

Modelling of heat transfer within heat exchangers

Background:

The process simulation software IPSEpro is frequently utilized at the institute to evaluate the overall performance of thermal power plants. In this software, heat exchangers are described by default using only a simple energy balance. The actual heat transfer, which depends significantly on local flow and temperature conditions, is not taken into account. This can lead to significant deviations between the simulation and actual plant operation.

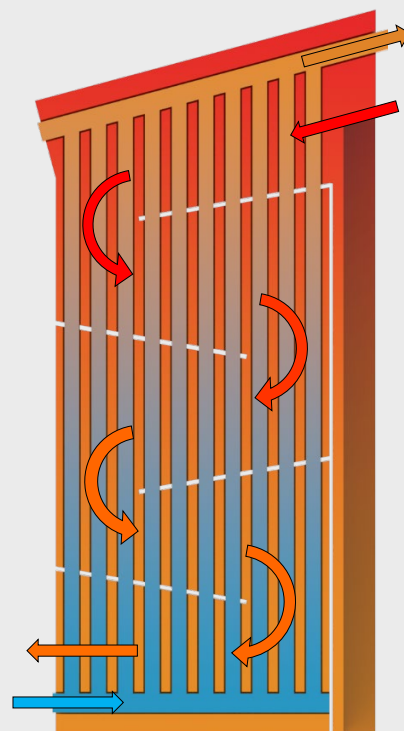
The objective of this work is to achieve a more accurate physical representation of heat transfer in heat exchangers, specifically in superheaters and evaporators. To this end, suitable Nusselt correlations are to be researched and integrated into the IPSEpro models in order to calculate the heat transfer coefficient as a function of flow and material parameters. The extended model is continuously reviewed and validated using CFD simulations, literature values and experimental measurement data.

Work content:

- Familiarisation with existing relevant heat exchanger models, Nusselt correlations and IPSEpro
- Development of an extended model for IPSEpro and implementation in an existing overall process model via predefined interfaces
- Validation through CFD simulations and provided measurement data
- Comparison with the standard energy balance model and evaluation

Skills:

- Motivation and organisational skills
- Good communication skills and willingness to work in a team



Framework conditions:

Start date: Immediate
Duration: approx. 6 months
Place: @ IWT, Graz
Payment: available
Thesis in German or English

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