

Humidity & the indoor environment



Proper indoor humidity helps you feel more comfortable and helps protect your home.

Humidity is simply vaporized water in the air. The percentage of water vapor in the air at a specific temperature, compared to the amount of water vapor the air is capable of holding at that temperature is most often referred to as “relative humidity.” Relative humidity that is too high or too low can be problematic to your home, your health, and your comfort.

Facts about humidity

Warm air holds more water vapor than cold air holds. When air at a certain temperature contains all the water vapor it can hold at that temperature, its relative humidity is 100 percent. If it contains only half the water vapor it is capable of holding at that temperature, the relative humidity is 50 percent.

When air is saturated with water vapor, it is said to have reached the “dew point.” At the dew point, water vapor condenses and produces visible water or condensation. In winter it usually occurs first on windows. When warm, moist air comes in contact with a cold window, air temperature drops and it can no longer hold the water vapor, condensation results.

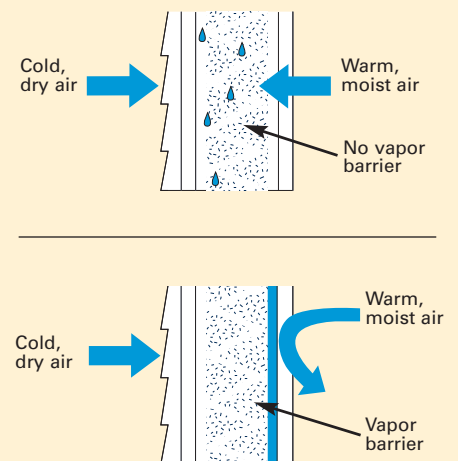
Desirable humidity levels

The human body is comfortable when relative humidity ranges between 20 and 60 percent. In your home, an average relative humidity of 30 to 50 percent is appropriate when the outside temperature is 20°F or above. During cold weather, higher humidity ranges may cause structural damage because of condensation on windows and on the inside of exterior walls. As outdoor temperatures fall, condensation problems may develop inside.

Season	Recommended relative humidity
Winter (Indoor temperature between 68 and 75 degrees)	20%+
Summer (Indoor temperature between 73 and 79 degrees)	No more than 60%

While there is no ideal humidity level and temperature suitable for all individuals, acceptable relative humidity levels should range from 20 to 60 percent year ‘round. For maximum comfort, relative humidity should be maintained between 30 and 50 percent.

A vapor barrier protects walls from condensation.



The construction of a home also influences how much humidity is desirable. Tightly constructed buildings with properly installed vapor barriers and tight-fitting doors and windows retain more heat and moisture. This is when mechanical ventilation becomes important. If a home does not have the proper mechanical ventilation, excess water

vapor can move through walls and ceilings causing wet insulation, peeling paint, and mold on walls and woodwork.

How to gauge indoor humidity

Try this test: Drop three ice cubes into a glass, add water and stir. Wait three minutes. If moisture does not form on the outside of the glass, the air is too dry; you may need a humidifier. (Do not perform this test in the kitchen. Cooking vapors may produce inaccurate results.)

Also, watch for frequent fogging of windows, which may indicate too much humidity. The appropriate relative humidity will allow only slight condensation along the edges or corners of windows. More condensation could be damaging.

Moisture buildup or mold on closet walls or room ceilings and walls also indicates high humidity.

Humidity should be monitored daily since outside temperatures will change. Consider purchasing a digital hygrometer (widely available) and check it regularly.

If humidity is too high

High humidity levels can produce constantly fogged or iced windows, musty odor and/or a clammy feel to the air. During cold weather, condensation in the lower corners and edges on prime (inside) windows is common. Excessive condensation on prime windows may indicate loose storm windows; seal storm windows by caulking and weatherstripping. Condensation on the inside surface of storm windows may indicate loose prime windows; seal prime windows by caulking and weatherstripping.

If you maintain high humidity, expect to have more window condensation and possibly structural damage.

Excessive humidity can be temporary. During summer, outdoor humidity is high; your house and its furnishings naturally absorb some water vapor. In fall, when temperatures drop and the air becomes drier, this water vapor is released into the living space and condensation on windows may occur. The situation normally subsides within a short time.

Principal sources of higher humidity

Adding only four to six pints of water to the air raises the relative humidity in a 1,000-square-foot home from 15 to 60 percent, assuming the temperature is constant.

- One person's breathing produces 1/4 cup of water an hour. (Your breath contains hundreds of droplets of invisible water vapor; you see them when you breathe on cold glass.)
- Cooking for a family of four produces approximately five pints of water in 24 hours.
- Showering puts 1/2 pint of water into the air and bathing puts 1/8 pint of water into the air.

Tips for lowering humidity in your home

- Turn humidifier down or off. In the summer, use a dehumidifier.
- Cook with pans covered.
- Use range and bathroom exhaust fans while cooking and bathing, or open a window for a few minutes to bring in cooler, drier air.

- Take shorter showers with cooler water.
- Install a fresh air intake duct. Outside air introduced into the home lowers the humidity level. Consult a qualified contractor.
- Reduce the number of plants in your home or water them less; they release water vapor into the environment.
- Always vent your clothes dryer to the outside.
- In tightly insulated homes, consider installing an air-to-air heat exchanger.

If humidity is too low

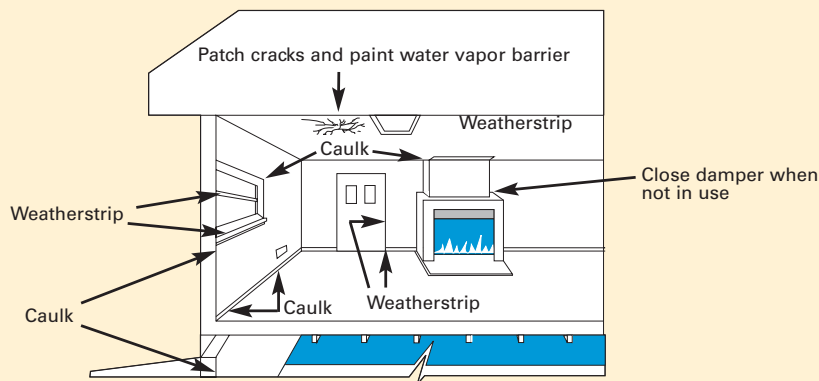
Low humidity causes static electricity, dry skin and hair, itching and chapping. Mucous membranes in the nose and throat dry out, increasing your discomfort and susceptibility to colds and respiratory illness. At low humidity levels, body moisture evaporates so quickly you feel chilled even at higher thermostat settings.

Adding a humidifier

Adding a humidifier will remedy these problems. There are three standard types:

- **Evaporating:** Moisture evaporates into the air from a pan or absorbent plates partially immersed in water and attached to the sides of a radiator or to a warm air heating system. This type offers limited humidification capacities.
- **Portable or room:** Air circulates through a wet pad or a very fine mist of water is discharged into the room. Water must be manually added regularly. Unit may be moved from room to room as desired, and should be cleaned daily according to manufacturer's directions.
- **Power:** Moisture is introduced directly into the air stream circulating through the furnace; water is fed automatically into the unit by a connection to the house water system. A humidistat (humidity control) should be located near the furnace thermostat or in the return side of the duct system. The unit may be built in or attached to a forced air heating system. This type offers the greatest humidification capacity.

Seal your home from inside to keep warm, moist air from escaping.



The importance of indoor air quality

Indoor air quality is a concern for environmental and energy researchers as well as consumers. Because we spend up to 90 percent of our time indoors in winter, consumers should be aware of how things like furniture and carpeting can affect their indoor environment.

More and more homeowners are trying to use energy efficiently and reduce fuel bills. Many have added insulation, vapor barriers, caulk and weatherstripping to their homes to effectively retain heated or cooled air and reduce air infiltration from outside. Because air remains inside longer, so do pollutants in the air.

Air changes

Air infiltration rates for homes vary with the amount of weatherization, construction materials, workmanship, temperature, wind and activities of the occupants. Infiltration rates are measured in air changes per hour (ACH), or the number of times an hour indoor air is replaced by outside air. ACH rates differ from house to house and from day to day. Generally, older homes have an average of 1 to 2 ACH. Tight, new homes or sealed older homes may have an ACH of only .5. If the ACH rate is too low, indoor air quality may suffer.

Be aware of these signs of poor indoor air quality:

- Frequent head or chest colds
- Stuffiness
- Mold, mildew, musty smell or lingering odors
- Heavy condensation or frost on windows

Sources of pollution and general control measures

Consumer products

Cleaning solutions, aerosol sprays, glues, paints and polishes contain a variety of pollutants such as formaldehyde and chlorine. Follow manufacturer's directions. If directions say to use in a well-ventilated area, try to use it outdoors, or else open doors and windows to allow pollutants to escape before, during and after use.



Building materials

Glues containing urea-formaldehyde are found in many building materials used in home and furniture construction. These materials slowly release formaldehyde, which can cause eye or nose irritation and headaches. In new construction, use low-formaldehyde materials and cover with latex-based paint to prevent formaldehyde release.

- Insulation made from urea-formaldehyde releases formaldehyde through leaks and cracks in walls and ceilings. Caulking leaks and cracks on the interior surface will prevent release into the living area.
- In the past, asbestos was used to insulate attics, walls and around furnace pipes. Due to evidence that asbestos can cause illness, it is no longer allowed for use in new construction. If your home has asbestos-type insulation, it is best left undisturbed. However, soft, easily-crumbled asbestos-containing materials have a greater potential for asbestos release and should be professionally sealed. Consult a professional.

Garage

Exhaust from a gasoline-fueled car contains pollutants such as carbon monoxide, lead and nitrogen dioxide. Never run or warm up a car in an attached or enclosed garage, even if the garage door is open; pollutants can enter your home, causing nausea and even death if allowed to build up.

Bathrooms

Bathrooms are a source of moisture. When moisture is not allowed to escape, water damage, mold and mildew may develop. Install a bathroom exhaust fan for ventilation, or slightly open a nearby window when bathing or showering.

Fuel-burning appliances

When burned, fuels such as wood, coal, fuel oil, charcoal and kerosene produce water vapor, carbon dioxide, heat, smoke and other pollutants. When natural gas is completely burned, it produces water vapor, carbon dioxide and heat (the same products we humans exhale.) All fuels need an adequate supply of combustion air to burn completely.

Homes normally exhaust air through flues, fans and cracks. When air leaves your home, it must be replaced by outside air, which is generally provided through cracks and leaks. If sufficient outside air is unavailable, air may be pulled down chimneys, preventing proper venting of appliance flue products (water vapor and carbon dioxide). The flue products will then mix with indoor air and reduce the amount of available oxygen. This causes the fuel to burn incompletely and could result in carbon monoxide buildup.

It is important that enough fresh air be available for complete combustion, especially when indoor air changes are reduced due to weatherization. An outdoor air intake can be installed in the heating system for efficient and proper operation.

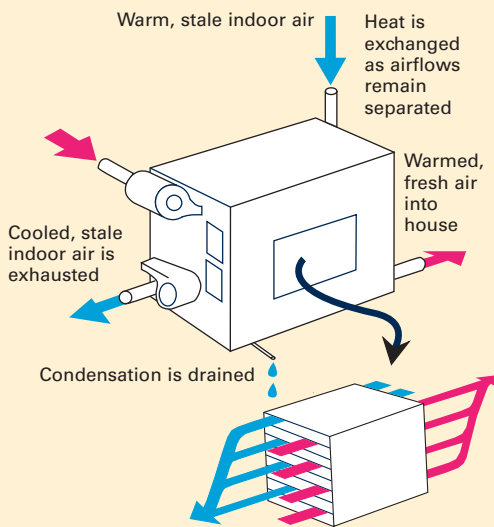
All furnaces, wood-burning stoves, space heaters, water heaters and gas logs must be vented to the outside. Follow manufacturer's directions and check local codes before installing. Inspect vent/chimney periodically to make sure it is tight, clean and in good repair.

A range hood can be installed to exhaust steam and cooking vapors.

Smoking

Tobacco smoke contains many pollutants. If there is a smoker in your home, ensuring adequate ventilation provides an even greater health benefit.

**Air-to-air heat exchangers
recover
50 to 80 percent of the warm air**



How to improve indoor air quality

Windows

When heating and cooling requirements are low, open windows to provide ventilation and reduce moisture and odors from cooking and bathing.

Spot ventilation

Local or spot ventilation helps reduce the amount of pollutants emitted in a specific room or area and prevents their movement to the rest of your house. For example, a range hood directs steam and cooking vapors to the outside.

Air-to-air heat exchanger

An air-to-air heat exchanger mechanically ventilates and dehumidifies homes in colder climates. During winter it transfers heat from the air being exhausted, to the fresh, outside air entering the home. About 50 to 80 percent of the heat normally lost in exhausted air is returned to the house. Air-to-air heat exchangers can be installed as part of a central heating and cooling system or in walls or windows. Wall- and window-mounted units resemble air conditioners and will ventilate one room or area.

Conventional or mechanical furnace filters

Filters are coated with a viscous substance to collect dust, lint and fibers. These range from low to high efficiency in ability and capacity for filtering pollutants from the air. Clean or replace at least every one to two months.

High density media filters

Some of these products can replace existing filters. Others, initially, require professional installation. These filters are very effective but may affect air flow. Consult a heating or air conditioning professional before using.

Electronic furnace filters (air cleaners)

Air is cleaned as it moves through a series of mechanical filters and electronically charged plates, chambers or filters which hold dust like a magnet. These can be more efficient in removing pollutants from the air than conventional filters. Follow manufacturer's directions for cleaning.

More fact sheets

For more information, ask for these related CenterPoint Energy fact sheets:

- Combustion Air
- Using Natural Gas Safely
- Indoor Air Quality

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