



# National Fenestration Rating Council Incorporated

NFRC 701.08-2010<sub>[E0A0]</sub>

NFRC Simulation Laboratory Accreditation Requirements

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## ***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 and 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 Rating System employs computer simulation and physical testing by NFRC-accredited laboratories to establish energy and related performance ratings for fenestration product types. The 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 (the "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 (the "PCP")
- NFRC 705 Component Modeling Approach ("CMA") Product Certification Program (the "CMA-PCP").

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

- The laboratory accreditation program (the "Accreditation Program"), set forth in the NFRC 701 Laboratory Accreditation Program (the "LAP")
- The IA licensing program (the "IA Program"), set forth in NFRC 702 Certification Agency Program (the "CAP")
- The CMA Approved Calculation Entity ("ACE") licensing program (the "ACE Program") as set forth in the NFRC 708 Calculation Entity Approval Program (the "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 Programs, 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, Air Leakage, 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, which 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 Certification Authorization Report (CAR), 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.

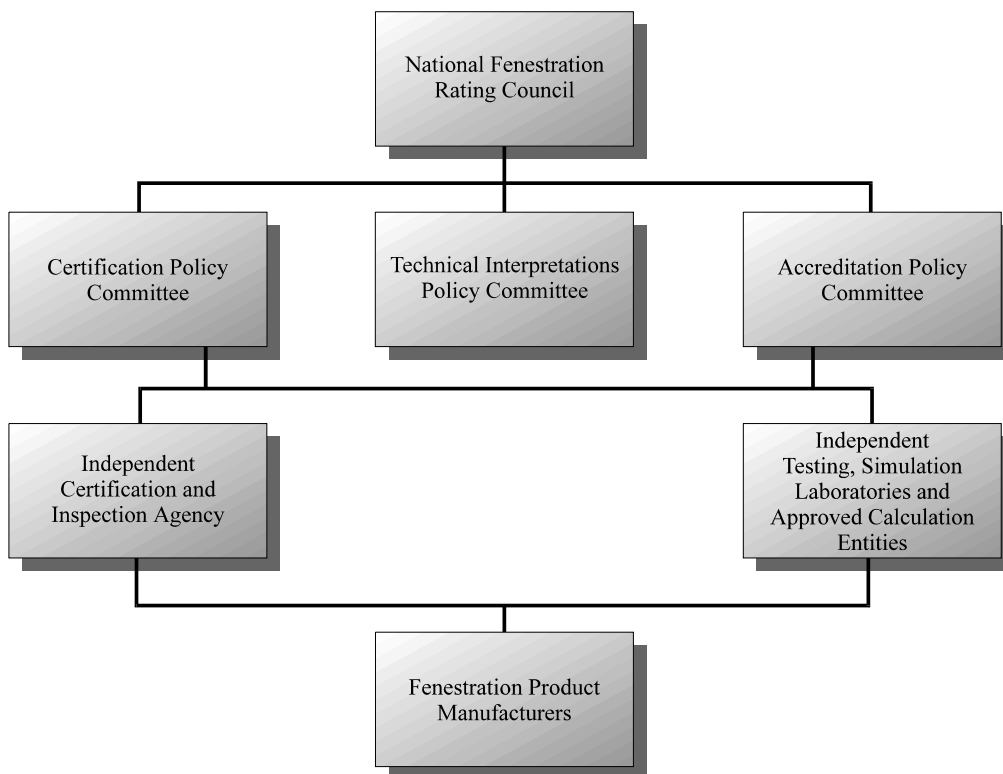
Ratings for products that are labeled with the NFRC Temporary and Permanent Label, or products that are listed on an NFRC Label Certificate, in accordance with NFRC requirements, are considered to be NFRC-certified. NFRC maintains a Certified Products Directory (CPD), listing product lines and individual 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 Compliance and Monitoring Program (CAMP). NFRC continues to develop the Rating System and each of the programs.

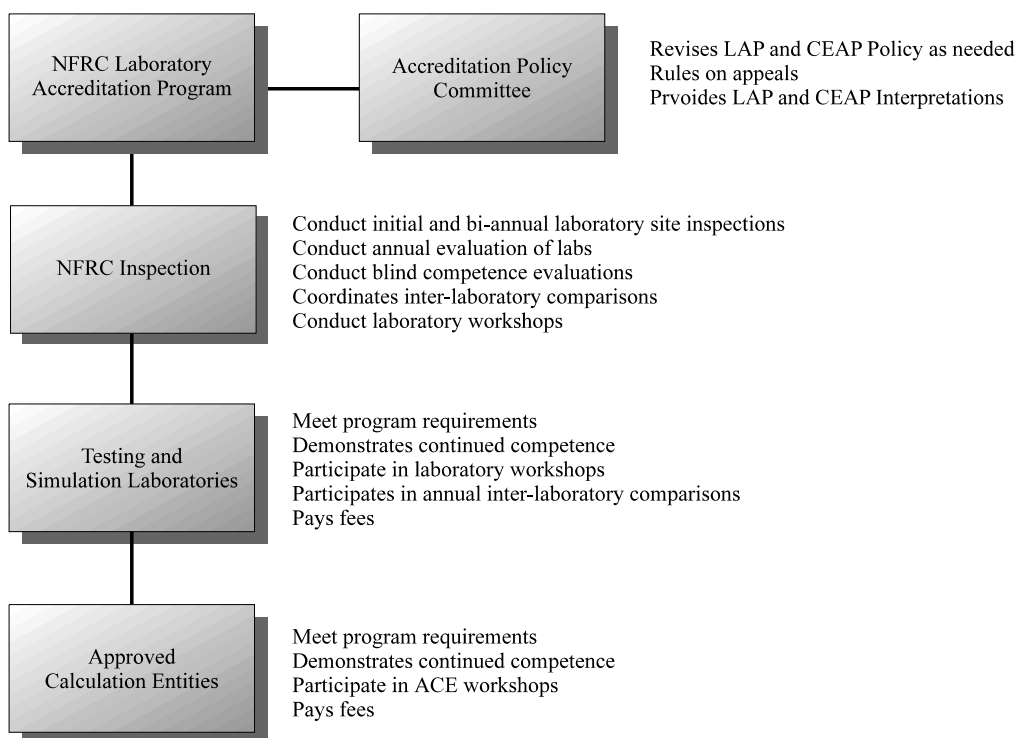
NFRC owns all rights in and to each of the NFRC 700, NFRC 701, NFRC 702, NFRC 705, NFRC 707, NFRC 708 and each procedure, which is a component of the Rating System, as well as each of its registration marks, trade names, and other intellectual property.

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.

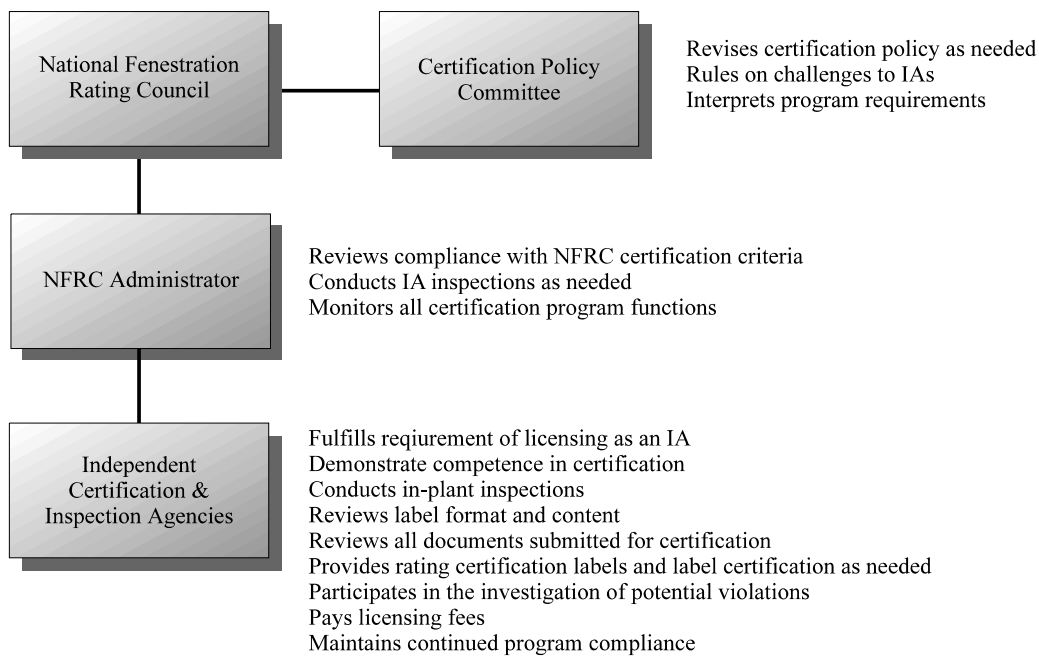
**Figure 1**



**Figure 2**



**Figure 3**



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

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### ***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.



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# **1. INITIAL REVIEW FOR SIMULATION LABORATORY ACCREDITATION**

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## **1.1 Scope**

A simulation laboratory seeking initial NFRC accreditation shall be evaluated by the NFRC Inspector in accordance with the following:

## **1.2 Application for Accreditation**

Those seeking NFRC accreditation to provide computer simulation services as described in NFRC 100: Procedure for Determining Fenestration Product Thermal Properties (Currently Limited to U-factors), NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence, and NFRC 500: Procedure for Determining Fenestration Product Condensation Resistance Rating and shall complete the Simulation Application NFRC 701.01.

## **1.3 Accreditation Evaluation**

Upon receipt by NFRC of an initial application and required application fees from a laboratory desiring accreditation to NFRC 100, NFRC 200, and NFRC 500 and any other of the Rating Procedures for which a simulation laboratory wishes to issue test reports for use in connection with the Certification Program a laboratory accreditation competence evaluation and initial on-site visit shall be scheduled and conducted by the NFRC Inspector. An examination and verification of compliance with, or the ability to meet, the following requirements:

### **1.3.1 General Requirements**

- A. All NFRC Accredited Laboratories shall be licensed by NFRC
- B. All NFRC Accredited Simulation Laboratories shall meet the independence requirements in Section 3.1 of the NFRC 701.
- C. All NFRC Accredited Simulation Laboratories shall meet the competency requirements in Section 3.2 of the NFRC 701.
- D. The person(s) designated in the application as the proposed simulator(s)-in-charge shall meet the requirements in Section 3.2 and Section 4 of the NFRC 701.
- E. All NFRC-licensed Simulation Laboratories shall be required to demonstrate their competence in understanding the NFRC-approved thermal performance procedures for which they

provide ratings, as they may be amended or interpreted or otherwise modified from time to time. This also applies to new thermal performance procedures as they become approved by NFRC (See Section 3, Section 4, Section 5 and Section 6 of NFRC 701)

- F. Simulation equipment adequacy (Section 1.5)
- G. Laboratory quality control system (Section 1.6)
- H. Laboratory record keeping system (Section 1.6)
- I. Ability to produce reports consistent with the appropriate LAP language, NFRC document, and / or supplemental documents
- J. On-Site Inspection
  - i. On-Site inspection of NFRC simulation laboratories is a component of the NFRC Laboratory Accreditation Program and is mandatory for the initial assessment. The activities associated with the inspections are intended to assist the simulation laboratory in making the necessary inspection preparations are listed in Section 1.3.2, Section 1.3.3 and Section 1.3.4.

### **1.3.2 Pre-Inspection**

NFRC will contact you to:

- A. Arrange appropriate dates and times for the pre-accreditation inspection
- B. Identify the inspector(s)
- C. Identify the specific simulations to be performed per Section 1.4
- D. Provide specific information that will be evaluated in the form of a simulation laboratory checklist

NFRC may require access to the following types of information:

- A. Simulation equipment and software
- B. Organization of Laboratory Operation
- C. Personnel
- D. Simulation records

- E. Quality Control Manual
- F. Simulation Operations Manual
- G. Laboratory Independence

### **1.3.3 Inspection**

On the day of the inspection, several activities are scheduled.

Entrance Briefing – The inspection team will hold a brief preliminary meeting with the senior staff covering:

- A. NFRC Laboratory Accreditation Program Requirements
- B. Objectives of the on-site inspection;
- C. The accredited services to be demonstrated
- D. Agenda of the inspection

Facilities and Equipment – A Simulation Laboratory staff representative will be asked to conduct the inspection team on a brief tour of the facilities identifying all equipment and record keeping associated with NFRC-accredited services.

Personnel – Employees involved in NFRC-accredited services must be identified and available for interviews with the NFRC Inspector. At least one Individual (Simulator)-in-Responsible-Charge, who is considered appropriate laboratory staff, shall be present and available at the time of the inspection and.

Inspection – The following points will be assessed in the inspection:

- A. Independence of the laboratory
- B. Competence of personnel
- C. Adequacy of facilities and equipment
- D. Adequacy of operating and quality control procedures
- E. Adequacy of records and record keeping
- F. Ability to perform the accredited services

Inspectors may offer advice and make suggestions on the operations. All mandatory actions will be presented as such at the exit briefing.

NFRC Inspectors will discuss any administrative, managerial and/or financial matters with appropriate laboratory management.

In Camera Meeting – The inspection team will meet together to consolidate their findings for presentation to the appropriate laboratory staff.

Exit Briefing – The findings of the inspection team will be presented to the appropriate laboratory staff. The following points will be covered:

- A. NFRC Inspector will provide all mandatory action items before accreditation or re-accreditation in writing.
  - i. Mandatory (required) action items may be added or removed by the Accreditation Policy Committee (APC) during their review of the draft assessment report.
- B. Recommended action items
- C. Suggestions for improvement of laboratory operations

#### **1.3.4 Post-Inspection**

Reference Section 5.5.2 of NFRC 701 – All Laboratories (Initial Review) Inspection Report

- A. Compliance within the criteria of the LAP and all mandatory action items may result in a recommendation by the NFRC Inspector that the laboratory be accredited or reaccredited. Refer to Section 5.6 of NFRC 701 for granting accreditation and Section 5.7 of NFRC 701 for Denial of Accreditation.

### **1.4 Technical Evaluation**

Technical evaluation of NFRC simulation laboratories is a component of the NFRC Laboratory Accreditation Program. The following activities associated with this evaluation are intended to assist the simulation laboratory in submitting the necessary information to NFRC.

- A. Arrange to have the simulation laboratory submit the appropriate data files, drawings, reports, and other information necessary to perform the technical evaluation
- B. Identify a minimum of three specific simulation files to be submitted

## **1.5 Simulation Laboratory Equipment and Operations Manual Requirements**

### **1.5.1 Minimum Equipment Requirements**

Each NFRC-accredited simulation laboratory shall maintain such computer equipment as is necessary to provide consistent computer simulations by use of NFRC-approved computer software tools

### **1.5.2 Simulation Equipment and Operations Manual**

Each simulation laboratory shall have a simulation operations manual which shall provide information for operating the equipment and performing simulations in an accurate and consistent manner. The manual may be electronic or hard-copy, or a combination of both. Accessibility and organization of the manual shall be demonstrated upon laboratory inspection.

The manual shall include, but not be limited to, the following:

- A. All NFRC simulation laboratory training course materials
- B. NFRC-published computer simulation guidelines and procedures
- C. Currently approved computer software program manuals and other applicable NFRC software manuals\
- D. Procedures for conducting computer simulations under the NFRC Certification Program
- E. Procedures for determining completion of the simulation
- F. Procedures for determining when re-simulation is necessary
- G. Simulation specimen information requirements
- H. Procedures employed as internal laboratory audits to ensure simulation accuracy
- I. A copy (electronic or hard copy) of all applicable NFRC approved Technical and Program Procedure and documents including simulation manuals and all related interpretations by use of which ratings are determined

### **1.5.3 Adequacy**

The adequacy of a simulation laboratory's simulation operations manual shall be determined in connection the annual review (see Section 6.2 of NFRC 701)

## **1.6 Simulation Laboratory Quality Control program and Quality Manual Requirements**

Each accredited laboratory shall have and maintain an internal quality control program, which meets the criteria of this section. The program shall be set forth in either a stand-alone manual or the simulation operations manual. The manual may be electronic or hard-copy, or a combination of both.

Accessibility and organization of the manual shall be demonstrated upon laboratory inspection. The manual shall contain at a minimum the following:

- A. The manual shall include, but not be limited to, the following:
- B. Copies of all current NFRC test methods, procedures, technical and LAP interpretations, user manuals, and instructions
- C. Methodology for ensuring accuracy, precision and consistency of such test methods and procedures
- D. Methods for ensuring personnel competence
- E. Procedures for correcting quality deficiencies.

[*Note:* Any of the aforementioned items that have been documented in the operations manual need not be duplicated in the Quality Control Manual.]

The manual shall be made available to the NFRC Inspector at any time and shall be available to laboratory staff at all times.

### **1.6.1 Adequacy**

The adequacy of the quality control program and quality control manual shall be determined in connection with the annual review (see Section 6.2 of NFRC 701)

## **1.7 Simulation Laboratory Record Keeping Requirements**

### **1.7.1 Maintaining of Records**

Each accredited laboratory shall maintain a system of record keeping that will allow for verification and/or reconstruction by NFRC of any test or simulation report.

- A. The record keeping system shall provide retention of original specimen data, observations and notes, calculations and derived results and other pertinent data. Simulation laboratory equipment shall employ such data storage and retrieval systems as are necessary to permit review and reconstruction of all simulations.
  - i. Each laboratory shall keep all simulation records and reports confidential and in locked or sealed files in a

secure location with its access limited to specified employees

- ii. Each accredited laboratory shall make its records and files available for review by NFRC at any time during customary business hours
- iii. Records, including final reports and relevant data, shall be retained for a period of at least four years from date of issuance

### **1.7.2 Adequacy**

The adequacy of a simulation laboratory's record keeping shall be determined in connection the annual review (see Section 6.2 of NFRC 701)