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

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The program libraries developed for calculating thermophysical properties of working fluids can be used in the daily work of an engineer who calculates heat cycles, steam or gas turbines, boilers, heat pumps or other thermal or refrigeration processes. Thermodynamic properties, transport properties, thermodynamic derivatives, and backward functions can be calculated.

The following property libraries are being presented: LibHuGas for humid combustion-gas mixtures, LibHuAir for humid air, LibAmWa for ammonia/water mixtures, LibWaLi for water/lithium bromide mixtures, LibIDGAS for combustion gas mixtures, LibIdGasMix for 25 ideal gases and their mixtures, LibRealAir for real dry air, LibIF97 and LibICE for steam, water, and ice, LibSeaWa for seawater, LibCO2 for carbon dioxide including dry ice, Libraries for ammonia, R134a and other refrigerants, libraries for propane, isobutane, n-butane, and further hydrocarbons,, LibD4, LibD5, LibD6, LibMDM, LibMD2M, LibMD3M, LibMD4M, LibMM for siloxanes used as ORC working fluids, LibCH3OH for methanol, LibC2H5OH for ethanol, LibH2 for hydrogen, LibN2 for nitrogen, LibHe for helium, and LibSecRef for 10 liquid secondary refrigerants.

The libraries contain the most recent algorithms for thermodynamic and transport properties.

The following software solutions are presented: Add-In FluidEXL for Excel[®], Add-On FluidLAB for MATLAB[®], Add-On FluidMAT for Mathcad[®], Add-On FluidEES for the Engineering Equation Solver[®], Add-On FluidDYM for Dymola[®] and SimulationX[®] (Modelica), and Add-On FluidVIEW for LabVIEW[®].

In addition, property libraries for pocket calculators of Casio, Texas Instruments, and Hewlett Packard, apps for iPhone, iPad, and iPod touch, and apps for Android smart phones and tablet computers have been developed.

A web-based fluid property calculator will be demonstrated.

Student versions of the property libraries for Excel, MATLAB, and Mathcad are available.