

Heat Exchangers

Performance Prediction & Evaluation

...just the color figures for those who got the B&W printed book...

by **D. James Benton**

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Foreword

Heat is that transient form of energy that passes through a system boundary by virtue of a temperature difference. This temperature difference distinguishes heat from *work*, which passes through a system boundary by virtue of a force. Systems may contain energy, but do *not* contain heat or work.

We are most often concerned with heat transfer within an enclosed device or heat exchanger. There are several ways to analyze the heat transfer within a heat exchanger, all of which involve assumptions. Often these assumptions are unstated, yet they impact the outcome of the analysis. These methods and assumptions will be presented along with examples of when the assumptions work and fail.

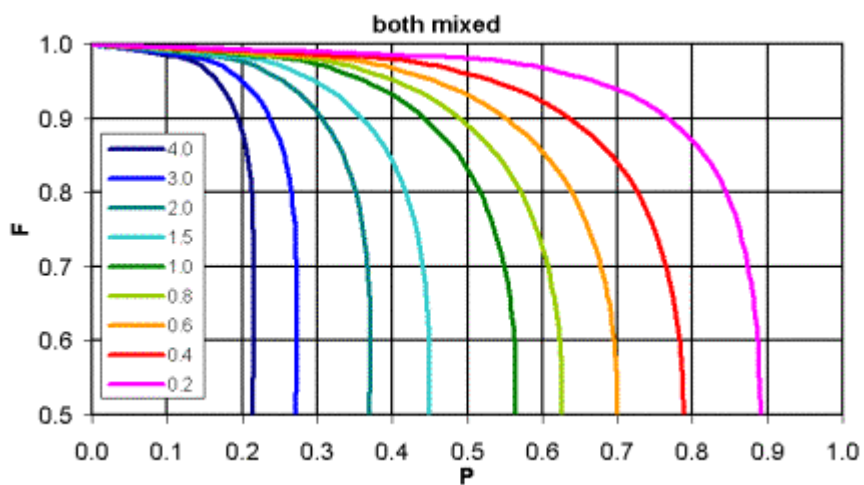
The two areas of focus in heat exchanger analysis are performance prediction and evaluation, that is: design and testing. Thermal design will be presented here, but mechanical design will not. Actual test data will be presented along with uncertainty analysis, as this is critical to a comprehensive understanding of heat exchanger performance.

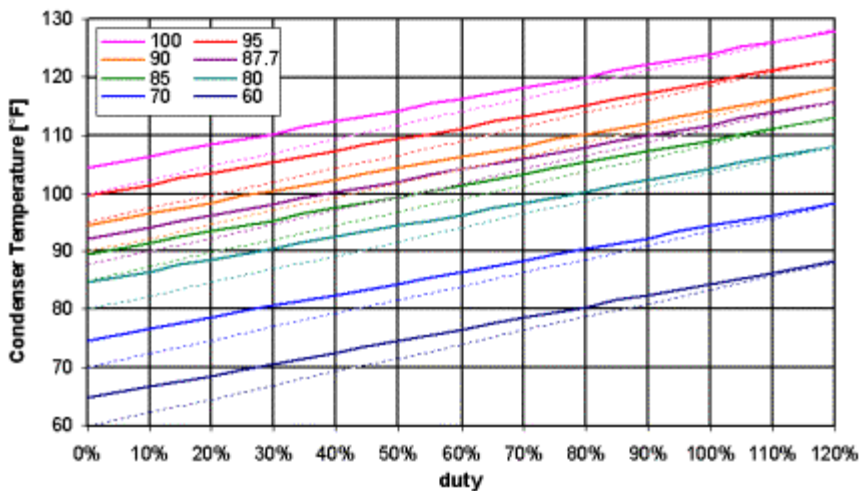
This book is divided into two sections: Chapters 1 through 10 cover classical (i.e., analytical) methods and Chapters 11 and following cover numerical methods. Prediction and evaluation are included in both sections. Some sections of code are included in the Appendices. The complete codes and precompiled executables are included in the on-line archive.

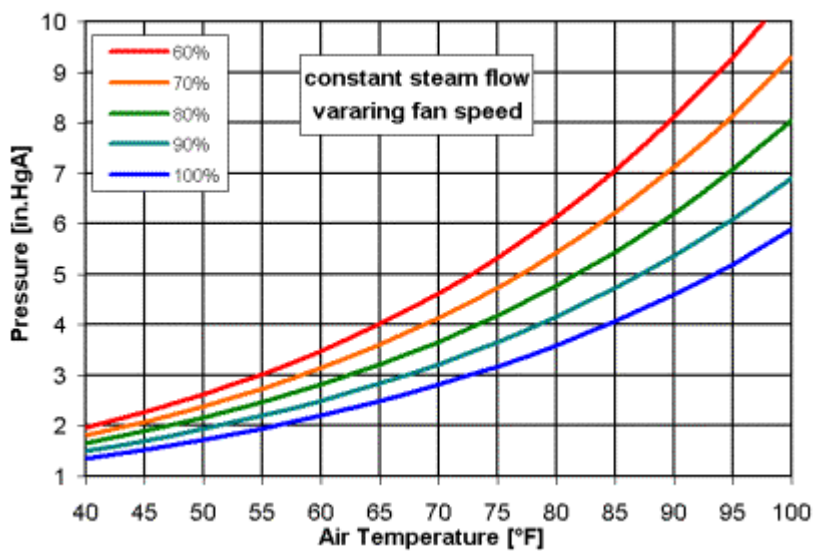
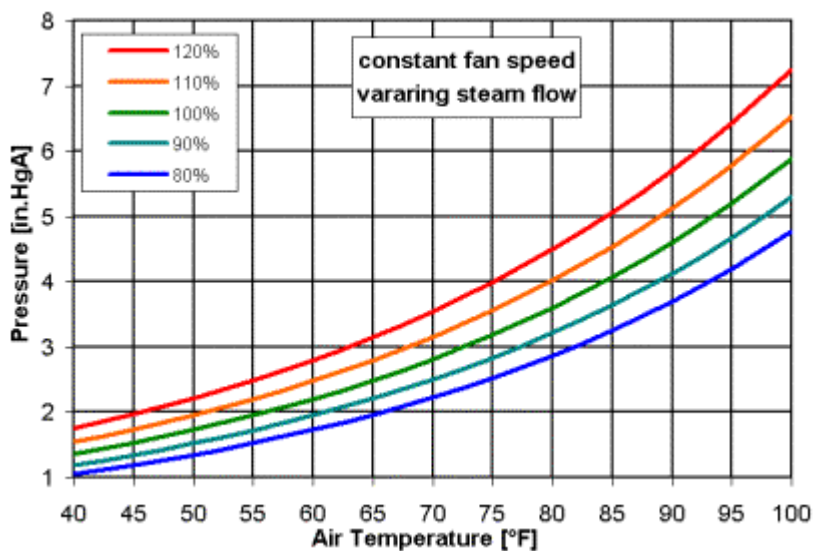
*All of the examples contained in this book,
(as well as a lot of free programs) are available at...*

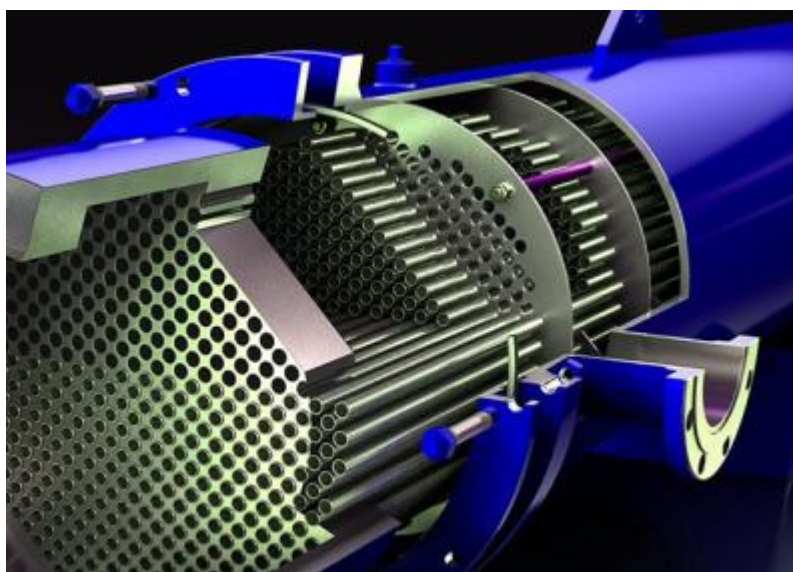
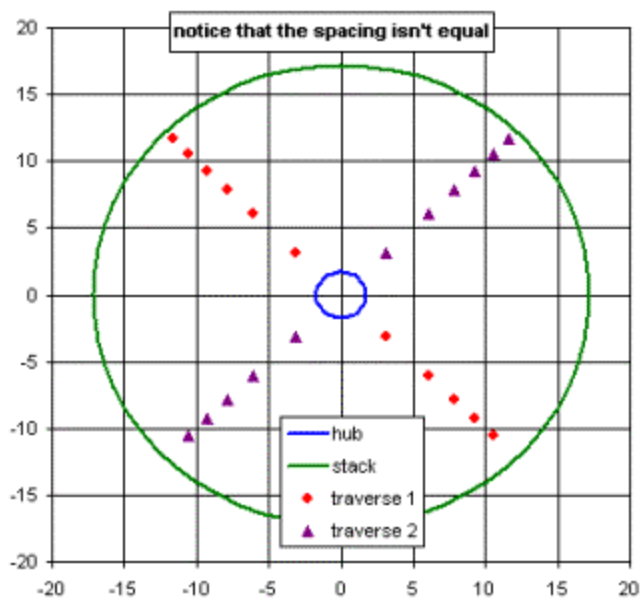
<http://www.dudleybenton.altervista.org/software/index.html>

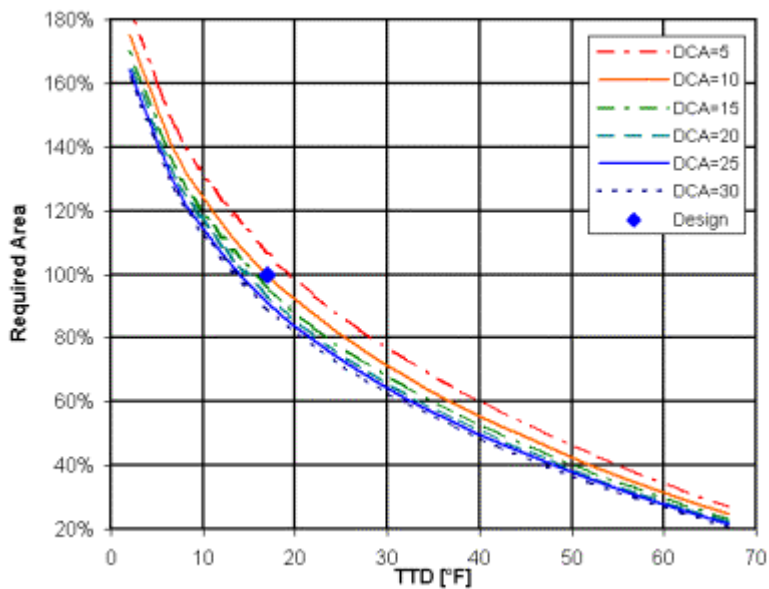
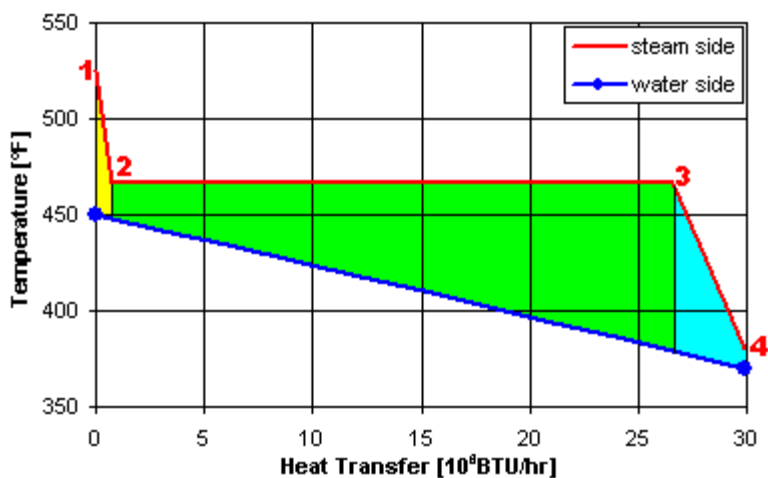
*Example spreadsheets are provided
in both SI and English units.*

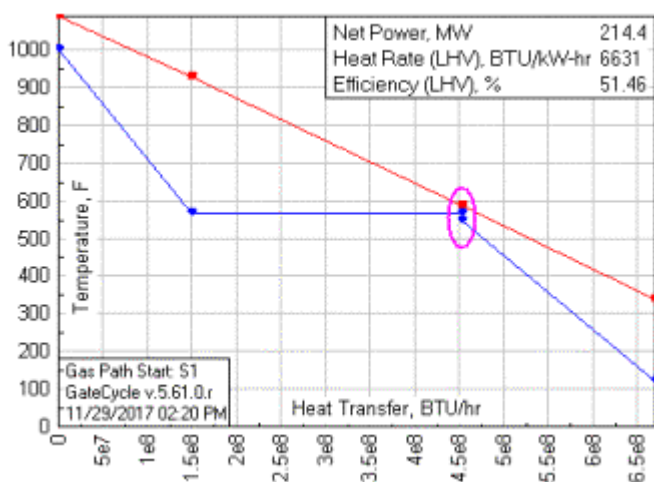
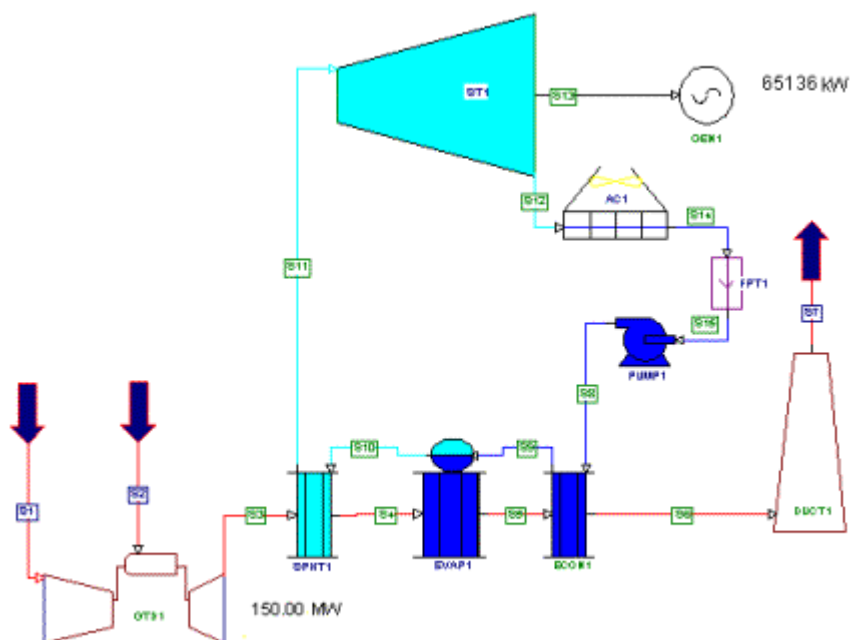


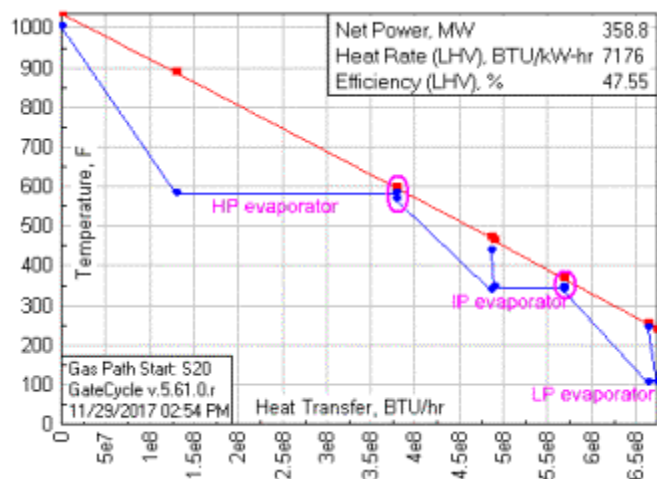
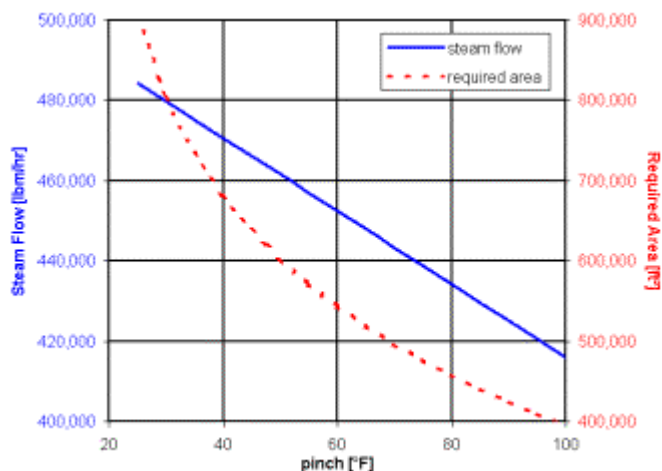


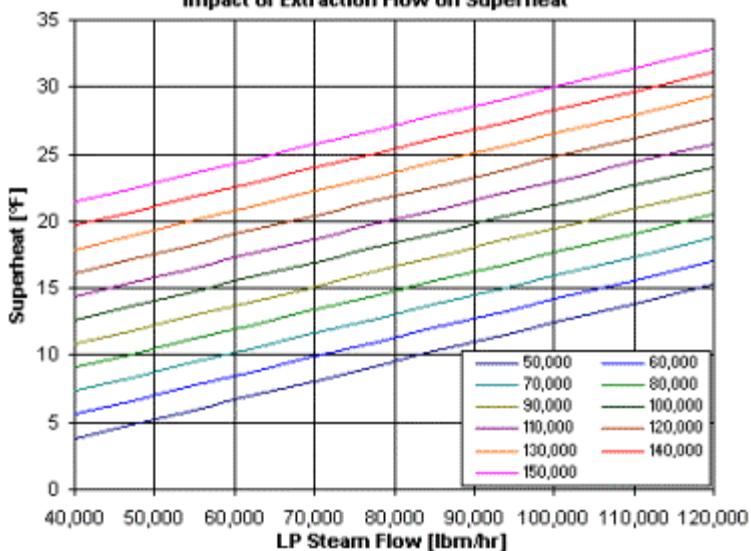
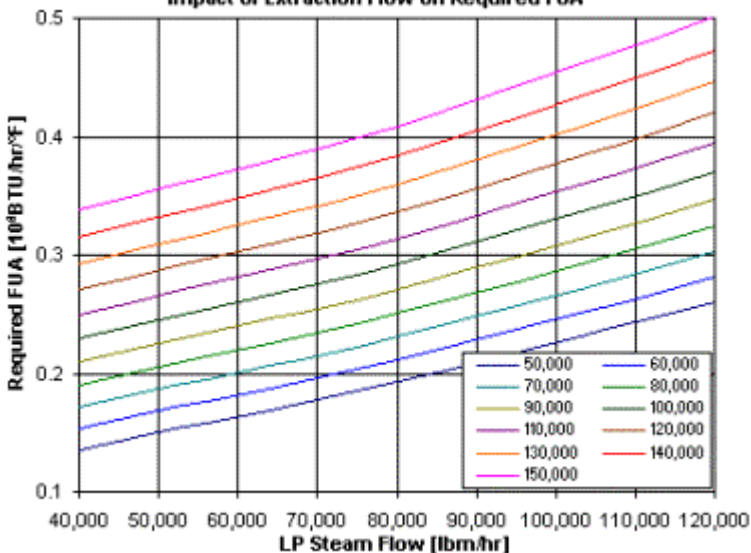


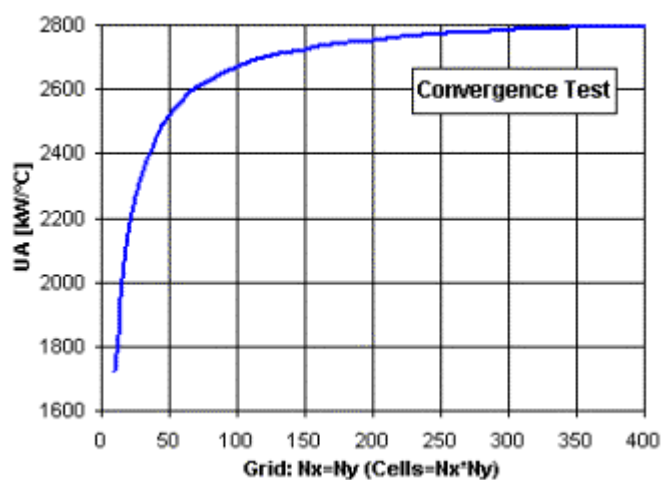
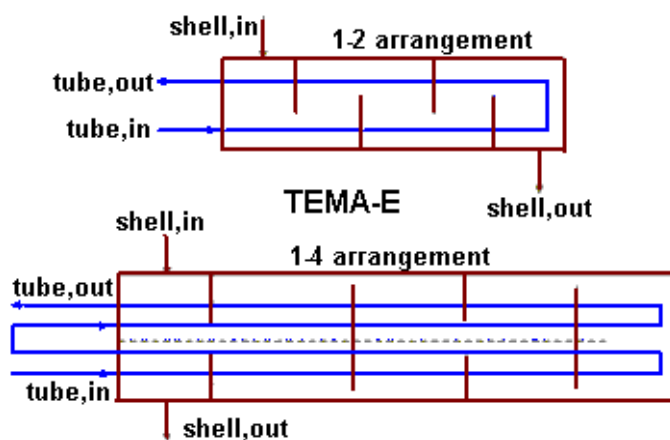


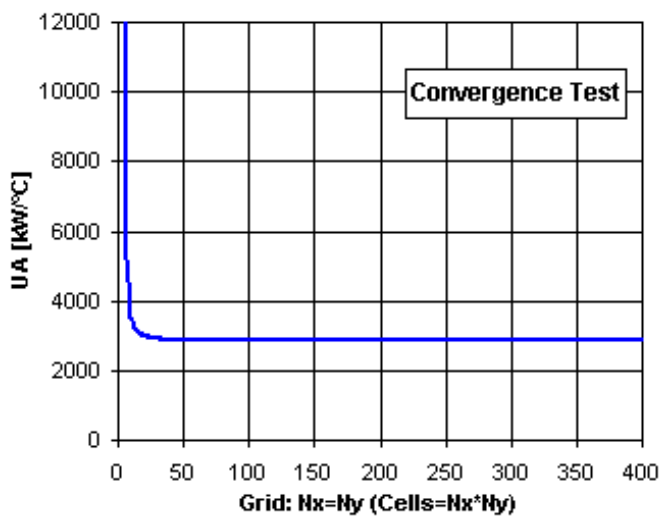
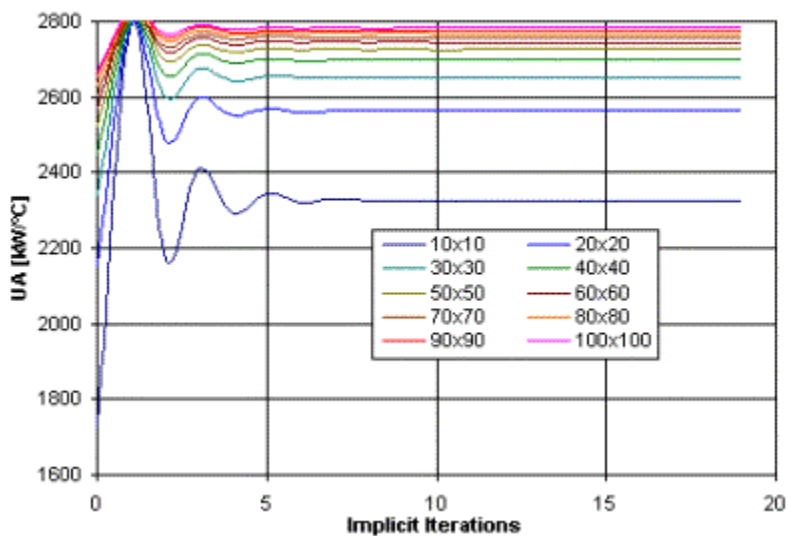


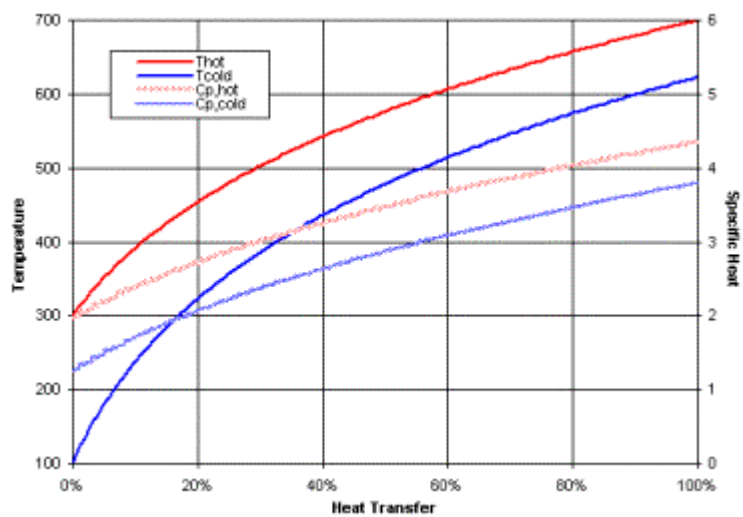
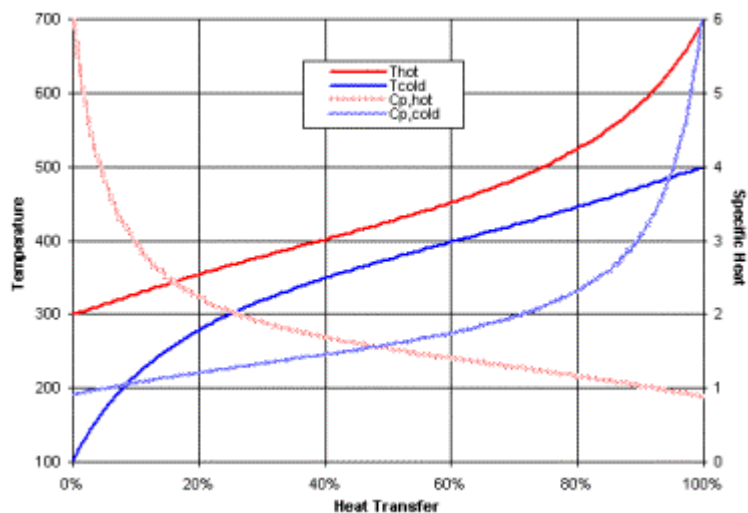


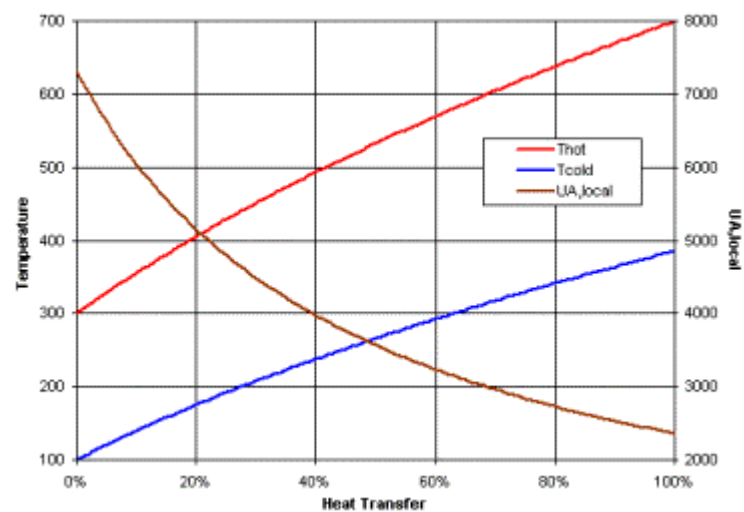
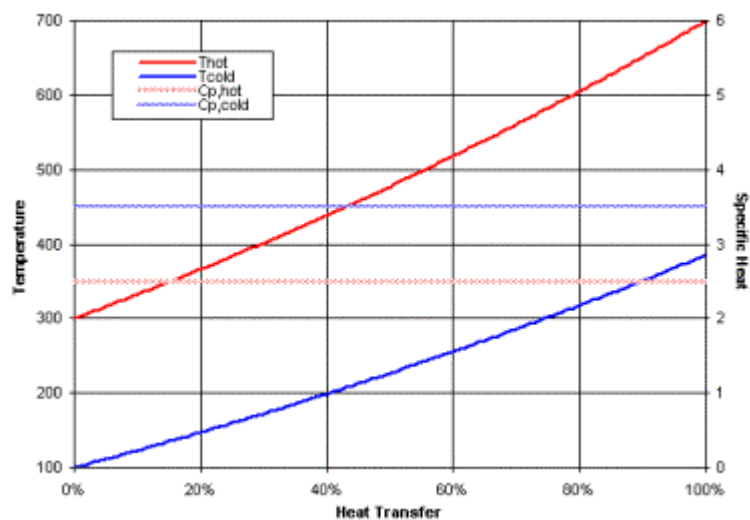


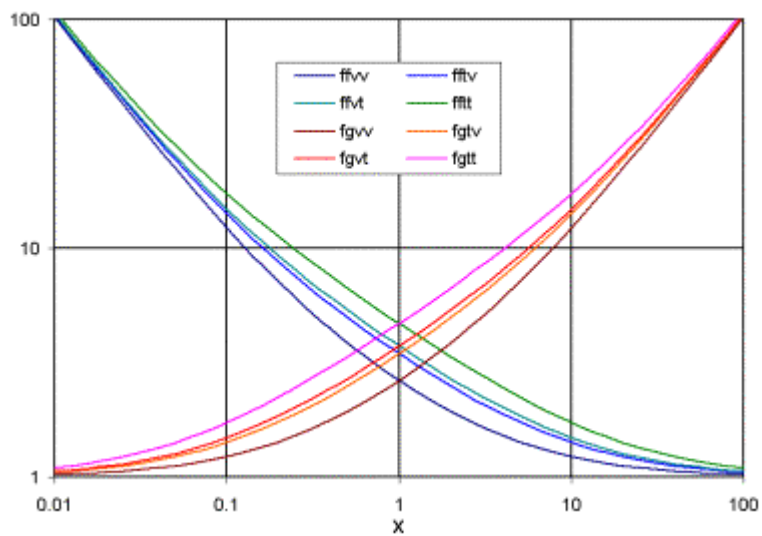
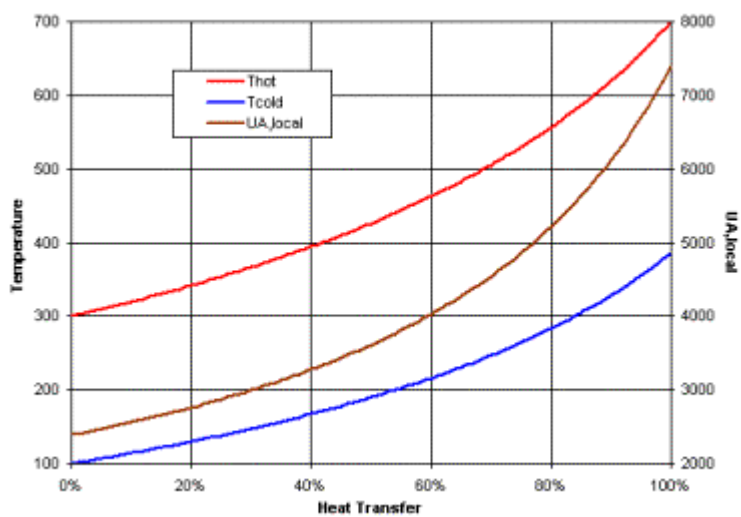
Impact of Extraction Flow on Superheat**Impact of Extraction Flow on Required FUA**

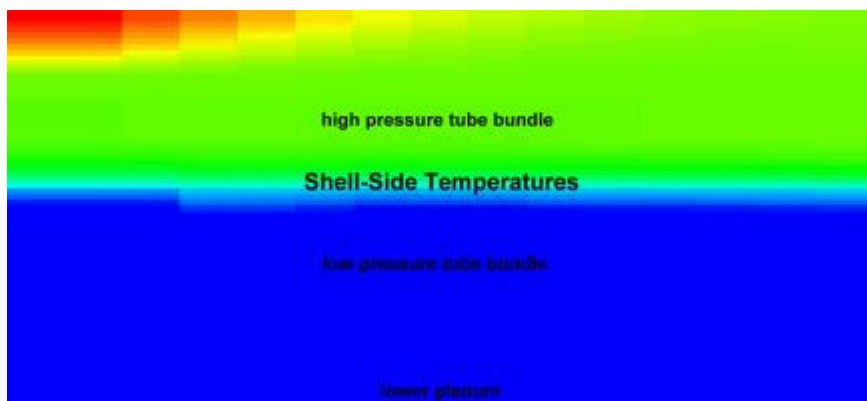
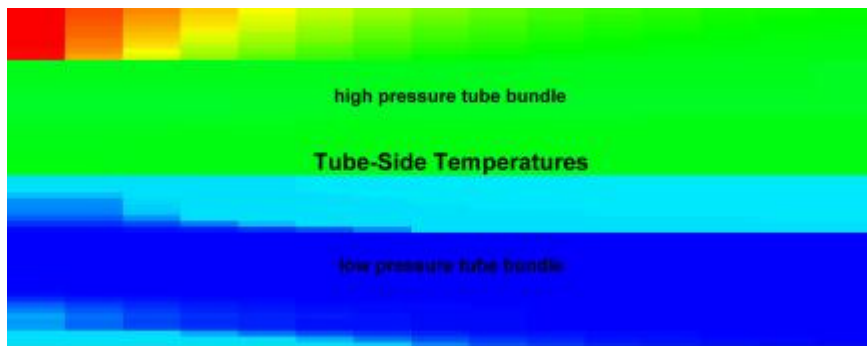


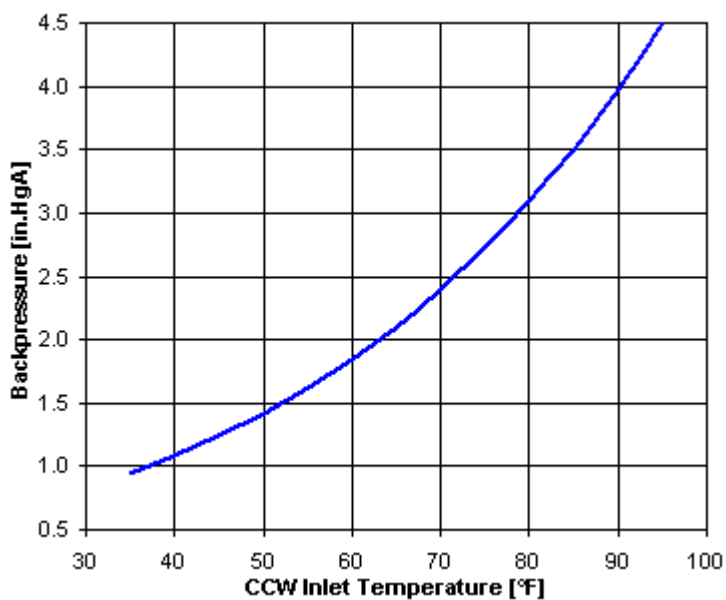
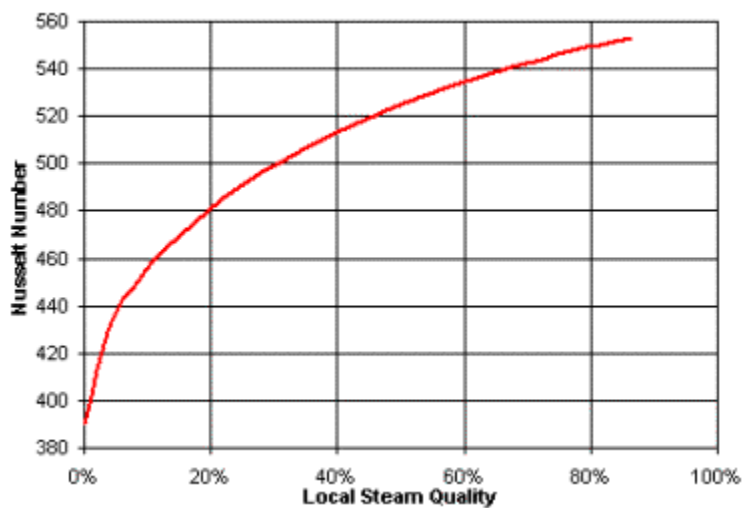


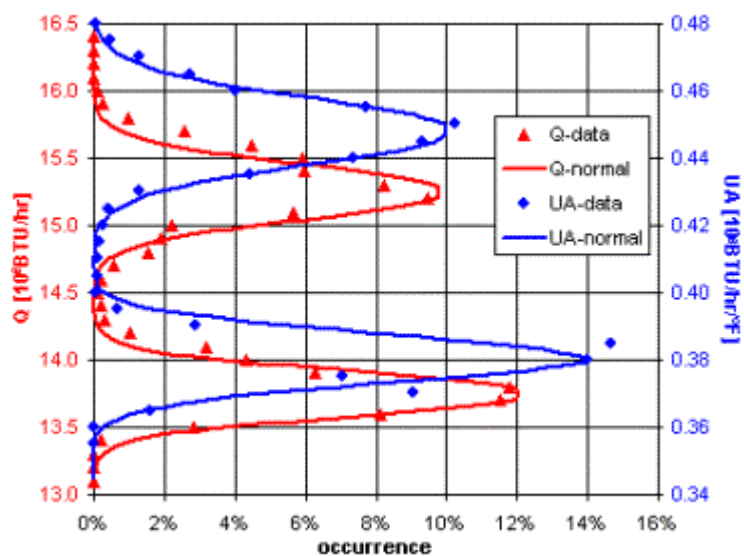
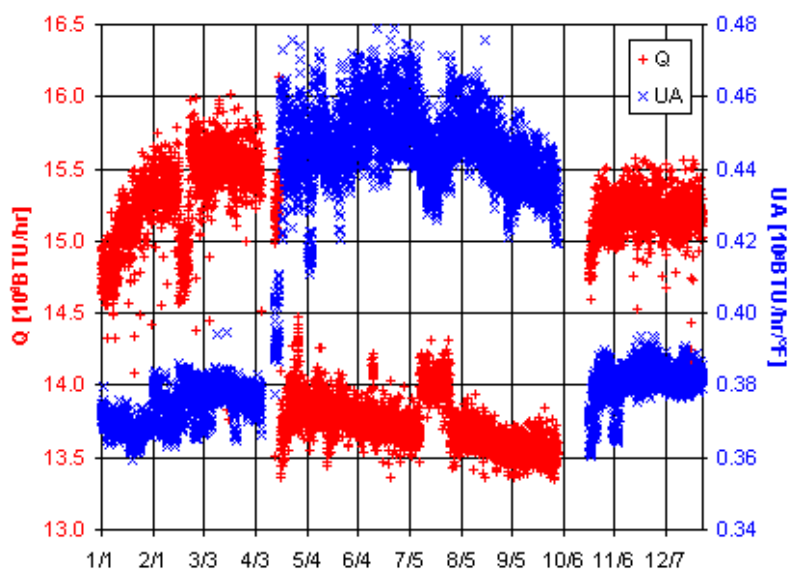


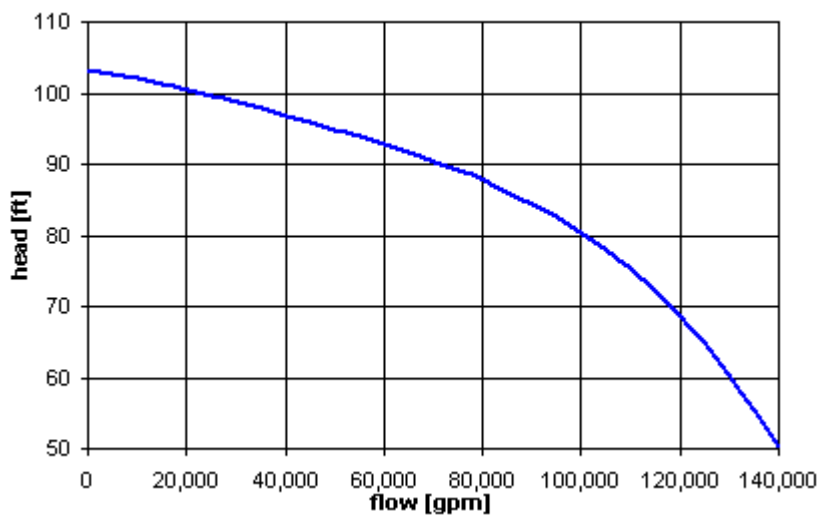
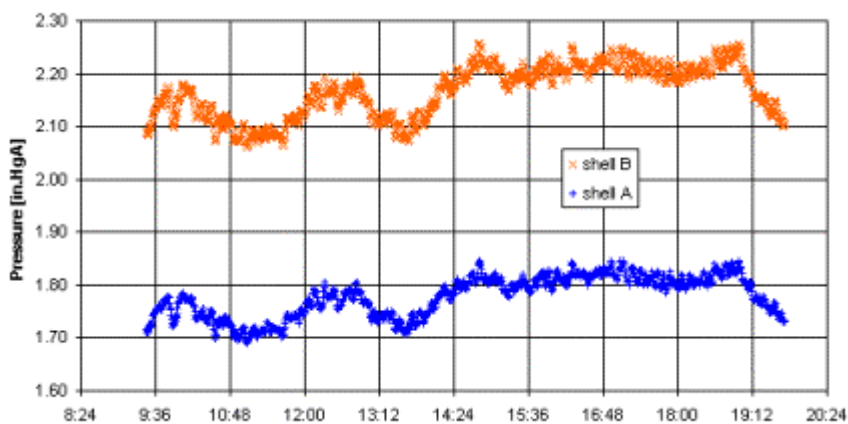


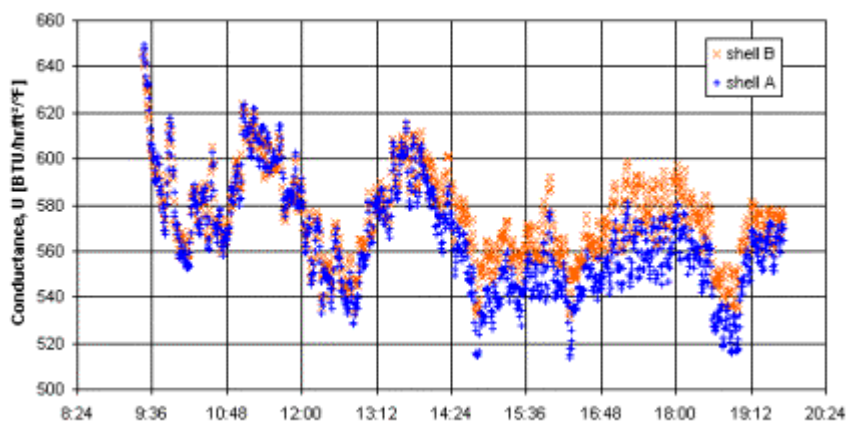
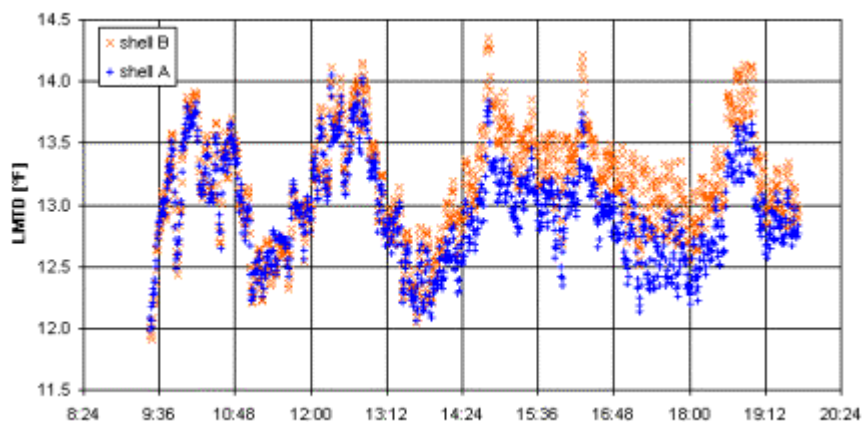


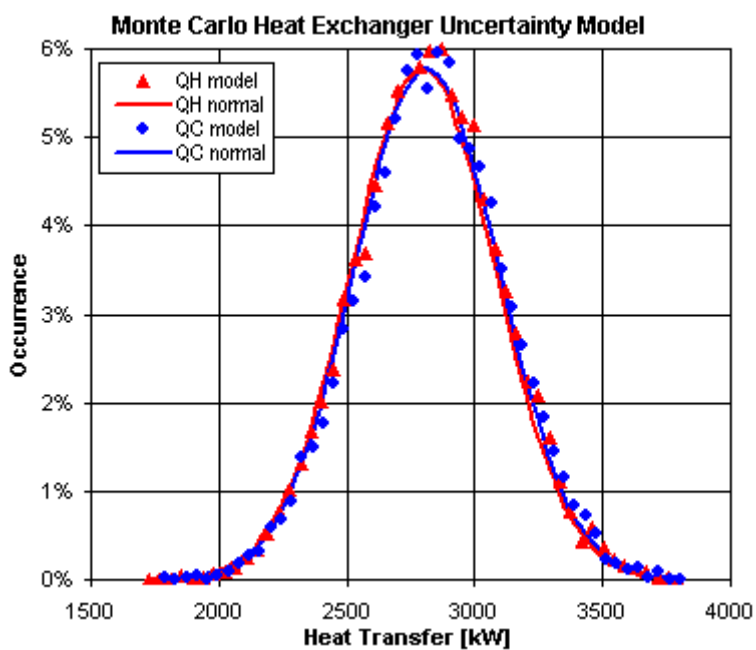
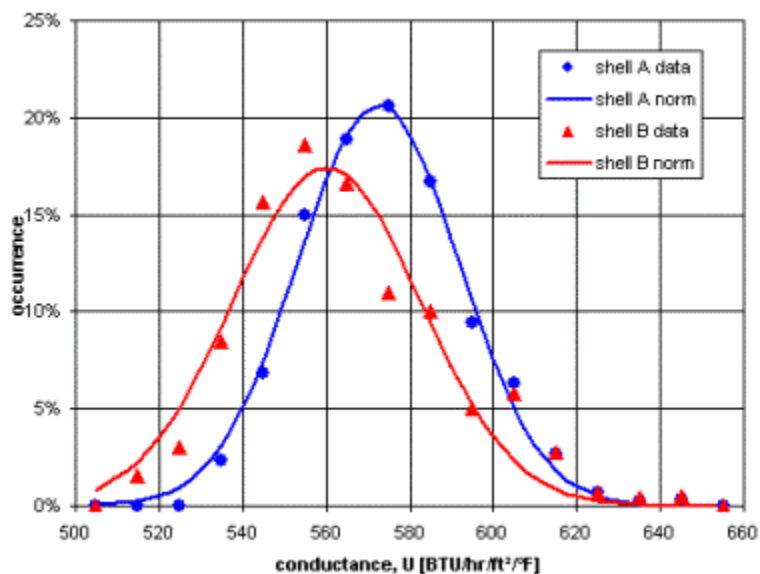




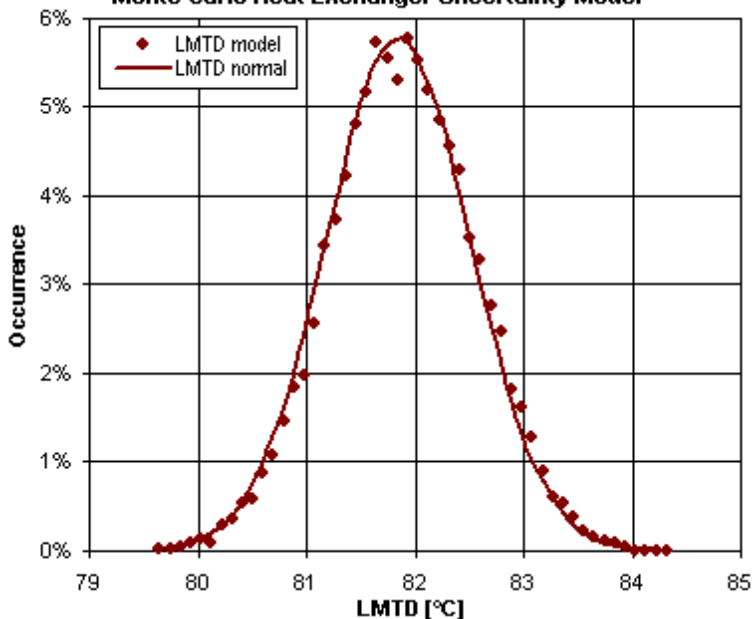








Monte Carlo Heat Exchanger Uncertainty Model



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