

Proposal for Poster

Property Libraries for Working Fluids for Calculating Heat Cycles, Turbines, Heat Pumps, and Refrigeration Processes

Hans-Joachim Kretzschmar, Matthias Kunick, Sebastian Herrmann, Ines Stoecker, and Mariana Nicke

Department of Technical Thermodynamics, Zittau/Goerlitz University of Applied Sciences, 02763 Zittau, Germany

E-mail: hj.kretzschmar@hszg.de

The program libraries for calculating the thermophysical properties for water and steam, for mixtures with water and steam, and for other working fluids are designed for practical use by engineers who calculate heat cycles, steam or gas turbines, boilers, heat pumps, or other thermal or refrigeration processes. They can calculate thermodynamic properties, transport properties, thermodynamic derivatives and inverse functions.

The following property libraries are being presented here: *LibIF97* for water and steam, *LibIF97_META* for metastable steam, *LibICE* for ice, *LibSeaWa* for seawater, *LibHuGas* for humid combustion-gas mixtures also at high pressures, *LibHuAir* for humid air also at high temperatures and pressures, *LibAmWa* for ammonia/water mixtures in absorption processes and the Kalina process, *LibWaLi* for water/lithium bromide mixtures in absorption processes, *LibIDGAS* for combustion gas mixtures, *LibIdGasMix* for 25 ideal gases and their mixtures, *LibRealAir* for real dry air, *LibCO2* for carbon dioxide including dry ice, *LibNH3* for ammonia, *LibR134a* for the refrigerant R134a, *LibPropane* for propane, *LibButane_Iso* and *LibButane_n* for isobutane and n-butane, *LibD4*, *LibD5*, *LibD6*, *LibMDM*, *LibMD2M*, *LibMD3M*, *LibMD4M*, and *LibMM* for siloxanes used as ORC working fluids, *LibC2H5OH* for ethanol, *LibCH3OH* for methanol, *LibH2* for hydrogen, *LibN2* for nitrogen, and *LibHe* for helium. In addition, property libraries for a number of hydrocarbons are available.

These libraries contain the most accurate algorithms currently available for calculating thermodynamic and transport properties.

For extremely fast property computations in CFD or non-stationary process modelling, spline-based property libraries are available.

The property libraries can be used in user-specific programs written in Fortran, C++, C#, Java, Pascal (Delphi), Python, Visual Basic or other programming languages under the operating systems Windows, Unix/Linux or Mac OS.

In addition, add-ons for the use of these property libraries in Excel[®], MATLAB[®], Mathcad[®], Engineering Equation Solver[®] (EES), Dymola[®] and SimulationX[®] (Modelica), and LabVIEW[™] are available.