

How a heat pump works.....

What They Do

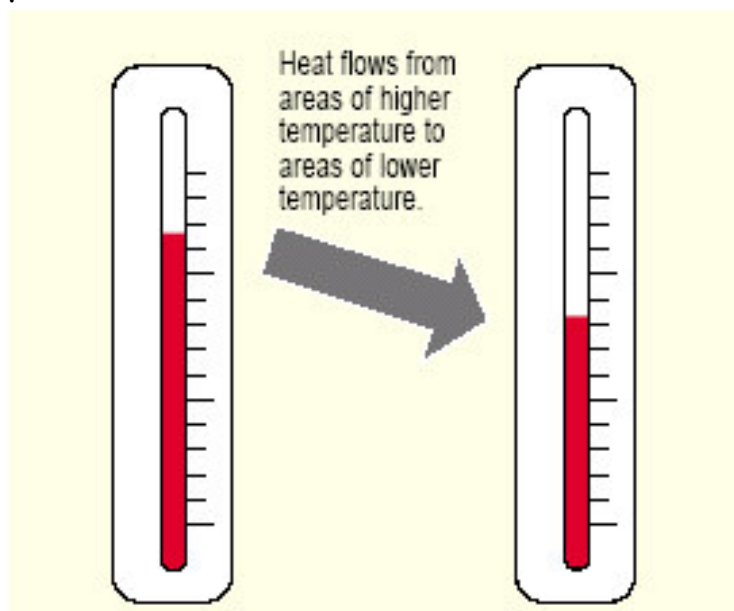
Heat pumps provide heat in the winter and cooling in the summer, at efficiencies that are far better than those for most alternative systems.

Heat pumps, air-to-air or ground source, are essentially air conditioners that can also run in reverse to provide heat in the winter and coolness in the summer.

The primary difference is that they rely on the outside air or the earth's temperature for heat transfer instead of creating heat from the burning of fossil fuels.

Heat pumps and air conditioners, make use of a refrigerant to help transfer (or pump) heat into and out of your home. The refrigerant helps the heat pump system take advantage of two primary principles of heat transfer:

1. Heat energy always flows from areas of higher temperature to areas of lower temperature.



2. The greater the difference in temperature between two adjacent areas, the higher the rate of heat transfer between them.

Refrigerators, air conditioners, and heat pumps all operate by pumping refrigerant through a closed loop in a way that creates two distinct temperature zones--- a cold zone and a hot zone.

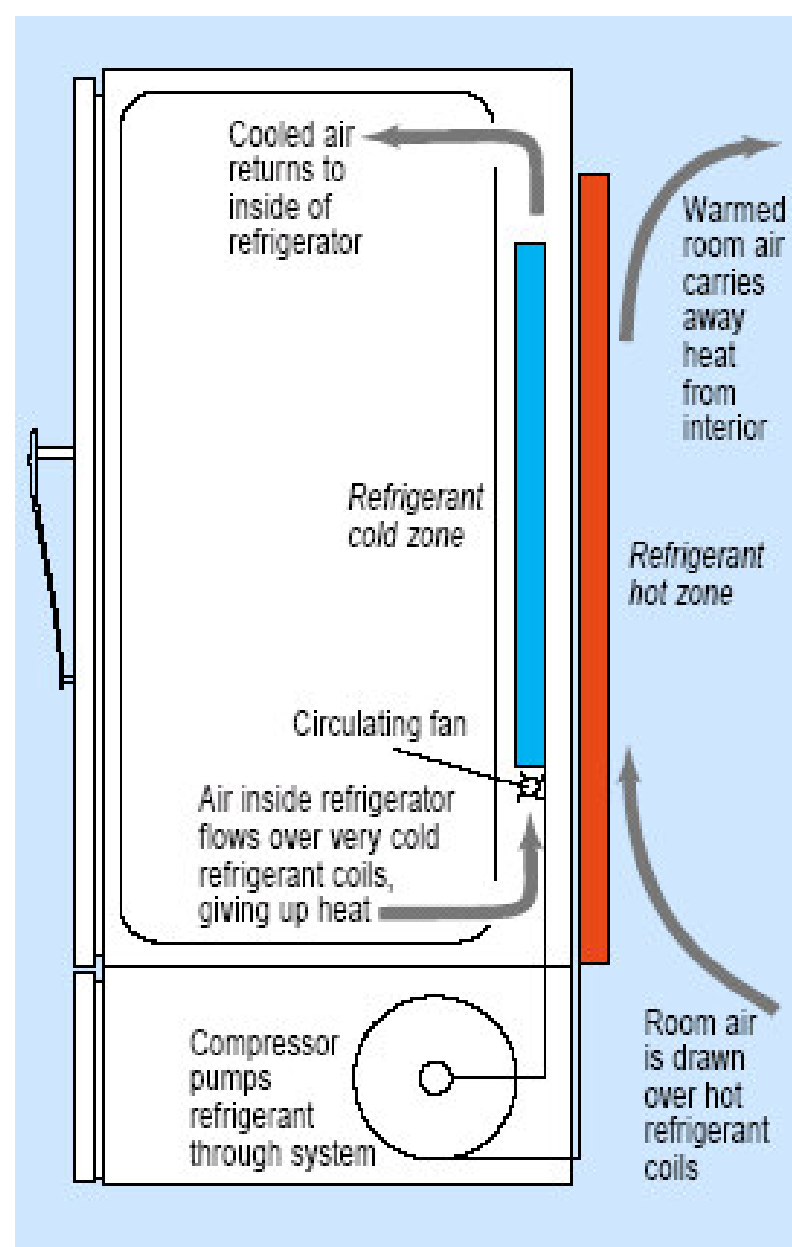
The simplest example of such a system is the universally familiar home refrigerator. In a refrigerator, a fan blows the air inside the box over tubes containing refrigerant that is very cold (typically below 0°F). Heat flows from the interior air to the cooler refrigerant.

The refrigerant is then pumped to the high-temperature section, which is exposed to room air outside the refrigerator box. Because the refrigerant is hot in this zone, it gives up heat to the relatively cooler air in the room, before flowing back to the cold zone to begin the loop again.

An air conditioner works in exactly the same way, except that it extracts heat from the air inside a room or building and transfers it to the air out-side the building.

A heat pump adds a reversing capability, so the hot zone and the cold zone can be switched. With the zones reversed, it can extract heat from the outside air or earth in the winter and transfer it inside.

Granted, being able to extract heat from frigid winter air or earth seems like it shouldn't work. But it will, if we can expose the cold air or earth to a refrigerant that's even colder than it is. And modern heat pumps can do that.



Typical home refrigerator