
High-Performance Windows in Residential and Commercial Buildings

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ABSTRACT

In most buildings, windows are a critical component of energy use. Continued improvements in window technology have led to high-performance windows that can significantly reduce energy used in all regions of the U.S. while providing other benefits such as maximum light, view, and condensation resistance. This workshop will describe existing residential window technologies and give designers and builders the tools to compare products and select the best window for their buildings. The basic approach to window selection is to (1) look for the Energy Star, (2) compare window properties based on NFRC labels, (3) compare energy performance with different windows on a typical house in your region, and (4) use the computer program RESFEN to calculate energy performance on a specific house with different window types. The Efficient Windows Collaborative provides fact sheets, books, and a web site to assist designers and builders selecting high-performance windows. The workshop will also address issues such as proper window installation and the impact of design decisions such as window orientation and shading on energy performance.

High-performance glazing systems in commercial buildings have great potential to reduce energy costs without sacrificing daylight, view, and comfort for the occupants. Glazing systems must be part of an integrated approach to design that includes the relationship to electric lighting, mechanical systems, and interior environmental quality. The workshop will describe existing and future glazing technologies and provide tools and information to assist in selecting the best window options for a commercial building in a specific region. Determining the optimal glazing system requires balancing energy issues with lighting, view, and thermal comfort considerations. Glazing performance must be understood in relationship to shading systems, overhangs, and other design issues such as orientation and climate. A new guidebook and web site on commercial glazing systems will be presented. All of the tools and programs described in the workshop have been developed with support from the U.S. Department of Energy.

James Benney will present the National Fenestration Rating Council's standardized procedure for determining and reporting the U-factor, SHGC (solar heat gain coefficient), and visible transmittance of fenestration systems for commercial and high-rise residential construction. This presentation will provide a discussion on the mechanism and benefits of this program. The NFRC program will provide architects and manufacturers with a tool for comparative performance; it will provide code officials with a tool for determining code compliance; and it will provide energy service providers (and other incentive program administrators) with an accurate measure for assessing envelope performance.

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