

INFLUENCE OF THE PARTIAL ADMISSION AND BLADE ASPECT RATIO ON AN ORC TURBINE PERFORMANCE

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ABSTRACT

The paper describes the experimental and numerical results of a single stage impulse turbine which is a part of a hermetic turbogenerator working with HFE 7100 fluid. The device is a component of a hybrid micro power plant consisting of two sub-cycles: high temperature steam cycle and an ORC bottoming cycle.

The experimental tests included the turbines with two admission sizes: $\varepsilon = 0.25$ and $\varepsilon = 0.5$. For each admission size different blade heights were tested.

For the selected geometrical cases steady-state RANS simulations have been performed in which the real gas equations of state has been applied in form of a look-up table. The influence of the blade height (aspect ratio) and the tip clearance on the stage losses was investigated. The results have been compared with the selected empirical loss models as well as with the obtained experimental results.