

MULLIONS AND NAFS

Mulling over the new testing guidelines.

Fenestration Canada has just released two important new documents that potentially affect all manufacturers and prehangs supplying window and door products in Canada. First discussed at the Fenestration Canada AGM and Conference held in Winnipeg in June, both relate to the testing and labelling of windows and doors with mullions. The first document is *Voluntary NAFS Labeling Guidelines for Products with Mullions*. The second is *Recommendation on the Use of Engineering Calculations to determine Design Pressure Ratings of Fenestration Products under NAFS-08*.

by AL JAUGELIS,
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The need for guidelines was identified by the Fenestration Canada Technical Services Committee following the publication of the original NAFS Labeling Guidelines for Canada, published in November, 2013. A working group that included representatives from Canada and the United States sought to reconcile the intent of NAFS—to label the performance of products with mullions—with the need to report that performance using primary and secondary designators as required by the Canadian Supplement. The working group met by conference call over several months and considered existing mullion labelling practices in the U.S. as well as the needs of manufacturers on both sides of the border, and presented a draft guideline document to the Technical Services Committee in June. Following the Technical Committee's review, this document has now been approved for publication by the Fenestration Canada board.

WHY GUIDELINES?

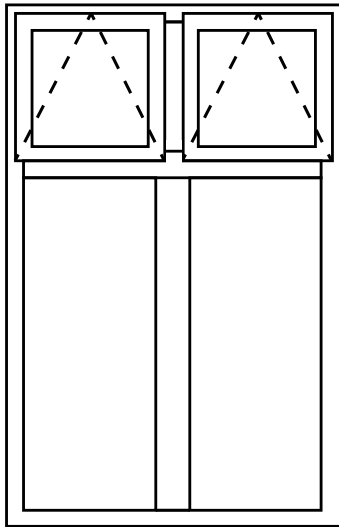
The NAFS standard is very clear that the performance ratings of products with mullions must be based on the testing of products with mullions. This had not been common practice in Canada prior to NAFS,

and some Canadian manufacturers did not realize that the performance ratings of products with mullions, typically lower than the ratings for individual units or “boxes”, had to be tested and reported on product labels.

NAFS-08, the 2008 edition of the NAFS standard referenced in the 2010 National Building Code of Canada, requires product labels to report the performance of products with mullions, but does not provide any guidance on how to do so. The example labels provided only address individual unit products. It provides no terminology for products whose frames are divided by integral mullions, or products combined from individual units whose abutting frames form combination mullions.

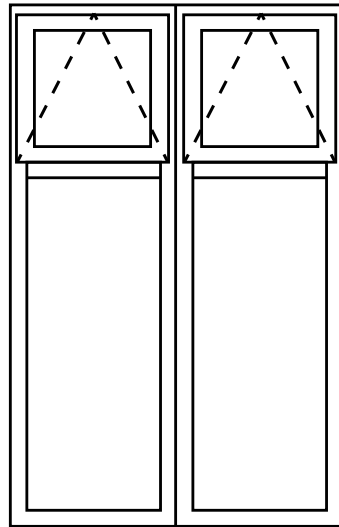
NAFS, the North American Fenestration Standard, made its first Canadian code appearance in the 2010 National Building Code. Called the Harmonized Standard in the Code, called NAFS-08 in Canada but A440 in much of the U.S., its full name is AAMA/WDMA/CSA 101/I.S.2/A440-08, NAFS—North American Fenestration Standard/Specification for windows, doors and skylights.

American certification organizations have developed U.S. labelling programs to meet



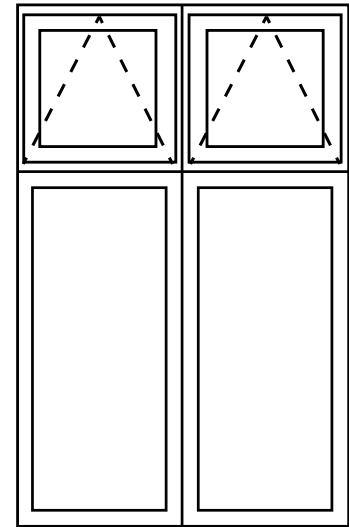
Composite Unit

One frame divided by crossing mullions.



Combination Assembly

Two composite unit frames mullied together vertically.



Combination Assembly

Four individual units mullied together vertically and horizontally.

the need, but they don't address the Canadian challenge: how to label mullied product performance using primary and secondary designators as required by A44oS1-09, the Canadian Supplement to NAFS-08. Both Canadian and American manufacturers were seeking guidance on how to do so.

There is one more reason why guidelines were deemed to be necessary. There are three organizations certifying the performance of fenestration products in Canada, and four in the United States. In theory, each of these organizations could develop their own Canadian NAFS labelling guidelines independently of one another, leading to labelling confusion. Fenestration Canada developed these guidelines in the sincere hope they would be adopted by all affected parties to make Canadian NAFS labels more uniform and to ensure they are based on a correct understanding of the acceptable test methods that may be used.

You can download both *Voluntary NAFS Labeling Guidelines for Products with Mullions* and the *Recommendation on the Use of Engineering Calculations to determine Design Pressure Ratings of Fenestration Products under NAFS-08* in French and English from the Fenestration Canada website. They are available at no charge. Fenestration Canada members can also access recordings of the informational webinars that the association hosted in September to introduce the new guidelines.

TWO TYPES OF MULLIONS, TWO KINDS OF PRODUCTS

NAFS defines for us two kinds of mullions, and the mullions in turn define two types of products. The testing and labelling requirements for these two kinds of products differ.

An integral mullion is defined as a horizontal or vertical

member that is bounded at either end or both ends by crossing frame members, such as a "T-bar" mullion in a window system. The integral mullion definition does not address whether the mullion has additional internal or external reinforcement.

A combination mullion is defined as the horizontal or vertical member formed by joining two or more individual units together. When an additional reinforcing member is incorporated in a combination mullion, it is called a reinforcing mullion. The distinction between combination and reinforcing mullions is important in the context of the standard used to rate these kinds of mullions: AAMA 450, Voluntary Performance Rating Method for Mullied Fenestration Assemblies.

(Then there is the verb, to mull, which describes the action or the result of combining, or mulling two or more individual products together into a combination assembly. A mullied window or door is by definition a combination assembly product.)

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Distinguishing between these mullion types is important because they are essential for describing two very different types of fenestration products:

- Composite unit — a fenestration product consisting of two or more sashes, leaves, lites, or sliding door panels within a single frame using an integral mullion.
- Combination assembly — an assembly formed by a combination of two or more separate fenestration products whose frames are mulled together utilizing a combination mullion or reinforcing mullion

Why are these definitions important? Because NAFS has different testing requirements for products with integral and combination/reinforcing mullions, and this leads to different NAFS labels as well.

Do these terms sound foreign to you, or familiar? It probably depends where in Canada you live. There are regional variations in how Canadian manufacturers name these mullion and product types. We need get comfortable with the NAFS terminology to discuss the Canadian NAFS labelling requirements for products with mullions.

COMBINATION ASSEMBLY TESTING MADE EASIER

Many Canadian manufacturers will be pleased to learn about how various individual product and mullion types can be grouped together to reduce the amount of testing required to qualify products using AAMA 450. This standard requires the air-tightness and water-tightness of combination/reinforcing mullions to be determined by physical testing. But it allows their structural performance to be determined by calculation or by a simple beam test in addition to NAFS testing of the mulled combination assembly. It also allows grouping of mulled fenestration assemblies to qualify multiple designs with a single evaluation, and can be used to determine NAFS ratings for bay and bow window assemblies.

But using AAMA 450 is not a do-it-yourself project: it requires a registered professional engineer to prepare a detailed evaluation report that pulls together test data and engineering calculations to show how NAFS performance ratings for a range of mulled products were arrived at. AAMA 450 evaluation reports can serve as the basis for NAFS labelling of combination assembly products.

The *Voluntary NAFS Labeling Guidelines for Products with Mullions* document has an important annex that concerns the test data that must be recorded to determine Canadian performance ratings. This is of particular importance to U.S. manufacturers and their engineers, as the AAMA 450 document deals with design pressure (DP) ratings only and does not adequately address the need to include mullion performance measures essential for Canadian product labelling, such as air infiltration/exfiltration levels, water-test pressure ratings separate from DP, and Product Class related attributes. American engineers intending to use AAMA 450 for products shipped to Canada are advised to refer to this document understand the differences between Canadian and U.S. NAFS mullion ratings.

ENGINEERING METHODS THAT CAN SUPPLEMENT NAFS TESTING

The second document released by Fenestration Canada relates to the use of engineering methods permitted by the NAFS standard to determine the Performance Grades of tested products at sizes other than those tested.

By now, most people know that the NAFS standard requires the air-water-structural performance of fenestration products to be determined by physical testing. Many people may not realize that NAFS also provides guidance, by reference to other standards, for the limited application of engineering calculations and principles to determine the design pressure component of fenestration Performance Grades.

The Fenestration Canada Technical Committee has issued a document recognizing that “the most recent versions of the standards referenced in NAFS-11 for this purpose define the state-of-the-art with respect to the methods used to determine design pressure ratings for fenestration Performance Grades.” These documents are:

AAMA 450-10, Voluntary Performance Rating Method for Mulled Fenestration Assemblies

AAMA 2502-07, Comparative Analysis Procedure for Window and Door Products

WDMA I.S.11-09, Voluntary Analytical Method for Design Pressure Rating of Fenestration Products

Manufacturers and engineers interested to learn more about this subject are advised to consult the Fenestration Canada Technical Services Committee’s *Recommendation on the Use of Engineering Calculations to determine Design Pressure Ratings of Fenestration Products under NAFS-08*.

WHERE ARE THE GUIDELINES FOUND?

These guidelines and recommendations documents are being announced through Fenestration Canada email communications and on its website, as well as through provincial fenestration associations across Canada, including the Fenestration Association of B.C. (www.fen-bc.org), Fenestration Manitoba (fenestrationmanitoba.ca), Fenestration Canada (fenestrationcanada.ca), and are also available in French from the Association de vitrerie et fenestration du Québec (www.avfq.ca).

For readers who have not yet been notified about this guideline document or the original NAFS Labeling Guidelines for Canada, visit the Fenestration Canada website.

ABOUT THE AUTHOR

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