World Academy of Science, Engineering and Technology
International Journal of Civil and Environmental Engineering
Vol:8, No:03, 2014

A Design of the Organic Rankine Cycle for the Low Temperature Waste Heat

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Abstract : A presentation of the design of the Organic Rankine Cycle (ORC) with heat regeneration and super-heating processes is a subject of this paper. The maximum temperature level in the ORC is considered to be 110°C and the maximum pressure varies up to 2.5MPa. The selection process of the appropriate working fluids, thermal design and calculation of the cycle and its components are described. With respect to the safety, toxicity, flammability, price and thermal cycle efficiency, the working fluid selected is R134a. As a particular example, the thermal design of the condenser used for the ORC engine with a theoretical thermal power of 179 kW was introduced. The minimal heat transfer area for a completed condensation was determined to be approximately 520m2.

Keywords : organic rankine cycle, thermal efficiency, working fluids, environmental engineering
Conference Title : ICCEE 2014 : International Conference on Civil and Environmental Engineering
Conference Location : Miami, United States
Conference Dates : March 10-11, 2014