ABOUT YOUR HOUSE

North Series 8

HOW TO PREVENT PLUMBING AND HEATING VENT STACK FREEZE-UP

Many Canadians, particularly those in the North, have experienced the effects of frozen plumbing or heating system vent stacks. By taking a few preventative measures, risky trips onto a frozen roof in the middle of winter to thaw out frozen vent stacks can be greatly reduced.

The concern with frozen vent stacks is that moisture carried by exhaust air in the plumbing system or heating system may condense inside cold vent stacks before it has been safely vented from the house. Exhaust air from the plumbing or heating system may then enter the house. There are two main strategies used to prevent this: make the portion of the vent stack that is exposed to cold winter air as short as possible; and keep it as warm as possible.

Potential causes of vent stack blockages

Mechanical ventilation systems, even when fairly well designed, require some effort to keep functioning properly in areas where snow accumulation can be large and in areas where winter temperatures are extremely low for extended periods of time. Winter blockages are generally attributed to one of two causes: snow and exhausted moisture. Snow allowed to build up on the roof-top surrounding the vent stacks may bury the pipe if not cleared away. Exhaust gases that pass through ventilation stacks, chimneys and flues that exhaust combustion gases from fuel-heating devices contain vaporized water. These gases can get so cold while passing through vent stacks that the water vapour condenses, collects on the interior walls of the stack and freezes.

How to prevent freeze-up

The portion of the stack that is located within the warm envelope of the house will not freeze, so efforts to reduce frost build-up should focus on the part of the vent stack that is not protected by the warm interior. There are a number of methods that, when combined, minimize the chance of vent stack freeze-up:

- A PVC "Y" clean-out valve should be installed by a plumber on the plumbing wall in the bathroom area so that the vent can be manually unplugged. This is done by opening the access panel, unscrewing the threaded cap and cleaning out the vent at the roofline with a flexible wire rod or by blowing warm air into the vent.
- The vent stack should terminate as close to the roof as possible, reducing exposed vent stack area. However, a very short vent stack is at risk of being buried in snow. The vent stack should extend 20 cm above the roof, wrapped in rigid foam insulation and a metal collar to reduce the potential for frost.
- In buildings using non-ventilated roof systems, standard PVC pipe used for the inside surface of vent stacks with an outer skin of

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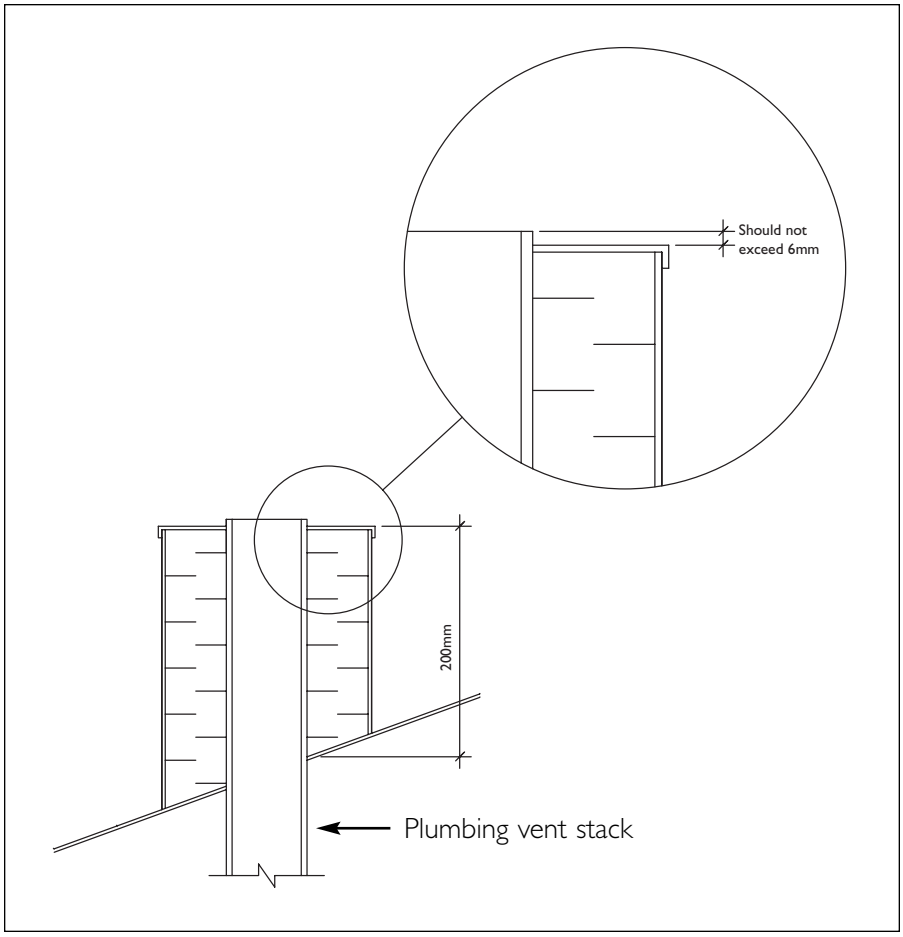

galvanized steel helps to reduce frost build-up inside the pipe.

- In vented attic spaces, a standard stack runs through the attic, sometimes wrapped in foil-back insulation to reduce frost build-up.
- Heat and plumbing exhausts can be "twinned" so that the heating vent warms the plumbing vent. The heat transferred by this method is usually just enough to prevent icing.
- Vent stacks can be wrapped with thermostatically controlled heat tape if the pipe is accessible. There are a variety of types of heat tapes that are available for different purposes. Those that are on at all times are good for regularly monitored, metal pipes. Temperature regulated heat tapes have a built-in thermostat, enabling the heat tape to turn off or on when a pre-set temperature is reached. These work well in places that are difficult to reach or check regularly, and are the most economical. Self-regulating heat tapes increase the flow of electricity to the tape as the pipe gets colder and decrease the flow as the pipe is warmed. This kind of heat tape is never actually off, so continues to use electricity as long as it is plugged in. Consult a service representative to determine the proper kind of heat tape for your purposes. Regardless of the type of heat tape you choose, it is critical that the heat tape be properly installed to prevent fire. Some heat tapes must not overlap or touch themselves, unless specifically permitted in the manufacturer's instructions. If the electrical insulation is damaged or deteriorated in any way, the heat tape should be replaced[1].

Chimney stacks

Chimney stacks function in a very similar way to ventilation stacks, and are also susceptible to frost blockages. The first step in avoiding freeze-up in this kind of vent termination is to determine why there is an excess of ice build-up at the level of the appliance, and then make the appropriate adjustments. Incomplete combustion is one common factor to consider. Keep the vent stack temperature high for more efficient combustion.

Low vent stack temperatures result in condensation, which freezes and builds up over the winter, eventually leading to blockage. Higher efficiency furnaces and household mechanical systems may, in fact, be more prone to stack freeze-up since less heat is exhausted.

Some heating units have air-intake and combustion-exhaust pipes that end near one another outside the house. The warm, moisture-laden exhaust air passing near the cold air-intake pipe can condense on it and freeze during extreme cold. Outdoor exhaust vents should be located at least 1 m from the fresh-air intake where it will not be susceptible to snow accumulation or discharge directly into the prevailing wind. A review of snow drifting patterns should be done when locating the intake as poorly positioned air-intake vents may be blocked by snow drifts, impeding the operation of the system for many months of the year.

In addition, chimney condensation problems can often by prevented by installing insulated stovepipes for chimneys on any type of furnace or

heater. Wood-stove owners should burn only well-dried wood to reduce the amount of water vapour carried out in the smoke[2]. Chimney lengths should be kept within the heated building envelope as much as possible, installed within the house rather than on an outside wall to minimize exposure to cold and maintain sufficient draft at the appliance. The exposed exterior length should be kept to a minimum. If your chimney stack freezes up frequently, consider temporarily removing the chimney cap.

How to thaw frozen ventilation stacks

If your heating or ventilation system begins to malfunction during severe cold, check the pipes and remove any blockages. An electric hair dryer can be particularly useful for this; flame torches should not be used to thaw vent stacks. On some installations, hot water can be poured over the outside portion of the intake pipe to melt the frost block.

Notes:

[1] More information regarding the proper installation and use of heat tapes is available in the publication "Consumer Product SAFETY ALERT: Electric Heat Tapes May Cause Fires," put out by the U.S. Consumer Product Safety Commission, Washington, D.C.

[2] Additional information on woodstove safety in available from Natural Resources Canada, in the publication "A Guide to Residential Wood Heating." This article is posted at: http://www.canren.gc.ca

Other useful information about ventilation from Canada Mortgage and Housing Corporation

Moisture and Air: Problems and Remedies	(Free) 61033
Clean-Up Procedures for Mold in Homes	($3.95 plus GST) 61091
Measuring Humidity in Your Home – AYH CE01	(Free) 62027

Sources

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