



Energy Efficiency: Window & Door Insulation

(General)

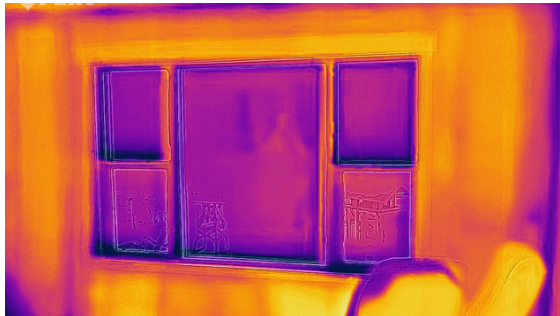
Importance of Windows & Doors Insulation

Windows and doors account for 35% of heat loss in Canadian homes, making them a significant part of a home's air sealing and insulating design within a building envelope. Energy efficient windows and doors are an essential part of maintaining an efficient building envelope. A well insulated home will reduce a family's environmental impact while saving money on their monthly utilities.

Energy Efficient Windows are:

- double, triple or even quadruple glazed
- made of low-emissivity (low-E) glass
- lined with very stable gases, such as krypton or argon
- air-tight
- built with insulated frames and/or sashes
- labeled with an Energy Star certified logo.

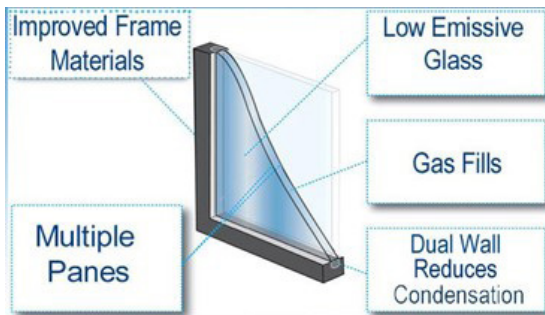
- Combination frames are made of multiple materials throughout to provide an all around strong performance.
- Composite frames follow the same logic as combination, the difference being that composite frames are various materials blended into one energy efficient material instead of separate components made of different materials. A great option for Canadian winters.



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This thermal image demonstrates where cool air will penetrate the most. Cool air is represented by the darker purples. Yellow represents warmer air. See how the cooler purple is found around the frame, indicating that cold air is able to travel through air gaps or thermal bridging (when heat travels directly through solid building materials). This can be prevented by better air sealing or by being replaced with an Energy Star window in the future.

Windows and doors account for 35% of heat loss in Canadian homes.



energystar.gov

Doors

Doors can come with or without small windows which will influence their effectiveness. The less glass you have the more insulative it will be.

Energy Efficient Doors:

- Are Energy Star certified.
- Have core material such as polyurethane foam that will provide insulation.
- Are complemented by weatherstripping that seals around the door, is installed properly and is undamaged. This can be just as important as the door's quality.
- Have a tight seal around the frame of the door, insulated with spray foam and/or caulk will ensure heat does not escape.

This thermal image of an exterior door demonstrates where cool air will penetrate the most. Cool air is represented by the darker purples. Yellow represents warmer air. See how the cooler purple is found around the steel hardware, the window and air gaps below the door.



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Window Materials

An important part of getting a good window seal is an effective frame. Energy Star certified windows can come in a variety of materials such as:

- Vinyl or Fiberglass frames are often filled with insulating foam and are durable and low maintenance.
- Aluminum frames are also low maintenance and durable, while also being made of at least 15% recycled content. Gaps within the frame will reduce heat transfer.
- Wood frames are mostly used in historical neighbourhoods and one of the most insulative options. Not great in humid areas. Wood clad is a more expensive option and is covered in aluminum or vinyl to make them more durable.

Why Upgrade to Energy Star Rated Windows & Doors?

Energy Savings - Many homes have windows ready for replacement, or inefficient double pane windows.

Comfort - Ever sit next to a drafty window? Energy star windows will increase occupant comfort by insulating against winter drafts.

Protect Belongings - Not only are Energy Star rated windows secure, they have protective coatings or glazing, that act like a sunscreen for your belongings. This coating will filter out ultraviolet light that fades colors in furniture and curtains.

Reduce Condensation - Energy Star certified windows will reduce condensation build up.

Security - Sturdy windows and doors will increase your home security.

What is an R-Value?

An R-value or thermal “resistance” is a measurement of how good a product is at retaining heat. An R-value is determined by the properties of a type of material, density and thickness. A higher number indicates a higher insulation value.

What is Weatherstripping?

Weatherstripping is the material you find underneath and around your door frame or window. It is a form of insulation generally made of rubber, foam or sponge. Doors and windows will lose their insulative properties if they do not have properly installed weatherstripping that is in good condition.

Things to Consider Before Replacing Your Windows or Doors

How to Check for Air Leaks

- Can see light coming through the door frame? If so, the weatherstripping will need to be replaced. Another way to detect an air leak is to place a lit incense stick near the door jamb or window jamb. If the smoke is blowing into or away from the window you will know you have a leak.
- Does the weatherstripping go completely around the top of the door frame and the sides and is tightly in place, with no loose ends?
- Is there is a separate piece of weatherstripping (door sweep) underneath doors and windows on the frame that is in good condition (no significant rips or tears)?

If you've detected any of these issues you will need to replace the weatherstripping.

How to Fix Weatherstripping

Before fixing the weatherstripping, ensure the rest of the door or window is in good condition. If any repairs need to be made, make those first as weatherstripping should be the last phase of fixing a door or window.

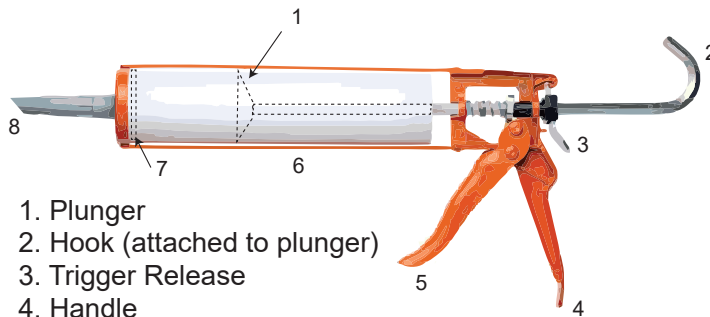
- When selecting replacement weatherstripping, make sure that you select the right width material.
- Before applying new weatherstripping, clean the surface that you'll be applying it to and dry it off completely.
- Weatherstripping will either come with a sticky side just like tape or a grooved edge. The grooved edge will snugly slide into a slit in your door frame.
- Cut the weatherstripping to the exact length of the surface you are applying it to, leaving no gaps.
- Minor gaps in the corner of a door or window frame are common. A corner pad can be installed as a cheap and easy fix.

Determine if Caulking is needed

Caulking is a great tool that blocks air flow between materials that do not provide an airtight seal. It is to be used to assist in tight spaces where traditional insulating materials are not effective. Caulking is mostly used in areas that are out of sight, between the components that make the building envelope. For example caulking is typically used between studs, electrical outlets, where plumbing or wiring penetrate through surfaces, in the seams between the interior of door and window frames, floor joists etc.

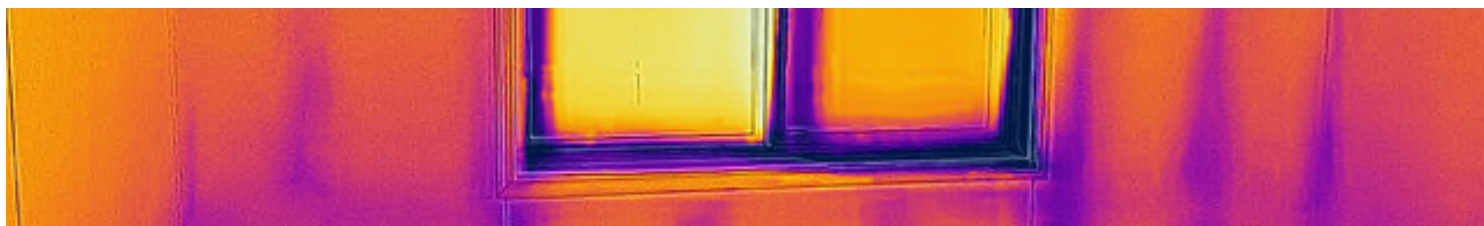
The same techniques to determine whether weatherstripping should be installed or repaired can be used to detect where caulking should be applied.

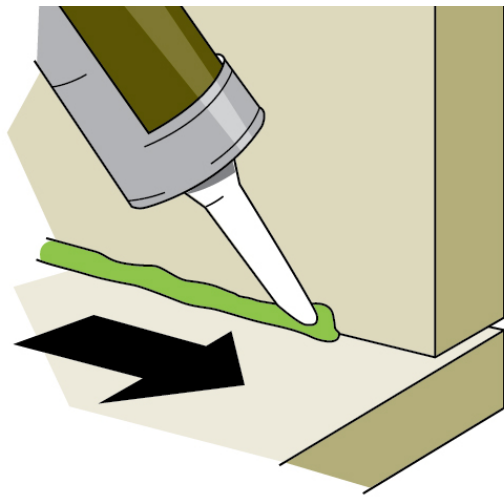
- Can you see light coming through any place in the building envelope?
- Place a lit incense stick near a door frame or window frame to check for a draft. If the smoke is blowing into or away from the window you will know you have a leak.



1. Plunger
2. Hook (attached to plunger)
3. Trigger Release
4. Handle
5. Trigger
6. Frame/Canister Tray
7. Foil that needs to be punctured
8. Nozzle cut at 45 degree angle

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Hold the caulking gun approximately perpendicular to the line of travel. Cut the nozzle squarely. Force the caulk into the crack. natural-resources.canada.ca

How to Apply Caulking

What You Need

Gloves, Caulking Gun, Caulk, Nail, Scissors or Utility Knife

Step 1: Load Caulk

Release the gun by thumbing the plunger at the rear of the gun. Pull plunger all the way back and load a tube of caulk into the gun, nozzle end first. Push the plunger snugly into the back of the tube and remove your thumb.

Step 2: Cut the Tip

Cut the tip of the caulk at a 45 degree angle so it fits the size of the area you're caulking. Always cut smaller than you initially intend, as you can make the hole slightly bigger but not smaller.

Step 3: Puncture Seal

Push a nail through the cut opening of the caulk tube. This will puncture any foil seal and allow the caulk to flow freely. Squeeze the trigger a few times until the plunger makes contact with the membrane at the back. Squeeze once or twice more to fill the tip with caulk.

Step 4: Practice

Try laying a bead of caulk on a piece of cardboard. How hard you squeeze the trigger and how quickly you move the gun will determine how much caulk is applied.

Step 5: Start Caulking

Start caulking at a 45-degree angle. Squeeze the trigger slowly while drawing the gun toward you. Keep the gun moving at a steady speed with even pressure. Once the trigger is fully depressed, it will automatically spring back. At the end of the bead, release pressure to stop flow of caulk.

Step 6: Smooth

As soon as you've finished caulking, push the caulk into the seam and smooth it over with a finishing tool, an ice cube, a gloved finger or a spoon dipped in a bit of water. This light pressure applied by a slick tool will give you the even, smooth lines of a professional job.

Note: Always overlap beads of caulking in corners

Things to Consider when Upgrading Windows and Doors

- Improving a home's windows does not always mean a total replacement. Applying new weatherstripping, caulking, glazing or installing a new sash, locks, latches and cranks will improve a windows efficiency.
- Full window or door replacements are a large undertaking for the uninitiated. It is highly recommended that you hire a contractor if you have never replaced one before.

Energy Savings

Window Replacement

- Many windows are aged and not up to Canada's current building standards. By replacing old windows that were not designed to be in a Northern climate with Energy Star rated windows, a homeowner can save up to \$270 a year and reduce up to 640 kg of greenhouse gases a year!
- Windows have a high upfront cost but if they need to be replaced, ensure you purchase the most energy efficient ones possible. For a simpler, short term option, insulating curtains or blinds can be installed for a fraction of the price.

Door Replacement

- By replacing an old door that was not designed to be in a Northern climate with Energy Star rated doors, a homeowner can save up to \$80 a year and reduce up to 190 kg of greenhouse gases a year!
- Enjoy energy savings and a reduced impact on the environment!

Useful Links

Natural Resources Canada - Windows and Doors

<https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-homes/how-can-i-make-my-home-more-ener/keeping-heat/keeping-heat-chapter-8-upgrading-windows-and-doors/15643>

Natural Resources Canada - Energy Star

<https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-products/product-information/windows-doors-and-skylights/13739>

Energy Star Windows

https://www.energystar.gov/products/building_products/residential_windows_doors_and_skylights/key_product_criteria

