



UNDERSTANDING ENERGY EFFICIENT WINDOWS

U-FACTOR AND SOLAR HEAT GAIN COEFFICIENT (SHGC)

What is a U-Factor?

- U-Factor or thermal transmittance is a measurement of the rate of heat transfer through a material. A U-Factor is used in the window industry to indicate the energy efficiency of a window.^[7]
- The U-Factor is the reciprocal of the R-value.^[6] Learn more about R-values with the National Home Performance Council's [Insulation R-value Fact Sheet](#).
- A window with a *low* U-Factor allows less heat gain/loss through the window, and therefore conserves *more* energy.^[6]
- When windows effectively conserve energy, the temperature of the rooms in your home will be more consistent and comfortable!
- Did you know that a typical single-pane window has a U-Factor of 1.1^[6] whereas a high performance double-pane window can have a U-Factor of 0.30 or lower?^[2] Remember, the lower the U-Factor, the more energy-conserving the window is!
- Windows with low U-Factor values will provide benefits all year long! Low U-Factor windows will keep the heat inside during the winter and the heat outside during the summer.^[1]
- Windows with low U-Factors are most important in cold climates where heating systems are frequently used.^[4]

What is Solar Heat Gain Coefficient?

- Solar Heat Gain Coefficient (SHGC) represents the fraction of the solar energy that is transferred through the glass of a window.^[10]
- SHGC values range from 0 to 1. The lower a window's SHGC value, the less solar heat is transmitted through the window.^[3]
- A standard double-pane window has a SHGC value of 0.76, which allows about 75% of the sun's heat into your home.^[9]
- Do you live in a hot weather climate? Residences in hot weather climates where homeowners want cool indoor temperatures should have windows with low SHGC values to effectively block heat from the sun from entering the home.^[8]
- In cold weather climates where homeowners want warmer temperatures indoors, windows with high SHGCs should be selected in order to collect heat from the sun.^[8]
- Choosing windows with the correct SHGC for your climate is essential to heating or cooling your home efficiently! Visit the [Efficient Windows Collaborative](#) to find out the recommended SHGC for your climate.

How can the energy efficiency of windows be compared?

- The National Fenestration Rating Council (NFRC) developed a nationally recognized rating and labeling system for the energy performance of windows.^[4]
- NFRC ratings and labels provide consumers with a way to compare the energy performance of windows.^[10]





National Home Performance Council

- Manufacturers who have certified their products through the NFRC Certification Program can be found in the NFRC Certified Products Directory.^[7] Find these manufacturers, thousands of certified products, and the energy performance ratings of products [here](#).
- ENERGY STAR qualified windows are tested/certified by NFRC and contain the NFRC label. The ENERGY STAR qualification is based on U-factor and SHGC ratings only.^[10]
- Did you know that the cold, inside surface of inefficient windows pull heat away from your body? The interior glass of ENERGY STAR qualified windows stays warmer so you can enjoy a seat by the window throughout the year!^[9]
- Additionally, ENERGY STAR qualified windows have coatings that act like sunscreen for your home without noticeably reducing visible light. These coatings can reduce fading of your valuables by up to 75%!^[9]

What are the NFRC Performance Ratings?

- The NFRC label provides consumers with performance ratings in five categories:^[10]
 1. **U-Factor** measures the rate of heat transfer and tells you how well the window insulates. The lower the U-factor, the less heat will be lost from your home through your windows!
 2. **Solar Heat Gain Coefficient (SHGC)** tells you how well the product blocks heat caused by sunlight. The lower the SHGC, the less solar heat the window transmits. Remember, a low SHGC is most important in warmer climates where air conditioning is frequently used.
 3. **Visible Transmittance (VT)** measures the amount of light the window lets through. The higher the VT, the more light you see. Technological advances in the past 10 years have developed new types of coatings for windows.^[7] These coatings reduce heat loss through the window without reducing transmission of visible light!^[5]
 4. **Air Leakage (AL)** measures the rate at which air passes through joints in the window. The lower the AL value, the less air leakage. Depending on the climate and location of your home, reducing air leakage can significantly save on heating/cooling energy costs!
 5. **Condensation Resistance** measures how well the window resists water build-up. The higher the condensation resistance factor, the less water build-up will occur on the window.
- Discover more information about windows and ratings, FAQs, and helpful links for purchasing new windows on the [NFRC website](#).

Are there tax credits for windows available?

- You may be able to claim a tax credit for purchasing energy-efficient windows!
- Guidelines and information regarding energy-efficient windows and tax credits can be found on the [ENERGY STAR website](#) and the [Efficient Windows Collaborative website](#).
- Always consult the [Tax Incentives Assistance Project](#) or a tax professional to determine if your home energy efficiency projects are eligible!





National Home
Performance Council

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