

**THE REFPROP DATABASE FOR THE THERMOPHYSICAL  
PROPERTIES OF REFRIGERANTS<sup>1</sup>**

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Property databases are widely used for the design and analysis of refrigeration systems. A completely revised version of the REFPROP (Reference Fluid Thermodynamic and Transport Properties) database distributed by the National Institute of Standards and Technology is described with an emphasis on the new features implemented in the revised version. The new version includes additional fluids and mixtures (including air and ammonia/water mixtures), improved property models, additional properties (including exergy), increased calculational speed, an enhanced user interface, and support for using the property routines with other applications.

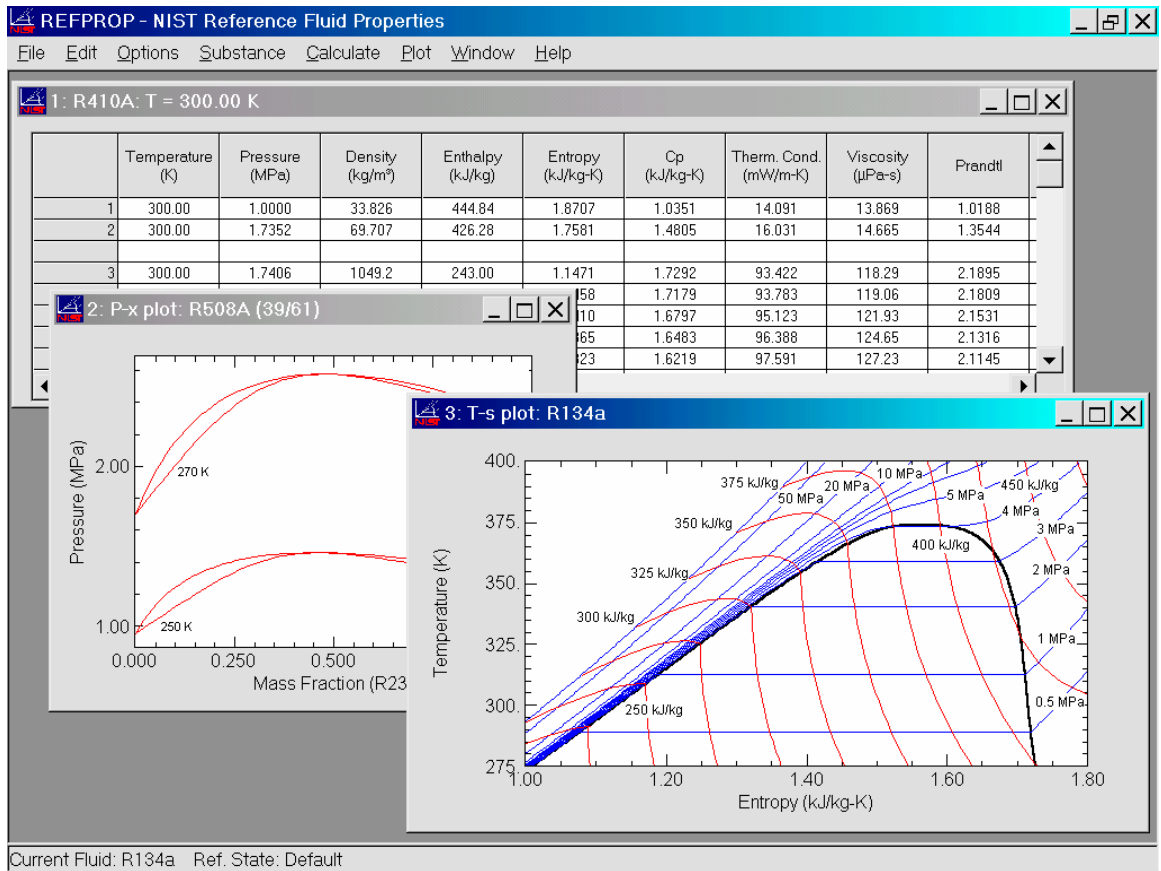
This program is based on the most accurate pure fluid and mixture models currently available. Properties of HFC mixtures are calculated with a new Helmholtz energy model, and experimentally based values of the parameters in this model are now available for 145 mixtures. The viscosity and thermal conductivity models have been updated based on recently published data. The new graphical user interface (GUI) retains the overall look and feel of the previous GUI, but incorporates enhanced usability and many new features and options, greatly improved speed of calculation, and many more options to prepare plots of thermodynamic surfaces. These models are implemented in a suite of subroutines written in standard Fortran which may be used independently of the GUI.

This database has become the *de facto* standard for refrigerant properties. It has been used to generate refrigerant property tables published by the IIR and ASHRAE. The relationship between REFPROP and a proposed ISO standard for refrigerant thermodynamic properties is discussed.

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Screen shot of the REFPROP database, depicting a typical properties table, a pressure-composition plot for a binary mixture, and a temperature-entropy diagram.