10 things that make a window more energy-efficient

Windows are an important consideration in the passive solar management of a home - potentially providing free heating, free cooling, and free lighting. Most window manufacturers and installers strive to offer energy-efficient window solutions that will lower your energy costs. Here's how they do it.

1

The Installer

Professional installers are trained by the manufacturer to ensure:

- installation is completed according to recommended proceedures and specifications
- proper tools and top-rated filler materials are used
- each window is optimise to its full energy-efficiency potential

To ensure you are getting the best installer, check reviews and look for companies that offer lifetime warranties on labour and material.

2

ENERGY STAR

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Canada
energystar.gc.ca

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Energy Performance Ratings
Évaluation des propriétés énergétiques

U-Factor Facteur-U	Solar Heat Gain Coefficient Coefficient de gain de chaleur solair
1.10	0.35
Energy Rating Rendement énergétique	Visible Transmittance Transmission visible
36	0.53
Air Leakage Fuite d'air	Condensation Resistance Résistance à la condensation
≤0.3 (U.S./I-P) ≤1.5 (Metric/SI)	53

Window Company Ltd.
Triple X Operable Casement
Vinyl frame, tripleglaze, Low-e coating (e=0.022,S3, S5)
Krypton/air filled (both cavities), Grills <=13mm
WCTXCAP0.022G

Energy performance and visual transmittance ratings certified to **CSA A440.2-14**. Ratings are determined for a fixed set of environmental conditions and a specific product. Certification agency does not recommend or warrant product for any specific use.

Les taux de performance énergétique et se transmission visible sont certifiés **CSA A440.2-14**. Les taux sont déterminés selon une série de conditions environnementales fixes et un taille de produit particulière. L'agence de certification ne recommande ni ne garantie le produit aux fins d'utilisation particulière.

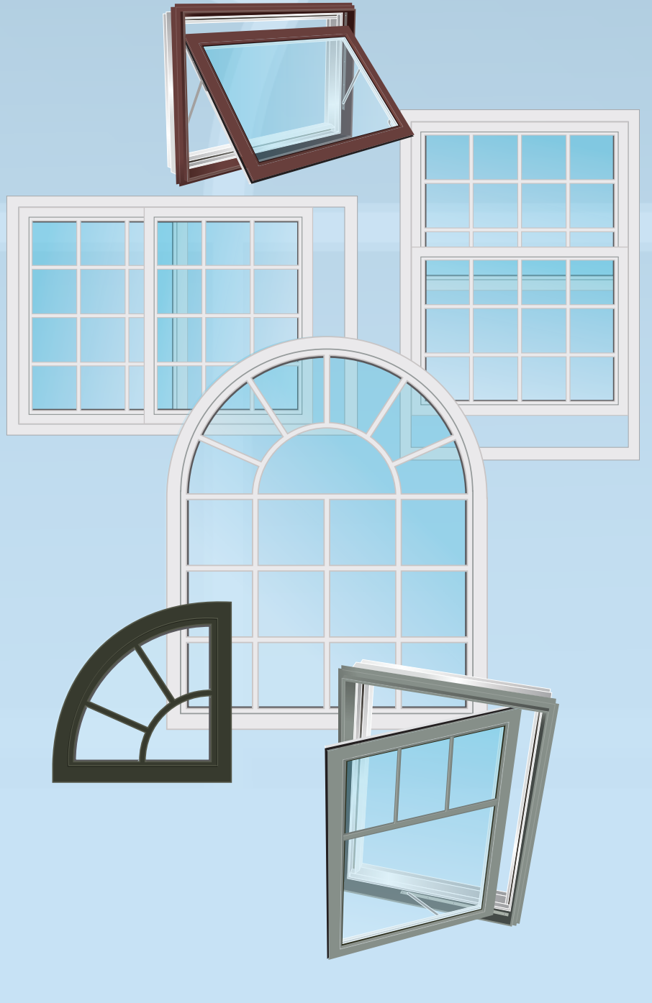
Installing ENERGY STAR certified windows can shrink energy bills and carbon footprints by an average of 12 percent compared to non-certified products.

When you buy ENERGY STAR certified windows, you are getting a product that has been tested against current standards by an accredited Canadian laboratory - test results are verified by an independent third party.

Not all ENERGY STAR windows are the same. Be sure to check the Energy Rating (ER) - a balance between U-factor, SHGC and air leakage. The higher the "ER" number, the more efficient the product.

3

The Window Style



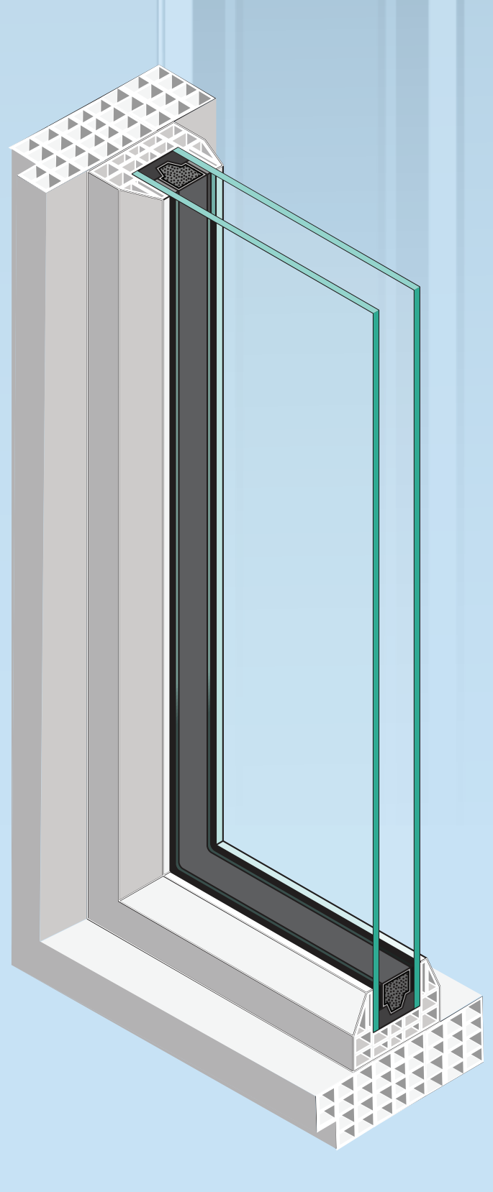
Window manufacturers have become very good at levelling the window style playing field to make most window styles equal.

Although some professional installers believe that certain operational window styles offer better energy efficiency than others, all brands are different.

By their nature (non-operational) picture windows are certain to be the top energy-efficient performer every time.

4

The Frame & Sash



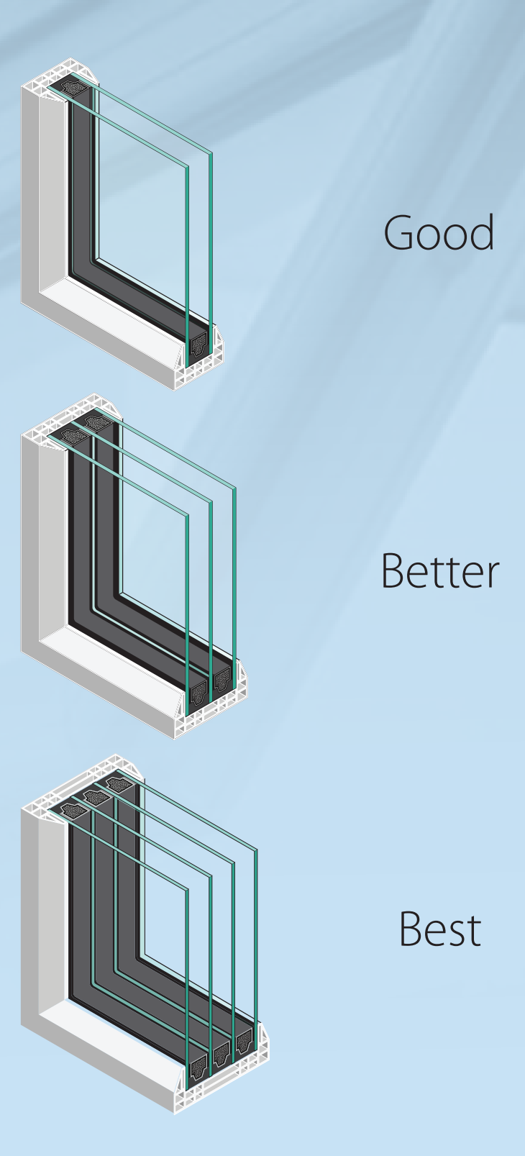
Windows are manufactured from a variety of materials including vinyl, wood, fibreglass, metal and composite. The thickness and type of material being used will affect it's insulating properties, longevity and price of the window.

Premium materials such as wood and various cladding options will improve thermal resistance and contribute to a window's overall energy efficiency. However, the higher purchase price will often outweigh the energy-cost savings over the life of the window.

There are advantages and disadvantages to most types of frame and sash materials, but typically vinyl, wood, fibreglass, and composite will provide greater thermal resistance than metal.

5

The Glazing



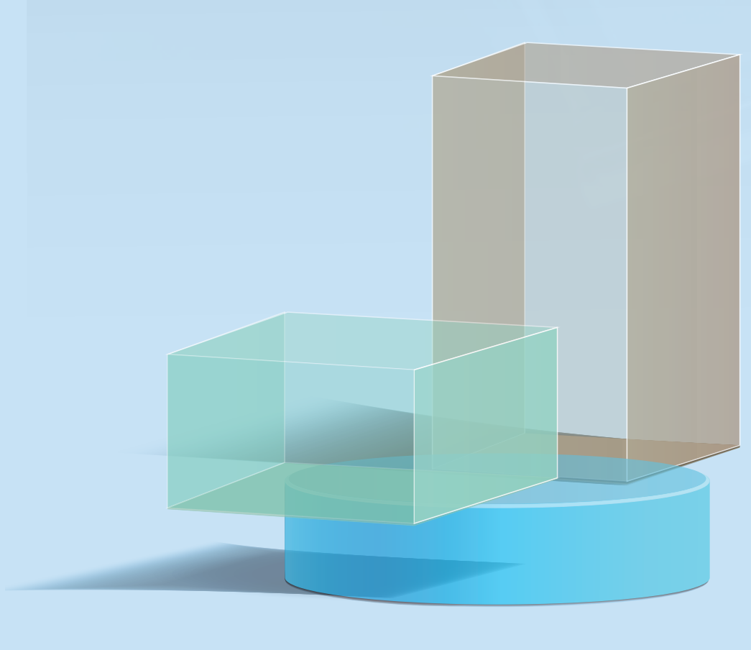
Glazing refers to the panes of glass in an insulated glass units (IGU's) that are placed within a window.

In most cases, the more layers of glass, the higher the thermal insulation (R-value).

Dual glazed (2 panes) windows are the most common glazing configuration available today. However, triple (3 panes and quadruple (4 panes) glazed windows are becoming increasingly common and available from some manufacturers.

6

Coatings & Tints



Window glass is available with special coatings and tints that may or may not contribute to a window's performance and energy efficiency.

Low Emissivity Glass (Low-E/LoE) has a thin reflective coating of silver applied to its surface that reduces the amount of heat that can flow through it. It reflects heat back to the source - toward the sun in the summer - back into the home in the winter. It is available in many configurations to produce a desired balance between solar gain, light transmittance and UV blocking.

Tinted glass does not officially score points as an energy-efficient solution - it reflects visible light without any passive solar heating gain in the winter.

7

The Gas

Inert odourless, colourless, non-toxic gases such as Argon, Krypton and Xenon are used to fill the spaces between glass multi-paned windows. These gases displace the air between the glazed windows making them less conductive than air and more effective in reducing heat transfer from one pane to another.

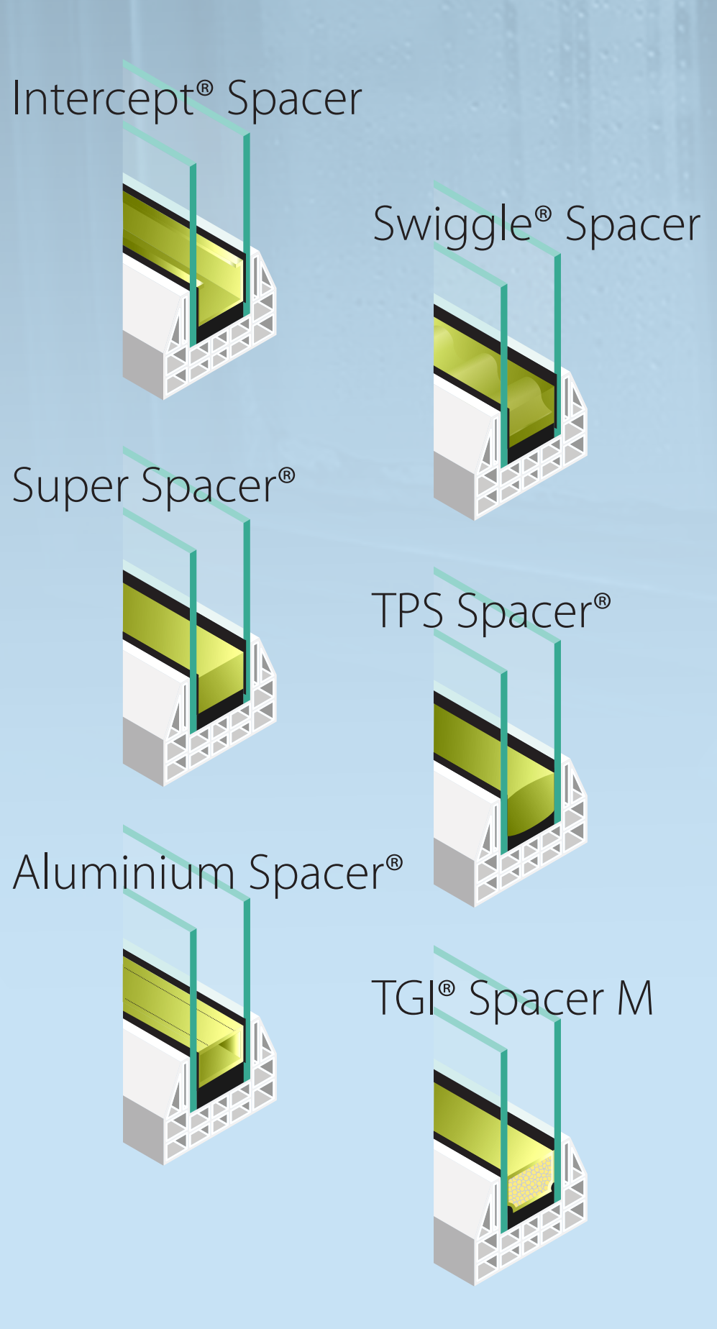
Argon is the more widely used gas - it is much less expensive than krypton.

Krypton is typically used for applications where the total glazing unit thickness must be minimized.

Xenon is very expensive compared to Argon and Krypton and is typically used in large expanses of glass.

8

The Spacer



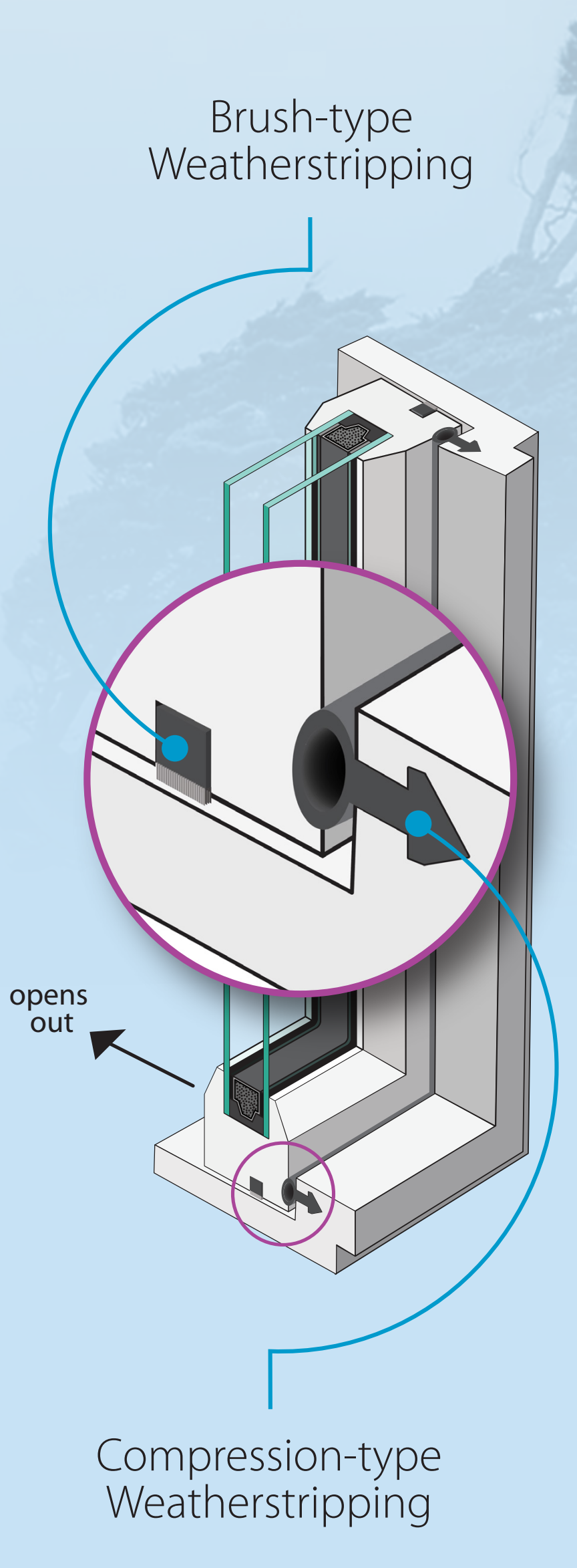
Spacers separate glass panes from each other, providing durability, a space for gas fills and increased thermal performance (reduction of temperature transfer from one window pane to another).

There are many different spacer technologies available and although some may preform better than others - it should be noted that windows are rated by the sum of all parts rather than individual components.

When comparing windows, look at Condensation Resistance (CR) and Energy Rating (ER) values which indicate the overall performance of the window.

9

Weatherstripping



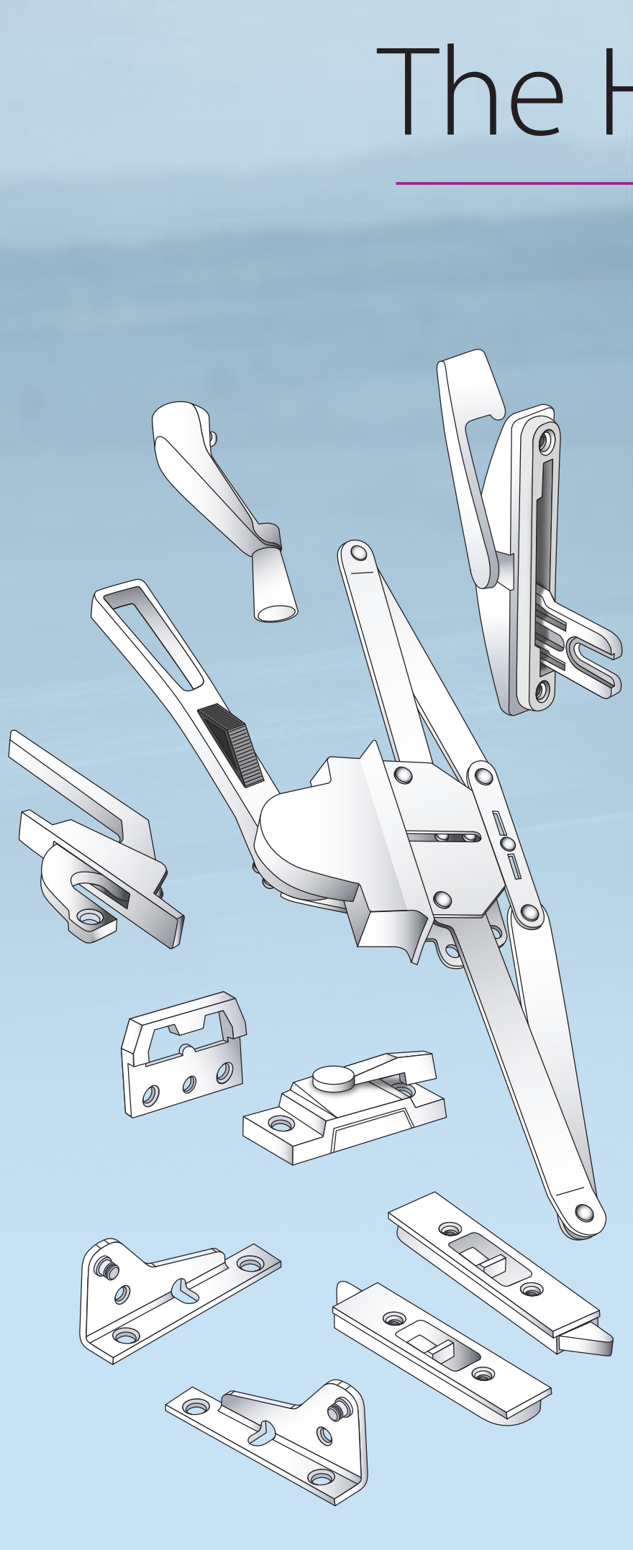
Weatherstripping is a key component in making an operational window more energy efficient. In fact without good weatherstripping a window could be 10-15% less energy efficient.

There are several types of weatherstripping (typically compression and brush) and configurations (single, double and triple) made of various materials including rubber, vinyl, felt and foam. Different styles of windows require different weatherstripping set-ups.

Not all weatherstripping configurations are the same, some work better than others. To ensure you are getting the most energy-efficient, compare air leakage (AL) measurements which are available for most ENERGY STAR certified windows. The smaller the "AL" number, the less air leakage.

10

The Hardware



Hardware (cranks, hinges, operators and multi-locking mechanisms) do not increase the energy-efficiency of a window, in fact because most hardware components are made of metal they easily transfer heat to colder objects, or absorb heat from warmer objects. As well, they require openings in the frame (decreasing insulating integrity) in order to function - decreasing the insulating properties of a window.

However, these hardware items do aid in creating an air-tight fitting when closed.

Although some companies may appear to offer more superior energy saving technologies than others, it's the overall performance of a window that counts when energy-efficiency is desired. Always look for the highest ENERGY STAR "ER" rating when comparing windows.

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