

# Thermodynamic & Transport Properties of Fluids

by D. James Benton

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

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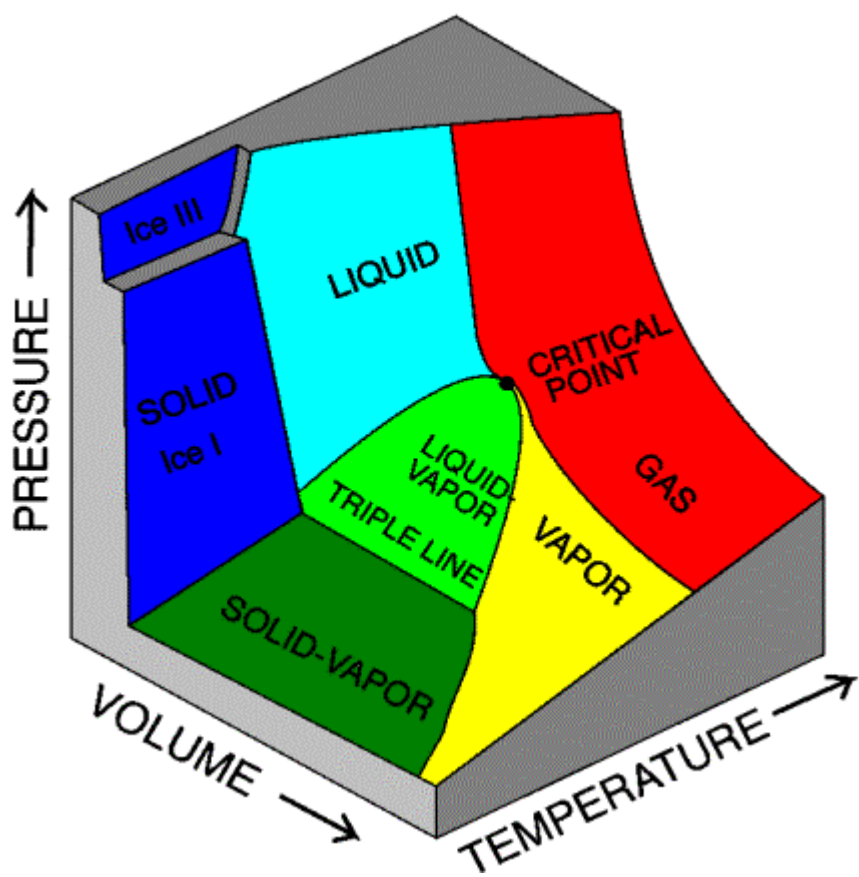
## Foreword

Accurate, consistent, and continuous thermodynamic and transport properties are essential to the analysis and design of energy devices of all sorts, from power generation to product manufacturing. Articles and papers abound covering various aspects of this important field. Often these are esoteric and omit details on how the process is accomplished. The end result of property research may be inaccessible to practitioners, who would use the information to create and manage the machines of industry. This text is a step-by-step manual on why and how to develop and implement functions for thermodynamic and transport properties from raw data to Excel® Add-Ins.

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

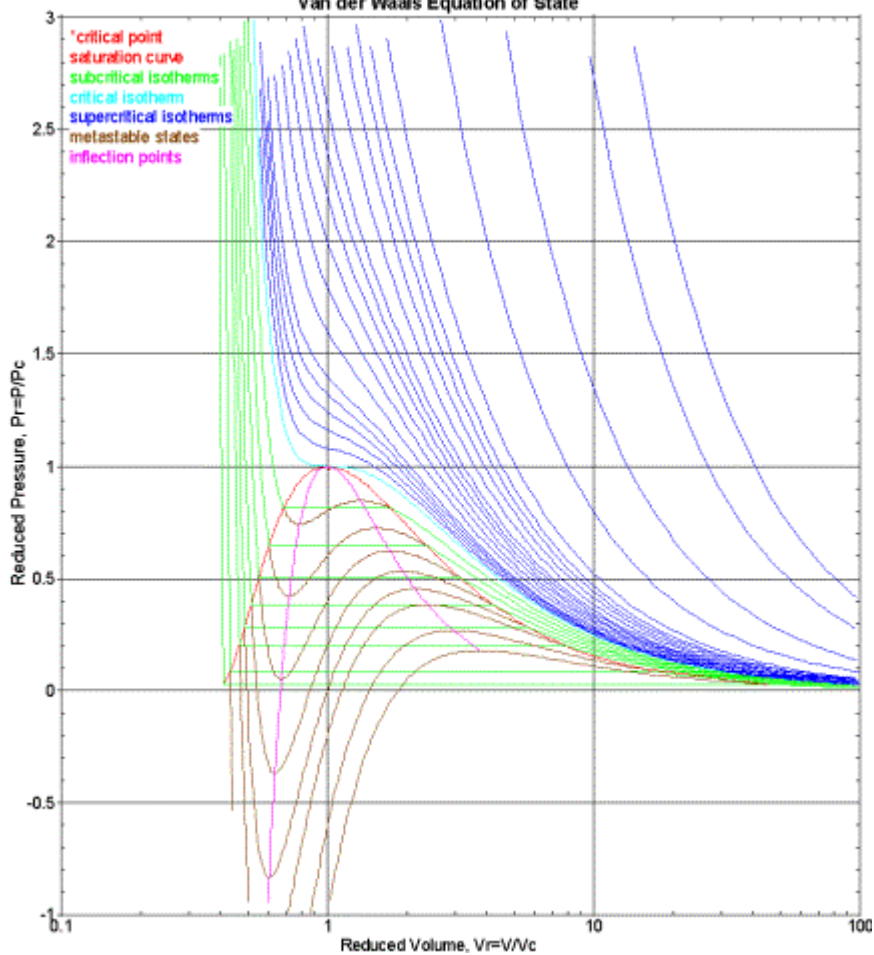
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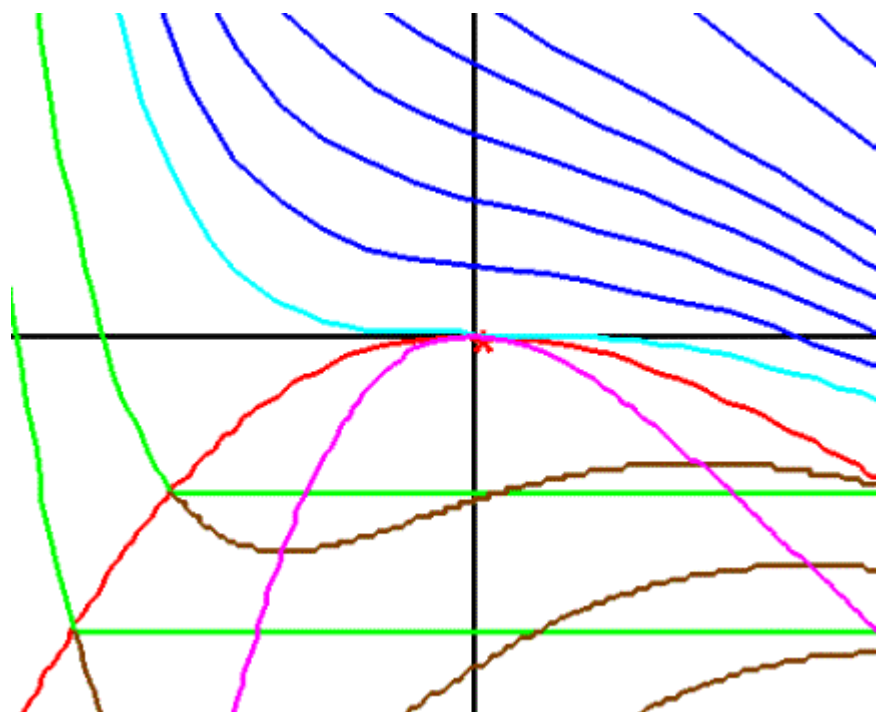
In this text we will cover all of the significant equations of state, their strengths and weaknesses. We will also cover several transport property formulations and why these have been used. This text includes a unique graph never before published, which is perhaps the most revealing presentation of an equation of state, including the elusive meta-stable states under the vapor dome.



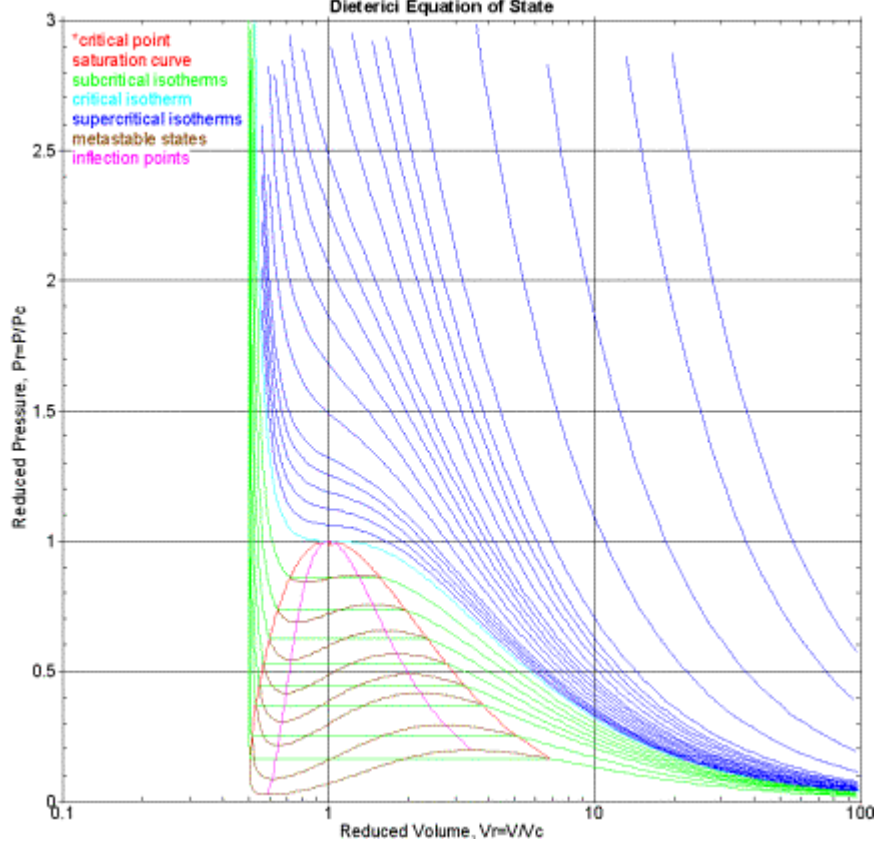


### van der Waals Equation of State

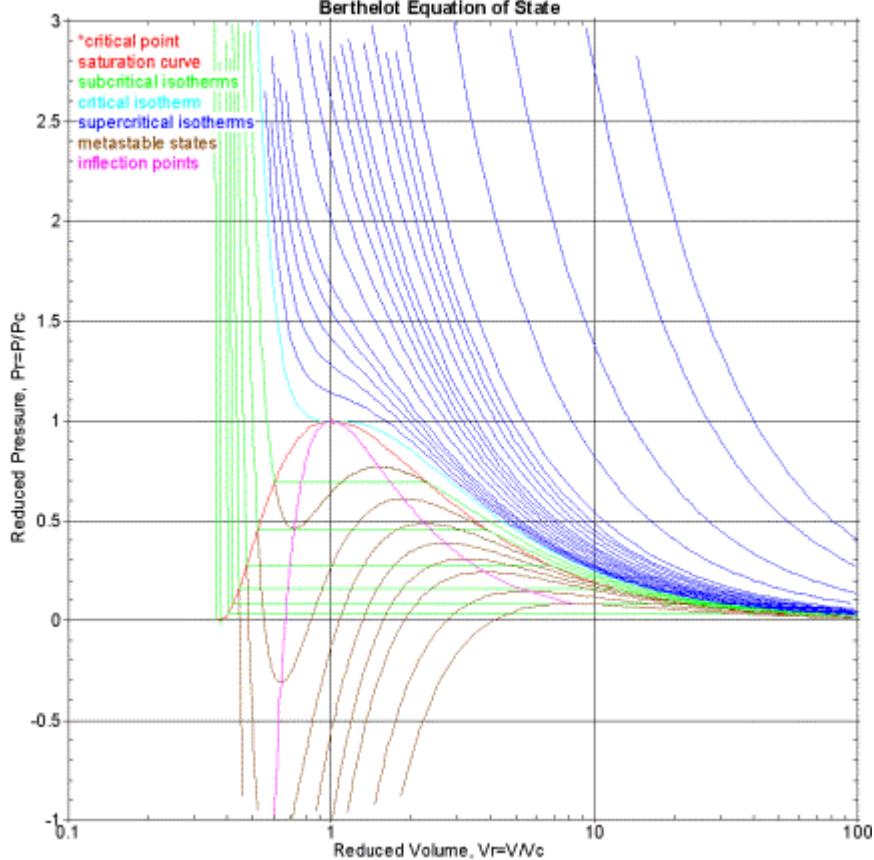




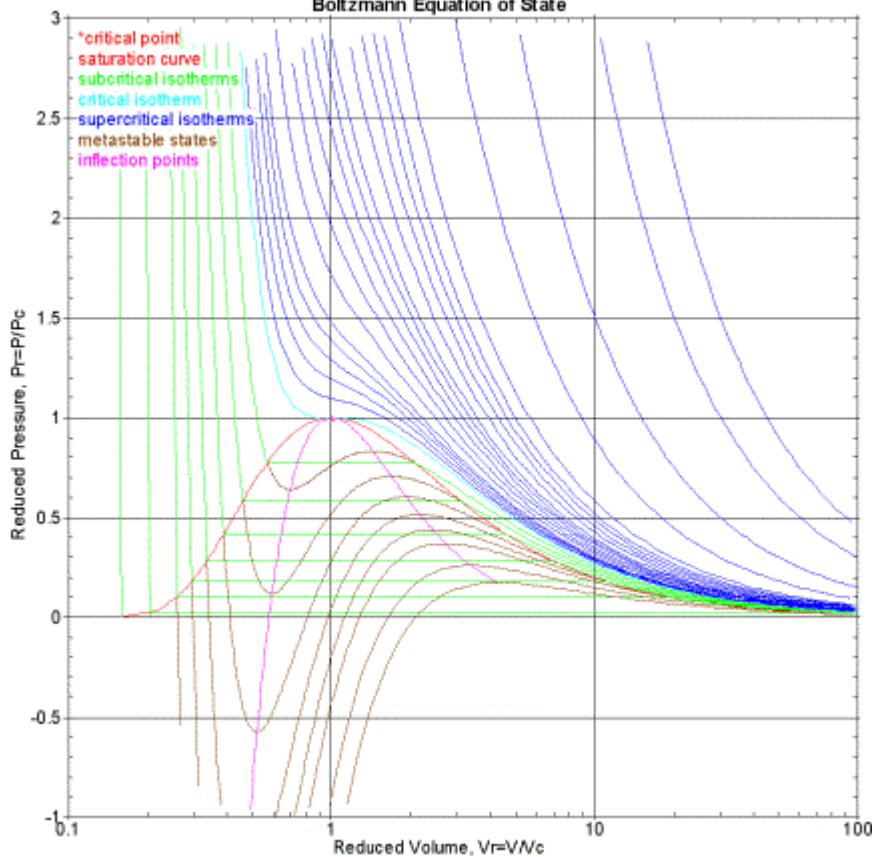
### Dieterici Equation of State



### Berthelot Equation of State

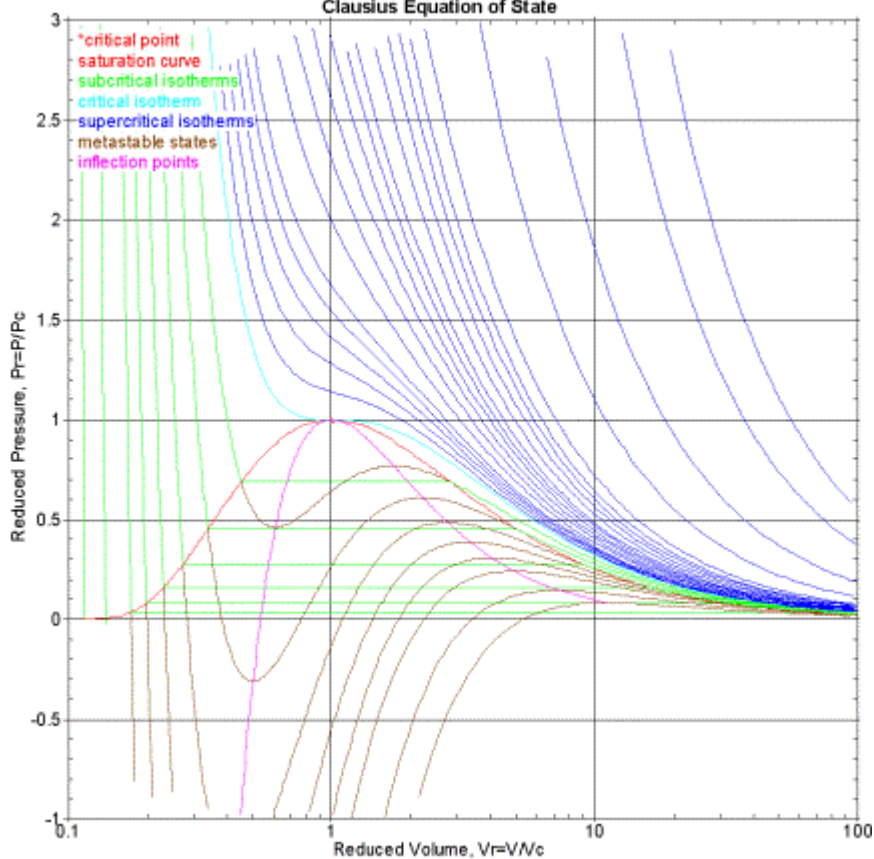


### Boltzmann Equation of State

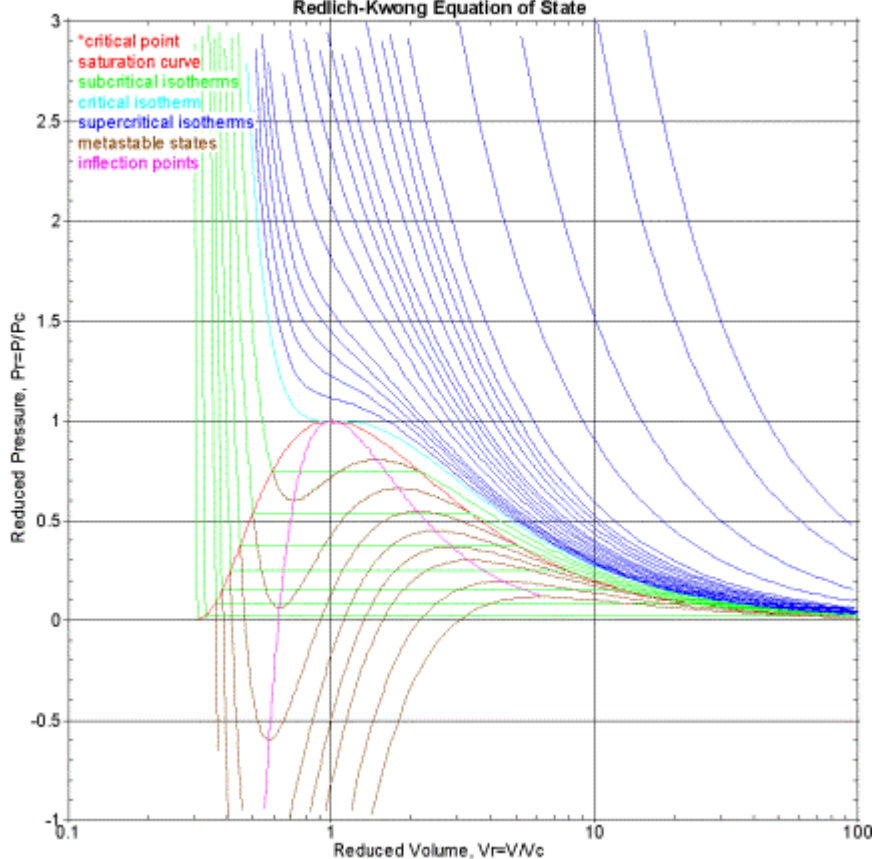


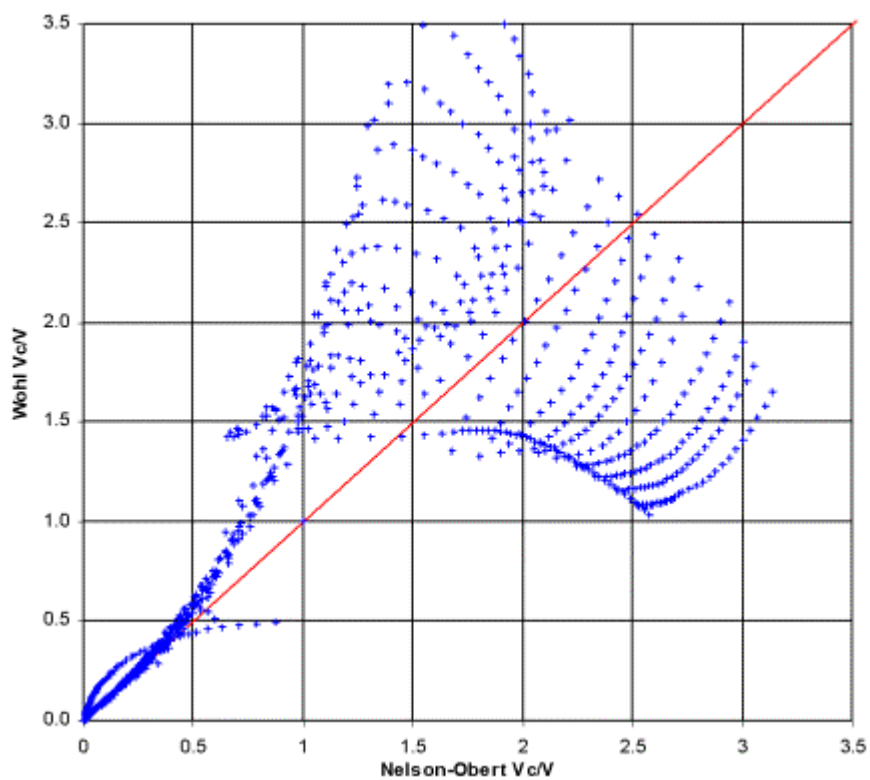


### Clausius Equation of State

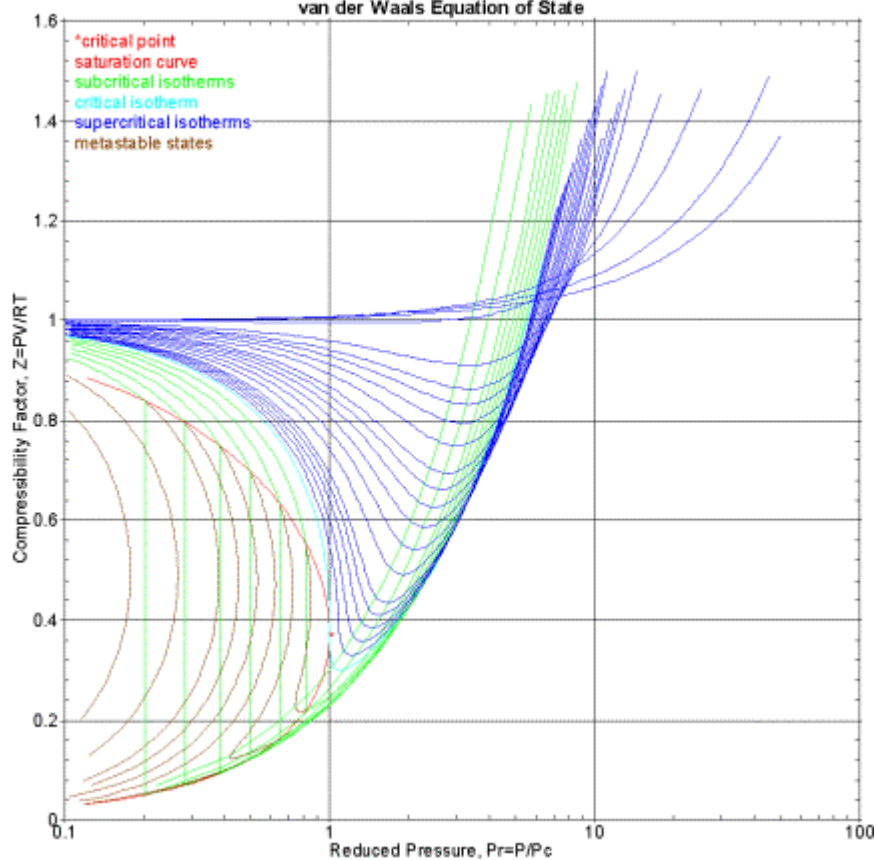


### Redlich-Kwong Equation of State

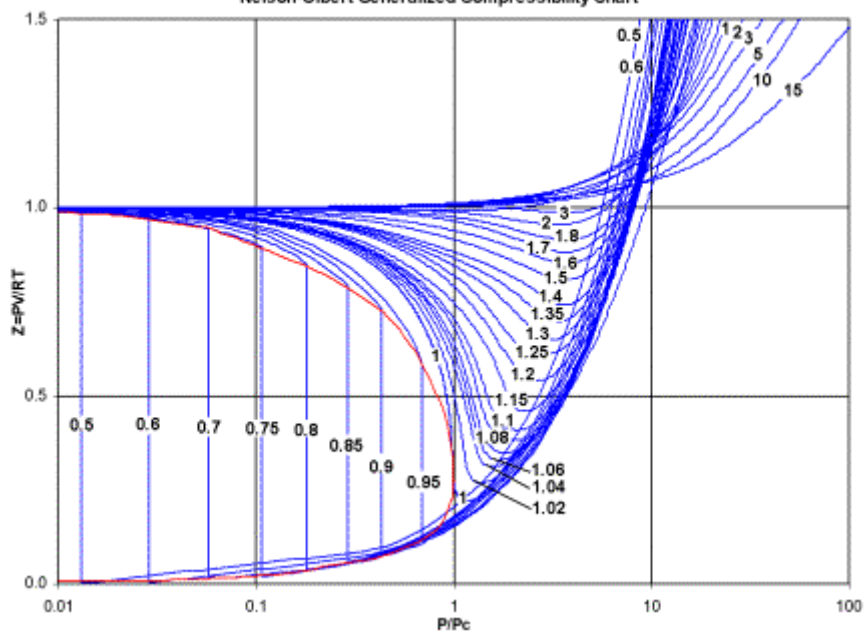




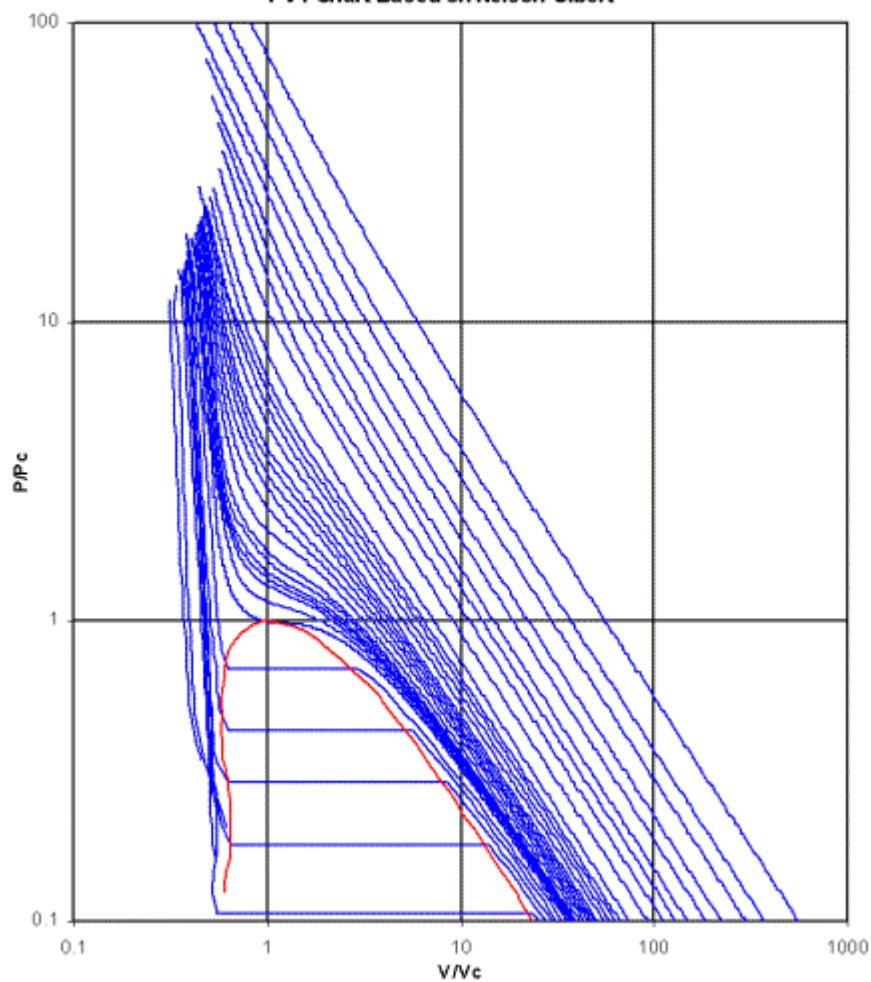
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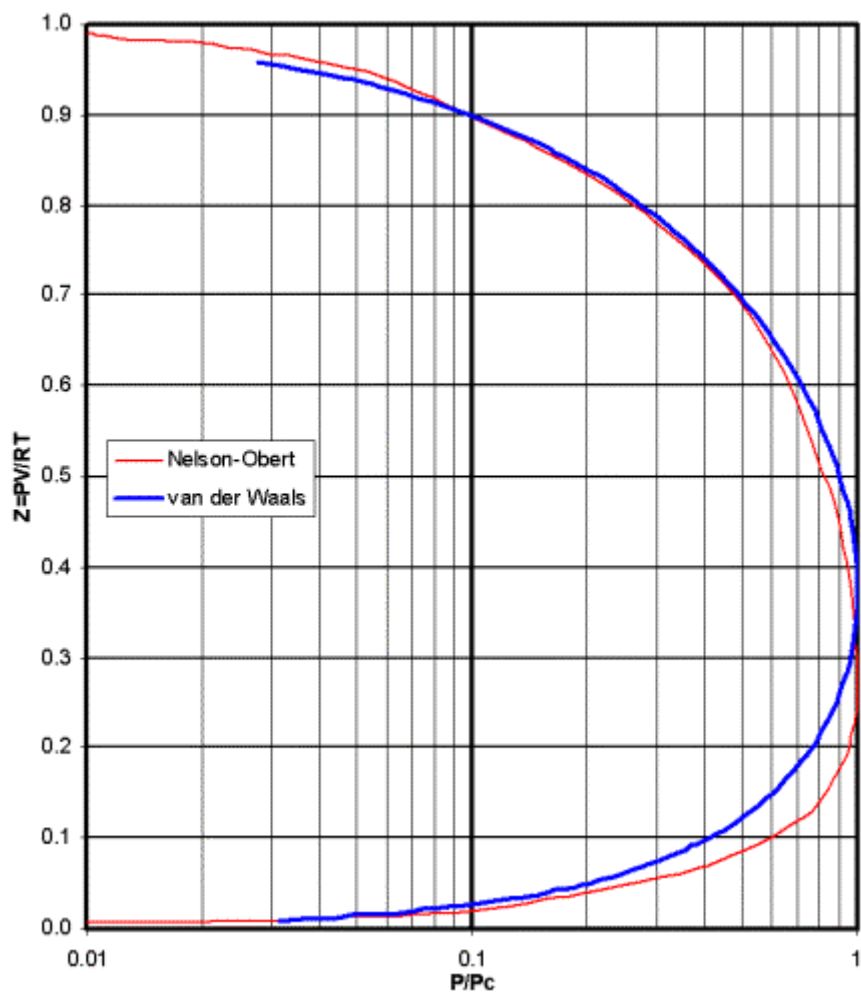


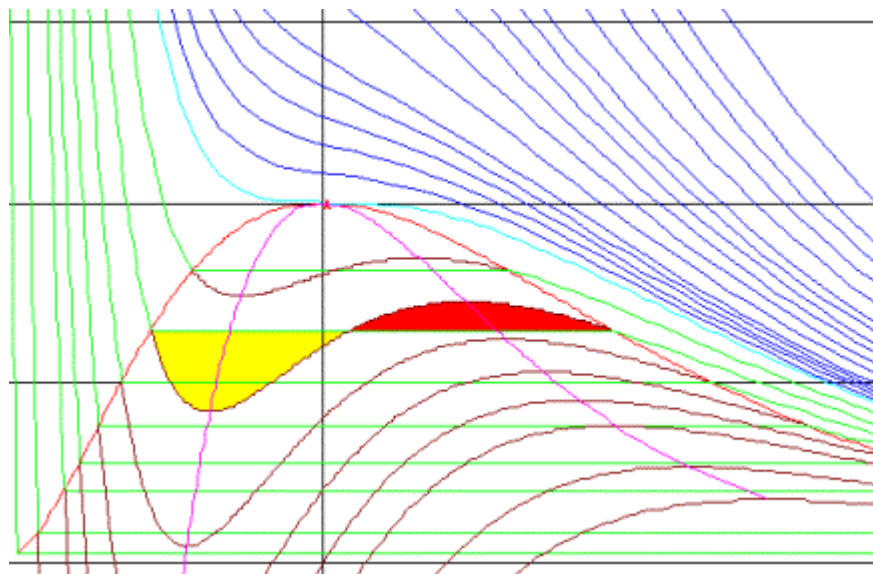
Nelson-Olbert Generalized Compressibility Chart



PVT Chart Based on Nelson-Olbert



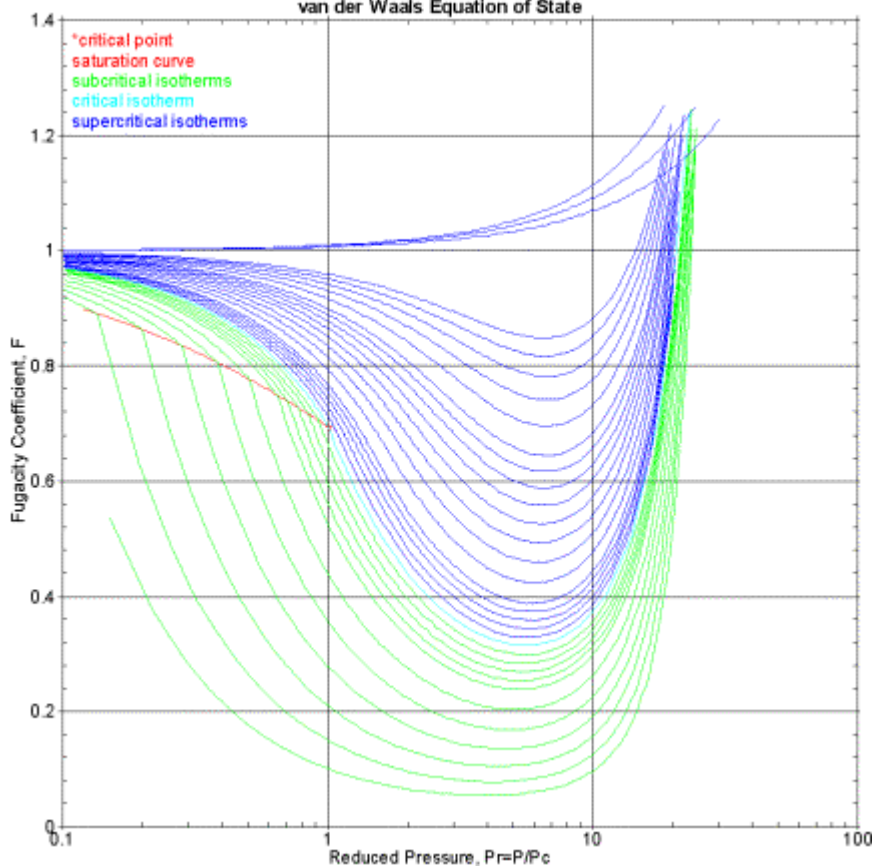


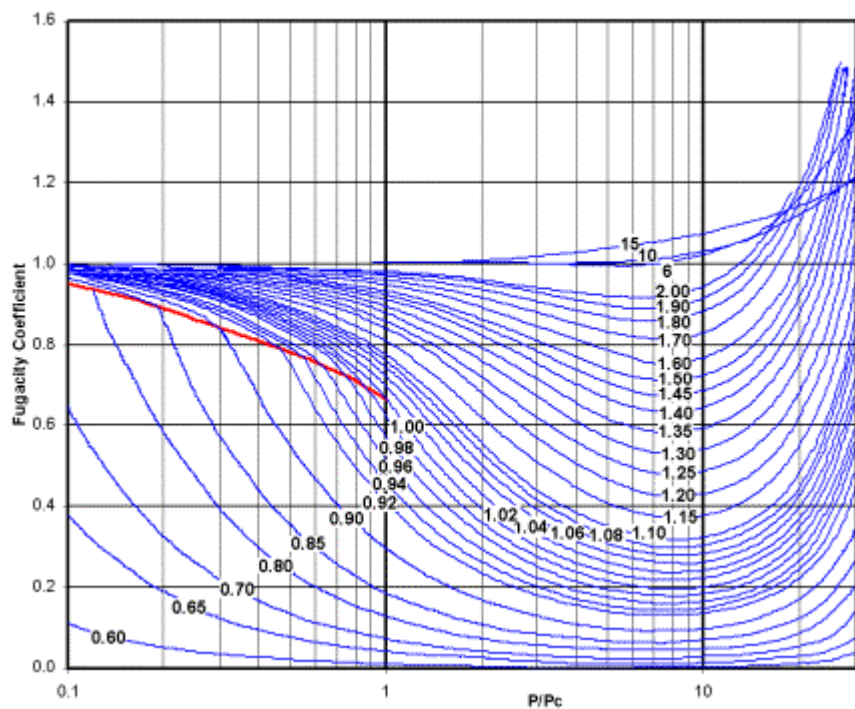


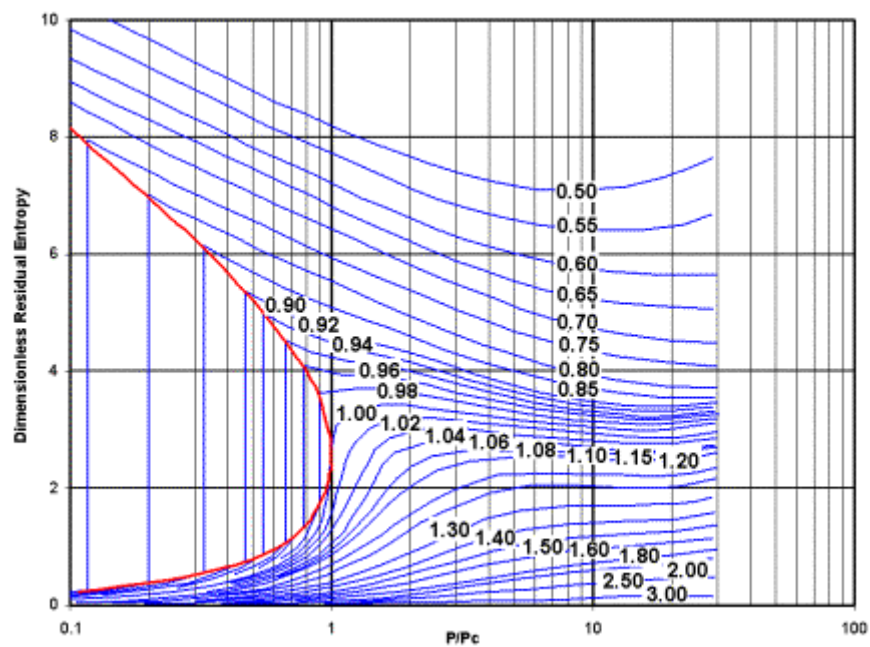
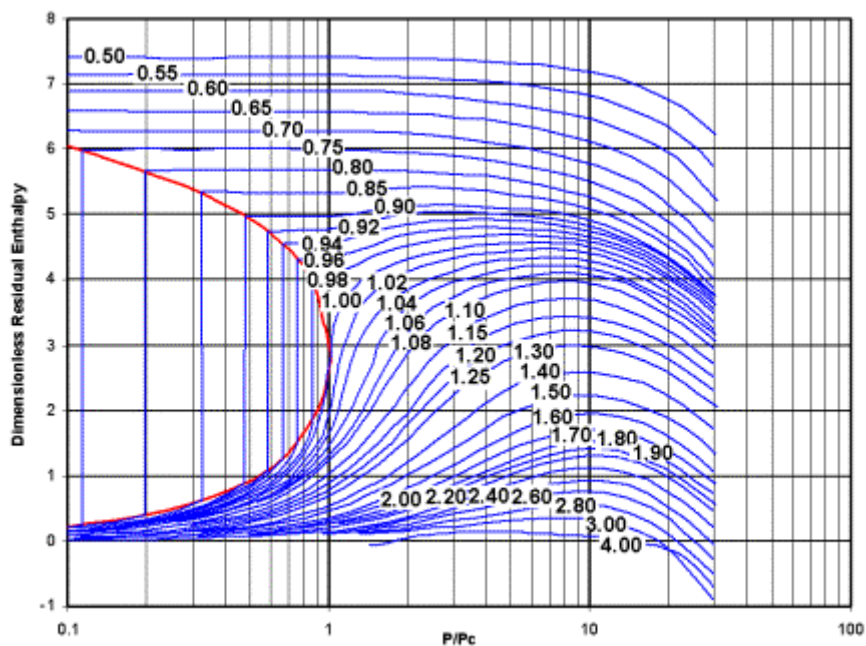
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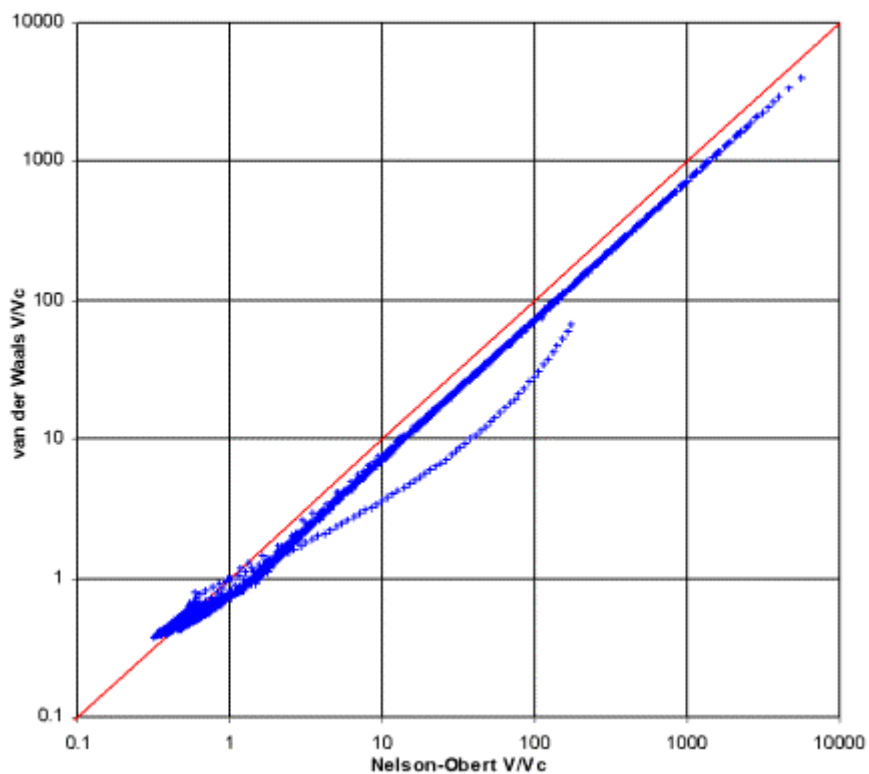


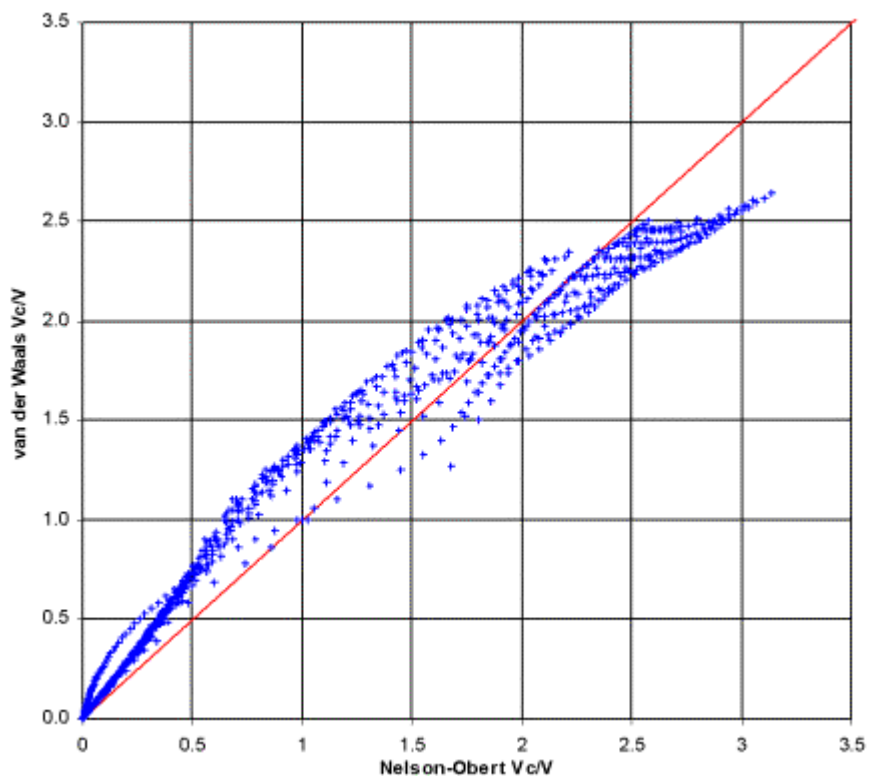
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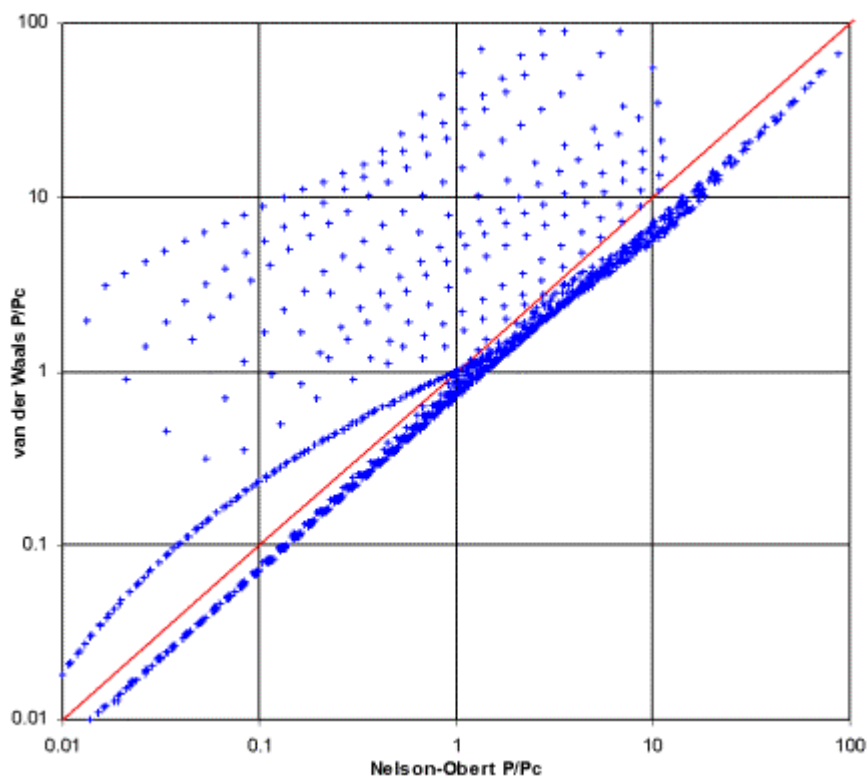


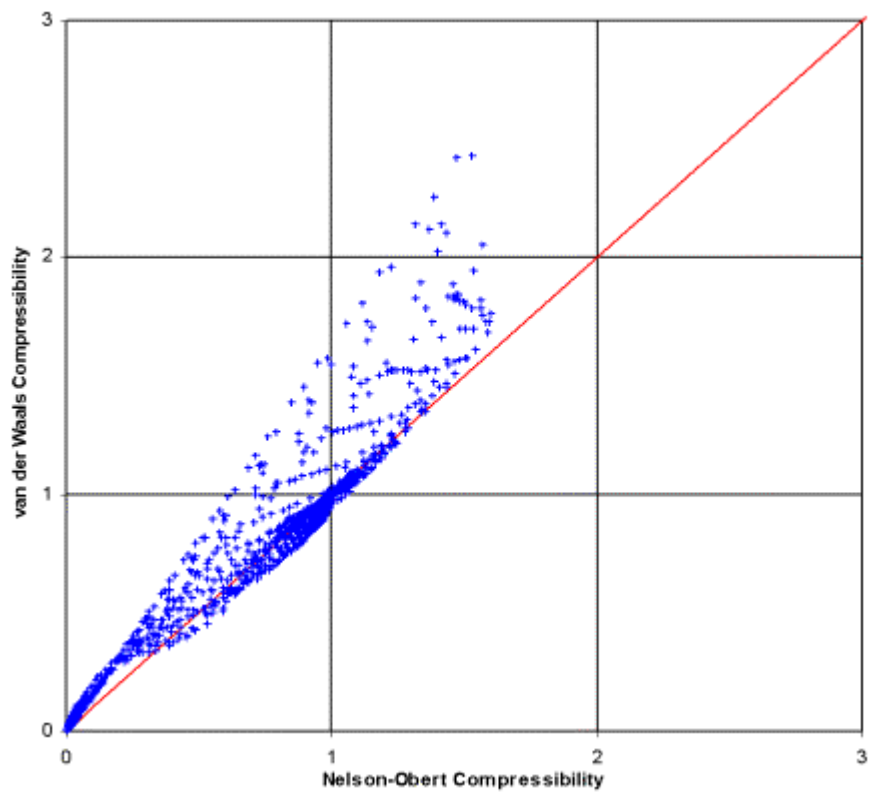


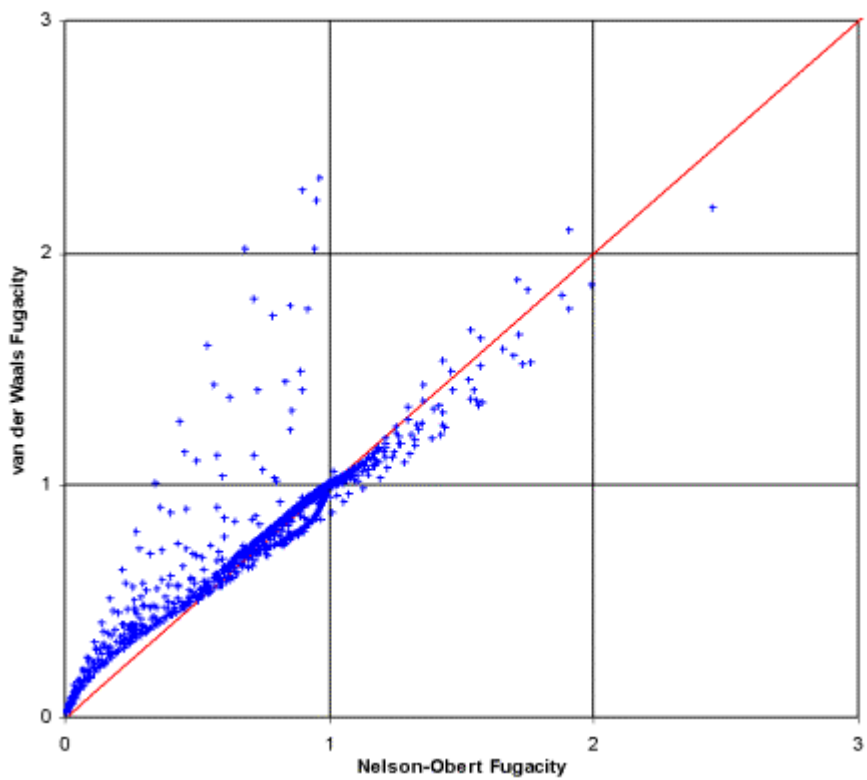




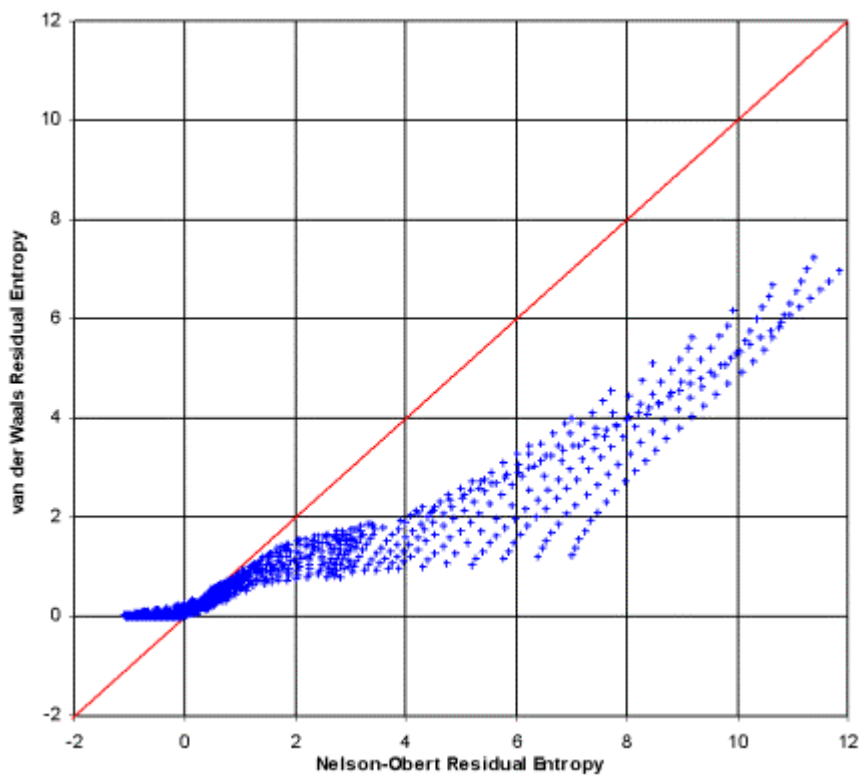


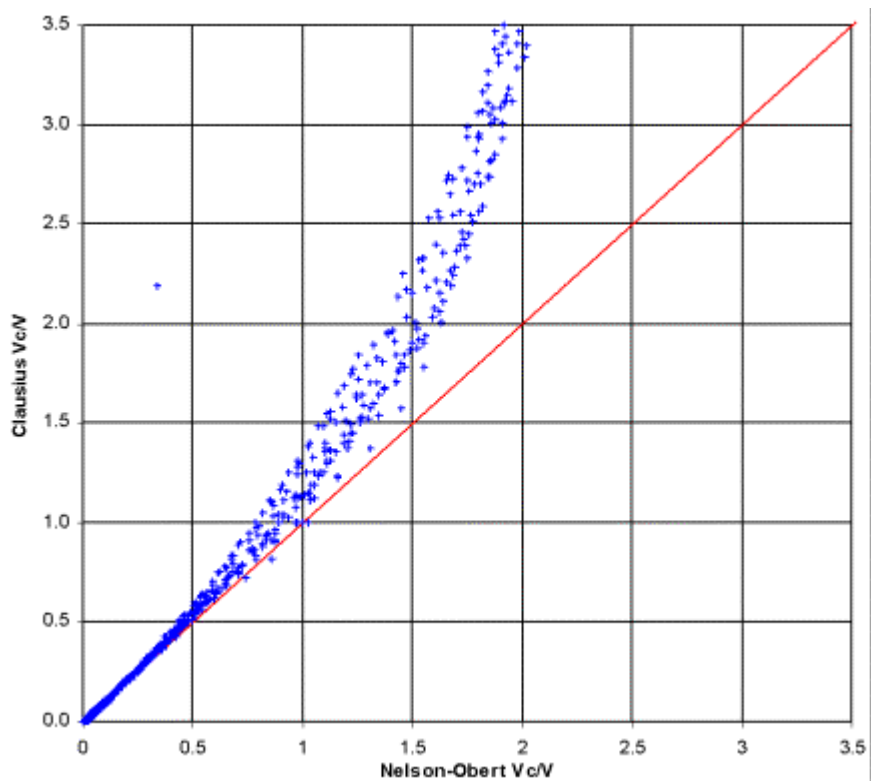


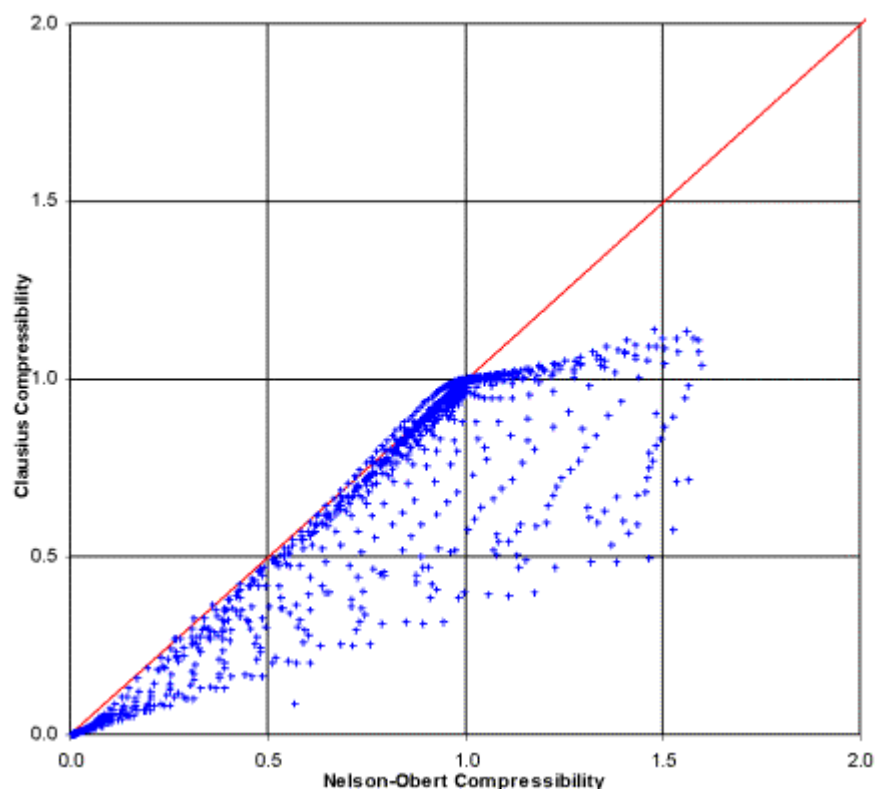


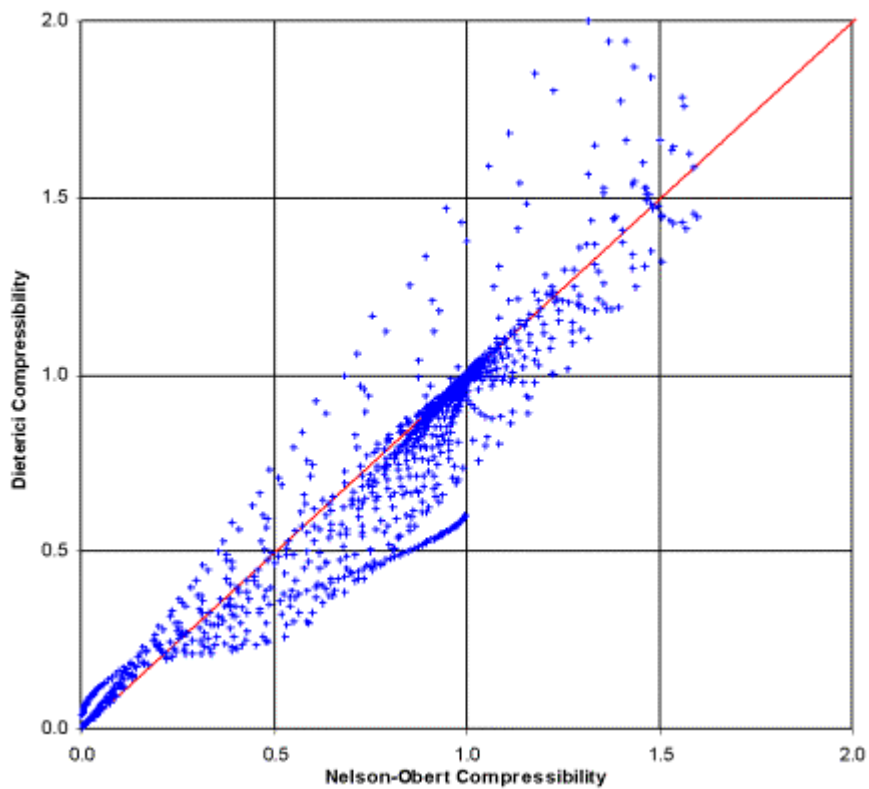


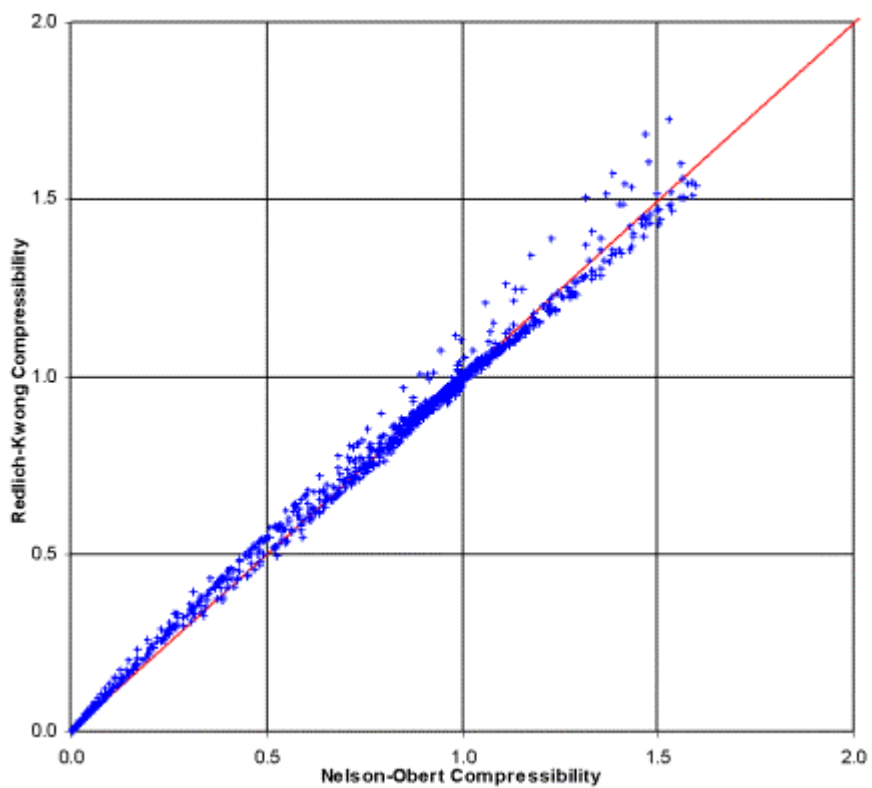


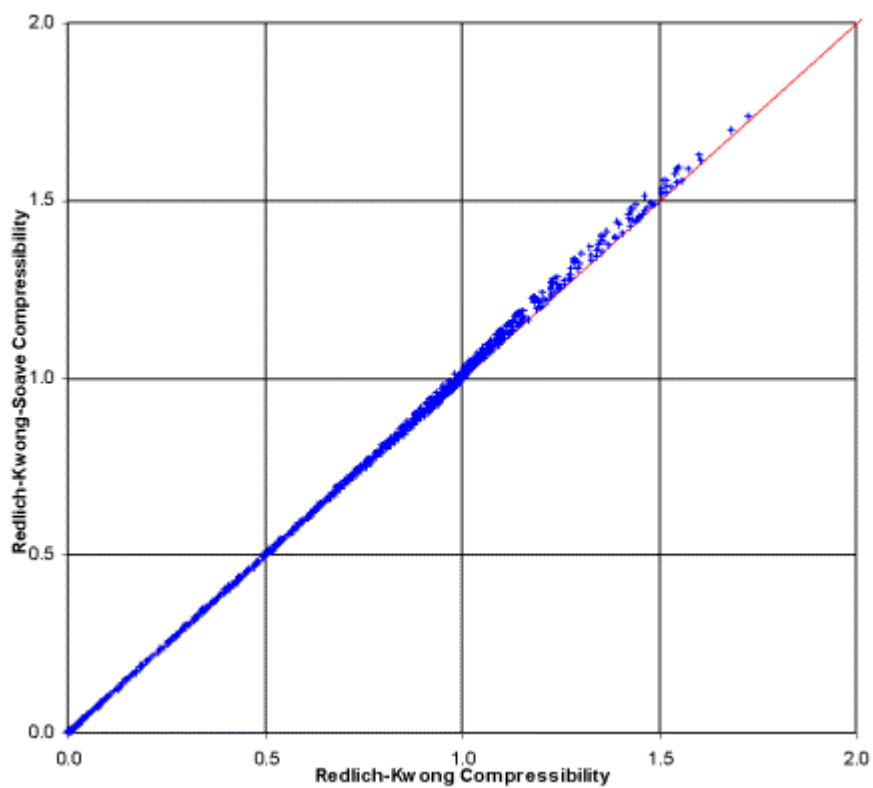


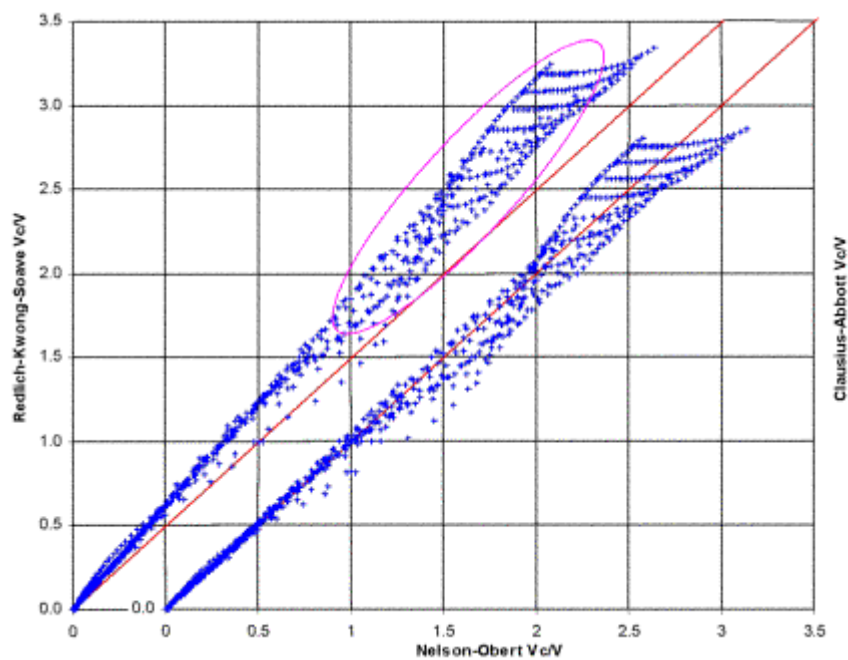
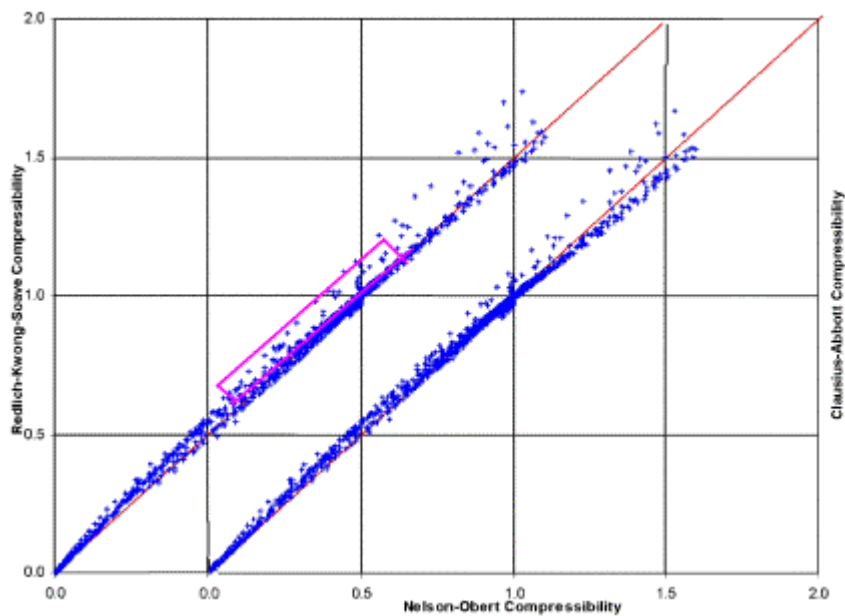


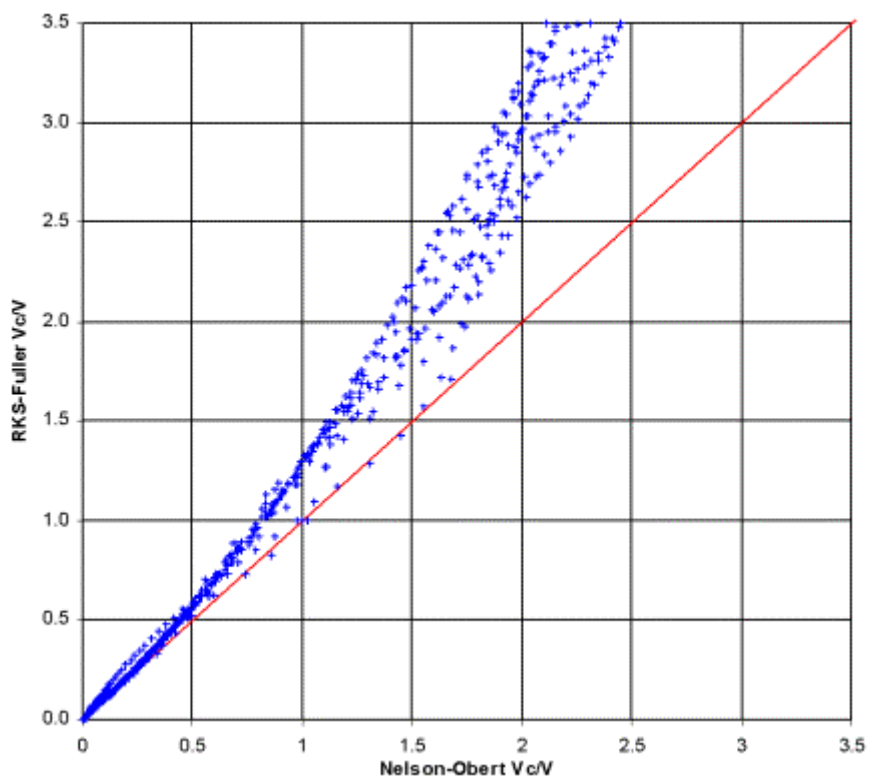




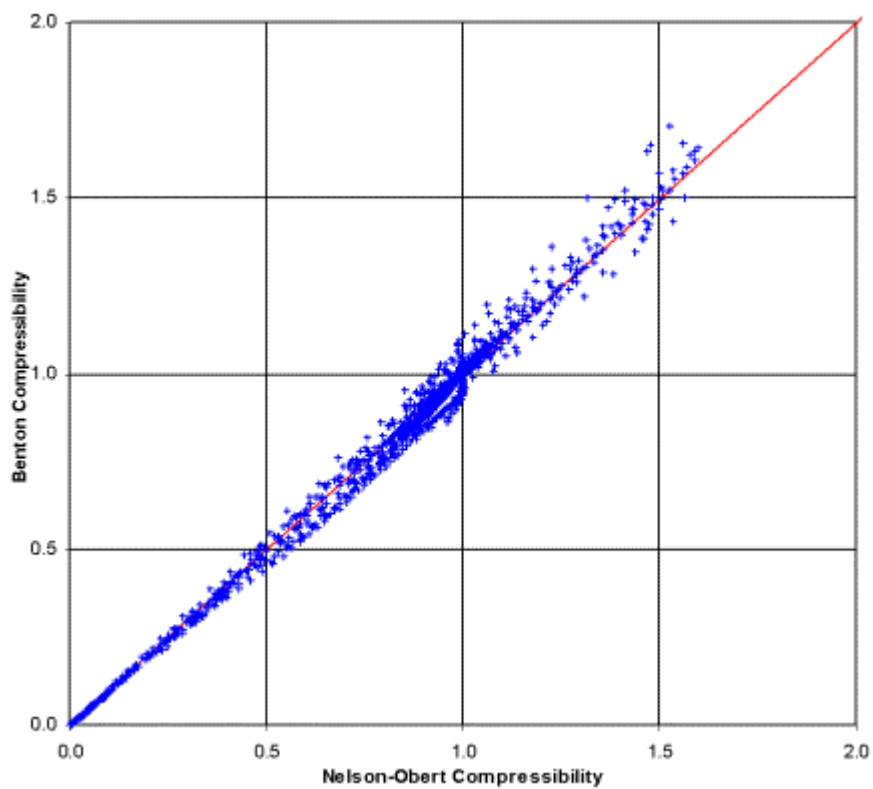


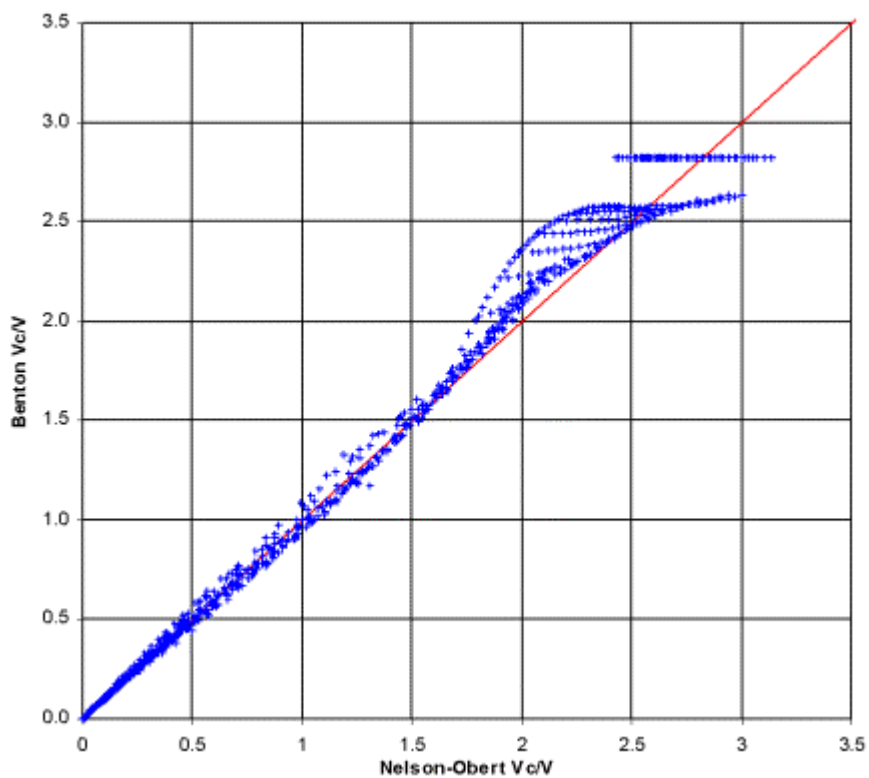


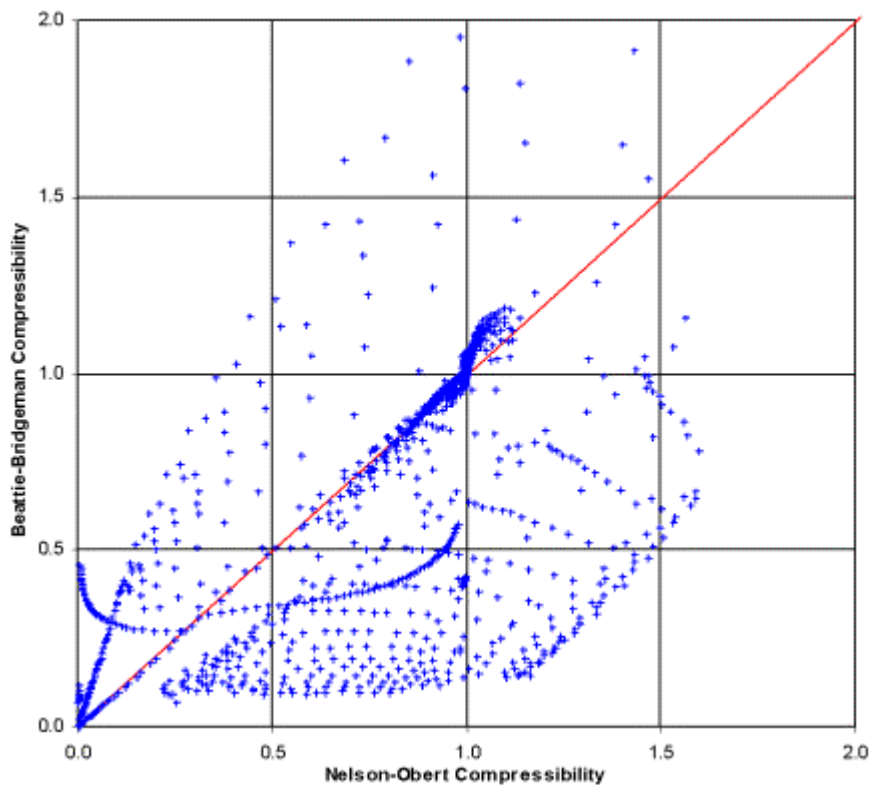


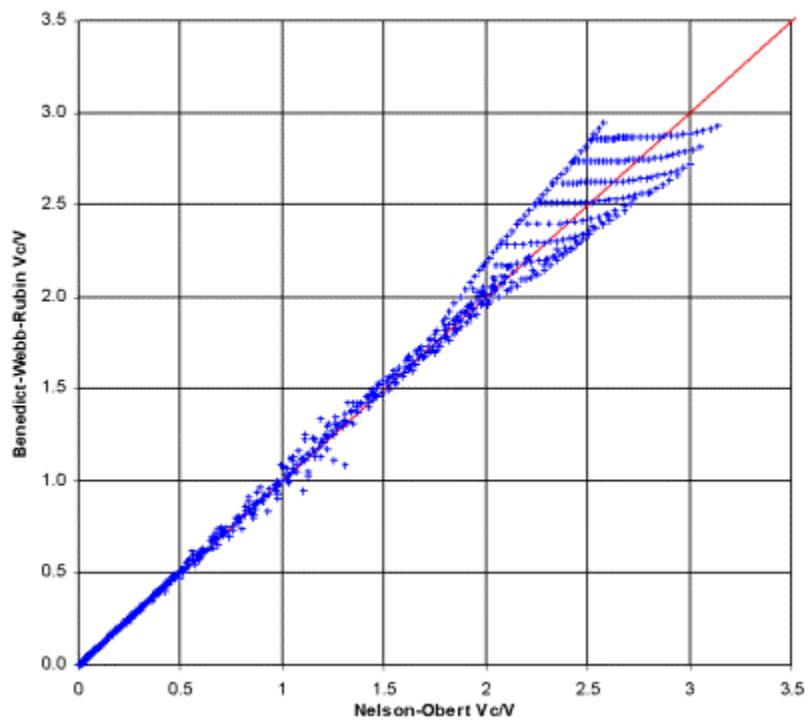


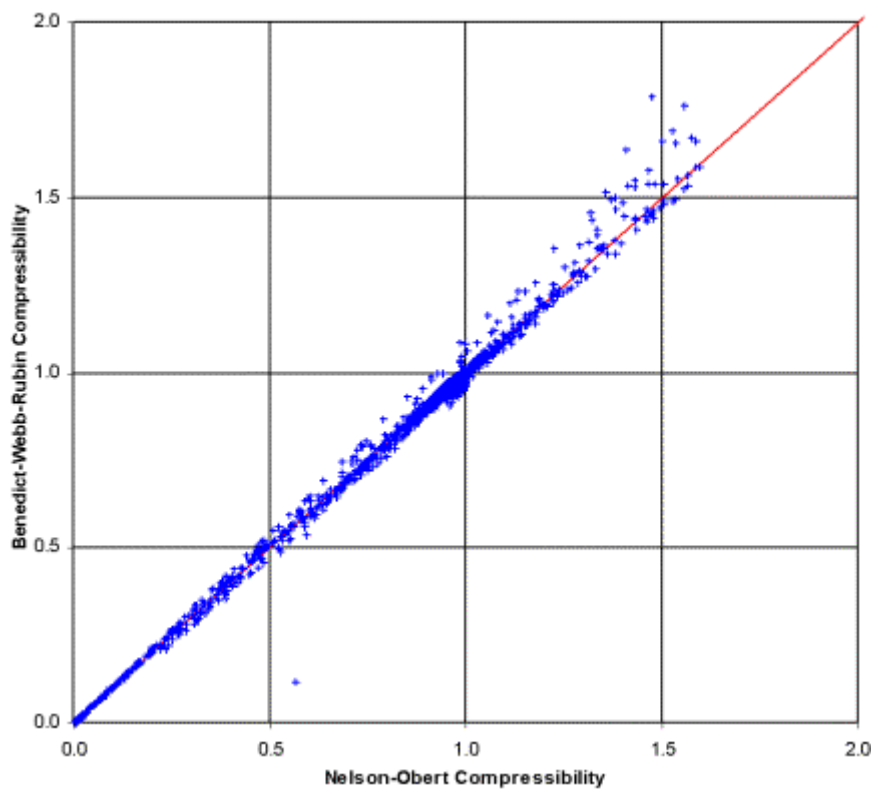


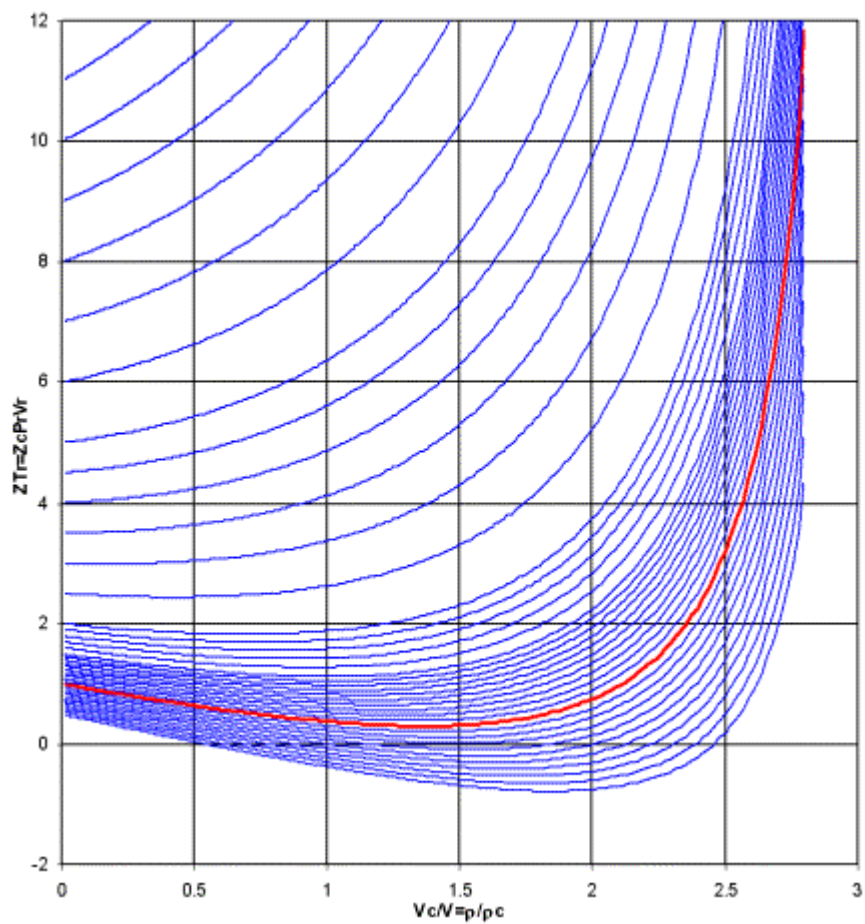


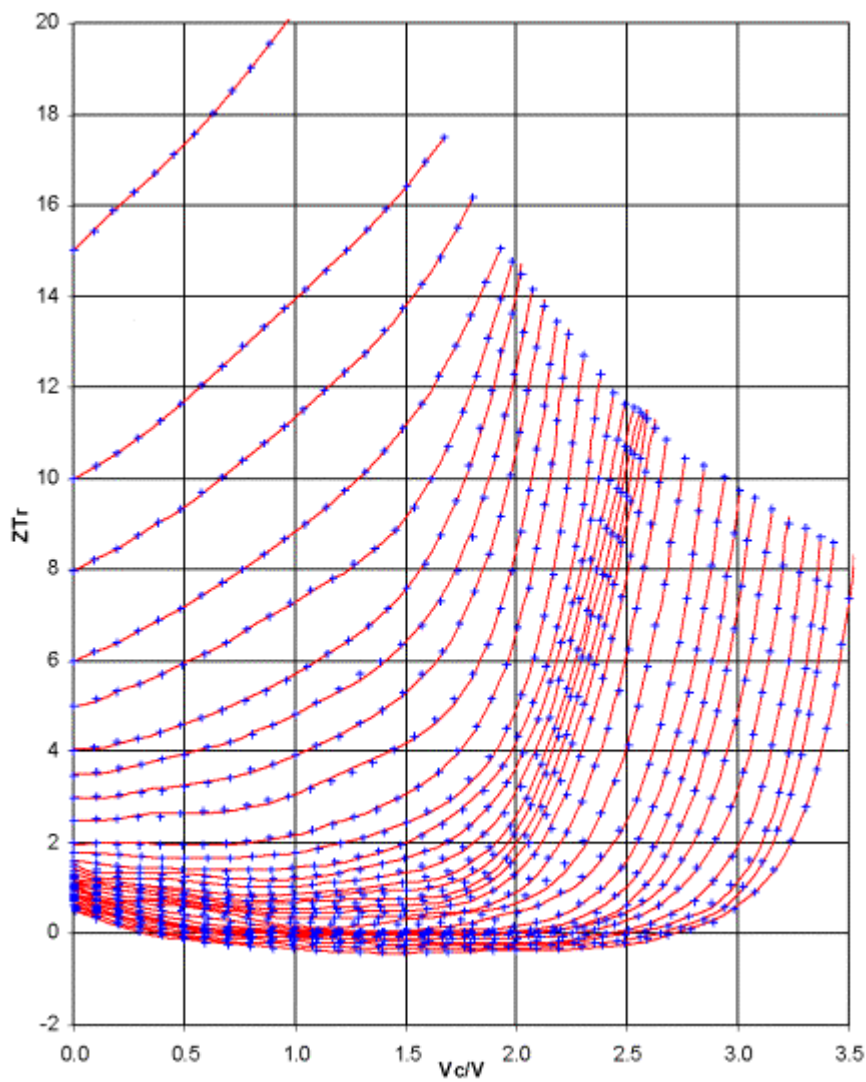




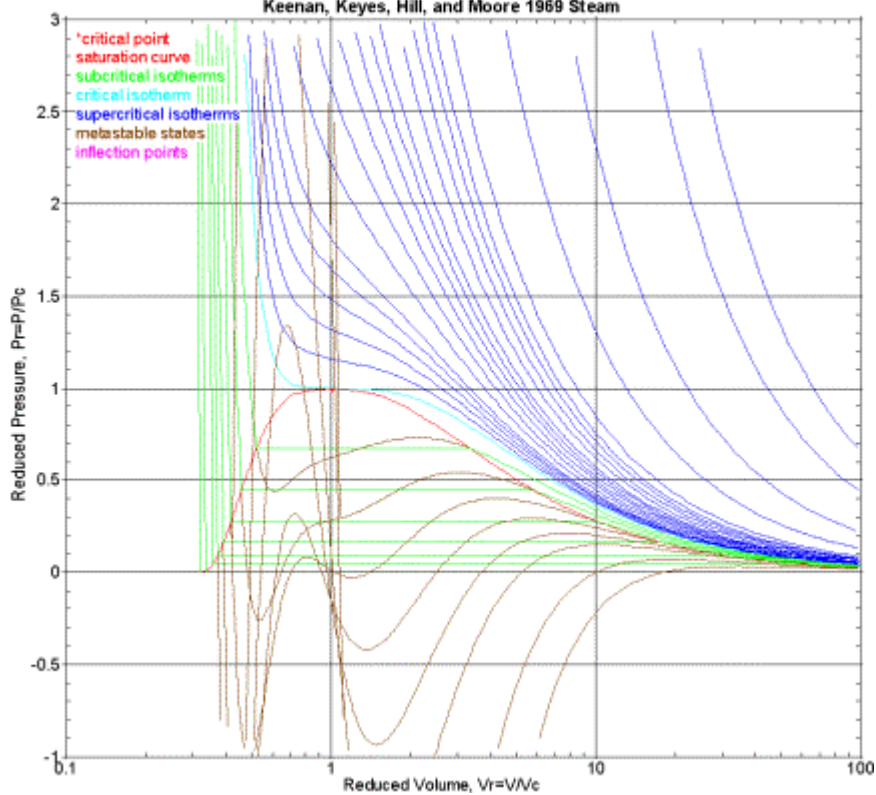






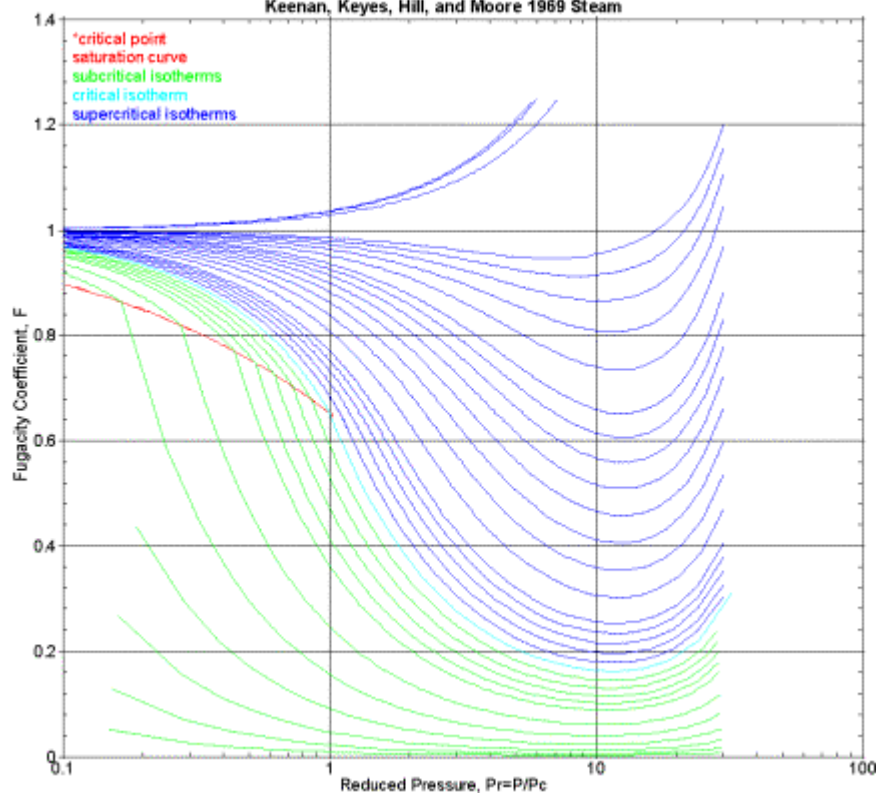


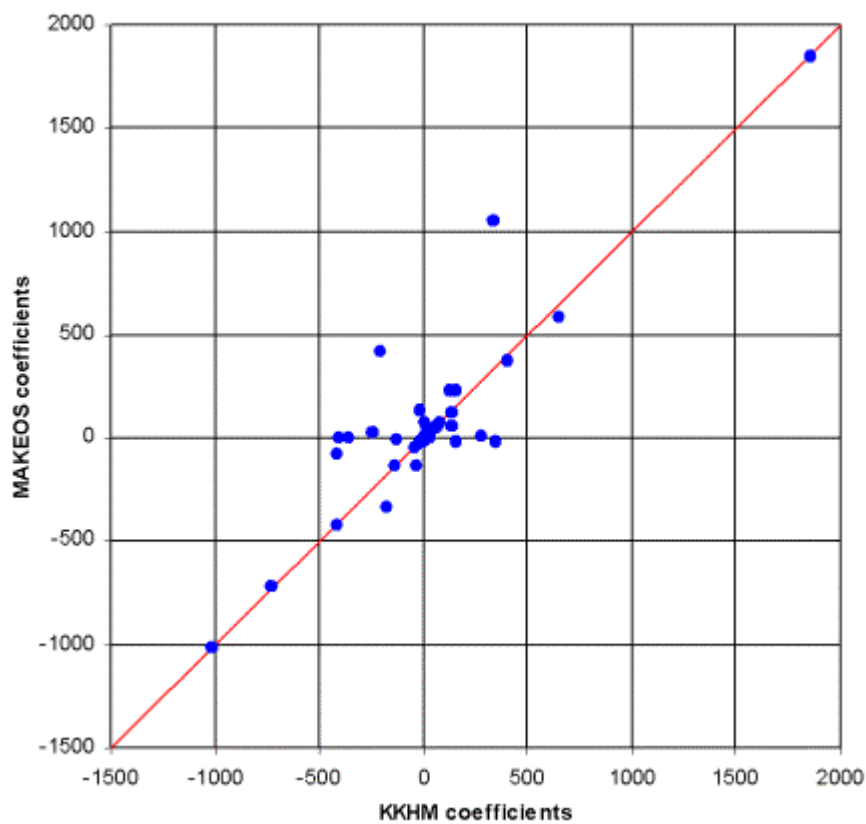
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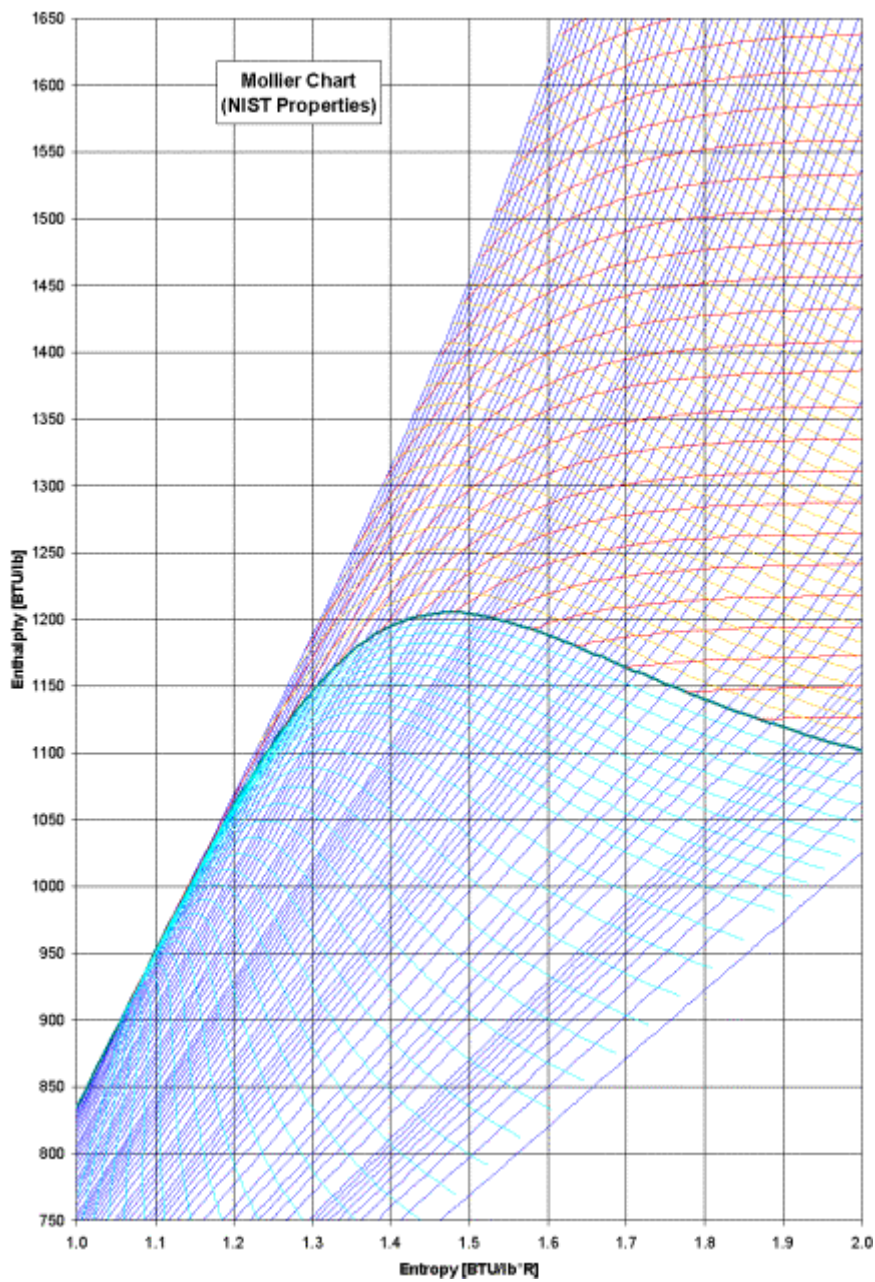


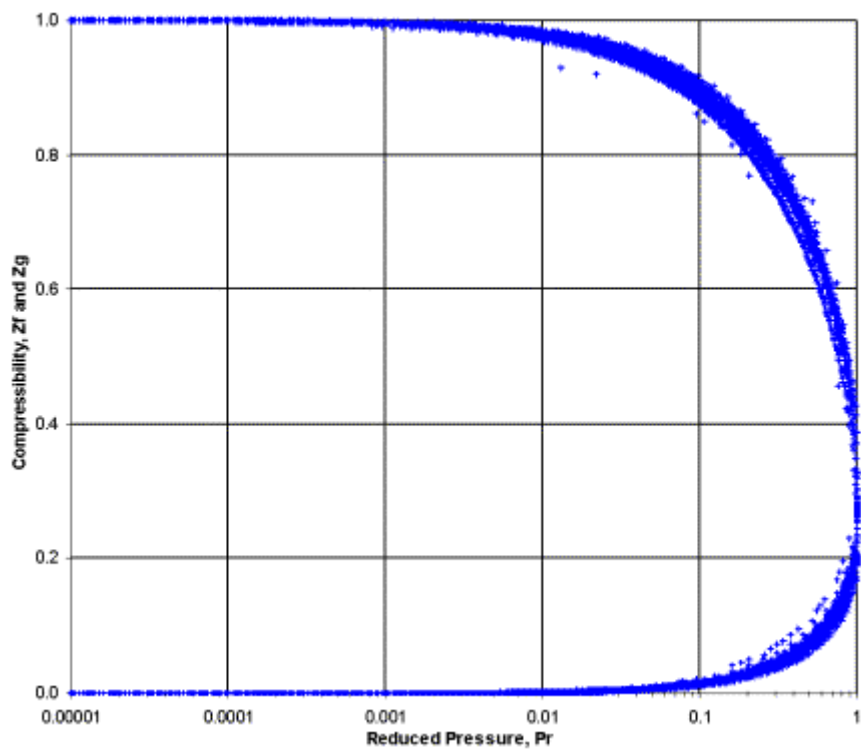


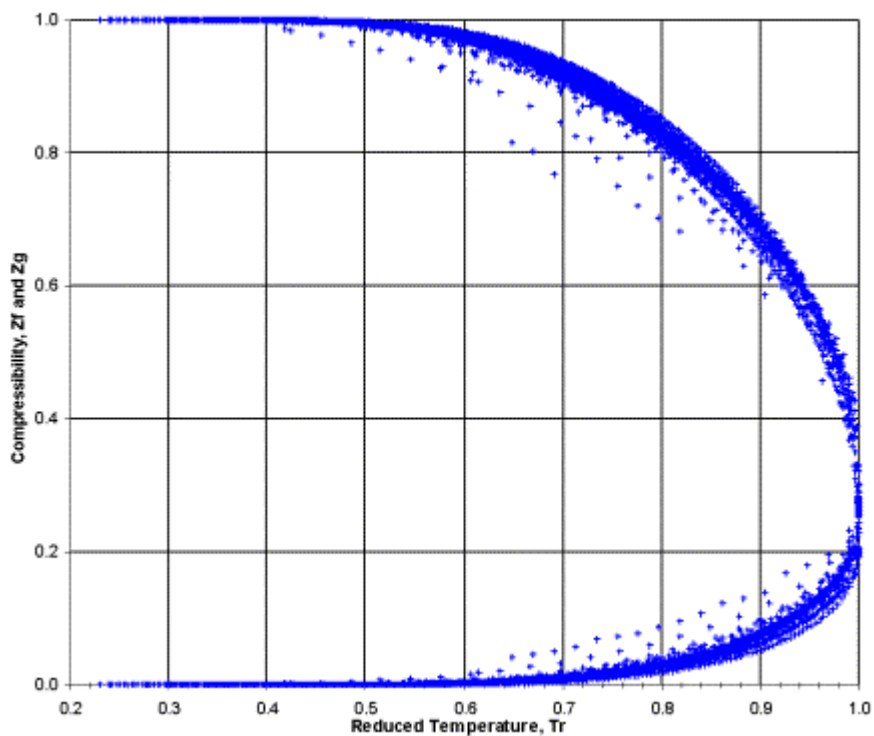
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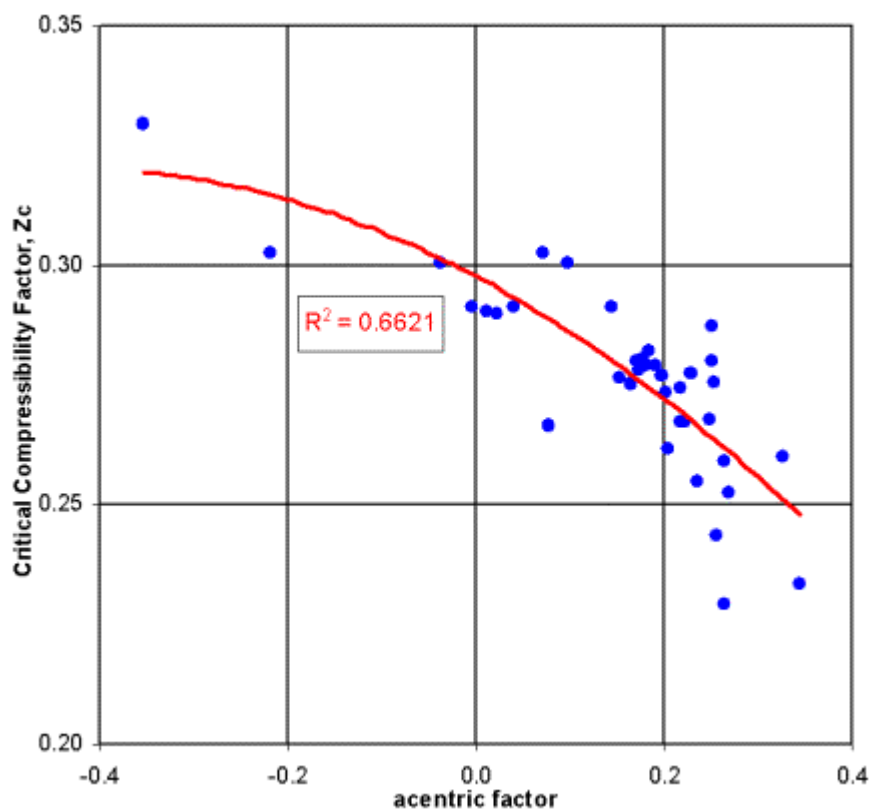


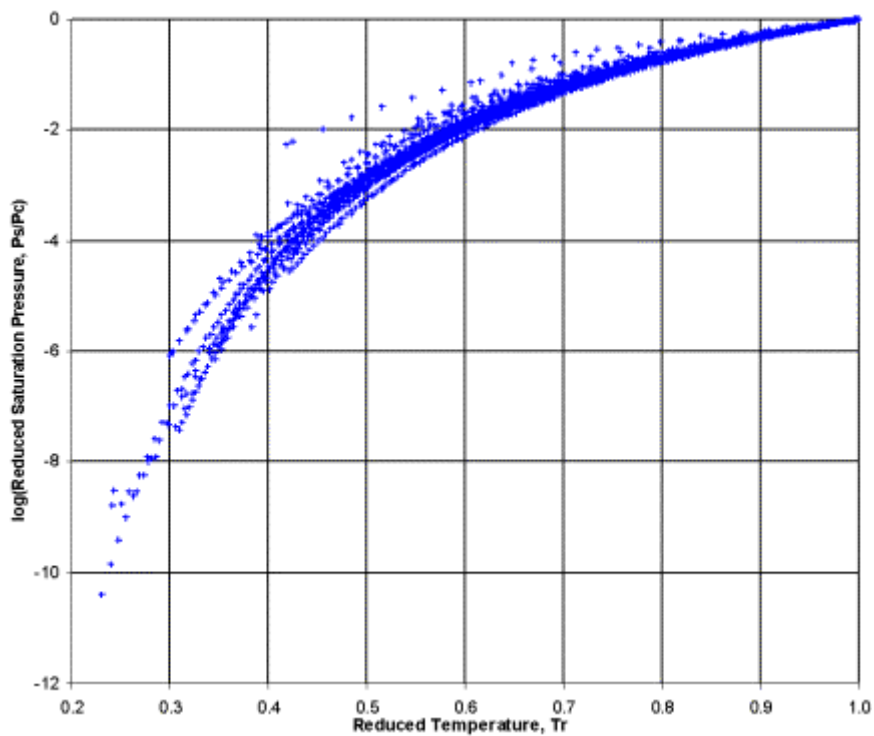


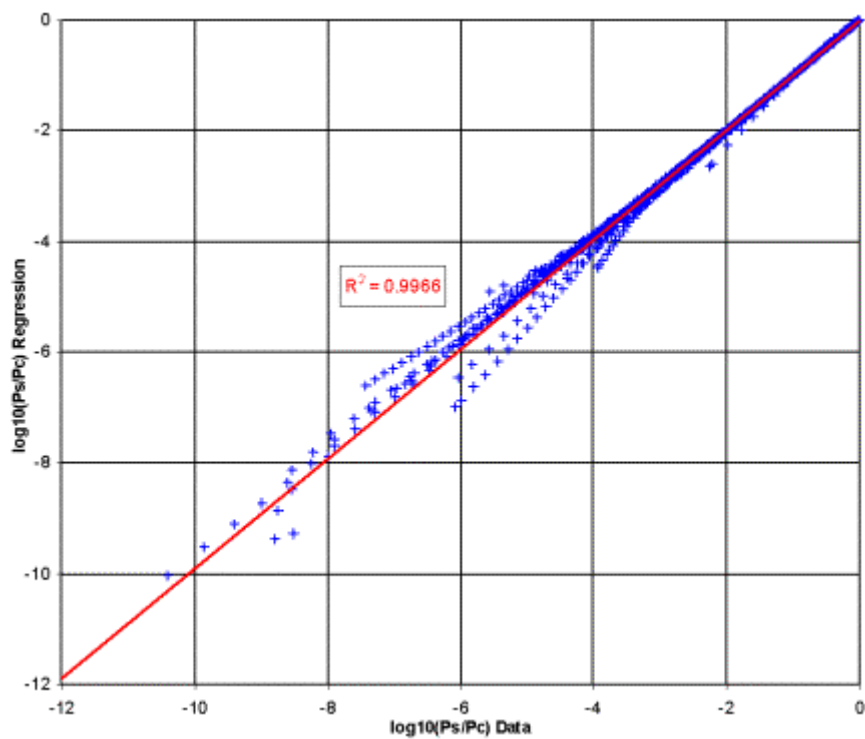




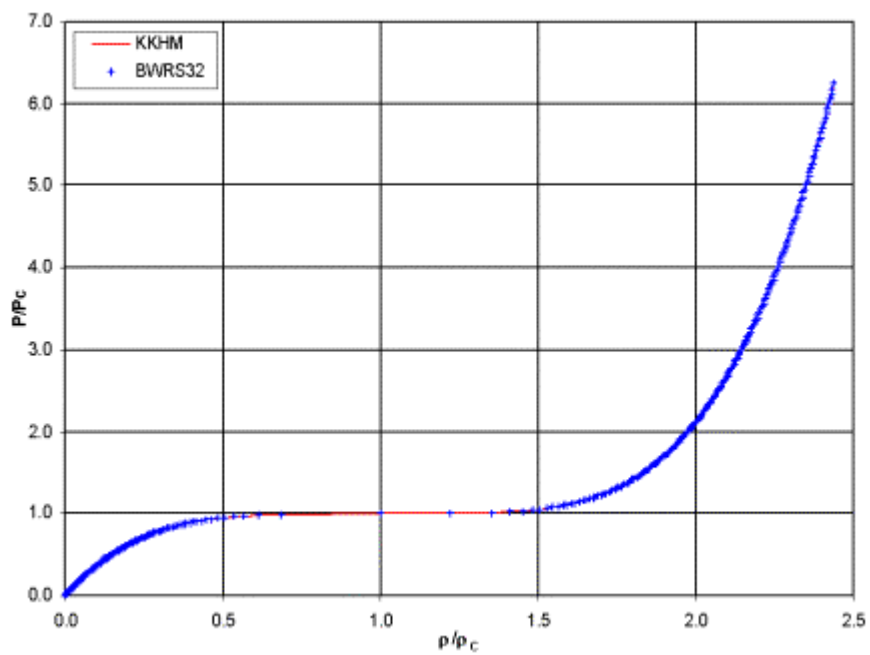
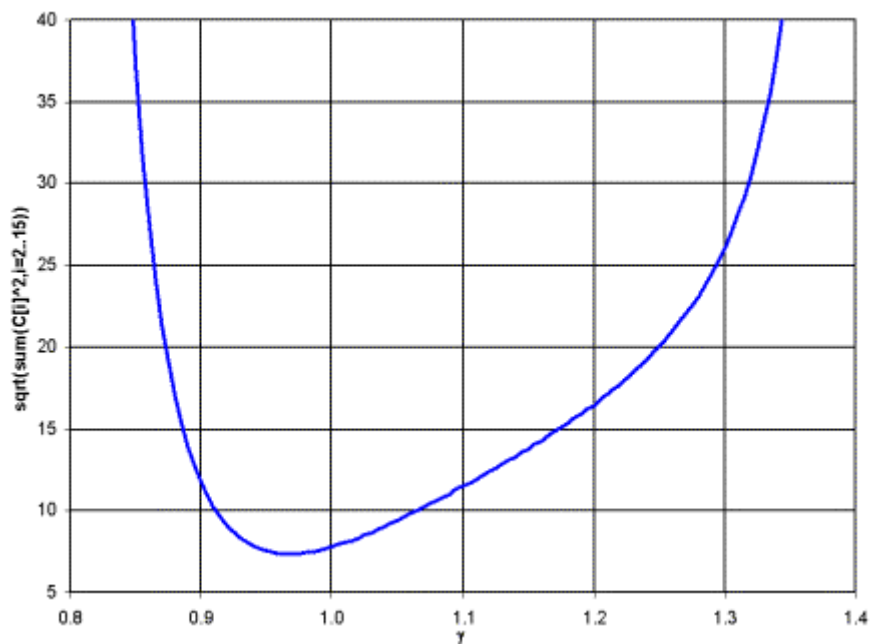


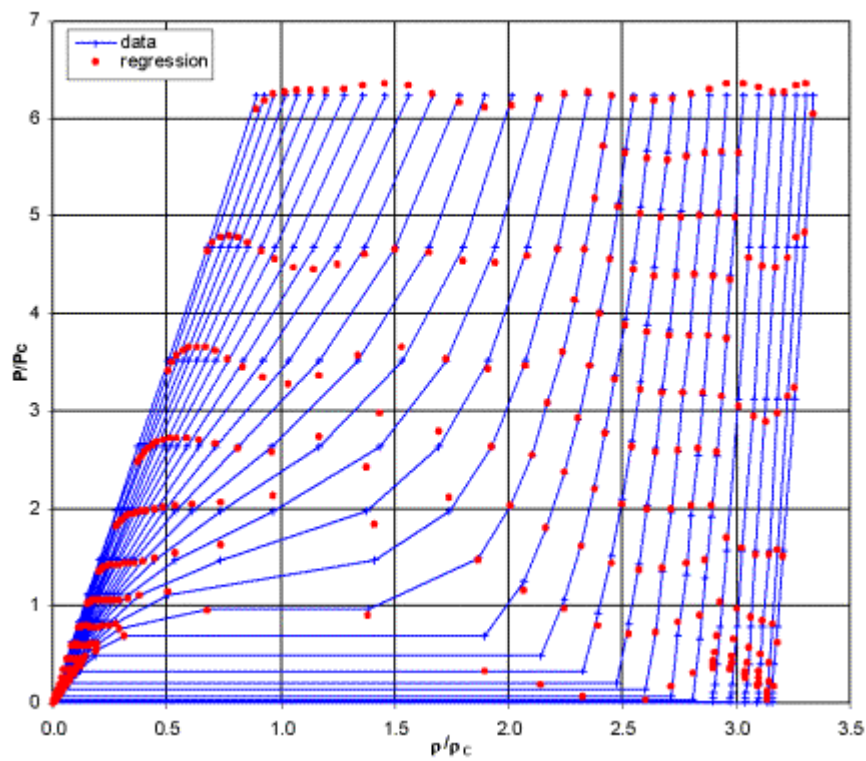


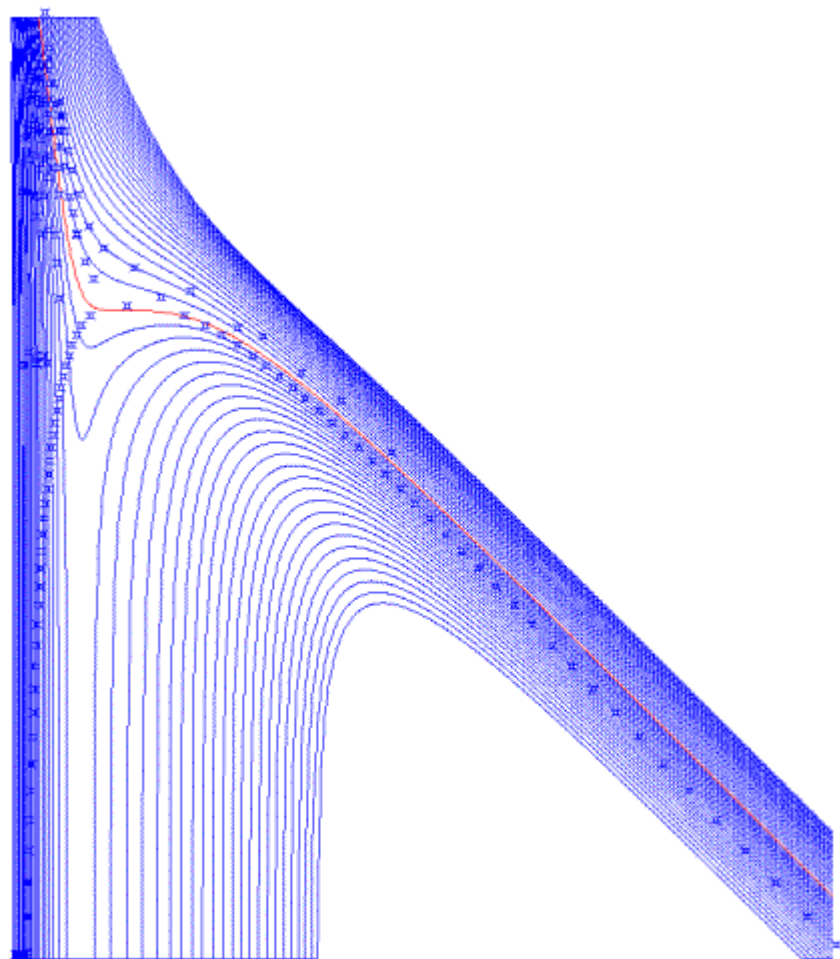


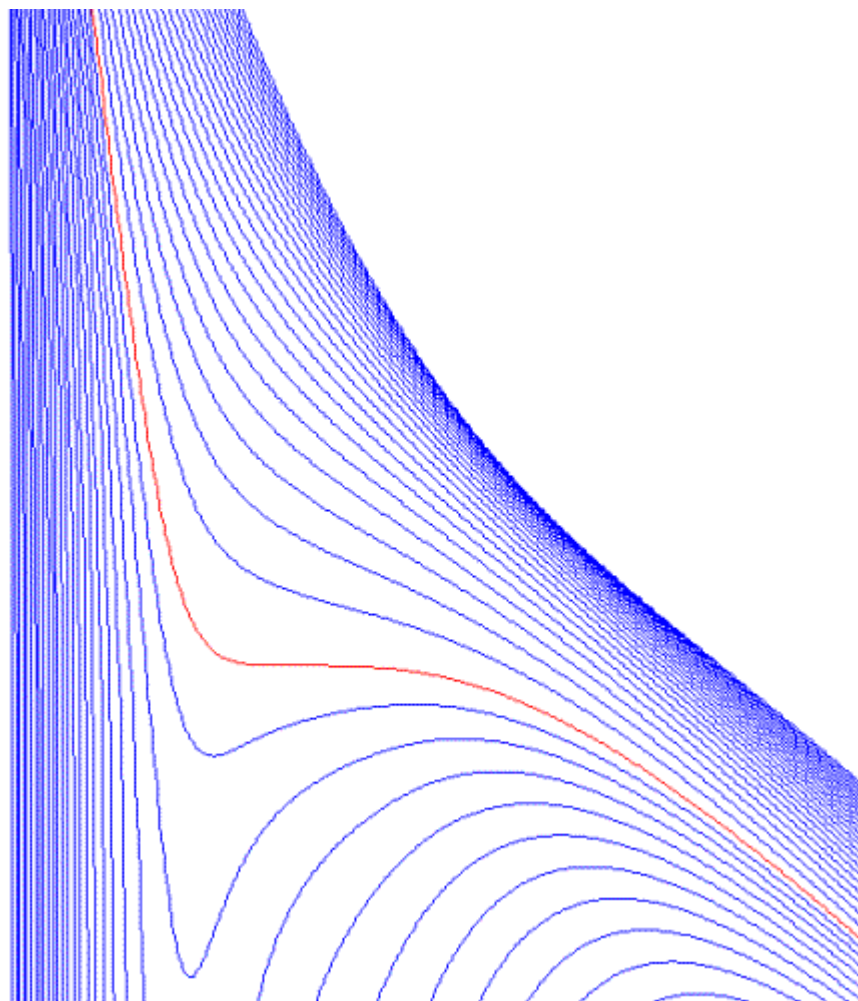


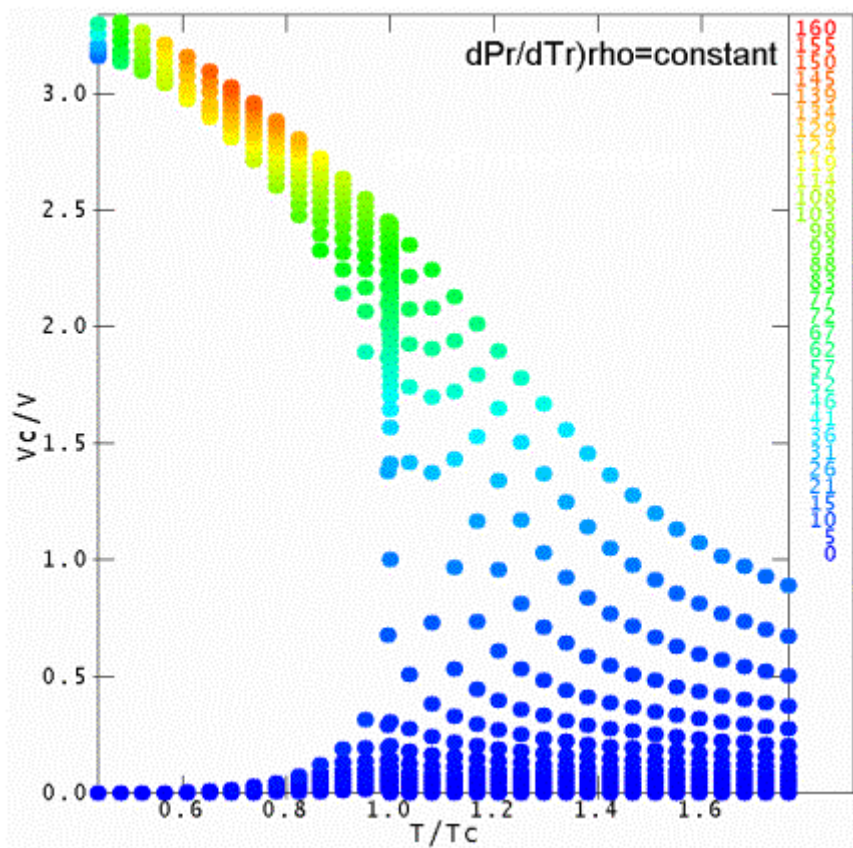


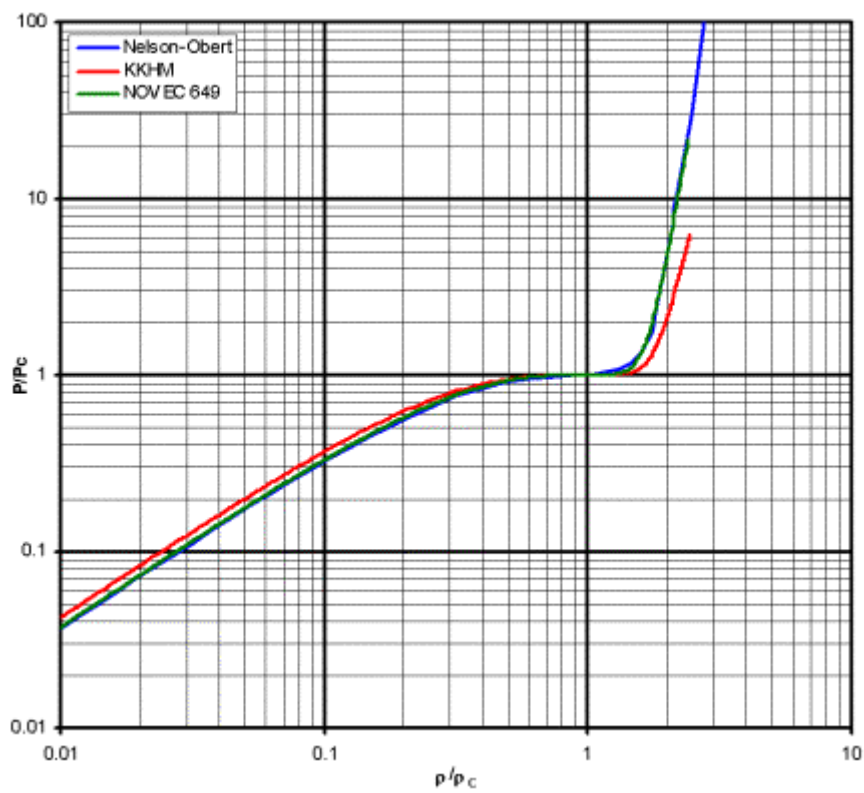


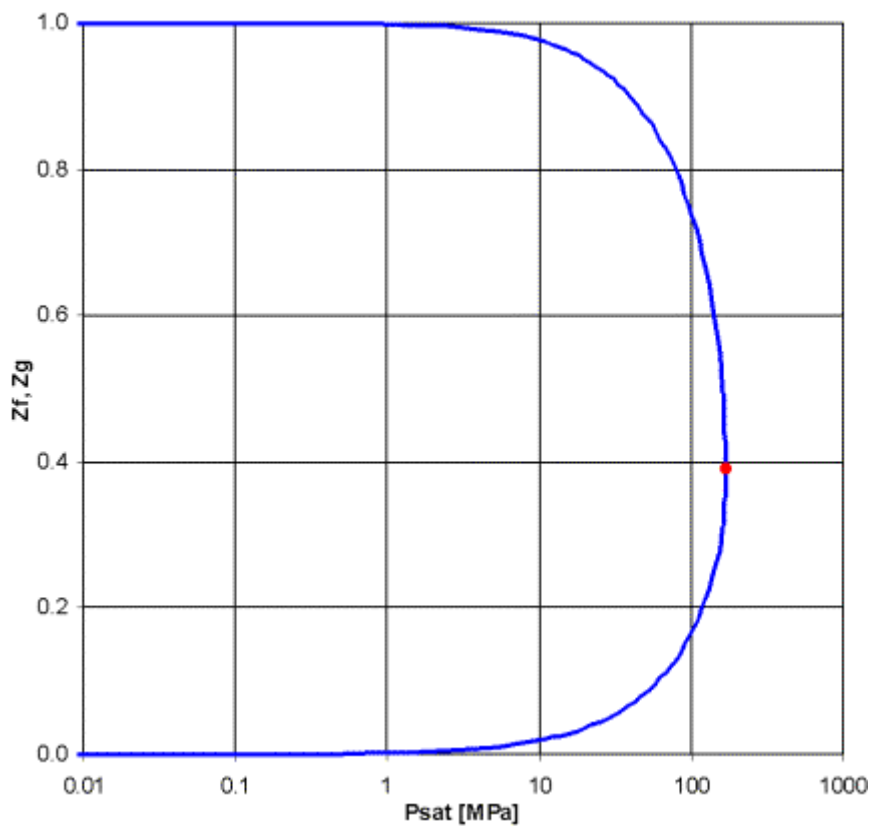


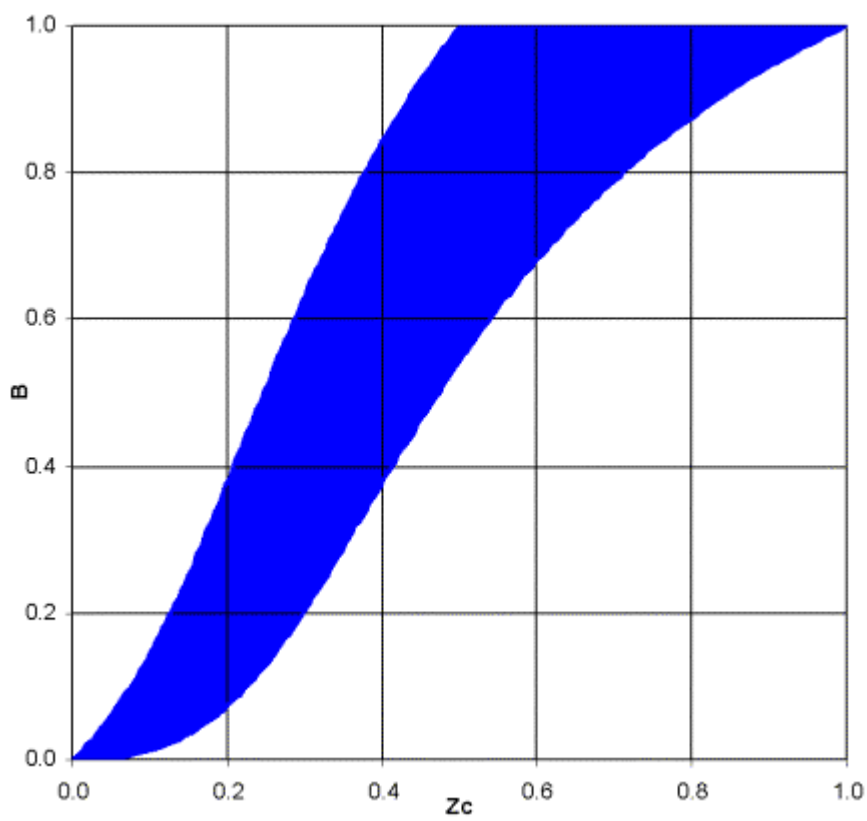




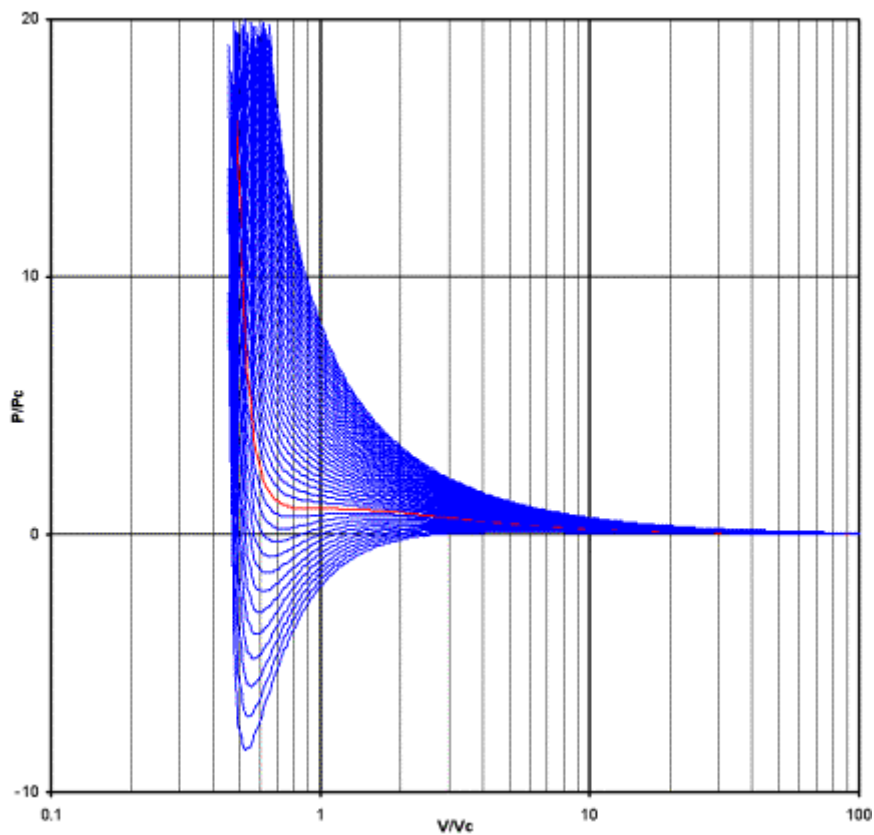












### KKHM Steam

