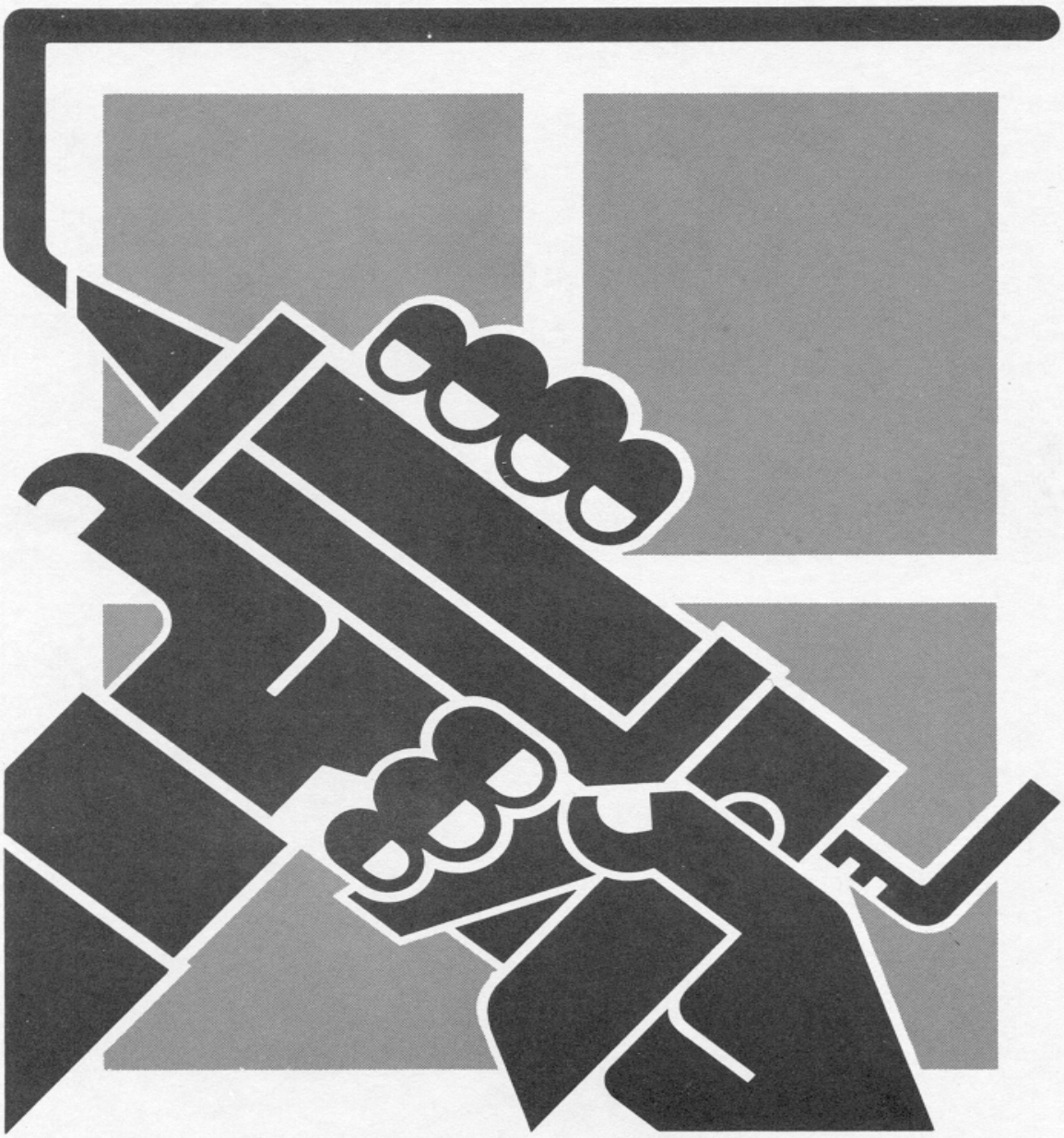
Caulking and Weatherstripping



This booklet deals with conservation and wise energy management as it relates to caulking and weatherstripping. It was originally issued by, and is reprinted with kind permission from, the Public Service Company of Colorado.

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Foreword

In the inflationary times we live in, everything seems to be costing more. And energy expenses are one of those big items we all have to face each month. But there is something we can do to control energy costs—conservation. It's still the most cost-effective and sensible approach to the problem. Energy conservation must be practiced by all of us—and it should begin right in our own homes.

By practicing conservation in our regular daily routines and by fixing up our homes to be energy efficient, we can save energy —and money! Once you have weatherized your home, the following benefits are available to you:

- use less energy and save money year after year,
- be more comfortable in your home in the winter and in the summer,
- add to the resale value of your home. Since it will cost less to heat and cool your home, a potential buyer should recognize the value of an energy efficient home.

Two of the most cost effective things you can do to weatherize your home are CAULKING and WEATHERSTRIPPING. A significant amount of energy can be saved by making these simple improvements on your home. This booklet deals with the basics of caulking and weatherstripping—why you should do them, where your home needs these improvements and how to go about doing the jobs yourself.

This booklet is part of a series of conservation booklets we have developed for your use. All these booklets are available from The North Dakota Extension Service. We hope they will help you **conserve your dollars by conserving energy.**

Stop Air Infiltration

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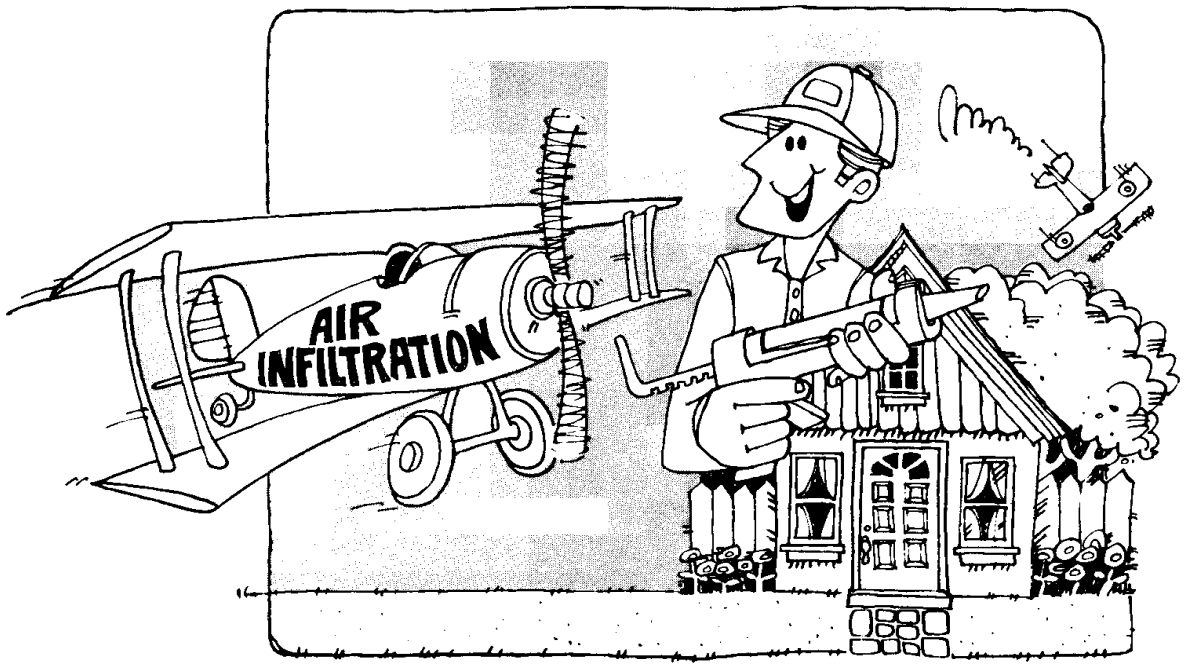


Air Infiltration!— Sounds like an air attack in *an old war movie, doesn't* it? Actually, stopping air infiltration is part of the "war effort" against wasting energy in your home.

If your home is well insulated, most of your heat loss will occur through air infiltration; cracks and crevices in your home that can account for up to 35% of your heating load.

During the winter, cold air leaks in and warm air escapes through cracks and openings around doors and windows and through any openings in walls, the attic and floors over unheated areas.

In fact, a recent study we participated in showed that air leaks into your home through many areas you would not often suspect.

The Major Sources of Air Infiltration are:

Sole plate — where wall meets the floor
Meeting point of foundation and side walls
Windows and doors
Electrical fixtures (including wall outlets)
Plumbing fixtures
Bath and kitchen vents
Fireplaces
Exterior doors
Air duct system
Dryer vent

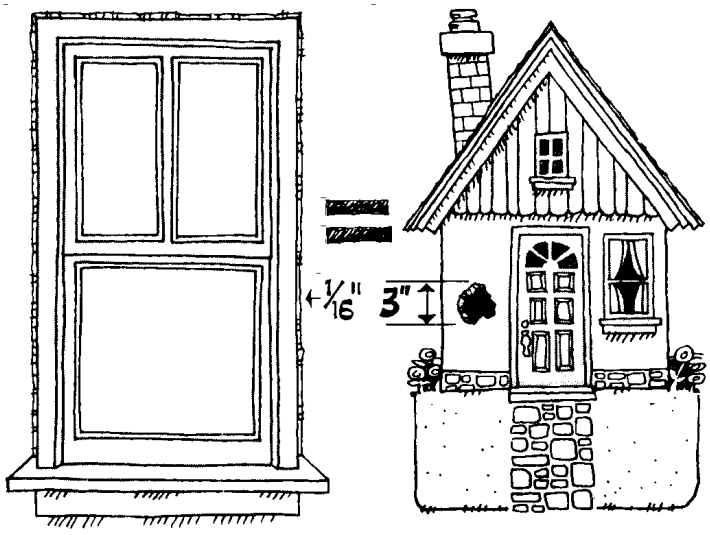
A tiny crack around the window frame may seen insignificant. But, imagine this: an opening 1/16 of inch wide all the way around a 3' x 3' window is equal to a hole about 9 square inches. If you have cracks and crevices around most of your doors and windows, it soon adds up to a **lot** of air infiltration — wasted money and wasted energy.

That's the bad news. Now the good news! **Stopping the air leakage is inexpensive, fairly simple to do, and cost effective.**

Caulking and weatherstripping prevent the free flow of warm air from the inside to the outside of your home, and the cold air from the outside in.

If your home is weatherstripped and caulked properly, these are other benefits you will receive:

- higher humidity levels due to retention of free humidity from bathing, cooking and laundry.
- lower dust levels
- reduced noise levels
- and increased comfort because of the reduction of drafts caused by the air movement.



Weatherstripping is applied at any joint where two surfaces meet and/or move relative to each other (doors and windows). Caulking is applied where two surfaces meet but do not move.

Caulking and weatherstripping should be two of the first things you do to make your home more energy efficient. Let's look at both of these applications in detail.

Caulking Your Home

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Caulking is an easy, energy-saving project you can do yourself that is relatively inexpensive—and very effective. In fact, it will usually pay for itself in energy savings within one year.

"Caulking" is a compound used for filling cracks, holes, crevices and joints on both the inside and outside of your home. You will only need a few simple tools to caulk these areas and a minimum of skill. You may want to start at the back of your house and work toward the front so that your skill level has improved by the time you caulk places that are very visible.

Try to choose a mild day to tackle this project. The outside temperature should be above 40° for the caulking to be applied correctly. So, **plan to caulk during the spring, summer or fall for best results.**

Where to Caulk

As a general rule of thumb, **caulking should be applied wherever two different building materials meet on the interior or exterior of your home.** Different building materials expand and contract at various rates. Through the years with temperature extremes and the caulking materials drying out, cracks develop between these materials. This allows air infiltration and the cracks therefore need to be caulked.

On the interior of your home, you can check for air leakage by moving your hand around the windows and doors on a windy day. If you can feel air movement, you need to caulk and/or weatherstrip. You will probably be surprised to find how many spots are "air leakers"!

The following are areas you should check before beginning your caulking project:

1. Around door and window frames—inside and out
2. Places where brick and wood siding meet
3. Joints between the chimney and siding
4. Between the foundation and walls
5. Around mail chutes
6. Around electrical and gas service entrances, phone lines and outdoor water faucets
7. Where dryer vents pass through walls
8. Cracks in bricks, siding stucco, and foundation
9. Around air conditioner
10. Around vents and fans
11. **Wherever two different materials meet**

Before every heating season, go around your home for a general maintenance check. You will not only find areas that need to be caulked, but also other repairs that need to be made. It will certainly be well worth the time it takes in energy savings.

Types of Caulking Compounds

You will find a variety of caulking compounds on the market that will vary greatly in initial cost, and how long they will last. Rather than describing all of the caulking compounds available, only a few of the more common ones are listed in the following chart:

Caulking Compound	Durability	Elasticity	Cost	Comments
Oil based	1-5 yrs.	poor	low	very low elasticity
Acrylic latex	2-10 yrs.	fair-good	moderate	easy to apply, water clean up, paintable
Butyl rubber	5-10 yrs.	fair	moderate	difficult to apply, solvent clean-up, high moisture resistance
Polyurethane	20 yrs.	excellent	moderate-high	solvent clean up, excellent elasticity adheres well to most surfaces
Silicone	20 yrs. or more	excellent	high	paintable silicone available

There are various other caulking compounds available from hardware stores, lumber yards or conservation centers.

Remember—You get what you pay for! You may decide that you will be better off in the long run by investing a little more money in a caulking compound that will last several years longer.

Because of its durability and reasonable cost, we recommend a good quality grade of acrylic latex caulk for most purposes.

Caulking Your Home

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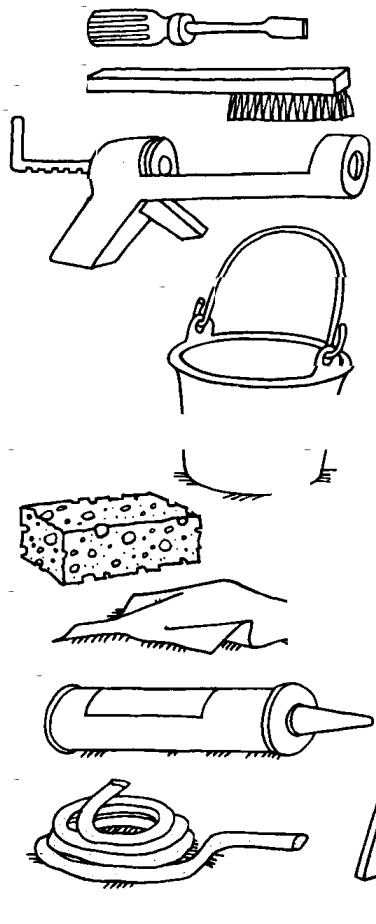
How to Caulk

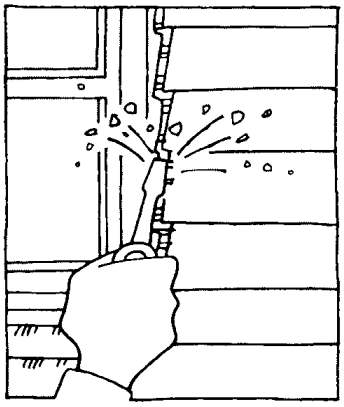
Tools: 1" scraper or screwdriver
wire brush
caulking gun
water container
cloth
ladder

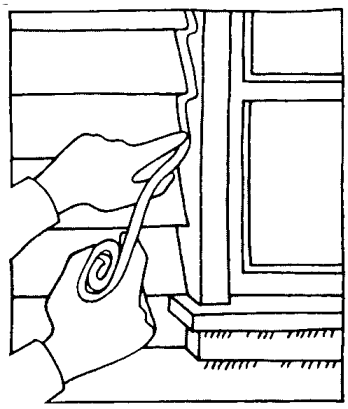
Materials: caulking compound (Average: 1/2 cartridge per window) filler material (used to fill large cracks before caulking) such as backer rod or scraps of insulation



Procedure:

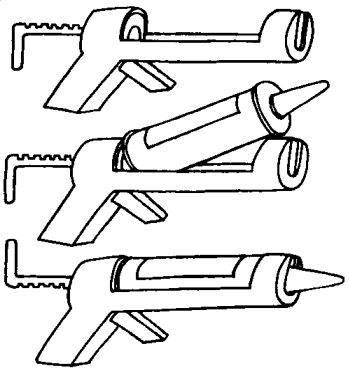
1. Preparation: Clean all surfaces before caulking. Remove loose paint, dirt and grease. This insures good adhesion. Make sure the surface is dry before you begin caulking. If you are replacing or repairing old caulking, remove as much of the old material as possible.



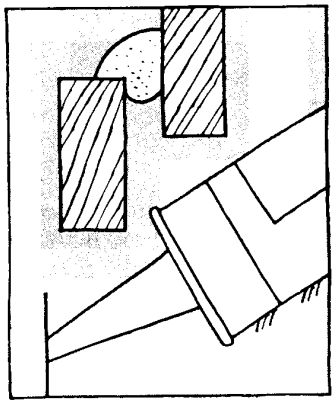


2. Fill wide or deep cracks with filler material.

3. Read the instructions on the caulking tube very carefully!

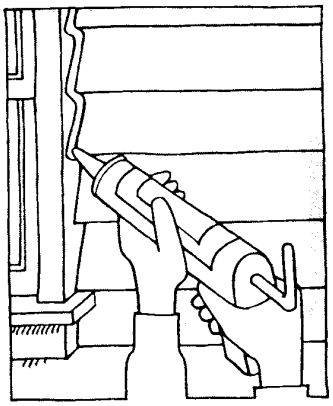


4. load the gun: Turn the plunger rod teeth face up and pull back as far as you can. Insert the cartridge in the opening and press the nozzle into the slot. Turn the rod teeth face down and push the plunger until the teeth engage.

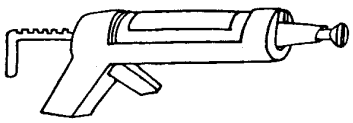


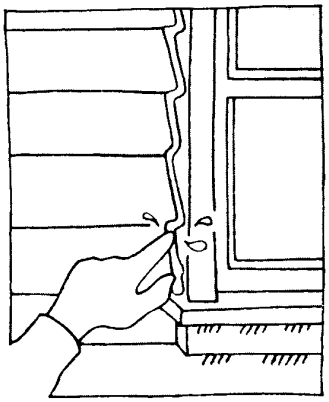
5. Open the tube: Cut off the tip of the tube with a sharp knife at a 45° angle. The amount of the tip of the tube you cut off will determine whether you have a thin, medium or heavy bead. Use a long nail to break the inner seal and plug the nozzle when not in use.

6. Apply the caulking compound: Hold the gun at a 45° angle to the surface (tilted in the direction of the movement) and squeeze the trigger to keep the caulk flowing evenly. The trick is to finish a seam in one stroke without stopping. Make sure the caulking completely fills the cracks.



7. Disengage the plunger on the caulking gun by twisting the plunger and pulling it back. This will stop the flow of caulk. Plug the end of the tube with a nail or screw.





8. Smooth the caulk, if you are using an acrylic latex, by wetting your finger and running it down the caulking bead.

9. Clean Up! Clean all tools immediately after you have finished. For acrylic latex caulk, use water.

Weatherstripping Your Home

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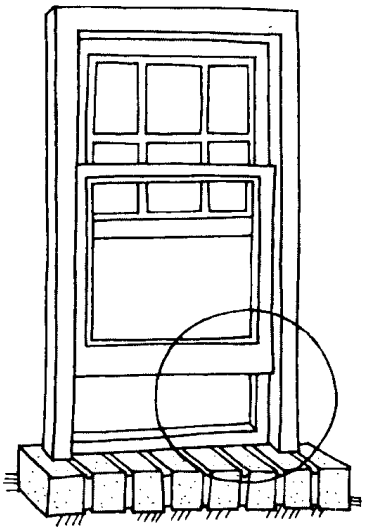
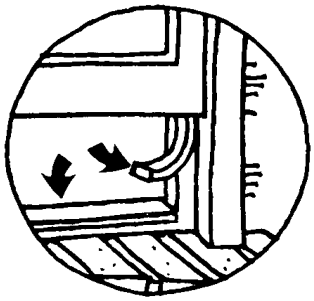
Caulking takes care of the cracks and crevices where two different materials meet. But to seal joints between surfaces that meet and move relative to each other—such as doors and windows—you'll need weatherstripping

Like caulking, weatherstripping is another low-cost way to cut energy costs that will usually pay for itself in energy savings within one year.

"Weatherstripping" is a narrow strip of metal, vinyl or foam that provides an air-tight seal between the frame and the moving parts of doors and windows.

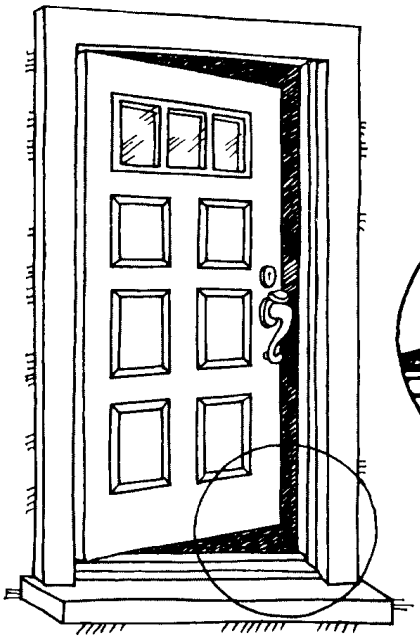


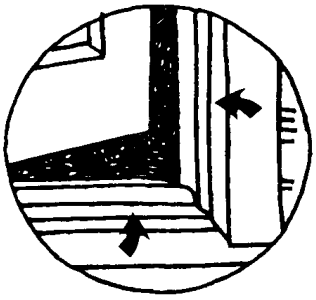


Where to Weatherstrip

Weatherstrip windows and doors on sides, tops and bottoms. Don't forget the meeting point where the top and bottom sash of double hung windows or sliding windows come together. Weatherstrip entrance doors —plus attic doors, basement doors and doors leading to unheated garages.

Check your home for existing weatherstripping. If you have some, check its condition to see if it needs to be replaced. If you can feel a draft coming in around your doors and windows, or you can see light coming in, weatherstripping is needed.

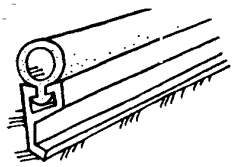
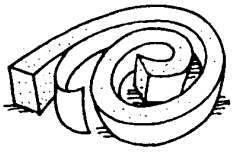
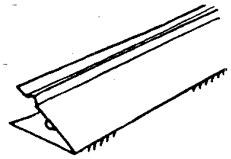
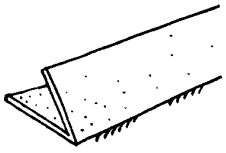
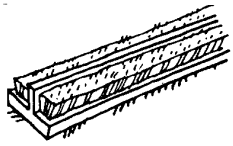




Types of *Weatherstripping*

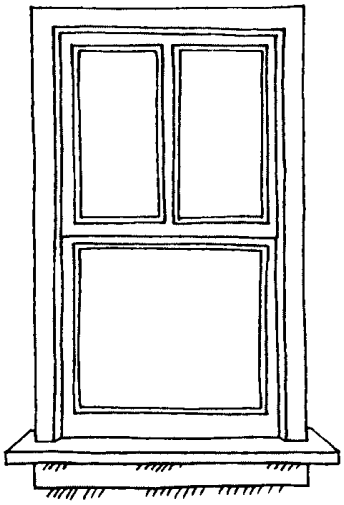
Most weatherstripping materials are available at hardware stores, lumber yards or conservation centers. If applied correctly, weatherstripping will last for years. Read the manufacturers' directions and do a good job.

There are several types of weatherstripping available. In most cases, we recommend one of the following types:

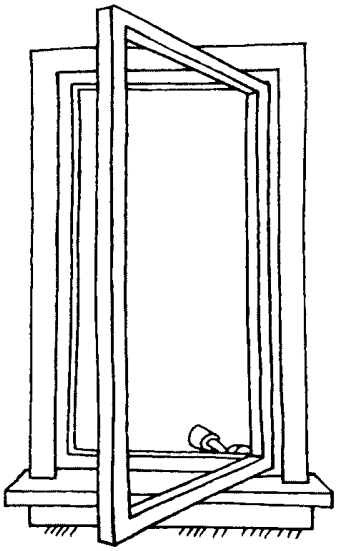
Weatherstripping		Durability	Comments
Rolled vinyl with rigid metal backing		5 years and up	Must make contact for proper seal. Visable when installed.
Foam rubber		1-2 years	Easy to apply. Short life span.
Thin spring metal		5 years and up	May lose some flexibility with time and, therefore, lose its sealing ability.
Spring plastic		5 years and up	Easy to apply.
Fin seal (nylon brush with thin plastic strip down the middle).		5 years and up	Used to replace worn weather-stripping on aluminum horizontal sliding windows and sliding glass doors.

Weatherstripping Your Windows

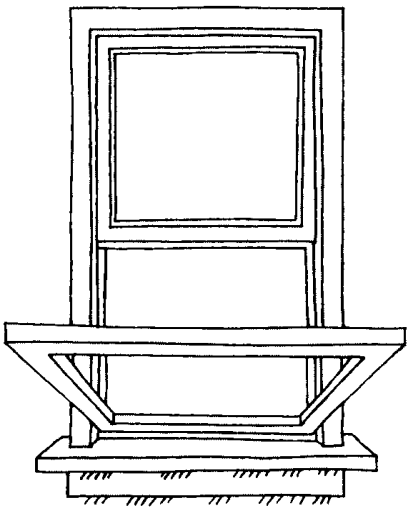
Windows are divided into four basic types: double hung, casement, hinged and sliding.



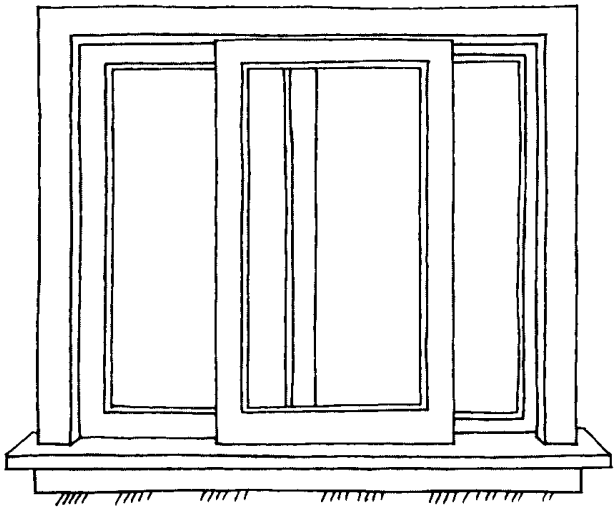
1. Double-hung



2. Casement



3. Hinged



4. Sliding panel

Air infiltration can be minimized around windows by applying weatherstripping between moveable and stationary parts. Before you weatherstrip, be sure that the window opens and closes easily and fits correctly into the frame.

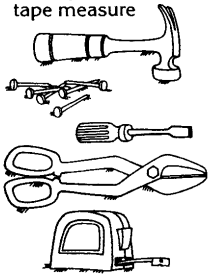
The type of weatherstripping you use depends on the type of window you have, where the air infiltration is occurring, the importance to you of the window frame's appearance, price and durability.

Before you purchase weatherstripping, measure your windows to determine the amount you will need. You can buy weatherstripping by the foot or in kits which state the amount contained on the package.

Double-Hung Windows

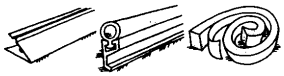
The double-hung window consists of upper and lower windows in which one or both slide up and down. This type of window should be weatherstripped on the sides, top and bottom of the moveable portion.

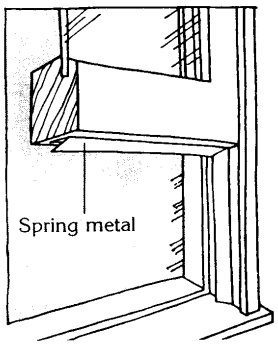
Tools: hammer and nails
screwdriver
tin snips
tape measure

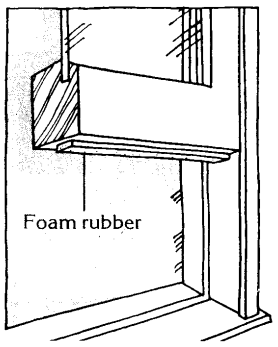


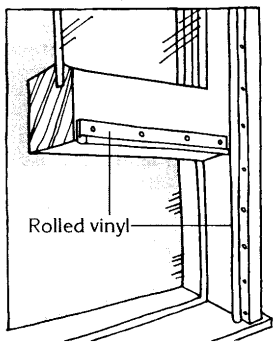
Materials:

Thin spring metal, roled vinyl (with or without metal backing) or foam rubber with adhesive backing.



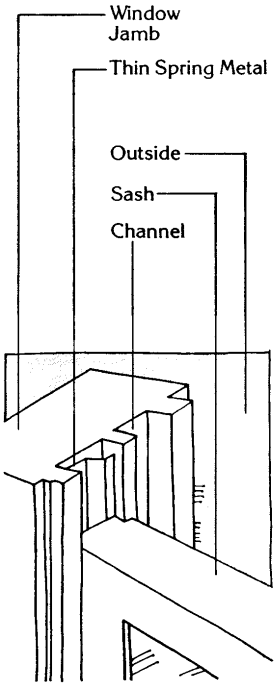






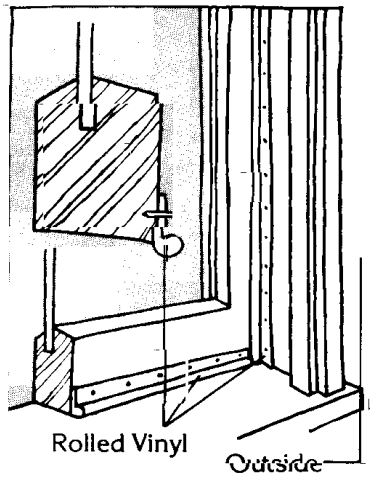
Procedure:

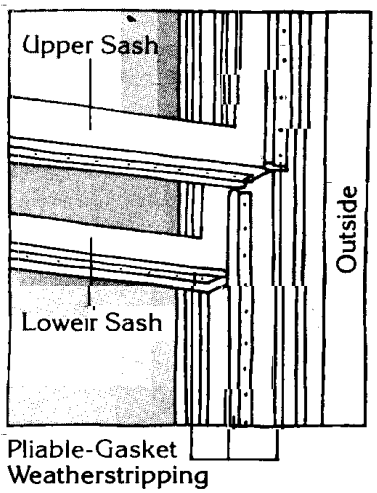
1. Raise the sash (moveable portion) as far as possible. Measure from the bottom of the channel to about two inches above the bottom of the upper sash. To use the thin spring metal, cut two strips this length. Slide the strips in between the sash and the channel. Nail into place so that the window will not catch on the weatherstripping. You may have to piece the weatherstripping to fit around the pulleys in the upper channels.



2. Measure the lower sash bottom rail and the upper sash top rail. Cut strips, making sure they extend across the full width of the sash. Nail in place. (If you use the rolled vinyl, install on the outside of the window and frame so it is not visible from the inside.)

3. Measure the upper sash bottom rail. Cut and attach by countersinking the nails so they won't catch on the lower sash top rail.





Casement Windows

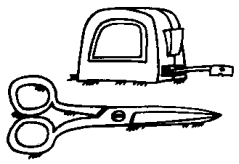
Casement windows are windows that open and close from side hinges with a crank handle. There are two types of casement windows: metal and wood.

Wood casement windows should be weatherstripped in the same manner as a door. (see section on Weatherstripping Doors). Rolled vinyl or thin spring metal are the most commonly used weatherstripping materials for these windows.

Metal casement windows are common in this geographic area. They usually cannot be effectively weatherstripped with thin spring metal or rolled vinyl. If your casement windows are somewhat warped, close the window just enough to allow the latch to *begin* to catch. Apply silicone caulk to three sides of the window between the sash and the frame (omit the side with the hinges). Allow the caulk to dry. Cut the caulk away from the moveable portion of the window. What you have, in effect, is a home-made gasket. Insert closed cell backer rod between the sash and frame on the hinged side of the window.

Metal casement windows may also be taped closed for the winter using duct tape, but this may present a fire hazard. The tape may also leave a gummy residue when removed or pull off the paint. If you *do* chose to use weatherstripping, use adhesive backed foam, even though it will soon wear out.

Tools: Tape measure
scissors



Materials: Adhesive backed foam.

Procedure:

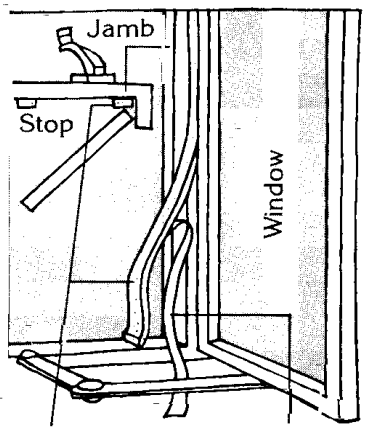
1. Clean the metal surface.

2. Measure the length of the jamb from the top to the bottom. Cut 2 pieces of weatherstripping this length.

3. Attach strips to the window jamb and window stop.

4. Cut two strips the width of window.

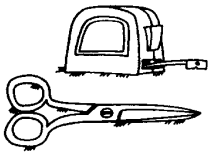
5. Attach strips to top and bottom of the jamb.



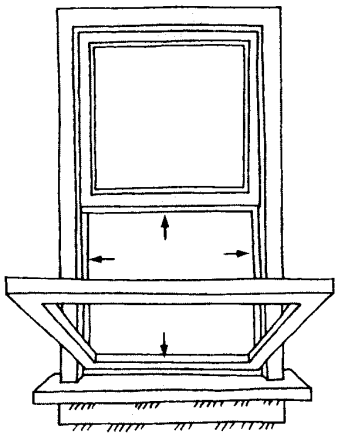
Hinged Windows

Hinged windows are windows that open and close from top or bottom hinges. Weatherstrip them in the same manner as casement windows.

Tools: Tape Measure
Scissors



Materials: Adhesive backed foam.



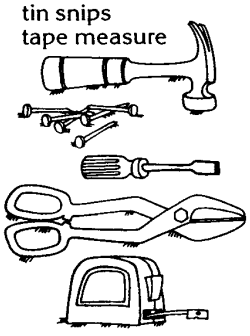
Weatherstripping jamb (top sides & bottom)

Sliding Windows

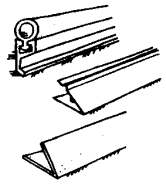
Sliding windows slide from side to side. Fin seal weatherstripping (nylon brush with thin plastic strip down the middle) is used to replace worn weatherstripping on aluminum horizontal sliding windows.

Sliding wood-sash windows can be weatherstripped with pliable rolled vinyl weatherstripping. If both sashes on the window move, weatherstrip in the same manner as a double-hung window. If only one sash moves, follow these directions:

Tools: hammer and nails
screwdriver
tin snips
tape measure



Materials: Rolled vinyl and thin spring metal or spring plastic weatherstripping.

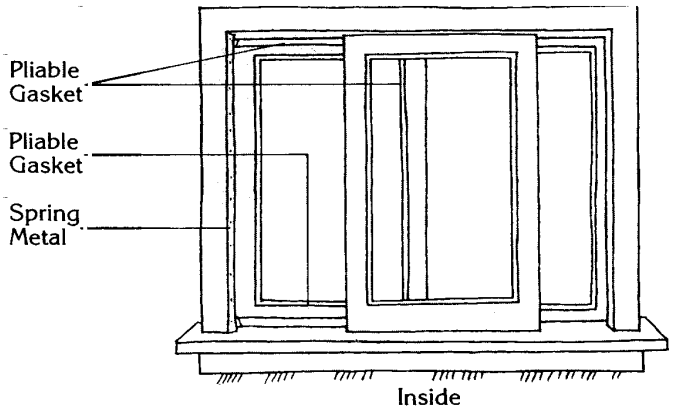


Procedure:

1. Open the window. Measure the length of the top and bottom (horizontally) of the opening. Cut two pieces of rolled vinyl this measurement. Attach to the stationary part of the window inside the channel on the top and bottom.

2. Measure from top to bottom (vertically) of window opening. Cut a piece of thin spring metal or plastic this measurement and insert in the channel where the sash closes against the side of the frame (casing).

3. Using the same measurement as #2, cut a piece of rolled vinyl and attach vertically to the stationary window where it meets the moveable portion of the window when closed.



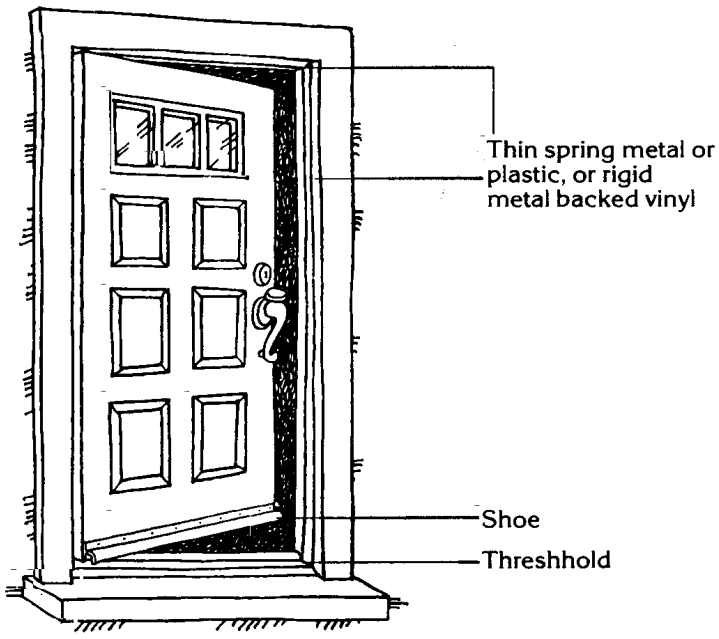
Inside

Weatherstripping Your Home

Weatherstripping Your Doors

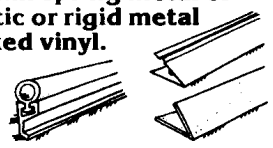
If you have a poor prime door, you should spend your dollars repairing it rather than adding a storm door. **The most effective use of your money is in being sure that you have a good, tightly sealed prime door.**

Exterior doors should be weatherstripped on the sides and top with one of the previously described weatherstripping materials (thin spring metal or plastic, rigid metal backed vinyl or the less effective, adhesive backed foam). The door bottoms should be weatherstripped with a more durable weatherstripping applied either to the door sill or the door itself. The components of the prime door—weatherstripping, threshhold, door sweep and locking mechanism all need to be addressed.

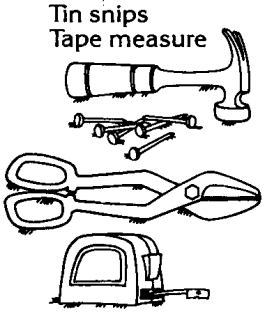


Alternatives for Top and Sides of Doors

1. Thin spring metal or plastic or rigid metal backed vinyl.



Tools: Hammer and nails
Tin snips
Tape measure



Procedure:

1. Cut two pieces to fit the measurement of the sides of frame and one piece to fit the top of the frame. Leave room for door lock or dead bolt.

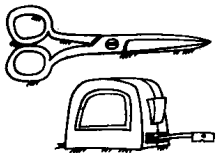
2. Tack in place on the door frame.

3. If using thin spring metal, lift outer edge of weatherstripping with screwdriver after tacking for a better seal.

2. Adhesive backed foam.

Note: Easy to install but not as durable or effective as method number 1.

Tools: Knife or scissors
Tape measure



Procedure:

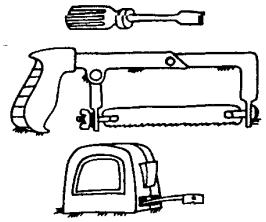
1. Measure top and sides of door frame. Cut pieces of weatherstripping these measurements. Leave room for door lock or dead bolt.

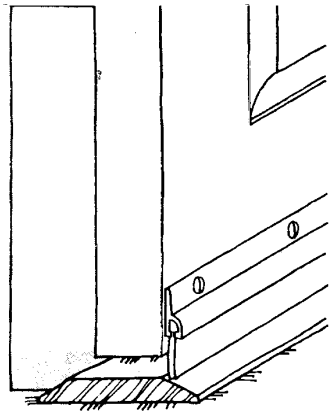
2. Remove backing and press into place on door frame.

Alternatives for Door Bottom

1. Door Sweeps

Tools: Screwdriver
Hacksaw
Tape measure





Inside

Procedure:

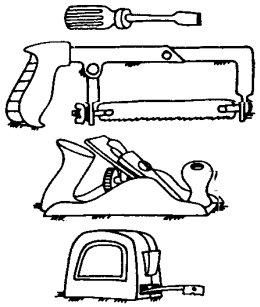
1. Cut sweep to fit 1/16" in from the edges of the door.

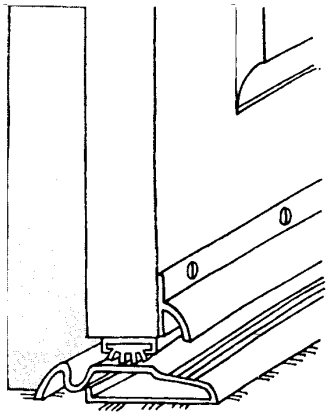
2. Install on interior or exterior of door, depending upon manufacturer's directions.

Note: Use for flat threshholds.

2. Door Shoes

Tools: Screwdriver
Hacksaw
Plane
Tape measure





Outside

Procedure:

1. Remove door from hinges and trim required amount off bottom.

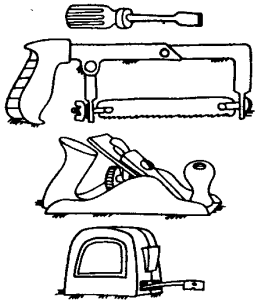
2. Cut shoe the width of the door.

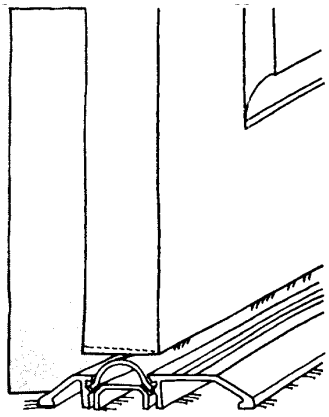
3. Install by sliding vinyl out and fasten with screws.

NOTE: Use for wooden threshold that is not worn.

3. Vinyl bulb thresholds

Tools: Screwdriver
Hacksaw
Plane
Tape measure





Inside

Procedure:

1. Remove door from hinges and trim required amount off bottom (should have 1/8" bevel to seal against vinyl). Be sure to cut bevel in the correct direction for the door opening.

NOTE: Use where there is no threshold or the wooden one is worn out.

Sliding Glass Doors

Weatherstrip sliding glass doors in the same manner as sliding glass windows.

Glossary Of Terms

Backer Rod: A round rod-shaped foam material used to fill large cracks as a backup before caulking is applied. It is available in various diameters and packaged like rope.
Casement Windows: Windows that open and close from side hinges.
Caulking: Compound used for filling and sealing cracks to prevent air infiltration (or leakage) and condensation around windows, doors and any place where two different materials meet.
Double Hung Windows: Windows consisting of upper and lower windows in which one or both slide up and down.
Heat Gain: The heat which flows into or is released within a structure due to solar radiation or from internal heat sources such as appliances, lighting or heat given off by people.
Heat Loss: The heat which flows from a home caused by heat's physical property of always moving from a higher temperature to a lower temperature.
Heat Transfer: The movement of heat from one substance or region to another by conduction, convection or radiation. Heat always flows from a higher temperature to a lower temperature.
Hinged Windows: Windows that open and close from top or bottom hinges.
Infiltration: Air leakage into the house through cracks and crevices. Since building products shrink and expand and contract at different rates over time, infiltration can be the cause of a major portion of your heating bill.
Jamb: The fixed frame of a door or window.
Sash: The moveable part of a window.
Sliding Window: Windows that slide from side to side.
Weatherstripping: A narrow strip of material used to reduce infiltration and exfiltration of air and moisture around window or door openings. Weatherstripping and caulking are generally your most cost effective conservation practices. Check their condition every heating season.

For More Information:

The following materials are available from the North Dakota Energy Extension Service:

- Properties of Common Insulation Materials
- Preparing to Insulate
- Applying Insulation
- Cut Foundation Heat Loss
- Wall Insulation
- Avoiding Hidden Moisture Problems In Your Home
- The Energy Efficient Construction Manual - A Handbook for Builders and Developers

Free copies of each of these publications are available from

North Dakota Energy Extension Service
14th Floor, State Capitol
600 East Boulevard Avenue
Bismarck, ND 58505

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