



VISION House® Orlando 2011



Manufacturer: Andersen®

Product: 100 Series

Category: Windows

In the hot, humid climate of Central Florida, the building component having the single largest impact on energy-efficiency and occupant comfort are the windows. Indispensable for providing daylight, views, and the potential for natural ventilation, windows have the potential of becoming the thermal enclosure's weak-link. When paired with the high-performance aspirations of the VISION House® Orlando 2011, the shortcomings of typical windows became even more apparent.

Creating an efficient and comfortable home starts with a high-performing building envelope. The VISION House is no exception. With an R-22 insulated concrete form (ICF) structure, an insulated roof deck and sealed attic, and exceptional air-tightness levels (1.23 ACH50), selecting windows to perform at comparable levels becomes a key objective. Fortunately, the availability of windows with the type of required performance has increased in the past several years, particularly in Florida where single-glazed, tinted, aluminum frame units have been the norm for many years. To put "standard-practice" windows into perspective, consider that the energy performance of windows rests primarily on three functions: Solar Heat Gain Coefficient (SHGC), U-Factor and air infiltration. Solar Heat Gain Coefficient measures the window's ability to limit direct solar heat gain and U-Factor measures the insulating value of the window or its ability to limit conductive energy losses. Air infiltration is measured in cfm/ft² of window area. The typical aluminum frame window described above may have a SHGC of 0.8, which means the window prevents only 20% of the heat from sunlight from entering the home while it allows 80% to pass. The typical window also has a poor insulating value with a U-Factor of 1.20 or R-value equivalent to R-0.83.

The VISION House design team turned to Andersen for a solution. With Andersen's extensive window selection it was easy to find the perfect fit for the VISION House project. One of Andersen's most cost-effective product lines, 100 Series windows are made from Fibrex® composite material which is twice as strong as vinyl and blocks thermal transfer nearly 700 times better than aluminum. Andersen® 100 Series windows are available in a traditional single-hung farmhouse style with SmartSun™ Low-E glass. This "southern" glass is specifically tuned for cooling-dominated climates and offers an extraordinary SHGC of 0.21, which blocks over 80% of the heat from sunlight before it can enter the house. It also offers high visible light transmission reducing the need for artificial lighting. Coupled with a U-Factor of 0.30 (R-3.33) these Andersen® windows look great, fit the urban farmhouse aesthetic, provide ample natural daylighting, natural ventilation opportunities and views, as well as match the performance values of the rest of the building envelope.

Comparing overall building performance with the Andersen® 100 Series windows versus the standard single-aluminum unit, brings into focus the benefits of this energy efficient window. With its ability to block 80% of the heat from sunlight, the total cooling load attributable to the windows drops to 18.9 kBtu/h from 36.7 kBtu/h with the single glazed tinted windows. This reduces the size of the cooling systems needed to less than 2 tons from more than 3 tons, and results in an annual cooling energy savings of approximately \$400. Bottom line benefits: reduced first cost for the smaller HVAC system; improved comfort from a heating and cooling system better matched to peak and non-peak loads; superior humidity control and indoor-environmental-quality (again due to smaller cooling requirements and system capacity); lower operating costs; and generous glazing areas for light, views, and that urban farmhouse aesthetic.

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¹ Modeling analysis by BeOPT (Building Energy Optimization Version 1.0.1 by NREL). BeOPT is a computer program designed to find optimal building designs along the path to highly efficient buildings. In addition to an optimization search, BeOPT includes: 1) a main input screen that allows the user to select from many predefined options, those to be used in the optimization, 2) an output screen that allows the user to display detailed results for many optimal and near-optimal building designs, and 3) an options library spreadsheet that allows a user to review and modify detailed information on all available options.

² Based on U.S. Department of Energy's Building America program data in Central Florida.