

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors

[\(click here to access the original proposed ballot\)](#)



NFRC Ballot Comments through November 2, 2009 Technical Committee — U-Factor Subcommittee

Legend:

AC :Approve with Comment

NEG: Negative response with Comments

Company Name, Rep Initials	AC/NEG	Section and/or Page #	Comment/Alternate Language
Alliance to Save Energy, N. Petermann	NEG 01	Table 5.2 Fenestration Attachment Products Base Reference Windows	I propose using different reference products, as outlined in the tables below. These tables do not show definite U-factor values, as these would depend on the specific geometry of these reference windows. <i>(see attached supporting information in following pages 2-5)</i>

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



NFRC Ballot Fall 2009

NFRC 100A-2010

Negative by Nils Petermann, Alliance to Save Energy

Table 5.2 Fenestration Attachment Products Base Reference Windows

I propose using different reference products, as outlined in the tables below. These tables do not show definite U-factor values, as these would depend on the specific geometry of these reference windows.

Window Base Case Products (Metric Units)

<u>Reference Glazing System</u>	<u>Frame Material</u>	<u>Operator Type</u>	<u>Size</u>	<u>U-Factor</u>
			<i>in. x in.</i>	<i>Btu/(hr·Ft²·°F)</i>
<u>3mm (1/8in.) clear</u>	<u>Metal</u>	<u>Operable</u> ¹	<u>1200 x 1500</u>	<i>close to 6.81</i>
<u>3mm (1/8in.) clear</u>	<u>Non-metal</u>	<u>Fixed</u> ²	<u>1200 x 1500</u>	<i>close to 5.39</i>
<u>3mm (1/8in.) clear + 7mm (1/4in.) air + 3mm (1/8in.) clear</u>	<u>Metal</u>	<u>Operable</u> ¹	<u>1200 x 1500</u>	<i>close to 4.54</i>
<u>3mm (1/8in.) clear + 7mm (1/4in.) air + 3mm (1/8in.) clear</u>	<u>Non-metal</u>	<u>Fixed</u> ²	<u>1200 x 1500</u>	<i>close to 3.12</i>

Frame Types: ¹ *Default Aluminum Window Frame, Operable*

² *Default Wood Window Frame, Fixed*

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



Window Base Case Products (IP Units)

<u>Reference Glazing System</u>	<u>Frame Material</u>	<u>Operator Type</u>	<u>Size</u>	<u>U-Factor</u>
-		-	<i>in. x in.</i>	<i>Btu/(hr·Ft²·°F)</i>
<u>3mm (1/8in.) clear</u>	<u>Metal</u>	<u>Operable</u> ¹	<u>47.2 x 59.1</u>	<i>close to 1.20</i>
<u>3mm (1/8in.) clear</u>	<u>Non-metal</u>	<u>Fixed</u> ²	<u>47.2 x 59.1</u>	<i>close to 0.95</i>
<u>3mm (1/8in.) clear + 7mm (1/4in.) air + 3mm (1/8in.) clear</u>	<u>Metal</u>	<u>Operable</u> ¹	<u>47.2 x 59.1</u>	<i>close to 0.80</i>
<u>3mm (1/8in.) clear + 7mm (1/4in.) air + 3mm (1/8in.) clear</u>	<u>Non-metal</u>	<u>Fixed</u> ²	<u>47.2 x 59.1</u>	<i>close to 0.55</i>

Frame Types: ¹ *Default Aluminum Window Frame, Operable*

² *Default Wood Window Frame, Fixed*

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



The rationale for these proposed changes is as follows:

- **Relevant but easy-to-use information**
 - Differentiate between metal and non-metal, not between residential and non-residential
 - The U-factor differences between metal and non-metal are more significant
 - Users of ratings can easily tell if windows are metal or non-metal, but they may not always be certain whether a window is residential or non-residential
- **Keep it relatively simple.**
 - I suggest four categories that are easy to distinguish: single vs. double pane, metal vs. non-metal. These categories are easier to recognize by users of the ratings than the distinction between residential and non-residential windows. Users may not be able at all to determine what kind of low-E glazing an existing window has.
- **Use reference windows based on conservative (reasonably worst case) assumptions.**
 - Use operable reference windows in the metal-framed categories and fixed frames in the non-metal category. Operable metal windows yield more conservative U-factor results than fixed windows, while the opposite is true with single-pane non-metal windows. In the case of double-pane non-metal windows with 1/4" air space, operable and fixed windows do not differ much in their U-factor.
 - Use 1/4" air space for double-pane reference windows. 1/4" air space is not uncommon among older windows and performs worse than 1/2" air space.
 - The resulting U-factors should be close to the default values used in the IECC:

Glazing	Frame	U-factor
Single pane	metal	1.20
	non-metal	0.95
Double pane	metal	0.80
	non-metal	0.55

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



The ASHRAE Handbook of Fundamentals shows the following U-factors for the proposed reference window types (these are based on NFRC 100-91, though, and have not been updated since):

Glazing	Frame	Operator Type	Air space	U-factor
Single pane	metal	Operable	---	1.27
	non-metal	Fixed	---	0.98
Double pane	metal	Operable	1/4"	0.87
	non-metal	Fixed	1/4"	0.56

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



Company Name, Rep Initials	AC/NEG	Section and/or Page #	Comment/Alternate Language
Pella Corporation, J. Hayden	NEG 02	General	Good progress continues to be made but the document is still not complete enough to be approved. See attached for some specific comments. (Note that I removed all the photos and graphics to reduce the file size, making it easier to e-mail) <i>(see attached supporting information in following pages 7-12)</i>

4. GENERAL

4.1 Fenestration Attachments Standard Simulation and Test Conditions

4.1.1 Interior Attachment Requirements for Testing and Simulation

- A. ~~Assume base case window established (assume single surface, no offset as in double hung type windows) based on~~ The fenestration attachment product shall be evaluated in conjunction with all eight base-case products defined in Table 5.2.
- B. Mounted “inside” the window recess (day lighting region) which will be based on the base product sizes
 - a. Shade material ~~shall-should~~ be 25 mm (1”) from the glazing when in the Fully Opened position. ~~(open state) unless product size determines the distance.~~
 - b. Maximum product to edge of frame allowance ~~is~~ shall be 3 mm (1/8”) for head and bottom rail and 12 mm (1/2”) for edge of frame to fabric or shade body and is assumed to be a result of manufacturer’s standard deductions.

- 4.1.1 C. Mounted “outside” the reveal which is based on the Table 5.2 sizes. Edge of shade material ~~shall can~~ overhang the frame by 50 to 100 mm (2” to 4-“).
- D. Product ~~is~~ shall be simulated as free hanging (not fixed at lower window frame) unless manufacturer’s installation requirements state otherwise. Note- the product will need to be fixed to prevent it from falling into the test structure. *(At some point, rules or guidelines will need to be established for how to accomplish this so all test labs are doing so in substantially the same manner)*
- E. Products ~~shall can~~ be evaluated in both their Fully Opened and Fully Closed positions. ~~either test condition:~~
- a. ~~Fully Opened~~
 - b. ~~Fully Closed~~

4.1.2 Exterior Attachments Requirements for Testing and Simulation

(See recommended edits to 4.1.1)

- A. Assume base case window established (assume single surface, no offset windows) based on Table 5.2
- B. Exterior products can be mounted “inside” the window recesses or “outside” the frame.

4.2 Calculation of Total Fenestration Attachments Product Rating

4.2.1 Reference Fenestration Products

All ratings will be derived utilizing the ~~applicable~~ Base Reference windows listed in Table 5.2 Fenestration Attachment Products Base Reference Windows. The Base windows shall ~~will~~ be constructed as indicated in section 6

4.2.2 Total Fenestration Attachments Product U factor

Table 5.2 list applicable U-factors for reference windows and Fenestration Attachment Products

4.3 Testing

If the fenestration attachment cannot be simulated then testing ~~is~~ shall be conducted as detailed in NFRC 102 and the following sections:

4.3.1 Reference Window Test Procedure

Testing ~~is~~ shall be conducted as detailed in NFRC 102 to determine the Base Window U-factors.

4.3.2 Total Fenestration Product Test Procedure

Testing ~~is~~ shall be conducted as detailed in NFRC 102 with the following additional items added:

Attachments ~~will~~ shall be mounted as indicated in section 4.3.3. The system shall be tested with the attachment in both the ~~f~~Fully eClosed and Fully Opened positions.

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



4.3.3 Fenestration Attachments Installation Procedure

(What is the procedure ???)

4.3.3.1 References

- A. NFRC 600-2007: Glossary and Terminology
- B. EN12216- Shutters, external blinds, internal blinds — Terminology, glossary and definitions
- C. ANSI WCMA A100.1-2007 American National Standard for Safety of Corded Window Covering Products

4.3.3.2 Utilizing a Base Window from Table 5.2 and the mounting parameters given in 4.1

4.3.3.3 There are two conditions that are defined for testing

4.3.3.3.1 Fully Opened

4.3.3.3.2 Fully Closed

(Section 4.3 is apparently not yet complete ...)

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors (continued)



Company Name, Rep Initials	AC/ NEG	Section and/or Page #	Comment/Alternate Language
Andersen Corporation, S. Johnson	NEG 03	General	Title needs a distinctly different number rather than a suffix. Suggest NFRC 104. Also, my previous negative suggested that the reference windows be based on the IECC default tables because the IECC correctly recognizes that credit should not be given for window attributes that cannot be easily verified; yet Table 5.2 contains two items that cannot be readily verified- low e and residential vs. non-residential reference windows. Suggest removing all the non-residential reference windows; and also removing the low-e residential reference window.
Cardinal Glass Industries, J. Larson	NEG 04	Scope, Section 5.2	To eliminate confusion between Base Case Reference Windows (table 5.2) and IECC default windows revise Scope with new section: --2.1 Ratings derived using the base case reference windows in Section 5.1 cannot to be used for code compliance. --Renumber existing sections accordingly.
VELUX America Inc., R. LeBrun	NEG 05	General	Does not contain language and reference products for rating skylight attachments
WESTLab, J. Baker	NEG 06	General	I can not approve as there are too many "When available" statements in this document.

NFRC 100A-2010 Procedure for Determining Fenestration Attachment Product U-Factors
(continued)



Company Name, Rep Initials	AC/NEG	Section and/or Page #	Comment/Alternate Language
Carli, Inc., C. Curcija	AC 07	General	<p>There should be a reference to Applied Film reference products, so that it is clear that we are not talking about different reference products for two different types of attachments. As I indicated earlier, eventually we need to have single attachment procedure for ALL attachments, so then use as much as possible from the document that is approved or will be approved shortly.</p> <p>Also, the procedure talks about open and closed state as if these are the only attachments possible. Storm window would be attachment with just one state, so there should be conditional language that states that for dynamic attachments there would be two states.</p>
Hunter Douglas, M. Cienian	AC 08	General	<p>This Work Group has done a great job to update and advance the ballot since the Summer Membership Meeting.</p>