



Guidelines for the NFRC Product Certification Program For Site-Built Fenestration Systems

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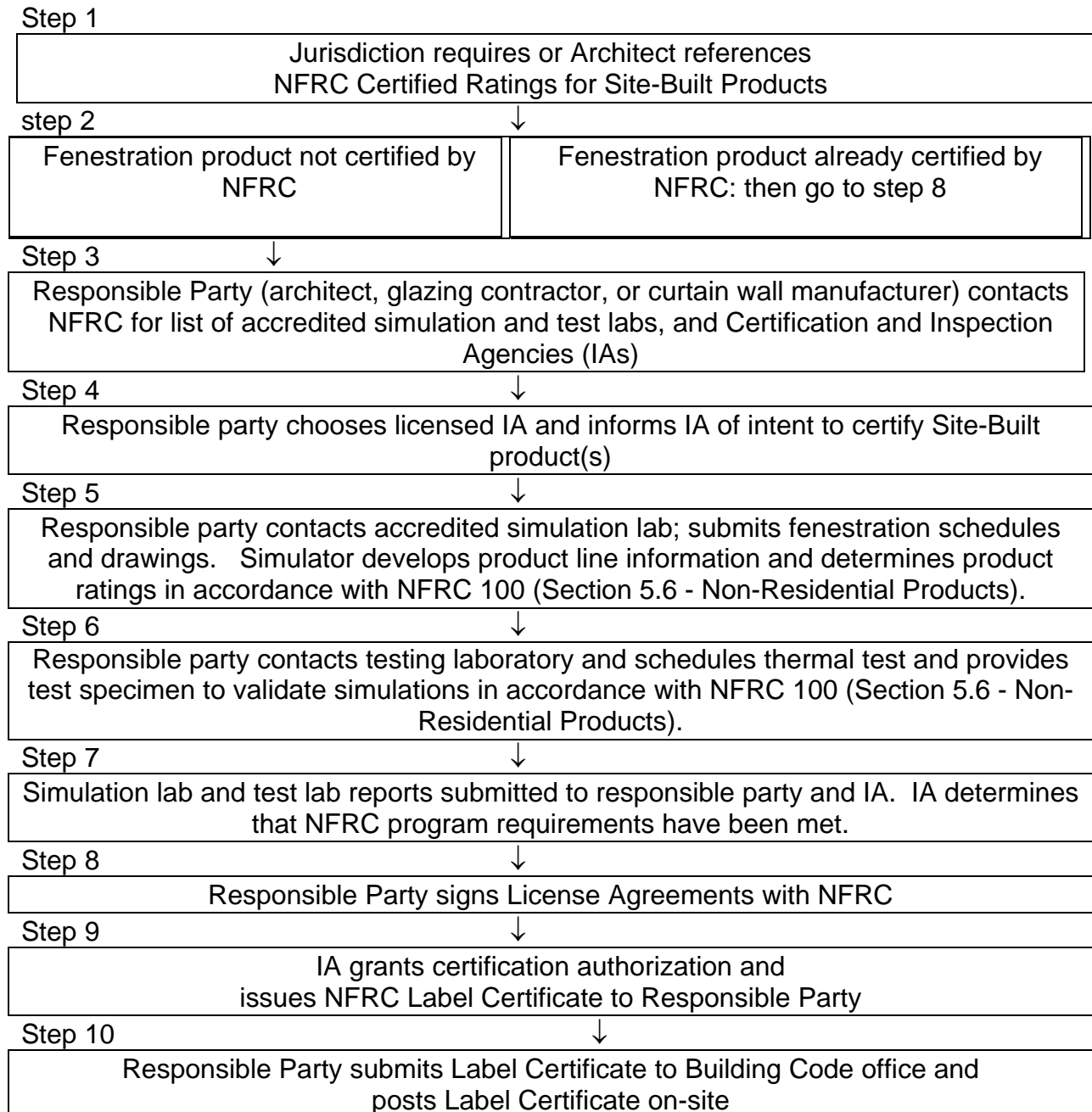
**In cooperation with
The California Energy Commission**

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Flowchart
NFRC Certification and Rating Program for Site-Built Fenestration
Products
NFRC 100 (Section 5.6 - Non-Residential Products)



Section 1

Introduction

Scope of Program

Any curtain wall manufacturer, lineal supplier, glazing contractor, architect or other party may choose to be the “Responsible Party” licensee. The Responsible Party specifies, assembles, fabricates or installs site-built fenestration products. The Responsible Party arranges to have the product physically tested by an NFRC-accredited testing laboratory and simulated by an NFRC-accredited simulation laboratory. The simulation and testing sequence is performed at the Responsible Party’s discretion.

The IA then compares the physical test results with the computer simulation results for the same product line or system. If the IA determines that the simulated and tested values are within the tolerances required by the *NFRC 100*, and that all requirements for product certification have been met, the IA authorizes NFRC product certification and issues an NFRC Label Certificate to the Responsible Party in accordance with the Product Certification Program (PCP). Products reflected on the Site-Built Label Certificate are NFRC-certified. These products may be listed in the on-line Certified Products Directory (CPD) on the NFRC website at the discretion of the Responsible Party.

A. Role of NFRC

1. NFRC establishes, and periodically reviews, Certification Program requirements, including rating and certification criteria and a procedures for challenges and appeals;
2. NFRC manages the Certification Program in accordance with the *PCP, LAP, CAP, NFRC 100 (Section 5.6 - Non-Residential Products)* and other NFRC rating procedures;
3. NFRC licenses IA’s to provide NFRC product certification services;
4. NFRC accredits simulation and testing laboratories to provide NFRC rating services;
5. NFRC maintains a system under which Label Certificates are issued to Responsible Parties to be posted on-site and files with the proper authorities;
6. Maintains an online listing of products and their energy performance ratings authorized for certification; this listing is the Certified Products Directory (CPD).
7. NFRC conducts educational workshops for IA’s, laboratories and others to ensure continuing competence and uniform application of the Certification Program;
8. NFRC hears challenges, reviews policy and acts on appeals pertaining to the Certification Program, the IA Program, and the Accreditation Program.

B. Role of Responsible Party

1. Arranges with one or more NFRC-licensed IA's to obtain NFRC certification for one or more product lines;
2. Arranges with one or more NFRC-accredited simulation laboratories for the conduct of simulations and development of the matrix required for rating the manufacturer's product lines;
3. Arranges with one or more NFRC-accredited testing laboratories for the conduct of thermal tests required for rating the Responsible Party's products;
4. Authorizes testing and simulation laboratories to provide an IA with copies of simulation and testing results and necessary support data for the purpose of determining compliance with Certification Program requirements;
5. Maintains a quality control program to assure consistent quality as it relates to energy performance characteristics of rated products;
6. Cooperates with inspections of facilities to determine continued compliance with the Certification Program requirements;
7. Enters into a license agreement with NFRC, authorizing the Responsible Party to use an NFRC certification mark on certified products and in advertising;
8. Utilizes Label Certificates to indicate certification.

Please note that a Responsible Party may participate in the NFRC Certification Program with more than one IA and participate in other product certification programs not related to energy performance referencing NFRC procedures. Additional requirements may be established by NFRC as necessary to assure continued program credibility.

C. Role of IA

- 1 Establishes written procedures and policies consistent with the requirements of the Certification Program for licensee's participation in the NFRC Certification Program;
- 2 Implements the NFRC requirements and procedures regarding product rating and certification;
- 3 Conducts in-plant inspections of licensee's facilities to determine continued compliance with Certification Program requirements;
- 4 Reviews product matrix, simulation and test reports to determine whether all data is complete and in compliance with Certification Program requirements;

- 5 Authorizes certification of a licensee's products that are deemed certifiable and issues Label Certificates to be posted at the building site and filed with the appropriate authorities;
- 6 Participates in the investigation of potential violations (prohibited activities) as set forth in the NFRC Compliance and Monitoring Program.

Please note that additional information regarding the role of the IA in the NFRC Certification Program may be found in the NFRC CAP. In the event that there are no NFRC-licensed IA's available to perform the services to be provided by an IA, any such service may be provided by NFRC or NFRC's subcontractor. In the event there is no NFRC-licensed IA's, the word "IA," as used herein, shall mean NFRC or NFRC's subcontractor.

D. Role of Laboratory

Manufacturers participating in the NFRC's Certification Program shall use testing and simulation laboratories that are accredited under NFRC's Laboratory Accreditation Program. For information on the Laboratory Accreditation Program, see the NFRC *LAP*.

E. Property Rights

NFRC owns all rights to the Certification Program, the Accreditation Program, the IA Program, *NFRC 100, NFRC 101, NFRC 102, NFRC 200, NFRC 201, NFRC 300, NFRC 301, NFRC 400 and NFRC 500.*

F. Compliance and Monitoring Program

NFRC has adopted and enforces a Compliance and Monitoring Program. Through this program NFRC may impose fines and require corrective action by Certification Program participants and other persons who fail to comply with the requirements of the Certification Program License Agreement or certain legal requirements. Each NFRC licensee shall comply with the provisions of the Compliance and Monitoring Program.

F. Required Testing and Simulation Tools

Under the Certification Program, fenestration products may be authorized for certification only if they have been rated in accordance with NFRC-approved procedures, computer programs and test methods.

1. Fenestration thermal performance procedures for rating and testing methods are set forth in the *NFRC 100: Procedure for Determining Fenestration Product U-factors*, and the *NFRC 102: Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems*, as may be amended or interpreted or otherwise modified from time to time.
2. Fenestration performance *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence (NFRC 200)*, as may be amended or interpreted or otherwise modified from time to time.
3. All NFRC-accredited testing laboratories are required to follow *NFRC Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems* and in general accordance with *ASTM C 1199: Standard Test Method for Measuring the Steady State Thermal Transmittance of Fenestration Systems using Hot Box Methods* (or its successor provision).
4. All NFRC-accredited simulation laboratories are required to use the following NFRC-approved computer software for the simulation of the energy performance of fenestration products, adopted by the NFRC Board of Directors or its successor provision upon approval by the NFRC Board of Directors:

WINDOW 5.2

WINDOW 5.2 is a Microsoft Windows™-based computer program developed at Lawrence Berkeley National Laboratory (LBNL) for calculating total window thermal performance indices (i.e. U-values, solar heat gain coefficients, shading coefficients, and visible transmittances). WINDOW 5.2 provides a heat transfer analysis method consistent with the rating procedure developed by NFRC that is consistent with the ISO 15099 standard.

THERM 5.2

THERM 5.2 is a Microsoft Windows™-based computer program developed at LBNL for modeling two-dimensional heat-transfer effects in building components such as windows, walls, foundations, roofs, and doors; appliances; and other products where thermal bridges are of concern. THERM's heat-transfer analysis allows for the evaluation of a product's energy efficiency and local temperature patterns, which may relate directly to problems with condensation, moisture damage, and structural integrity.

Optics 5.1.02

A Windows-based program developed by LBNL for analyzing optical properties of a glazing system. Note: this software is approved for creating a laminant and/or film layer in the NFRC rating system.

Section 2 Product Certification Authorization

A. Responsible Party Participation Requirements

A Responsible Party seeking to participate in the NFRC Certification Program may do so only upon applying for and obtaining product certification authorization from an NFRC-licensed IA and thereafter entering into a license agreement with NFRC. Product certification authorization may be obtained for the energy performance ratings comprising the Rating System.

B. Product Certification Authorization Procedures

An applicant wishing to be the responsible party for product certification (i.e., fenestration manufacturer, lineal supplier company, glazing contractor, architect, etc.) shall obtain, from an NFRC-accredited laboratory, a fenestration product U-factor, Solar Heat Gain Coefficient, and Visible Transmittance rating, for each product to be authorized for certification. Such ratings shall be obtained by complying with either the Product Line Validated Computational Procedure or Testing Alternative Procedure in accordance with *NFRC 100 and NFRC 200*. An applicant that rates products in accordance with the Product Line Validated Computational Procedure shall meet the requirements and follow the procedures set forth in Section B1 (see below). An applicant rating products in accordance with the Testing Alternative shall follow the procedures in Section B3.

Note: The Testing Alternative shall not be used to obtain a rating to grant product certification authorization if the U-factor and/or Solar Heat Gain Coefficient/Visible Transmittance rating for the product to be certified can be simulated in accordance with *NFRC 100 and NFRC 200*.

1. Product Line Validated Computational Procedure

An applicant shall, for each product to be authorized for certification utilizing the Product Line Validated Computational Procedure, obtain an NFRC simulation report in accordance with the following requirements:

- A. For each product to be rated the applicant shall deliver copies of product drawings representative of and describing each of the products to an NFRC-accredited simulation laboratory.

- B. For certified product ratings on a specified building project, the applicant shall submit the fenestration schedule, construction details and elevation drawings (including framing system and glazing system descriptions) for that project to an accredited simulation laboratory.
- C. The schedule and drawings shall include or be accompanied by specification sheets and any supplemental drawings or specifications that accurately portray product construction and operation. Products to be rated shall meet the definitional and other requirements set forth in *NFRC 100*.
- D. The applicant shall request the simulation laboratory to conduct computer simulations on each such product in accordance with *NFRC 100 and NFRC 200*, and to develop a matrix and issue both the matrix and a copy of each simulation report to the applicant.
- E. The applicant shall direct the simulation laboratory to deliver the matrix and one copy of each simulation report, together with copies of complete support data to the NFRC-licensed IA selected by the applicant.
- F. An applicant shall, for each product line or system to be authorized for certification, obtain physical test reports from an NFRC-accredited test laboratory. The testing laboratory shall physically test the representative products in accordance with *NFRC 100* and issue one copy of the test report to the applicant. The laboratory may perform destructive evaluation after each test to ensure that the product complies with the product's bill of materials.
- G. The applicant shall direct the testing laboratory to deliver one copy of each test report, together with copies of complete support data to the NFRC-licensed IA selected by the applicant.

2. Validating Simulations

The applicant shall select an NFRC-licensed IA and shall direct the IA to review the test results and review the simulation results obtained in B1 to determine whether the products rated meet the equivalence and certification authorization requirements as set forth in the *NFRC 100* (see below).

- A. Simulated and tested U-factors for a given total fenestration product shall be considered equivalent if the agreement between the two numbers is within the following range:

Simulated U-factor	Accepted Difference between Tested and Simulated U-factor
2.27 W/m ² -°C (0.4 BTU/hr-ft ² -°F) or less	2.27 W/m ² -°C (0.4 BTU/hr-ft ² -°F) or less
Greater than 2.27 W/m ² -°C (0.4 BTU/hr-ft ² -°F)	10% of Simulated U-factor

- B. The products submitted for physical testing shall conform to the product drawings, catalogue information, bills of materials or other product information submitted in connection with computer simulation ratings.

3. Testing Alternative

An applicant shall, for each product line to be authorized for certification utilizing the Testing Alternative, obtain physical test reports from an NFRC-accredited test laboratory. The testing laboratory shall physically test the representative products in accordance with *NFRC 100* and issue one copy of the testing report to the applicant. The laboratory may perform destructive evaluation after each test to ensure that the product complies with the product's bill of materials. The applicant shall direct the testing laboratory to deliver one copy of each test report, together with copies of complete support data to an NFRC-licensed IA selected by the manufacturer. The physical test results for the product set forth in each test report issued pursuant to this section shall meet the requirements for Testing Alternative set forth in the *NFRC 100*.

Note: A product shall not be rated utilizing this alternative if it can be simulated in accordance with *NFRC 100*, Section 5.4 (or its successor provision).

4. Non-validation Actions

If the thermal test does not validate the simulation the following procedure shall be followed:

- A. The IA shall notify the simulation laboratory, the manufacturer, fabricator or lineal supplier and the testing laboratory of the non-validation. These parties shall attempt to establish reasons of the non-validation. These parties shall have ten (10) calendar days to identify the reason(s) for the non-validation.
- B. If errors in workmanship or product materials are identified, one re-test is allowed at the expense of the applicant.
- C. If no resolution is reached within the ten (10) calendar day period, the IA shall notify NFRC staff within one (1) business day for assistance.

5. Re-certification of U-factor

Product certification authorization is maintained for four (4) years from the date of the physical test date. To maintain certification authorization for a site-built product, the product would be required to be re-certified prior to the certification expiration date pursuant to the NFRC PCP (Section 5.6).

6. Inspection

In connection with an initial product certification authorization a designated IA shall conduct an inspection of the Responsible Party facility, to ensure compliance with the requirements of the certification program. The initial inspection in connection with the initial product certification authorization may be conducted after certification of the responsible party's first product, at the discretion of the IA, but shall be completed no later than one year after the issuance date of the Label Certificate. For more information about Site-Built inspections, see Section 8.7.1.7 of the PCP.

7. Responsible Party Rights

NFRC certification, simulation, and test reports shall be considered confidential.

Section 3 NFRC Licensing

A. Procedure for Licensing

1. Prior to certification authorization, NFRC shall deliver to the responsible party a license agreement, with schedules for identifying the products to be authorized for certification. The responsible party shall return a signed copy of the license agreement to NFRC. The license agreement remains valid until terminated by either the responsible party or the NFRC.
2. When the IA determines that all of the requirements for product certification authorization have been met, the IA shall notify the responsible party in writing (i.e., issuance of a Certification Authorization Report (CAR)), with a copy to NFRC, listing the products for which product certification authorization has been granted.
3. Upon execution of the NFRC license agreement and the issuance of the CAR, a responsible party shall be licensed and authorized to utilize the NFRC certification mark, by means of the NFRC Label Certificate and to advertise NFRC certification of such products.
4. A responsible party shall also be entitled to have certified products listed in the *NFRC*

Certified Products Directory (CPD).

B. Denial of Product Certification Authorization or Licensing

An NFRC IA may deny NFRC product certification authorization or NFRC licensing if all of the requirements of this program have not been met. A responsible party may appeal a denial pursuant to the NFRC appeals procedures set forth in the NFRC PCP (Section 9.3).

Section 4

Certification and Labeling of Site-Built Products

The following is to provide guidance to site-built product manufacturers and others regarding testing and certification authorization for such products. This guidance is provided subject to NFRC adoption of program provisions that establish procedures for such testing and certification authorization.

1. The NFRC Product Certification Program provides for the licensing of manufacturers or responsible parties to participate in the NFRC Program and to certify fenestration products as meeting NFRC requirements. Product certification authorization is available only for products of a licensed manufacturer or fabricator or responsible party.
2. A Lineal Supplier may contract for simulations and tests on product lines for NFRC rating on behalf of one or more contractors or other responsible parties.
3. If a Lineal Supplier obtains NFRC simulation and test reports on behalf of a contractor or other responsible party, the Lineal Supplier shall authorize the simulation and test laboratory to reissue the reports in the name of the responsible party provided that the report clearly indicates the date and report number of the original simulation and test. Reissued reports shall employ a numbering system to allow for tracking the reported information to the drawings, materials lists, and other information used in conducting the original simulations and tests. If a simulation or test report is issued to a Lineal Supplier, e.g., and identified as Report 1000, all reissues of these reports shall be identified as 1000-01, 1000-AA, or similar suffix identifiers.
4. When submitting simulation or test reports to an IA in connection with a manufacturer's product certification authorization, a laboratory must indicate to the IA that the reissued report is based on the same drawings, materials lists, and other information utilized under any previously submitted report.
 - a Site-built products may have a label certificate based on test and simulations of assembled sample products if the manufacturer maintains control and responsibility of all components including glazing materials

used in the site assembly of the product.

- b. Other site-built products shall have a certificate based on test and simulations of assembled sample products if the manufacturer or responsible party for the ratings assumes responsibility for all components, including glazing materials, used in the site assembly of the component system. This option may be used by any entity participating as a fenestration manufacturer including, but not limited to, a lineal supplier, a fabricator, or a glazing contractor.
5. Each site-built individual product meeting the requirements of *NFRC 100 (Section 5.6 - Non-Residential Products)* shall have an NFRC Label Certificate, which shall act in the capacity of an NFRC label.
 6. The Label Certificate shall identify the system option, including glazing type, and operator type employed in the construction of the project. Each individual product shall have its own unique Label Certificate.
 7. The Label Certificate shall, by itself, permit compliance with the permanent label and temporary label requirements as long as this Label Certificate is part of a permanent record of the project specifications and will be readily accessible during the construction phase of the job and upon completion of the job.

Section 5

Licensee Responsibilities

A. Product Consistency, Modification, and Labeling

1. Each NFRC responsible party shall assure that products (or projects) it markets as NFRC-certified are described in product literature using product descriptions that are consistent with those submitted to the NFRC-accredited simulation laboratory for computer simulation.
2. A product shall not be NFRC certified unless it has been issued an NFRC Label Certificate.
3. An NFRC responsible party shall assure that only products for which it has obtained NFRC product certification authorization shall be issued an NFRC Label Certificate.
4. An NFRC responsible party shall be responsible for the proper posting and filing of NFRC Label Certificates.
5. An NFRC responsible party shall maintain an in-plant quality control program

- acceptable to the IA to assure consistent quality as it relates to energy performance characteristics of rated products.
6. An NFRC responsible party shall retain all quality control records for a minimum of four years.
 7. An NFRC responsible party shall employ properly trained and experienced personnel to supervise production to assure the products meet the thermal performance ratings for which certification authorization has been granted, including at least one qualified person responsible for the immediate direction and maintenance of the licensee's quality control system. All quality control personnel shall be qualified by experience and training and shall be known to have the integrity to conduct the required minimum tests and inspections and to keep proper records.

B. Requirements for NFRC Label Certificates

1. General Requirements

- a. A licensee shall only affix labels or post Label Certificates for products that have been granted product certification authorization.
- b. Labels or Label Certificates may not be printed or issued, or authorized to be printed, until a certification authorization has been granted for the product line by the Responsible Party's IA.
- c. Only ratings for which certification authorization has been granted may appear on the Label Certificate.
- d. The Label Certificate shall enable tracing of the product to the *Certified Products Directory*.
- e. Label Certificates shall not be printed or posted for products whose certification authorization is suspended or revoked.
- f. If an appeal of a Notice of Suspension is not requested or if a Notice of Revocation is issued, the Label Certificate for that product shall be destroyed by the IA not later than ninety (90) days after the date of the Notice of Suspension or Notice of Revocation.

2. Label Certificates shall:

- a. Be a stand-alone document of the size, format and content shown in Appendix C. of the *PCP*, unless otherwise specified. The Label Certificate shall include ratings for U-factor, Solar Heat Gain Coefficient and Visible Light Transmittance (effective January 1, 2004).

- b. Be available on the job site no later than the installation of the first complete fenestration product and be available for building code inspection.
- c. Be placed in a conspicuous location on the job site that shall ensure accessibility, legibility and visibility.
- d. Be specific to each Individual Product that has received an NFRC certification authorization report and is being installed on the job site, with the certificate complying with the requirements of the *PCP*.

Section 6

Size, Layout and Design Requirements For NFRC Label Certificates

A. Size

1. Label Certificate width shall be 8-1/2 inches (or A4 size) within ½ inch.
2. Label Certificate height shall be 11 inches (or A4 size) within ½ inch.

B. Format

1. Label Certificate shall conform to the content and layout in Figure C.1. of the *PCP*.
2. Label Certificate shall contain in the upper right hand corner the NFRC Temporary Label from Appendix B of the *PCP*. The NFRC Temporary Label portion of the Label Certificate shall be of the size specified in Appendix B, and shall contain all the information required in Appendix B and be subject to the limitations in Appendix B.
3. Label Certificates shall contain all the NFRC Permanent Label information required in Appendix C of the *PCP* and be subject to the limitations in Appendix C.
4. Label Certificates shall contain the following project information:
 - a. Street address
 - b. City, state, zip code
 - c. Project name (optional)
 - d. Designer (optional)
5. Label Certificates shall contain the following product line information:
 - a. Operator type
 - b. Product line identification number
 - c. Individual product identification number
 - d. Number of individual products in the project (building)
 - e. Location of the individual products in the project (building)
 - f. Elevation page location in the architectural drawings
 - g. Fenestration (window and door) schedule page in the architectural drawings
6. Label Certificate shall contain the following information for the frame material supplier,

- the glazing material supplier and the glazing contractor/installer:
- a. Company name
 - b. Street address
 - c. City, state, zip code
 - d. Name of contact person with phone and facsimile number
7. Label Certificate shall be signed by and contain the name of the Independent Certification and Inspection Agency (IA) and the date that the Certification Authorization is issued.