



ECOBROKER International

Green Topic Pages

Moisture Management for Energy Efficiency and Comfort

Technology Snapshot & Benefits:

You can increase comfort and save money by mindfully managing the moisture content of the air in your home. Humans are most comfortable at a relative humidity of 50%, plus or minus 10%. Relative humidity is the amount of moisture that air contains relative to the maximum amount that it *could* contain (at any given temperature and pressure). Two separate strategies are required: one for summer and one for winter.

In the winter, air inside the house is cycled repeatedly past heating elements in your heating system, where it gets drier and drier. As room air dries, you will increasingly experience dry and itchy skin, dry eyes and mouth, chapped hands, static electricity and a wide range of other discomforts. From an energy efficiency perspective, the dry air increases the rate of evaporation of body moisture from your skin and this evaporation makes you feel chilled. A normal reaction is to turn up the heat as you attempt to keep warm. The net result is that you will burn extra fuel to maintain a higher room temperature and the air will become progressively drier. In the winter, your strategy is to add moisture to the air.

In summer, the situation is generally reversed and your strategy is to reduce relative humidity of the room air. As humidity levels increase above about 50%, evaporation from your skin is reduced. Lower evaporation rates deprive your body of its normal cooling mechanism and you feel warm. A typical reaction is to turn down the thermostat of your air conditioning in an attempt to keep cool. The net result is that you will burn extra fuel and money to maintain a lower room temperature than necessary, compared to the amount of cooling that is needed if relative humidity is maintained at comfortable levels.

Studies have shown that when humidity is maintained at around 50% in a living space, air conditioner thermostats may be set as much as 5 to 7 degrees (F) warmer while providing the same level of comfort to occupants. Since most air conditioners are electric, and most electricity is produced in central-station power-plants, energy and pollution savings from reduced air conditioning are huge. This is because the electricity that arrives at your electric outlet is produced and delivered at an overall fuel efficiency of about 30%. Turning up the thermostat of your air conditioner has a dramatic and positive effect on your electric bill and on summer pollution levels. To do this and maintain (or improve) comfort, you must control relative humidity of the room air.

Estimated Cost Savings:

Economic savings achieved by moisture control are in direct proportion to how much less you run your furnace in the winter and air conditioner in the summer. Costs to achieve moisture control vary with the level of sophistication of the equipment. At the inexpensive end are simple operational changes that cost you nearly nothing. An example is the practice of venting a clothes dryer through a lint filter to the interior of a building rather than the exterior. This technique captures productively both the moisture in the clothing and the heat generated by the clothes dryer. In addition, a new generation of rechargeable desiccant technologies is emerging that provide low-cost means of reducing moisture in buildings during the summer months. Depending upon the level of sophistication of equipment and controls, you may expect savings to your utility bills in the range of 10-30%.

Issues:

Moisture control is not fully appreciated by the building industry. Often, equipment is purposefully oversized as a way of providing performance during periods of peak demand. By definition, peaks occur infrequently and the equipment is oversized for the balance of the time, requiring more energy than necessary to operate. A primary issue facing you in your quest to achieve moisture control in buildings is finding an installer or contractor that understands techniques that take into consideration the lifetime operating costs of equipment. An installer or builder

is usually sensitive to first cost considerations, but seldom appreciates the full cost of operation over the useful lifetime of the equipment. As a homeowner, you see not only the initial cost but the full operating cost as well.

Availability of the most energy-efficient equipment may be an issue. Sometimes the best equipment is in demand and this can mean that discounts are either unavailable or limited.

Regional Issues:

Buildings in northern climates are more likely to benefit from humidification in winter. Buildings in southern climates are more likely to benefit from de-humidification in summer. Some systems can achieve both goals, but traditionally both humidification and de-humidification functions have not been incorporated in the same piece of equipment. Other regional issues involve supply, delivery, and installation of equipment.

Installation (Getting It Done):

Be sure to price shop and to get two or three (or more) prices. Inquire about installation and removal of any older equipment that you may have in your building. For any air conditioning or refrigeration unit, be sure that the refrigerant will be removed and recycled responsibly. Refrigerants are very potent greenhouse gases and must be captured and contained. Shopping for price and availability will give you perspective on the true costs of equipment and installation in your area.