

ASK THE INSPECTOR

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I have noticed that there are damaged bricks on my chimney above the roof line. What has caused this and what needs to be done to correct it?



A chimney is designed to exhaust products of combustion from a fuel-burning appliance to the exterior of the building. A masonry chimney is typically built on its own footing and foundation with brick or concrete block on the exterior. Flaking sometimes occurs on a masonry chimney due to the moisture in the exhaust gases that is a product of combustion. The moisture gets absorbed into the brick and freezes in the winter when the warm exhaust gases stop flowing out the chimney. When water freezes it expands and over time and this freeze-thaw cycle leads to deterioration of the brick, clay tile, and mortar. The damage is usually

located at the top portion of the chimney for many reasons. The top portion of the chimney is the most exposed area and therefore the most vulnerable to weather. Moisture may also enter the top portion of the chimney from the exterior if the cap is cracked or missing. As well, once the exhaust gases reach the top of the chimney, they may have cooled sufficiently for the moisture to condense, making the concentration of moisture higher at the top.

Once flaking has occurred, the brick requires replacement to prevent further deterioration. This requires the services of a qualified mason. Several quotes should be obtained, including a detailed description of proposed repairs. Depending on the level of deterioration, the repairs may be costly, since the chimney may have to be completely rebuilt from the roof line up. To prevent further deterioration once the chimney is repaired, the cap should be maintained in a properly sealed condition and a metal liner should be installed through the entire chimney flue to protect the chimney from exhaust gas moisture.

Chimneys and their venting

Different combustion appliances require venting through different types of chimneys. The following provides a descrip-

tion and characteristics of different types of chimneys and the types of combustion appliances they can vent, as well as some typical problems that are routinely found during home inspections.

Masonry Chimneys

- Masonry chimneys can be used to vent almost any type of appliance, including natural gas, propane, and oil burning appliances, as well as wood burning fireplaces, fireplace inserts, and stoves.
- In most cases, a prefabricated metal liner is required to protect the clay flue liner and surrounding brick or concrete block from the moisture in the exhaust gases. As well, the chimney flue may require resizing to a smaller size for venting newer, more efficient appliances or if one of the appliances no longer uses the flue for venting (e.g. If an older furnace is replaced with a side vented high efficiency furnace and the water heater is the only appliance venting through the chimney, a metal liner will likely be required to decrease the size of the flue for venting the smaller appliance). If the flue is too large, the exhaust gases will not rise quickly enough, leading to the formation of condensation or soot/creosote deposits in the case of wood and oil burning appliances, and



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potential damage to the chimney. The original clay tile flues are usually too large which is acceptable in terms of size when older, inefficient appliances are vented, however a liner is typically required when newer, more efficient appliances are installed to protect the chimney from the exhaust gases.

- Wood burning fireplaces generally do not require a metal liner; however wood burning stoves and fireplace inserts do require that a stainless steel liner be installed because of the potential for chimney fires. A clay tile liner is not capable of withstanding the heat of a chimney fire like a stainless steel liner is, so most wood stove and fireplace insert manufacturers make the chimney liner a requirement of proper installation.

Pre-Fabricated Metal Chimneys

- Type 'B' vents/chimneys are used to vent natural gas or propane burning appliances.
- A type 'L' vent can be used to vent natural gas, propane, or oil burning appliances, but is most commonly used for oil appliances.
- These are the metal chimneys that usually run through the interior of the home and extend above the roof. This type of chimney should not extend up the side of the building un-insulated since the exhaust gases can cool sufficiently on the exterior of the home during the colder months of the year to condense significant amounts of moisture, potentially resulting in damage to the base of the chimney or the appliance heat exchanger.
- Rusting and corrosion is typical on this type of chimney. Prior to the introduction of modern, more efficient gas appliances, a significant amount of the heat generated by the appliance was lost up the exhaust vent. While this was not very energy efficient, it did provide for a powerful, hot draft that promoted good removal of exhaust gases from the home. Because the flue gas was hot, the risk of condensa-

tion was low, and vent corrosion and pitting problems were minimal. With today's more efficient gas appliances, the amount of heat in the exhaust gases is greatly reduced, therefore the force to push the exhaust gases up the chimney (draft) is greatly reduced which can cause corrosion failure, condensate damage of the appliance, and leakage of flue exhaust gasses into the home.

Factory Built Chimneys

- Factory Built (or 650°C) chimneys are used to vent wood burning stoves. Their metal exterior is much larger in diameter than type B or L vents. They are built to a standard which requires the chimney to withstand flue gas input temperatures of 650°C, hence their name. This type of chimney is typically doubled walled and insulated and therefore can be installed inside or on the exterior of a home, however if installed on the exterior, an opening for removing soot after cleaning should be present at the base of the chimney.
- Factory Built Type 'A' chimneys were introduced in the 1950's and were initially used to vent oil burning appliances. Many were used for wood burning appliances until it was discovered that they could not withstand the heat of a chimney fire. They are round or square metal chimneys that are usually installed on the exterior of the home and sometimes have a painted brick façade on the exterior. This type of chimney is still acceptable for venting oil burning appliances because of the lower exhaust gas temperatures of these appliances.

General

- Any chimney venting a wood burning appliance should be cleaned annually or every 60 fires by a qualified chimney sweep to prevent creosote from building up and potentially causing a chimney fire.
- In specific cases, a masonry chimney flue or a pre-fabricated chimney can be connected to more than one appli-

ance, as long as the chimney or vent is correctly sized based on the heat output capacity of the chimney/vent. A flue venting a wood burning fireplace cannot be used for any other purpose. Because the rules for venting wood burning appliances are complicated, it is always best to check with a qualified Wood Energy Technology Trained (WETT) contractor regarding the venting of wood burning appliances

- Some other common deficiencies that are usually identified during a home inspection with respect to chimneys include inadequate clearance to combustibles around chimneys and flue vents (the required clearance varies, depending on the chimney, its location, and what it is venting), missing spark arrester/rain cap on masonry chimney flues (These prevent moisture or pests from entering the chimney flue), inadequate or improperly sealed roof flashing around the chimney, and inadequate chimney height (A general rule is that a chimney should be 1m above the roof line and 60 cm above anything within 3.18m of the chimney). Areas that are not visually accessible during the inspection cannot be inspected, such as proper clearance to combustibles behind walls and/or the condition of the interior chimney flue. Verifying that the flue is properly sized for the appliance(s) being vented is outside of the scope of the inspection since the output capacities of the appliances are required to perform the sizing calculations and these values are not typically readily available. The home inspection focuses primarily on safety issues, and not code issues, so commenting on the chimney's code compliance are also outside of the scope of the home inspection.

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