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Objective
This work investigates the heat transfer process of n-Pentane in brazed plate heat exchangers (BPHE). A preliminary experimental analysis is carried out and the heat transfer coefficients are compared to established correlations from literature.

Motivation
The organic Rankine cycle (ORC) can utilize low-to-medium temperature heat sources for power production with a suitable working fluid, depending on the temperature of the heat source. n-Pentane is suitable for ORC applications and has been discussed in the literature for utilization of e.g. geothermal heat sources [2] and industrial waste heat recovery systems [3].

Methodology
The experimental test rig is made of three loops: a working fluid loop, an oil loop and a water loop.

Results
Based on the experimental results, the influence of important parameters of the boiling process is identified.

The measured heat transfer coefficients for the preheater and evaporator were compared to single- and two-phase heat transfer correlations from the literature. The single-phase heat transfer coefficient showed the best agreement with the correlation of Martin [4] with a mean average error of 14.1 %.

Conclusion
In this work the heat transfer coefficients of n-Pentane in brazed plate heat exchangers have been analysed. An experimental test facility was built and the results showed that single- and two-phase heat transfer coefficient could be correlated within 14.1 % and 20.5 % mean average error of existing correlations from literature.

References