

CARE OF STEAM BOILERS

CLEANING STEAM BOILERS

The steam boiler should be cleaned within one week after it is installed and in operation. This should be done to remove any accumulation of oil, grease, etc., which has a tendency to cause the boiler to foam, producing a very unsteady water line. It is thus necessary to blow off the boiler under pressure. If one blowing-off does not result in a steady water line and clear gauge-glass, the operation must be repeated a second and if necessary a third or fourth time.

Close all radiator valves, or, if the mains are equipped with valves, close both flow and return valves tightly.

Fill the boiler to the top of the gauge with water. Build a hot fire in the boiler and get up a pressure of 10 to 15 lb.

Open the blow-off cock and be careful that sufficient fire is carried to maintain a pressure until the boiler is empty.

After doing this, draw the remaining fire and allow the boiler to cool down thoroughly. This will require one-half to one hour's time, after which close the blow-off cock and slowly fill boiler to water line.

Open all radiator valves or valves on flow and return mains and rebuild fire, and the heating plant is ready for operation.

HOW TO CLEAN A WATER-GAUGE GLASS ON A STEAM BOILER WITHOUT REMOVING IT

1. Draw a cupful of hot water from the boiler, into which pour at least a table-spoon of raw muriatic or other acid.
2. Close both water-gauge valves.
3. Open top water-gauge valve and also pet cock at bottom, and blow water out of glass. Then immediately close the top valve and submerge the end of the pet cock in cup of hot-water solution. A vacuum is at once created in the gauge glass which causes the solution in the cup to rush in.
4. Keep the pet cock immersed and operate the top valve, slightly opening and closing, alternately expelling and drawing in the solution until all grease, oil, or other matter adhering to the inside of the glass is cut out. Then close pet cock and open both water-gauge valves.

It is necessary to have 1 lb. pressure of steam or more on the boiler before commencing this operation, which need not occupy more than 10 minutes. The result is a clean glass without the risk of breakage and probable renewal of gaskets, which is frequently the case when removing the glass for cleaning.

PIPE SIZES FOR GRAVITY HOT WATER HEATING

(From Mechanical Equipment of Federal Buildings, By Nelson S. Thompson)

TWO-PIPE HOT-WATER BASEMENT MAINS, GRAVITY CIRCULATION, DIRECT RADIATOR TAPPINGS

First Floor	Second Floor	Third Floor	Fourth Floor	Pipe Size Inches
40	50	60	70	¾
70	80	90	100	1
110	120	135	150	1¼
180	195	210	230	1½
300	350	400	500	2

At ends of mains increase tapping one size. No main to be less than 1¼ in.

To get size of mains and risers serving more than one radiator, add area of tappings together and use the following:

EQUALIZING TABLE

Inches		Inches	
½ equals	2	3 equals	175
¾ equals	5	3½ equals	260
1 equals	10	4 equals	380
1¼ equals	20	5 equals	650
1½ equals	30	6 equals	1,050
2 equals	60	7 equals	1,600
2½ equals	110	8 equals	2,250

To get size pipe to serve a ¾-inch pipe and a 1-inch pipe:

¾ in. equals 5
1 in. equals 10

15 equals 1¼ in.

Expansion tanks are made 1 gal. to 30 sq. ft. radiation up to 1,000 sq. ft.; 1 gal. to 40 sq. ft. 1,000 to 2,000 sq. ft.; 1 gal. to 50 sq. ft. 2,000 to 5,000 sq. ft., and 1 gal. to 60 sq. ft. for jobs above 5,000 sq. ft. in radiators.

THE FRICTION OF WATER IN IRON PIPES AND ELBOWS

By F. E. GIESECKE

Data and experiments carried out by the Division of Engineering, Bureau of Economic Geology and Technology of the University of Texas, led to the establishment of the formula

$$h = 0.00685 \frac{v^{1.77}}{d^{1.275}}$$

showing the relation between the friction of flow of water (h) and the velocity (v) for clean iron pipes ranging in size from ½ to 3 in. when the water has a temperature of about 68 deg. fahr. and flows at velocities up to 3 ft. per sec.

The friction of water at temperature of about 68 deg. fahr. in one standard short-radius steam elbow is given by

$$h = 0.0141 \frac{v^{1.98}}{d^{0.26}}$$

(For the complete paper see Transactions A. S. H. V. E., Vol. XXIII, 1917, p. 499.)