Phius Certified Window Program:

Application & Instructions

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Purpose

The Passive House Institute US (“Phius”) developed the voluntary Phius Certified Window Program (“Program”) to make verified, component-level performance data for windows, doors, and skylights readily available to passive building practitioners.

Manufacturers who have their window component performance data verified by Phius can better position their products in the marketplace by providing practitioners with the information they need to specify high-performance products in their projects. Manufacturers seeking Certification supply the required product and testing data to Phius, from which a custom performance data set is generated. This data is then summarized and distributed in the form of a Phius Certified Product certificate.

Certified products receive a Phius Certified Product mark upon completion of the certification/verification process. The Phius-certified product performance values are then published to the Phius Certified Product Database on www.phius.org where they are publicly available to practitioners.

1. Program Overview

The Phius Certified Window Program is a voluntary program intended to verify the accuracy and appropriateness of the energy performance data for windows and their components needed to accurately model passive building energy balances. For best accuracy in building energy modeling, window performance data (e.g. U-values) are needed at the component level, that is, for the frame and glass separately, so that the performance of the windows can be calculated for the exact sizes and configurations planned in the project. The Phius certification process follows the appropriate window simulation protocols and conditions for high-performance windows, doors, and skylights.

Two options are available when selecting a path to Phius Certification:

- **Orange Path**: Based on EN standards, this protocol calculates center-of-glass U-value per EN 673, center-of-glass solar gain per EN 410, and frame/spacer performance per EN 10077-2. No NFRC certification nor CPD listings are required, and physical testing is required nor performed.
  - To pursue the Orange Path to certification, please contact Michael Franco, Phius Product Certification Manager, at mfranco@phius.org

- **Blue Path**: Based on NFRC standards, this protocol generates calculations per ISO 15099. Full NFRC certification for each product combination and current NFRC CPD numbers and listings are required to use this path.
  - Manufacturers who have already (or are currently pursuing) NFRC certification should select the Blue Path in order to save time and money by avoiding additional calculation costs.
  - To pursue the Blue Path to certification, the first step is to contact a Phius-trained NFRC-accredited Blue Path Simulator.

In addition to the calculations required for the Orange Path and Blue Path protocols, the following information is also calculated:

- Climate-zone-dependent center-of-glass U-value
  - Phius can support the Manufacturer with how to use LBNL WINDOW software to calculate climate-dependent center-of-glass properties upon request.
- Whole-window U-value for a standard size unit

Regardless of which calculation protocol is selected, the resulting verified performance data labels have the same format and include the following information:

- Frame U-value (U-Frame)
- Linear bridge coefficient for the spacer/edge-of-glass effect (Psi-Spacer)
- Center-of-glass U-value (U-COG)
- Center-of-glass solar heat gain coefficient (SHGC)

The differences between the two calculation protocols are as follows: for the Blue Path the data are taken from the Lawrence Berkley National Laboratory (LBNL) THERM and WINDOW files that are minimally modified from NFRC standards instead of completely recalculated per CEN standards as with the Orange Path. This adjustment entails converting the extra heat loss from NFRC's 2.5-inch-wide edge-of-glass area into an equivalent linear coefficient. By selecting the Orange Path, Manufacturers receive compatible/comparable ratings to the values typically assigned to imported European windows. Both protocols support passive building practitioners with the component-level window data they need

to perform building energy modeling, and Phius considers the certifications from each path to be functionally equivalent for Phius project (building) certification.

The color differences on the data label (Blue Path vs. Orange Path) are used to indicate that the CEN and NFRC methods are not strictly comparable for comparison shopping purposes due to subtle calculation method differences between the two protocols. However, for building energy modeling and Phius project certification purposes, both data sources are considered valid.

1.1 Certification Protocol

1.1.1 Orange Path

1. The Manufacturer works with the Phius Product Certification Manager to determine the scope of work, after which Phius develops the quoted cost for the job (not-to-exceed estimate, current pricing information is available upon request). The Agreement is then executed and Phius invoices the Manufacturer for the down payment.
2. The Product Certification Manager assigns an independent third-party calculation provider/simulator, licensed and trained through Phius, to perform the necessary calculations and simulations.
3. A Reviewer performs a review and spot check of the calculations and informs the Simulator of any required corrections. The Product Certification Manager or Director may act as the Reviewer or delegate this task to another Phius-trained Simulator.
4. Once confirmed by the Reviewer, the results are sent to Phius for final review. Once approved, the results are shared with the Manufacturer and Phius invoices the Manufacturer for final payment.
5. The Phius Certified Product mark is awarded and the values are published in the Phius Certified Product Database.

1.1.2 Blue Path

1. The Manufacturer contacts an NFRC-accredited Simulation Laboratory with a Certified Simulator on staff who has been trained to do the Phius conversion and is licensed to use the software to produce Blue mode Phius data labels. A list of qualified simulators can be found on the Find a Qualified Blue Path Simulator page.
2. The Manufacturer works with the Blue Path Simulator to determine the scope of work, after which Blue Path Simulator develops the quoted cost for the job. Phius works with the NFRC Simulator to determine the total number of products to be certified, and calculates the Phius Certified Product Database listing fee. The calculation and inspection work proceeds per NFRC standard practice.
3. The NFRC-accredited Simulation Laboratory sends converted THERM and WINDOW files to Phius for a quality inspection. The inspection may be performed by Phius or by a Phius-trained NFRC Inspection Agency.
4. The NFRC-accredited Simulation Laboratory sends the certificate-calculating files to Phius.
5. Phius contacts the manufacturer to identify which products are to be listed on the Phius website and bills the appropriate database listing fee.
6. Upon payment of the database listing fee, the Phius Certified Product mark is awarded and the values are published to the Phius Certified Product Database.

2. Program Submittal Requirements and Prerequisites

2.1 Requirements for Orange Path Verification

Important note: Since the calculations for Orange Path Verification are done using LBNL THERM and WINDOW software, the individual glass layers must be listed in the International Glazing Database (IGDB) published and maintained by LBNL.

2.1.1 Submission Requirements for a Price Quote (Orange Path)

☐ Number of unique glazing systems. Omit from the count those glazing systems for which a current pre-existing NFRC WINDOW glazing system library file is available. Due to the way the recommendation criteria work, it is recommended to have at least one low-gain glazing package (see Appendix A for full certification criteria).

- **# Glazing Systems =**

☐ Number of one-lite products, such as fixed, awning, or tilt-turn. Each frame-glass-spacer combination, or NFRC "group leader", constitutes a product.
Refer to the NFRC 100 clause 4.2.4 for grouping rules.

- **# One-Lite Products =**

☐ Number of two-lite products, such as single or double-hung window or sliding door.

- **# Two-Lite Products =**

☐ Number of unique frame cross-sections to be newly modeled. For example, head, sill, and jamb all using the same extrusion count as one, but meeting rails count separately.
***** Count cross-sections for multi-chamber vinyl or fiberglass frames separately from other frame types. Pricing differs between the two categories.

- **# New Multi-Chamber Vinyl or Fiberglass Frame Cross-Sections =**
- **# New Wood or Other Material Frame Cross-Sections =**

☐ Number of spacers (spacer-edge-seal-assemblies) to be newly modeled. Omit from the count any spacers which are represented in current pre-existing THERM files being submitted, and any listed in the table of pre-modeled spacers below.

- **# New Spacers =**

Pre-Modeled Spacers	
Cardinal XL Edge	Quanex Super Spacer
Cardinal Endur	Quanex Super Spacer S2 Premium
Chromatech Ultra F	Swisspacer Advance
Intercept Ultra Standard Dual Seal	Swisspacer Ultimate
Multitech G	Swisspacer V
Quanex Duralite	Technoform TGI NA
Quanex Duraseal	Thermix
Quanex Tri-Seal Premium Plus	Tremco Eneredge

2.1.2 Submission Requirements for Certification (Orange Path)

☐ List of desired frame/spacer/glazing combinations. Please fill out the included order matrix sheet included in a separate Excel workbook available from Phius.

☐ Dimensioned drawings of window and window components showing all cross-sections with materials clearly indicated (e.g. by different patterns, colors, or callouts).

- The thermophysical properties of materials used are obtained from appendices A, B, and C in NFRC 101.
- Pre-existing THERM files from NFRC simulators are acceptable for documentation of *material properties*, but such files do not suffice alone for documentation of the *cross-section geometry*.
- The manufacturer agrees to respond to any requests for clarification, such as to the continuity or intermittency of pictured elements in the direction "into the page".

The Manufacturer may choose the preferred option(s) for supporting the calculation of window installation thermal bridge coefficients ("psi-install calculations"). These offer different degrees of technical data disclosure and are not mutually exclusive. Please check at least one box below:

☐ **Option A:** The manufacturer consents to allow Phius to publish or distribute the Phius-verified THERM models of certified products for use by the public, including but not limited to, architects, engineers, Phius certified professionals (e.g. Phius CPHC® or CPHB practitioners) for their use to calculate psi-install values.

☐ **Option B:** Phius will **not** publish THERM files for certified products, and the manufacturer will field all psi-install calculations as an in-house technical support service using Phius certified product performance data.

☐ **Option C:** Phius will **not** publish the THERM files for certified products, but the manufacturer will refer customer requests for psi-install calculations to Phius. Phius may assign psi-install calculation jobs to its qualified Simulators, or, in connection with a building certification project, to certification staff, and will bill the manufacturer's customer directly.

2.1.3 Optional Manufacturer Deliverables (Orange Path)

Please check all that apply:

☐ ASTM E-283 airtightness test results

2.2 Requirements for Blue Path Verification

2.2.1 Submission Requirements for Certification (Blue Path)

The Manufacturer may choose the preferred option(s) for supporting the calculation of window installation thermal bridge coefficients ("psi-install"). These offer different degrees of technical data disclosure and are not mutually exclusive. Please check at least one box below:

[Option A is not available for the Blue Path.]

☐ **Option B:** Phius will **not** publish THERM files for certified products, and the manufacturer will field all psi-install calculations as an in-house technical support service using Phius certified product performance data.

☐ **Option C:** Phius will **not** publish the THERM files for certified products, but the manufacturer will refer customer requests for psi-install calculations to Phius. Phius may assign psi-install calculation jobs to its qualified Simulators, or, in connection with a building certification project, to certification staff, and will bill the manufacturer's customer directly.

2.2.2 Optional Manufacturer Deliverables (Blue Path)

Please check all that apply:

☐ ASTM E-283 airtightness test results

3. Certification Job Process

Once this Agreement is executed and Phius has received payment from the manufacturer, the certification process proceeds as follows for each path.

3.1 Verification Process for Orange Path Calculation

1. Phius Program Manager assigns job to a Phius-trained Orange Path Simulator.
2. The Simulator performs the calculations within a specified timeframe and provides Phius with THERM files and auxiliary calculation spreadsheets. The Simulator communicates requests for clarification as needed to the Product Certification Manager who serves as the primary point of contact for both the Simulator and the manufacturer.
3. The Product Certification Manager acts as or assigns a Reviewer for window calculations.
4. The designated Reviewer checks window calculations for quality and approves them for publication.
5. Phius confirms payment from manufacturer for any remaining balance due and the listing fee.
6. Approved results from the Reviewer (if other than the Product Certification Manager) are submitted back to the Product Certification Manager for a final review, after which product certificates are generated, issued to the manufacturer, and published to the Phius Certified Product Database.

Manufacturers can request a review of possible contested results. Phius will consider the request and make a final determination after review by Phius technical staff. No further appeal is possible after review by Phius technical staff. By agreeing to participate in this voluntary certification program, manufacturers waive their right to challenge certification results with legal action.

Manufacturers do retain the right to opt out of publishing any certification results to the Phius Certified Product Database, contested or otherwise. If a manufacturer chooses to forego publishing results, they must notify Phius in writing and specify which product(s) should be removed from the database or exempt from publication.

3.2 Verification Process for Blue Path Calculation

To begin with Blue Path certification, Phius must be in receipt of:

- Calculation workbooks from the NFRC Simulator,
- CPD numbers for all combinations for which the manufacturer seeks certification
- Notice from the manufacturer as to products will be listed in the Database, and
- A signed copy of this agreement

The certification process for the Blue Path Calculation then proceeds as follows:

1. The Blue Path simulator forwards all calculations, reports, and certificate drafts to Phius for review
2. The Phius Product Certification Manager reviews any WINDOW and THERM files to be inspected.
3. The Product Certification Manager acts as or assigns a Reviewer for window calculations.
4. Phius invoices the manufacturer for the Phius Certified Product Database listing fee.
5. Approved results from the Reviewer (if other than the Product Certification Manager) are submitted back to the Product Certification Manager for a final review, after which product certificates are generated, issued to the manufacturer, and published to the Phius Certified Product Database.

4. Phius Certified Product Program: Manufacturer Privileges & Obligations

- The manufacturer, specific product details, and verified product performance data values will be listed in the Phius Certified Product Database on the Phius website. If “Option A” is indicated, the THERM files for psi-install calculation support may also be published.
- Phius will deliver the following custom calculated window values to the Manufacturer: U-COG, SHGC, U-Frame, frame widths, and Psi-Spacer.
- The validity of Phius Certified Products, their certificates, and associated performance data lasts for a period of two (2) calendar years from the date of certification or until the manufacturer makes any changes to the design/composition of the product that affects its performance, whichever occurs first. After one of these conditions has transpired, product certificates automatically expire.
- If no performance-altering changes are made to the product(s) after the initial two (2) year period, the certificate(s) can be renewed for a new two-year period for a flat fee of $500.00. If any changes are made to the design/composition of the product(s) at any time during the valid certification period, the certificate(s) will be voided must be re-certified in order to be re-listed in the Certified Product Database. Calculation fees will be assessed based on the scope of any change(s) and subsequent rework associated with re-calculating and re-certifying eligible products.
- Manufacturers who are members of the Phius Alliance (the sister professional membership to Phius) will receive a discount on the certification fee based upon their membership’s benefits.
- Subject to the terms of a separate written license, the manufacturer may use the Phius Certified Product mark in conjunction with the specific certified product(s) and verified product performance data. The manufacturer will be granted access to the Phius Certified Product mark according to use guidelines issued by Phius.
- The certification of products and their performance data is product-specific. The certification mark is not transferable to other products, regardless of similarity. A “product” is a unique combination of frame profile(s), spacer model, and glass package (including gap sizes and choice of gas fills).
- The term “Phius Certified” or the certification mark shall not be used as standalone designations and must always be accompanied by at least one piece of performance data, such as “Phius-recommended for Climate Zone 4”, “Phius-rated U≤0.18”, or similar.
- Manufacturers may not use the term “Phius Certified” or the certification mark to broadly imply that entire product lines are Phius-certified unless *all* combinations in production *are* Phius certified.
- Phius reserves the right to terminate and revoke Phius Certified Product certificates and all rights of the use of the data and the certification mark if Phius determines the manufacturer has:
    - falsely represented their product data in the marketplace or program submission documents or;
    - submitted falsified information to obtain the certification for a product or;
    - promoted any of their products as “Phius Certified” when they are not or;
    - made any other material misrepresentation(s) with regards to their products.

By signing the form on the subsequent page, the Program Registrant (“manufacturer representative”) agrees that they have read and agree to the terms of the Program. The manufacturer representative agrees to acknowledge, accept, and abide by Phius certification procedures and all manufacturer obligations. Phius reserves the right to update or change the requirements of this program at any time.

Program Application

Please complete the following fields below:	
Manufacturer*	
Product Name(s)*	
Representative Contact Person*	
Company Street Address*	
City, State, ZIP*	
Phone*	
E-mail* *Business email address for Representative Contact Person of Manufacturer required*	
Required documentation from Section 2 included?	Yes ☐ No ☐
Manufacturer Website URL	
Phius Alliance Member?	Yes ☐ No ☐
I, the manufacturer representative named above, have read and agree to the terms of the Program and its instructions outlined in this document.	
Signature* _____ Date* _____ * Required field	

Job Quote	
Calculation Fees	
Listing Fee	
Grand Total	
Prepared by:	
Signature _____ Date _____	

Appendix A: Certification Criteria

ASHRAE/IECC/DOE North American Climate Zone	Overall installed window U-value Btu/h.ft2.F	Center-of-glass U-value Btu/h.ft2.F	SHGC - South	SHGC - North, East, West
8	≤0.11	≤0.10	≥0.50	Any
7	≤0.12	≤0.11	≥0.50	Any
6	≤0.13	≤0.12	≥0.50	Any
5	≤0.14	≤0.13	≥0.50	Any
4	≤0.15	≤0.14	≥0.50	≤0.40
Marine North	≤0.16	≤0.15	≥0.50	≤0.40
Marine South	≤0.22	≤0.20	≤0.50	≤0.30
3	≤0.18	≤0.16	≤0.50	≤0.30
2 West	≤0.18	≤0.16	≤0.30	≤0.30
2 East	≤0.20	≤0.18	≤0.30	≤0.30