



National Fenestration Rating Council Incorporated

Certification and Inspection Agency (IA) Operations Manual

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Published: July 2006
First Edition

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1. Introduction

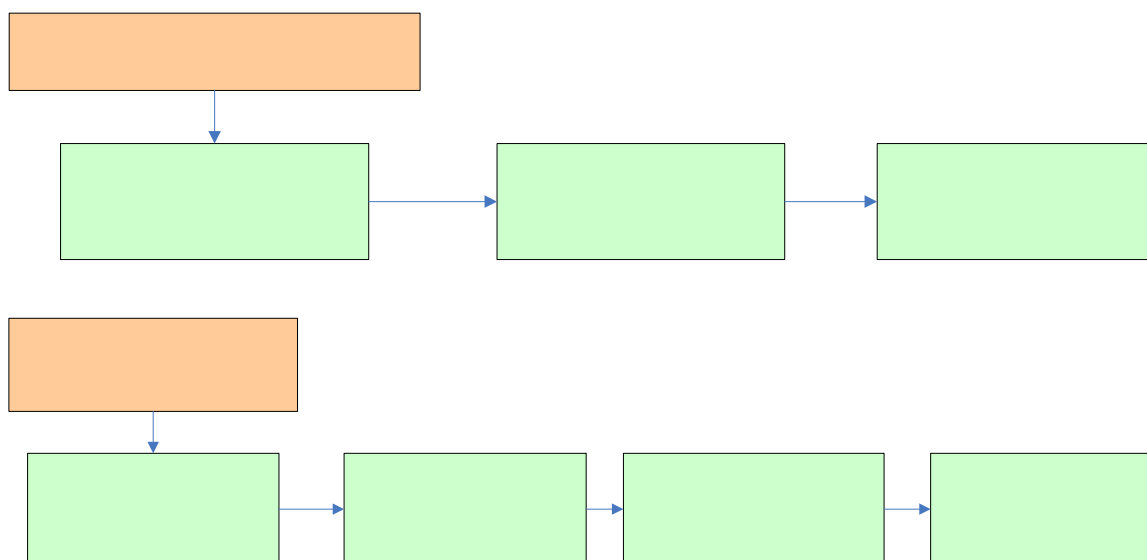
The Certification and Inspection Agency (IA) Operations Manual sets forth operational guidelines for NFRC-licensed IAs involved in the NFRC Product Certification Program (“PCP” or “Certification Program”) and Certification Agency Program (“CAP” or “IA Program”). This manual, in tangent with the IA Database User Manual, is to be used as a reference tool and guide to all IAs licensed by the NFRC when reviewing simulation and test reports, accepting report data into the Certified Product Database, generating certification authorization reports, and conducting plant inspections.

If this manual is in conflict with any NFRC standards or program documents then the standards and the program documents take precedence.

1.A. Overview of CAP Program

Under the Certification Program, responsible parties (manufacturers, fabricators, lineal suppliers, site-built licensees) obtain energy performance ratings for fenestration and attachment products within a product line from NFRC-accredited simulation and testing laboratories. Upon signing the license agreement with NFRC, the responsible party obtains a certification authorization report (CAR) for these ratings and authorization to label products from NFRC-licensed independent certification and inspection agencies (IAs). A responsible party may select to work with any NFRC-licensed IA and may work with more than one IA.

IAs are licensed by the NFRC and operate in accordance with NFRC requirements set forth in the *NFRC CAP*.



1.B. General Responsibilities of Licensed IA

An NFRC-licensed IA is responsible for

1. reviewing simulation laboratory and test laboratory reports prepared by NFRC-accredited laboratories, which includes but not limited to reviewing NFRC-approved computer software files, verification of baseline product validation, and meeting requirements as documented in the NFRC Laboratory Accreditation Program (LAP) reporting requirements;
2. carrying out periodic in-plant inspections as required by the CAP for quality assurance purposes, reviewing and approving label format and content, and taking any required action related to non-compliance;
3. issuing a Certification Authorization Report (“CAR”) from the NFRC Certified Products Database;
4. entering accurate and most current client certification data in the Certified Products Database;
5. coordinating client participation in the Certification Program; and
6. participating in the investigation of potential violations (prohibited activities) as set forth in the *NFRC Compliance and Monitoring Program*;

2. NFRC Documents

2.A. NFRC Program Documents

All current NFRC program documents are maintained on the NFRC website at <http://www.nfrc.org/resources.aspx>

1. **Certification Agency Program (CAP)** – The NFRC program for the licensing of an Independent Certification and Inspection Agency (IA). The CAP procedures manual, as amended, updated or interpreted from time to time by the NFRC Board of Directors, is the governing document of this program.
2. **Product Certification Program (PCP)** – The NFRC program for granting of authorization to fenestration responsible parties to label products under the NFRC energy rating system. The PCP procedures manual, as amended, updated or interpreted from time to time by the NFRC Board of Directors, is the governing document of this program.
3. **Laboratory Accreditation Program (LAP)** – The NFRC program for accreditation of a testing or simulation laboratory. The LAP procedures manual, as amended, updated or interpreted from time to time by the NFRC Board of Directors, is the governing document of this program.
4. **Fee Schedule** - Fee Schedule includes NFRC fees for participating in the Product Certification Program (“PCP” or Certification Program”), the Certification Agency Program (“CAP” or IA Program) and the Laboratory Accreditation Program (“LAP” or Accreditation Program). Fees incurred by PCP participants for services provided by a Certification and Inspection Agencies (IA) and/or an Accredited Laboratory are separate and apart from the NFRC PCP fees listed in Section 2 of the fee schedule.
5. **Compliance and Monitoring Program** – An NFRC compliance program of fines applicable to certain activities that an individual may engage in that is prohibited by the program, which activities are prohibited by law or contract.

2.B. NFRC Technical Documents

All current NFRC technical documents and technical interpretations are located on the NFRC website at <http://www.nfrc.org/technicaldocs.aspx> .

1. ***NFRC 100***: NFRC 100: Procedure for Determining Fenestration Product U-factors, including all attachments thereto, as amended, supplemented or otherwise modified from time to time, which is a component of the Rating System.
2. ***NFRC 101***: NFRC 101: Procedure for Determining Thermo-Physical Properties of Materials for Use in NFRC-Approved

Software Programs, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.

3. **NFRC 102:** NFRC 102: Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.
4. **NFRC 200:** NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence, as amended, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.
5. **NFRC 201:** NFRC 201: Procedure for Interim Standard Test Method for Measuring the Solar Heat Gain Coefficient of Fenestration Systems Using Calorimetry Hot Box Methods, as amended, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.
6. **NFRC 300:** NFRC 300: Test Method for Determining Solar Optical Properties of Glazing Materials and Systems, as amended, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.
7. **NFRC 301:** NFRC 301: Standard Test Method for Emittance of Specular Surfaces Using Spectrometric Measurements, as amended, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.
8. **NFRC 302:** Verification Program for Optical Spectral Data, as amended, supplemented, or otherwise modified from time to time, which is a component of the Verification Program
9. **NFRC 400:** NFRC 400: Procedure for Determining Fenestration Product Air Leakage, as amended, supplemented or otherwise modified from time to time, which is a component of the Rating System, and is one of the Test Procedures.
10. **NFRC 500:** NFRC 500: Procedure for Determining Fenestration Product Condensation Resistance Values, as amended, supplemented, or otherwise modified from time to time, which is a component of the Rating System.
11. **THERM 5 / WINDOW 5 NFRC Simulation Manual**, as amended, supplemented, or otherwise modified from time to time, which is a component of the Simulation Manual.

2.C. Program Bulletins and Interpretations

1. Program Bulletins - The NFRC Program Bulletin provides general information on recent changes, revisions, or additions to the NFRC Certification Program that have been implemented and/or approved by NFRC Board of Directors. Current program bulletins are

located on the NFRC website at
<http://www.nfrc.org/communityonly/bulletins.aspx>

2. PCP Interpretations - PCP Interpretations may be rendered in cases where a product certification issue is not clearly defined in the NFRC PCP-Product Certification Program or the NFRC CAP-Certification Agency Program. Interpretations are later incorporated into the PCP or CAP as either an addendum or erratum. Current PCP interpretations are located on the NFRC website at <http://www.nfrc.org/participantonly/interpretations.aspx>
3. Technical Interpretations (TI) - interpretations may be rendered in cases where a technical issue is not clearly defined in any of the NFRC technical documents. Interpretations are later incorporated into the respective documents as an addendum or erratum. Current TI's are located on the NFRC website at <http://www.nfrc.org/technicaldocs.aspx>.
4. Laboratory Accreditation Program Interpretations - LAP Interpretations may be rendered in cases where an laboratory accreditation issue is not clearly defined in the *NFRC LAP-Laboratory Accreditation Program*. Interpretations are later incorporated into the LAP as an addendum or erratum.

2.D. NFRC License Agreement and Schedules

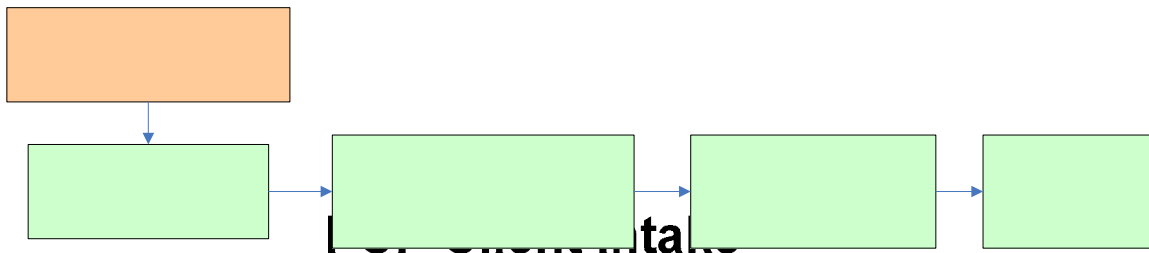
All participants in the NFRC Certification Program are required to sign an NFRC license agreement prior to certification authorization. A participant is to sign two (2) original copies and return those copies to the NFRC office. An executed license agreement will be sent back to the participant and one shall be documented in the participants file at the NFRC. The license agreement requires that the licensee/participant complete and include applicable schedules whose information shall fall under the agreement.

- **Schedule I** – a listing of the manufacturing facilities where certified products are to be labeled
- **Schedule II** – a listing of the products for which certification authorization has been granted
- **Schedule III** – a listing of fabricator facilities under a lineal supplier agreement where certified products are to be labeled
- **Schedule IV** – site-built project location(s) information.

Licensees are required to update these schedules as needed in the Certified Products Database, or by hard-copy if the database is not accessible sent to NFRC for updating into the database.

NFRC has participant license agreements specific to:

- a) Manufacturers (Schedule I and II)
- b) Fabricators (Schedule I and II)
- c) Lineal Suppliers (Schedule III)
- d) Site-Built Licensees (Schedule I, II, & IV)
- e) Door Manufacturer – Pre-hanger (Schedule I and II)
- f) Door Manufacturer – Lineal Supplier (Schedule III)
- g) Door Distributor – Dealer (Schedule I and II)
- h) **Applied Film Manufacturer (Schedule I and II)**



3. Program Participant Intake

3.A. Program Participant Initial Contact:

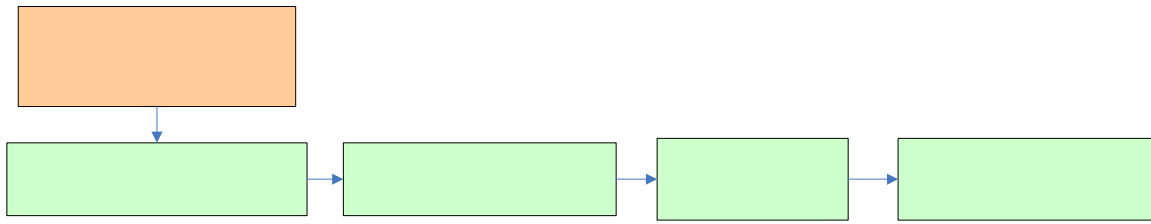
- o Manufacturers (fenestration mfrs., attachment mfrs., fabricators, lineal suppliers, site-built licensees, and the like) contact either an IA or NFRC to request information about the NFRC Product Certification Program (PCP).
 - Name of manufacturer
 - Address of manufacturer
 - Phone and fax number
 - Contact person's name and e-mail address
 - Category of manufacturer, if other than window manufacturer (e.g., door distributor, fabricator, lineal supplier, site-built)
- o If an IA is contacted, the IA will contact the NFRC Certification Program Manager (by e-mail or letter copy) and request that a PCP packet be sent to the manufacturer. The following participant information should be provided to NFRC staff:

The PCP packet contains the following documents:

1. NFRC PCP-Current Edition;
2. Most recent NFRC Certification Program Bulletins and Interpretations;
3. Two (2) copies of the applicable NFRC License Agreement to be signed and returned to NFRC;
4. Applicable Schedules;
5. A Data Sheet to be completed and returned with the completed License Agreements;
6. A copy of NFRC's Compliance and Monitoring Program;
7. A list of NFRC accredited laboratories and NFRC licensed Independent Certification and Inspection Agencies (IAs);
8. One NFRC brochure;
9. Guidelines for Manufacturers Requesting NFRC Product Certification;
10. Fact Sheet about the Certification Program; and
11. Current NFRC Membership packet.

3.B. Certified Products Database Records:

1. A record is created in the database by NFRC staff at the time a signed license agreement is received.
2. NFRC staff will activate the record in the database and incorporate the pertinent information received by the manufacturer, such as plant location(s), plant contact information, date license agreement received, and IA designation.
3. NFRC staff will notify the IA by e-mail that the record has been activated.
4. The simulation laboratory and the IA may then upload and accept the simulation data and generate a Certification Authorization Report (CAR).



4. Report Evaluation

This section should be used as a resource in conjunction with Example #1 set forth in Appendix D and the IA Database User Manual to evaluating simulation and test reports, and simulation spreadsheet.

4.A. Receiving Simulation Reports

Test Report Evaluation

Simulation reports (hard and/or electronic copy) are received by the IA from an NFRC accredited lab that conducted the simulation.

- The date the report was received is tracked/recorded (e.g., date-stamp and log)
- The IA checks the report to make sure that it is complete with all required materials. In addition, the IA is to check that the report has been signed by the simulator-in-responsible-charge and the simulator performing simulations.
- The IA may review the report by referencing the checklist shown in Table 4-A

Table 4-A Simulation Report Checklist

Reference	Simulation Report Requirements		
LAP Reporting Requirements			
L 4.9.1	Laboratories shall issue a unique simulation report for each distinct Product Line and/or product type as defined in NFRC 100.		
L 4.9.1	The simulation report and the representative electronic upload shall identify one distinct product line represented by one upload matrix with a unique report number.		
L 4.9.1	Upon approval from the manufacturer (via written letter or electronic documentation), the same report shall be issued to the manufacturer's IA. Check for release letter.		
L 4.9.1	The simulation laboratory shall include in the report the drawings and bill of materials supplied by the manufacturer.		
L 4.9.1	The package of extrusion drawings, bill of materials, and fabrication drawings shall be authenticated by the simulation laboratory. The Authentication shall be indicated by the laboratory stamp bearing the unique simulation report number. The simulation laboratory shall stamp the bill of materials and individual drawings to indicate that they are representative of the materials and profiles used in modeling the product.		

L 4.9.1.A	The simulation report shall include the name, address and phone number of simulation laboratory		
L 4.9.1.B	The simulation report shall include the simulation date		
L 4.9.1.C	The simulation report shall include the name and address of client		
L 4.9.1.D	The simulation report shall include the serial number, report number, date and means of identifying each PL report		
L 4.9.1.E	The simulation report shall include a statement of compliance to NFRC requirements		
L.4.9.1.F	The simulation report shall include the NFRC procedures and editions under which report is submitted		
L 4.9.1.G	The simulation report shall include the drawing or written description of the specimen including:		
L 4.9.1.G.i	<ul style="list-style-type: none"> • Manufacturer and model number 		
L 4.9.1.G.ii	<ul style="list-style-type: none"> • Description of product-OP type; size, frame, glazing and spacer type 		
L 4.9.1.G.iii	<ul style="list-style-type: none"> • Assembly dwg, Bill of Materials, and part drawings with dimensions 		
L 4.9.1.G.iv	<ul style="list-style-type: none"> • Individual product glazing characteristics (i.e. thickness, coatings, emissivities and surfaces, tints, etc.) 		
L 4.9.1.G.v	<ul style="list-style-type: none"> • Air space-gap width, gas fill, gas type and concentrations and filling tech. 		
L 4.9.1.G.vi.	<ul style="list-style-type: none"> • Spacer-materials, construction, placement w.r.t glazing and frame sections 		
L 4.9.1.G.vi.a	<ul style="list-style-type: none"> • Grilles – materials, placement and pattern if different from NFRC default 		
L 4.9.1.G.vii	<ul style="list-style-type: none"> • Material-- Frame & sash, edge window construction, weather strip type & location, finish 		
L 4.9.1.G.viii	<ul style="list-style-type: none"> • All continuous hardware used in the models 		
L 4.9.1.G.viii.a	<ul style="list-style-type: none"> • Solar absorbance of dividers and frames used for simulation if other than the default values. Deemed to be satisfied by inclusion in the NFRC Upload spreadsheet 		
L 4.9.1.H.i	<ul style="list-style-type: none"> • Frame heights (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.ii	<ul style="list-style-type: none"> • Calculated areas used for area-weighting (A_f, A_{edg}, A_{cog}, A_d, A_{de}, and etc.) (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.iii.	<ul style="list-style-type: none"> • Area weighted total product U-factor(OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.iii.a	<ul style="list-style-type: none"> • U-factors for all components used in areas-weighting (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.iv	<ul style="list-style-type: none"> • Area weighted total SHGC, (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.v	<ul style="list-style-type: none"> • Center-of-glass SHGC_c (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.vi	<ul style="list-style-type: none"> • Area weighted total VT. (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.vii	<ul style="list-style-type: none"> • Center-of-glass Vt_c. (OK, if NFRC approved software files provides the info) 		
L 4.9.1.H.viii	<ul style="list-style-type: none"> • Individual spacer models (if applicable) 		
L 4.9.1.H.ix	<ul style="list-style-type: none"> • Thermal & optical properties of material other than default 		

	in NFRC software		
L 4.9.1.H.x	<ul style="list-style-type: none"> Any changes to default boundary conditions 		
L 4.9.1.H.xi	<ul style="list-style-type: none"> Groupings details (if applicable). 		
L 4.9.1.I	<ul style="list-style-type: none"> All data, calculation and NFRC software files used for modeling, in electronic format or diskette 		
L 4.9.1.J	<ul style="list-style-type: none"> Data , additional comments (modeling assumptions) deemed important to understand or review the report . 		
L 4.9.1.K	<ul style="list-style-type: none"> Description of the product(s) meeting the validation criteria and the simulated results for those product(s) based on the actual specimen size (if different from the standard NFRC sizes). 		
L 4.9.1.L	<ul style="list-style-type: none"> Identification of each individual products within a product line, as defined for NFRC certification, (satisfied by submission of the NFRC upload spreadsheet) 		
L 4.9.1.M	The simulation report shall include the name & signature of simulator-in-responsible-charge for tech. accuracy		
L 4.9.1.N	The simulation report shall include the name and signature of the individual performing the simulations		
L 4.9.1.O	The simulation report shall include a statement that the report may not be reproduced except in full		
L 4.9.1.P	The simulation report shall include a statement that report relates only to products simulated		
L 4.9.1.Q	The simulation report shall include a statement that rounding is per NFRC unit conversion and rounding policy.		
L 4.9.1.R	Addition or revised reports are to include all revisions - identification, information and results. The reports shall include initial report date, revised report date, identification in title-“revised” and new drawings or information.		
L 4.9.1.S	U-factor, SHGC, VT, CR matrix and/or summary report (satisfied by submission of the NFRC upload spreadsheet)		
L.4.9.1.T	Table of 0 and 1 for SHGC and VT. Three significant digits, x.xxx. (satisfied by submission of the NFRC upload spreadsheet)		
L 4.9.1.U	Include statement about report rating numbers not to be used for labeling, only CAR #'s.		
L.4.9. 1.V	NFRC simulation laboratories are required to submit as part of the simulation report, an electronic copy of the “NFRC Upload spreadsheet.” The values in the upload spreadsheet shall be identical to those uploaded to the NFRC database. The electronic copy of the upload sheet must be in MS Excel® format and values must not be linked to other workbooks.		
L.4.9. 1.W	Electronic format submittal: <ul style="list-style-type: none"> meet written report, password protected, backup 		
L.4.9. 1.X	Report requirement per NFRC 500 section 4.4 (new after 06/2003)		

Drawings			
1	Assembly drawing, die drawings, lab stamp with signature and rep. #		
	Assembly Drawing and details for all series option within Product Line		
2	Spacer drawing and dimension details		
3	Spacer placement in regards to IG unit		

4	Primary and secondary sealant detail as applicable		
5	Divider Drawing and dimension detail		
BOM			
1	Glazing options, spacer options, divider options, Frame options, List of all part numbers,		
2	Part is continuous or non-continuous		
3	Material, finish, emissivity and conductivity details if other than default value		
Simulation Modeling Requirements (check list)			
COG			
1	Latest Spectral Data files - all the glazing panes used, # sign in Glass library		
2	Glazing COG-U-factor, SHGC and VT for all glazing options (Accept if NFRC 200 table 6.1 is used)		
3	Glass thickness, gap width		
4	Gas fill concentration and method used		
5	Emissivity of Low-e and on correct surfaces		
6	# sign or emissivity from spectral data file for U-factor		
7	COG Grouping rules and reference to TI's if any		
8	Correct NFRC environmental condition and specially for slope glazing		
Frame			
1	Modeled in accordance with the drawing assembly provided by Manufacturer. Also check assembly drawings with die drawings		
2	Material conductivity used for all components to be correct.		
3	User defined conductivity (check units) need to have test report ref. included in the report		
4	Correct IG unit used for modeling, check effective conductance		
5	Air cavity rules followed (5mm not ¼ inch rule)		
6	Boundary conditions used correctly		
7	Exterior BC for glazing and U-factor surface tag as none for glazing above 63.5mm (edge-of-Glazing)		
8	Exterior BC for glazing and correct SHGC tag		
9	Interior Frame, edge of glazing and SHGC tags correctly defined		
10	Correct Edge of glazing height from site line (inside)		
11	Correct cross-section identification used (Jamb, head, sill and...)		
12	Fin modeled correctly using 1 x 4 wood if non-removable fin is modeled		
13	Emissivity of frame exterior and interior of frame cavity used correctly		
14	Absorptance of frame used correctly based on product type, 0.5 for curtain wall, slope glazing, window wall and store fronts. 0.3 for all other product type.		
15	Lowest center of glass from U-factor used to model frame SHGC if		

	grouped.		
16	Spacer Grouping Rules have changed in NFRC-100-2004 document. Make sure it complies. Check Frame grouping rules. for both files need to be provided and report needs to indicate how Group leader was selected.		
Total			
1	All component U-factor, with same glazing option		
2	NFRC mode for calculation. If Design mode used check all cross-section placements		
3	Divider 5mm rules, Divider pattern, or default pattern		
4	Model size in accordance with NFRC-100 and in mm		
5	For skylight and sloped glazing check tilt at 20 deg.		
SHGC & VT			
COG			
1	Check if Table 6.1 or actual IG glass pane used for calculations.		
2	Best glazing used to calculate SHGC0 and 1 need three digits after decimal		
3	All options including tints and low-e with application to different surfaces (divider) be modeled if manufactured		
5	SHGCc and VTc correctly listed in the upload spread sheets		
Total			
1	Check SHGC 0 and 1, VT 0 and 1 with divider 0.75 and 1.5 as applicable		
2	Values of SHGC and VT 0and 1 table shall be reported to three digits		
3	SHGCc and VTc for all IG's within a product line (upload spread sheet)		
CR			
1	CR Boundary Condition for horizontal members only (Sill, head, horizontal mullion)		
2	No CR for cross-sections for slope glazing and skylight		
3	Check if the glazing height is correctly selected in accordance with table (see below).		
Special case			
1	Skylight and slope glazing, check COG modeled at 20 deg slope, total calculated at 20 deg. Slope		
2	Vertical cross-sections modeled as sill (Jamb, meeting rail)		
3	Boundary condition of 20 degree tilt selected		
4	Correct Absorptance		
5	Correct material and thermal conductivity selected for Aluminum and thermal break		

THERM 5.1 Glazing Height Modeling for Condensation Resistance

Product Height	Glazing Height for Condensation Modeling
2000 mm	1900 mm
1500 mm (vertical slider)	675 mm per sash
1500 mm (non vertical slider)	1400 mm

1200 mm	1100 mm
600 mm	500 mm

Note: For products not included above, subtract 50 mm for each frame member from the total product height to determine the glazing height.

4.B. Receiving Test Reports

Test Reports (hard copy and/or electronic format) are received from the NFRC-accredited testing laboratory that conducted the physical testing for determining either validation of the baseline product (Product Line Validated Computation) or obtaining performance ratings for products that can not be simulated and are only physically tested (Test Only Products).

- For test only product line reports, the IA shall verify the receipt of a letter from an NFRC accredited simulation laboratory that the product cannot be simulated.
- The date the test report is received is tracked/recorded (e.g., date-stamped).
- The IA checks the report to make sure that it is complete with all required materials (i.e., but not limited to, bill of materials, assembly drawings, dimensioned die drawings. Material information, and all simulation files) and will check that the hard copy report has been signed by the person-in-responsible charge.
- The IA reviews the test report by referencing the checklist shown in Table 4-B.

Table 4-B Test Report Checklist:

<u>Test Report Checklist-March- 2005</u>	
<i>Note: This list is just a guide line. NFRC standard and program requirements shall dictate the NFRC requirements.</i>	
LAP 4.9.2	<p>Reporting Requirements.</p> <ul style="list-style-type: none"> A. Name, address, and phone number of laboratory; B. Location (if different than the laboratory address) and identification of test equipment utilized; C. Test date; D. Name and address of client; E. Serial number, date or other appropriate means of identifying each individual product report; and F. Test method employed; G. A statement that the tests were conducted in full compliance with NFRC requirements;

- H. A bill of materials, assembly drawings, extrusion drawings, and a description of the specimen including the following
[*Note*: some items listed may not be applicable in certain cases]:
- i. Manufacturer, and series or model number;
 - ii. General description of product (operator type, framing type, glazing type, spacer type);
 - iii. Test Specimen size (reported in both SI and IP units).
 - iv. Bill of materials including vendor name and part numbers;
 - v. Parts drawings (i.e., frame, sash, glazing, hardware, etc.);
 - vi. Physically measured parameters (sizes and thickness measured to 1 mm (1/32 inches); i.e., overall window dimensions, operable and/or fixed sash dimensions, glazing daylight openings, and door component parts);
 - vii. Glazing material(s), including thickness, coatings, and/or internal films (emissivity, as reported by the sample manufacturer) and their location (surface);
 - viii. Measured air space at the edge-of-glazing and design gas fill %concentration and type, as reported by the sample manufacturer;
 - ix. Spacer materials and construction;
 - x. Grille materials, placement and pattern;
 - xi. Detailed description of the framing, sash, frame and sash corner/joint construction, glazing installation, weather-stripping (types and locations), drainage and finish;
 - xii. All hardware, operator and other components; and
 - xiii. All descriptive items in the test report, which have not been measured or verified by the test lab, must be clearly indicated in the report.
- I. Test results, including all the information required;
 - J. Date of last complete hot box calibration and last calibration check;
 - K. Statement of experimental uncertainty associated with tests and data reduction when available;
 - L. Any additional comments or data deemed important in the understanding or review of the report;
 - M. Name and signature of individual accepting responsibility for the technical accuracy of a test report;
 - N. Name and signature of individual conducting the test;
 - O. A statement that the report shall not be reproduced, except in full, without the approval of the laboratory;
 - P. A statement that the report relates only to the fenestration products tested; and
 - Q. A drawing indicating the location of each specified thermocouple and the corresponding surface temperature (when applicable).
 - R. A statement indicating whether the product tested was a prototype unit, production line unit or as a test-only option as identified by the manufacturer, and indicate whether the product was submitted for initial certification or re-certification.

- S. Rounding of numerical values shall be per NFRC unit conversion and rounding policy. (See Appendix F).
- T. A statement indicating whether the weather side wind direction is perpendicular or parallel. (U-factor and CR only)
- U. The projecting height of the frame and sash members shall be included.
- V. The format and content of the data sheets as defined in Appendix D are mandatory, shall be completed with the pertinent data and shall be included as part of the thermal performance test report;
- W. The following statement shall be included in the report: “Ratings included in this report are for submittal to an NFRC-licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) are to be used for labeling purposes.”; and
- X. If the report, in its entirety, is submitted in electronic format, it shall include and comply with all the requirements of a written report. Electronic reports shall be protected password or other means to prevent unauthorized modification. Reports prepared in this manner shall be considered equal substitutes to printed (hard) copies. If the electronic file format venue is used, the laboratory shall be responsible for maintaining a secured back-up copy.
- Y. Reference Section 9 of NFRC 102; Section 9 of NFRC 201, and Section 5.4 of NFRC 500.
- Z. ASTM C 518, ASTM E 1045, ASTM C 177 reporting requirements as applicable
- AA. ASTM E 903 reporting requirements as applicable.

Measured Test Data (were applicable)

Category	Parameter	Limit	Value	Units
Heat Flows	Total Measured Metering Box Input (Q_{total})			Btu/hr (W)
	Surround Panel Heat Flow (Q_{sp})			Btu/hr (W)
	Surround Panel Thickness			Inches (mm)
	Surround Panel Conductance			Btu/hr•ft ² •°F (W/m ²)
	Metering Box Wall Heat Flow (Q_{mb})			Btu/hr (W)
	EMF vs. Heat flow equation (equivalent information)			
	Flanking Loss Heat Flow (Q_{fl})			Btu/hr (W)
	Net Specimen Heat Loss (Q_s)			Btu/hr (W)
Areas	Specimen, Projected (A_s)			ft. ² (m ²)
	Specimen, Interior Wetted Parameter, Total (3-D) Surface (A_{int}) : If applicable			ft. ² (m ²)
	Specimen, Exterior Wetted Parameter Total (3-D) Surface (A_{ext}) : If applicable			ft. ² (m ²)
	Metering Box Opening (A_{mb})			ft. ² (m ²)
	Metering Box Baffle (A_{b1})			ft. ² (m ²)
	Surround Panel Interior Exposed (A_{sp})			ft. ² (m ²)

Measured Test Data (were applicable)

Category	Parameter	Limit	Value	Units
Test Conditions	Average Metering Room Air Temperature	70± 0.5°F		°F (°C)
	Average Cold Side Air Temperature	0± 0.5°F		°F (°C)
	Average Guard/Environmental chamber Air Temperature			°F (°C)
	Metering Room Average Relative Humidity	≤ 15%		%
	Measured Cold Side Wind Velocity			mph (kph)
	Measured Metering Side Air Velocity	≤ 0.3 m/s		cfm (m/s)
	Measured Static Pressure Difference Across Test Specimen : If applicable			PSF (Pa)
Temperature Data	warm side specimen (t ₁)			°F (°C)
	cold side specimen (t ₂)			°F (°C)
	warm side frame : If applicable			°F (°C)
	cold side frame : If applicable			°F (°C)
	warm side edge-of-glass : If applicable			°F (°C)
	cold side edge-of-glass : If applicable			°F (°C)
	warm side center-of-glass : If applicable			°F (°C)
	cold side center-of-glass : If applicable			°F (°C)
	cold side surround panel			°F (°C)
	metering room surround panel			°F (°C)
Thermal Transmittance	U _s , Measured			Btu/hr•ft ² •°F (W/m ² •°C)
	U _{st} , Standardized (area weighted procedure)			Btu/hr•ft ² •°F (W/m ² •°C)

Procedure A or B, Not Both (A = Area weighted procedure, B = CTS procedure)

Method	Parameter	limits	Value	Units
A	Warm Side Surface Conductance (h _i) :			Btu/hr•ft ² •°F (W/m ² •°C)
	Cold Side Surface Conductance (h _{il})			Btu/hr•ft ² •°F (W/m ² •°C)
	Test Specimen Thermal Conductance (C _s)			Btu/hr•ft ² •°F (W/m ² •°C)
	Standardized Warm Side Surface Conductance (h _{stl})			Btu/hr•ft ² •°F (W/m ² •°C)
	Standardized Cold Side Surface Conductance (h _{stll})			Btu/hr•ft ² •°F (W/m ² •°C)
	U_{st}, Standardized Thermal Transmittance (area weighted procedure)			Btu/hr•ft ² •°F (W/m ² •°C)
B	Emittance of Glass (e ₁)			
	Warm Side Baffle Emittance (e _{b1})			
	Equivalent Warm Side Surface Temperature			°F (°C)
	Equivalent Weather Side Surface Temperature			°F (°C)
	Warm Side Baffle Surface Temperature			°F (°C)
	Measured Warm Side Surface Conductance (h _i)			Btu/hr•ft ² •°F (W/m ² •°C)
	Measured Weather Side Surface Conductance (h _{il})			Btu/hr•ft ² •°F (W/m ² •°C)

Test Specimen Thermal Conductance (C_s)			Btu/hr•ft ² •°F (W/m ² •°C)
Convection Coefficient (K)			Btu/hr•ft ² •°F ^{1.25} (W/m ² •°C ^{1.25})
Radiative Test Specimen Heat Flow (Q_{r1})			Btu/hr•ft ² •°F (W/m ² •°C)
Conductive Test Specimen Heat Flow(Q_{c1})			Btu/hr•ft ² •°F (W/m ² •°C)
Radiative Heat Flux of Test Specimen (q_{r1})			Btu/hr•ft ² (W/m ²)
Convective Heat Flux of Test Specimen (q_{r2})			Btu/hr•ft ² (W/m ²)
Standardized Warm Side Surface Conductance(h_{st1})			Btu/hr•ft ² •°F (W/m ² •°C)
Standardized Cold Side Surface Conductance (h_{st11})			Btu/hr•ft ² •°F (W/m ² •°C)
U_{st}, Standardized Thermal Transmittance (CTS procedure)			Btu/hr•ft ² •°F (W/m ² •°C)

Duration

The environmental systems were started at _____ (am/pm) on _____ (date).

The test parameters were considered stable for two consecutive two hour test periods from _____ hours, _____ minutes to _____ hours, _____ minutes.

The thermal performance test results were derived from _____ hours, _____ minutes to _____ hours, _____ minutes.

4.C. Validating Product Lines

- 1) The simulation laboratory sends one copy of the simulation report and simulation summary matrix (summary spreadsheet) to the designated IA. The simulator will have uploaded the matrix or spreadsheet to the Certified Products Database and shall also provide a hard-copy or electronic copy of the summary.
- 2) The testing laboratory sends a copy of the test report to the designated IA.
- 3) The IA will review and evaluate the reports in accordance with the NFRC CAP and LAP, and will verify that the test report validates the simulation report findings within the range of variation permitted under the requirements of NFRC 100.
- 4) The IA will evaluate the simulation summary contained in the matrix using the Upload Spreadsheet Checklist shown in Table 4-C.

Table 4-C Spreadsheet Checklist:

Upload Spreadsheet Checklist			
1	Verify if NFRC upload spread sheet is same as the spreadsheet submitted with report		
2	Verify Header information (specifically codes, product size, and simulation procedure)		
3	Check SHGC 0 and 1 value with matrix best glazing		
4	Check if the upload spread sheet has been Error Checked and that the correct error checking spread sheet version is used.		
5	Check for glass codes, emmissivity value.		
6	Make sure that "Addendum" clearly indicated.		

4.D. Procedures for Handling Non-Validations

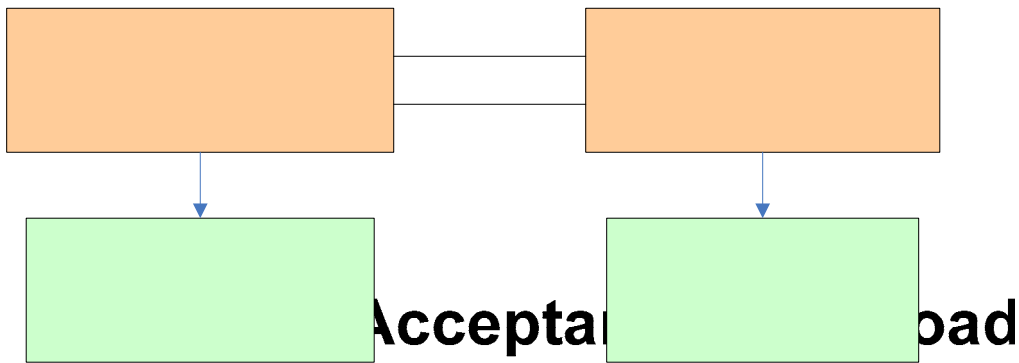
Per the *NFRC PCP*, if the physical baseline test does not validate the product line, the IA notifies the simulation lab, the manufacturer, and the testing laboratory of the non-validation, and collectively, the parties have ten (10) days within which to determine the reason(s) for the non-validation.

If the reason for the non-validation cannot be established by the parties within the 10-day period, the IA notifies NFRC for assistance.

Reasons for the non-validation may involve,

- 1) Error in workmanship or product materials – in this instance one re-test is allowed at the expense of the manufacturer, or in the case of a lineal extrusion error, at the expense of the Lineal Supplier.
- 2) A software program error or database error – in this instance, the manufacturer is not responsible and the error is addressed and corrected by NFRC.
- 3) Product non-conformance – in this instance, the product tested does not match the specifications or simulation data.

Per the PCP, if the non-validation can not be corrected and the product validated, a notice of denial of certification is rendered by the IA to the participant and a copy of the notice is provided to NFRC.



4.E. Acceptance/Rejection of Simulation Upload

Acceptance of Simulation Upload:

○ For Initial Certification:

1. The IA clicks on the accept button in the database and the summary data is populated into the application
2. The IA then enters or inputs the test validation information into the database (see IA database user manual for additional data entry information)
 - The IA enters the test report information (if the product line is grouped with an existing product line, check “grouped” and select the group leader from the drop-down list)
 - The IA enters the initial certification date, which is the date of IA acceptance.
3. Once the product has been accepted, a CAR may be generated.

○ For Recertification:

1. The Recertification simulation summary is uploaded into the database as a revision
2. The IA codes out any existing individual products with “05” status line code (DELCODE)
3. The IA clicks the accept button in the database
4. The IA enters the test validation information into the database
 - The IA enters test report information
 - The IA enters the recertification date, which is the date of acceptance.
5. Once the product has been accepted, a CAR may be generated.

- Addendums:
 1. For addendum reports, the upload spreadsheet data is appended to the existing product line data, i.e., to the last product option within the product line when a manufacturer has additional product options to be included in the matrix.
 - In the case of groupings, the duplicate group leader will need to be manually deleted from the summary matrix. As an alternative, the simulator may submit the report as a “revision”.
 2. The IA reviews and approves test validation data if the baseline product should change due to the addendum products
 3. Once the products are accepted, a CAR is eligible to be generated

- Revisions:
 1. Any existing individual products to be deleted are coded out using the “05” status code.
 2. Accept button is clicked in the database
 3. Once product accepted, a CAR may be generated

Rejection of Simulation Upload: When the IA rejects the simulation upload, the rejection notification is made via the database and the IA will incorporate comments in the “comments” field that set forth briefly, the reason(s) for the rejection. It is recommended that the IA track these rejections for trends and turn-around times.

The IA may reject the simulation summary for various reasons, such as

- Non-validation of product line
- Simulation error
- Incorrect or incomplete simulation data

4.F. Special Case Products

1. Dome Skylights & Glass Blocks – These are “test only” products, which can not be simulated in accordance to NFRC rating procedures at this time. NFRC 201 test procedures apply.

2. Tubular Daylight Devices (TDDs) – These products use the simulation validation computational procedure for U-factor & the “test only” procedure for rating Solar Heat Gain Coefficient (SHGC); TDDs currently exempt from obtaining Visible Transmittance (VT) ratings. (For additional information on database entry requirements,

see Appendix A of IA User Manual: “Entering SHGC Values for TDDs – Work Around Reference for the IA User.”)

3. Swing Door – This is the only operator type whose category or “Item type” falls under “door” in the CPD. All other fenestration operator types are to be categorized as “window.” The item type field can be found in the Product Line Details screen of the database under the General Information box and is an editable field. Per the NFRC PCP, swing doors with a glazing area less than or equal to 50% of the slab or panel area, are not required to label SHGC and VT ratings.
4. Attachment Products - Ratings required for certification authorization are SHGC and VT, which are obtained through simulation. Testing (for SHGC only) shall be required for film attachment products whose optical properties cannot be determined – e.g., non homogeneous or diffusive products (Section 5.7.6 of NFRC-200-2004). For additional information on film attachment data, please refer to the IA Database User Manual.
5. Dynamic Glazing Products – Shall have U-factor, SHGC, and VT ratings per the NFRC PCP.

4.G. Site-Built Products

Site-Built Products follow the general validated computational procedures for certification authorization. (See NFRC 100 and NFRC PCP for additional information).

5. Recertification

5.A. PCP Recertification Requirements

1. Overview: Initial certification authorization expires four (4) years from the physical test date (PCP Section 5.1).
2. General Requirements: Recertification can take place at any time within the certification period. (PCP Section 5.6)
 - i. Each individual product within a product line, for which certification is desired, is simulated by the simulation lab per the rating procedures in effect at the time of recertification.
 - ii. The manufacturer selects one individual product from within the product line matrix for physical testing by the test lab per the rating procedures in effect at the time of recertification. All test samples are production line units (except for site-built products and solarium/sunrooms).
 - iii. The simulation summary matrix is validated if the physical test results meet the equivalence criteria of NFRC 100.
3. Plant qualification testing: Per PCP requirements each plant on the Schedule I or fabricator location on the Schedule III is to test at least one NFRC-certified production line unit every four (4) years. (PCP Section 4.3.3) Site-Built products are excluded from plant qualification testing.
 - i. The plant inspector shall advise the manufacturer of this testing requirement at each annual inspection and shall provide the manufacturer with the necessary test submittal forms.
 - ii. The IA shall review and compare the final test report with the current simulation data for the product to determine if the production line unit validates.
 - iii. If the product validates, the IA shall enter the date of the production line unit test into the Certified Products Database.
 - iv. If the product does not validate, then the current procedures for addressing non-validation apply.
 - v. The IA verifies the information in the database and will then verify whether the manufacturer has tested.

5.B. Certification Timelines

Certification-Related Dates

Initial Certification date:	Date of IA product line certification – CAR can be issued
Test date:	Physical initial test date of product line (for validation/test only)
Simulation date:	Date of simulation per authorized simulation tools
Recertification date:	Always the date of the recertification activity - product line is eligible for a new CAR based on recertification date.

The expiration date is either,
- 4 years from initial certification (procedure prior to July 1996), or
- 4 years from the initial test date (current procedure **for fenestration products**)
- 4 years from the simulation report date for **products that do not require validation testing.**

Expiration date:	In general, the certification cycle is in increments of 4 years from the <u>initial</u> physical test date. (Refer to the PCP, Section 5.6 for specific exceptions)
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5.C. IA Notification of Approaching Expiration

The IA should notify the manufacturer/client of the approaching certification expiration date and should have procedures in place to ensure that notification is made within a reasonable time period to allow the manufacturer/client to recertify the product line before certification lapses (e.g. 6 months prior to product certification expiration).

Notification should

- be communicated in writing to the primary manufacturer contact;
- alert the manufacturer that deactivation of the product will occur 6 months after the date of expiration, if recertification has not been completed;
- explain requirements for recertification; and
- include any documentation necessary to assist the manufacturer/client with completing the recertification process (e.g., Submittal Form for Test Samples).

6. Issuing CARs

Certification Authorization Reports (CARs) can be generated by the Certified Products Database once the IA accepts the simulation data into the database which has been previously uploaded by the simulation lab (see IA Database User Manual for further details). The report is generated as a PDF file.

6.A. Generating a First CAR

Once the certification record in the database is activated, the simulation spreadsheet that has been uploaded into the Certified Products Database can be accepted or rejected by the IA.

- Upon acceptance of the simulation upload, a Certification Authorization Report (CAR) can be generated.
- The IA signs the CAR at the end of the report where indicated and sends a copy of the CAR to the manufacturer/client and NFRC, either by e-mail or hard-copy. If the CAR is sent by e-mail, it does not need to be signed; however, the e-mail should come directly from the IA issuing certification authorization (e-mailed from the database or from the IA user's e-mail account) and in this manner serves as an electronic signature for the CAR.

6.B. Generating subsequent CARs

The IA shall generate subsequent CARs from the database upon certification authorization of subsequent product lines submitted by the manufacturer. The CAR shall be sent to the manufacturer whenever there are additional product lines certified, or whenever there are revisions, addendums, or recertifications of previously certified product lines. Copies of subsequent CARs for a product line are not required to be sent to the NFRC.

6.C. Alternate Method for Issuing a CAR

1. The alternate method of issuing a CAR shall only be used in the event that the IA or NFRC cannot print a CAR using the standard procedures developed to do so in the database application.
2. If the IA encounters a problem in accepting a product line and therefore cannot print a CAR using the report generated from the database application or if the database generated report is missing data or contains in-accurate information, the IA shall complete the "Alternate Method for Issuing a CAR Request Form" (See Appendix B) and send it to NFRC via e-mail or facsimile.

3. NFRC will review and resolve the issue submitted within two (2) days of receiving the request.
4. If NFRC can identify the problem which prohibits a CAR from being produced, the resolution shall be sent to the appropriate party detailing the method to use to correct the problem. The appropriate party shall be responsible for correcting the problem.
5. If NFRC cannot provide a solution to the problem that allows the IA to print a CAR using the standard method within 2 business days, NFRC shall indicate on the Alternate Method CAR Form that the IA shall issue a CAR using the alternate method.
6. If NFRC cannot provide a solution within 2 business days, NFRC shall continue to investigate the problem and will record the problem in the database log. Upon resolution, the database log will be updated and the response area of the Alternate Method CAR Request Form shall be completed and forwarded to both the simulation laboratory and the IA.
7. NFRC shall be responsible for correcting the problem in the event that the problem is caused by the database application. If NFRC finds a user error after the second business day, NFRC shall notify the appropriate party detailing the method to use to correct the problem.
8. The IA shall sign and date the CAR for validity.

6.D. Issuing Site-Built Label Certificates

1. For site-built products, once the simulation data is accepted into the database and certification authorization is granted by the IA, the IA may issue a label certificate(s) to the site-built licensee. A copy of the label certificate should also be sent to the NFRC.
2. The label certificate is a stand-alone document, 8 ½" X 11", whose content and format are to follow the requirements set forth in the NFRC PCP (PCP, Appendix C). NFRC can provide a label certificate form to the IA upon request.
3. The label certificate is used in lieu of an NFRC temporary and permanent label for site-built products, and in lieu of the temporary label when installed in buildings more than three stories above grade and with a maximum fenestration area of 10,000 sq. feet.
4. Label certificates are to identify each system option, including glazing and operator type used for the project. Each product type for the project shall a Label Certificate.
5. A site-built licensee signs an NFRC Site-Built License Agreement and completes applicable schedules for that agreement upon initial certification authorization of a site-built product or upon obtaining a

label certificate for a product previously certified. The licensee is then responsible for updating schedules when subsequent certificates are issued. The licensee is required to update schedules (Schedules II and IV) for each site-built product that is added or deleted, and/or for each additional project that requires a label certificate(s).

6.E. Issuing Label Certificates for Film Attachment Products

1. At the time of generating the Certification Authorization Report (CAR) the IA shall generate a Label Certificate for the film manufacturer participant.
2. The IA shall complete the Attachment Product Information section of the label certificate, enter the date of certification authorization, and sign and date the certificate. The film manufacturer is to complete all other sections of the certificate when a certificate is requested and shall keep a log or record of label certificates requested.
3. The IA shall send both the CAR and the label certificate to the manufacturer at the time of the first certification authorization. A copy of the first CAR and certificate issued shall be submitted to NFRC; subsequent CARs and certificates are not required to be copied to NFRC.

7. NFRC Certified Products Database

The Certified Products Database is used by NFRC, IAs, Simulation Laboratories, and Manufacturer/Responsible Parties. The Certified Products Directory, an adjunct to the application, is utilized by various consumers, such as builders, purchasers, code officials, and architects; it allows the consumer to search certified products and obtain their performance ratings data of a certified window or door product.

7.A. The “IA Database User Manual”

This is the Certified Products Database reference manual for the IA user. It contains step-by-step instructions on how to utilize the application from accepting the simulation matrix, running reports (e.g. CAR), to inputting product line data (such as test data, certification dates, product status). The manual also sets forth rules for data entry. Please refer to this user manual for reference when needed.

7.B. NFRC Contacts for Database Issues

Any problems that may be encountered when using the database or any requests for additions or modifications to the application should be directed to NFRC’s Data Analyst.

- o Contact NFRC (by phone or e-mail) or
- o Complete and submit the “Database Request Form” for more in-depth requests requiring detail; this form may be obtained from the NFRC website at <http://www.nfrc.org/logofissues.aspx>.

8. Inspections

8.A. Initial and Annual Manufacturer Plant Inspections

Per PCP and CAP requirements, an IA shall conduct plant inspections of their manufacturer/client facilities not less than six (6) months after the date of initial certification, and once a year thereafter. Plant inspections are conducted to ensure compliance with NFRC product certification authorization and licensing requirements.

The IA may give up to 48 hours advance notice of the inspection to the manufacturer's designated plant contact. Plant inspections are to take place during normal working hours.

Inspection Criteria:

Criteria for the IA inspector to follow when conducting plant inspections are set forth in the NFRC CAP. **Included in this manual is a fenestration Plant Inspection Checklist (Appendix E), offered as a guideline of items to check for at the time of inspection at a fenestration manufacturing location.**

For initial plant inspections, it is highly recommended that the IA direct the manufacturer to PCP compliance requirements either at the time of certification authorization or in advance of the inspection (whichever is first), so that the manufacturer is aware of what is required to maintain certification authorization (e.g., quality assurance program).

Inspection findings:

Findings are reported in writing to the manufacturer and the NFRC no later than fifteen (15) days after conducting the inspection as per *NFRC CAP* requirements. If the results of the inspection indicate a non-compliance, the IA indicates the specified deficiency in the report and gives the manufacturer 15 business days to take the appropriate corrective action.

If corrective action is not taken within 15 days of the receipt of the report, the IA shall issue suspension of certification authorization per the NFRC PCP.

The IA may conduct a re-inspection to ensure that corrective action has been taken.

8.B. Site-Built Inspections

1. The designated IA is to conduct an inspection of the site-built licensee's facility (or office location) within one year issuing the Label Certificate. The inspector shall review the records regarding the site-built project/product.
2. Specific criteria for the IA inspector to follow when conducting site-built inspections are set forth in the NFRC CAP and PCP.

3. As with plant inspections, findings of the site-built inspection are reported in writing to the site-built licensee and the NFRC within 15 days of inspection.
4. If the results of the inspection indicate a non-compliance, the IA indicates the specified deficiency in the report and gives the manufacturer 15 business days to take the appropriate corrective action.
5. If corrective action is not taken within 15 days of the receipt of the report, the IA shall issue suspension of certification authorization per the NFRC PCP. The IA may conduct a re-inspection to ensure that corrective action has been taken.

8.C. Attachment Product Inspections

During an attachment product in-plant inspection, the IA shall review and verify the following (in addition to the attachment product manufacturer's quality control system).

1. All components used in the production of the attachment product;
2. The labeled box/packaging and the traceability of the materials contained therein;
3. The installation of both the temporary and permanent NFRC labels, and the accuracy of the applied labels on the box/packaging; and
4. The record or log of Attachment Product Label Certificates completed and delivered by request year-to-date.

9. Reporting

9.A. Inactive Manufacturers Reporting Process

NFRC will notify the designated IA of any manufacturer suspension of licensing or any manufacturer voluntary termination from the Certification Program.

An IA is to notify NFRC of any manufacturer suspension of certification authorization or any manufacturer voluntary termination from the Certification Program.

9.B. Quarterly reporting to NFRC

Product line count – Prior to NFRC pulling the product line billing report, IAs are to confirm reconciliation of product lines records in the database to NFRC on quarterly basis per CAP (Section 4) requirements and billing schedule (See Table 9-B below). **NFRC staff shall pull product line billing reports from the database one the first day of the following quarter.**

Label usage count – This is the manufacturer NFRC permanent label usage report. Label usage reporting is accomplished by either

- 1) The manufacturer, who generates his own permanent labels, reporting label usage to the NFRC directly on a quarterly basis with a Quarterly Label Usage Report form, or
- 2) The IA who generates permanent labels for the manufacturer/client, reporting to NFRC the number of labels they have generated and sent out for that particular manufacturer/client in a given quarter.

Site-built projects – IAs are to submit to NFRC copies of any label certificates generated for site-built projects in a given quarter.

Attachment Product label certificate records – IA inspectors are to submit to NFRC, along with their inspection reports, copies of an attachment product manufacturer's label certificate records.

Table 9-B – Uniform Billing Schedule:

NFRC UNIFORM PCP PARTICIPANT BILLING (FOR IA Reporting Purposes)

Participation Fees: Annually

NFRC will bill all PCP Participants by **January 15th**. (Participant may request quarterly payments.)

Product Line Fees: Quarterly

1 st Qtr:	Jan – March	Report Date: April 1st
2 nd Qtr	Apr – June	Report Date: July 1 st
3 rd Qtr	Jul – Sept	Report Date: October 1 st
4 th Qtr	Oct – Dec	Report Date: January 1 st

****Product line counts should be reconciled in the CPD by the last day of each quarter.***

Labeling Fees: Quarterly

Label usage from participants should be reported to NFRC no later than fifteen (15) days after the end of a given quarter. Any labeling fees collected from participants during the quarter must be received by NFRC along with this report.

Site-Built Label Certificates:

IAs provide copies of any label certificates to NFRC upon issuance. NFRC invoices Site-Built licensees throughout the year as certificates are issued.

Attachment Product Label Certificates:

IAs provide copies of attachment product manufacturer label certificate logs or records when plant inspection reports are submitted to NFRC.

~~10. Manufacturer Transfer Notification Protocol~~

~~10.A. Mergers, splits, and umbrella arrangements~~

- ~~1) **Mergers** of companies do not require a new license agreement if the licensee adds the merged facility to its Schedule I. However, a new license agreement would be required if the responsible party was not previously licensed or if the merger results in a name change. If the merged facility had been previously licensed with NFRG, it would terminate its NFRG licensing prior to being added to the Schedule I of the licensee.~~
- ~~2) **Splits** involve one of the manufacturers remaining licensed but amending schedules, and the new company emerging from the split needing to sign a license agreement with NFRG.~~
- ~~3) **Umbrellas** are set up either under
 - ~~a. the Lineal Supplier License Agreement and the Schedule III
 - ~~i. this arrangement occurs when a Lineal Supplier lists companies on the Schedule III that fabricate product lines of the supplier~~
 - ~~ii. The “fabricator” is issued simulation and test reports in their name, enters into a license agreement with NFRG, and is responsible for obtaining certification authorization of the fabricated products listed on their Schedule II.~~~~
 - ~~b. the Responsible Party license and Schedules I and II
 - ~~i. this arrangement occurs when one company assumes the role of the responsible party licensee and several companies are then listed under this parent company on the Schedule I of the NFRG License Agreement.~~
 - ~~ii. The parent company is responsible for obtaining certification authorization of the products that are listed on the Schedule II.~~~~~~

~~10.B. Transfers (to a new IA, of product lines, to a parent company)~~

- ~~1) **If transferring to a new IA**, participant companies retain their NFRG license and sign a new license with the new IA.
 - ~~a. The participant informs the new IA, the current IA and NFRG staff of their intent to transfer certification agencies.~~~~
- ~~2) When a participant transfers IAs and incorporates a name change at the same time, they must execute a new NFRG license agreement and any reports they wish to use must be reissued by the laboratory in the new company's name.~~
- ~~3) **Transfer to parent company** – Participants that elect to be listed on the Schedule I of a parent company (as in umbrella arrangements and mergers) need to terminate their NFRG license, transfer any product lines~~

- ~~to be assumed by the parent company, and be listed on the Schedule I and II of the parent company.~~
- ~~a. The participant informs the current IA and NFRG staff of their intent to terminate its licenses with NFRG and the IA, and transfer products.~~
- 4) ~~Participants that elect to be listed on the Schedule I of a parent company but still intend to maintain a portion or all of their currently certified product lines~~
- ~~a. maintain their NFRG license~~
 - ~~b. transfer any products lines to be assumed by the parent company, and~~
 - ~~c. are listed on the Schedule I and II of that parent company.~~
- 5) **Product Transfers** – ~~Product transfer periods shall be for a period of 60 days; during this time~~
- ~~a. All products remain certified by the current IA;~~
 - ~~b. The current IA informs NFRG staff of any outstanding fees owed by the participant (all outstanding fees must be paid in full prior to any transfer);~~
 - ~~c. NFRG staff will not complete the transfer until the current IA releases the participant from their fiduciary responsibility;~~
 - ~~d. If a new IA is involved, the participant has the current IA deliver their simulation and test reports to the new IA, or has the laboratory forward copies of the reports for all certified product lines;~~
 - ~~i. When the new IA receives the reports, they are to perform their own report review before changing the status of each product line to “Active;”~~
 - ~~e. NFRG staff copies all CPD records and assigns them either a new IA code or a new manufacturer code, or both (depending upon the circumstances for the transfer), using the 02 delete code for the previous records; and~~
 - ~~f. New permanent and temporary labels are created during the 60-day period, to be used when the product lines are activated again.~~
- 6) ~~At the end of the 60-day period, the transfer is to be completed.~~

10.C. Additional considerations – Labeling Issues

~~If the company name is not the licensee name but appears only on the Schedule I (as in the case of companies under an umbrella or merger arrangements), the company name may be displayed in the Manufacturer’s information section of the NFRG temporary label as long as the CPD number is included in this section.~~

4410. Compliance Protocol

In general, issues regarding participant compliance to the NFRC Certification Program are to be coordinated between the IA and the NFRC staff. Though each issue should be taken on individual basis, case precedence should be deferred to when making decisions for action and for consistency in protocol.

4410.A. Denial of Certification Authorization:

The NFRC PCP allows for denial of either product certification or manufacturer licensing, both actions may be taken by the IA. Denial may be the result of

- product line non-validation,
- manufacturer refusing to allow the initial in-plant inspection, or
- failure to meet compliance requirements sited at the initial in-plant inspection.

Notice of the denial shall be sent to the manufacturer and copied to the NFRC. The notice should be sent to the manufacturer by traceable mail.*

4410.B. Suspension

PCP-2005 allows for suspension of product certification and manufacturer licensing, both actions can be taken by either the IA or by NFRC. Suspension may be the result of

- the manufacturer refusing to allow the annual in-plant inspection or
- failure to remedy any discrepancies sited at the time of plant inspection and noted on the IA's 15-day Notice of Non-Compliance.
 - If the manufacturer has not remedied the discrepancy within 15 days of the non-compliance notice, the IA should issue a suspension notice to the manufacturer and copy NFRC staff.
 - The manufacturer has forty-five (45) days within which to either take corrective action or appeal the decision to the NFRC Certification Policy Committee.
 - If corrective action is taken by the manufacturer within the forty-five (45) day period, notice should be sent to the manufacturer confirming that the non-compliance has been corrected and the suspension of certification authorization and/or licensing lifted.
 - **During the suspension period, the manufacturer record remains active but the products are coded with the "02" status line code in the Certified Products Database.**

4410.C. Revocation

1. The NFRC PCP allows for revocation of certification authorization or licensing based on
 - o failure to remedy a Notice of Suspension,
 - o a manufacturer having three suspensions in a year, or
 - o rejection of an appeal of Suspension.
2. Revocation is the responsibility of the NFRC. The licensee has fifteen (15 days) from the date of the notice to appeal the revocation.
3. If no appeal is taken by the manufacturer, the certified products are decertified by the IA with the "02" status line code and the manufacturer record is deactivated by NFRC staff.

4410.D. Administrative Actions and Challenges

Procedures for Administrative Action requests and Challenges are expressly set forth in the *NFRC PCP*.

1. The NFRC may request the assistance of the respective IA in the investigation of an Administrative Action request.
2. An IA shall have written procedures for handling Challenges within the framework of the Challenge procedures set forth in the *PCP*.

11.E. Compliance and Monitoring Program

Per procedures set forth in the *NFRC Compliance and Monitoring Program*, an IA shall assist and participate in the investigation of alleged prohibited activity by a manufacturer/client as requested by NFRC.

***All compliance notices to a manufacturer should be sent by traceable mail (i.e., Certified Mail, FedEx, etc.).**

APPENDIX B

NFRC License Agreement Schedules I, II, III, and IV from CPD

NFRC Product Certification Program Schedule I to the NFRC License Agreement

For: 123XYZ Company
Date: 09/14/2005



Facility or Facilities addressed under this Agreement

Plant Name: 123XYZ Plant 2
Address: 8484 Georgia Ave.
Silver Spring, MD 20910
Contact: Jessica Ferris
Phone: 301-589-1776
Fax: 301-589-3884
Email:

Plant Name: Jan Doe Shopping Center
Address: 123 Oak Street
Anyplace, MA 01234
Contact: Jessica Ferris
Phone: (514) 555-1212
Fax: (514) 555-1234
Email:

Plant Name: John Doe Library
Address: 123 Redwood Street
Someplace, IA 67899
Contact:
Phone: (666) 555-1111
Fax: (666) 555-9999
Email:

Plant Name: National Fenestration Rating Council Office Building
Address: 8484 Georgia Avenue
Silver Spring, MD 20910
Contact: Jane Doe
Phone: (301) 589-1776
Fax: (301) 589-3884
Email: jdoe@nfrc.org

NFRC Product Certification Program
Schedule II to the NFRC License Agreement



For: 123XYZ Company
Date: 09/18/2005

List of Product Lines Addressed under this Agreement

CPD Number	Series/Model Designation	Production Plant(s) Location
		8484 Georgia Avenue Silver Spring, MD 20910 USA
XYZ-T-1	5200 equal lite	8484 Georgia Avenue Silver Spring, MD 20910 USA
XYZ-T-2	5200 equal lite	8484 Georgia Ave. Silver Spring, MD 20910 USA
XYZ-T-3	5200 equal lite	8484 Georgia Ave. Silver Spring, MD 20910 USA
XYZ-T-4	5200 equal lite	8484 Georgia Ave. Silver Spring, MD 20910 USA
XYZ-T-5	5200 equal lite	8484 Georgia Avenue Silver Spring, MD 20910 USA
XYZ-T-6	MFR Sr 123	8484 Georgia Avenue Silver Spring, MD 20910 USA
XYZ-T-6	MFR Sr 123	5555 Strawberry Fields Pleasantville, PA 17555 USA
XYZ-T-7	5200 equal lite	123 Redwood Street Someplace, IA 67899 USA

INSERT SCHEDULE III HERE.....

**NFRC Product Certification Program
Schedule IV to the Site-Built License Agreements**

Date: 09/18/2005



Project Location covered under this Agreement

Site/Building Name: National Fenestration Rating Council Office Building
Address: 8484 Georgia Avenue
Silver Spring, MD 20910
Contact: Jane Doe
Phone: (301) 589-1776
Fax: (301) 589-3884
Email: jdoe@nfr.org

Site/Building Name: Jan Doe Shopping Center
Address: 123 Oak Street
Anyplace, MA 01234
Contact: Jessica Ferris
Phone: (514) 555-1212
Fax: (514) 555-1234
Email:

Site/Building Name: John Doe Library
Address: 123 Redwood Street
Someplace, IA 67899
Contact:
Phone: (666) 555-1111
Fax: (666) 555-9999
Email:



National Fenestration Rating Council, Inc. Reviewing Reports – Example # 1

Fenestration Product Description

- Type:** Skylight
- Frame Material:** Aluminum with thermal break. (white)
- Glazing:** See glazing matrix
- Glazing dimension:** 1) Overall glazing width 1.00 inches. See matrix attached.
- Glazing Fill:** Glazing has following option for gas fill: (Details in glazing matrix)
1) 85% Argon filled with Two-Probe filling with a concentration sensor.
2) AIR
- Spacer:** Standard Aluminum spacer (Drawing provided).
Coated Steel Intercept spacer (Drawing provided)
- Divider:** None
- Primary Sealant:** PIB (See drawing for details)
- Secondary Sealant:** Butyl (See drawing for details)
- Cross Sections:** 1) Assembly drawings (dxf file provided)
2) Spacer (drawings provided)
3) All component die drawings with dimensions.

Other

Glazing Matrix:

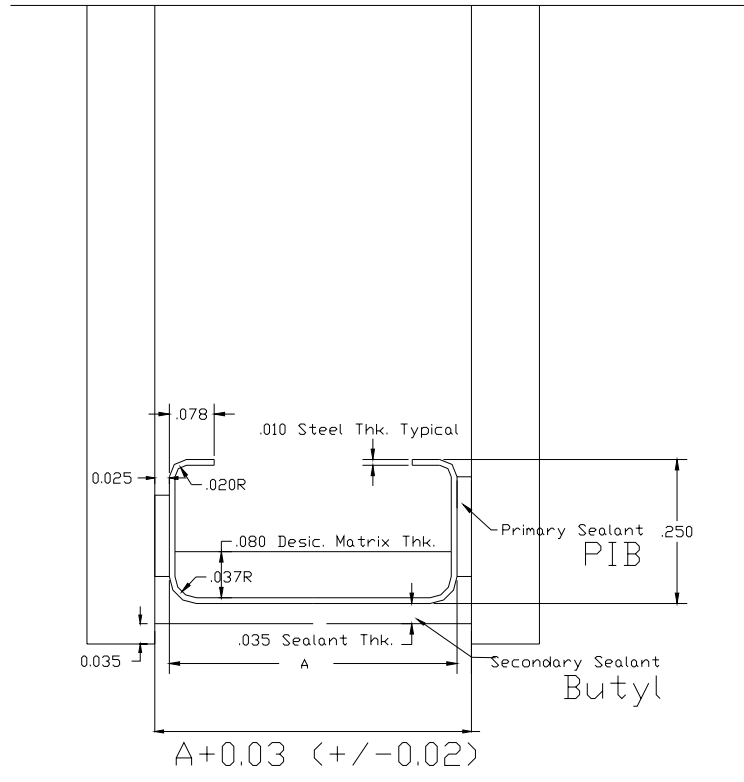
overall size 1.0”

SR	ID	Gap	ID	Gap	ID
1	Clr 3mm	Air	Clr 3mm		
2	Clr 4mm	Air	Clr 4mm		
3	Clr 5mm	Air	Clr 5mm		
4	Clr 6mm	Air	Clr 6mm		
5	Clr 3mm	Ar 85%	Clr 3mm		
6	Clr 6mm	Ar 85%	Clr 6mm		
7*	LoE=0.04(2 nd) 3mm	Air	Clr 3mm		
8*	LoE=0.04(2 nd) 6mm	Air	Clr 6mm		
9*	LoE=0.04(2 nd) 3mm	Ar 85%	Clr 3mm		
10*	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm		
11*	Clr 3mm	Air	LoE=0.04(3 rd) 3mm		
12*	Clr 6mm	Air	LoE=0.04(3 rd) 6mm		
13*	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		
14*	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		
15	3mm Solar-Ban 60	Air	6mm clear laminate		

*LoE glass products used are, LoE² 162 on clear, Guardian Performance Plus II on clear and Solar-Ban 60 on clear.

Clear Glass is a float glass from any glass Industries.

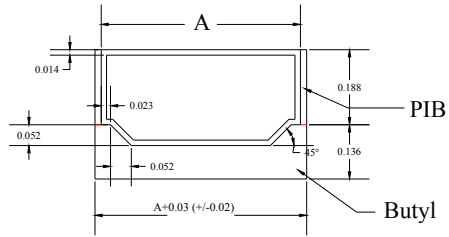
6mm overall thickness clear laminate glass having 0.015” PVB interlayer from Vitrum industries ltd.



See Table for strip width (A).

Steel, Tin Plate Intercept Spacer

Spacer



A	Dimension
1	0.6 inch
2	0.5 inch
3	0.4 inch
4	0.3 inch
5	0.25 inch

GLAZING MATRIX –Evaluation:

I. Glazing Matrix:

1. Options
2. Low_e on correct location (Flip function)
3. # sign
4. Gap
5. Gas fill %
6. Tilt (for slope glazing should be 20° and for Vertical glazing 90°)
7. Glazing matrix grouping.

Glazing Matrix

Options: Base on manufacture instructions following options have to be modeled.

Overall IG unit measurement 1.00” inch

SR	ID	Gap	ID	Glazing ID
1	Clr 3mm	Air	Clr 3mm	887/A/887
2	Clr 4mm	Air	Clr 4mm	888/A/888
3	Clr 5mm	Air	Clr 5mm	889/A/889
4	Clr 6mm	Air	Clr 6mm	890/A/880
5	Clr 3mm	Ar 85%	Clr 3mm	887/AG/887
6	Clr 6mm	Ar 85%	Clr 6mm	890/AG/890
7	LoE=0.04(2 nd) 3mm	Air	Clr 3mm	2021/A/887
8	LoE=0.04(2 nd) 3mm	Air	Clr 3mm	3213/A/887
9	LoE=0.04(2 nd) 3mm	Air	Clr 3mm	5281/A/887
10	LoE=0.04(2 nd) 6mm	Air	Clr 6mm	2024/A/890
11	LoE=0.04(2 nd) 6mm	Air	Clr 6mm	3216/A/890
12	LoE=0.04(2 nd) 6mm	Air	Clr 6mm	5284/A/890
13	LoE=0.04(2 nd) 3mm	Ar 85%	Clr 3mm	2021/AG/887
14	LoE=0.04(2 nd) 3mm	Ar 85%	Clr 3mm	3213/AG/887
15	LoE=0.04(2 nd) 3mm	Ar 85%	Clr 3mm	5281/AG/887
16	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm	2024/AG/890
17	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm	3216/AG/890
18	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm	5284/AG/890
19	Clr 3mm	Air	LoE=0.04(3 rd) 3mm	887/A/2021
20	Clr 3mm	Air	LoE=0.04(3 rd) 3mm	887/A/3213
21	Clr 3mm	Air	LoE=0.04(3 rd) 3mm	887/A/5281
22	Clr 6mm	Air	LoE=0.04(3 rd) 6mm	890/A/2024
23	Clr 6mm	Air	LoE=0.04(3 rd) 6mm	890/A/3216
24	Clr 6mm	Air	LoE=0.04(3 rd) 6mm	890/A/5284

25	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		2021/AG/887
26	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		3213/AG/887
27	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		5281/AG/887
28	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		2024/AG/890
29	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		3216/AG/890
30	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		5284/AG/890
31	3mm Solar-Ban 60	Air	6mm clear laminate		5281/A/7404

4b) A = Air and AG = Argon

Notes:

- *LoE glass products used are, LoE² 162 on clear, Guardian Performance Plus II on clear and Solar-Ban 60 on clear.
- Clear Glass is a float glass from AFG Industries.
- 6mm overall thickness clear laminate glass having 0.015” PVB interlayer from Vitrum industries ltd.

Simulation evaluation:

Option modeled, Tilt angle, # sign and IG overall thickness.

The screenshot shows the 'Glazing System Library' application window. The main area contains a table with 32 records. Annotations include:

- A box labeled '# Sign' pointing to the '#' symbol in the 'Mod' column.
- A box labeled 'Overall IG measurements' pointing to the 'Overall Thickness' column.
- A box labeled 'For Slope Glazing 20° For Vertical Glazing 90°' pointing to the 'Tilt' column.

ID	Name	# of Layers	Mod	Tilt	Environmental Conditions	Keff Btu/h-ft-F	Overall Thickness inches	Uval Btu/h-ft-F	SHGC	SC	Tvis	RHC Btu/h-
1	clr887/air/clr887 *	2	#	20	NFRC 100-2001	0.074	1.000	0.566	0.787	0.906	0.821	188.:
2	clr888/air/clr888	2	#	20	NFRC 100-2001	0.067	1.000	0.565	0.774	0.891	0.813	185.:
3	clr889/air/clr889	2	#	20	NFRC 100-2001	0.060	1.000	0.564	0.760	0.876	0.805	182.:
4	clr890/air/clr890	2	#	20	NFRC 100-2001	0.052	1.000	0.559	0.734	0.847	0.784	176.:
5	clr887/arg/clr887**	2	#	20	NFRC 100-2001	0.065	1.000	0.529	0.788	0.906	0.821	188.:
6	clr890/arg/clr890	2	#	20	NFRC 100-2001	0.046	1.000	0.526	0.734	0.847	0.784	176.:
7	cig2021_3mm2nd/air/clr887	2	#	20	NFRC 100-2001	0.043	1.000	0.412	0.369	0.428	0.618	89.7
8	clr887/air/cig2021_3mm3rd	2	#	20	NFRC 100-2001	0.043	1.000	0.412	0.507	0.583	0.618	120.!
9	cig2024_6mm2nd/air/clr890***	2	#	20	NFRC 100-2001	0.031	1.000	0.420	0.358	0.416	0.596	87.0
10	clr890/air/cig2024_6mm3rd	2	#	20	NFRC 100-2001	0.031	1.000	0.420	0.486	0.560	0.596	115.:
11	grd3213_3mm2nd/air/clr887	2	#	20	NFRC 100-2001	0.043	1.000	0.412	0.414	0.479	0.690	99.9
12	clr887/air/grd3216_6mm2nd/arg/clr887	2	#	20	NFRC 100-2001	0.043	1.000	0.412	0.484	0.553	0.690	114.!
13	grd3216_6mm2nd/arg/clr887	2	#	20	NFRC 100-2001	0.031	1.000	0.420	0.399	0.461	0.665	95.9
14	clr890/air/grd3213_3mm3rd	2	#	20	NFRC 100-2001	0.031	1.000	0.419	0.461	0.531	0.665	110.!
15	ppg5281_6mm2nd/arg/clr887	2	#	20	NFRC 100-2001	0.042	1.000	0.409	0.396	0.458	0.726	95.6
16	clr887/air/ppg5281_3mm3rd	2	#	20	NFRC 100-2001	0.042	1.000	0.409	0.473	0.540	0.726	111.!
17	ppg5284_6mm 2nd/air/clr890	2	#	20	NFRC 100-2001	0.031	1.000	0.417	0.386	0.448	0.701	93.2
18	clr890/air/ppg5284_6mm3rd	2	#	20	NFRC 100-2001	0.031	1.000	0.417	0.455	0.524	0.701	108.!
19	cig2021_3mm2nd/arg/clr887	2	#	20	NFRC 100-2001	0.033	1.000	0.349	0.364	0.423	0.618	88.!
20	clr887/arg/cig2021_3mm3rd	2	#	20	NFRC 100-2001	0.033	1.000	0.349	0.511	0.587	0.618	120.!
21	cig2024_6mm2nd/arg/clr890****	2	#	20	NFRC 100-2001	0.025	1.000	0.362	0.354	0.412	0.596	85.5
22	clr890/arg/cig2024_6mm3rd	2	#	20	NFRC 100-2001	0.025	1.000	0.362	0.490	0.565	0.596	116.:
23	grd3213_3mm2nd/arg/clr887	2	#	20	NFRC 100-2001	0.033	1.000	0.348	0.412	0.476	0.690	98.7
24	clr887/arg/grd3213_3mm3rd	2	#	20	NFRC 100-2001	0.033	1.000	0.348	0.486	0.555	0.690	114.:
25	grd3216_6mm2nd/arg/clr890	2	#	20	NFRC 100-2001	0.025	1.000	0.362	0.397	0.460	0.665	95.0
26	clr890/arg/grd3216_6mm3rd	2	#	20	NFRC 100-2001	0.025	1.000	0.361	0.462	0.533	0.665	109.!
27	ppg5281_3mm2nd/arg/clr887	2	#	20	NFRC 100-2001	0.033	1.000	0.345	0.389	0.454	0.726	94.7

Check: Low_e on correct surface, flip function and gas fill:

Gas fill ID #

Flip function to place Low_e on correct surface

(1) E1 = Pane1 surface 1
(2) E2 = Pane1 surface 2

(3) E1 = Pane2 surface 1
(4) E2 = Pane2 surface 2

	ID	Name	Mode	Thick	Flip	Tsol	Rsol1	Rsol2	Tvis	Rvis1	Rvis2	Tir	E1	E2	Cond	Comment
Glass 1	890	CLR_6.AFG	#	0.236	<input type="checkbox"/>	0.801	0.069	0.069	0.883	0.076	0.076	0.000	0.840	0.840	0.578	
Gas 1	10	85% Argon/15% Air		0.528												
Glass 2	2024	EE162-6.CIG	#	0.236	<input checked="" type="checkbox"/>	0.346	0.394	0.246	0.672	0.042	0.056	0.000	0.046	0.840	0.578	

Center of Glass Results						
	Ufactor	SC	SHGC	Rel. Ht. Gain	Tvis	Keff
	Btu/h-ft ² -F			Btu/h-ft ²		Btu/h-ft-F
	0.362	0.565	0.490	116	0.596	0.0246

- Low_e is generally not on exposed surfaces of the glazing unit, e.g. on surface (1) and (4) of double pane glazing unit.

Gas Library (C:\Workshop 2005\Simulation evaluation 2005\Gary Brown\Exam 2005\exam1\Skylight.mdb)

File Edit Libraries Record Tools View Help

Detailed View

Calc
New
Copy
Delete

Find ID

Advanced...

5 records found.

Import
Export
Report
Print

ID	Name	Type	Conductivity Btu/h-ft-F	Viscosity lb/ft-s	Cp Btu/lb-F	Density lb/ft3	Prandtl	Comment
1	Air	Pure	0.013907	0.000011	0.240304	0.080668	0.7197	
2	Argon	Pure	0.009446	0.000014	0.124661	0.111236	0.6704	
3	Krypton	Pure	0.005006	0.000015	0.093256	0.233343	0.6717	
4	Xenon	Pure	0.002981	0.000014	0.037819	0.365608	0.6542	
10	85% Argon/15% Air	Mix	0.010068	0.000013	0.137781	0.106651	0.6784	

Gas fill ID verification

For Help, press F1

Mode: NFRC IP 11:15 AM

Gas Library (C:\Workshop 2005\Simulation evaluation 2005\Gary Brown\Exam 2005\exam1\Skylight.mdb)

File Edit Libraries Record Tools View Help

List
New
Copy
Delete
Save

Gas Library

ID #: 10

Name: 85% Argon/15% Air

Gas Mixture Add Delete

Gas	ID	Name	Percent
Gas 1	1	Air	15.0%
Gas 2	2	Argon	85.0%

Properties at STP

Conductivity 0.010068 Btu/h-ft-F
Viscosity 0.000014 lb/ft-s
Specific Heat 0.137781 Btu/lb-F
Density 0.106651 lb/ft3
Prandtl 0.6784

Property Calculator

Comment:

Protected

Verify Gas fill % and Gas type is correct

For Help, press F1

Mode: NFRC IP 11:16 AM

FRAME Library in WINDOW 5.2:

1. Type: (for slope products vertical members, i.e. Jamb and meeting rail should be sill)
2. Absorptance: (Frame and divider SHGC shall be calculated with a default frame and divider absorptance of 0.3 for all products except window glazed wall, sloped glazing systems as defined in Table 4-1 of NFRC 100, curtain wall and store front as defined in Section 5.6 in NFRC 100. For these products use a default frame and divider absorptance of 0.5.)

ID	Name	Source	Type	Frame Uvalue	Edge Uvalue	Edge Correlation	Glazing Thickness	Pfd	Abs	Color
				Btu/h-ft ² -F	Btu/h-ft ² -F		inches	inches		
1	Al no break	ASHRAE	N/A	1.900	N/A	Class1	N/A	2.250	0.90	
2	Sky-Head-AlumSpacer_001.thm	Therm	Head	3.863	0.540	N/A	1.000	2.050	0.30	
3	Sky-Jamb-AlumSpacer_001.thm	Therm	Sill	3.573	0.540	N/A	1.000	2.055	0.30	
4	Sky-Sill-AlumSpacer_001.thm	Therm	Sill	3.869	0.541	N/A	1.000	2.055	0.30	
5	Sky-Head-AlumSpacer_005.thm	Therm	Head	3.860	0.510	N/A	1.000	2.050	0.30	
6	Sky-Jamb-AlumSpacer_005.thm	Therm	Sill	3.569	0.510	N/A	1.000	2.055	0.30	
7	Sky-Sill-AlumSpacer_005.thm	Therm	Sill	3.865	0.510	N/A	1.000	2.055	0.30	
8	Sky-Head-6mm-AlumSpacer_009.thm	Therm	Sill	3.947	0.426	N/A	1.000	1.980	0.30	
9	Sky-Jamb-6mm-AlumSpacer_009.thm	Therm	Sill	3.844	0.427	N/A	1.000	2.050	0.30	
10	Sky-Sill-6mm-AlumSpacer_009.thm	Therm	Sill	3.838	0.427	N/A	1.000	2.050	0.30	
11	Sky-Head-6mm-AlumSpacer_017.thm	Therm	Sill	3.943	0.381	N/A	1.000	1.980	0.30	
12	Sky-Jamb-6mm-AlumSpacer_017.thm	Therm	Sill	3.840	0.382	N/A	1.000	2.050	0.30	
13	Sky-Sill-6mm-AlumSpacer_017.thm	Therm	Sill	3.833	0.382	N/A	1.000	2.050	0.30	
14	Sky-Head-SB-Lami-AlumSpacer_023.T	Therm	Head	3.830	0.417	N/A	1.000	2.055	0.30	
15	Sky-Jamb-SB-Lami-AlumSpacer_023.T	Therm	Sill	3.829	0.417	N/A	1.000	2.055	0.30	
16	Sky-Sill-SB-Lami-AlumSpacer_023.T	Therm	Sill	3.825	0.418	N/A	1.000	2.055	0.30	
17	Sky-Head-InterSpacer_001.thm	Therm	Head	3.876	0.540	N/A	1.000	2.055	0.30	
18	Sky-Jamb-InterSpacer_001.thm	Therm	Sill	3.869	0.540	N/A	1.000	2.055	0.30	
19	Sky-Sill-InterSpacer_001.thm	Therm	Sill	3.869	0.541	N/A	1.000	2.055	0.30	
20	Sky-Head-InterSpacer_005.thm	Therm	Head	3.872	0.510	N/A	1.000	2.055	0.30	
21	Sky-Jamb-InterSpacer_005.thm	Therm	Sill	3.865	0.510	N/A	1.000	2.055	0.30	
22	Sky-Sill-InterSpacer_005.thm	Therm	Sill	3.865	0.510	N/A	1.000	2.055	0.30	
23	Sky-Head-6mm-InterSpacer_009.thm	Therm	Head	3.886	0.421	N/A	1.000	2.055	0.30	
24	Sky-Jamb-6mm-InterSpacer_009.thm	Therm	Sill	3.849	0.428	N/A	1.000	2.055	0.30	
25	Sky-Sill-6mm-InterSpacer_009.thm	Therm	Sill	3.844	0.428	N/A	1.000	2.055	0.30	
26	Sky-Head-6mm-InterSpacer_017.thm	Therm	Head	3.880	0.376	N/A	1.000	2.055	0.30	
27	Sky-Jamb-6mm-InterSpacer_017.thm	Therm	Sill	3.844	0.383	N/A	1.000	2.055	0.30	
28	Sky-Sill-6mm-InterSpacer_017.thm	Therm	Sill	3.840	0.383	N/A	1.000	2.055	0.30	

Grouping: In this example following glazing can be grouped.

	SR	ID	Gap	ID		Glazing ID
G1	1*	Clr 3mm	Air	Clr 3mm		887/A/887
G1	2	Clr 4mm	Air	Clr 4mm		888/A/888
G1	3	Clr 5mm	Air	Clr 5mm		889/A/889
G1	4	Clr 6mm	Air	Clr 6mm		890/A/880
G2	5*	Clr 3mm	Ar 85%	Clr 3mm		887/AG/887
G2	6	Clr 6mm	Ar 85%	Clr 6mm		890/AG/890
G3	7	LoE=0.04(2 nd) 3mm	Air	Clr 3mm		2021/A/887
G3	8	LoE=0.04(2 nd) 3mm	Air	Clr 3mm		3213/A/887
G3	9	LoE=0.04(2 nd) 3mm	Air	Clr 3mm		5281/A/887
G3	10*	LoE=0.04(2 nd) 6mm	Air	Clr 6mm		2024/A/890
G3	11	LoE=0.04(2 nd) 6mm	Air	Clr 6mm		3216/A/890
G3	12	LoE=0.04(2 nd) 6mm	Air	Clr 6mm		5284/A/890
G3	19	Clr 3mm	Air	LoE=0.04(3 rd) 3mm		887/A/2021
G3	20	Clr 3mm	Air	LoE=0.04(3 rd) 3mm		887/A/3213
G3	21	Clr 3mm	Air	LoE=0.04(3 rd) 3mm		887/A/5281
G3	22	Clr 6mm	Air	LoE=0.04(3 rd) 6mm		890/A/2024
G3	23	Clr 6mm	Air	LoE=0.04(3 rd) 6mm		890/A/3216
G3	24	Clr 6mm	Air	LoE=0.04(3 rd) 6mm		890/A/5284
G4	14	LoE=0.04(2 nd) 3mm	Ar 85%	Clr 3mm		3213/AG/887
G4	15	LoE=0.04(2 nd) 3mm	Ar 85%	Clr 3mm		5281/AG/887
G4	16*	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm		2024/AG/890
G4	17	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm		3216/AG/890
G4	18	LoE=0.04(2 nd) 6mm	Ar 85%	Clr 6mm		5284/AG/890
G4	25	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		2021/AG/887
G4	26	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		3213/AG/887
G4	27	Clr 3mm	Ar 85%	LoE=0.04(3 rd) 3mm		5281/AG/887
G4	28	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		2024/AG/890
G4	29	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		3216/AG/890
G4	30	Clr 6mm	Ar 85%	LoE=0.04(3 rd) 6mm		5284/AG/890
G5	31*	3mm Solar-Ban 60	Air	6mm clear laminate		5281/A/7404

FRAME CROSS SECTION – Evaluation (THERM files):

- 1) Grouping
 - i. Spacer
 - ii. Divider
 - iii. Frame
- 2) Profile checking
- 3) Material
- 4) Cross-section property
- 5) Glazing details
- 6) Spacer (link to glazing cavity)
- 7) Divider (argon fill link)
- 8) Emisivities
- 9) Boundary condition and tags
- 10) Special cases
 - i. Skylight
 - ii. Curtain wall
 - iii. TDD

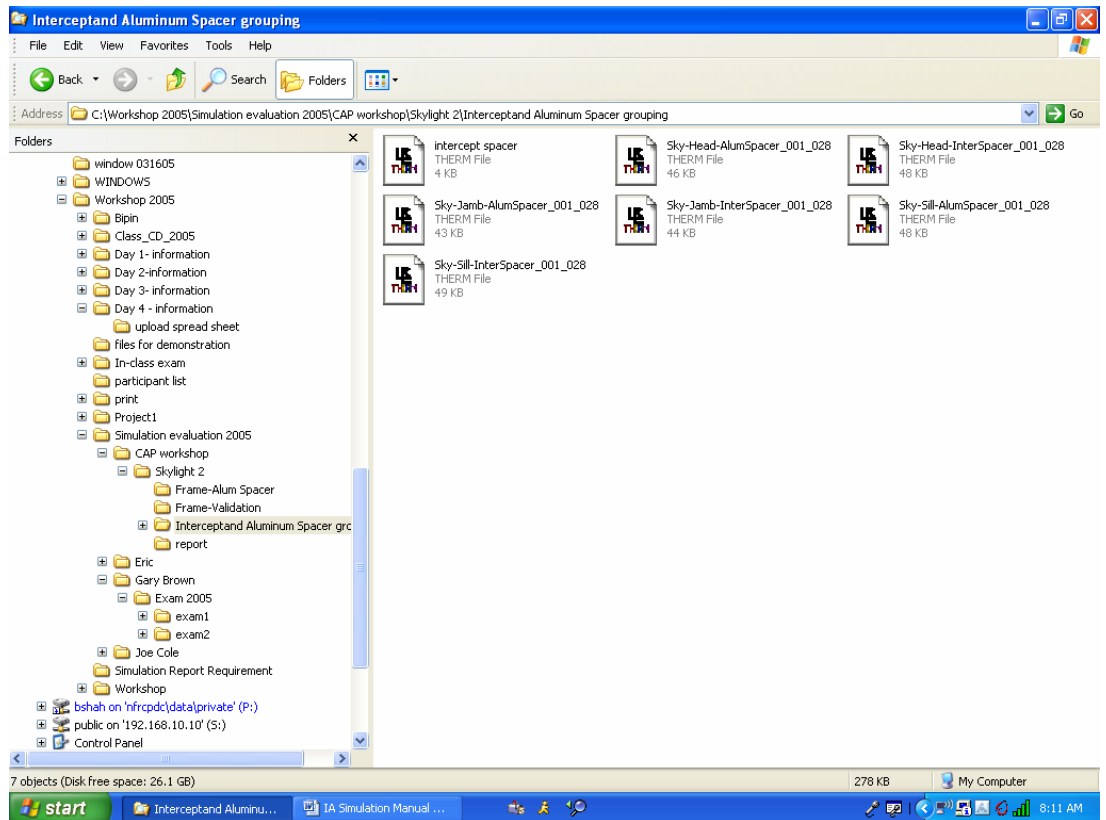
e)c) Grouping

- i. Spacer
- ii. Divider
- iii. Frame

Note: Rules for grouping need to be followed per NFRC 100 procedure.

Spacer:

- Check that best glazing is modeled in each cross-section models.
- All spacers need to be modeled.
- Whole product U-factors need to be compared to determine group leader.
- All files need to be part of the final report submitted.
- Report should indicate the spacer group leader.
- All spacer drawings need to be part of the final report



Divider:

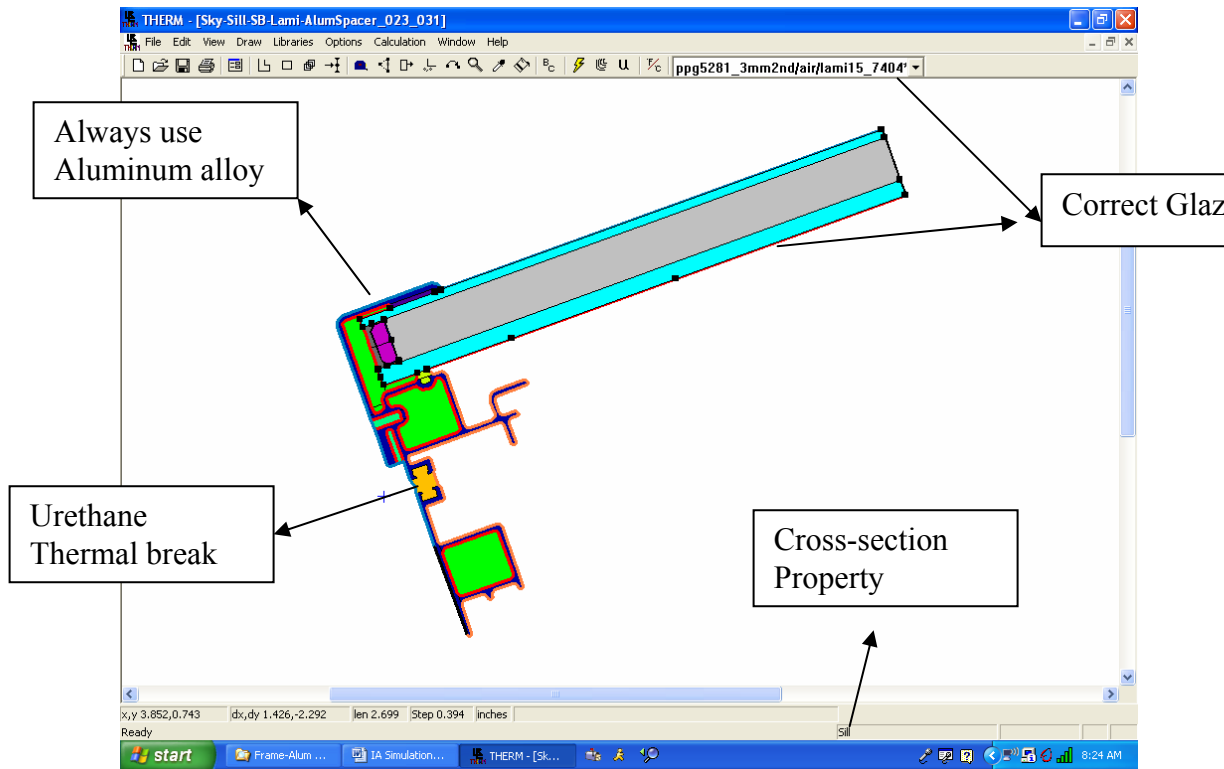
- Check that best glazing is modeled in each divider models
- Whole product U-factors need to be compared to determine group leader
- All files need to be part of the final report submitted
- Report should indicate the divider group leader
- All divider drawings need to be part of the final report

Frame:

- Check that best glazing is modeled in each cross-section models
- All frame cross-section options need to be modeled
- Whole product U-factors need to be compared to determine group leader
- All files need to be part of the final report submitted.
- Report should indicate the spacer group leader
- All frame options and assembly drawings need to be part of the final report

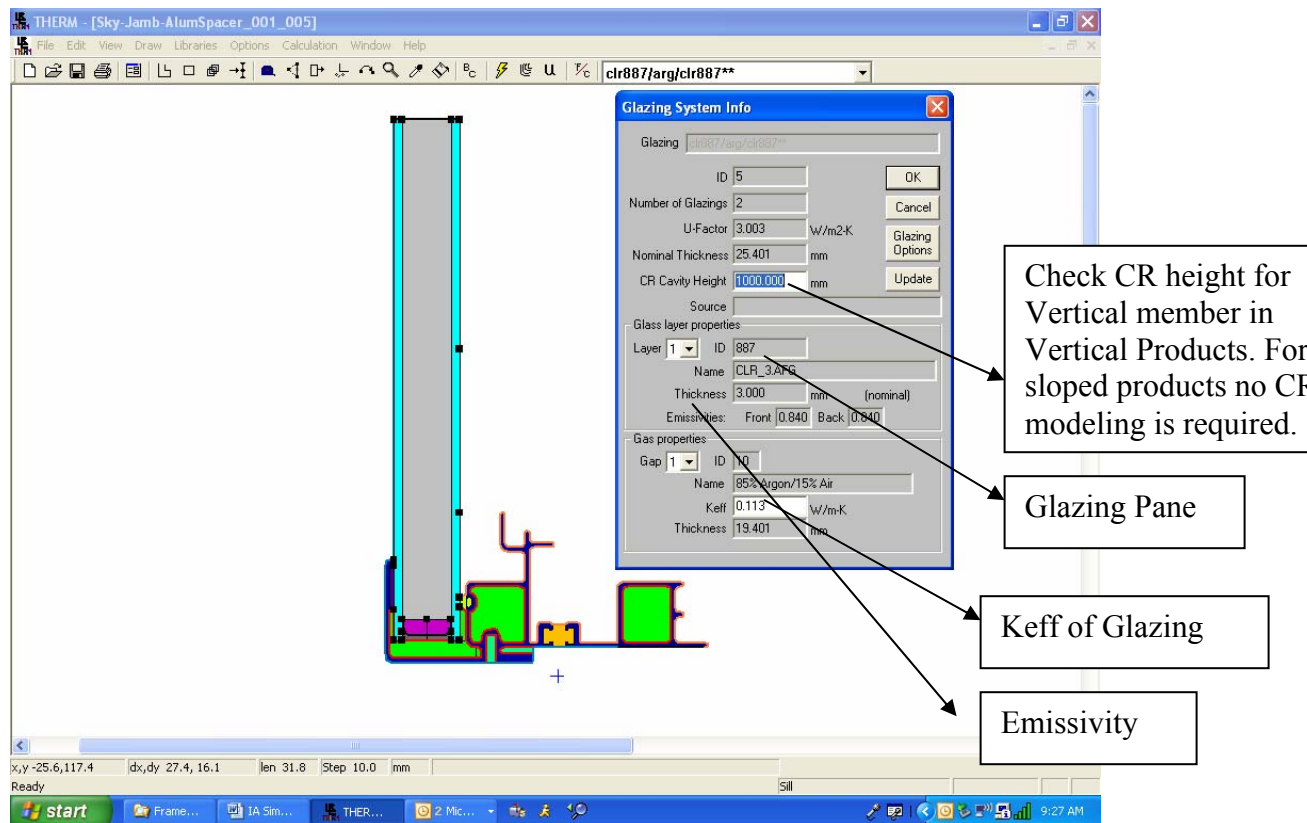
fd) Profile checking – Material – Cross-section property

- Make sure that product cross-section profile matches the simulation model
 - Check assembly drawing and die drawings
- Check material properties used for product components
 - Thermal break material
 - Material not in THERM and NFRC 101 library need to meet NFRC 101 requirements.
 - Spacer details and material used



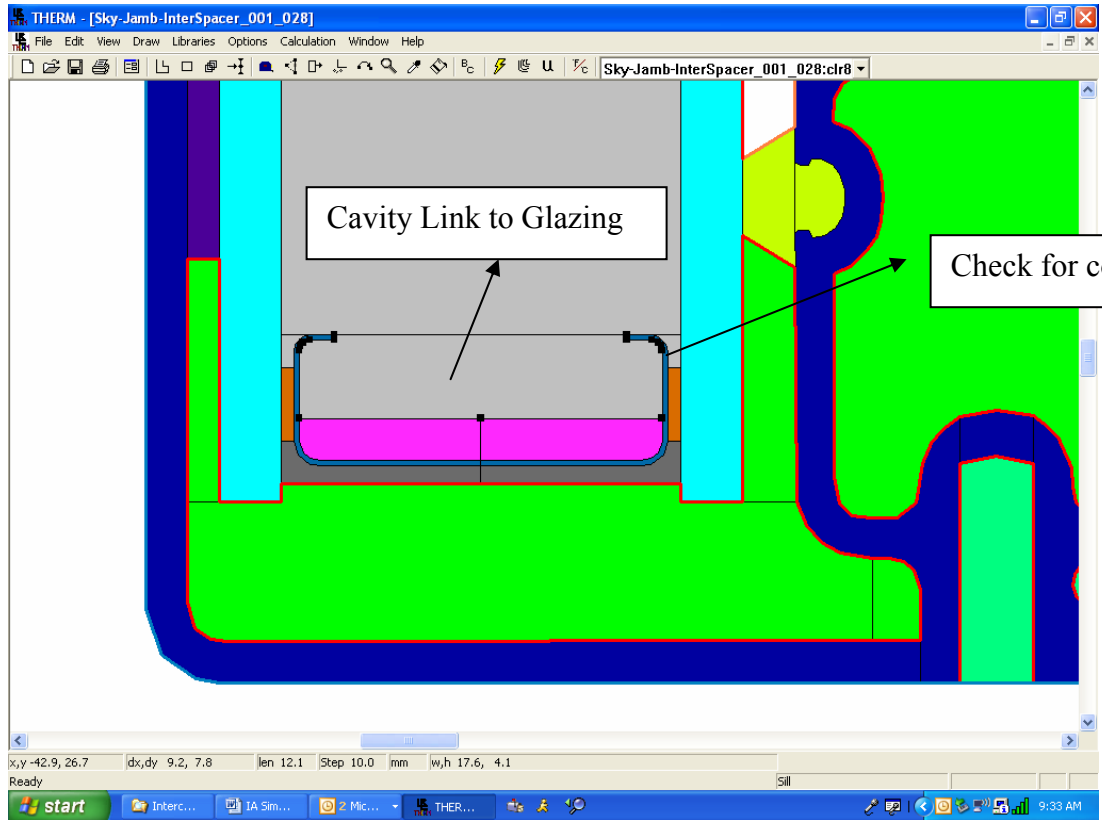
- Check if correct cross-sectional property is used.

IV. Glazing details – Spacer (link to glazing cavity) – Divider (argon fill link) – Emissivities

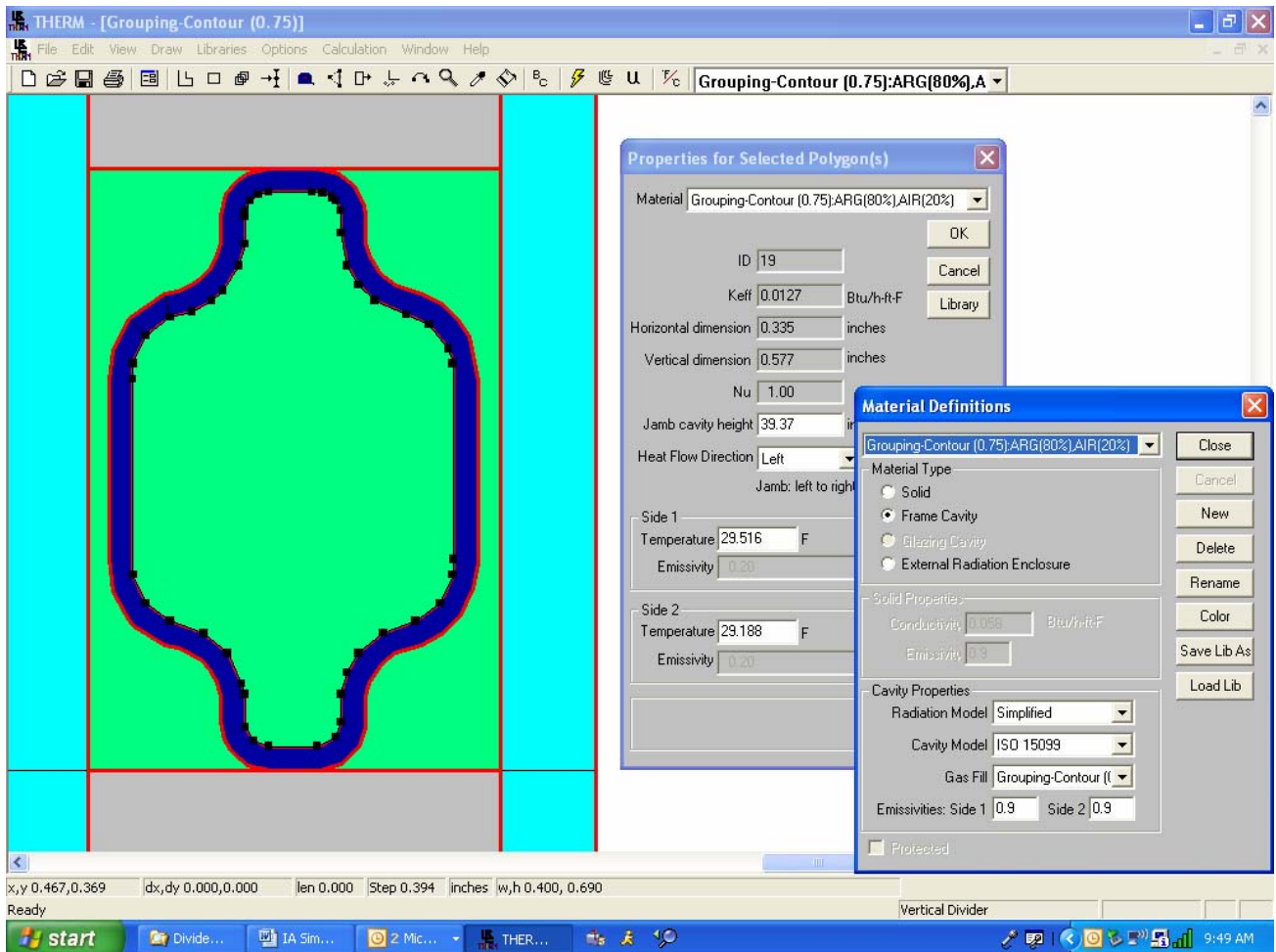


Glazing IG unit information can be checked by double clicking on the glazing unit.

- Check CR height
- Check if for all cross-section of a product has same effective Conductivity, Keff.
- Check glass and emissivity surfaces

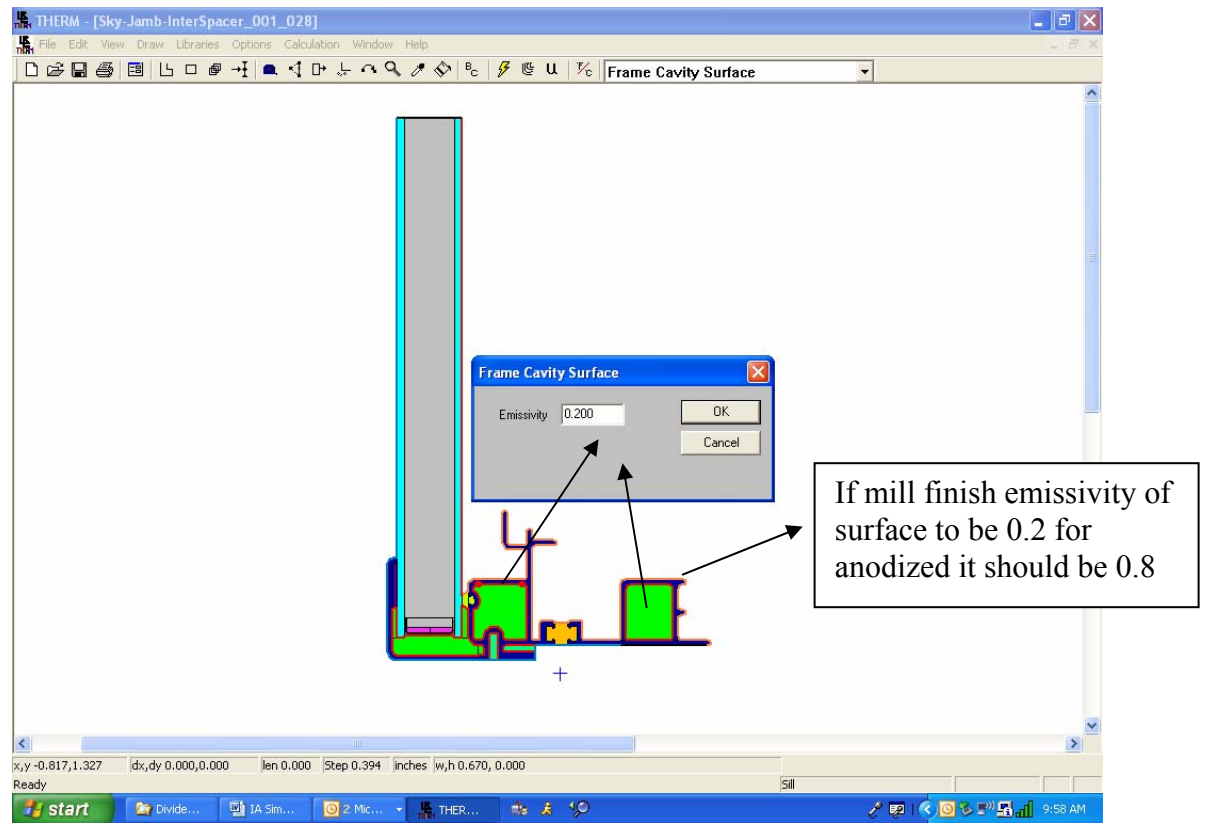


- Spacer cavity linked to glazing cavity should be linked correctly

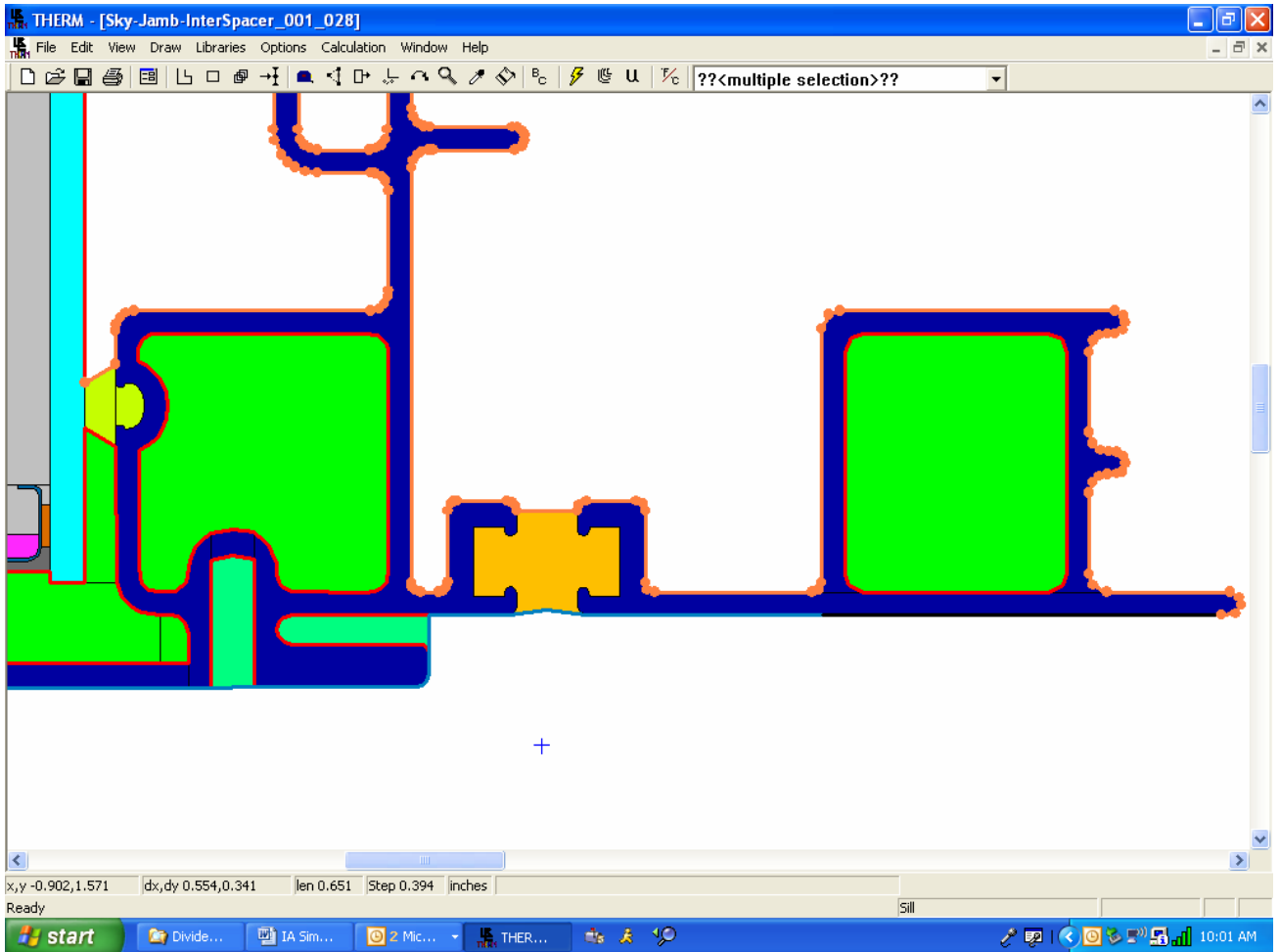


- Glazing with gas fill (Argon, krypton ...) and having a divider shall be modeled with air cavities having material property derived from WINDOW glazing library
 - Verify if the material is a frame cavity using ISO 15099 cavity model and simplified radiation model
- Check interior emissivity of aluminum divider cavity which should be 0.2.

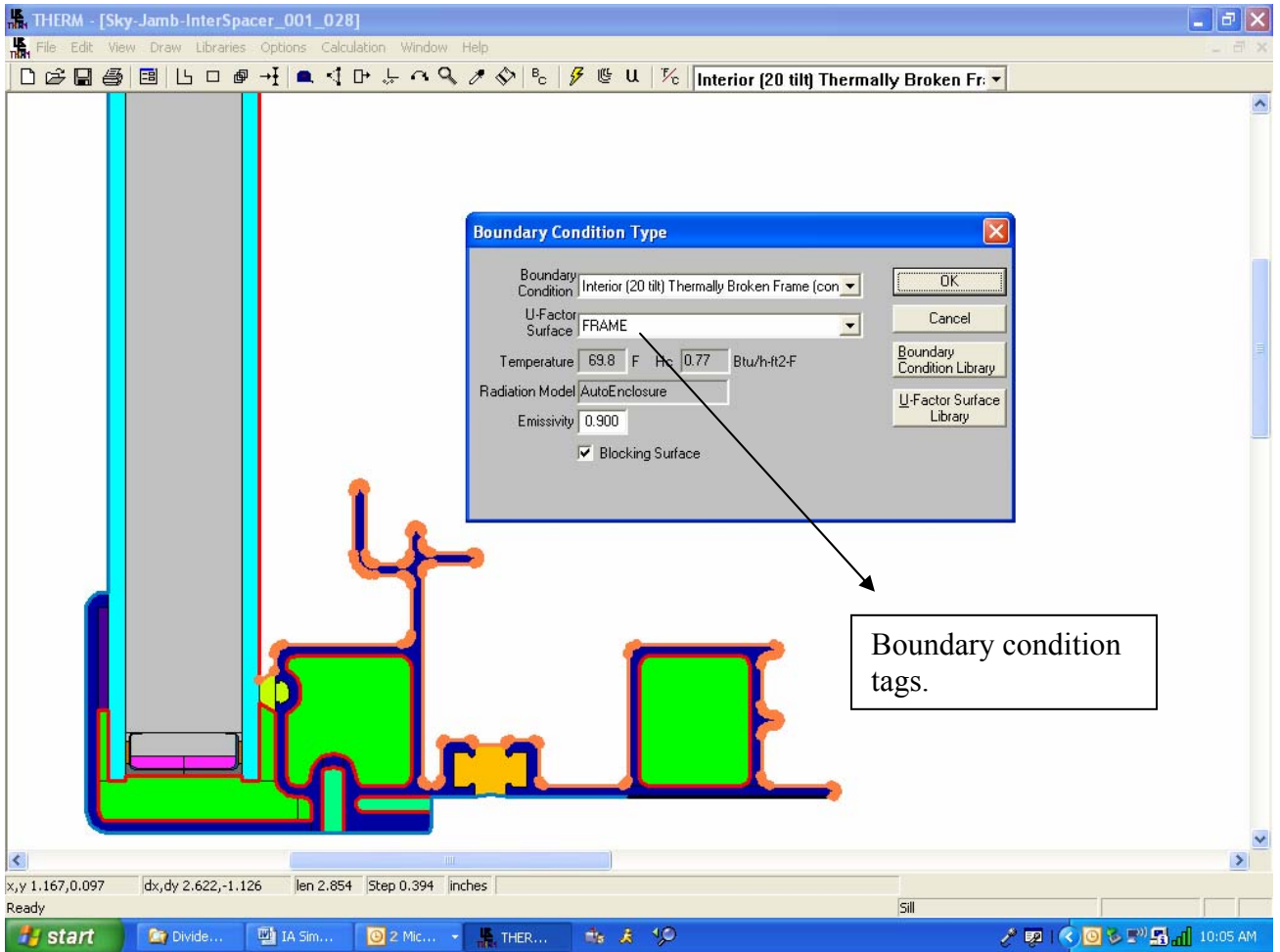
V. Emissivities – Boundary condition and tags



- Emissivity of aluminum extruded enclosed cavity is 0.2 and not 0.9



- By highlighting the boundary condition (BC) one can check if correct BC is used. As in the case above the window indicating ??<multiple selection>?? Identifies that incorrect BC is used. Then check where error is made by selection lesser BC.
- Check for correct BC tags



b) Special Cases: Skylight, Curtain wall and TDD

Skylight and Slope glazing wall:

- Check if Jamb (vertical cross sections) property are selected as sill
- Gravity arrow for Jamb (vertical cross sections) section is selected as 'Right'.
- Sill and head cross section tilted to represent 20 degree slope
- Boundary Condition for 20 deg. Slope to be selcted
- Model for validation testing to be modeled at 90 deg.
- Jamb for 90 deg validation model should have correct gravity arrow (inword) and BC (regular BC not 20 deg slope).
- No CR modeling required for slope products

Curtain wall:

- Jamb, head and sill cross-section to be modeled in accordance with TI-2003-12

Interpretation Requested:

- a) For a Curtain Wall, how can the Jambs, Head and Sill cross-sections be modeled to reflect center line to centerline modeling?
- b) For a Window Wall or strip window, how can the Jamb cross-sections be modeled to reflect center line to center-line modeling?

<i>Date Requested:</i>	<i>Initial Interpretation Date:</i>	<i>Final TIPC Approval Date:</i>
06/03/03	06/08/03	06/08/03

Pertinent Document:

NFRC 100 (2001), NFRC 200 (2001), NFRC 500 (2001)

<i>Referenced Sections:</i>	<i>Referenced Pages:</i>
NFRC 100 – Table 1 foot notes	Page 21

Interpretation :

For determining the NFRC Rating:

- 1) Simulate the intermediate vertical as jambs and the intermediate horizontal members as head and sill, with the glazing modeled on both sides.
- 2) Assign the boundary condition in accordance with the THERM/WINDOW simulation manual.
 - c) Determine one-half of the frame cross-section (see attached figure) by measuring the PFD dimension from site-line to site-line on the interior and dividing the distance by a factor of 2. Draw a datum line and insert a point in the THERM file on the interior and exterior sides of the frame section at this intersection. This will allow you to assign different U-Factor and SHGC tags to each half.
- 4) When using the intermediate horizontal member as the head and sill, the member shall be run (calculated) twice, once as the head and once as the sill as follows:
- 5) When running the section as the sill, set the “properties” in the THERM file to Sill. Set the U-factor tag on the interior centerline point to the top site-line as Frame, and the first 63.5mm of the glass as edge. (NOTE: If CR calculations will be performed, make sure

- that the glazing cavity height is set to 1900mm). Assign the lower half of the frame and bottom glass a U-factor tag of 'None'. On the exterior side, assign the top half of the frame center-line to site-line as SHGC exterior. All other sections on the exterior are assigned a tag of 'None'.
- 6) When running the section as the head, set the "properties" in the Therm file to Head. Set the U-factor tag on the interior centerline point to the bottom site-line as Frame, and the first 63.5mm of the glass as edge. (NOTE: If CR calculations will be performed, make sure that the glazing cavity height is set to 1900mm). Assign the upper half of the frame and top glass a U-factor tag of 'None'. On the exterior side, assign the bottom half of the frame center-line to site-line as SHGC exterior. All other sections on the exterior are assigned a tag of 'None'.
 - 7) When using the intermediate vertical member as the jambs, the member shall be run (calculated) twice, once as the left jamb and once as the right jamb as follows:
 - 8) When running the section as the right jamb, set the "properties" in the THERM file to Jamb. Set the U-factor tag on the interior centerline point to the top site-line as Frame, and the first 63.5mm of the glass as edge. (NOTE: CR calculations are not applicable to jamb sections). Assign the lower half of the frame and bottom glass a U-factor tag of 'None'. On the exterior side, assign the top half of the frame center-line to site-line as SHGC exterior. All other sections on the exterior are assigned a tag of 'None'.
 - 9) When running the section as the left jamb, set the "properties" in the THERM file to Jamb. Set the U-factor tag on the interior centerline point to the bottom site-line as Frame, and the first 63.5mm of the glass as edge. (NOTE: CR calculations are not applicable to jamb sections). Assign the upper half of the frame and top glass a U-factor tag of 'None'. On the exterior side, assign the bottom half of the frame center-line to site-line as SHGC exterior. All other sections on the exterior are assigned a tag of 'None'.
 - 10) Determine frame and edge-of-glazing U factors for each cross-section.
 - 11) Use the values obtained for the jambs, head, sill and the intermediate vertical member in equation 4 of NFRC 100 to calculate the total U-factor.
 - 12) The same procedure shall be used to calculate SHGC, VT and Condensation Resistance.

For representative product used for validation test:

a) Simulate the full vertical intermediate member twice. Once with the left glass replaced with wood, which is the same thickness as the IG unit, and once with the right glass replaced with wood, which is the same thickness as the IG unit. The wood shall extend to the original site line (This is for the left and right jambs).

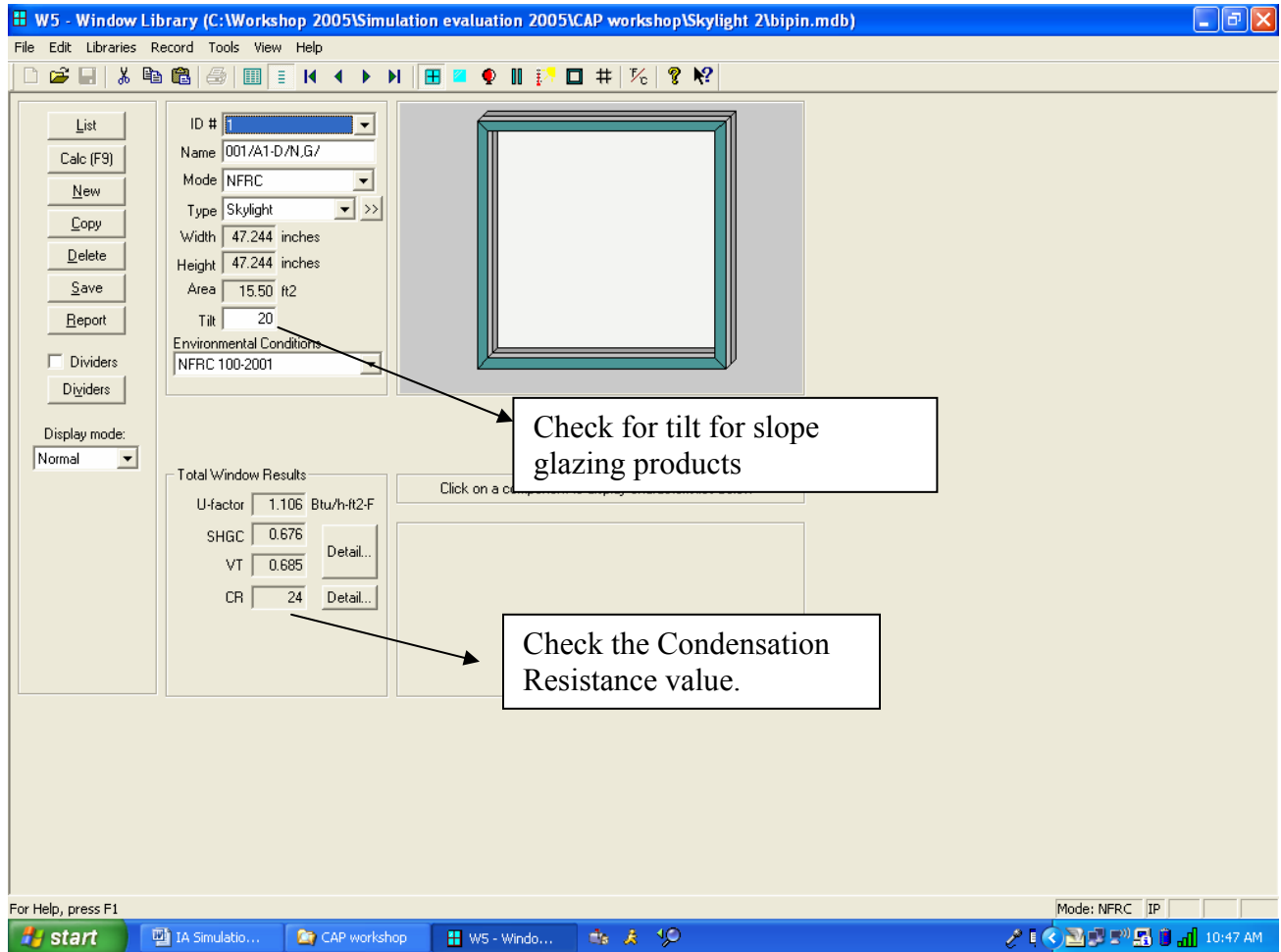
b) Simulate the full intermediate horizontal member twice. Once with the top glass replaced with wood, which is the same thickness as the IG unit, and once with the bottom glass replaced with wood, which is the same thickness as the IG unit. The wood shall extend to the original site line (This is for the head and sill).

Produce the test sample with the same cross sections as simulated in steps a & b.

The reported product simulated value shall be based on the simulations as performed in steps 1 through 7. Validation is checked by comparing the values obtained by simulating the product using steps a & b and the physical test results.

WHOLE PRODUCT – Evaluation (WINDOW5 files):

- 2) All options (group leader) modeled
- 3) Grouped product options
- 4) Validation test option
- 5) Special cases



The screenshot shows a software interface for window simulation. The top window displays a table of window records. The bottom window shows a detailed view of a selected skylight window, including a 3D model and a 'SHGC and VT detail' dialog box.

ID	Name	Type	Width (inches)	Height (inches)	Ufactor (Btu/h-ft ² -F)	SHGC	Tvis	CR
1	001/A1-D/N.G./	Skylight	47.24	47.24	1.106	0.676	0.685	24.5
2	005/A1-D/N.G./	Skylight	47.24	47.24	1.076	0.677	0.685	24.6
3	009/A1-D/N.G./	Skylight	47.24	47.24	0.986	0.318	0.496	24.8
4	021/A1-D/N.G./	Skylight	47.24	47.24	0.938	0.315	0.496	25.0
5	031/A1-D/N.G./	Skylight	47.24	47.24	0.980	0.344	0.590	24.4
11	024/A1-D-/Validation	Skylight	47.24	47.24	0.755	0.412	0.605	N/A
21	028/CU-D-/spacer	Skylight	47.24	47.24	0.921	0.416	0.605	25.2
22	028/A1-D-/spacer	Skylight	47.24	47.24	0.921	0.416	0.605	46.2

SHGC and VT detail			
	No Dividers	Generic Dividers	Generic Dividers
PDD (inches)	N/A	0.75000	1.50000
SHGC0	0.01953	0.02228	0.02488
SHGC1	0.85322	0.77126	0.69370
VT0	0.00000	0.00000	0.00000
VT1	0.83369	0.74899	0.66882

SHGC₀ and SHGC₁, VT₀ and VT₁ are selected from the product with best U-factor.

SHGC₀ and SHGC₁, VT₀ and VT₁ are selected from the product with best U-factor. These values should be compared with the entries in the Upload spread sheet to be correct.

W5 - Window Library (C:\Workshop 2005\Simulation evaluation 2005\CAP workshop\Skylight 2\bipin.mdb)

File Edit Libraries Record Tools View Help

Window Library (C:\Workshop 2005\Simulation evaluation 2005\CAP workshop\Skylight 2\bipin.mdb)

ID	Name	Type	Width	Height	Ufactor	SHGC	Tvis	CR
			inches	inches	Btu/h-ft ² -F			
1	001/A1-D/N,G/	Skylight	47.24	47.24	1.106	0.676	0.685	24.5
2	005/A1-D/N,G/	Skylight	47.24	47.24	1.076	0.677	0.685	24.6
3	009/A1-D/N,G/	Skylight	47.24	47.24	0.986	0.318	0.496	24.8
4	021/A1-D/N,G/	Skylight	47.24	47.24	0.938	0.315	0.496	25.0
5	031/A1-D/N,G/	Skylight	47.24	47.24	0.980	0.344	0.590	24.4
11	024/A1-D/Validation	Skylight	47.24	47.24	0.755	0.412	0.605	N/A
21	028/CU-D/spacer	Skylight	47.24	47.24	0.921	0.416	0.605	25.2
22	028/A1-D/spacer	Skylight	47.24	47.24	0.921	0.416	0.605	46.2

Options

Validation option

Spacer grouping option

8 records found.

Import
Export
Report
Print

For Help, press F1

Mode: NFRC IP

start CAP workshop W5 - Windo... IA Simulation... 10:50 AM



IA Plant Inspection Checklist

(Recommended checklist for conducting plant inspections)

Pre-Inspection Checklist

Manufacturer/ Plant Contact information:

- Licensee Name (Responsible party/Manufacturer name):
- Licensee Contact Name:
- Licensee alternate contact name:
- Licensee Address:
- Licensee Telephone Number:
- Licensee Fax:
- Licensee Email:
- Plant Name:
- Plant Contact Name:
- Address (facility to be inspected):
- Telephone Number:
- Fax:
- Email:
- Date of Inspection:
- IA inspector Name:

(Verify if the above manufacturer information is correctly listed in the Schedule I and the Certified Products Database)

Product Information:

- Print out the product line listing report from NFRC database for the licensee whose facility/plant is to be inspected.
- Print out the Schedule II report and compare the products listed to the active product line listing from the NFRC database; discrepancies found, if any, should be verified and discussed during inspection.
- Prepare a list of product lines to be inspected during the inspection. Have an individual inspection-checklist for each product line to record observations and findings.
- Copy of the Simulation Reports and Test Reports for product lines to be inspected.
- Copy of the CAR for product lines to be inspected.

- List of non-compliances, if any, from previous inspection to verify that non-compliance has been corrected.

Inspection Equipment:

- Camera to record non-compliance.
- Equipment for measurements such as calipers and tape measure
- Equipment to measure IG-Unit glass thickness and gap width.
- Equipment to verify the presence of Low-E and placement of the coating in an IG unit, e.g., Emissometer (capable of determining the surface of low emissivity coatings)

During Plant Inspection - Checklist

- Verify plant and contact information. If there are any changes, communicate those changes to NFRC staff.
- Verify information provided in the Schedule I and II report in relation to the plant location being inspected.
 - Is plant location listed on the Schedule I?
 - Are the authorized products listed on the Schedule II for the plant location, the same products being produced there?
 - If any discrepancies are found, report discrepancy to NFRC.

Quality Control Program

- Verify in-house Quality Control Program, as defined in the *NFRC PCP*. Document procedures to follow to meet compliance. Obtain copy/updates of manufacturer’s quality control procedures related to NFRC certification.
 - Review work order process.
 - Review incoming material inspection/rejection QC procedure
 - Review in-line process QC procedure to maintain quality
 - Review final assembly inspection/corrective action/rejection process
 - Review the process for accurate selection and application of NFRC labels
- All QC records shall be retained for a period of four years.
- Obtain the name of the persons in charge of the quality control program and/or NFRC labeling.
- Determine how the quality control procedures are implemented and if the responsible person at the facility is well-informed and trained for following the process.
- QC procedures shall be documented and be available to all responsible persons at the plant.
- The QC program shall include procedures for accepting or rejecting incoming material.

- The QC program shall include procedures for addressing and resolving product complaints.
- The QC program shall include procedures for controlling, calibrating, and maintaining inspection and test equipment used by plant personnel.
- The QC program shall include a method for handling non-conforming materials.
- The QC program shall include internal quality audits.

Assembly Components

- Verify that all components used in the product assembly are equivalent to those materials used in the simulation report.
 - Spacer – type and dimensions
 - Divider – material and dimensions
 - Frame – frame and sash components, material, and geometry
 - Sealant – primary and secondary sealant material

Glazing Unit

- Verification of Glazing Unit
 - Manufacturer of Glass
 - Manufacturer of glazing unit
 - Number of glazing panes in the unit
 - Glass type, tint and thickness
 - Capillary or breather tubes
 - Is the tube pinched after gas fill or at field (if in field then confirm the use of air for simulation modeling)
 - Identify the Gap Width
 - Obtain a copy of the Purchase Order from manufacturer to determine if any substitution of the glazing is done over reasonable period of the inspection intervals.
 - Verification of Low E glass manufacturer and model.
- Verification of the use of gas- Argon, Krypton and other gas fills
 - Inspection and verification that the gas-fill technique is equivalent to that specified in the simulation report.
 - Inspection and verification that the gas-fill equipment is operating correctly; and
 - Inspection of recent gas-fill invoices or Verification that the responsible party has on record a letter indicating the gas-fill process and percentage from the supplier of sealed insulating glass units. Obtaining copy(s) of the Purchase Order to record the use.

Glass Collapse

- Verify that the gap width reduction does not exceed the allowable reduction widths. The NFRC IA shall check the center of glass gap width reduction for IG units used in NFRC Certified Products during each In-plant inspection.
 - Edge of Glazing gap measurement (within 1” of the site line)
 - Center of glazing gap measurement
- At least three randomly selected units shall be checked during the inspection.

- Gap Width Reduction shall:
 - Be measured in the vertical or near vertical position
 - Be calculated by subtracting the center of glass gap measurement from the gap measured as near to the glass edge as possible
 - Be performed indoors on new, finished products at ambient temperature and pressure
 - Be measured on a window size similar to the NFRC test size requirement
 - Be measured to an accuracy of 1 mm
- Permitted Gap Reduction:
 - ≤ 13 mm (1/2") design gap, 3 mm (1/8") maximum reduction permitted.
 - > 13 mm (1/2") design gap, 6 mm (1/4") maximum reduction permitted.
 - There shall be no contact between glazing layers and components (e.g., divider and glass) except as noted.
 - **NOTE: Contact with buttons serving as grid locators are permitted.**
- At least three (3) randomly selected units shall be checked during inspection.
 - If one of the three units checked fails to comply with the permissible gap width reduction allowed, ten additional units shall be inspected.
 - If one of the ten additional units inspected fail to comply with the permissible gap width reductions allowed, notify the manufacturer/responsible party of this deficiency in the inspection report.

Divider (Grids)

- Inspection of grid system(s) for their application. Internal grids shall meet the minimum clearance tolerance as defined in NFRC 100 (3 mm or 0.118 in.) if not simulated. If due to glass collapses the gap is less than 3mm recorded the observation and report to NFRC.
- If Grid (Divider) is simulated in a glazing unit and gap is reduced to make contact of dividers due to glazing collapse recorded the observation and report to NFRC.
- Glazing option included in the simulation matrix and CAR. SHGC and VT representative of the glazing system used (except when grouping rules of NFRC 200 is used in which case be representative in accordance with NFRC 200 rules.)
- Divider width and material

Spacer System

- Verification of spacer system(s) to assure compliance with simulation report. Can be done through verification of purchase orders of component material and sealants and/or visual verification
 - List spacer type
 - Sealant used - primary and secondary

Labels:

- Inspection of finished units for accuracy of assembly and labeling requirements
 - Get a copies of the labels to document compliance with NFRC-PCP
 - Verify compliance of the Temporary Label with PCP and CAR.
 - Verify compliance of the Permanent Label with PCP and CAR.
 - Identify where the permanent label is affixed.
 - Product line series name same as listed in NFRC CPD
 - CPD number listed if sold by entity other than the licensee.
- Label confirms to the format specified in NFRC PCP and approved by the IA.
 - At minimum all mandatory ratings specified on the label, U-factor, SHGC and VT. Additional ratings.
 - Label width and/or height shall not be less than 3.75 inches nor greater than 6 inches.
 - The width may be no greater than the height.
- Format to compliance
 - The 2003 one-size labels shown in Figure B-1 and Figure B-2 shall not be used after April 1, 2006.
 - The one-size labels (2005) shown in Figure B-3 and Figure B-4 shall be used on all newly printed labels as of May 16, 2005.
 - Existing 2003 labels may be used until April 1, 2006.
 - The “CM” mark on existing 2003 labels may be struck out as long as the ® mark is added.
 - The term "RES97" shall be used as shown in Figure B-4 for Temporary Labels with NFRC 1997 ratings.
- Requirements and optional information description be verified on a NFRC labeled units glazing. PCP section B6 and B7.
- Verify label usage monthly/quarterly/yearly and if reported to the IA accurately.
- Review and inspection of certification label control techniques (get a copy of the CAR for comparison)
- Verification that any production line test sample units(s) submitted for testing are ordered through the normal in-plant work scheduling system. (get paperwork showing this is true)

Exit Interview:

- Compliance verification of previous inspection if any.
- Perform an Exit Interview with the responsible person at site
 - Report all non-conformance and recommended findings.
 - Clear identify the time frame for meeting compliance as indicated in the NFRC-PCP
 - Means to ask for extension to meet compliance
 - Consequences of non-compliance
 - Appeals procedure.
- Obtain signature of the responsible party on the inspection form statement that he/she agrees with the inspectors finding and have understood the consequences on non-compliance if not addressed in due time frame. He/she also understands the rights to appeal procedure.

NFRC Post Inspection Checklist

- Update the Certified Products Database for information related to plant inspection. Add any additional comments in the comments field as necessary.
- Report actions to be taken, if any, by Licensee to continue with the certification.
- Generate a formal report and issue the report to the manufacturer with a copy to NFRC.
- Notify NFRC of any corrective actions taken by facility/plant responsible party.