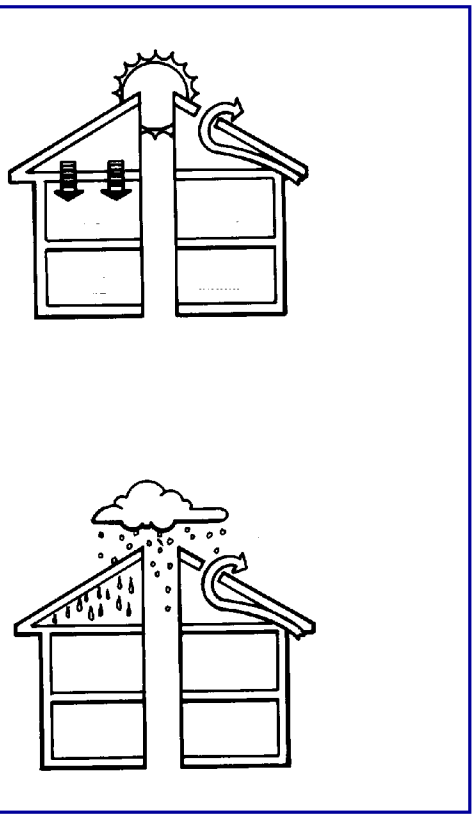
HOW-TO BOOKLET #3134

ENERGY SAVERS: CLIMATE CONTROL

TOOL & MATERIAL CHECKLIST

- ❑ Hammer
- ❑ Nails
- ❑ Safety Glasses
- ❑ Gloves
- ❑ Insulation
- ❑ Wood Strips
- ❑ Screwdriver
- ❑ Tape
- ❑ Staple Gun
- ❑ Razor Knife

Read This Entire How-To Booklet For Specific Tools and Materials Not Noted in The Basics Listed Above



Good home improvement begins with an investment in energy savings. You may not have thought about energy saving in the past, but as you will see, the improvements found in this Booklet will begin paying off immediately in the form of reduced utility bills. The money saved will not only pay off your investment, but it will pay "interest" as well.

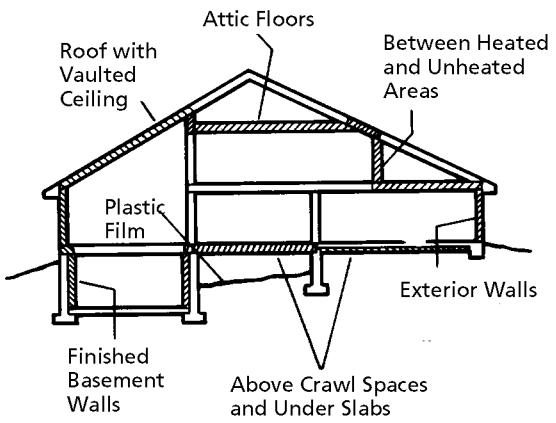
INSULATION

Adequate insulation is the most important consideration in conserving heating and cooling energy in the home. Such insulation will also contribute greatly to the comfort level during both summer and winter. Insulation reduces the leakage of heat into or out of a home.

As described in booklet #3065, there are several materials used to insulate a home. The effectiveness of insulation is measured by R-value, the thermal resistance to heat flowing out in winter and flowing in during the summer. The higher the R-value, the greater the comfort...and the greater the savings in heating and cooling costs.

The first step in determining how much insulation is needed is to obtain the optimal R-value of insulation for your home. The R-value needed depends on the type of insulation to be used and the climate in which you live. The United States Department of Energy (D.O.E.) has established optimal R-values for walls, floors, ceilings in each of eight different zones in the continental United States. Find your locality on the map and chart in How-To Booklet #3065 for the recommended R-values in your area. Remember that one roll of 16-inch-wide insulation covers 48 square feet.

For complete information on how to install insulation in both walls, ceilings and attic, see How-To Booklets #3086 and #3087.



Areas to Insulate

MOVING AIR

While you are adding insulation to the attic, consider the need for better ventilation, both in summer and winter. In an unventilated attic, when the outside temperature reaches 90°F, the attic floor can reach 150°F and the roof sheathing 160°F. This, in turn, heats the air in the living areas below. Adequate ventilation, as described in How-To Booklet #3078, can keep you cooler and more comfortable.

Gable vents at both ends of the attic allow superheated summer air to escape. During winter, these small vents let the attic breathe, moving out the moisture that could condense on the insulation and lower its efficiency.

Soffit vents should be sized to provide the same area of surface openings as gable vents. In other words, they must admit fresh outdoor air as rapidly as gable vents exhaust stale attic air. When adding more attic insulation, be careful not to block gable vent openings.

A powered attic fan will also improve the performance of the gable and soffit vents in summer by driving superheated attic air out of the house. At the same time, the fan draws warm air from the living spaces inside the house. This air is, in turn, replaced with cooler outside air pulled in through north-facing windows (usually, it's best to run the fan at night only). One word of caution, on the very muggiest days, don't use the fan. It will bring in humidity with outside air.

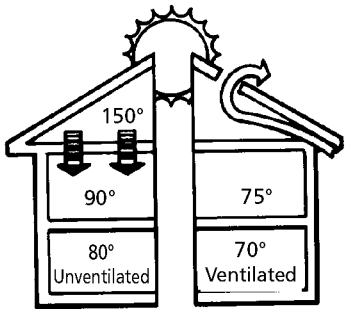
Crawl space vents allow moisture to escape. If moisture were allowed to build up, it would condense in the insulation and greatly lower its heat holding qualities. Adequate ventilation, as described in How-To Booklet #3078, can keep the home more comfortable and save energy.

CAULKING AND WEATHERSTRIPPING

Caulking and weatherstripping can cut energy costs as much as 40%. All doors, windows, and other openings into the house should be tightly caulked. Use latex, acrylic, butyl rubber, or silicone compounds, which remain flexible and won't crack as the house settles or the wood in the siding, windows, and door casings contract and expand with seasonal changes. Doors and windows also should be tightly weatherstripped. If they're not, as a temporary measure in winter, apply masking tape or duct tape around the interior of operable windows to keep out air.

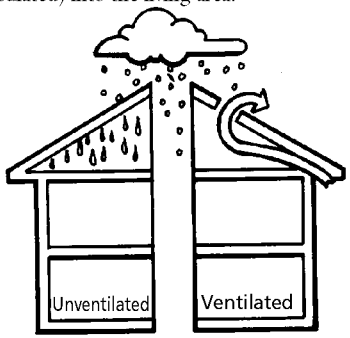
Heat loss through house windows can be reduced by more than 50% with the addition of storm windows yielding a 10% overall reduction in home heating costs. Similar savings can be achieved with storm windows during summer in air-conditioned homes. Storm windows form a dead-air space which acts as insulation. The same principle applies to storm doors.

Another way to save energy (especially with air-conditioning) is to use a solar film. It is applied directly to the window, or door glass on the inside (see Booklet #3103).



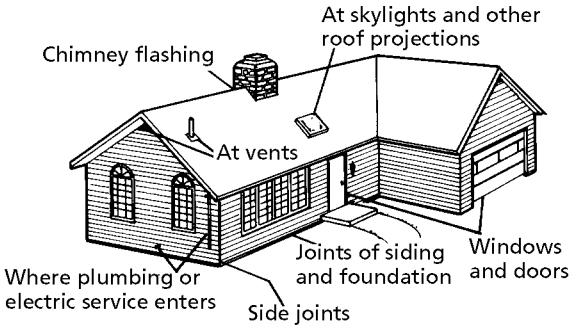
Summer

In hot weather, proper ventilation prevents the attic from becoming a hot-box that spills unwanted heat down through the attic floor (even if the attic is insulated) into the living area.



Winter

What-Ventilation Does



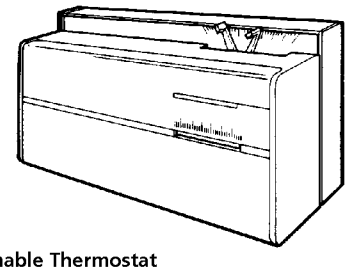
Where to Caulk

HEATING AND COOLING

Heating and cooling is the greatest single energy user in the home. It accounts for over 45% of energy used by an average family. Therefore, the heating and cooling systems provide the greatest opportunity to save energy.

When the heat is on:

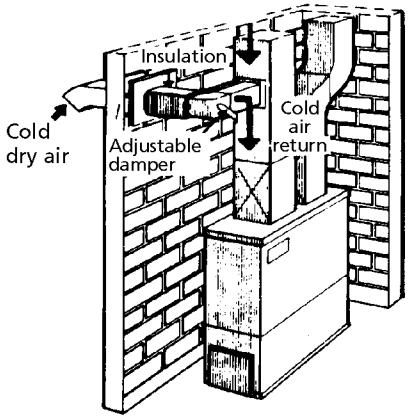
- Set the thermostat between 65° and 68°F during waking hours.
- Isolate unused rooms from the rest of the house; close their hot air dampers or shut off their radiators. A zoned heating system can save money and energy wasted on unused rooms.
- Pipes and heating ducts should be well insulated, if not, they will lose a significant amount of energy before warm air or hot water reaches its destination.
- Heating and cooling systems should be properly maintained and the equipment serviced at least once a year. If the heating system requires replacement, keep in mind that new high-tech furnaces almost double the efficiency of older types. Many do not require a chimney for venting.
- Add a humidifier to make indoor air feel warmer than it actually is. But remember that most experts say the maximum humidity in a house should not exceed 40% in winter. If you have a forced air furnace, there's a relatively simply and inexpensive modification that can increases ventilation and lower humidity. A length of insulated duct is installed between the outdoors and the cold-air return plenum. This introduces fresh air into your system which is then filtered, warmed and evenly distributed through the house. A damper in this duct can be adjusted manually or automatically (by means of a humidistat) to ensure that indoor humidity is kept at a desirable level relative to the outside temperature. If



Programable Thermostat

operated manually, start with an open damper and gradually close it over several cold days.

- Windows near the thermostat should be kept tightly closed, otherwise the furnace will keep working after the room has reached a



Forced-air furnace

comfortable temperature. Thermostats should be mounted 4 feet above the floor.

- Clean or replace the filter in your forced-air heating system three or four times a year.
- Attic access should be checked. Check the door to make sure it is well insulated and weatherstripped, otherwise you'll be wasting fuel to heat that cool air. An automatic garage door encourages one to shut the door quickly, thereby saving fuel even in unheated garages by preventing cold from reaching the inside walls.
- Draperies and shades should be kept open in sunny windows; close them at night.
- Frequent changes in thermostat settings waste energy. Try to avoid manually changing thermostat settings. The easiest way to prevent this is to install a programmable set-back thermostat (see How-To Booklet #3109).
- Dust or vacuum radiator surfaces frequently. Dust and grime impede the flow of heat. And if the radiator needs painting, use flat paint, preferably black. It radiates heat better than glossy.
- Check the duct work for air leaks about once a year if you have a forced-air heating system. To do this feel around the duct joints for escaping air when the fan is on. Relatively small leaks can be repaired simply by covering holes or cracks with duct tape. More stubborn problems may require caulking as well as taping.
- A fireplace can be a big energy loser. When in use in winter, it sends enormous amounts of furnace-warmed air up the chimney with the smoke. Even when unused, it constantly lets warm indoor air escape. Consider the installation of glass doors which will help prevent heat from escaping up the chimney. When not using the fireplace, keep the damper closed during winter. If you never use it, consider capping off the chimney.

When the air conditioner is on:

- Set your thermostat at 78°F, a reasonably comfortable and energy-efficient indoor temperature. The higher the setting and the less difference between indoor and outdoor temperature, the less outdoor hot air will flow into the building. If the 78°F setting raises your home temperature 6° (from 72° to 78°F for example), you should save between 12%

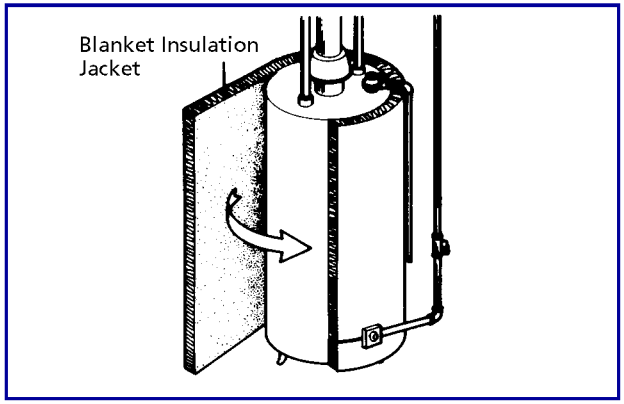
and 47% in cooling costs, depending on where you live.

- Don't set your thermostat at a colder setting than normal when you turn your air-conditioner on. It will NOT cool faster. It WILL cool to a lower temperature than you need, using more energy.
- Set the fan speed on high except in very humid weather. When it's humid, set the fan speed to low; you'll get less cooling, but more moisture will be removed from the air.
- Clean or replace air conditioning filters at least once a month. When the filter is dirty, the fan has to run longer to move the same amount of air, and thus, uses more electricity. Deflect daytime sun with awnings on windows or draw draperies and pull shades on sunny windows.
- Turn off your window air-conditioners when you leave a room for several hours.
- Consider using a fan with your window air-conditioner.
- Don't place lamps or TV sets near your air-conditioning thermostat.
- Fins or coils of air-conditioning units should be kept free of lint and dust.

WATER HEATER

The hot water heater is the second largest consumer of energy in the home. The hot water heater, therefore, gives us the second greatest opportunity to conserve energy at home. Actually, lowering the thermostat setting on water heaters can serve the triple function of saving energy, lowering costs, and preventing serious scald injuries due to hot tap water. Recommended hot water temperature to prevent energy loss/scalding is 110°F to 140°F. If a dishwasher is in the kitchen, the temperature range may go as high as 150° to 160°F.

Insulating a hot water heater will reduce tank standby losses. Water heater insulation kits are available in



all sizes and are easy to install. In some cases, it is possible to save 10% to 15% of the water-heating energy by adding proper insulation. But when installing the insulation, be sure not to block off needed air vents. That would create a safety hazard. Insulation kits are available.

Wrap hot water pipes with pre-split tubes to save energy all year round. They can cut heat losses as much as 10% and help prevent winter freeze-ups.

LIGHTING ENERGY SAVERS

More than 15% of the electricity we use in our homes goes into lighting. Most Americans overlight their homes, so keep the following in mind:

- Turn off lights in any room not being used.
- Use incandescent lamps only in hard-to-reach places. They are less efficient than ordinary bulbs.
- Always turn three-way bulbs down to the lowest lighting level when watching television. You'll reduce the glare and use less energy.
- Use low-wattage night-light bulbs.
- Use fluorescent lights whenever you can; they give out more lumens per watt.
- Fluorescent lighting also is effective for make-up and grooming areas. Use 20-watt deluxe warm white lamps for these areas.
- Keep all lamps and lighting fixtures clean. Dirt absorbs light.
- Lighting energy can be saved through decorating. Remember, light colors for walls, rugs, draperies, and upholstery reflect light and therefore, reduce the amount of artificial light required.
- Outdoor safety/security lights can be put on a photocell unit or timer so they will go off automatically and not use power unnecessarily in case you forget to turn them off during daylight hours.

ENERGY FOR MAJOR APPLIANCES

The energy required to operate major appliances follows third in line for home energy consumption, behind (1) space cooling and heating and (2) hot water heaters. New major appliances therefore give us the third greatest opportunity to conserve energy at home. The chart here compares operating costs for major appliances and tells how you can reduce the amounts of energy they use.

APPLIANCE	RELATIVE OPERATING COST	HOW YOU CAN SAVE
Refrigerator Freezer	The biggest energy eater in any kitchen. Auto-defrost models use as much as 50% more than manual-defrost types	If you can do without the convenience, buy a manual defrost; if not, energy-saving automatic types are worth the extra money you'll have to pay for them.
Range	Usually the number-two consumer, depending on your family's cooking and baking needs. Self and continuous cleaning ovens are most costly.	Cook small meals in pressure cookers or other small appliances. A meat thermometer minimizes wasteful oven peeking. Each time the oven door is open during operation 20% of the heat is lost.
Dishwasher	Third or fourth. Most of the energy goes for heating water. Run only full loads and select short cycles.	Eliminating the drying cycle can cut operating costs by at least one-third.
Washer Dryer	Third or fourth, again, the less water a machine uses the less it costs to operate. On dryers auto-dry settings can save electricity but not much.	Run cold-water loads whenever possible and use the lowest water level necessary. Longer spin periods cut down drying times.