



reduce condensation in your home

h.e.l.p. sheet

overview

Periodic condensation on windows is normal, particularly in cold weather. However, hidden condensation can become a significant problem if not corrected. This h.e.l.p. sheet explains how you can recognize the sources of excessive condensation and take action to remedy the problem.

What is condensation?

Air in the home is actually a mixture of air and invisible water vapour. The average family produces about 10 litres of moisture a day from activities like cooking, bathing, washing dishes and doing laundry. Condensation is the conversion of the water vapour into a liquid, and usually happens when the vapour cools. The temperature at which the vapour begins to condense is called the dew point. Condensation occurs whenever warm, moist air comes in contact with a surface or object cold enough to chill the moisture in the air below its dew point.

As a rule, the coolest visible surfaces in a home will be the cold water pipes, windows, and hinges and locks on exterior doors. It is on these surfaces that condensation first becomes apparent. However, condensation may also occur in areas where it is not visible, such as in the attic and exterior walls. Condensation on windows may be little more than a nuisance, but condensation on walls and ceilings can cause paint to peel. Hidden condensation can lead to problems that range from mould, mildew and stains on walls and ceilings, to dry rot and the destruction of a wood frame structure.

Condensation on windows

Windows are one of the coldest surfaces in a house. Condensation forms on a window when the temperature of the glass is below the dew point of the air and the warm air that contacts it cools rapidly. Like glass, metal is also a poor insulator. If the window has a metal frame, condensation also occurs on the frame.

Condensation on windows can be reduced and often eliminated by adding storm windows or installing multiple-glazed windows. If you are shopping for new windows, look for Power Smart-endorsed windows and sliding glass doors to replace your old ones. Power Smart windows not only reduce condensation, they improve your home's comfort.

Hidden condensation

Hidden condensation can occur when warm, moist air migrates into the walls, attic or other interior areas of the structure. Most of the moisture is carried into walls and attics by air leaking through openings for plumbing, piping, electrical boxes and wires, gaps between framing and drywall, attic hatches and other openings.

If, at some area in the wall or attic, the moist air encounters a temperature below the dew point, condensation will occur. Moisture inside the walls may also cause blistering of paint on exterior siding.

To minimize problems in attic and wall cavities, it is important to seal these cavities from the interior of the home to minimize the movement of moisture into the cavity. It is also important that the cavities are vented to the outside through attic vents and 'breathable' exterior sidings. This will allow small amounts of moisture that do get into the cavity to escape.

New housing is required to have a continuous vapour barrier, sealed at all penetrations. This requirement is intended to prevent, or at least severely inhibit, hidden condensation.

If the temperature is low enough, moisture may deposit as ice or frost. If the amount of moisture is small, it may change back into water vapour with a rise in temperature and be carried away by natural air movement. However, large deposits of ice will melt and soak insulation materials, ruin interior and exterior finishes and possibly lead to structural deterioration.

Causes and solutions

The combination of indoor moisture sources, air exchange rates and cold surfaces will determine how much condensation occurs in the home.

Activities such as cooking, washing or bathing will often result in some condensation on windows for short periods of time during cold weather. Other than causing deterioration of the finish on wood frames, sills or casings, such condensation is harmless. Therefore, moderate, intermittent condensation on windows is probably no cause for alarm. However, if windows are consistently wet, or water stains appear on ceilings or walls, prompt action should be taken to avoid further problems.

The quickest and most effective response to a condensation problem is to increase the ventilation of the house. This can be done in several ways:

- using exhaust fans, particularly when cooking, bathing or washing
- opening the fireplace damper
- opening doors and windows to increase the amount of outdoor air being brought into the house

Outdoor air, when heated to indoor temperatures, will be dryer than the air indoors. Increased ventilation will reduce condensation, but it doesn't correct the cause.

The cause should be located and corrected. The following page lists possible causes of high humidity in the home and suggests ways to control this moisture.



Controlling humidity in your home

Action required	Comments
Personal actions	<ul style="list-style-type: none">• use a vented range hood fan when cooking• cover cooking pots to reduce steam and conserve energy• use clothes dryer rather than hanging wet towels and clothes indoors• operate bathroom exhaust fans during a bath or shower• take shorter showers
Turn humidifiers down or off	<ul style="list-style-type: none">• this may require shutting off water supply to furnace humidifier• use individual room humidifiers sparingly• dehumidifiers are capable of lowering the relative humidity to 50 or 60%
Check that the clothes dryer is vented to the exterior	<ul style="list-style-type: none">• your electric dryer may have been vented indoors as a heat-saving measure. Gas dryers must be vented to exterior.
Operate furnace fan continuously	<ul style="list-style-type: none">• set switch for summer operation – fan runs constantly• use two-speed fan – runs continually at low speed, switch to high speed for heating cycle• improve circulation to reduce localized condensation
Increase air circulation in out-of-the-way areas	<ul style="list-style-type: none">• pull furniture and stored material away from exterior walls and up off basement floors• open drapes and curtains• leave closet doors ajar• leave bedroom doors open as much as possible• don't block or deflect warm air registers• don't close off unused rooms
Isolate moisture-producing areas	<ul style="list-style-type: none">• close windows and doors to greenhouses, indoor pools and hot tubs• do not draw air from humid areas into the heating system• add separate exhaust venting system
Cover exposed earth in basements or crawlspaces	<ul style="list-style-type: none">• use ground cover, like heavy polyethylene or roll roofing, overlapped by 10 cm (4 inches) and weighted down or protected by a sand layer• ventilate space in summer
Increase outside air supply to heating system	<ul style="list-style-type: none">• a fresh air duct with variable damper allows a controlled amount of dry outside air into the home
Add mechanical venting	<ul style="list-style-type: none">• install fans in moisture-producing areas like bathrooms, laundry areas and the kitchen. Run fans for a few minutes after the activity to ensure moisture is removed. Use only as needed since heated air is being exhausted.• control exhaust fans with the dehumidistat, which only operates when the humidity goes above a preset level
Install heat recovery ventilator (HRV)	<ul style="list-style-type: none">• provides a balanced ventilation system – that is, a supply fan replaces the air removed by the exhaust fan• can recapture up to 80% of the heat from outgoing air• this is an expensive item; carefully weigh costs and benefits

Typical causes and sources of high humidity in your home

Cause or source of moisture	Comments
Faulty or plugged chimney serving any fuel-fired appliance, such as a furnace or hot water heater	Water vapour forms a large portion of the product of combustion, so unusually high moisture levels can signal a plugged or leaking chimney vent, which is a safety hazard, and must be corrected immediately. Have a heating contractor test your system.
New home or large addition	New building materials, such as lumber, concrete, drywall joint fillers and paint, contain large amounts of moisture. This moisture can be released into the house over a period of one to two years.
Inadequate home ventilation	Moisture must be able to escape from the home either from air leakage, open windows or an exhaust fan. If there is not adequate removal of moisture, it will build up to become a problem.
Extensive air sealing done to lower fuel consumption and cost	Stopping air leakage (fresh, dry air) means that moisture that used to leak out must now be ventilated to prevent high humidity in the home.
Installing of a high-efficiency (chimneyless) furnace	Eliminating or blocking off the chimney will eliminate one major source of air leakage, but can create problems with moisture buildup. This must be solved with additional ventilation.
Flooded basement or crawl space	Major water sources, such as broken water pipes, spring runoff or a high water table can result in large amounts of moisture entering the home. Proper ground slope and weeping tile and gutters directed away from basement walls can help prevent flooding.
Minor leaks and water sources	Leaking roofs, water pipe leaks, badly dripping taps, steam cleaning of carpets, mopping floors or storage of a large quantity of green wood can introduce moisture into the home. Try to identify and control the source.
Firewood stored indoors	Dry and store firewood outdoors. Drying wood produces a significant amount of moisture.

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This h.e.i.p. sheet provides advice for BC Hydro customers.

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