Rating Site-Built Products Under the NFRC System.

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Site built commercial fenestration products are different from other fenestration systems, in that they usually have very large number of possible variations on the basic design, and that they are put together by a third party at the site, form the supplied frame components and insulated glazing, again usually put together somewhere else. This makes the task of rating them very complex and potentially very expensive.

Residential and punched opening commercial fenestration products are rated for their basic performance indices (i.e., U-factors, SHGC, and VT) at standard sizes. In residential applications, windows are labeled with permanent and temporary labels for easy identification. After some adjustments for climate zones, this gives consumer and contractor fairly good indication of how is product going to perform in the house. For the commercial windows, depending on the size of the project, instead of temporary labels, the certificate is issued. The key here is simplicity and relatively low cost of rating windows, due to the use of simulation software and very limited testing. Because the same product is used over and over, the manufacturer's cost of determining the performance of the product is spread over the large number of sold units, and therefore is fairly low (it is estimated that the average cost of the label for residential window manufacturer is less than $1 per product)

For site built products, the number of variations that are possible in a single building may be very large and may necessitate large number of computer simulations as well as testing validations. Currently, only few site-built products are rated by NFRC, and it is already clear that the system in place is not fully adequate. It is not clear how many of the different products on the single project need to be rated, what needs to be validated by testing, and what is the overall cost. Also, it is not clear at all how to relate performance of the product to the overall energy use in building.

As opposed to residential buildings, commercial buildings have usually professional architects, mechanical engineers, etc. involved at various stages of the design and construction of the building, so the audience for these NFRC ratings is quite different than in residential. As opposed to residential market, where there is need for simple indicator that would help consumer or contractor select fenestration system, in commercial buildings it is more important how are different windows and curtain walls going to affect sizing of the HVAC equipment, overall energy consumption, energy demand, etc. Having performance indices for single size applied in such calculations of energy consumption and equipment sizing is very wrong and can result in large errors. Alternative approaches are needed that would better capture performance of fenestration products and at the same time be simple and cost effective. One such idea, as proposed by Umass researchers, is to rate component performance rather than whole product performance. In that case, project, instead of product, becomes the focus of attention. The energy effects, rather than single performance indices become much more important for commercial buildings.

This requires further research and evaluation. The following areas need to be researched in the future:

- Develop viable procedure for rating component performance,

- Develop simple and cost effective procedure for determining whole product performance based on component performance,
- Develop energy rating for project, based on the performance of various products in the building.