



- The wrong stack system leads to burner inefficiency and flame-ignition failure upon startup
- Incorporate thermal expansion components in a chimney design to avoid damage and chimney leaks
- Many construction materials popular today should only be used in low temperature systems

## Boiler Stack Selection Basics

Incorporating the correct exhaust system engineered with the latest technology enhances boiler efficiency. Selecting the wrong stack system or a poorly designed one typically leads to burner inefficiency and flame-ignition failure upon startup.

Consider the following points when selecting and installing a boiler stack.

- 1. Boiler categorization.** Boilers are divided into four categories based on the pressure and temperature produced in the exhaust stack and the likelihood of condensate production in the vent.

In recent years, manufacturers have designed a range of higher efficiency systems, including condensing and near-condensing boiler applications. These boilers may be placed into different categories depending on the way they are operated, so it is important to consider the material selection, the jurisdiction's gas code, and manufacturer recommendations. Although a manufacturer may classify a boiler for more than one category, select the category reflecting the temperature and pressure at the vent stub of a specific boiler when at full rate.

Correct classification is important because it determines which UL and NFPA requirements for venting must be followed.

- 2. Insulation.** Proper insulation protects against heat loss. The main insulating materials used today are: air, mineral fiber and ceramic. These substances are placed between the stack or breeching's double walls to produce the insulating effect. Inadequate insulation can cause excessive condensation, increased fuel consumption, and possible injury from touching the outside of the chimney.
- 3. Thermal expansion.** Chimney selection and design must incorporate thermal expansion components to reduce potential damage to the exhaust system, chimney leaks, and excessive forces on chimney supports and building structures.
- 4. Stack sizing.** Vent stub diameter on a boiler is one factor among many used to select the correct chimney size, but it can be misleading. When fittings, horizontal sections and appliances are connected to a breeching, more draft losses can occur. The correct-size chimney is one that will maintain a sufficient draft in the entire exhaust system and at the vent stubs of the appliances throughout the operating range in all seasons.
- 5. Drains.** When burning #2 oil, more corrosive compounds are released into the exhaust system and an excess of condensation can occur in one section of the system. It is critical to ensure that the stack design include drains in the correct places.
- 6. Construction material.** For installation-ready boiler vent systems in North America, the most common material used is stainless steel. Other materials that are increasing in popularity are: PVC, ABS and CPVC; however, these materials are limited to very low temperature systems. Other types of steel such as galvanized and aluminized also have limitations.

For a freestanding stack, it is important to understand the environment and know what the boiler is burning. Regardless of the material selected, it must resist residual chemicals and combustion gases. Freestanding stacks can be single-wall or double-wall systems. They often have special requirements for paint and insulation to ensure longevity.

- 7. Multi-boiler systems.** Using controlled dampers on the exhaust systems of multi-unit systems will ensure that each boiler receives the optimal draft for its operation and is properly isolated from other boilers when it is not operating.
- 8. UL certification.** UL is the mark of a well-constructed stack. Its seal means that a stack system has been tested to be safe and in compliance.

To learn more about Cheminee Lining stack and exhaust solutions, visit us at [chemineelining.com](http://chemineelining.com).