

# Homeowner's Guide to Windows

*Windows are a long-term investment. Smart shoppers purchase energy-efficient windows to protect themselves from future energy cost increases and improve comfort for years to come. Improving the energy performance of windows is important, since windows are the least insulated surface of most homes. Energy-efficient features available for new or replacement windows include:*

- Low emissivity (low-E) coatings and films
- Inert gas between the panes of glass
- Insulated edge spacers
- Insulated frames
- Additional layers of glazing

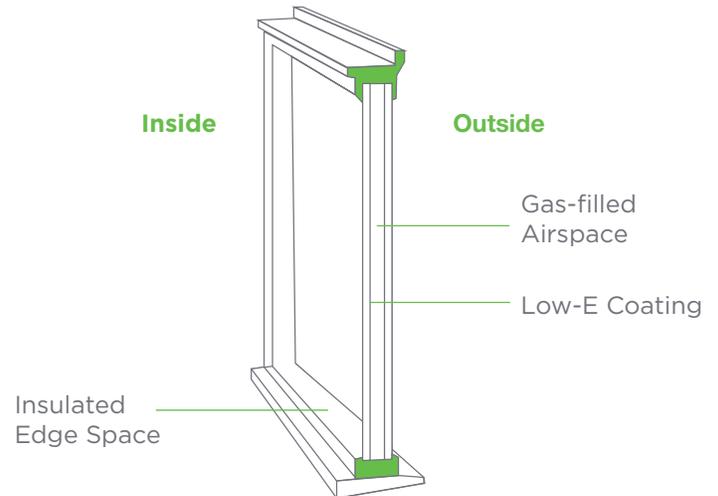
## Why Does Condensation Appear on Windows?

Condensation appears on windows because they are a home's coldest interior surface during the winter months. If the window glass cools the interior air below its dew point, water droplets from the air begin to appear on the glass. In homes with low-quality windows, increasing ventilation rates alone may not solve window condensation problems without reducing humidity below healthy levels. High ventilation rates also increase heating costs. The higher insulating value of an energy-efficient window "warms up" the glass, making condensation much less likely.

Condensation between the panes of a thermopane unit is caused by the failure of the edge seal. The most common way to fix this problem is to replace the thermopane unit with a new one. Removable interior window trim makes replacement relatively simple. Check with your window supplier or manufacturer to see if the thermopane unit is still covered under warranty.

It may also be possible to repair a foggy window unit in place. Technicians remove the moist air through small holes, dry out the air space between the glass layers, inject dry air and seal up the holes.

## Energy Efficient Window Features



## What is a "Low-E" Window?

Low emissivity, or "low-E" coatings, are extremely thin selective metal films applied to one of the inner surfaces of glass (usually the interior pane in heating climates). Low-E coatings are engineered to block heat from radiating out of the home, yet still allow solar energy to enter. Capturing as much solar energy as possible is especially important for south, southeast, and southwest facing glass. Low-E coatings are also available as a film suspended between glass panes.

## Why Use Argon Gas?

Replacing the air in a sealed window unit with a heavy inert gas, usually argon, decreases window heat loss by reducing air circulation (convection) between the glass panes. The leakage rate of argon gas fill is much too low to reduce window performance unless the glass unit's edge seal fails.

## Why Use Insulated Spacers?

For thermopane units with metal spacers, condensation begins at the bottom edge of the window and then extends up the sides because the metal spacer between the glass panes conducts cold well. As a result, temperatures at the edge of the glass are much lower than the temperature in the middle.

Most window manufacturers now offer insulated spacers. Insulated spacers raise the temperature of the glass near the frame, saving energy and reducing edge condensation.

## Is Triple-glazing Worthwhile?

The least costly way to increase window performance is to purchase double-glazed window units with low-E, argon gas, and insulated spacers. Triple-glazed windows may be much more expensive, since a heavier frame and sturdier hardware are required to accommodate the extra thickness and weight of the third layer of glass. Very high performance triple-glazed windows with low-E coatings and gas fills are available. These windows are typically best suited for north-facing windows or houses with very low energy targets.

## Are All Frames the Same?

No – frames can affect a window's energy performance. Standard wood and vinyl frames have a similar insulation value. Insulated fiberglass frames or foam-filled vinyl frames have higher insulation values.

Window frames made of several materials, such as fiberglass and wood or fiberglass and vinyl, are also available. Metal and metal-clad frames generally have the lowest insulating value.

## Are Some Window Styles More Efficient?

Air leakage, particularly between the sash and frame, affects a window's energy performance. Fixed windows are nearly always tighter than similar windows that open. Specify as many fixed windows as possible, keeping in mind the need for summer ventilation and fire safety. Operable windows usually cost \$50 to \$100 more than a fixed window of the same size.

Casement and awning windows with compression seals offer positive closure and seal better than vertical or horizontal sliders with sliding seals. They have lower air leakage rates and are more energy efficient, particularly as the seals of sliding windows wear over time.

When shopping for windows, examine the weather-stripping system carefully. Is the weather-stripping flexible? Is it replaceable? Is there more than one layer of weather stripping between the sash and the frame?

## Should I Replace My Existing Windows?

When purchasing a new window, the additional cost of upgrading to an energy efficient unit is a sound investment that will be quickly repaid. However, savings are usually not large enough to justify replacing a serviceable window solely to conserve energy. Common reasons for window replacement include breakage, moisture damage, rot, seal failure, excessive condensation, or uncomfortable drafts.

## How Can I Prevent Air Leakage Around the Window?

Comfort and window performance will suffer unless the gap between the window and rough framing is sealed with a material that prevents air leakage. Fibreglass insulation does not prevent air leakage unless it is combined with another material that can stop air movement. Methods used to seal this area include the following:

### Backer Rod and Caulking

Lengths of round foam rod (available in different diameters) are tightly wedged in the rough opening between the outside of the window and the framing. Any remaining gaps are caulked.

### Expanding Foam

Select a low-expansion foam with a delivery system, usually some type of gun, that allows for accurate and neat application of the foam. Spray cans of foam can be more difficult to work with.

High-expansion foam can damage glass or distort the window frame enough to keep the window from opening and closing properly.

### Drywall or Plywood Return

Drywall or plywood is installed as close to the window as possible, and any remaining gap is sealed to the window frame to create a continuous air barrier.

### Contractors Sheathing Tape

Air barrier tape is used to connect the plastic or drywall to the window frame. The tape is then covered with window casing. This system depends on the tape continuing to stick properly over the long term.

## What is the A440 Rating System for Windows?

The Canadian Standards Association (CSA) A440 standards allow window manufacturers to test and rate their windows against specific performance criteria. The higher the number attached to each letter, the better the performance of the tested window will be.

- "A" rating for air tightness has three categories, A1, A2, and A3.
- "B" rating for water has categories from B1 to B7.
- "C" rating for wind load resistance has categories from C1 to C5.

This rating system is a useful tool for accessing important window performance measures. Windows with the highest ratings available (A3, B7, and C5) are wise choices for homes in windy, exposed, or coastal locations with unusually harsh weather conditions.

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