2.2. ([3] 3) [F20,F22-OH1.1,OH1.2,OH1.3]

[5.2.2.2.] 5.2.2.2. ([3] 3) [F20,F22-OH4]

[5.2.2.2.] 5.2.2.2. ([4] 4) [F20,F55,F61-OH1.1,OH1.2,OH1.3]

[5.2.2.2.] 5.2.2.2. ([4] 4) [F20,F55,F61-OS2.1,OS2.3]

[5.2.2.2.] 5.2.2.2. ([5] 5) no attributions

-- (--) [F20,F55,F61-OH1.1,OH1.2,OH1.3]

-- (--) [F20,F55,F61-OS2.1,OS2.3]