



# National Fenestration Rating Council Incorporated

**NFRC 713-2015<sub>[E0A0]</sub>**

Independent Verification Program

---

**© 2013 NATIONAL FENESTRATION RATING COUNCIL, INC.**

**PREPARED BY:**

National Fenestration Rating Council  
6305 Ivy Lane, Suite 140  
Greenbelt, MD 20770  
Voice: (301) 589-1776  
Fax: (301) 589-3884  
Email: [info@nfr.org](mailto:info@nfr.org)  
Website: [www.nfr.org](http://www.nfr.org)

© 2013. National Fenestration Rating Council Incorporated (NFRC). All rights reserved. NFRC publications and documents are protected by copyright. Any use of NFRC publications and documents, including reproduction or dissemination, in whole or in part, requires authorization by NFRC pursuant to NFRC's terms of use located at <http://www.nfrc.org/terms-of-use.aspx>.



## ***FOREWORD***

The National Fenestration Rating Council, Incorporated (NFRC) has developed and operates a uniform rating system for energy and energy-related performance of fenestration products. The Rating System determines the U-factor, Solar Heat Gain Coefficient (SHGC) and Visible Transmittance (VT) of a product, which are mandatory ratings for labeling NFRC certified products, are mandatory ratings for inclusion on label certificates, and are supplemented by procedures for voluntary ratings of products for Air Leakage (AL), and Condensation Resistance. Together, these rating procedures, as set forth in documents published by NFRC, are known as the NFRC Rating System.

The NFRC Rating System employs computer simulation and physical testing by NFRC-accredited laboratories to establish energy and related performance ratings for fenestration product types. The NFRC Rating System is reinforced by a certification program under which NFRC-licensed responsible parties claiming NFRC product certification shall label and certify fenestration products to indicate those energy and related performance ratings, provided the ratings are authorized for certification by an NFRC-licensed certification and Inspection Agency (IA).

The requirements of the rating, certification, and labeling program (Certification Program) are set forth in the most recent versions of the following as amended, updated, or interpreted from time to time:

- NFRC 700 Product Certification Program (PCP).
- NFRC 705 Component Modeling Approach (CMA), Product Certification Program (CMA-PCP).

Through the Certification Program and the most recent versions of its companion programs as amended, updated, or interpreted from time to time:

- The laboratory accreditation program (Accreditation Program), as set forth in the NFRC 701 Laboratory Accreditation Program (LAP).
- The IA licensing program (IA Program), as set forth in NFRC 702 Certification Agency Program (CAP).
- The CMA Approved Calculation Entity (ACE) licensing program (ACE Program), as set forth in the NFRC 708 Calculation Entity Approval Program (CEAP).

NFRC intends to ensure the integrity and uniformity of NFRC ratings, certification, and labeling by ensuring that responsible parties, testing and simulation laboratories, and IAs adhere to strict NFRC requirements.

In order to participate in the Certification Program, a Manufacturer/Responsible Party shall rate a product whose energy and energy-related performance characteristics are to be certified in accordance with mandatory NFRC rating procedures. At present, a Manufacturer/Responsible Party may elect to rate products for U-factor, SHGC, VT, AL, Condensation Resistance, or any other procedure adopted by NFRC, and to include those ratings on the NFRC temporary label affixed to its products, or on the NFRC Label Certificate. U-factor, SHGC and VT, AL, and Condensation Resistance rating reports shall be obtained from a laboratory that has been accredited by NFRC in accordance with the requirements of the NFRC 701.

The rating shall then be reviewed by an IA which has been licensed by NFRC in accordance with the requirements of the NFRC 702. NFRC-licensed IAs also review label format and content, conduct in-plant inspections for quality assurance in accordance with the requirements of the NFRC 702, and issue a product Certificate of Authorization (CA), or approve for issuance an NFRC Label Certificate for site-built or CMA products and attachment products. The IA is also responsible for the investigation of potential violations (prohibited activities) as set forth in the NFRC 707 Compliance and Monitoring Program (CAMP).

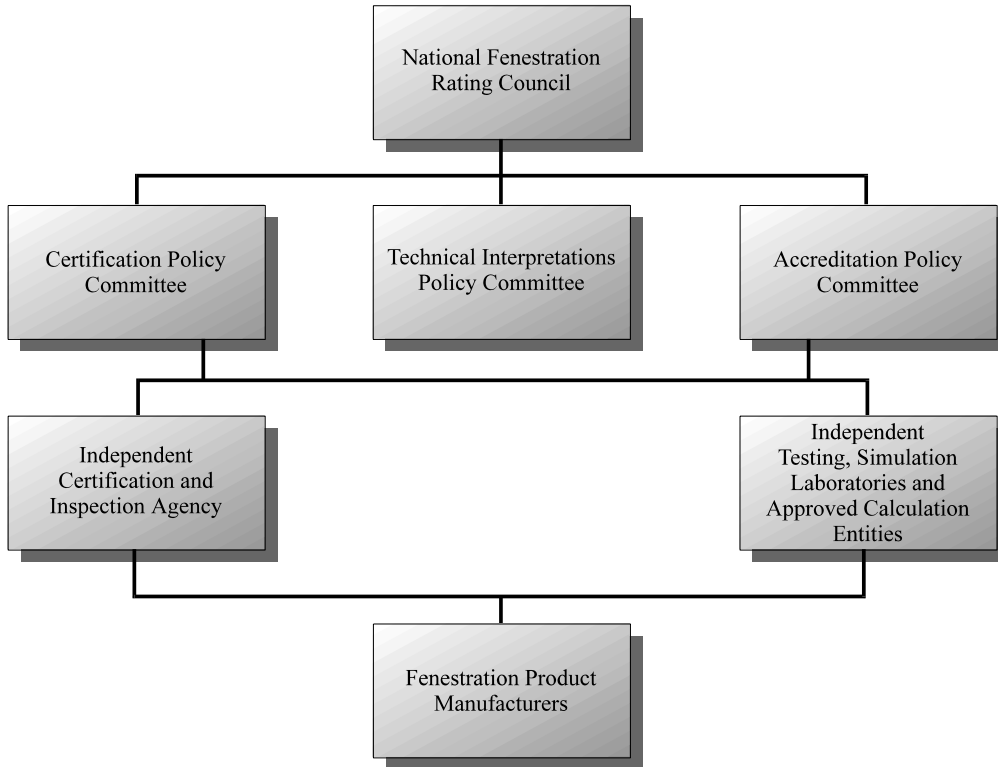
Ratings for products that are labeled with the NFRC Temporary and Permanent Label, or products that are listed on an NFRC Label Certificate in accordance with NFRC requirements, are considered to be NFRC-certified. NFRC maintains a Certified Products Directory (CPD), listing product lines and individual products selected by the manufacturer/responsible party for which certification authorization has been granted.

NFRC manages the Rating System and regulates the Product Certification Program (PCP), Laboratory Accreditation Program (LAP) and Certification Agency Program (CAP) in accordance with the NFRC 700 (PCP), the NFRC 701 (LAP), the NFRC 702 (CAP), the NFRC 705 (CMA-PCP), and the NFRC 708 (CEAP) procedures, and conducts compliance activities under all these programs as well as the NFRC 707 (CAMP). NFRC continues to develop the Rating System and each of the programs.

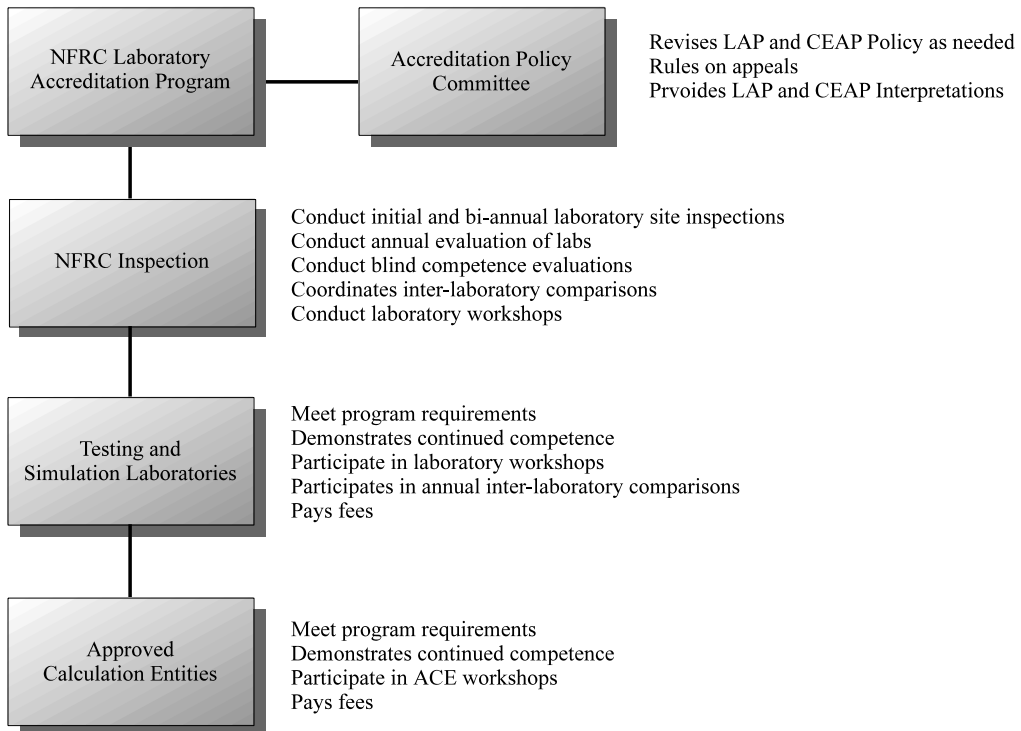
NFRC owns all rights in and to each of the NFRC 700, NFRC 701, NFRC 702, NFRC 705, NFRC 707, NFRC 708 and each procedure, which is a component of the Rating System, as well as each of its registration marks, trade names, and other intellectual property.

The structure of the NFRC program and relationships among participants are shown in Figure 1, Figure 2, and Figure 3. For additional information on the roles of the IAs and laboratories and operation of the IA Program and Accreditation Program, see the NFRC 700 (PCP), NFRC 701 (LAP), and NFRC 702 (CAP) respectively.

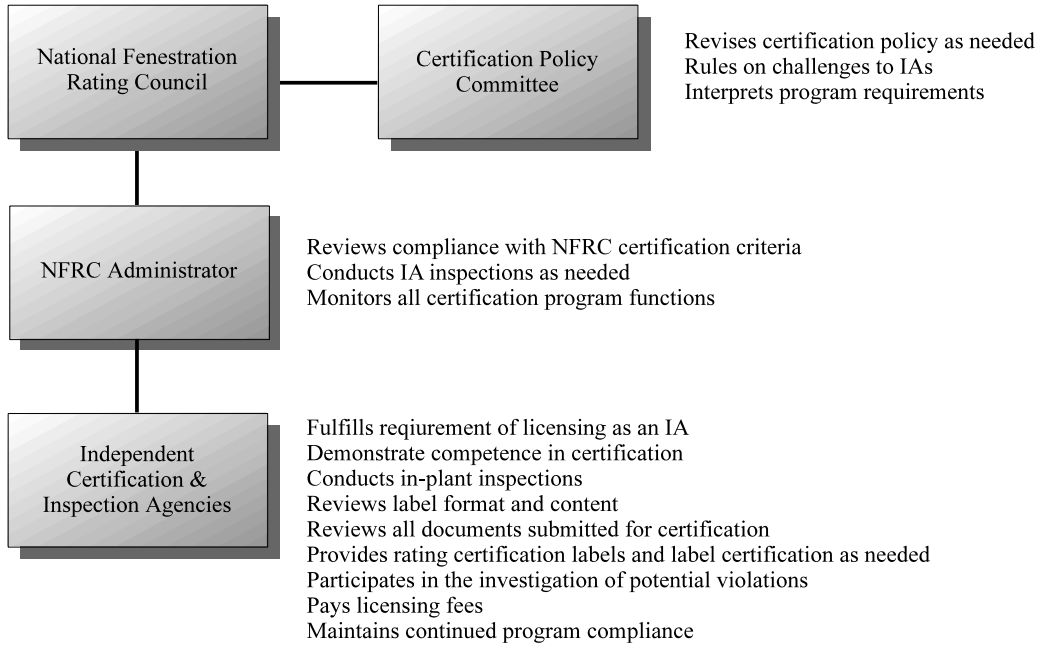
**Figure 1**



**Figure 2**



**Figure 3**



Questions on the use of this procedure should be addressed to:

**National Fenestration Rating Council**  
6305 Ivy Lane, Suite 140  
Greenbelt, MD 20770  
Voice: (301) 589-1776  
Fax: (301) 589-3884  
Email: [info@nfrc.org](mailto:info@nfrc.org)  
Website: [www.nfrc.org](http://www.nfrc.org)



### ***DISCLAIMER***

NFRC certification is the authorized act of a Manufacturer/Responsible Party in: (a) labeling a fenestration or related attachment product with an NFRC Permanent Label and NFRC Temporary Label, or (b) generating a site built or CMA label certificate, either of which bears one or more energy performance ratings reported by NFRC-accredited simulation and testing laboratories and authorized for certification by an NFRC-licensed IA. Each of these participants acts independently to report, authorize certification, and certify the energy-related ratings of fenestration and related attachment products.

NFRC does not certify a product and certification does not constitute a warranty of NFRC regarding any characteristic of a fenestration or fenestration-related attachment product. Certification is not an endorsement of or recommendation for any product or product line or any attribute of a product or product line. NFRC is not a merchant in the business of selling fenestration products or fenestration-related products, and therefore cannot warrant products as to their merchantability or fitness for a particular use.

NFRC THEREFORE DISCLAIMS ANY AND ALL LIABILITY THAT MAY ARISE FROM OR IN CONNECTION WITH SERVICES PROVIDED BY, DECISIONS MADE BY OR REPORTS OR CERTIFICATIONS ISSUED OR GRANTED BY ANY NFRC-ACCREDITED LABORATORY, NFRC-LICENSED IA OR ANY PRODUCT MANUFACTURER/ RESPONSIBLE PARTY; RELIANCE ON ANY NFRC PRODUCT DESCRIPTION, SPECIFICATION, RATING, TEST OR CERTIFICATION, WHETHER APPEARING IN A REPORT, A PRODUCT CERTIFICATION AUTHORIZATION OR A PRINTED OR ELECTRONIC DIRECTORY, OR ON A LABEL, OR ON A LABEL CERTIFICATE; OR THE SALE OR USE OF ANY NFRC-RATED OR CERTIFIED PRODUCT OR PRODUCT LINE; INCLUDING BUT NOT LIMITED TO DAMAGES FOR PERSONAL OR OTHER INJURY, LOST PROFITS, LOST SAVINGS OR OTHER CONSEQUENTIAL OR INCIDENTAL DAMAGES.

NFRC program participants are required to indemnify NFRC from and against such liability.



## Table of Contents

<b>Foreword</b> .....	<b>iii</b>
<b>Disclaimer</b> .....	<b>vii</b>
<b>1. Introduction</b> .....	<b>2</b>
1.1 SCOPE OF PROGRAM.....	2
1.1.1 Ratings Verified within IVP .....	2
1.1.2 Ratings Not Verified within IVP.....	2
1.1.3 Additional Elements Verified within IVP .....	2
1.2 ROLES.....	2
1.2.1 Role of NFRC.....	3
1.2.2 Role of ENERGY STAR Partner (Manufacturer).....	3
1.2.3 Role of Laboratory .....	4
1.2.4 Role of Inspection Agency .....	4
1.3 CONFIDENTIALITY .....	4
<b>2. Product Selection</b> .....	<b>4</b>
2.1 COMPONENTS FOR WEIGHTED AVERAGE .....	5
2.2 PRODUCT PROCUREMENT PROCESS.....	5
2.3 LABORATORY SELECTION .....	6
<b>3. Verification (Testing) Process</b> .....	<b>7</b>
3.1 LABORATORY TESTING REQUIREMENTS .....	7
3.2 PRODUCT THERMAL VERIFICATION TESTING .....	8
3.2.1 Thermal Hot box Test .....	8
3.2.2 Component Evaluation .....	8
3.3 AIR LEAKAGE CERTIFIED RATING VERIFICATION.....	11
3.4 INSTALLATION INSTRUCTIONS VERIFICATION .....	11
3.5 OTHER VERIFICATION TESTING .....	11
<b>4. Verification Results</b> .....	<b>12</b>
4.1 GRADING INVESTIGATION PROCESSES .....	12
4.1.1 Thermal Verification .....	12
4.1.2 Air Leakage Verification.....	13
4.1.3 Installation Instructions Verification .....	13
4.1.4 SHGC Verification.....	13
4.2 GRADING TOLERANCES OR CONDITIONS .....	13
4.3 PERFORMANCE BASED VERIFICATION GRADES .....	14



4.4	REPORTING OF TEST GRADE .....	16
4.4.1	Tests Graded as Successful.....	17
4.4.2	Tests Graded as Unsuccessful.....	17
4.5	VERIFICATION TEST RESULTS NOT ATTRIBUTABLE TO PARTICIPANT.....	17
<b>5.</b>	<b>Notice of Non-compliance Process .....</b>	<b>18</b>
5.1	THERMAL HOT BOX UNSUCCESSFUL TEST .....	18
5.2	AIR LEAKAGE UNSUCCESSFUL VERIFICATION.....	18
5.3	ISSUES OF CONCERN.....	18
5.4	TEST RESULTS NOT ATTRIBUTABLE TO PARTICIPANT .....	19
<b>6.</b>	<b>Appeals .....</b>	<b>20</b>
6.1	APPEAL PROCEDURE .....	20
<b>7.</b>	<b>Categorization of Issues .....</b>	<b>22</b>

---

# 1. INTRODUCTION

---

## 1.1 Scope of Program

As a recognized Certification Body for the ENERGY STAR® Windows, Doors, and Skylights program, NFRC has developed the NFRC Independent Verification Program (IVP). The IVP program is designed to meet the EPA requirement to verify ENERGY STAR product qualification. This program shall use procedures that complement the inspection and validation testing requirements of the NFRC 700, Product Certification Program (PCP). NFRC participants shall remain subject to the requirements of the NFRC PCP.

All participants involved with the IVP shall maintain a high level code of ethics and respect for the confidentiality of IVP product selection, testing, and results.

### 1.1.1 Ratings Verified within IVP

- A. U-factor ratings generated in accordance with ANSI/NFRC 100.
- B. Solar Heat Gain Coefficient ratings generated in accordance with ANSI/NFRC 200.
- C. Air Leakage ratings either generated in accordance with ANSI/NFRC 400 or certified by an independent Certification Body accredited to operate in accordance with ISO/IEC 17065.

### 1.1.2 Ratings Not Verified within IVP

- A. Solar Heat Gain Coefficient ratings generated in accordance with NFRC 201.
- B. Visible Transmittance ratings generated in accordance with ANSI/NFRC 200, and NFRC 202 and 203.
- C. Condensation Resistance ratings generated in accordance with NFRC 500 and 501.

### 1.1.3 Additional Elements Verified within IVP

- A. Manufacturer's installation instructions include the EPA mandated elements and are readily available online or packaged with the product.
- B. The ENERGY STAR and NFRC Temporary labels are verified to determine that the correct zone and ratings are displayed.

## 1.2 Roles

The following is a description of the entities' roles who are participating in the NFRC IVP.

### **1.2.1 Role of NFRC**

NFRC has established and shall sponsor and operate the IVP in accordance with the NFRC 713. Under the IVP, NFRC shall:

- A. Maintain the IVP online database containing selected products and appropriate and relevant information.
- B. Select products from the NFRC Certified Products Directory (CPD) for verification based on a weighted average algorithm.
- C. Review verification test results prepared by NFRC Accredited Laboratories.
- D. Enforce corrective actions in accordance with NFRC 713.
- E. Submit all reports in a timely manner to the EPA in accordance with the requirements as an EPA Certification Body.
- F. Provide a report of the verification test results to the participant.
- G. Ensure that the IVP requirements are fair, and the IVP is administered fairly and uniformly.
- H. Take Administrative Action as required to rectify any NFRC PCP non-compliances discovered during the IVP testing process per NFRC PCP Section 9.4.

### **1.2.2 Role of ENERGY STAR Partner (Manufacturer)**

NFRC licensees certifying products in accordance with NFRC PCP and who are ENERGY STAR Partners (herein referred to as the “Participant”) and elect to participate in the NFRC IVP in accordance with the following responsibilities:

- A. Provide and maintain a listing of their ENERGY STAR qualified product lines.
- B. Enroll, sign an agreement, and pay annual fees to NFRC for participation in the IVP.
- C. Assist staff in procurement of their fenestration product, air leakage certification, and installation instructions for IVP verification testing.
- D. Assume corrective actions in accordance with NFRC 713.
- E. Pay the additional financial fees associated with unsuccessful tests in the IVP of its fenestrations products.
- F. Take corrective actions in accordance with NFRC PCP.

### **1.2.3 Role of Laboratory**

NFRC Accredited Laboratories testing fenestration products in accordance with NFRC 713 shall participate in the IVP in accordance with the following responsibilities:

- A. Maintain accreditation status in accordance with NFRC 701.
- B. Provide all test results to NFRC in a timely manner.
- C. Work with staff to determine any verification discrepancies.

### **1.2.4 Role of Inspection Agency**

NFRC licensed Inspection Agencies (IA) shall participate in the IVP in accordance with the following responsibilities:

- A. Provide NFRC with documentation upon request.
- B. Work with staff to determine any verification discrepancies.
- C. Verify NFRC PCP corrective actions were resolved.

## **1.3 Confidentiality**

All parts of the NFRC IVP process including the selection, testing, and reporting shall be confidential in accordance with requirements developed by NFRC and revised from time to time. In addition without NFRC's prior written consent and except for disclosures required by applicable law, the Participant, the IA, and test lab shall not disclose any information they develop or receive in connection with the IVP including any test results or data to each other or to any other parties except NFRC.

---

## **2. PRODUCT SELECTION**

---

Manufacturers that are participating in the NFRC certification program and are ENERGY STAR Partners are all eligible for participation in the IVP.

Per EPA directive 2011-06, the IVP will require testing a minimum of 10% of the total number of unique product lines that are ENERGY STAR qualified each year.

In accordance with NFRC definitions, a product line is the model of a specific product type; for example a Series "1000" Double Hung. The NFRC and EPA will then select an ENERGY STAR individual product option listed within the product line for verification testing.

- A. The EPA will select up to 50% of the required 10% using their nomination process.
- B. NFRC will select the remaining 50% of the required unique products in a manner using the criteria described below in section 2.1.

## 2.1 Components for weighted average

- A. The products shall be selected on a statistical weighted average basis with any Energy Star qualified individual product option listed in the NFRC Certified Products Directory (CPD) eligible for selection.
- B. Participants' products selected shall be based on a summary of the data from the CPD in conjunction with the energy performance rating and weighted average composition of components as determined by NFRC.
- C. The following statistical weighted average characteristics are part of the selection process:
  - i. ENERGY STAR qualified products
  - ii. IVP unsuccessful tests
  - iii. IVP prior selection within certain timeframe (4 months)
  - iv. Successful IVP testing within certain timeframe (8 months)
  - v. Weighted average based on Product Type
  - vi. Product lines that have participated in IVP testing within the past 12 months.
  - vii. Weighted average scale based on energy performance rating within the CPD

NOTE: One function of the weighted algorithm criteria shall be to select a group leader of a series of grouped individual product options listed within a product line. This is performed in order to verify the actual simulated rating versus the tested rating. Selection of the group leader will help to eliminate the possible confusion with verifying "grouped" individual product options. The grouped options will have ratings that meet or exceed ENERGY STAR requirements.

## 2.2 Product Procurement Process

The Participant and individual product option is randomly selected from the listing of potential product lines with the highest weighted average from the IVP algorithm.

- A. ENERGY STAR qualified product lines designated by the Participant will be available for selection in the algorithm.
- B. All active ENERGY STAR qualified individual products options listed in the CPD are subject to participation.
- C. In cases when the selected product is unavailable for procurement, staff will select another product for verification testing.

- D. Staff will procure a product for IVP testing.
- E. The process to procure a product is conducted in a manner that ensures no Participant interferes with a test sample.
- F. Upon confirmation of the product selected, the product will be shipped to an NFRC Accredited Laboratory.

### **2.3 Laboratory Selection**

NFRC staff shall designate the NFRC Accredited Laboratory to perform verification testing as mutually agreed upon by the Participant and NFRC staff.

---

### 3. VERIFICATION (TESTING) PROCESS

---

Product evaluation and validation in the IVP shall be accomplished through the following testing and inspection process:

- Products chosen for verification shall be evaluated to determine if the product's performance is consistent with the product as it was authorized for NFRC certification.
- All selected products shall be inspected and tested by an NFRC accredited laboratory.
- Proof of air leakage certification or rating shall be provided.
- The method for making the EPA required installation instructions readily available shall be provided.
- Reference Section 7 (Categorization of Issues) for the protocol regarding labeling, pre-test, and/or post-test issues.

#### 3.1 Laboratory testing requirements

- A. Upon receipt, the laboratory shall check the product for the following:
  - i. No observed damage to the product
  - ii. Correct individual product option. Per Section 7, issues related to receiving the incorrect product are categorized as C-1, C-2, Pr-1, Pr-2, and Pr-3.
  - iii. NFRC, ENERGY STAR, and if applicable, the acceptable Certification Bodies' label are applied
  - iv. If applicable, manufacturer installation instructions attached to the product

If any of the above criteria are not met, the laboratory shall contact NFRC for instruction. This product may still be allowed to be tested or another product may be required to be sent for verification.
- B. Labs are not allowed to modify products upon arrival.
- C. Products are required to be placed in ambient room conditions for a minimum of 48 hours prior to testing.
- D. When a product with a "removable" nail flange is selected for verification, the lab is required to contact NFRC staff to determine if the flange is to be removed.
- E. The cut-up test specimen shall be stored by the lab for a minimum of 4 years from the verification test date.

## 3.2 Product Thermal Verification Testing

A verification test consists of a thermal hot box test to verify the product's performance.

### 3.2.1 Thermal Hot box Test

This part of the verification test will be used to determine the product energy performance.

A U-Factor test shall be conducted in accordance with NFRC 102. The test lab shall provide a detailed report.

- A. Report shall be in accordance with NFRC 701.04 Section 1.1.3.A.
- B. Lab shall provide a picture of all NFRC Temporary and EPA related labels displayed on the product.

### 3.2.2 Component Evaluation

After performing the thermal hot box test per Section 3.2.1 and at NFRC's direction, the laboratory shall disassemble the test specimen in a manner to verify the product description. Staff shall provide all necessary documentation for use in verification. Cut-ups shall be stored by the lab for a minimum of 4 years from the verification test date.

Processes used by staff are to validate the thermal hot box test results. This evaluation will not be used as part of the grading of a product's performance in the IVP. Per Section 7, component evaluation issues are categorized as Po-1, Po-2, Po-3, Po-4, Po-5, and Po-6.

#### 3.2.2.1 Inspection of frame, sash, components and cavities

- A. If the test specimen is to be evaluated for gap fill gas concentration, per 3.2.2.2.B. of this document, then the test shall be conducted before cutting the specimen.
- B. The test lab shall cut up the specimen and provide a detailed report on frame and sash members, and components. The report shall be forwarded to NFRC in accordance with NFRC 701.04 Section 1.1.3.B.
- C. The collection and number of cut cross-sections by operator type shall be as follows:
  - i. Four-Sided units with two lites of glass, side-by-side (e.g. sliding glass doors, glazed wall systems, or sliding windows).
    - (a) Collect a minimum of four cut cross-sections; a top corner, an opposite lower corner, meeting stile-to-head and meeting stile-to-sill.



- (b) Collect parts of the product that are deemed uncharacteristic to the four cross-sections per (a).
  - ii. Four-Sided units with two lites of glass, one above the other (e.g. double or single hung).
    - (a) Collect of minimum of three cross-sections; a top corner, an opposite lower corner, and one meeting rail-to-jamb.
    - (b) Collect parts of the product that are deemed uncharacteristic to the three cross-sections per (a).
  - iii. Four-Sided units with a single-lite of glass (e.g. casements, awnings, picture or dual-action, etc.), excluding entry doors with embossments or raised panels.
    - (a) Collect a minimum of two cut cross-sections; a top corner and an opposite lower corner.
    - (b) Collect parts of the product that are deemed uncharacteristic to the two cross-sections per (a).
  - iv. Entry Doors with embossments or raised panels
    - (a) Collect the following cut cross-sections: a top corner of frame/panel, an opposite lower corner of frame/panel, one corner of the embossment or raised panel, one top corner of the glass lite and an opposite corner of glass lite, one door core that shall include both the horizontal vertical intermediates.
    - (b) Collect parts of the product that are deemed uncharacteristic to the cross-sections selected per (a).
- D. For specimens that are not rectangular or four-sided (e.g. octagon or garden windows), consult with NFRC for the cross-sections to be collected.
- E. It is imperative that the placement and orientation of any reinforcement inside the frame cavities are intact for verification. Because there can be tendency for the reinforcement to fall out during the corner cutting and/or that the reinforcement does not run the entire

length of the frame/sash member, it is required to cut at least 12" of the cross-sections and then photograph it as part of the reporting process.

- F. To verify the correct spacer type was provided with the specimen, it is required to compare the spacer to manufacturer spacer specifications. See Section 3.2.2.2.C for instructions of spacer verification procedures.
- G. Product components shall be compared to frame and sash component drawings provided by NFRC staff.
- H. When applicable a minimum of six dimensions shall be verified for each profile. At a minimum, the following dimension verifications shall be recorded:
  - i. Overall profile height
  - ii. Overall profile width
  - iii. Wall thickness(es), if applicable
  - iv. Other dimensions deemed appropriate by laboratory
  - v. The tolerance(s) listed on the profile drawing shall be used for verifying the profile dimensions.

### **3.2.2.2 Inspection of glazing components**

Glazing components shall be compared to glazing component drawings provided by NFRC staff. The test lab shall cut up the glass specimen and provide a detailed report of the glazing contents in accordance with NFRC 701.04 Section 1.1.3.B, which includes but is not limited to the following of the characteristics:

- A. Overall Glazing Configuration
  - i. Overall insulating glass dimensions
  - ii. Individual pane thickness
  - iii. Gap thickness
  - iv. Low-emissivity coating location(s)
  - v. Grille (divider, muntin) details
- B. Gap Fill Characteristics

Gap fill contents shall be determined using:

- i. ASTM E2649-09 - Standard Test Method for Determining Argon Concentration in Sealed Insulating Glass Units Using Spark Emission Spectroscopy;
- ii. ASTM E2269 - Standard Test Method for Determining Argon Concentration in Sealed Insulating Glass Units using Gas Chromatography; or
- iii. Other approved equivalent methodology.

NOTE: Every reasonable attempt shall be made to obtain a percentage of gas concentration.

C. Spacer System Characteristics

- i. Orientation shall be reported for correct orientation (i.e., to ensure spacer was not placed upside down) and for any significant offset from bottom of glazing.
- ii. Material types of the spacer (excluding sealants) shall be reported, such as, but not limited to, plastic, foam, stainless steel, mild steel, and aluminum.
- iii. Presence of desiccant shall be reported.
- iv. Sealants configuration shall be reported, whether single or dual.

### 3.3 Air Leakage Certified Rating Verification

Participants employing air infiltration ratings certified by an independent Certification Body will provide to NFRC the product's air leakage certification authorization issued by that body.

### 3.4 Installation Instructions Verification

Participants shall provide to NFRC the product's installation instructions. NFRC staff and or test lab shall verify the manufacturer's installation instructions include the EPA mandated elements and are available online or packaged with the product.

If applicable, the test lab shall verify instructions were included in packaging.

### 3.5 Other Verification Testing

Simulation to evaluate conductivities shall be conducted in accordance with ANSI/NFRC 100 and ANSI/NFRC 200 by NFRC staff if required to verify performance.

---

## 4. VERIFICATION RESULTS

---

The following section provides the methodology for which NFRC shall apply a grade to the verification test results received from an NFRC accredited laboratory per the reporting requirements of NFRC 701 supplemental documents.

Reference the EPA document, “Disqualification Procedures ENERGY STAR Products” for non-compliance actions within the ENERGY STAR program.

With respect to an unsuccessful test of a product in the IVP, the Participant is responsible for purposes of the IVP testing for the performance of any product component including, but not limited to insulating glass units, door frames, spacers, etc.

### 4.1 Grading Investigation Processes

#### 4.1.1 Thermal Verification

The following are the tasks NFRC may be required to facilitate in order to validate the comparison between the thermal verification test results and the expected certified performance rating of the product selected for IVP:

- A. Validate that the tested product configuration matches the product’s configuration expected to be tested.
  - i. Verify possible groupings within the product line.
  - ii. Verify any waiver and/or exemptions within the product line.
- B. Validate the confirmed configuration’s tested results versus the tolerances and conditions listed in 4.2.
  - i. NFRC staff shall review any discrepancies between the certified and tested results with the laboratory that performed the testing, the IA, and the Participant.
  - ii. In some cases, the thermal hot box test product’s size may differ from the model sizes listed in Table 4-3 of ANSI/NFRC 100. Since the product’s certified (labeled) value is based on NFRC model sizes, NFRC staff may be required to adjust the certified (simulated) model size to match the size of the product that was verified.
  - iii. In cases when verifications require the modeling or verification of simulated component, any simulations required in connection with the IVP may be performed by NFRC staff.
- C. NFRC staff may require the product be shipped to another NFRC accredited lab for additional testing.

- D. The product's date of manufacturing and labeling shall be taken under consideration.
  - i. Review of archived CPD and CAR data may be necessary.
  - ii. Staff may need to compare current testing procedures versus the inventoried product's ratings test procedures.

**4.1.2 Air Leakage Verification**

The following are the tasks NFRC may be required to perform in order to verify the Air Leakage certified rating performance:

- A. Participants shall forward certification authorization for air leakage performance ratings from other Certifications Bodies.
- B. ANSI/NFRC 400 air leakage performance ratings will be verified by reviewing the CPD.

**4.1.3 Installation Instructions Verification**

- A. NFRC shall require the Participant to provide the installation instructions or the online link to the instructions.
- B. The testing laboratory shall forward any installation instructions attached to the product when applicable.

**4.1.4 SHGC Verification**

- A. NFRC shall verify the received product's low-e glass location is consistent with the CPD listing.

**4.2 Grading Tolerances or Conditions**

NFRC staff will use the following tolerances and conditions when comparing the certified value and the verification results from the thermal hot box test, and the requirements for labeling, air leakage performance, and installation instructions.

- A. Thermal Hot Box Verification Rating Value Tolerances
  - i. Comparison of the physical test IVP value is based on the following:

**Table 1 – U-factor Tolerance**

<b>Certified U-factor<sup>1</sup></b>	<b>Accepted Difference Between Tested and Certified U-factor</b>
1.7 W/m2K (0.3 Btu/h·ft2·°F) or less	0.17 W/m2K (0.03 Btu/h·ft2·°F)
Greater than 1.7 W/m2K (0.3 Btu/h·ft2·°F)	10% of Simulated U-factor
<sup>1</sup> Certified U-factor may be adjusted due to tested product size not equivalent to the NFRC model size	

- ii. The tolerance to compare a certified (simulation only) performance value and a verification simulated value shall be 0.11 W/m<sup>2</sup>K (0.02 Btu/h ft<sup>2</sup> F).
- iii. Simulated values shall be adjusted for any difference between tested size and NFRC model size.

**B. Labeling Verification Conditions**

The verification of the product’s label shall be based on the following conditions:

- i. Presence of the proper ENERGY STAR label meeting EPA Partner requirements.
- ii. Energy performance values displayed on the NFRC temporary label meets the ENERGY STAR climate zone qualification criteria within NFRC allowed tolerances.

NOTE: There may be times when the value on the label shall not be considered the expected verification value due to the possibility that a grouped individual product option within the product line was chosen for verification.

- iii. Product is listed in the CPD and/or CAR.
- iv. Display of an air leakage rating on the NFRC temporary label or the presence of another EPA recognized Certification Body label.
- v. The ENERGY STAR label width is equal to the NFRC temporary label.

**C. Air Leakage Verification Conditions**

The verification of the Air Leakage rating label and authorized certification shall be based on the following conditions:

**Table 2 – Air Leakage Tolerance**

Product	Air Leakage Rating
Window, Sliding Door or Skylight	≤ 0.3 cfm/ft <sup>2</sup>
Swinging Door	≤ 0.5 cfm/ft <sup>2</sup>

**D. Installation Instructions Verification Conditions**

Verify that the installation instructions are available online or packaged with the product and meet the EPA requirements.

**4.3 Performance Based Verification Grades**

NFRC shall grade the product’s performance based on the verification reports, certification reports, and installation instructions in conjunction with tasks listed in

Section 4.1. NFRC shall verify that the results of the review are within the tolerances and meet the conditions listed in Section 4.2.

A. Successful Verification

- i. Thermal hot box test products meet the rating performance value per Table 3, Table 4, and Table 5.
- ii. Air leakage ratings are certified and meet the rating performance value per Table 2.

B. Unsuccessful Verification

Per Section 7, the following are categorized as R-1.

- i. Thermal hot box test products do not meet the rating performance value per Table 3, Table 4, and Table 5; or
- ii. SHGC rating do meet the rating performance value per Table 3, Table 4, and Table 5 based on incorrect low emissivity surface location; or
- iii. Air leakage ratings do not meet requirements per Table 2.

C. Range of tolerance to determine an unsuccessful and successful test based on the ENERGY STAR zone U-factor and SHGC performance criteria and product category:

**Table 3 – ENERGY STAR U-factor Performance Tolerances for Windows**

Climate Zone	Required U-factor	SHGC	Windows	
			Successful Test U-factor Tolerances	Unsuccessful Test U-factor Tolerances
Northern	≤ 0.30	Any	≤ 0.33	≥ 0.34
	= 0.31	≥ 0.35	≤ 0.34	≥ 0.35
	= 0.32	≥ 0.40	≤ 0.35	≥ 0.36
North-Central	≤ 0.30	≤ 0.40	≤ 0.33	≥ 0.34
South-Central	≤ 0.30	≤ 0.25	≤ 0.33	≥ 0.34
Southern	≤ 0.40	≤ 0.25	≤ 0.44	≥ 0.45

**Table 4 – ENERGY STAR U-factor Performance Tolerances for Skylights**

<b>Skylights</b>				
<b>Climate Zone</b>	<b>Required U-factor</b>	<b>SHGC</b>	<b>Successful Test U-factor Tolerances</b>	<b>Unsuccessful Test U-factor Tolerances</b>
Northern	≤ 0.50	Any	≤ 0.55	≥ 0.56
North-Central	≤ 0.53	≤ 0.35	≤ 0.58	≥ 0.59
South-Central	≤ 0.53	≤ 0.28	≤ 0.58	≥ 0.59
Southern	≤ 0.60	≤ 0.28	≤ 0.66	≥ 0.67

**Table 5 – ENERGY STAR U-factor Performance Tolerances for Doors**

<b>Doors</b>					
<b>Climate Zone</b>	<b>Glazing Level</b>	<b>Required U-factor</b>	<b>SHGC</b>	<b>Successful Test U-factor Tolerances</b>	<b>Unsuccessful Test U-factor Tolerances</b>
All	Opaque	≤ 0.17	No Rating	≤ 0.20	≥ 0.21
All	≤1/2-Lite	≤ 0.25	≤ 0.25	≤ 0.28	≥ 0.29
Northern and Northern-Central	>1/2-Lite	≤ 0.30	≤ 0.40	≤ 0.33	≥ 0.34
South-Central and Southern	>1/2-Lite	≤ 0.30	≤ 0.25	≤ 0.33	≥ 0.34

- i. The “Required U-factor” column displays the expected value from the CAR / NFRC Certified Label.
- ii. The “SHGC” column displays the required Solar Heat Gain Coefficient value and is verified via labeling and listing in NFRC CPD.
- iii. The “Successful Test U-factor Tolerances” column displays the maximum verification tested U-factor value for a thermally tested product.
- iv. The “Unsuccessful Test U-factor Tolerances” column displays the beginning verification tested U-factor value that exceeds the ENERGY STAR performance criteria.

#### **4.4 Reporting of Test Grade**

NFRC Staff will provide notices to Participants when the final grade of the test is determined.



#### **4.4.1 Tests Graded as Successful**

For tests that are graded as successful, Participants shall receive a Notice of Verification.

#### **4.4.2 Tests Graded as Unsuccessful**

Products that are graded as unsuccessful tests per Section 4.3 are considered a failure per the EPA directives.

##### **4.4.2.1 Provide Reports to Participants**

NFRC staff shall provide a detailed report (Notice of Non-compliance) on the findings and the basis for the unsuccessful test to the Participant whose products were evaluated in the IVP.

##### **4.4.2.2 Provide Reports to EPA**

Per EPA directive 2011-06, the NFRC shall report to EPA “failures” within two business days after determining an unsuccessful test.

As requested by the EPA, Certification Bodies shall provide a summary of models tested since the previous report submitted to the EPA.

#### **4.5 Verification Test Results Not Attributable to Participant**

There may be situations when the Participant is not responsible for a test result because the results are not attributable to the product performance or the Participant’s compliance. These situations will require additional investigation by NFRC in conjunction with Participant. The grade for the test will not be determined until NFRC has received all the necessary information regarding the questionable results. In some cases, the Participant may be required to update certification ratings during the period of investigation.

---

## 5. NOTICE OF NON-COMPLIANCE PROCESS

---

In accordance with Section 4.4.2.1, Participants shall receive a Notice of Non-compliance in the event of an unsuccessful test. The Notice of Non-compliance will provide the performance results and the foundation for the unsuccessful test.

- A. Participants shall have the right to appeal the verification test results that result in EPA reportable event in accordance with Section 6.
- B. Participants are subject to corrective actions per the EPA's "Disqualification Procedures" document. NFRC will work with the EPA and the Participant to assist in determining the deficiency and reason for the failure.
- C. After the first unsuccessful test, all costs for any additional product procurement, shipping, and retesting as a follow-up to the initial verification test shall be assumed by the Participant.
- D. The Participant is subject to of higher probability of selection for verification testing for a period of up to 6 months.

### 5.1 Thermal Hot box Unsuccessful Test

- A. NFRC will provide a failure report to the EPA.
- B. The Participant is still subject to compliance actions per the EPA's "Disqualification Procedures" document.

### 5.2 Air Leakage Unsuccessful Verification

NFRC will inform the EPA that the product does not meet the rating tolerances. The Participant is subject to compliance actions per the EPA's "Disqualification Procedures" document.

### 5.3 Issues of Concern

- A. In cases where the ENERGY STAR label is not applied or inaccurate, the Participant shall rectify the labeling issue with the EPA. Per Section 7, this issue is categorized as L-1, L-2, L-6, and L-8.
- B. In cases where the values are inaccurate or the product option is not authorized for certification (NFRC and/or Air Leakage), as a result the individual product option is no longer eligible for ENERGY STAR qualification until such time that the issue is resolved. Per Section 7, this issue is categorized as L-3, L-4, L-5, and L-7.
- C. In cases where the installation instructions do not meet EPA requirements and/or are not available per Participant's preferred methodology, the Participant shall rectify the issue(s) with the EPA. Per Section 7, this issue is categorized as L-9.

#### **5.4 Test Results Not Attributable to Participant**

With respect to matters addressed in Section 4.5, the Participant has 30 days from receipt of the Notice of Non-compliance to cooperate with the proper entities (labs, IA, etc.) to achieve compliance. If compliance is not achieved by the deadline and reasonable progress toward that goal is not demonstrated, NFRC will notify the EPA of the matter.

---

## 6. APPEALS

---

This section sets forth the procedures for appealing the finding of an unsuccessful test that constitutes a failure under the EPA directives. The NFRC shall report to the EPA the result of any appeals under this Section 6. This appeals process is exclusive of any appeal made directly to the EPA.

### 6.1 Appeal Procedure

- A. Upon receipt of the Notice of Non-compliance, the Participant shall have a period of 15 days to appeal the IVP decision of the verification results by written notification to NFRC (electronic submission acceptable). The appeal shall set forth the basis that the Notice of Non-compliance is inaccurate or incorrect.
- i. The Participant shall present their appeal to the Verification Policy Committee (VPC) for review of the initial independent findings. The Participant has the right to present the appeal to the VPC without identifying the name of the Participant. The appeal shall be conducted by conference call or at a meeting as determined by the VPC chairman.
    - (a) The identity of the Participant shall not be disclosed to the VPC without the Participant's approval.
    - (b) Participants have the right to inspect the failed test specimen within the following guidelines:
      - (i) The Participant shall notify NFRC prior to inspecting the failed test specimen.
      - (ii) The failed test specimen shall remain in the custody of the testing facility at all times.
      - (iii) The Participant shall assume all costs associated with conducting the inspection.
      - (iv) If the product is discarded, manipulated, or modified in any manner during the inspection, Participants are subject to suspension from the NFRC IVP and NFRC will notify the EPA.
  - ii. At the discretion of the VPC chair, Participant representatives may attend the conference call or meeting.
  - iii. The VPC shall provide a recommendation on the appeal to the NFRC Executive Committee. The Executive Committee shall review the VPC recommendation and make the final decision on the appeal.

- iv. All NFRC Executive Committee decisions on the appeal are final. In the event that the appeal is denied, the Notice of Non-compliance shall remain in effect. In event that the appeal is upheld by the Executive Committee, the Executive Committee shall direct the further action to be taken.
- B. If the Participant does not submit an appeal within 15 days of the receipt of the Notification of Non-compliance, the verification result shall be final and binding.

## 7. CATEGORIZATION OF ISSUES

ID	Labeling Issues	IVP Action	NFRC Action	EPA Action	IVP (Pass / Fail)
L-1	No ENERGY STAR® or NFRC labels (Lab indicated no labels on product)	No test; and Participant required to send new product.		Incident included in EPA bi-annual report.	n/a
L-2	No ENERGY STAR label (No ENERGY STAR label, only NFRC label on product)	No test; and Participant required to send new product.		Incident included in EPA bi-annual report.	n/a
L-3	No NFRC label (No NFRC label, only ENERGY STAR label on product)	No test; and Participant required to send new product.		Inform EPA for ENERGY STAR label compliance; incident included in EPA bi-annual report.	n/a
L-4	Incorrect NFRC label (Option) with correct ENERGY STAR zone label (Ex: NFRC label states aluminum spacer and product has intercept spacer)	No test; and Participant required to send new product.	Initiate NFRC compliance process	Incident included in EPA bi-annual report.	n/a
L-5	Incorrect NFRC label (Values) with correct ENERGY STAR zone (Ex: U-factor on NFRC label is 0.31 and was supposed to be 0.30. ENERGY STAR map is correct.)	No test; and Participant required to send new product.	Initiate NFRC compliance process;	Inform EPA for ENERGY STAR label compliance; incident included in EPA bi-annual report.	n/a
L-6	Incorrect zone designated on ENERGY STAR label based on correct NFRC label. (Product and NFRC label are accurate; however, ENERGY STAR label displays incorrect zone(s))	Test product		Inform EPA for ENERGY STAR label compliance.	Result of test

<b>ID</b>	<b>Labeling Issues</b>	<b>IVP Action</b>	<b>NFRC Action</b>	<b>EPA Action</b>	<b>IVP (Pass / Fail)</b>
L-7	Not an NFRC certified product with ENERGY STAR label. (Product is received with a NFRC and ENERGY STAR label however the product is not listed in CPD or CAR)	No test; and Participant required to send new product.	Initiate NFRC compliance process	Inform EPA for ENERGY STAR label compliance; incident also included in EPA bi-annual report.	n/a
L-8	Incorrect zone designated on ENERGY STAR label and incorrect NFRC label. (Both the ENERGY STAR and NFRC label on product are incorrect.)	No test; and Participant required to send new product.	Initiate NFRC compliance process	Inform EPA for ENERGY STAR label compliance; and incident also included in EPA bi-annual report.	n/a
L-9	Installation instructions not available and or incomplete.			Inform EPA for ENERGY STAR label compliance; and incident also included in EPA bi-annual report.	Result of test

<b>ID</b>	<b>Certification Issues</b>	<b>IVP Action</b>	<b>NFRC Action</b>	<b>EPA Action</b>	<b>IVP (Pass / Fail)</b>
C-1	Expired product line	No test;	Initiate NFRC compliance process.		n/a
C-2	Not listed in product line	No test; and Participant required to send new product	Initiate NFRC compliance process.		n/a

ID	Component Issues	IVP Action	NFRC Action	EPA Action	IVP (Pass / Fail)
<b>Pre-test</b>					
Pr-1	Different spacer (Ex: product received has different spacer system than expected; however product is labeled with the correct CPD number.)	Test if product is listed in CPD and meets ENERGY STAR.	Initiate NFRC compliance process if applicable.		Result
		No test if product is not listed in CPD; and Participant required to send new product.	Initiate NFRC compliance process.	Inform EPA for ENERGY STAR label compliance; and the incident is also included in EPA bi-annual report.	n/a
Pr-2	Different glass (Ex: product received has different glass option than expected; however product is labeled with the correct CPD number.)	Test if product is listed in CPD and meets ENERGY STAR.	Initiate NFRC compliance process.		Result
		No test if product is not listed in CPD; and Participant required to send new product.	Initiate NFRC compliance process.	Inform EPA for ENERGY STAR label compliance; and the incident is also included in EPA bi-annual report.	n/a
Pr-3	Default door frame used in simulation (Ex: product received has different frame than expected; however product was simulated with default door frame.)	Test product			Result
<b>Post test</b>					
Po-1	Modified profile	Tested;	Initiate NFRC Compliance process.		Result
Po-2	Different profile	Tested;	Initiate NFRC Compliance process.		Result
Po-3	With or without foam	Tested;	Initiate NFRC Compliance process.		Result
Po-4	Different reinforcement	Tested;	Initiate NFRC		Result



ID	Component Issues	IVP Action	NFRC Action	EPA Action	IVP (Pass / Fail)
			Compliance process.		
Po-5	Default door frame	Tested; not an issue.			n/a
Po-6	Incorrect glazing configuration	Tested;	If applicable, initiate NFRC Compliance process.	If applicable, inform EPA for ENERGY STAR label compliance; and the incident is also included in EPA bi-annual report.	Result

ID	Results Issues	IVP Action	NFRC Action	EPA Action	IVP (Pass / Fail)
R-1	Not within ENERGY STAR tolerance		Possibly initiate NFRC Compliance process.	Notify EPA within 2 days of verification; and the incident is also included in EPA bi-annual report.	Fail
R-2	Not within NFRC tolerance		Initiate NFRC Compliance process.		Result