



**Canadian
Home Builders'
Association**

Technical Research Committee News

Proposed Minimum Window Performance Requirements

NRCan has released a draft proposal to regulate the thermal performance of factory-built windows under the Energy Efficiency Act. Products to be covered include:

- residential windows;
- non-residential windows;
- flat-glazed skylights;
- roof windows; and
- sliding glass doors.

The proposed minimum energy efficiency standard for residential windows is an Energy Rating (ER) of -13 for operable products and -3 for fixed products.

For flat-glazed skylights and roof windows, the total window U-value must be 3.1 W/m²C or less (RSI 0.322 or R 1.82).

Labelling Requirements

As part of the requirements, it is proposed that an appropriate EnerGuide label must be put on every unit. The format of the labels is still under development, but it is suggested that each label show the ER or U value for that product, which can be derived by testing or computer simulation.

To be able to enforce the proposed regulations, each unit will have a permanent Product Identification Mark (PIM). The PIM is analogous to a model number and would ensure that documentation can be related to a specific product.

The proposed date for the prescribed labelling of products is June 1, 2002, and the date for meeting the minimum energy requirements is September 1, 2003.

What You Should Know About Window Performance Ratings

Windows come in different types and materials. Windows provide ventilation, light, a view to the outdoors, and a part of the a building's overall aesthetics of a building. They are also part of the building envelope of the building, so they must resist water and wind. Since one-third to one-half of a home's heat loss can be attributed to windows, energy performance is also an important consideration for controlling home heating costs.

With thousands of products to choose from, how can you be sure you are getting good value? Choosing appropriate windows requires more thought today now than was the case in the past. Besides energy ratings, other performance factors apply to windows. These are part of the CSA A440 Window Standard.

Products with the CSA mark have been tested and certified to relevant performance standards relating to:

- * air tightness (A)
- * water tightness (B)
- * wind load resistance (C)
- * forced entry resistance (F)
- * screen strength/ease of operation (S/E)

"optional" performance standards are:

- * condensation resistance (I)
- * energy rating (ER)

It is important to recognize, however, that the CSA tests are done on a "design" unit supplied by the manufacturer, and no ongoing, random sampling program is in place to ensure that production models meet design specifications. This means that the units delivered to the site may perform better or worse than the units officially tested units. In addition, the performance of a window's performance will depend a great deal on how it is installed. Price is not always an indication of performance or quality.

Performance Ratings

Air Tightness (A)

The performance rating for air tightness of windows and sliding doors is represented by the letter 'A'. The air tightness test measures how much air would pass through a closed window or sliding door at an air pressure differential that represents a wind speed of 40 km/h (25 mph).

Performance is shown by a number rating from A1 to A3. The higher the number, the more airtight

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the product. For example, a window with an A1 rating could have an air leakage of 2.79 m³/hr-m (or 0.5 cfm per foot of perimeter). An A3 rating could be 0.55 m³/hr-m (or 0.1 cfm per foot of perimeter).

Water Tightness (B)

Water tightness is represented by the letter 'B'. Water tightness testing involves applying a uniform water spray at increasing air pressure (to simulate wind-driven rain) until water penetrates through the window or sliding door. Performance is shown by a number ranging from B1 to B7 for windows, and from B1 to B4 for sliding doors. The higher the number, the more watertight the product. A B1 rating means leakage can occur at 137 pascals (0.55" WG), while a B3 resists 250 pascals (1" WG).

Wind Load Resistance (C)

Resistance to wind load is a measure of the product's structural strength and is tested by applying increasing levels of air pressure to simulate the wind force. Air pressure is applied until the product's operation is impaired. Wind load resistance is represented by the letter 'C'. There are up to five levels of wind resistance for windows (C1 to C5) and three levels (C1 to C3) for sliding doors. The higher the number, the better the performance. The pressure limit for a C1 rating is 1.5 kPa (31.3 psf) while for a C3 it is 2.5 kPa (52 psf).

Condensation Resistance (I)

This test is optional so not all certified windows and sliding doors are tested for condensation resistance. Condensation resistance for windows and sliding doors is determined by a thermal characteristic called Temperature Index (I), which ranges from 40 to 80. The higher the number, the more likely the product will resist condensation.

Condensation is influenced by outdoor winter temperature and the indoor relative temperature and humidity. Very few windows or sliding doors will be free of condensation if the indoor humidity is higher than 40% at outdoor temperatures of -20 degrees Celsius or less.

Forced Entry Resistance (F)

The standards for windows and doors include a test to suggest how well the product may thwart entry within five minutes. One of two ratings is assigned, F1 or F2. For windows, F1 means the

product has a lock, while F2 indicates it has a lock and it passes hand and tool manipulation tests. This test is optional for windows that are installed higher than two meters from the ground. All sliding doors must have a lock or latching device. An F1 or F2 rating indicates the product has passed hand and tool manipulation tests. As with windows, F2 represents the higher level of security.

Screen Strength/Ease of Operation (S/E)

Sliding doors are tested for ease of operation and the letter 'E' represents the performance rating. Insect screens are not intended to serve any purpose other than to keep insects out. They are tested for tear, damage or retention in windows when subjected to loads. A rating of S2 is stronger than S1. Sliding doors are tested for ease of operation based on the force required to open and close the moveable section of the door. Ratings range from E1 to E3, where E3 requires the least amount of effort.

Energy Rating (ER)

This rating is determined by calculation. It is optional, so not all products are analyzed for energy efficiency. The ER rating for windows and sliding doors considers:

- * Solar heat gain

- * Heat loss through frames, center centre and edge of glass

- * Air leakage heat loss

The combined effect of all three is defined in watts per square metre and can be either a positive or negative number. A positive number represents a net heat gain, while a negative number suggests that the unit loses more energy through heat loss and air infiltration than it gains in solar energy absorbed from the sun.

ER numbers range widely depending on the type of window and design options. Fixed windows generally have better ER ratings than operating windows. Operating windows and sliding doors typically have an ER number ranging from -35 (a very poor energy performance) to +8. Fixed windows can have positive numbers that can be as much as +15.

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Installation

Poor installation may defeat the benefits of selecting a good window. The CSA A440.4 standard sets out requirements for installation for some types of window units.

* Before installation, windows should be handled with care and stored in a place protected from the weather.

* Window frames should be set plumb and square, properly and well secured to the surrounding structure, and according to the manufacturer's instructions.

* The window sill should be adequately supported and set level, with particular care taken to see that the designed "bevel" or "fall" is maintained to the exterior.

* Windows should not be expected to carry any load other than their own weight nor should they be structurally modified to accommodate air conditioners, exhaust fans, etc.

* Cavities between window frames and the rough opening should be properly filled with insulation.

* The exterior joints between window frames and the building opening should be carefully caulked.

* The full interior of the window should be sealed between the window frame and the window opening to act as an air and vapour seal.

* Where applicable, sash and hardware should be adjusted for smooth operation after installation of the window.



Letters to the Editor

Re: Editorial (Solplan Review No. 95, November 2000)

Thanks for a nicely written editorial in the November Solplan Review. From a builder's perspective, I cannot begin to express the frustration that I feel rising inside of me (not directed at you) as I read your article and feelings that I believe are felt throughout this industry.

In our firm, we have tried not only to be innovative, progressive and customer oriented, but also profitable. The last seems to be almost a heretical concept in Canada. Even with instant communication via cell phones, pagers, two way radios and laptops in our trucks mated to database software and linked through cell phone modems to servers in our office, we still cannot keep up. We have tried working smarter, longer hours, devoted much time to educating ourselves, and been involved at all levels of regulation to implement change.

We still are regulated by putting shoes on our children's feet, maybe even giving them Playstation 2, when available, paying taxes on land, mortgages on model homes and land investments, interest at the bank on our large overdrafts to cover the decorator's fees, the landscape architect, the drapery person, the marketing consultant, and the sign guy, etc. All this so consumers will be wowed enough so that when they make the largest investment decision in their life, based solely, in most cases, on the emotion of the moment, they will pick one of my homes above the other "quality" builder down the road.

While I agree that all trades are specialized, imagine the cost if they were not. How many homes could we sell at those costs? Yes, there are even some bad builders out there. Excuse me for the cynicism, but until the consumer is willing to properly compensate builders for their efforts, investments, reward professionalism and make realistic buying decisions based on reasonable budget restraints and not on "how big, how much"; and government is willing to recognize us as legitimate providers to the economy and not as cash cows for their latest projects, the home buying public will continue to be robbed of some of the best housing technology that is available in the world sacrificed to the god of "keeping all accounts current."

Despite common perception, none of the builders I know are rolling in the bucks. Tight profit margins and no profit margins are the order of the day despite an improved economy. Let us never forget, while the system is not perfect and obviously needs continuous monitoring and improvement, Canadians are still the best housed people in the world.

As you have ably documented in the past, there are numerous issues that continue to hamper our industry. Why is it that despite better products, more detailed research, better designs, etc. we are having more building problems? Another discussion for another day perhaps.

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Ontario Home Builders' Association Member of the Year 2000