



WINTER PREPARATION

Energy and Cost Saving Strategies

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Produced by the Carnegie Mellon University Chapter of the American Institute of Architecture Students, a student organization of Carnegie Mellon University.

This booklet and related weatherproofing materials are made available to community residents without charge as a project of Carnegie Mellon Chapter of the American Institute of Architecture Students Freedom By Design and through the generosity of its sponsors and are not for sale / resale.



WHY WEATHERIZE?

Pittsburgh's long winters can cause high heating costs, this kit provides you with the means to help you insulate your home. **The fabricated box provides materials and instructions for Pittsburgh residents.** Door sweeps, window plastic, weatherstripping, and electrical socket insulation are included in the kit and are labeled to match the descriptions and instructions within this booklet. **Making the small improvements shown in this booklet should help you reduce your energy consumption.**

WHO WE ARE

THE AMERICAN INSTITUTE OF ARCHITECTURE STUDENTS

The Carnegie Mellon Chapter of the AIAS is focused on promoting interest and intrigue in the field of architecture within the academic setting. The organization hopes to promote excellence in architectural education, training and practice via involvement and interaction between architecture students and the greater campus and community of Pittsburgh. We would like to foster an interdisciplinary connection between architecture students, the culture of the major and the university as a whole. Each semester, the AIAS CMU Chapter will offer a diverse set of events and experiences for members including firm visits, local and national social and networking opportunities, community service initiatives, and exposure to cutting edge developments within the professional field of architecture.

FREEDOM BY DESIGN

Freedom by Design™, the AIAS community service program in partnership with the National Council of Architectural Registration Boards (NCARB), uses the talents of architecture students to radically impact the lives of people in their community through modest design and construction solutions. The program embraces efforts to provide both design-build and engagement solutions to address 5 barriers:

Physical • Educational • Environmental • Socio-Economic • Cultural

We hope to develop projects in which students can engage with Pittsburgh communities and work with residents and community leaders to enact positive change and improve the lives of our neighbors.

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What's in the box:

Electric Socket Insulators

QTY: 2 PACKS (28 OUTLETS / SWITCHES)

Tools Required:

Screwdriver

Door Sweeps

QTY: 2 (2 DOORS)

Tools Required:

Screwdriver

Hacksaw (to cut down if is door is under 36" wide)

Weatherstripping

QTY: 5 PACKS (5 WINDOWS)

Tools Required:

Paper Towels / Rags

Scissors

Window Plastic

QTY: 1 PACK (5 WINDOWS)

Tools Required:

Glass Cleaner

Paper Towels / Rags

Scissors

Hair Dryer

Electric Socket Insulator

Required Tools:
Screwdriver (Included)

WHY?

The spaces behind electrical outlets and light switches are often the least insulated places in a wall. In older houses it is common to feel cold drafts coming from electrical outlets, especially on exterior walls. This may not seem significant, but any air leakage can increase heating bills during the winter. On average, an estimated 2-4% of heat loss occurs through electrical outlets and light switches.¹

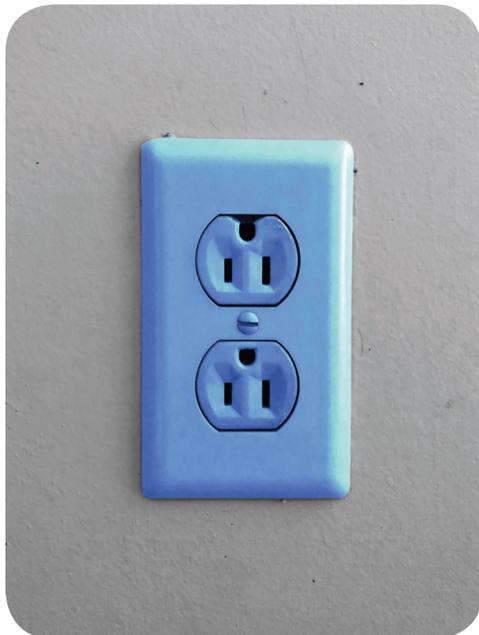
The following should be considered before installing electric outlet and switch sealers as there is a risk for electric shock:

Do not push insulators too far into socket.

Do not touch the relay terminal (live parts) or socket terminal (live parts) while the power is on.

Do not insert screws or screwdriver into wall socket ports.

Do not cut or tamper with any wires on the duplex receptacle.

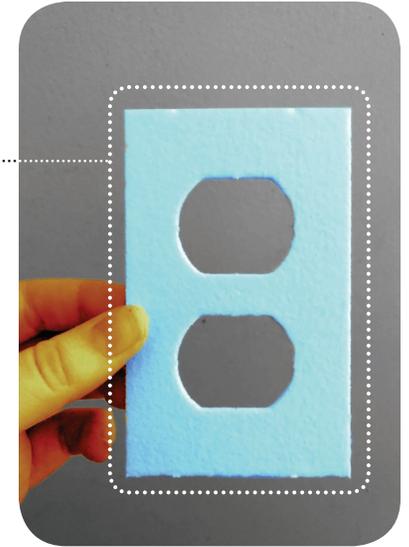


Turn power off before installation by:

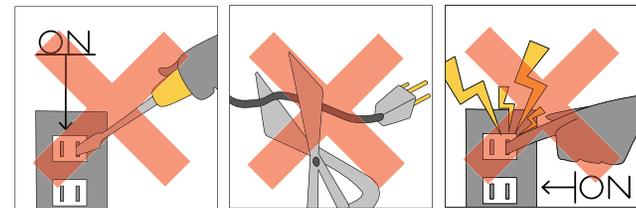
**Tripping circuit switches to off position
OR
Temporarily removing fuses during installation**

1

Example of Foam Socket Insulator

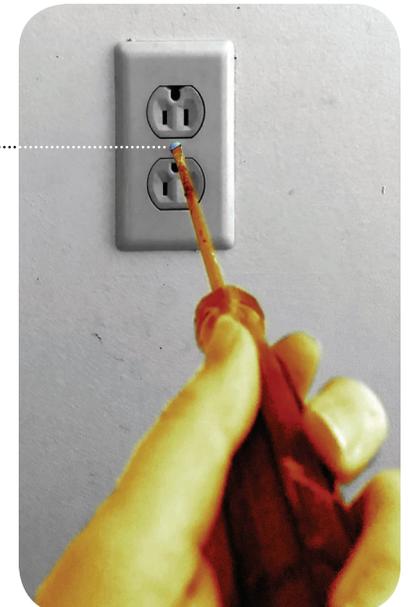


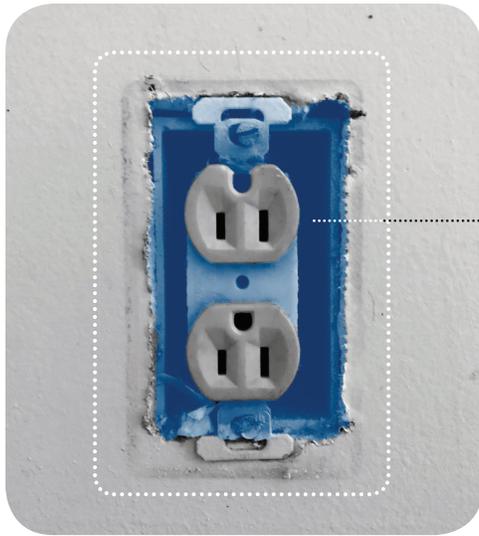
Beware of Electric Shock



2

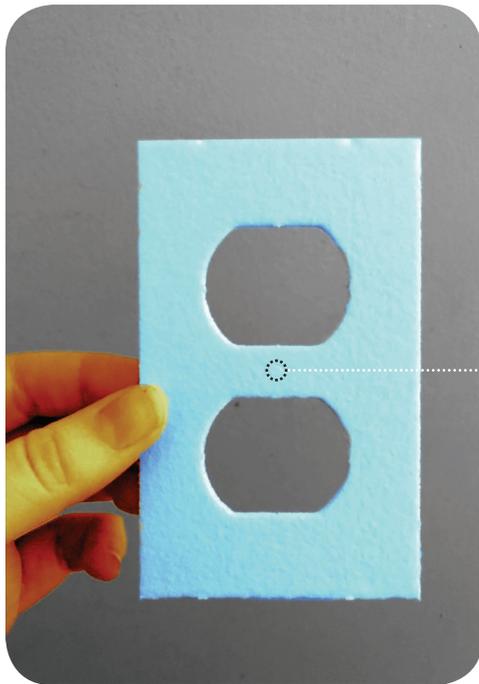
Unscrew plastic socket cover





3

Remove plastic socket cover



4

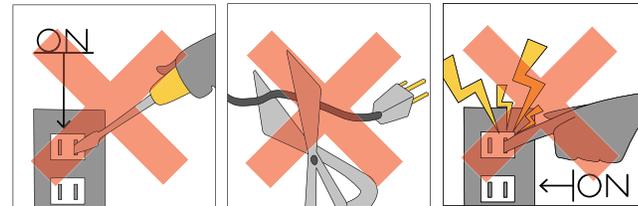
Poke a hole in center for screw with a sharp pencil or scissor.



5

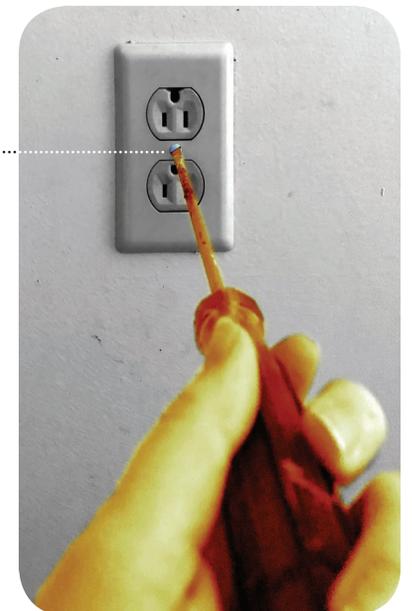
Place socket insulator in the wall cut-out

Beware of Electric Shock



6

Re-install the socket cover



You are done! Seemingly small improvements such as this can reduce your heating bills greatly! Do this for all of your electrical sockets, and switch plates.

Door Sweep

Required Tools:

Screwdriver (Included)

Masking Tape (Included)

WHY?

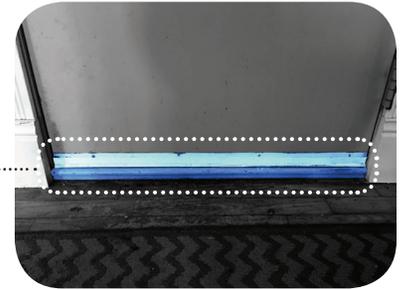
A door sweep is a small piece of plastic or rubber attached to an aluminum carrier strip and fitted across the bottom of a door. It provides a weatherproof seal and prevents drafts from coming in under the door. Door sweeps have the ability to protect against drafts, moisture, and outside insects. The draft protection against colder outdoor temperatures can save energy and reduce energy bills up to 10%.²

Make sure door is secure and will not be in motion during installation.



If you already have a door sweep installed it might look like this:

Door Sweep



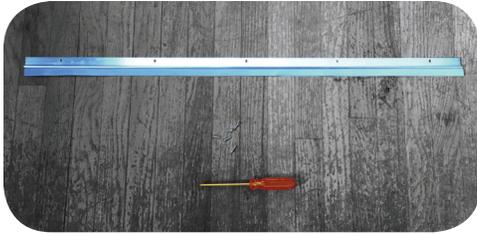
Door Sweep



Door Sweep

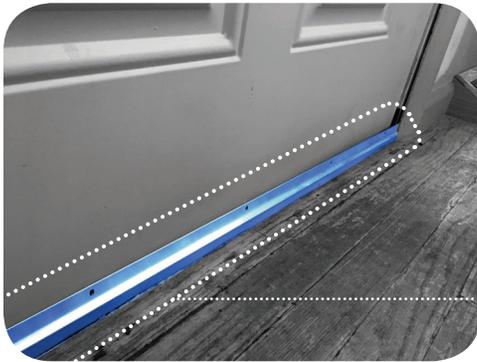
If your door already has a sweep installed, there is no need to install a new one, unless the current one needs to be replaced.

A draft stopper could prevent heat from further escaping your home. Recommendations can be found on page 33.



Required Tools:
Screwdriver (Included)

In Box Supplies:
Door sweep
Screws

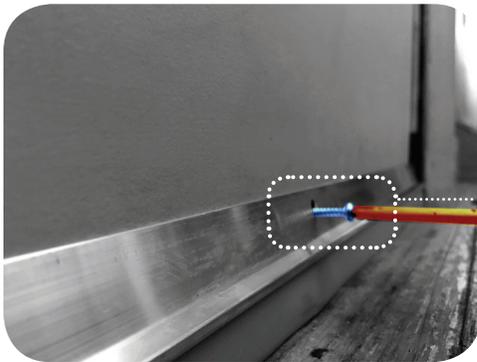


1

If the sweep is longer than the door is wide, cut with a saw

2

Position sweep against door with bottom brushing against floor and tape in place



3

Screw sweep into place. (May need to pre-drill holes for metal doors)
Remove tape

If you need help drilling your door, please contact us for assistance.

Installation complete! Installing door sweeps blocks warm air from escaping your house, reducing infiltration rates. This help to reduce heating costs in the winter.



Weatherstripping

Required Tools:

Paper Towels / Rags
Scissors
Tape Measure (Included)

WHY?

Poorly sealed doors and windows can leak the heat outdoors in the winter. Heating bills can be reduced by 20% if windows and doors are weatherstripped.³

Do not use this product to adhere to anything other than the items listed above. Do not consume or wrap around any body parts with this product, as it is a choking or injury hazard.



Weatherstripping will be applied to all sides of the windows, the top of the upper window, and the bottom of the lower window.

In Box Supplies:

V-Seal Weatherstrip



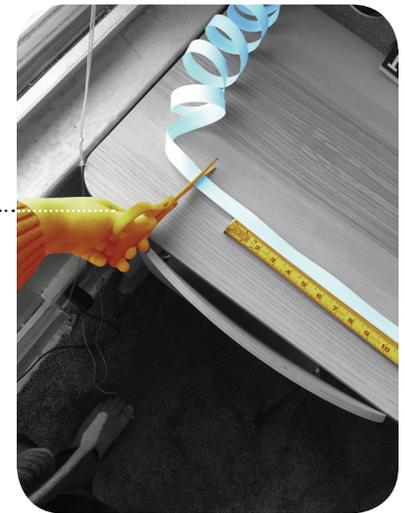
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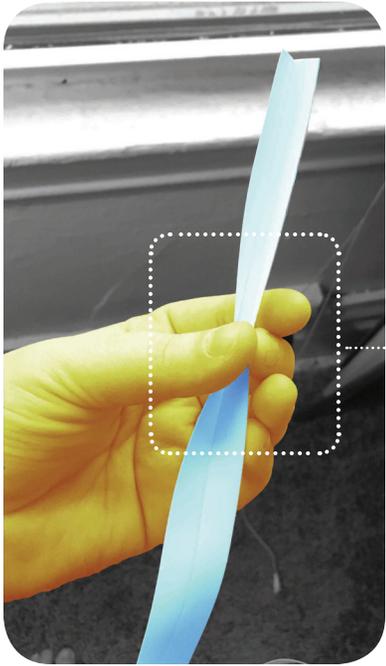
Open window, wipe clean inside of window frame and bottom and top of window. Dry before applying weatherstripping



2

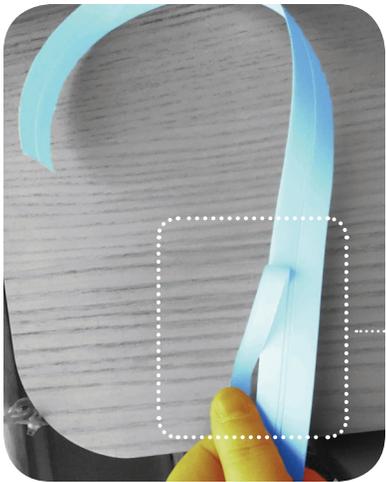
Measure window and trim weatherstripping (for sides, give yourself an extra inch or so)





3

Bend V-Strip



4

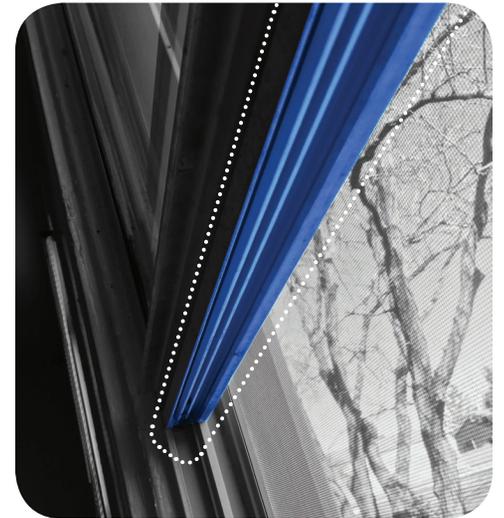
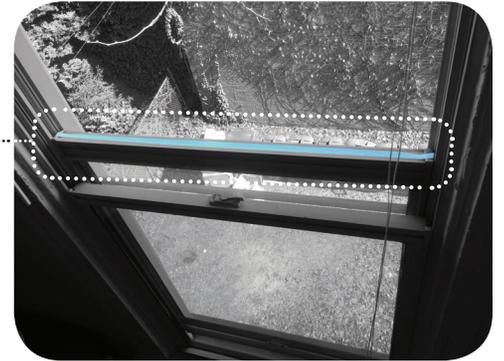
Peel off wax paper to expose adhesion*

*It may be easier to peel off the wax paper in parts, and continue to peel off the paper as you apply the weatherstripping to the frame so that only parts of the adhesion is exposed at a time.

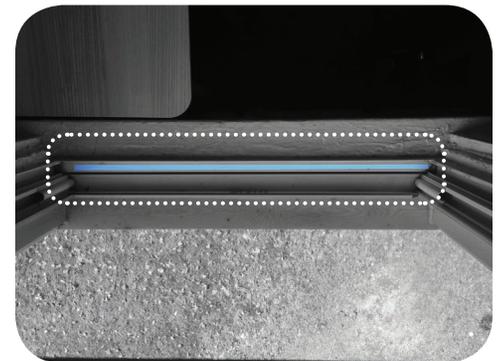
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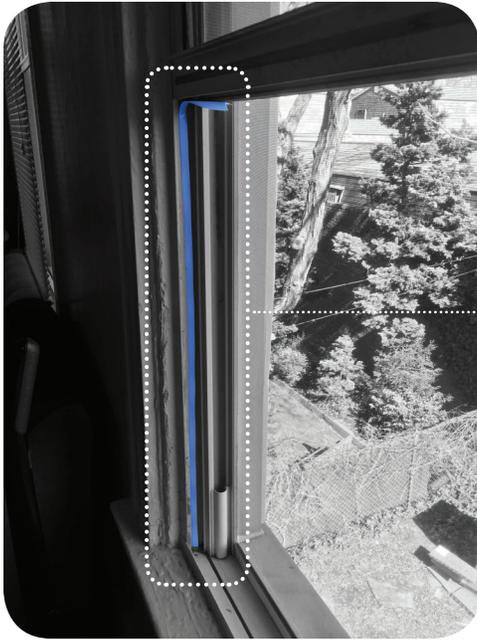
Apply to top of upper window and bottom of lower window

Place adhesive inside window frame with the point of the “v” facing inside.



If the surface on the moving window is not flat, apply to outer frame.





6

Apply to sides of windows, giving yourself an extra inch or so to slide past window. Keep wax paper on extra piece.

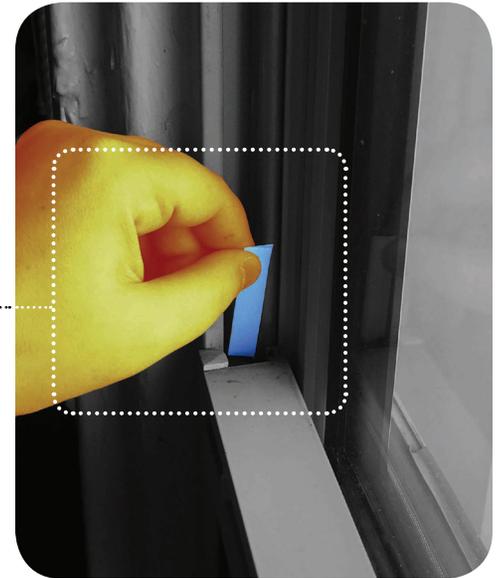


7

Loop weatherstripping under frame and retrieve on other side

8

Remove wax paper from extra piece and press to frame



If the window does not close all the way, find the weatherstripping that is stopping it from closing. Make sure all weatherstripping is applied flat to surfaces, if this is not possible, remove that section of weatherstripping.

Installation complete! Your windows are almost ready for winter! Now time to install the window plastic...



Window Plastic

Required Tools:

- Glass Cleaner
- Paper Towels / Rags
- Scissors
- Hair Dryer
- Tape Measure (Included)

WHY?

Roughly 30% of all heat loss in a home occurs through windows. Plastic Window Insulation sheets can reduce this heat loss, and your heating bill. Each sheet covers a standard window and saves up to 25% (for every 9 windows) in heating costs seasonally.⁴

If your home has more than 9 windows Frost King Window Insulation Kits are available at the following locations: The Home Depot, Lowe's, True Value, Do it Best, Walmart and Menards.

Keep plastic out of reach of children.

Do not wear on body in order to prevent suffocation or lack of circulation.

Double sided tape may cause paint to peel or chip.



Window trim

Area to clean and later
apply tape

If you have flat window trim surrounding your window, you will be applying the tape to that.

If you do not have a window trim, you will applying it directly to the wall.



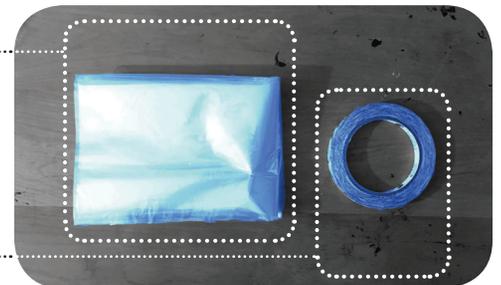
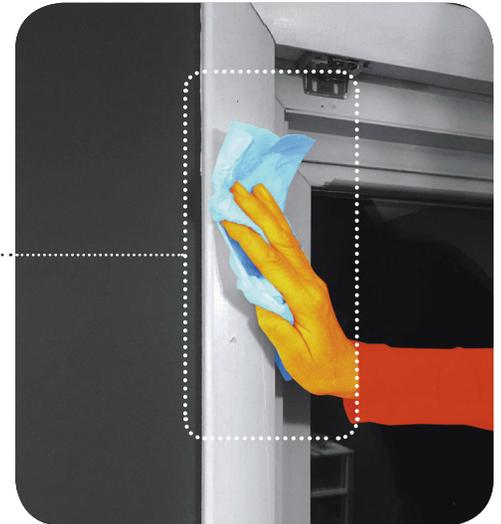
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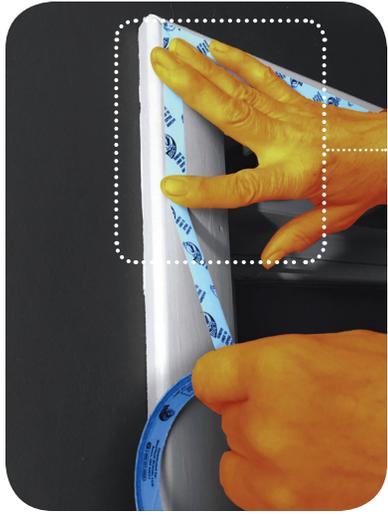
Clean window with glass cleaner and wipe trim and surrounding wall. Dry Surfaces before applying tape in next step.

In box supplies:

Heat Shrink Plastic

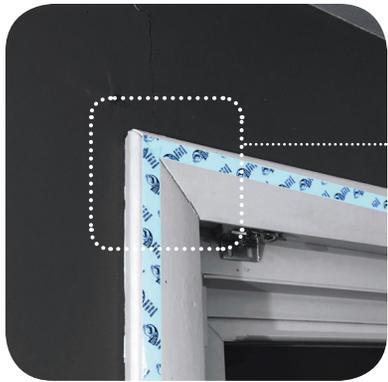
Double Sided Tape





2

Apply double sided tape to flat trim, or surrounding wall

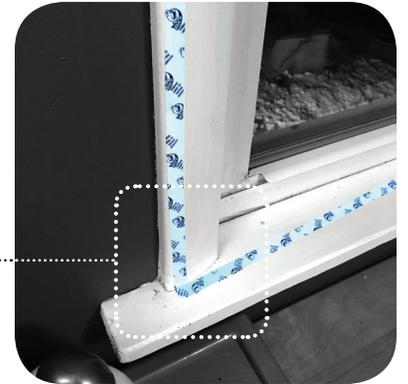


3

Overlap tape at corners

4

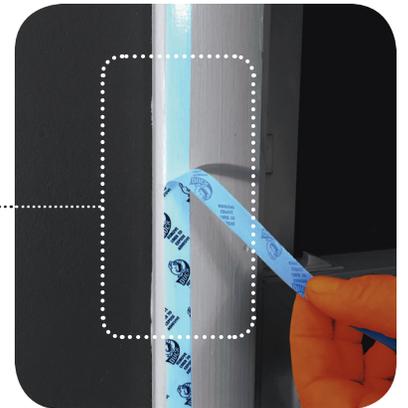
If the bottom of the window is a horizontal sill that sticks out, apply the tape to that surface, but make sure that the tape overlaps at the corners.



Press tape firmly to the surfaces

5

Remove the wax paper film to expose the other side of the tape.





6

Make sure the plastic sheets are the correct size for your windows by holding up to windows; it is recommended that you measure the size of the window opening and make the plastic sheet 4" bigger on each side.



7

Trim your plastic down to size if it is too large

8

Place plastic over window. It should be a few inches larger on all sides. Lightly press the plastic into place.



9

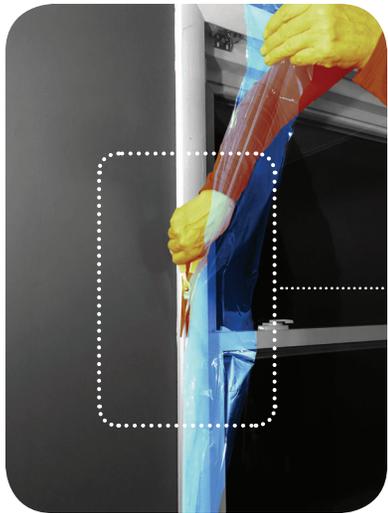
Adjust edges of plastic so that the sheet is taught around the window. Press the plastic firmly against the tape once in its final place





10

Use a blow dryer to tighten the plastic. The plastic should be wrinkle-free.



11

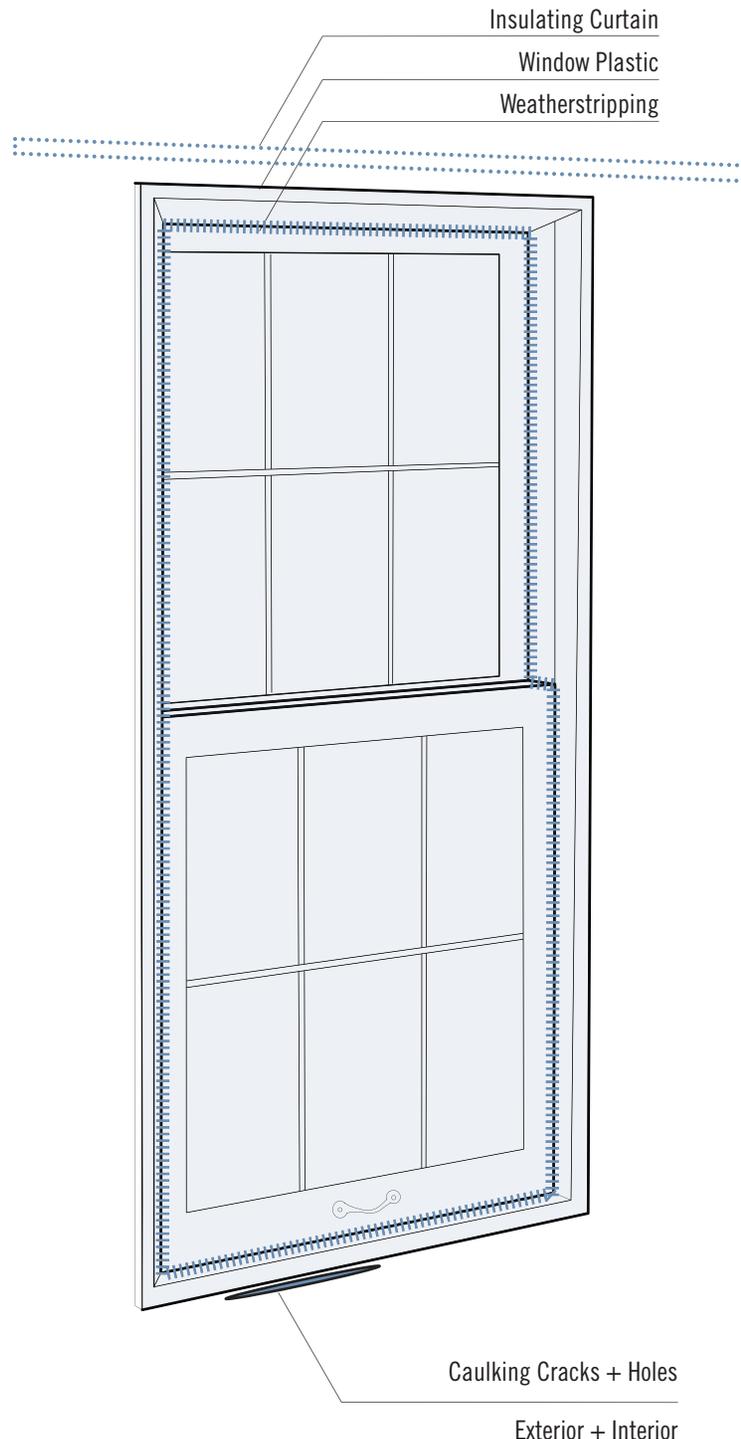
Trim the excess plastic from the sides

***Check for holes or gaps along the edge, you can seal these with packaging tape.**

Installation complete! Applying window plastic over your windows doubles their efficiency in the winter, but don't forget to remove the plastic in the spring!



Windows



Roughly 30% of all heat loss in a home occurs through the windows. Loss of heat happens through the glass itself, but also around the window frame. Windows with poorly insulated or sealed frames allow the heat and air to escape outdoors, and create drafty rooms indoors. Stopping this air and heat exchange reduces heat bills, and keeps the temperature inside more comfortable and consistent.

Products that stop this exchange include:

Weatherstripping (GOOD FOR RENTERS)

Weatherstripping is the process of sealing openings such as doors, windows, and trunks from the elements. The term can also refer to the materials used to carry out such sealing processes. The goal of weatherstripping is to keep interior air in, thus saving energy on heating and air conditioning.⁵

Window Plastic (GOOD FOR RENTERS)

Window insulation film is a ubiquitous, low cost way to improve your window's insulation and reduce drafts. It consists of a clear oversized plastic film designed to fit over the interior of a standard-sized residential window. The kits usually include double-sided tape to adhere the plastic around the edges of the window frame. Once secured on all four sides, applying heat from a hair dryer or other source will shrink the plastic, tightly sealing the window.^{6*}

Caulk

Caulk is a flexible material used to seal air leaks through cracks, gaps, or joints less than 1-quarter-inch wide between stationary building components and materials. For components that move -- doors and operable windows, for example -- weatherstripping is the appropriate material.^{7**}

Insulating Curtains (GOOD FOR RENTERS)

Insulated curtains, panels and shades help stop drafts and block the sun. Thermal curtains and insulated drapes have lined backs that help create a barrier at your windows. They provide year-round insulation and can help lower your utility bills.⁸

*Seasonal tape removal may result in paint chipping around windows.

**Discuss caulking with landlord before application if you rent.

Weatherstripping

Provided in Box (pg 10)

Frost King

E/O 7/8 in. x 17 ft. Self-Adhesive V-Seal Weatherstrip

Type: Plastic V Seal

Why: Adhesive seal for fairly even gaps around poorly sealed windows

Installation: Adhesive Strip

Buy at: Home Depot

Price: \$3.97 per window

Other Products

Frost King

E/O 1/2 in. x 17 ft. White Tubular Vinyl Gasket

Type: Tubular Vinyl

Why: Seals out drafts around loose-fitting, warped or rattling windows

Installation: Nail / Tack / Glue / Staple

Buy at: Home Depot

Price: \$3.57 per window

Frost King

3/8 in. x 5/16 in. x 20 ft. White Weatherseal

Type: Rubber Foam Tape

Why: Easy installation, long lasting, washable, flexible for loose fitting windows

Installation: Adhesive Strip

Buy at: Home Depot

Price: \$8.87 per window

Window Plastic

Provided in Box (pg 16)

Frost King

E/O Indoor Window Insulation Kit (9 per Pack or 4 per Pack)

Type: Window Insulation Plastic

Why: Individual Sheets pre-cut to allow for easier install for standard size windows (62" x 42")

Installation: Adhesive Strip + Heat Shrink

Buy at: Home Depot (Similar kits at Lowes)

Price: \$1.50 per window

Other Products

Duck

62 in. x 420 in. Crystal Clear Window Kit Shrink Film (10-Pack)

Type: Window Insulation Plastic

Why: Large Sheets allow for variety of window sizes to be cut in case windows are not standard size

Installation: Adhesive Strip + Heat Shrink

Buy at: Home Depot (Similar kits at Lowes)

Price: \$1.10 per window

3M

62 in. x 84 in. Clear Plastic Indoor Window Kit

Type: Window Insulation Plastic

Why: Individual Sheets pre-cut to allow for easier install for standard sliding patio door, or two 3' x 5' windows

Installation: Adhesive Strip + Heat Shrink

Buy at: Home Depot (Similar kits at Lowes)

Price: \$2.50 per window

Caulking

Products

GE

Supreme Paintable Silicone 10.1 oz. White Window and Door Caulk

Why: Suitable for application on windows, doors, siding, trim, filling holes to prevent loss of heat, comes in multiple colors

Buy at: Home Depot

Price: \$8.22

DAP

18109 Acrylic Latex Caulk With Silicone, 10.1-Ounce, Dark Bronze

Why: Suitable for application on windows, doors, siding, trim, filling holes to prevent loss of heat, comes in multiple colors

Buy at: Amazon

Price: \$3.05

Window Curtains

Products

Smart Sheer

Insulating Voile 63-Inch Window Curtain Panel

Type: Insulating Curtains

Why: Curtains slow drafts within the home, in the winter, and block solar heat in the summer. Curtains that specify their insulation value can help keep your home warm in the winter.

Buy at: Bed Bath and Beyond

Price: \$9.99

Thermalogic

Ultimate Window Liner

Type: Insulating Curtain Liner

Why: This product can add insulation value to curtains that you already own.

Buy at: Amazon

Price: \$20.29

Blinds.com

Economy Blackout Cellular Shade

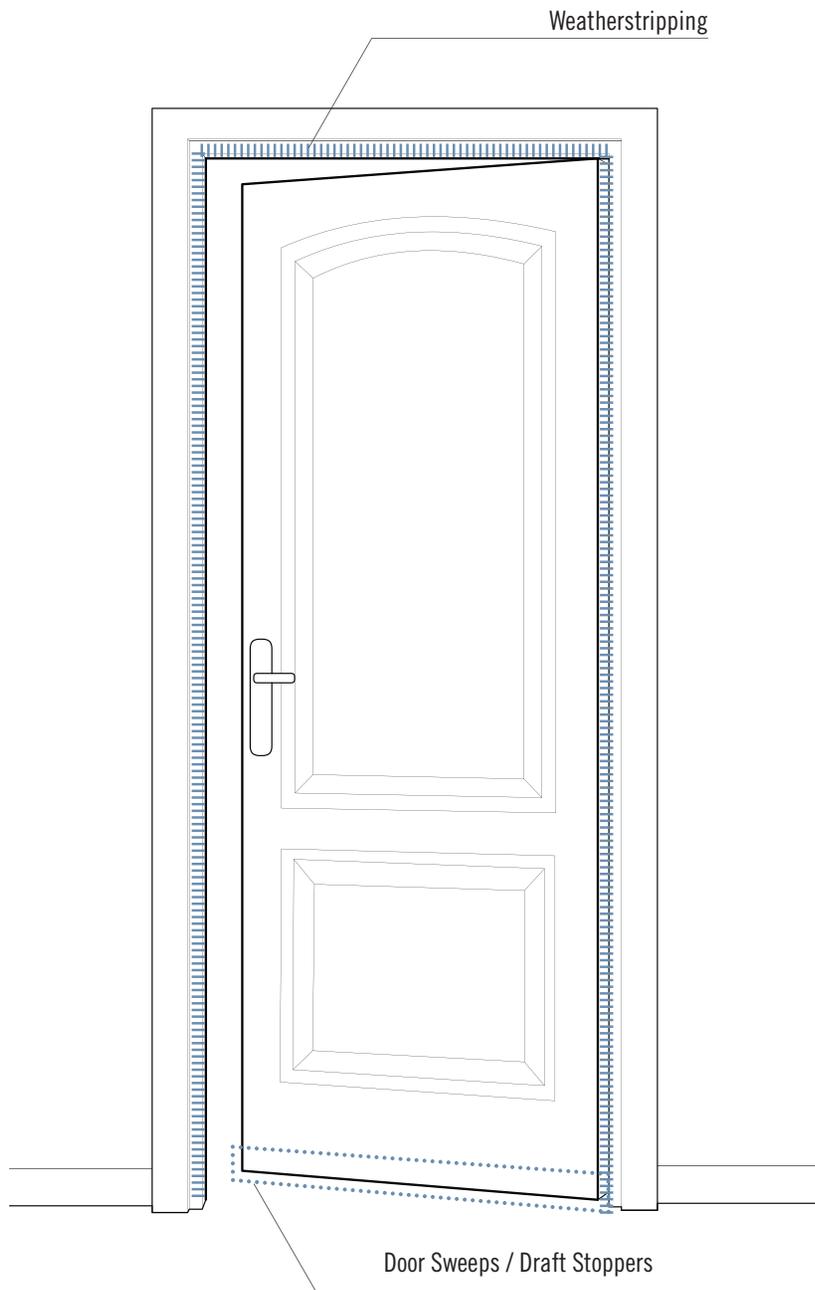
Type: Insulating Window Shade

Why: For problematic windows, you can order custom cellular shades that perform better than a simple curtain, this is one of the more expensive options, with a more intensive installation.

Buy at: blinds.com

Price: \$57+ per window

Doors



Similar to the windows, heat loss happens around door frames and through the space underneath the door. The best way to stop this heat and air exchange is through the sealing of these spaces. This reduces heating bills, and keeps the temperature inside more comfortable and consistent.

Products that stop this exchange include:

Door Sweeps (GOOD FOR RENTERS)

A door sweep is a small piece of plastic or rubber, attached to an aluminum carrier strip and fitted across the bottom of a door. It provides a weatherproof seal and prevents drafts from coming in under the door. Door sweeps have the ability to protect against drafts, moisture, and outside insects. The draft protection against colder outdoor temperatures can save energy and reduce energy bills up to 10%.⁹

Draft Stoppers (GOOD FOR RENTERS)

Draft stoppers are long thin objects that are placed at the bottom of a door to prevent the movement of air in between spaces. They can work with a door sweep, or if a door sweep cannot be installed, they can be used in their place.¹⁰

Weatherstripping (GOOD FOR RENTERS)

Weatherstripping is the process of sealing openings such as doors, windows, and trunks from the elements. The term can also refer to the materials used to carry out such sealing processes. The goal of weatherstripping is to keep interior air in, thus saving energy on heating and air conditioning.¹¹

Door Sweeps

Provided in Box (pg 6)

Frost King

E/O 1-5/8 in. x 36 in. Aluminum White and Vinyl Door Sweep

Why: Fills up to 3/4 in. gap between the door bottom and threshold

Installation: Screws

Buy at: Home Depot

Price: \$6.48 per door

Other Products

Frost King

2 in. x 36 in. Heavy-Duty Aluminum/Brush White Door Sweep

Why: Brush bottom prevents scratches on floor

Installation: Screws

Buy at: Home Depot

Price: \$10.72 per door

Draft Stoppers

Products

Frost King

E/O Designer Cloth Draft Seal

Why: This is simple, cheap, requires no installation, and prevents drafts from entering the home from underneath the door.

Buy at: Home Depot (Similar kits at Lowes)

Price: \$7.88 per door

Morgan Home

Solid Fleece Draft Guard

Why: This is simple, cheap, requires no installation, and prevents drafts from entering the home from underneath the door.

Buy at: Bed Bath and Beyond

Price: \$9.99 per door

Frost King

1.25-in x 36-in Brown Aluminum Door Threshold

Why: This is simple, cheap, and prevents drafts from entering the home from underneath the door.

Installation: Slide onto door

Buy at: Home Depot

Price: \$7.97 per door

Weatherstripping

Products

Frost King

E/O 1/2 in. x 17 ft. White Tubular Vinyl Gasket

Type: Tubular Vinyl

Why: Seals out drafts around loose-fitting, warped or unevenly cut doors

Installation: Nail / Tack / Glue / Staple

Buy at: Home Depot

Price: \$3.57 per door

Frost King

3/8 in. x 5/16 in. x 20 ft. White Weatherseal

Type: Rubber Foam Tape

Why: Easy installation, long lasting, washable, flexible for loose fitting doors

Installation: Adhesive Strip

Buy at: Home Depot

Price: \$8.87 per door

Frost King

E/O 9/16 in. x 5/16 in. x 10 ft. White EPDM Cellular Rubber Weather-Strip Tape Cushioned Ribbed

Type: Rubber Foam Tape

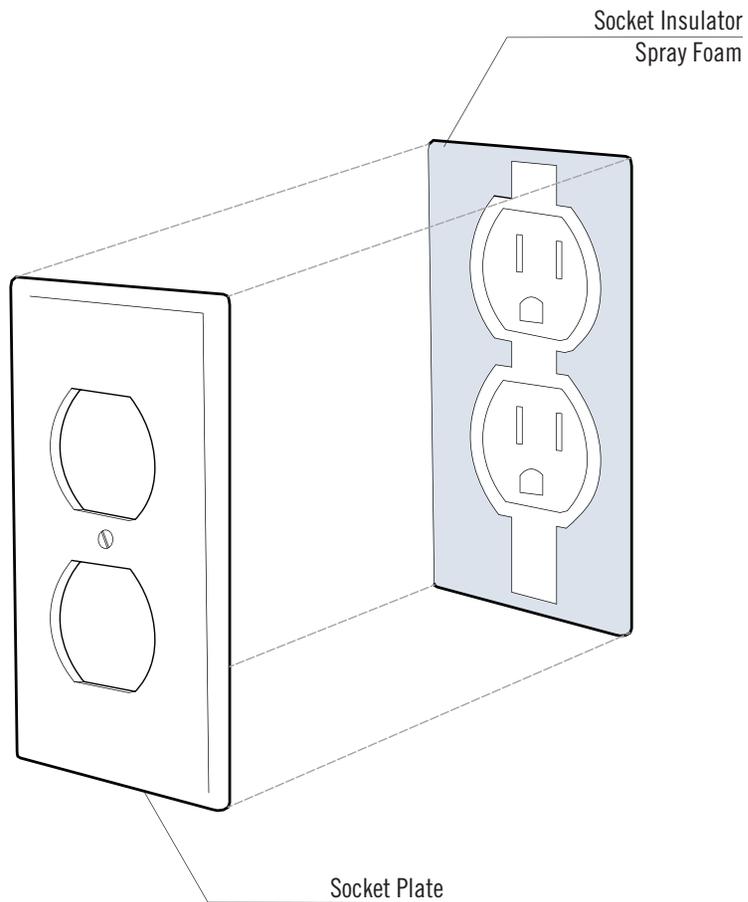
Why: Easy installation, long lasting, washable, flexible for loose fitting doors with a 10 year guarantee.

Installation: Adhesive Strip

Buy at: Home Depot

Price: \$16 per door

Electrical Sockets



The spaces behind electrical outlets and light switches are often the least insulated places in a wall. In older houses it is common to feel cold drafts coming from electrical outlets, especially on exterior walls. This may not seem significant, but any air leakage can increase heating bills during the winter. On average, an estimated 2-4% of heat loss occurs through electrical outlets and light switches.

Products that stop heat loss include:

Socket Insulators (GOOD FOR RENTERS)

Socket insulators are flat pieces of solid foam insulation that can be installed behind the socket plate to reduce heat transfer through the electrical sockets, it can be applied inside light switches as well.

Spray Foam

Spray foam comes in a can, and is a spray-able foam insulation that can be applied behind the socket plate to reduce heat transfer through the electrical sockets, it can be applied inside light switches as well.^{12*}

*Discuss spray foam with landlord before application if you rent.

Socket Insulator

Provided in Box (pg 2)

Frost King

1 Gang Socket Switch and Deco Wall Plate (14-Pack)

Why: Stops heat from escaping through poorly insulated socket spaces in wall

Installation: Screws

Buy at: Home Depot

Price: \$2.28

Spray Foam

Products

Touch 'N Foam Max

Fill Expanding Foam Sealant- 12 Oz

Why: This super-expanding foam creates an airtight, weather-resistant bond that seals out drafts while blocking insects and other pests. MaxFill Foam Sealant is ideal for filling larger gaps and cracks. It can be used indoors or outdoors.

Buy at: Dollar General

Price: \$4.95 for 12 Oz

GREAT STUFF

16 oz. Big Gap Filler Insulating Foam Sealant Quick Stop Straw

Why: This product can fill gaps larger than 1 in. It's airtight, paintable, stainable and sand-able. It's polyurethane-based and perfect for all sorts of materials like wood, drywall, metal, masonry, glass and most plastics.

Buy at: Home Depot

Price: \$5.25 for 16 Oz

Loctite

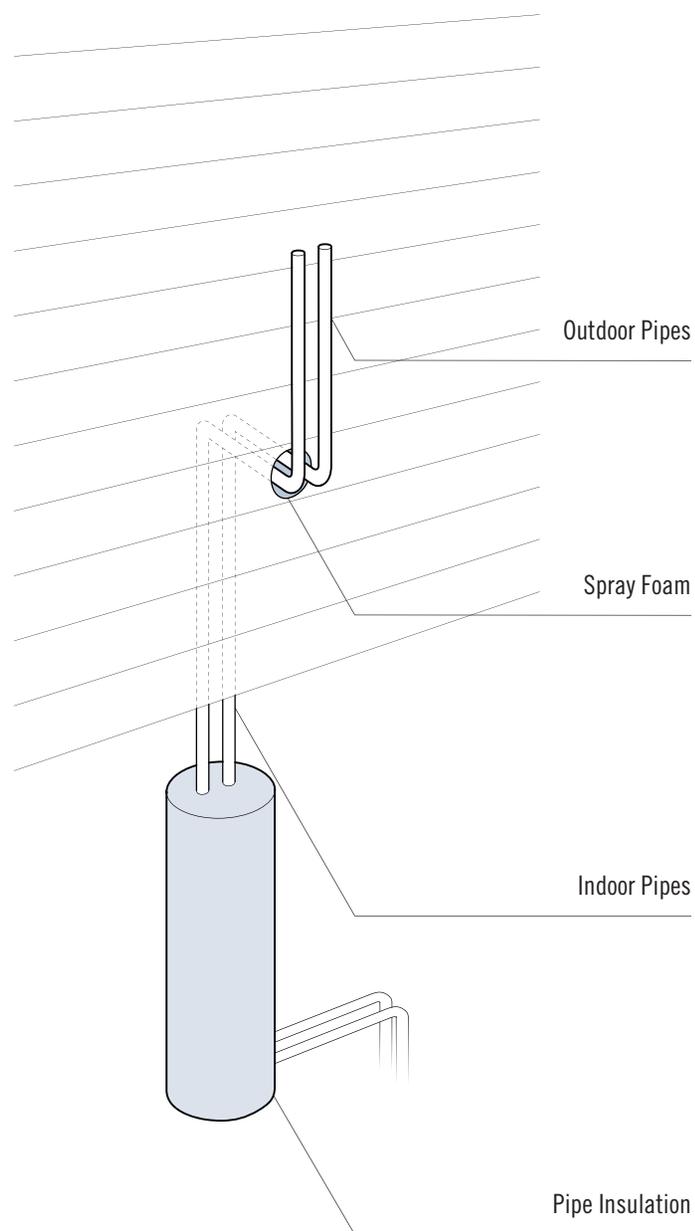
12 fl. oz. Tite Foam Insulating Foam

Why: This product is the best insulator. It can be used for multiple applications including sealing out drafts, moisture and pests. It can be used on both interior and exterior projects and is paintable, sandable and stainable, and cures white.

Buy at: Home Depot

Price: \$5.78 for 12 Oz

Plumbing



Uninsulated hot water pipes allow for the water's heat to radiate out of the pipes and add unnecessary heating costs to your energy bills. A relatively inexpensive way to lower heating costs and conserve energy is to insulate your hot water pipes, which can lead to savings of 3 to 4% per year. Insulating pipes can raise the water's temperature 2 to 4 degrees Fahrenheit, allowing you to lower the hot water temperature setting. This also means you will not need to wait as long for your water to heat up when you go to use your shower, or another faucet helping to conserve water. While it is possible to get an outside party to insulate your pipes for you, this is not necessary. It is also recommended to insulate all your pipes during new construction as they are installed.

Products that stop this exchange include:

Pipe Insulation (GOOD FOR RENTERS)

Pipe insulation is usually a tube made of foam insulation that surrounds a pipe. Interior pipe insulation is usually used to keep heat in hot water pipes, reducing energy costs, while exterior pipe insulation is used in order to prevent the pipes from freezing and bursting outside the home, or in unheated parts of the home. When buying tube insulation, first measure the diameter of your pipes so that you know what size to get at the store. The thicker the foam, typically the better the insulation.

Spray Foam

Spray foam comes in a can, and is a spray-able foam insulation that can be applied inside the holes in the wall created for the passage of pipes, reducing the transfer of heat from inside to outside.^{13*}

*Discuss spray foam with landlord before application if you rent.

Pipe Insulation

Products

M-D Building Products

3/8 in. x 3/4 in. x 6 ft. Tube Pipe Insulation Kit (Other sizes available)

Why: The insulating tape blocks heat loss or gain to help save energy, as well as halting condensation on cold pipes to help prevent water damage. It is easy to install.

Installation: Self Adhesion

Buy at: Home Depot

Price: \$1.92 per 6 ft

Everbilt

3/4 in. x 6 ft. Foam Self Seal Pipe Insulation

(Other sizes available)

Why: For an economical and energy efficient way to help prevent your pipes from freezing use the Everbilt Self Sealing Foam Pipe Insulation.

Installation: Self Adhesion

Buy at: Home Depot

Price: \$2.63 per 6 ft

Everbilt

3/4 in. Rubber Pipe Insulation Pre-Slit Elbow

(Other sizes available)

Why: This 3/4 in. Rubber Prefabricated Elbow helps save energy by protecting copper and iron pipes from freezing and condensation.

Buy at: Home Depot

Price: \$5.53

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Buy at: Home Depot

Price: \$5.78 for 12 Oz

SOURCES

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