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Working Fluid Selection and Performance Evaluation of ORC

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Abstract

Organic Rankine Cycle (ORC) is known as one of the best method amongst the other low-grade energy recovery methods. ORC can be applied for different applications such as geothermal, solar thermal and waste heat. However, the application of ORC in these applications requires the selection of suitable working fluid for better performance. So, this paper focuses on performance evaluation of ORCs for different working fluids. The modelling work was performed using MATLAB and, a thermo-physical database, REFPROP. The evaluation is performed based on the performance of the working fluid. The results reveal that MD2M & cyclopentane for temperature ranges 50 - 100 °C, butane, neopentane & R245fa for 100 - 150 °C, ethanol, methanol and propanone for 150-200 °C and Water, m-Xylene and p-Xylene for 200 - 320 °C are better working fluids for energy extraction.

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1. Introduction

The global energy demand increases continuously throughout the years. Sources specify the world energy demand will increase by 28 % between 2015 to 2040 [1]. The possible solutions are found to be exploring new sources or

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