

**“DESIGN AND CONSTRUCTION OF A VERTICAL BOILER FOR
CIGARETTE OIL DISTILLATION WITH A STEAM CAPACITY OF 100
KG/HOUR”**

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ABSTRACT

This research is to design and manufacture a vertical boiler for citronella oil distillation with a steam capacity of 100 kg/hour. Designing a vertical firetube boiler using ASME (American Society of Mechanical Engineers) design standards and making design drawings using the 2017 version of Autodesk Inventor software. The dimensions of the boiler are 500 mm in diameter, 1200 mm in height and inside there are fire pipes with a diameter of 40 mm, a length of 100 mm and a total of 17 pieces. The materials used are carbon steel, SA 285 GRADE C and pipes, Seamless carbon steel, SA 53 Grade B, Seamless carbon steel, SA 53 Grade B. And the fuel used is used oil. The distillation method that will be used is the direct steam distillation method. The first test: At a pressure of 1 bar with a steam temperature of 102 (0C) can produce citronella oil yield of 6.8%. At a pressure of 2 bar with an increasing steam temperature to 125 (0C) the yield of citronella oil is 8.5%. The second test: At a pressure of 1 bar with a steam temperature of 102 (0C) can produce citronella oil yield of 3.75%. At a pressure of 2 bar with a steam temperature of 125 (0C) can produce citronella oil yield of 4.35%. The pressure affecting the yield is caused by too much pressure, resulting in too much steam to lift the oil in the citronella plant, but the ineffectiveness of the heat exchanger in the condenser, causing a lot of citronella oil that has not changed phase to be carried back into the air with the steam coming out of the product.

Keywords: Boiler, distillation, ASME