

Design Of Trap Pipes On Horizontal Water Tube Type Boilers

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ABSTRAK

This study aims to design and evaluate the performance of a horizontal water tube boiler equipped with trap pipes made of stainless steel and powered by used oil fuel. The design process was conducted using SolidWorks software and involved technical calculations such as cylindrical conduction heat transfer, heat energy, trap pipe efficiency, and thermal flux. Test results showed that increasing the operating pressure from 1 to 4 bar led to rises in steam temperature, heat energy, thermal efficiency, and heat flux. Heating duration increased with pressure, from 9 minutes at 1 bar to 22 minutes at 4 bar. Meanwhile, heat transfer efficiency reached its peak value at 4 bar. Fuel consumption also rose in line with the pressure, with a maximum usage of 14.3 kg. The findings indicate that the trap pipe design effectively maximizes heat transfer and improves the thermal efficiency of the boiler system. Therefore, this design can be implemented in small-scale industrial applications as an energy-efficient and environmentally friendly heating system.

Keyword: Boiler, water pipe boiler, trap pipe