

Ask Jon Eakes

# What is the proper level of humidity for a house in the winter?

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Victor from Stoney Creek, Ontario writes: "My house is a 3 level back split and is 3 years old. The furnace is natural gas. I am having problems with condensation and mould on my thermal windows! The window manufacturer said that there is too much humidity and that thermal windows always get condensation. I have installed a dehumidifier and have brought the humidity level down to 55%, but the situation continues. Can you help?"

Victor, I am sorry to inform you that you are one of many victims of a very short sighted change in the Ontario Building Code where Ontario has decided to not follow the recommendations of the National Building Code which requires mechanical ventilation in all new homes. According to the Ontario officials, you can open a window to get rid of your excess humidity. Not a very practical practice in a Canadian winter. Update note: In the 2010 building code this has changed in Ontario.

## Understand Relative Humidity (%RH)

First you may want to look at a primer on [What is Relative Humidity?](#)

If you look at this chart produced by National Resources Canada, a simple double pane thermal pane window will form condensation on it when indoor humidity exceeds the listed minimum's for each outdoor temperature, condensation being a result of high humidities and low temperatures. If you can't raise the temperature, then you have to reduce the humidity. Even at zero, you need to drop your humidity to 40% to prevent that condensation. Dehumidifiers cannot drop that humidity below about 50 - 55%, as you found out, and you have to pay the electricity bill to operate these machines as well. If you are wondering if your Hygrometer is giving you an accurate reading, follow this link to [Calibrating your Hygrometer](#).

## Relative Humidity and Health

This chart shows the relationship between relative humidity and various health problems -- especially as it relates to air borne pathogens. The sweet spot for human health is 50% RH and the target for household humidity levels is between 40 & 50%. But we can't always do that without creating condensation, and potential mold, on cold surfaces like windows. The more energy efficient the house, the warmer are the indoor surfaces when it is cold outdoors and hence the higher we can raise the general relative humidity without causing too high relative humidity next to cold surfaces. Follow this link for details on ventilation strategies for Covid and other health threats.

## Winter ventilation reduces RH

Ventilation is our only effective dehumidifier in the winter when we need to have significantly less humidity in our houses. With old drafty houses, the cold air drafts did the job. With modern well sealed, draft free and energy efficient houses, we have no choice but to install mechanical ventilation. If you go a step beyond the National Building Code requirements you can get ventilation systems that include heat recuperation devices to make that dehumidifying, healthy fresh air less expensive. For many more details on these devices check out the keyword listing for "HRV".

Victor, you can always add a full house ventilation system, it is just sad that it didn't come with the house because they are far less expensive to install during construction than as a retrofit. In addition, because it is not part of the Ontario Building Code, the New Home Warranty program will not deal with your legitimate complaint that your house is not healthy. Have you gotten the message that I don't feel that the Ontario Code has a good track record on this one? I am not just making this stuff up. I receive letters like yours every week during the winter complaining about health problems in new

Ontario homes but very few like this from outside of Ontario.

#### Turn off the furnace humidifier

In the old days we always had humidifiers added to forced air furnaces, to add humidity to a dry house. Actually the primary reason for a house being too dry is there are too many cold air leaks running through the house drying it out. A dry house is almost always a drafty house. As we improve the energy efficiency of houses with good weather-stripping and caulking and other air sealing measures and in many cases eliminate chimneys by the change over to high efficiency furnaces, the humidity level in the house will rise and you may find that you no longer need a humidifier or that a humidifier could even be part of a condensation problem. In fact as Victor had found, he wanted to de-humidify the air in his house.

#### Air conditioning and furnace humidifiers - close the damper

One special note is that if you have air conditioning on your forced air heating system, you must absolutely close off the humidifier duct during the summer months or it will provide an air path that will re-circulate cold air back into the air conditioner in a circular fashion that will eventually freeze up the unit. Usually you will find a little round damper that pivots down to close one end of the humidifier duct.

#### **Keywords:**

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