

Flanged Fittings

Flanged fittings are generally used in the best practice for connecting all piping above 6 in. in diameter. While screwed fittings may be used for the larger sizes and are satisfactory under the proper working conditions, it will be found difficult either to make or to break the joints in these large sizes.

The dimensions of elbows, tees and crosses for 125 lb cast-iron screwed fittings are given in Table 3, whereas the dimensions for 125 lb cast-iron flanged fittings are given in Tables 4 and 5. Table 6 gives the dimensions of welding neck flanges for standard pipe.

A special type of joint known as the *Sargol* joint consists of a lip which is provided for welding to make the joint fluid tight, while mechanical strength is provided by bolted flanges. Another type of pipe joint, the *Van Stone*, is made by using loose flanges on lengths of pipe whose ends are lapped to give a bearing surface for a gasket or metal joint.

VALVES

Valves, like fittings, are usually either made with screwed or threaded ends or else are flanged for bolted connection to corresponding flanges on the pipe or fitting, in which case the flange and bolting arrangement should conform with the *American Standard* for flanged fittings.

The material used for valves of small size is generally brass, but in the larger sizes either cast iron, cast steel or some of the steel alloys are employed. Practically all iron or steel valves intended for steam or water work are brass-mounted or trimmed, while valves for acids, ammonia and corrosive gases are of iron throughout.

Pressure Requirement

Valves are generally designed for standard or extra heavy service, the former being used up to 125 lb and the latter up to 250 lb steam working pressure, although most manufacturers also make a valve for low pressure up to 25 lb steam and for medium pressure up to 175 lb steam working pressure. In practically all cases these valves are tested at a cold water pressure of twice the steam pressure, and may be used on water lines with a pressure 40 per cent in excess of the allowable rated steam pressure. Some manufacturers rate their standard valves at 150 lb steam working pressure instead of 125 lb. The more common types are gate valves or straightway valves, globe valves, angle valves, check valves and automatic valves, such as reducing and back-pressure valves.

A special class of valves is required for controlling the steam and hot water supply to radiators. These valves are of brass, usually of the angle type, modified to suit the service requirements, and are often arranged with graduated heads and lever handles in order to indicate the relative opening of the valve port in any position.

Chapter 22

COVERINGS FOR PIPES AND HOT SURFACES

Heat Losses through Bare Pipes; Insulation of Hot Water; Low and High Pressure Steam Lines; Insulation for Cold Surfaces; Effect of Air Velocity on Surface Losses; Economic Thickness of Pipe Insulation; Heat Losses from Bare Fittings.

WHEN steam or hot water are conveyed from one part of a building to another, it usually is desirable that the loss of heat from the pipes through which these heating media pass, be reduced to an economic minimum by means of the proper thickness of pipe covering. Pipe insulation is also used to reduce the absorption of heat by cold pipes as well as to prevent condensation on the outer surfaces. This chapter contains essential data for estimating the proper thickness of pipe or surface insulation for various conditions.

HEAT LOSSES THROUGH BARE PIPES AND SURFACES

The heat losses from horizontal bare iron pipe for sizes up to 18 in. in diameter, are given in Table 1. These losses are expressed in Btu per hour per linear foot of pipe per degree Fahrenheit difference in temperature between the steam or hot water in the pipe and the air surrounding the pipe. The monetary value of the loss of heat given in Table 1 may be obtained by means of Fig. 1 for various temperature differences and coal costs. In using this chart, the cost of coal should also include the labor for handling it, boiler room expense, etc.

In order to determine heat losses per linear foot of pipe from known losses per square foot, it is necessary to know the number of square feet area per linear foot of pipe. Table 2 gives these areas for various standard pipe sizes while Table 3 gives the area in square feet for flanges and fittings for various standard pipe sizes.

The loss of heat per unit area from flat surfaces varies greatly with the size and position of the heat-losing body. The loss from the surface in a horizontal position is entirely different for the same surface in a vertical position. Also, the loss is different for the same flat surface facing downward or upward.

The heat losses from various geometrical shapes can be determined with reasonable accuracy from the following two equations:

$$Q_r = 17.23 \times 10^{-10} \times e \times (T_1^4 - T_2^4) \quad (1)$$

$$Q_c = C \times \left(\frac{1}{D}\right)^{0.2} \times \left(\frac{1}{T_{avg}}\right)^{0.181} \times t_d^{1.256} \quad (2)$$