CANADA

BUILDING NOTE

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ANALYZED

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CONDENSATION ON THE INNER PANE OF DOUBLE WINDOWS

Many house owners are puzzled by the appearance of moisture as a film of water or as frost on their window panes in winter. This moisture comes from the warm air in the home and is deposited on the cold window surface by a process called condensation. This is the same action that causes moisture to collect on the surface of a glass containing ice water.

The air in every home contains moisture which originates from the drying of clothes, cooking or from humidifiers in the furnace. Some moisture is also added to the air by evaporation from the skin and lungs of people occupying the house. The modern Canadian home is more tightly constructed than older homes and this tends to seal in much of this moisture and thus raise the relative humidity within the home.

When warm air in the home comes in contact with a cool window surface some of the moisture in it will be deposited on the glass surface as water or frost if the temperature of the glass surface is at or below the "dew point" temperature. When the relative humidity is low, the "dew point" temperature will be low and condensation will then only occur on a very cold surface; when the relative humidity is high, the dew point temperature is close to air temperature and condensation will occur on surfaces which are slightly cooler than the air surrounding them. Window surfaces are cool in winter simply because there is a relatively high heat loss through windows. Double windows provide much better insulation than single ones, but even a triple-glazed window provides less insulation than an uninsulated frame wall.

Condensation on double windows is to be expected, therefore, during cold weather. The conditions under which this will occur can be forecast. For example, condensation will occur on a properly installed double window when the inside temperature is 70°F., the relative humidity is 38% and the outside temperature is -10°F. When condensation occurs on the inner pane of a double window it is a signal that the humidity should be lowered. This can be accomplished by turning off the humidifier or by ventilation of the house to replace the moist air in the home with dry air from outside. The relative humidity can be adjusted, as the average outside temperature changes, to provide higher relative humidity during mild weather and lower humidity during periods of cold weather.

So far this note has only considered condensation which appears on the inner pane of double windows. The more common location for condensation is on the outer or storm pane of double windows. This is caused by leakage of warm air around the inner window into the space between the two glass surfaces. Since the temperature of the outer pane is lower than that of the inner pane condensation can occur on the outer pane at quite low relative humidities. Condensation on outer panes is often observed when the inner window is raised for ventilation, on upstair windows of two storey houses and on the leeward side of houses during cold windy weather. This problem is overcome in sealed window units which prevent the entry of moisture and dust between the panes. (C.R.C.)

Dear Sirs:

It is the question of condensation on the inside of theoretically "sealed" units which is the big problem today and it is on this matter that information is required. This condensation occurs not only on the more cheaply constructed units but also on those of reputable companies. This condensation is almost impossible to remove and is a great inconvenience.

Yours truly,
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