

T=Thickness of tube plate in inches.

W=Extreme width of combustion box in inches from front of tube plate to back of fire box, or distance between combustion box tube plates when boiler is double ended and the box common to the furnaces at both ends.

(L.) The rivet section, if of iron, in the horizontal seams of cylindrical shells, where lapped and at least double riveted, should not be less than  $\frac{1}{3}$  times the net plate section; but if steel rivets are used, their section should be at least  $\frac{2}{3}$  of the net section of the plate if the tensile stress of the rivet is not less than 27 tons gross or 62,000 lbs., or not more than 32 tons gross or 72,000 pounds per square inch. Therefore, in calculating the working pressure, the percentage strength of the rivet may be found in the usual way by the rules, but in the case of iron rivets the percentages found should be divided by  $\frac{1}{3}$ , and in the case of steel rivets by  $\frac{2}{3}$ , the result being the percentages required. If the percentage strength of the rivets by calculation is less than the calculated percentage strength of the plate, calculate the working pressure by both percentages. When using the percentage strength of the plate, use the nominal factor of safety suitable for the method of construction as by the rules for iron boilers, but when using the percentage strength of the rivets, use 5 as the factor of safety. The less of the two pressures so found is the working pressure to be allowed for the cylindrical portion of the shell, or otherwise in accordance with the formulæ in appendix.

(u.) Local heating of the plates should be avoided, as many plates have failed from being so treated.

(v.) Steel plates which have been welded should not be passed if subject to a tensile stress, and those welded and subject to a compressive stress should be sufficiently annealed. In other respects the boiler should comply with the rules for iron boilers.

Sec. 37. In no case shall a certificate be granted for a boiler, when drift pins have been used in bringing the holes in the sheets together.

Sec. 38. Man-hole openings must be stiffened with compensating plates or rings of at least the same effective sectional area as the plate cut out, and in no case shall such plates or rings be of less thickness than the plate to which they are attached, nor the attachment of less strength than the plate or ring. All openings in the shells of boilers must have their short axes placed longitudinally.

Sec. 39. Every boiler, made after the coming into force of these Regulations, shall be stamped with the initial letters of the Inspector's name, who inspected and tested it, the year it was made and the pressure under which it was tested, also the actual working pressure allowed upon it.

#### *Furnaces and Flues.*

Sec. 40. (a.) The external working pressure to be allowed on plane circular steel furnaces and flues, when subjected to such pressure when the longitudinal joints are welded or made with a butt strap, shall be determined by the following formulæ:—

(b.) The product of 90,000 multiplied by the square of the thickness of the plate in inches, divided by the length of the flue, or furnace, in feet, plus one multiplied by the diameter in inches, will be the allowable working pressure per square inch in pounds; provided it does not exceed that found by the following formula:

(c.) The product of 10,000 multiplied by the thickness of the plate in inches, divided by the diameter (outside) of the flue or furnace, in inches, will be the allowable working pressure per square inch in pounds.