

The Design of Fire in Tube Boiler

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Abstract : This report presents a final year project pertaining to the design of Fire tube boiler for the purpose of producing saturated steam. The objective of the project is to produce saturated steam for different purpose with a capacity of 2000kg/h at 12bar design pressure by performing a design of a higher performance fire tube boiler that considered the requirements of cost minimization and parameters improvement. This is mostly done in selection of appropriate material for component parts, construction materials and production methods in different steps of analysis. In the analysis process, most of the design parameters are obtained by iterating with related formulas like selection of diameter of tubes with overall heat transfer coefficient optimization, and the other selections are also as like considered. The number of passes is two because of the size and area of the tubes and shell. As the analysis express by using heavy oil fuel no6 with a higher heating value of 44000kJ/kg and lower heating value of 41300kJ/kg and the amount of fuel consumed 140.37kg/hr. and produce 1610kw of heat with efficiency of 85.25%. The flow of the fluid is a cross flow because of its own advantage and the arrangement of the tube in-side the shell is welded with the tube sheet, and the tube sheet is attached with the shell and the end by using a gasket and weld. The design of the shell, using European Standard code section, is as like pressure vessel by considering the weight, including content and the supplementary accessories such as lifting lugs, openings, ends, man hole and supports with detail and assembly drawing.

Keywords : steam generation, external treatment, internal treatment, steam velocity

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