

Ductless Heat Pumps – A New Option for Home Heating

The ductless heat pump is a new option for home heating that offers

- Efficient operation at outside temperatures of 17°F. and below without electric backup
- Quiet operation – both indoors and outdoors
- Heating and cooling
- Simplified installation

Ductless heat pumps are appropriate for both replacement of existing heating systems, especially baseboard/wall heaters, as well as for new construction. Ductless heat pumps have been installed in commercial buildings for more than 20 years and are available from many manufacturers.

Ductless heat pumps are very efficient for several reasons: Since the heated or cooled air is delivered directly to the room, ductless heat pumps avoid efficiency losses associated with ductwork – typically 15-20 percent. Variable speed compressor models, usually labeled “inverter technology,” avoid on-off cycling losses and are able to provide usable heat efficiency on all but very cold days. And, because they provide heat/cooling to specific areas of the house, they can be more efficient since each “zone” can be heated to the desired temperature.

Ductless heat pumps are sometimes called a “mini-split” heat pump and consist of an outside compressor unit and one or more inside “heads” that deliver conditioned air to the room or rooms. Inside units are typically mounted high on the wall, but certain models can be recessed in the ceiling or even installed with a short duct run to serve adjacent rooms. The inside and outside units are connected by refrigerant lines, usually concealed in the walls or ceilings or under a cover on the outside of the house. Some models allow several indoor heads to be connected to a single outside compressor.

Ductless heat pumps operate on the same principle as traditional heat pumps - using electricity to move heat between outdoor and indoor air by compressing

and expanding a refrigerant. Most new ductless heat pumps use the newer, less environmentally-harmful refrigerant R-410a. Depending on the rated capacity, they require 110 or 220 volt AC power.

A very quiet oscillating fan delivers conditioned air more evenly to all parts of the room. The indoor temperature and other settings, such as automatic night temperature setback are set with a hand-held remote control. Like any air conditioner in cooling mode they provide some dehumidification of the indoor air.

Applications for Ductless Heat Pumps

Ductless heat pumps are most appropriate for homes with open floor plans, since each indoor “head” can serve the entire “zone” not blocked by doorways. Some typical applications for ductless pumps include:

Replacing an existing zonal heating system –

Ductless heat pumps can replace existing electric baseboard/wall units, woodstoves. A cost effective electric heat conversion in a small house might consist of single system serving the main area of the house, leaving existing electric baseboards in bedrooms and bathrooms.

Room additions – Another application for ductless heat pumps is when a room is added to a house or an attic is converted to living space. Rather than extending the home’s existing ductwork or pipes or adding electric resistance heaters, the ductless heat pump can provide efficient heating and cooling.

New construction –New homes can be designed or adapted to take advantage of the characteristics of ductless heat pumps. Typically one or more systems might be installed in various “zones” of the house to simplify installation and minimize refrigerant line length.

Cost of Ductless Heat Pumps

The cost of the ductless heat pump equipment appears to be comparable to traditional heat pump systems. Installation costs are based on the difficulty of running refrigerant lines and whether the existing electrical service can handle the new equipment.

The best way to determine how much a ductless heat pump will cost in your situation is to get several bids. Be sure to specify that you want models that

* So-called “mini-split” because they tend to be smaller capacity (BTU/hour “tonnage” rating) and because they are “split system” with separate compressor (outside) and expansion heat delivery unit (inside) units, similar to traditional heat pumps, but unlike a through-the-wall unit, sometimes used to heat motel rooms.

qualify for the Oregon Residential Energy Tax Credit. Most contractors that install ductless heat pumps can provide comparison bids for traditional heat pumps or furnaces, as well. Many manufacturers' Web sites have lists of installers in various areas.

Oregon Residential Energy Tax Credit and Other Incentives

Ductless heat pump models eligible for the Oregon Residential Energy Tax Credit must meet the following specifications:

- Have variable speed compressor (“inverter technology”) – providing more efficient operation to match the heating/cooling needs of the house under a variety of weather conditions
- Be listed in the ARI directory and provide at least 50% of rated capacity efficient operation when outside air is 17° F. and have no built-in electric resistance heat.
- Be installed by a technician that has received factory-sponsored training within the past 5 years

The Oregon tax credit for ductless systems is calculated at \$50 per 6,000 BTU/hour (“half ton”) of rated capacity with a maximum of 25 percent of the equipment cost or \$400 per residence, whichever is less. There is no state tax credit for ductless air conditioner-only models.

Your electric utility may have rebates or other incentives that include ductless heat pumps. Note models which qualify for the Oregon Residential Energy Tax Credit may not meet utility or Energy Star requirements.

Installation considerations for Ductless Heat Pumps

Several options may be considered when installing a ducted heat pump in homes:

- Multi-zone with one outside compressor unit serving several indoor units
- Two separate single zone systems may be less expensive and easier to install than a multi-zone system, particularly if long runs of refrigerant lines are required for one or more indoor units

Properly sizing the system to the heating/cooling loads of the house is important, but not as critical as with traditional single speed heat pumps, since variable speed compressor allows ductless heat pumps to operate efficiently in “part load” conditions.

The inside and outside units should be located to minimize refrigerant piping runs (typically less than 50 ft. unless special measures are taken). Because the outside unit is considerably quieter than traditional heat pumps, installers have somewhat greater flexibility in deciding where to locate the compressor to keep refrigerant line lengths as short as possible.

Some people are concerned that the wall-mounted unit will be an “eyesore” in the room, but most report after a few weeks they forget they’re there. Indoor units can be painted if desired. Indoor units are usually powered by the outside unit and do not require separate electrical connection. Because these units dehumidify the air in the summer, they require a small condensate drain line from the indoor unit to the outside.

Indoor and outdoor units are connected by two refrigerant lines and an electrical cable. Each model has a maximum distance and height difference between inside and outside units that must be observed. A technician familiar with high pressure R-410a refrigerant is needed to insure the systems are installed and “commissioned” at the initial start up.

For More Information

For more information and a list of manufacturers and websites, see the Air Conditioning and Refrigeration Institute website:

www.ari.org/sections/section_groups/DuctlessEquipment

For information about the Oregon Department of Energy’s Premium Efficiency Ductless Heat Pump tax credit, see our Web site at

www.Oregon.gov/energy or contact us 1-800-221-8035 or by email: energywebincomin@state.or.us