

OUTSIDE AIR TEMP	INSIDE RELATIVE HUMIDITY
-20° F or below	Not over 15%
-20° to -10° F	Not over 20%
-10° to 0° F	Not over 25%
0° to 10° F	Not over 30%
10° to 20° F	Not over 35%
20° to 40° F	Not over 40%

CONDENSATION ON WINDOWS

On windows, condensation often forms at the meeting rail and at the interior bottom of the lower sash. This is because when warm air cools, it falls down across the interior surface of the window at the same time the temperature of the air is falling. When the air hits the meeting rail and sash handles, these horizontal surfaces act like a dam where the trapped water vapor forms.

Low-E glass reduces heat conducted through the glass from the warm interior of the home to the outside glass surface. Heat conduction can also be reduced with Low-E glass. This reflected heat energy reduces the outside glass temperature and can result in condensation on the glass. Exterior condensation is actually an indication that the insulating glass in the window is performing as it should. The warm-edge technology of high-performance replacement windows and doors can help typical condensation buildup on glass.

REDUCING HUMIDITY

Many factors can lead to excess humidity, like house size, ventilation, heating system, type of insulation and vapor barrier, soil type, and quality of drainage. Here are some suggestions before seeking help.

- Use exhaust fans in your kitchen, laundry area, and bathrooms
- Vent all gas burners, clothes dryers, etc. to the outdoors
- Shut off furnace humidifiers and humidifying devices if needed
- Be sure that louvers in your attic or basement crawl spaces are open, well-ventilated, and amply sized
- Use a dehumidifier and clean it regularly
- Open doors between rooms, use fans, and make sure vents aren't covered to increase air circulation
- Open fireplace dampers to allow moisture-laden air to escape
- Air out your house for a few minutes every day
- Fix leaks and ensure landscaping slopes away from the house

UNDERSTANDING WINDOW CONDENSATION

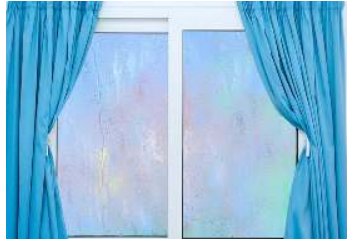


Occasional, mild condensation is normal. When does it become a problem, and what can you do?



WHAT IS CONDENSATION?

Humidity (invisible water vapor) is present in almost all air. When moist warm air comes in contact with a cooler surface, the vapor can condense into visible droplets of liquid. This usually occurs on glass surfaces because they normally have lower temperatures than other interior surfaces in your home. This is seen on bathroom mirrors after a hot shower, a glass of iced tea on a hot day, or a home's windows.



EXTERIOR VS. INTERIOR CONDENSATION

Exterior condensation that forms on the outside of windows occurs when moist air comes into contact with the cool surface.

This appears when the dew point in the air is higher than the temperature of the glass — often in the spring and fall when a cool night follows a warmer day.



Interior condensation forms on the inside of a window whenever there is excess humidity inside a home. It manifests in the form of condensation on the coldest areas of the wall — normally the windows. The warmer the air, the more moisture it will

retain, so when air comes in contact with the colder glass surface, it is cooled, and moisture is released in the form of condensation.

WHAT IS PROBLEM CONDENSATION?

This is **EXCESSIVE** condensation that can cause enough frost or fog to block a whole window, causing water to run off the windows and stain woodwork or damage walls. This vapor can freeze the insulation in your home, which can melt and damage your house. The humidity can also force its way out of a home through the siding, forming blisters under the exterior paint. Even worse, this moisture can collect in walls and ceilings — leading to rotting wood, insulation deterioration, mold and mildew, and even structural damage.

Windows do not cause condensation; they reflect the presence of moisture to warn you that you have excess moisture. The window prevents the moisture from escaping to the outside.

The cause of this excessive condensation is due to an excess of humidity in the house. When moisture in wet air forces its way toward drier air and mixes together, it is called "vapor pressure." This can be very powerful and force moisture through wood, plaster, brick, and even cement.



Some building materials stop water vapor, such as glass, some varnishes, paints, tiles, and plastic wall coverings. Plus, many houses are built with air-tight windows and vapor-seal insulation to stop the escape of water vapor and protect the insulation. All of this makes

for a "tight" home where moisture does not flow easily to the outside as in older homes. Unfortunately, this also makes it easy to build up excessive and even harmful moisture levels in such homes. And houses with no basements have more moisture issues.

TEMPORARY CONDENSATION

There are two types of temporary condensation. One is from the moisture in wood or other building materials that come from new construction or remodeling. When the new heating season starts, this moisture will gradually flow out into the air in the home. It will then disappear and not cause any more trouble. This is similar to what happens in a milder form at the beginning of every heating season. During the summer, your house absorbs some moisture. After the first few weeks of heating, your home will dry out, and you'll have less trouble with condensation.

SAFE HUMIDITY

Controlling the amount of water vapor in your home is the most effective action to prevent condensation problems. First, monitor your home's humidity with a hygrometer, psychrometer, or humidistat.

The table on the back page shows the recommended safe relative humidity levels to maintain a 70° F indoor temperature. Higher indoor temps need lower humidity levels, and a warmer outside temperature permits a higher indoor relative humidity.