



ENERGY STAR[®] Product Specification Residential Windows, Doors, and Skylights

Eligibility Criteria Final Draft Version 6.0

Following is the **Final Draft** Version 6.0 ENERGY STAR product specification for Windows, Doors, and Skylights. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

Note: This Final Draft Version 6.0 specification contains the U.S. Environmental Protection Agency's (EPA) proposed revisions for residential Windows, Doors, and Skylights. Please send comments via email to windows@energystar.gov no later than Wednesday, August 21, 2013.

1) **Definitions:** Below are the definitions of the relevant terms in this document. Most definitions are based on or pulled directly from the National Fenestration Rating Council (NFRC) 600 except where otherwise noted.

Product Types

- A. **Window:** An assembled unit consisting of a frame/sash component holding one or more pieces of glazing functioning to admit light and/or air into an enclosure and designed for a vertical installation in an external wall of a Residential Building. Includes Transoms.
- B. **Door:** A sliding or swinging entry system designed for and installed in a vertical wall separating conditioned and unconditioned space in a Residential Building. Includes Sidelites. ENERGY STAR recognizes three categories of Doors and Sidelites:
 - i) **Opaque:** A Door or Sidelite with no glazing (per NFRC 100).
 - ii) **≤ ½-Lite:** A Door with ≤ 900 in² (0.581 m²) of glazing or a Sidelite ≤ 281 in² (0.181m²) of glazing (per NFRC 100). Includes ¼- and ½-lite Doors and Sidelites.
 - iii) **≥ ½-Lite:** A Door with > 900 in² (0.581 m²) of glazing or a Sidelite with > 281 in² (0.181m²) of glazing (per NFRC 100). Includes ¾-lite and fully glazed Doors and Sidelites.

Note: References to NFRC 600-2010 and NFRC 100-2010 have been changed to NFRC 600 and NFRC 100, respectively, to allow for updates in the NFRC documents. Transoms qualify under the Window criteria and Sidelites qualify under the Door criteria.

- C. **Skylight:** A Window designed for sloped or horizontal application in the roof of a Residential Building, the primary purpose of which is to provide daylighting and/or ventilation.

Product Subcategories

- D. **Sliding Door:** A Door that contains one or more manually operated panels that slide horizontally within a common frame.
- E. **Swinging Door:** A Door system having, at a minimum, a hinge attachment of any type between a leaf and jamb, mullion, or edge of another leaf or having a single, fixed vertical axis about which the leaf rotates between open and closed positions.
- F. **Sidelite:** A fenestration product with the NFRC product code FXSL.
- G. **Transom:** A fenestration product with the NFRC product code FXTR.

Note: Sidelite and Transom definitions have been simplified.

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- H. Tubular Daylighting Device (TDD) or Tubular Skylight: A non-operable device primarily designed to transmit daylight from a roof surface of a Residential Building to an interior ceiling surface via a tubular conduit. The device consists of an exterior glazed weathering surface, a light transmitting tube with a reflective inside surface and an interior sealing device, such as a translucent ceiling panel. TDDs are considered Skylights.
 - I. Dynamic Glazing Product: Any fenestration product that has the fully reversible ability to change its performance properties, including U-Factor, Solar Heat Gain Coefficient (SHGC), or Visual Transmittance. This includes, but is not limited to, shading systems between the glazing layers and Chromogenic Glazing.
 - i) Chromogenic Glazing: A broad class of changeable glazings that have means to reversibly vary their optical properties, including active materials (e.g., electrochromic and Suspended Particle Device/SPD) and passive materials (e.g., photochromic, thermochromic, etc.).
 - ii) Internal Shading System: Operable blinds or shades positioned between glass panes in a Window, Door, or Skylight.

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Performance Metrics

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- J. U-Factor: The heat transfer per time per area and per degree of temperature difference (Btu/h ft²·°F). The U-Factor multiplied by the interior-exterior temperature difference and by the projected fenestration product area yields the total heat transfer through the fenestration product due to conduction, convection, and long-wave infra-red radiation.
 - K. Solar Heat Gain Coefficient (SHGC): The ratio of the solar heat gain entering the space through the fenestration product to the incident solar radiation.
 - L. Air Leakage: The volume of air flowing per unit time per unit area (cfm/ft²) through a fenestration system due to air pressure or temperature difference between the outdoor and indoor environment.

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- M. Residential Building: A structure used primarily for living and sleeping that is zoned as residential and/or subject to Residential Building codes. For the purposes of ENERGY STAR, Residential Building refers to buildings that are three stories or less in height.
 - N. Insulating Glass Unit (IGU): A preassembled unit, comprising lites of glass, which are sealed at the edges and separated by dehydrated space(s).
 - O. North American Fenestration Standard (NAFS): The common name for the American Architectural Manufacturers Association (AAMA)/Window & Door Manufacturers Association (WDMA)/Canadian Standards Association (CSA) 101/I.S.2/A440 testing standard.

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Note: EPA has added this definition now that NAFS labels may be used in lieu of including the Air Leakage value on the NFRC temporary label (see Item 3.c).

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2) Scope:

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- A. Included Products: Products that meet the definition of a residential Window, Door, or Skylight as specified herein are eligible for ENERGY STAR qualification, with the exception of products listed in Section 2.B.
 - B. Excluded Products: Products that are assembled onsite, including but not limited to sash packs or sash kits; Windows, Doors, or Skylights that are intended for installation in non-Residential Buildings; Window, Door, or Skylight attachments that are not included in a product's NFRC-certified rating.

118 3) **Qualification Criteria:**

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 120 A. **Energy Efficiency Requirements:** To qualify for ENERGY STAR, products shall have NFRC-certified U-
 121 Factor and, where applicable, SHGC ratings at levels which meet or exceed the minimum qualification
 122 criteria specified in Tables 1-3. Windows and Skylights shall meet the criteria for a given ENERGY
 123 STAR Climate Zone. Doors shall meet the criteria for a given glazing level. Dynamic Glazing Products
 124 shall meet the criteria while in the minimum tinted state for Chromogenic Glazing products or the “fully
 125 open” position for Internal Shading Systems.
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Table 1: Energy Efficiency Requirements for Windows		
Climate Zone	U-Factor¹	SHGC²
Northern	≤ 0.27	Any
North-Central	≤ 0.30	≤ 0.40
South-Central	≤ 0.30	≤ 0.25
Southern	≤ 0.40	≤ 0.25

128 **Note:** EPA has changed the U-Factor maximum for Windows in the North-Central Zone from 0.29 to 0.30 and in
 129 the South-Central Zone from 0.31 to 0.30. Stakeholders requested a 0.30 U-Factor maximum in the North-
 130 Central Zone due to the large number of products already being sold at that specification level. EPA opted for the
 131 same U-Factor maximum in the South-Central Zone to simplify the specification.
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Table 2: Energy Efficiency Requirements for Doors			
Glazing Level	U-Factor¹	SHGC²	
Opaque	≤ 0.17	No Rating	
≤ ½-Lite	≤ 0.25	≤ 0.25	
> ½-Lite	≤ 0.30	Northern and North-Central	≤ 0.40
		South-Central and Southern	≤ 0.25

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Table 3: Energy Efficiency Requirements for Skylights		
Climate Zone	U-Factor¹	SHGC²
Northern	≤ 0.48	Any
North-Central	≤ 0.48	≤ 0.35
South-Central	≤ 0.50	≤ 0.28
Southern	≤ 0.60	≤ 0.28

134 **Note:** EPA has changed the U-Factor maximum for Skylights in the Northern and North-Central Zones from 0.47
 135 to 0.48. Stakeholders informed EPA that a U-Factor maximum level of 0.48 would improve product availability for
 136 all product types in both Zones.
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 139 ¹ Btu/h ft²·°F

140 ² Solar Heat Gain Coefficient
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B. Equivalent Energy Performance: To qualify for ENERGY STAR, Windows may also have NFRC-certified U-Factor and, where applicable, SHGC ratings at levels which meet or exceed the equivalent energy performance criteria specified in Table 4. These criteria allow Windows with energy performance equivalent to the prescriptive criteria to qualify in the Northern Zone. Equivalent performance criteria are not applicable to the North-Central, South-Central, or Southern Zones or to Doors or Skylights.

Table 4: Equivalent Energy Performance for Windows		
Climate Zone	U-Factor¹	SHGC²
Northern	= 0.28	≥ 0.32
	= 0.29	≥ 0.37
	= 0.30	≥ 0.42

¹ Btu/h ft²·°F

² Solar Heat Gain Coefficient

C. Air Leakage Requirements: To qualify for ENERGY STAR, products shall have Air Leakage ratings at levels which meet or exceed the minimum qualification criteria specified in Table 5 and adhere to the labeling requirements laid out below.

Table 5: Air Leakage Requirements	
Product	Air Leakage Rating
Window, Sliding Door, or Skylight	≤ 0.3 cfm/ft ²
Swinging Door	≤ 0.5 cfm/ft ²

- i) Windows, Sliding Doors, and Skylights shall demonstrate adherence to this requirement by either
 - (1) Displaying “≤ 0.3” in the Air Leakage portion of the NFRC temporary label.
 - OR
 - (2) Placing one of the following labels on the product:
 - (a) AAMA Gold Label
 - (b) Keystone Certifications, Inc. NAFS Structural Certification Label
 - (c) National Accreditation & Management Institute, Inc. (NAMI) NAFS Structural Certification Label
 - (d) WDMA Hallmark Certification Label

NOTE: The U.S. Environmental Protection Agency (EPA) may consider similar labels offered by other Certification Bodies on a case by case basis.

- ii) Swinging Doors shall demonstrate adherence to this requirement by either:
 - (1) Displaying “≤ 0.5” in the Air Leakage portion of the NFRC temporary label.
 - OR
 - (2) Placing one of the following labels on the product:
 - (a) AAMA Gold Label
 - (b) Keystone Certifications, Inc. NAFS Structural Certification Label
 - (c) NAMI NAFS Structural Certification Label
 - (d) WDMA Hallmark Certification Label
- NOTE: EPA may consider similar labels offered by other Certification Bodies on a case by case basis.
- iii) Manufacturers shall test and/or add the necessary labeling as their products come up for NFRC re-certification.

Note: Stakeholders requested that the four labels outlined above be allowed in lieu of including the Air Leakage value on the NFRC temporary label to assist in reducing labeling costs.

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188 D. Installation Instructions: To qualify for ENERGY STAR, products shall have installation instructions
189 readily available online or packaged with the product. This information does not need to be included on
190 product labels. Electronic versions of instructions may be provided on the website of a retailer,
191 manufacturer, and/or industry association. Retailers, manufacturers, and industry associations may
192 include in these instructions whatever disclaimers they feel are necessary to limit their liability. EPA
193 understands that the manufacturer cannot write installation instructions for every situation and that
194 generic instructions covering the most common situations are acceptable to fulfill this requirement. The
195 installation instructions shall include:
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197 **Note:** At stakeholder request, EPA has clarified that this information is not required on product labels.

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199 i) A list of hardware and tools required for installation, including those provided by the manufacturer
200 and those not provided by the manufacturer.
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202 ii) Diagrams/pictures and descriptions of the product or a typical product of similar type and parts
203 provided by the manufacturer.
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205 iii) General guidance on safely removing old products and preparing the frame for installation.
206 Guidance should direct consumers to relevant content on proper management of lead paint, such as
207 www.epa.gov/lead. (Inclusion of diagrams/pictures is preferred, but optional.)
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209 iv) General information on proper disposal or recycling of products being removed.
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211 **Note:** As requested by stakeholders, EPA has created a standalone item for recycling and proper disposal.

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213 v) Detailed flashing instructions including diagrams/pictures or reference to the applicable flashing
214 manufacturer's instructions, as applicable to the product.
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216 vi) Instructions on properly shimming the product to achieve an installation that is flush, level, and
217 plumb. (Inclusion of diagrams/pictures is preferred, but optional.)
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219 vii) Guidance on sealing and weatherproofing to prevent air and water infiltration at the product-wall
220 interface. (Inclusion of diagrams/pictures is preferred, but optional.)
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222 viii) Variations of the above based on whether the job is a pocket installation, rough opening installation
223 with exterior sheathing intact, and/or rough opening installation with exterior sheathing removed, as
224 applicable to the product.
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226 **Note:** As requested by stakeholders, EPA has removed the reference to new construction as an example of
227 when a product might be installed in a rough opening with exterior sheathing removed.

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229 Disclaimer: EPA makes no warranties, expressed or implied, nor assumes any legal liability or
230 responsibility for the accuracy, completeness, or usefulness of the contents of installation instructions, or
231 any portion thereof. Further, EPA cannot be held liable for defects or deficiencies resulting from the
232 proper or improper application of installation instructions.
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234 **4) Test Requirements:**

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236 ~~A.—Representative Models shall be selected for testing per the following requirements:~~

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238 ~~i.—For qualification of an individual product model, the representative model shall be equivalent to that~~
239 ~~which is intended to be marketed and labeled as ENERGY STAR.~~
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241 ~~ii.—Qualification of a product family is not permitted under this specification.~~
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243 **Note:** Section A has been removed because product families and representative models are not used in the
244 Windows, Doors, and Skylights program.
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B.A. When testing residential Windows, Doors, and Skylights, the test methods shown in Table 6 shall be used to determine ENERGY STAR qualification:

ENERGY STAR Requirement	Test Method Reference
U-Factor	NFRC 100
SHGC	NFRC 200
Air Leakage	ASTM E283 in accordance with NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440-11

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C.B. All products containing IGUs shall have them certified according to NFRC procedures.

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- 5) **Effective Date:** The ENERGY STAR Residential Windows, Doors, and Skylights specification shall take effect on January 1, 2015. To qualify for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

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Note: To allow manufacturers more time to meet the proposed U-Factor maximum in the Northern Zone, EPA has revised the effective date of the Version 6.0 criteria to January 1, 2015.

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- 6) **Future Criteria Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions. In the event of a specification revision, please note that the ENERGY STAR qualification is not automatically granted for the life of a product model.

ENERGY STAR Qualification Criteria for Residential Windows, Doors, and Skylights

Climate Zone	Windows		
	U-Factor ¹	SHGC ²	
Northern	≤ 0.27	Any	Prescriptive
North-Central	= 0.28	≥ 0.32	Equivalent Energy Performance
	= 0.29	≥ 0.37	
	= 0.30	≥ 0.42	
	≤ 0.30	≤ 0.40	
South-Central	≤ 0.30	≤ 0.25	
Southern	≤ 0.40	≤ 0.25	

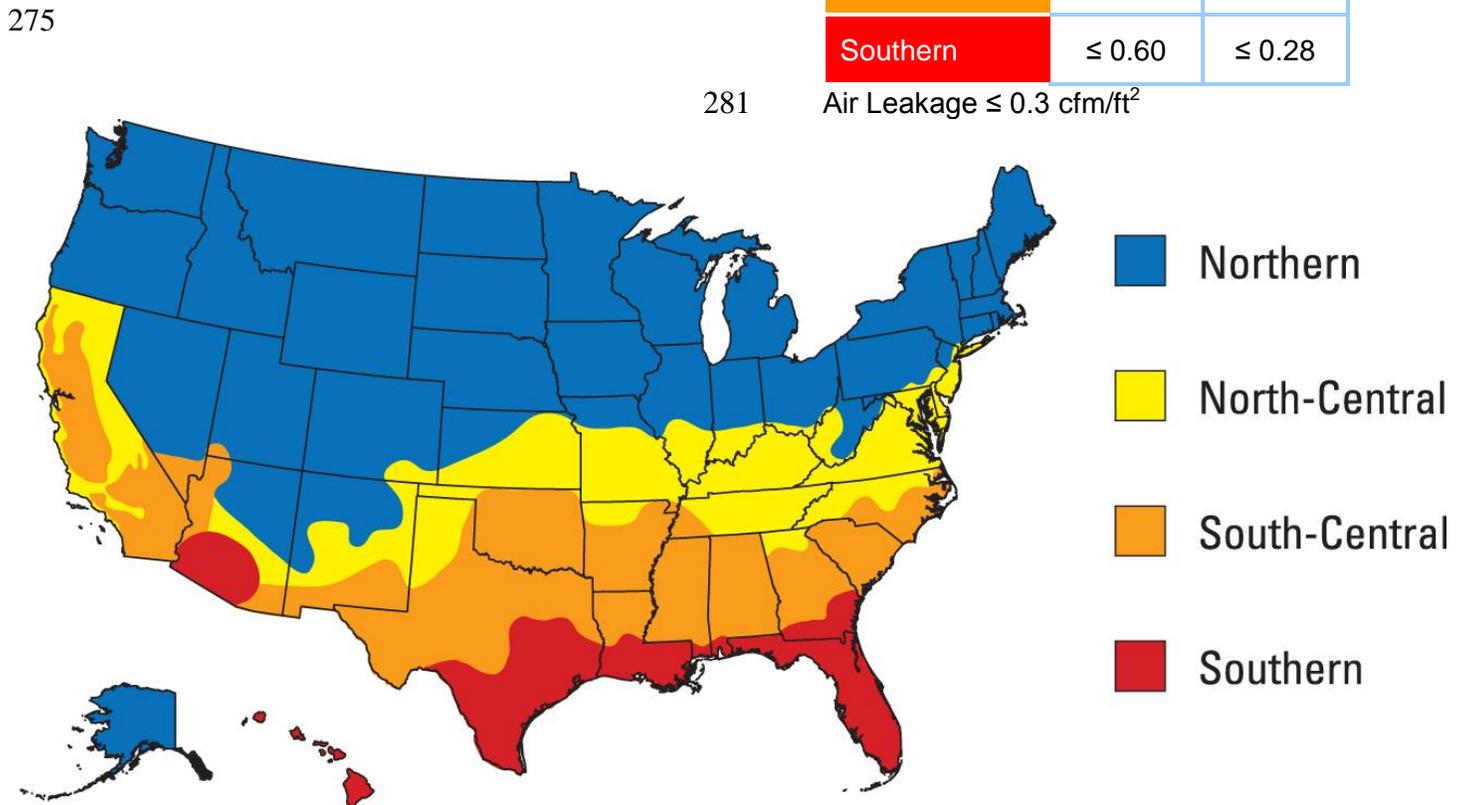
Glazing Level	Doors		
	U-Factor ¹	SHGC ²	
Opaque	≤ 0.17	No Rating	
≤ ½-Lite	≤ 0.25	≤ 0.25	
> ½-Lite	≤ 0.30	Northern North-Central	≤ 0.40
		Southern South-Central	≤ 0.25

277 Air Leakage for Sliding Doors ≤ 0.3 cfm/ft²
 278 Air Leakage for Swinging Doors ≤ 0.5 cfm/ft²

Climate Zone	Skylights	
	U-Factor ¹	SHGC ²
Northern	≤ 0.48	Any
North-Central	≤ 0.48	≤ 0.35
South-Central	≤ 0.50	≤ 0.28
Southern	≤ 0.60	≤ 0.28

281 Air Leakage ≤ 0.3 cfm/ft²

271 Air Leakage ≤ 0.3 cfm/ft²
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 273 ¹ Btu/h ft²·°F
 274 ² Solar Heat Gain Coefficient



Note: A complete list of ENERGY STAR Climate Zones by state and county or, where applicable, zip code is available at https://www.energystar.gov/index.cfm?fuseaction=windows_doors.search_climate.