



Your Touchstone Energy® Cooperative 

## Oregon Trail Electric Cooperative Residential Rebate Application

\*Home must have permanently installed electric heat.

\*Rebate will be keyed as a credit to the members account unless check marked

Project Type **Windows** Date

Project Address

Member SEP number (if known)

Mailing Address

Phone

Email

Members Name

Property Owners Name (if different than above)

O TEC's energy efficiency program budget may be limited and is time sensitive; therefore, pre-approval of all projects is required. Energy efficiency (EE) projects must comply with the current BPA and/or OTEC standards. OTEC reserves the right to withdraw a project if not completed within 90 days of this signed agreement. Any deviation from program standards without written authorization from OTEC may invalidate the project and a member's qualification for the energy efficiency program. The member agrees to release OTEC and hold it harmless from any and all liability associated with the completed work or material installed or applied through an EE project. All energy savings results are assumptions and estimates from acceptable standards of installed material. OTEC is not responsible nor guarantees any stated or estimated energy savings from this program. The selection and use of acceptable and conforming material is the sole responsibility of the member and OTEC assumes no warranty of the service or material.

(qualified OTEC member), I certify that I have read and understand the OTEC program agreement and agree to abide by those requirements. I certify that to the best of my knowledge the information on this application is true and correct.

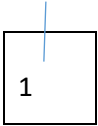
Authorized Members Signature

Date



Paste sticker in this box (If two stickers won't fit on this page, turn sideways and try that)  
Above this box draw a square and put a hash mark on the square approximately where the window/door that the sticker is from. If you have more than one floor, put the floor number in the center of the box.

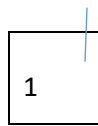
Example:



Attach as many pages as necessary

Paste sticker in this box (If two stickers won't fit on this page, turn sideways and try that)  
Above this box draw a square and put a hash mark on the square approximately where the window/door that the sticker is from. If you have more than one floor, put the floor number in the center of the box.

Example:



Procedure for windows and doors:

To participate in Oregon Trail Electric Cooperative's (OTEC's) window program the following conditions must be met:

1. Have permanently installed electric heat or have only wood heat with electric usage showing space heating is utilized
2. Current windows must be single pane with any framing or double pane with aluminum framing. Sliding glass doors must meet this same criteria as windows
3. All other doors must not be sealing well and a picture must be supplied showing light around the door. The same heating requirements apply as well.

Get bid (bid must have u-factor of windows, energy star compliance for "other doors", size, quantity, if the window has safety glass, manufacturer, model number and cost)

Consumer must supply list of current window sizes and types (Sliding, picture, etc; single pane or double pane; framing material (wood, aluminum, etc) and type of heat in the home (Form attached)

Make sure safety glass is spec'd where conditions warrant (based on state code attached)

Make sure windows spec'd are .30, .29, .28, etc (or lower—the lower the number the better the window)

Read "Care for your Air" and sign "Indoor Air Quality Homeowners Disclosure"

Meet with Energy Program Representative if you decide to proceed with project prior to ordering your windows.

**Funding is not guaranteed until project is complete based on -1<sup>st</sup> project complete 1<sup>st</sup> to receive funds**

Order materials and have windows installed based on attached best practices guide

Make sure all your windows have the stickers on them when you take possession of them.

\*All windows have a unique number on them that matches the sticker – please keep the sticker with the window so once it is installed you will know where that window is.

Once the windows are installed make a diagram (see example attached) for each window

Turn in the stickers from the windows with the diagrams showing where they were installed to OTEC

Complete Check list and turn into OTEC with stickers

Random inspections to verify information will happen throughout the process

Once project is completed and all paperwork has been completely filled out and turned in then funding will be determined and consumer will be notified.

## SECTION R308 GLAZING

**R308.1 Identification.** Except as indicated in Section R308.1.1 each pane of glazing installed in hazardous locations as defined in Section R308.4 shall be provided with a manufacturer's designation specifying who applied the designation, designating the type of glass and the safety glazing standard with which it complies, which is visible in the final installation. The designation shall be acid etched, sandblasted, ceramic-fired, laser etched, embossed, or be of a type which once applied cannot be removed without being destroyed. A *label* shall be permitted in lieu of the manufacturer's designation.

### **Exceptions:**

1. For other than tempered glass, manufacturer's designations are not required provided the *building official* approves the use of a certificate, affidavit or other evidence confirming compliance with this code.
2. Tempered spandrel glass is permitted to be identified by the manufacturer with a removable paper designation.

**R308.1.1 Identification of multiple assemblies.** Multipane assemblies having individual panes not exceeding 1 square foot (0.09 m<sup>2</sup>) in exposed area shall have at least one pane in the assembly identified in accordance with Section R308.1. All other panes in the assembly shall be *labeled* “CPSC 16 CFR 1201” or “ANSI Z97.1” as appropriate.

**R308.2 Louvered windows or jalousies.** Regular, float, wired or patterned glass in jalousies and louvered windows shall be no thinner than nominal <sup>3</sup>/<sub>16</sub> inch (5 mm) and no longer than 48 inches (1219 mm). Exposed glass edges shall be smooth.

**R308.2.1 Wired glass prohibited.** Wired glass with wire exposed on longitudinal edges shall not be used in jalousies or louvered windows.

**R308.3 Human impact loads.** Individual glazed areas, including glass mirrors in hazardous locations such as those indicated as defined in Section R308.4, shall pass the test requirements of Section R308.3.1.

**Exceptions:**

1. Louvered windows and jalousies shall comply with Section R308.2.
2. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.
3. Glass unit masonry complying with Section R610.

**R308.3.1 Impact test.** Where required by other sections of the code, glazing shall be tested in accordance with CPSC 16 CFR 1201. Glazing shall comply with the test criteria for Category I or II as indicated in Table R308.3.1(1).

**Exception:** Glazing not in doors or enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers shall be permitted to be tested in accordance with ANSI Z97.1. Glazing shall comply with the test criteria for Class A or B as indicated in Table R308.3.1 (2).

**R308.4 Hazardous locations.** The following shall be considered specific hazardous locations for the purposes of glazing:

1. Glazing in all fixed and operable panels of swinging, sliding and bifold doors.

**Exceptions:**

1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
2. Decorative glazing.
2. Glazing in an individual fixed or operable panel adjacent to a door shall be considered a hazardous location where the bottom edge is less than 60 inches (1524 mm) above the floor or walking surface and it meets either of the following conditions:

- a. Where the glazing is within 24 inches (610 mm) of either side of the door in the plane of the door in a closed position.
- b. Where the glazing is on a wall perpendicular to the plane of the door in a closed position and within a 24 inch (610 mm) arc of the hinged side in the direction of swing. See Figure R308.4.1.

**Exceptions:**

1. Decorative glazing.

**TABLE R308.3.1(1)  
MINIMUM CATEGORY CLASSIFICATION OF GLAZING USING CPSC 16 CFR 1201**

EXPOSED SURFACE AREA OF ONE SIDE OF ONE LITE	GLAZING IN STORM OR COMBINATION DOORS (Category Class)	GLAZING IN DOORS (Category Class)	GLAZED PANELS REGULATED BY ITEM 7 OF SECTION R308.4 (Category Class)	GLAZED PANELS REGULATED BY ITEM 6 OF SECTION R308.4 (Category Class)	GLAZING IN DOORS AND ENCLOSURES REGULATED BY ITEM 5 OF SECTION R308.4 (Category Class)	SLIDING GLASS DOORS PATIO TYPE (Category Class)
9 square feet or less	I	I	NR	I	II	II
More than 9 square feet	II	II	II	II	II	II

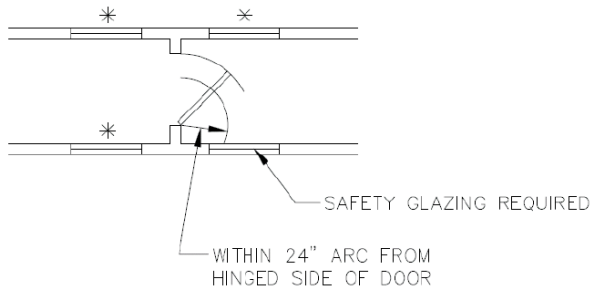
For SI: 1 square foot = 0.0929 m<sup>2</sup>.  
NR means “No Requirement.”

**TABLE R308.3.1(2)  
MINIMUM CATEGORY CLASSIFICATION OF GLAZING USING ANSI Z97.1**

EXPOSED SURFACE AREA OF ONE SIDE OF ONE LITE	GLAZED PANELS REGULATED BY ITEM 7 OF SECTION R308.4 (Category Class)	GLAZED PANELS REGULATED BY ITEM 6 OF SECTION R308.4 (Category Class)	DOORS AND ENCLOSURES REGULATED BY ITEM 5 OF SECTION R308.4 <sup>a</sup> (Category Class)
9 square feet or less	No requirement	B	A
More than 9 square feet	A	A	A

For SI: 1 square foot = 0.0929 m<sup>2</sup>.  
a. Use is permitted only by the exception to Section R308.3.1.

\* DENOTES SAFETY GLAZING NOT REQUIRED



**FIGURE R308.4.1**  
**GLAZING ADJACENT TO DOOR**

2. When there is an intervening wall or other permanent barrier between the door and the glazing.
  3. Glazing adjacent to a door where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth.
  4. Glazing that is adjacent to the fixed panel of patio doors.
3. Glazing in an individual fixed or operable panel that meets all of the following conditions:
- 3.1. The exposed area of an individual pane is larger than 9 square feet (0.836 m<sup>2</sup>); and
  - 3.2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor; and
  - 3.3. The top edge of the glazing is more than 36 inches (914 mm) above the floor; and

- 3.4. One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the glazing.

**Exceptions:**

1. Decorative glazing.
2. When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965) above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
3. Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet (7620 mm) or more above *grade*, a roof, walking surfaces or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior.
4. All glazing in railings regardless of area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
5. Glazing in enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.

**Exception:** Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the waters edge of a hot tub, whirlpool, saunas, steam rooms or bathtubs and showers.

6. Glazing in walls and fences adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm), measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
7. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

**Exceptions:**

1. When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and be a minimum of 1½ inches (38 mm) in cross sectional height.
2. The side of the stairway has a guardrail or hand-rail, including balusters or in-fill panels, complying with Sections R311.7.7 and R312 and the plane of the glazing is more than 18 inches (457 mm) from the railing; or
3. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (863 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a *guard*.



8. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches (914 mm) above the landing and within a 60-inch (1524 mm) horizontal arc less than 180 degrees (3.14 rad) from the bottom tread nosing shall be considered a hazardous location.

**Exceptions:**

1. The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.7 and R312 and the plane of the glass is more than 18 inches (457 mm) from the railing; or
2. When a solid wall or panel extends from the plane of the adjacent walking surface to 34 inches (864 mm) to 36 inches (914 mm) above the walking surface and the construction at the top of that wall or panel is capable of withstanding the same horizontal load as a *guard*.



## Residential Weatherization Specification Manual

October 1, 2011

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### Indoor Air Quality Homeowner Disclosure

Weatherization work may affect the Indoor Air Quality (IAQ) in your home. This is because weatherization work can reduce the amount of outdoor air that naturally comes into your home through small air leaks in the home's exterior. When weatherization measures are installed, it's a good time to assess the IAQ of your home as well as inspect and upgrade your home's ventilation components.

All homes have some sort of "ventilation". At a minimum, operable windows and small unintentional air-leaks distributed throughout the house allow outside air into the house under certain conditions. This may not always be adequate for good indoor air quality.. Many homes also have mechanical exhaust fans in kitchens and bathrooms to provide ventilation in those areas. Other homes have dedicated controlled ventilation systems designed to provide fresh air to dilute other pollutants in the house.

The US EPA recommends following ASHRAE Standard 62.2, which requires homes have carefully designed ventilation systems. The standard separates ventilation systems into two primary components: spot ventilation for kitchen and bathrooms for moisture and odor control; whole house ventilation that introduces regulated amounts of outdoor air to dilute other contaminants not controlled by spot ventilation. The specific requirements depend on the characteristics of the house. We strongly recommend you seek further guidance on how to comply with the US EPA's recommendations. Contact your utility or contractor for more information.

Of course, your behavior also plays a significant role in the overall IAQ. It's important to operate ventilation systems when bathing or cooking. Ventilation systems are not typically designed to remedy pollution caused by smoking indoors or excessive moisture due to a plumbing leak or unvented dryer, for example.

If your home has a combustion appliance, a carbon monoxide alarm will be installed. This is for your safety. The CO alarm helps protect you by warning of elevated levels of carbon monoxide, a harmful by product of combustion-fuel appliances such as furnaces, stoves, fireplaces and water heaters. It is important for you to keep the CO alarm, like your smoke alarm, in good working condition with fresh batteries at all times.

I have received a copy of *EPA Care for Your Air: A Guide to Indoor Air Quality* and received an explanation of the importance of source control, natural and mechanical spot and whole house ventilation. I have been informed that weatherization measures may affect the Indoor Air Quality of my home.

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Homeowner

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Address

Date

For more information, visit <http://www.epa.gov/iaq/pubs/insidest.html>

# Window Installation Checklist

This **Window Installation Checklist** includes Prep and Installation measures that will result in a quality project. This checklist includes Residential Weatherization Specifications & Best Practices Guide sections: 12.1 through 12.3. This checklist calls out both utility weatherization program requirements, which are **bolded**, as well as best practices, which are not bolded.

Check with the local serving utility what incentives are available and what the required qualifications, specifications, and documentation are for its program

## 12.1 GENERAL WINDOW REQUIREMENTS

**Comply with these bolded general requirements on all window and patio door replacements.**

Additional recommended best practice steps are included as well. **Window requirements also apply to patio doors unless otherwise stated.**

- Replacement windows must be certified and labeled for U-factor in accordance with the simulation, testing, and certification procedures of the National Fenestration Rating Council Incorporated (NFRC).**
- Installers should always confirm that adhesives being used are designed and rated for exterior use and will work with both existing and new flashing and water-resistive barriers.
- Caulk and prime all exterior wood, including frame, sash, trim, stops and sills on all sides and ends.**
- Support the bottom rail of a patio door within ½ inch of exterior edge of the frame.**
- Any wood that touches the ground or concrete must be pressure-treated.**
- Incorporate the replacement window and window opening into the home's water-resistive barrier using proper flashing techniques for each specific window type.**
- Hardware and fasteners must be aluminum, stainless steel or another noncorrosive material.**
- Seal the structural frame to the window, and seal surrounding gaps and cracks.**
- Frame: Install caulk or low-expansion foam between window frame and rough opening.**
- Install backer rod or non-expanding foam and caulk where gaps are greater than 3/8 inch.**
- Exposed framing components: Caulk at exposed wood-to-wood framing cracks; remove sash weights, if applicable, and seal and insulate weight channels.**
- Cover gaps of over 3/8 inch between the exterior siding and the window with solid trim material.**



# Window Installation Checklist

## 12.1 GENERAL WINDOW REQUIREMENTS (cont.)

- Fill all exterior or interior voids over 3/8 inch in width or depth with window manufacturer- approved materials, such as non-expanding foam, backer rod, or similar product prior to caulking, if caulking will be applied.
- Verify that windows operate smoothly and safely.

## 12.2 WINDOW INSTALLATION REQUIREMENTS

**Comply with these bolded requirements when replacing windows.** Additional recommended best practice steps are included as well.

### 12.2.1 REPLACING NAILING-FIN WINDOWS

**Comply with these requirements to install a nailing-fin window securely in the rough opening.**

- At the sill, insert the flashing underneath the existing siding and on top of existing building paper. The bottom nailing fin of the window will cover this flashing.
- Install the window by sliding the top fin under the building paper. Side and bottom fins should rest on top of the building paper.
- Use flat shims to provide a level surface and support under the vertical structural members of the new window frame. Don't allow the fins to support the window's weight.
- Use fasteners with heads wide enough in diameter to span the holes or slots in the window fin. Avoid over-driving the fasteners or otherwise deforming the window fin.
- Flash the window around its perimeter with 15-pound felt, house wrap or a peel-and-stick membrane.
- First, flash the side fins of the window, overlapping the sill flashing;
- Then, flash the top fin of the window, overlapping the side flashing.
- Windows that are exposed to wind-driven rain or without overhangs above them should have a rigid head flashing to prevent rainwater from draining onto the window.
- If the tops of the windows are already protected by an overhanging metal head flashing, tuck the new flashing behind this head flashing.



# Window Installation Checklist

## 12.2.1 REPLACING NAILING-FIN WINDOWS (cont.)

- If the tops of exposed windows aren't protected by head flashing, insert new metal head flashing behind the existing siding and building paper at the top of the window and over the head trim piece.
- The head flashing should extend beyond the sides of the window enough to divert water away from vertical joints bordering the window.
- Tuck the head flashing up behind the exterior siding at least 1 inch.
- Metal head flashing must have downward bending lip of at least 1/4 inch on the front and ends.
- Thoroughly caulk all filler and trim pieces surrounding the replacement window.

## 12.2.2 BLOCK FRAME OR FINLESS WINDOWS

**Comply with the following bolded requirements when installing block-frame or finless windows.** Additional recommended best practice steps are included as well.

- Block-frame or finless windows may require a sufficiently wide gap between the existing window frame or masonry opening to allow for the following:
  - Leveling the window.
  - Insulating the gap with backers and foam.
  - Allowing for slightly out of square opening.
- If window-weight cavities are accessible, remove the weights, fill the cavities with insulation, and seal the cavities.**
- Support block-frame or finless windows under their main vertical supports with shims that level the window.**
- Use flat shims if the sill surface is flat.**
- Use tapered shims or a sill angle if the sill surface is sloping.**



## Window Installation Checklist

### 12.2.2 BLOCK FRAME OR FINLESS WINDOWS (cont.)

- Windows without fins must be secured to the rough opening within 4 inches of each side corner and a minimum 12 inches on center along the remainder of the sides of the frame with one of these fastening methods.**
- Screws fastened through the window frame. Use screws that are designed for fastening block- frame windows.**
- Jamb clips or plates that are fastened first to the window and then to the opening in separate steps.**
- Protect the existing sill with a metal or plastic sill pan or rigid sill flashing if necessary for drainage and to protect the existing sill that protrudes from the exterior wall. Or, install a new sill as part of the window replacement.**
- Fill any gaps over 3/8 inch that are between the exterior siding and the block-frame window.**
- Install backer rod in all exterior or interior voids over 3/8 inch in depth or width before caulking.**
- If possible, flash block-frame windows between the opening and the replacement-window frame and extend the flashing out far enough to slip under or into the siding.**
- Tuck the flashing up behind the exterior siding at least 1 inch.**
- Sill and head flashing should have a downward bending lip of at least 1/4 inch on the front that sheds water away from the building.**
- Caulk around the perimeter of the window to the existing frame to prevent water intrusion.**

### 12.2.3 FLUSH-FIN WINDOW REPLACEMENT

**Replace windows in stucco walls using windows with flush fins, also called stucco fins, which have no nail holes. Flush-frame windows are replacement windows that fasten to the window opening and mount directly over the flat siding surrounding the window opening. This flush-fin window-replacement technique is similar to block-frame window installation.**

- If window-weight cavities are present and accessible, remove the weights, fill the cavities with insulation, and seal the cavities.**



## Window Installation Checklist

### 12.2.3 FLUSH-FIN WINDOW REPLACEMENT (cont.)

- Support the replacement window on the existing sill with one of the following materials.
  - A flat or tapered continuous wood support.
  - Flat shims under the window's main vertical supports.
  - Tapered shims under the window's main vertical supports if the sill is sloping.
- Apply a sealant that remains flexible to the back of the flush fin of the replacement window in order to seal it to the surface of the exterior wall.
- Leave a gap in the caulking at the bottom fin for one inch on each side of the window's weep holes to allow water to drain.
- Windows must be secured to the rough opening within 4 inches of each side corner and a minimum 12 inches on center along the remainder of the frame with one of these fastening methods.
- Screws fastened through the window frame. Use screws that are designed for fastening block- frame windows.
- Jamb clips or plates that are fastened first to the window and then to the opening in separate steps.

### 12.3 SAFETY GLASS AND EMERGENCY EGRESS

All windows must meet the following safety glazing and egress requirements.

- Use safety glazing in locations where the risk of breakage is high.

Egress windows are windows with an opening sash large enough for people to use as a fire escape.

Safety glazing requirements apply to replacement windows, replacement patio doors, multi-glazing inserts and storm windows.

- Each pane of glass requiring safety glazing must bear the manufacturer's permanent safety glazing label. This label of identification is etched or ceramic-fired on the glazing and clearly visible in one of the corners of the lite.



# Window Installation Checklist

## 12.3.1 HAZARDOUS LOCATIONS REQUIRING SAFETY GLAZING

**Comply with state and local code for required safety-glazing locations.**

Common locations for safety glazing include the following:

1. Glazing in entry doors.
2. Glazing in patio doors and French doors.
3. Glazing in a fixed or operable panel that meets all of the following conditions:
  - a. The exposed area of an individual pane is greater than 9 square feet.
  - b. The bottom edge is less than 18 inches above the floor.
  - c. The top edge is greater than 36 inches above the floor
  - d. One or more walking surfaces are within 36 inches horizontally of the glazing.
4. Glazing in a fixed or operable panel adjacent to a door where the nearest vertical edge of the window is within a 24-inch arc of the door in a closed position and whose bottom edge is less than 60 inches above the floor or walking surface.
5. Glazing in hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers, if the bottom edge of the glazing is less than 60 inches above the drain inlet.

## 12.3.2 EMERGENCY EGRESS OPENINGS

**Where an existing window meets code-required egress requirements, the replacement window must also meet those egress requirements.**

### ADDITIONAL INFORMATION

Free resources, additional training and one-on-one support are available through Comfort Ready Home. Visit [ComfortReadyHome.com](http://ComfortReadyHome.com) to contact your [Comfort Ready Home Field Specialist](#) or visit the [Online Learning Center](#) for on-demand training.





# Care for Your Air: A Guide to Indoor Air Quality





## Understand indoor air in homes, schools, and offices

Most of us spend much of our time indoors. The air that we breathe in our homes, in schools, and in offices can put us at risk for health problems. Some pollutants can be chemicals, gases, and living organisms like mold and pests.

Several sources of air pollution are in homes, schools, and offices. Some pollutants cause health problems such as sore eyes, burning in the nose and throat, headaches, or fatigue. Other pollutants cause or worsen allergies, respiratory illnesses (such as asthma), heart disease, cancer, and other serious long-term conditions. Sometimes individual pollutants at high concentrations, such as carbon monoxide, cause death.



**Some pollutants in the air are especially harmful for children, elderly people, and those with health problems.**

# Learn about pollutants

Understanding and controlling some of the common pollutants found in homes, schools, and offices may help improve your indoor air and reduce your family's risk of health concerns related to indoor air quality (IAQ).

**Radon** is a radioactive gas that is formed in the soil. It can enter indoors through cracks and openings in floors and walls that are in contact with the ground.

- Radon is the leading cause of lung cancer among nonsmokers, and the second leading cause of lung cancer overall.

**Secondhand smoke** comes from burning tobacco products. It can cause cancer and serious respiratory illnesses.

- Children are especially vulnerable to secondhand smoke. It can cause or worsen asthma symptoms and is linked to increased risks of ear infections and Sudden Infant Death Syndrome (SIDS).

**Combustion Pollutants** are gases or particles that come from burning materials. In homes, the major source of combustion pollutants are improperly vented or unvented fuel-burning appliances such as space heaters, woodstoves, gas stoves, water heaters, dryers, and fireplaces. The types and amounts of pollutants produced depends on the type of appliance, how well the appliance is installed, maintained, and vented, and the kind of fuel it uses. Common combustion pollutants include:

- Carbon monoxide (CO) which is a colorless, odorless gas that interferes with the delivery of oxygen throughout the body. Carbon monoxide causes headaches, dizziness, weakness, nausea, and even death.
- Nitrogen dioxide (NO<sub>2</sub>) which is a colorless, odorless gas that causes eye, nose and throat irritation, shortness of breath, and an increased risk of respiratory infection.

**Volatile organic compounds (VOCs)** are chemicals found in paints and lacquers, paint strippers, cleaning supplies, varnishes and waxes, pesticides, building materials and furnishings, office equipment, moth repellents, air fresheners, and dry-cleaned clothing. VOCs evaporate into the air when these products are used or sometimes even when they are stored.

- Volatile organic compounds irritate the eyes, nose and throat, and cause headaches, nausea, and damage to the liver, kidneys, and central nervous system. Some of them can cause cancer.



**Asthma triggers** are commonly found in homes, schools, and offices and include mold, dust mites, secondhand smoke, and pet dander. A home may have *mold* growing on a shower curtain, *dust mites* in pillows, blankets or stuffed animals, *secondhand smoke* in the air, and *cat and dog hairs* on the carpet or floors. Other common asthma triggers include some foods and pollutants in the air.

- Asthma triggers cause symptoms including coughing, chest tightness, wheezing, and breathing problems. An asthma attack occurs when symptoms keep getting worse or are suddenly very severe. Asthma attacks can be life threatening. However, asthma is controllable with the right medicines and by reducing asthma triggers.

**Molds** are living things that produce spores. Molds produce spores that float in the air, land on damp surfaces, and grow.

- Inhaling or touching molds can cause hay fever-type symptoms such as sneezing, runny nose, red eyes, and skin rashes. Molds can also trigger asthma attacks.

# Improving your air

Take steps to help improve your air quality and reduce your IAQ-related health risks at little or no cost by:

**Controlling the sources of pollution:** Usually the most effective way to improve indoor air is to eliminate individual sources or reduce their emissions.

**Ventilating:** Increasing the amount of fresh air brought indoors helps reduce pollutants inside. When weather permits, open windows and doors, or run an air conditioner with the vent control open. Bathroom and kitchen fans that

exhaust to the outdoors also increase ventilation and help remove pollutants.

Always ventilate and follow manufacturers' instructions when you use products or appliances that may release pollutants into the indoor air.

**Changing filters regularly:** Central heaters and air conditioners have filters to trap dust and other pollutants in the air. Make sure to change or clean the filters regularly, following the instructions on the package.

**Adjusting humidity:** The humidity inside can affect the concentrations of some indoor air pollutants. For example, high humidity keeps the air moist and increases the likelihood of mold.

Keep indoor humidity between 30 and 50 percent. Use a moisture or humidity gauge, available at most hardware stores, to see if the humidity in your home is at a good level. To increase humidity, use a vaporizer or humidifier. To decrease humidity, open the windows if it is not humid outdoors. If it is warm, turn on the air conditioner or adjust the humidity setting on the humidifier.

## Important tips that will help control indoor pollutants

- Test for radon and fix if there is a problem.
- Reduce asthma triggers such as mold and dust mites.
- Do not let people smoke indoors.
- Keep all areas clean and dry. Clean up any mold and get rid of excess water or moisture.
- Always ventilate when using products that can release pollutants into the air; if products must be stored following use, make sure to close tightly.
- Inspect fuel-burning appliances regularly for leaks, and make repairs when necessary.
- Consider installing a carbon monoxide alarm.



## Remodeling old homes and building new homes

While remodeling or improving the energy efficiency of your home, steps should be taken to minimize pollution from sources inside the home, either from new materials or from disturbing materials already in the home. In addition, residents should be alert to signs of inadequate ventilation, such as stuffy air, moisture condensation on cold surfaces, or mold and mildew growth.

When building new homes, homebuyers today are increasingly concerned about the IAQ of their homes. Pollutants like mold, radon, carbon monoxide, and toxic chemicals have received greater attention than ever as poor IAQ has been linked to a host of health problems. To address these concerns, builders can employ a variety of construction practices and technologies to decrease the risk of poor IAQ in their new homes using the criteria from EPA's Indoor airPLUS as a guide.

To help ensure that you will have good IAQ in your new or remodeled home:

- Ask about including radon-reducing features.
- Provide proper drainage and seal foundations in new construction.
- Consider installing a mechanical ventilation system. Mechanical ventilation systems introduce fresh air using ducts and fans, instead of relying on holes or cracks in the walls and windows.
- When installing new appliances (like furnaces) make sure they are installed properly with a good vent or flue.

## Schools

With nearly 56 million people, or 20 percent of the U.S. population, spending their days inside elementary and secondary schools, IAQ problems can be a significant concern. All types of schools—whether new or old, big or small, elementary or high school—can experience IAQ problems. School districts are increasingly experiencing budget shortfalls and many are in poor condition, leading to a host of IAQ problems.

- EPA's voluntary *Indoor Air Quality Tools for Schools* Program provides district-based guidance to schools about best practices, industry guidelines, and practical management actions to help school personnel identify, solve, and prevent IAQ problems.
- Children may be more sensitive to pollution, and children with asthma are especially sensitive. Asthma is responsible for millions of missed school days each year. Parents' and caregivers' involvement helps daycare facilities become aware of asthma triggers and the need to reduce them.



## Office Buildings



Many office buildings have poor IAQ because of pollution sources and poorly designed, maintained, or operated ventilation systems.

- Office workers help to improve the indoor air in their buildings by paying attention to environmental conditions including ventilation, temperature, and the presence of odors. Report any problems to facility managers immediately.
- To improve IAQ, be careful not to block air vents or grilles, keep your space clean and dry, and do not bring in products that may pollute the indoor air.

*Unfold this brochure to find a poster that tells you how to improve the air you breathe in your home.*

[www.epa.gov/iaq](http://www.epa.gov/iaq)

# Take Action to Improve Air Quality in Every Room

## Asthma is a serious, sometimes life-threatening respiratory disease that affects the quality of life for millions of Americans.

Environmental asthma triggers: are found around the home and can be eliminated with simple steps.

- Don't allow smoking in your home or car.
- Dust and clean your home regularly.
- Clean up mold and fix water leaks.
- Wash sheets and blankets weekly in hot water.
- Use allergen-proof mattress and pillow covers.
- Keep pets out of the bedroom and off soft furniture.
- Control pests—close up cracks and crevices and seal leaks; don't leave food out.

## Children are especially sensitive to secondhand smoke, which can trigger asthma and other respiratory illnesses.

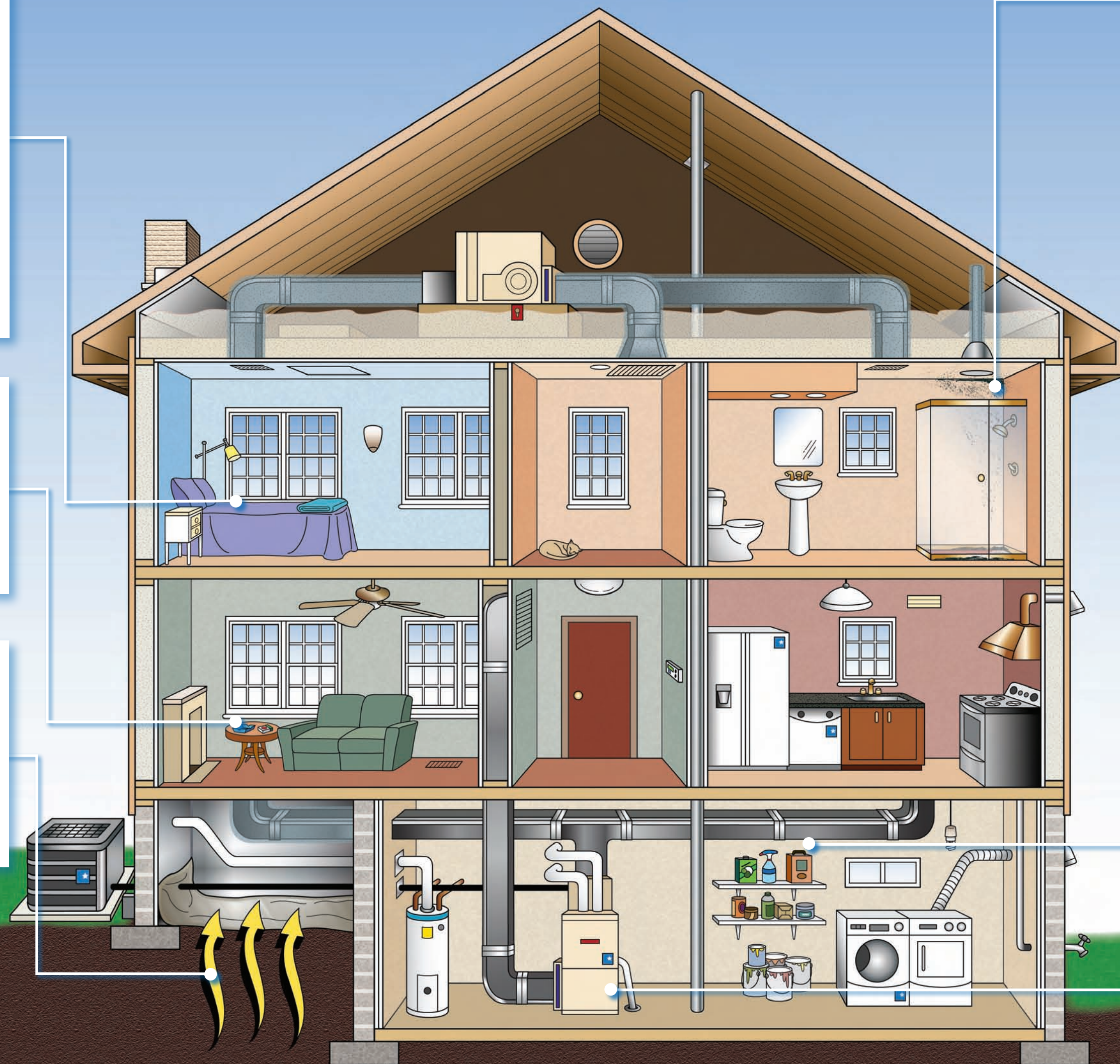
Secondhand smoke: smoke comes from burning tobacco products such as cigarettes, pipes, and cigars.

- To help protect children from secondhand smoke, do not smoke or allow others to smoke inside your home or car.

## Radon is the second leading cause of lung cancer.

Radon gas: enters your home through cracks and openings in floors and walls in contact with the ground.

- Test your home with a do-it-yourself radon kit. If the test result indicates you should fix, call a qualified radon mitigation specialist.
- Ask your builder about including radon-reducing features in your new home at the time of construction.



## Mold can lead to allergic reactions, asthma, and other respiratory ailments.

Mold: can grow anywhere there is moisture in a house.

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly and fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.

## VOCs cause eye, nose, and throat irritation, headaches, nausea, and can damage the liver, kidney, and central nervous system.

Volatile organic compounds (VOCs): are chemicals that evaporate at room temperature. VOCs are emitted by a wide array of products used in homes including paints and lacquers, paint strippers, varnishes, cleaning supplies, air fresheners, pesticides, building materials, and furnishings. VOCs are released from products into the home both during use and while stored.

- Read and follow all directions and warnings on common household products.
- Make sure there is plenty of fresh air and ventilation (e.g., opening windows and using extra fans) when painting, remodeling, or using other products that may release VOCs.
- Never mix products, such as household cleaners, unless directed to do so on the label.
- Store household products that contain chemicals according to manufacturers' instructions.
- Keep all products away from children!

## Carbon monoxide causes headaches, dizziness, disorientation, nausea and fatigue, and high levels can be fatal.

## Nitrogen dioxide causes eyes, nose, and throat irritation, impairs lung function, and increases respiratory infections.

Sources include: indoor use of furnaces, gas stoves, unvented kerosene and gas space heaters, leaking chimneys, and tobacco products.

- Ventilate rooms where fuel-burning appliances are used.
- Use appliances that vent to the outside whenever possible.
- Ensure that all fuel-burning appliances are properly installed, used, adjusted, and maintained.

Visit [www.epa.gov/iaq](http://www.epa.gov/iaq)