

## Steps to Consider When Selecting a Boiler Exhaust System

Proper design and installation of an exhaust system helps to ensure that a boiler system operates at peak efficiency. Boiler inefficiency, burner shutdowns and flame ignition failure upon start-up can result from a poorly designed stack system.

Following are steps to consider when selecting and installing a boiler stack:

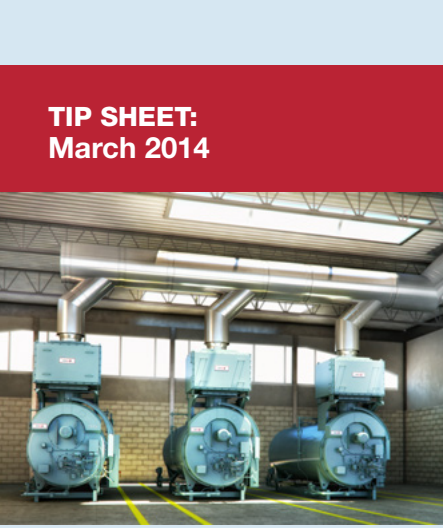
**Correct Sizing:** As a guideline, the vertical stack should be at least as tall as the length of the breeching. If multiple boilers are combined, the air flow through the common breeching system should be the sum of the flow of all the boilers at the minimum. The design of the stack and breeching must provide the required draft at each boiler's flue gas outlet. Proper draft is critical to burner performance. Although constant pressure at the flue gas outlet is not always required, it is necessary to size the stack/breeching to limit flue gas pressure variation. Consult the manufacturer's recommendations for the allowable pressure range. Incorrect stack sizing leads to poor or excess draft.

**Proper Amount of Natural 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. There can be cases of diminishing returns; if a stack is disproportionately tall relative to the heat exiting the stack, the flue gases may cool down before reaching the top of the chimney. This condition can result in poor drafting. A number of variables must be evaluated in order for a chimney or stack to be designed with the right amount of natural draft.

**Good Ventilation:** Buildings today are constructed to save energy. 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 in the path of least resistance, which many times is the stack, especially if it is not a sealed circuit.

Incorporating an exhaust system engineered with the latest technology can enhance boiler efficiency, and Cleaver-Brooks can design any stack system, from a simple installation-ready system to the most complete freestanding stack.

For installation-ready systems, Cleaver-Brooks products feature a proprietary male-to-female jointing system that eliminates the need for adapters and accelerates the installation process by up to 40 percent. To view a stack installation demonstration of the male/female jointing system, visit <http://www.youtube.com/watch?v=AU-hAkh6pfQ> on the Cleaver-Brooks YouTube channel.



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The products available in the installation-ready line fit the Cleaver-Brooks full range of condensing boilers, packaged hot water and steam boilers and allow for complex arrangements of multiple boiler applications.

For more information or to view Cleaver-Brooks broad range of exhaust solutions products, visit [cleaverbrooks.com](http://cleaverbrooks.com).