Values and benefits of improving the Performance of heat exchangers used in the Oil, Petrochemical and Gas industries by linking co-operative research, product to process development with unique engineering techniques.

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Abstract

The selection of equipment type, design, and geometry specification in the field of heat exchangers may be considered to be quite a simple task, using relatively accurate performance predictions based on well proven methodologies. In reality and for many cases this concept of assumed accuracy can be far from the truth. Limitations include the inherent in-accuracy of the fundamental data available, anomalies in predicting specific fluid flow dynamics, effects of wall friction causing fluid maldistribution, 2-Phase flow instabilities together with transient and unstable temperature gradients. A further and significant level of uncertainty is the unpredictable impact of fouling.

This all leads to the need for design engineers to make significant and ‘subjective allowances’ based on ‘experience’ to meet the level of commercial confidence required to fulfil the technical contract. It follows from the above that often heat exchangers do not meet performance requirements at the beginning or fail to maintain performance level over time. These often critical processing limitations become substantial challenges to plant engineers. An area of fundamental and applied research together with associated product development that has growing success to meet these multi-variable design and performance challenges is discussed in this paper.