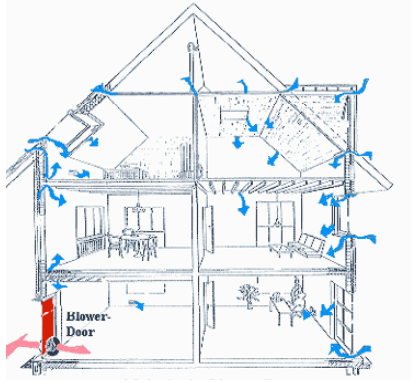


# How to Increase Comfort and Save Money on Energy



## **Air Infiltration**

New and particularly older structures often have a variety of leaks that reduce its overall energy efficiency and cause moisture problems over time. Flashing reduces rain and bulk water penetration in exterior walls, preventing moisture damage. A well sealed "tight" building envelope may lose up to 20 percent of its overall insulation value to air infiltration. Buildings may also lose heat through unsealed penetrations to unheated attics or crawl spaces. Ventilation systems are more efficient when installed in a tight building.

### **ACTIONS:**

- On all documents, clearly detail flashing and air sealing.

Show how building wrap is fastened at window and other penetrations.

- The insulation contractor is responsible for air sealing to meet energy code. The general contractor should seal remaining penetrations prior to insulation. Using a "wet" type cellulose insulation eliminates the need for this step.

- Specify the use of low-VOC and/or non CFC propellant caulks and sealants.

- Often overlooked air leakage sites include: rim joists between conditioned spaces, ceiling recessed light fixtures, unless ICT rated, drainpipe holes for showers and tubs, and chases for plumbing or ductwork.

- Install/replace dampers on fireplace(s). Dampers reduce down drafting in winter when fireplace not in use.

## **Blower Door Test**

For highest comfort and safety, the tightness of the building envelope and ductwork can be tested with a blower door and duct tester. The test reveals hidden air and moisture flows and potential problems and

costs. It can be performed in new construction and renovations.

### **ACTIONS:**

- Perform blower door test to determine air sealing gaps and combustion safety. Note: the test is necessary in any dwelling with a gas furnace or water heater to prevent back drafting and spillage of combustion by-products.

- Conduct test after drywall is mudded and exterior doors are installed, so that leaks can still be easily sealed.

- Perform a "duct blaster" test to check the efficiency of heating ducts in attics and crawl spaces. Inadequately sealed ducts lose 20-30 percent of their heat into unconditioned space, draw pollutants from attics/basements, and cause pressure imbalances.

## **Wall and Ceiling Insulation**

Beyond code insulation in exterior walls and ceilings improves comfort, decreases heating and cooling requirements, makes homes quieter, minimizes mold and mildew, and saves money.

Combining good practices to reduce infiltration with recycled content products contributes to a more energy-efficient building, while reducing indoor air quality and other environmental hazards.

### **ACTIONS:**

- Insulate walls and ceilings of wood framed buildings to exceed the code by 20 percent. Wall cavities with existing insulation can be blown full with new insulation to increase density. New and refinished exterior walls can be wrapped with a minimum of 1" (R-4) rigid foam to increase envelope R-value.

- To maximize R-value, specify recycled content fiberglass, Dense-Pak cellulose, Blow-In Blanket System, Icynene, and/or foam board cladding insulation. Recycled content fiberglass contains recycled glass (up to 30 percent), formaldehyde-free binders, and no asphalt binders. Dense-Pak cellulose is formaldehyde-free and completely fills cavities and penetrations - reducing air infiltration, moisture intrusion, and fire spread.

- During installation, avoid crushing, cut and fill carefully, face-staple flanges, and fill all gaps.

- Use expandable foam and caulk to prevent infiltration where wood connections are made or framing is drilled for plumbing and electrical runs. This is especially important when fiberglass is installed. Caulk top and bottom plates on all floors.



## Windows and Doors

Quality windows and doors are integral to energy efficiency. In winter, they account for up to 25 percent of a building's heat loss. Better windows and doors improve comfort and reduce noise and utility bills. Consider environmental performance when choosing products.

### **ACTIONS:**

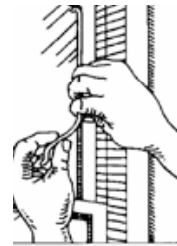
- Install double-paned, low-emissivity (low-E) windows prevent heat from escaping through the glass in winter and block heat from entering in summer), low conductivity windows. Install windows with U-value equal to 0.35 or lower. A window with a U-value of 0.35 cuts heat loss by 15 percent compared to code windows.

- Another important rating is the solar heat gain coefficient (SHGC) that measures the amount of solar heat a window allows to pass. A low SHGC (.40 or less) is desirable on west-facing facades. Use a .60 SHGC on east and south sides to encourage passive solar heating. Consider installing reflective film on west windows, particularly if unshaded and single glazed.

- When installing vinyl windows, use a low expanding foam and don't nail top flanges to reduce air infiltration.

- On remodels, if existing windows are in relatively good shape, consider weatherstripping, caulking, insulating drapes, and storm windows to improve performance in lieu of replacement.

- Specify insulated core exterior doors (they are up to 60 percent more efficient than solid wood doors). Note; specify doors



without polyisocyanate foam which is made from ozone-depleting HCFCs.

## Concrete Slab Insulation

Concrete slabs lose heat at their edges, where the air and soil are coldest. A floor slab should be insulated between heated and unheated areas (i.e. garages and living areas). Some spaces, such as utility rooms, can be designed to be thermally isolated from conditioned living space, helping to reduce the volume of conditioned space in a unit.



### **ACTIONS:**

- Insulate perimeter edge of concrete slab floor with code approved foam board. Insulate slab between heated and unheated spaces.
- R-15 edge insulation is 3" thick. For a floating slab inside a

foundation wall, a pressure-treated lumber strip can be ripped to fit over the top of the insulation, flush with the top of the slab. On a monolithic slab, the edge insulation can be taper-cut and fitted with flashing.

- Exposed insulation can be coated with stucco to protect from sunlight and moisture.
- A slab floor with radiant heating should be fully insulated underneath the slab and its perimeter.



For information on available rebates, please refer to our companion brochure, "How to get free money for saving energy!" Both brochures are available on our website: [www.greendecade.org](http://www.greendecade.org) and will be updated as changes occur.

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