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- Excess draft can increase operation costs of the boiler while poor draft can jeopardize installation safety and building users
- Incorrect sizing (conduit diameter, vertical vs. horizontal runs) can cause excess or poor natural draft
- Today's sophisticated ventilation systems require optimized design of the exhaust system in order to fully benefit from all the new technological features that are now available

## Properly Designing and Installing a Boiler Exhaust System

Properly designed stack systems can alleviate many costly and aggravating problems associated with boiler operations. Boiler inefficiency, burner shutdowns, and flame ignition failure upon start-up can result from a poorly designed stack system. Following are factors that lead to most of these problems:

**Poor or Excess Draft:** The combustion flue gases inside the chimney or stack can be much hotter than the ambient outside air, and therefore, less dense than the ambient air. This variance causes the bottom of the vertical column of hot flue gas to have a lower pressure than the pressure at the bottom of a corresponding column of outside air. The higher pressure outside the chimney is the driving force that moves the required combustion air into the combustion zone and also moves the flue gas up and out of the chimney. That movement or flow of combustion air and flue gas is called "natural draft." The taller the stack, the more draft is created. A poor draft may prevent the flue gas from being able to exit the exhaust system, compromising the safety of the installation and the quality of air in the building. It could also generate premature cooling of the flue gases before reaching the top of the chimney, causing unwanted condensation within the exhaust system. On the other end, excess draft will affect the boiler's efficiency, forcing out unconsumed combustion gases, which will increase operating costs. It could also extinguish the burner's flame and cause a great deal of trouble at the start-up stage. Therefore, an optimized draft can save you money while making your life easier during the boiler's standard operations.

**Breeching and Stack Sizing:** Incorrect sizing leads to poor or excess draft. In general, the larger the conduit's internal diameter is, the stronger the draft. Another important parameter: the vertical stack should be at least as tall as the length of the breeching. If you combine multiple boilers, the air flow through the common breeching system should be the sum of the flow of all the boilers at the minimum. The design of the stack and breeching must provide the required draft at each boiler's flue gas outlet. Proper draft is critical to the burner's performance.

**Poorly Designed Ventilation System:** Buildings today are constructed to save energy and money in the long run. As a result, the ventilation system often is very sophisticated and brings in less air than it vents out. This causes negative pressure in the building. To obtain a balance, the outside air comes through the path of least resistance, which many times is the stack, especially if it is not a sealed circuit.

Proper design and installation of an exhaust system helps to ensure that a boiler system operates at peak efficiency. Cheminee Lining manufactures installation-ready exhaust systems and engineered freestanding stacks. For installation-ready systems, Cheminee Lining uses an exclusive male/female jointing system, which requires only a few steps and accelerates installation time by up to 40%.

Installation of an exhaust system with the male/female jointing system involves just a few simple steps. There are arrows and labels indicating where to connect the ends, and two sealant applications within the system ensure an airtight fit.

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