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STACKS & BREECHINGS

BASIC PRINCIPLES

Breechings and stacks should be designed with the same attention given to air distribution systems within a building. The same general principles should apply. Pressure drops should be calculated and the total pressure drop from the boiler flue outlet to the stack or chimney outlet should not exceed 0.2 inches W.C.

The stack or chimney should be of sufficient height to extend above the roof of the building or adjoining buildings to avoid down drafts in the stack or the possibility of carrying combustion gasses to undesirable locations such as air inlet ducts or open windows in adjoining or nearby buildings. Local codes should be checked to determine criteria on heights and exit velocities. It may be necessary to install smoke density alarms, recorders or other devices in stacks.

Avoid mounting stack directly on boiler flue outlet. Rain or condensate formed in the stack may cause corrosive elements to wash down on structural parts of the boiler and cause damage. The weight of the stack may restrain the expansion and contraction of the boiler as it alternately heats and cools. No more than 500 pounds of weight should be carried on boiler flue outlet. When weights over this value are considered, the boiler manufacturer must be consulted.

Stacks and chimneys should be straight. In some cases of very high buildings, offsets may be necessary. The number of offsets should be kept to a minimum and the angle of offset preferably less than 10° .

Two breechings should not enter a stack or chimney at the same height and 180° apart as excessive turbulence and even back blow of gasses may occur.

The difference between the friction loss in the stack when cold and the draft induced when the stack is hot should be evaluated. When this difference exceeds 0.5" W.C., over fire draft regulators should be installed in the breeching to stabilize the pressure on the boiler flue outlet. These dampers should be installed in a straight section of breeching where turbulence is at a minimum.

BREECHINGS

Breechings should be as short as possible and have a minimum number of bends.

Round breechings are preferable to square or rectangular and high aspect ratio rectangular ducts should be avoided. Round breechings are more efficient and large flat sides of rectangular ducts may be a large factor in contributing to noise caused by resonance.

Breechings should be sized on the basis of flue gas velocity of 30 feet per second or less. Chart shows breeching sizes based on this velocity.

Changes in direction should be accomplished as gradually as possible. Mitered elbows should be avoided. Circular elbows should be of a minimum of four piece construction and have a minimum R/D ratio of 2.0 where R is the centerline radius of the arc and D is the diameter of the duct. Rectangular or square elbows should have a minimum R/W of 3.0 where R is the centerline radius of the bend and W is the width of the elbow in the plane parallel to the radius of curvature.

QUANTITIES OF FLUE GAS:

The following chart may be used for determining the volume of flue gas in breeching and stack calculations.