

Grease in a boiler, not only prevents proper steam generation but it is liable to cause burning out of the boiler. A practical method of determining when the water in a boiler is free from oil, is to draw a sample of the water from the gage cock into a vessel, say about 3 in. in diameter, and at least 8 to 12 in. deep. Have about 2 or 3 in. of water in the vessel and boil it over a gas plate or other hot fire. If there is oil in the water the boiling will cause it to foam and overflow the vessel; while if the water is clear and free from oil and alkali, one can always see the top of the boiling water emitting bubbles of steam but not foaming.

PREVENTING WATER HAMMER CAUSED BY BOILER PRIMING

Where the velocity of steam in a steam pipe is so great that it banks the condensate up in waves, similar to a high wind on a body of water, steam pockets are formed between solid lugs of water—similar to A, Fig. 16. The steam in those pockets is condensed rapidly by the condensate and cool air around the pipe which produces a vacuum and as a result the slugs of water B-B are forced together with a sharp impact and often with sufficient force to crack large ells at the end of a straight run of pipe.



FIG. 16. EXAMPLE OF WATER HAMMER

If the pipe is properly graded, and large enough to permit the steam to travel at a relatively low velocity, it will not form such waves of water and produce water hammer. A steam separator placed in the main near the boiler will prevent water hammer due to the boiler priming. Quickly heating up a cold radiator or partly opening a valve on a one-pipe radiator will cause water hammer and gurgling in the radiator.

CHAPTER VI

CODE FOR TESTING LOW-PRESSURE STEAM-HEATING BOILERS

REVISION OF 1923

(Adopted by AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Jan., 1924)

OBJECT OF THE CODE

THE object of the Code for Testing Low-Pressure Steam-Heating Boilers is to provide a standard method for conducting and reporting tests to determine the heat efficiency at various rates of steaming.

ESSENTIALS NECESSARY TO DETERMINE HEAT EFFICIENCY

The essentials necessary to determine the heat efficiency of a steam-heating boiler are:

- The total heat input.
(The total heat input is the total heat value of the fuel charged.)
- The total heat recovered at the boiler outlet.
(The total heat recovered at the boiler outlet is the total heat of the steam leaving the boiler less the total heat of the feed water entering the boiler.)

PREPARATIONS FOR TEST

The boiler shall be erected, covered and connected to conform to the directions and practice of the manufacturer. The piping shall be connected in such a way that the steam may be carried to a point away from the boiler and it shall be arranged so that the condensation cannot flow back to the boiler.

The moisture in the steam shall be determined by a steam separator, not less than 95 per cent efficient, placed in the steam delivery pipe as close to the boiler as possible. The piping between this separator and the boiler, also the separator itself, shall be thoroughly covered with insulating material. A pipe connected to the bottom of the steam separator shall be provided with a positive seal. The water shall be drained from the separator hourly and weighed immediately.

The steam connections between the boiler outlet and the separator shall be the same in size and arrangement as that to be used when the boiler is installed.

The water shall be fed to the boiler continuously from the feed tank through piping with all necessary valves, and all other water connections to the boiler shall be carefully blanked off. The temperature of the feed water shall be read from a thermometer inserted in a cup projecting well into the feed line near the boiler and filled with a heavy oil. All boiler water connections, including blow-off pipes, must be exposed to view, so that leakages may be observed, and either stopped or measured. The glands of the feed pump shall be carefully packed to prevent leakage.

Code Revisions made by Committee for Testing Low-Pressure Steam Heating Boilers: John Blizard, Chairman, Homer Addams, F. Paul Anderson, L. P. Breckenridge, P. J. Dougherty, L. A. Harding, F. B. Howell, and J. F. McIntire.