On the Evaluation of Correlations Predicting the Heat Transfer Coefficient at Supercritical Pressure Conditions

Abstract:
In the design of future concepts of supercritical nuclear and solar steam generators the heat transfer is an important measure. The general approach to assess the prediction accuracy of heat transfer correlations is to calculate the heat transfer coefficient using experimentally-obtained data, such as the bulk and wall temperature, and compare the results to the experimentally-determined heat transfer coefficients. However, in the design process of a steam generator the wall temperature, for instance, is not known a priori and might be, depending on the heat transfer correlation, subject to an iterative calculation. As a result, this work presents a new method to evaluate the accuracy of correlations predicting the heat transfer to water at supercritical pressure. The new approach is based on an iterative solution method without any a priori knowledge of the wall temperature. Seven correlations from the literature are evaluated with the new method by assessing the results against a database containing 1,053 data points from the upward flow in vertical tubes. Different results are obtained using both
assessment methods.

Stichworte: Assessment method; Heat transfer; Heat transfer coefficient; Supercritical

Kongress- / Buchtitel: 15th UK HEAT TRANSFER CONFERENCE

Kongress / Zusatzzinformationen: UKHTC2017

Ausrichter der Konferenz: Brunel University London

Datum der Konferenz: 04.09.2017 - 05.09.2017

Jahr: 2017

Jahr / Monat: 2017-09

Seiten: 2

Revied: ja

Sprache: en

TUM Einrichtung: Lehrstuhl für Energiesysteme

Occurences:
- Hochschulbibliographie > 2017 > Fakultäten > Maschinenwesen > Lehrstuhl für Energiesysteme (Prof. Spliethoff)
- Einrichtungen > Fakultäten > Fakultät für Maschinenwesen > Institut für Energietechnik > Lehrstuhl für Energiesysteme (Prof. Spliethoff) > Publikationen > 2017

entries: