**Waste Heat Conversion to Power via Organic Rankine Cycle**.

Abstract

Several studies have been carried out on how to recover waste heat using Organic Rankine cycle. Each study applied different working conditions, power scale and cycle configuration, hence an assessment of working fluids is given for specific case. As a result, no single working fluid have been identified that would meet an entire heat source temperature levels. This motivated us to examine various substances for use as working fluids for subcritical ORC systems operating in the temperature range (543 - 633K). In this study, with a given finite thermal source, performance of working fluid candidates are evaluated and assessed using four criteria: thermal efficiency, exergy efficiency, total exergy destruction and net power output. Results of the study indicate that from a performance point of view, the linear alkanes such as nonane seem to be a suitable fluid in the temperature range (543-573K). Beyond aforementioned temperature range it appears that aromatic hydrocarbons such as toluene, ethylbenzene, P-xylene, O-xylene, propylbenzene preformed better. Under this condition, they represent comparably similar proposed screening criteria parameters and comparably high evaporating pressure, with only occasional slight differences between them.