

# Abstracts of



# THERMO INTERNATIONAL 2006



16th Symposium on  
Thermophysical Properties

ICCT 2006

19th International Conference on  
Chemical Thermodynamics

CalCon 2006

61st  
Calorimetry Conference

**July 30 - August 4, 2006**  
**Boulder, Colorado**  
**USA**

Organized by

NIST (National Institute of Standards and Technology)  
ASME (American Society of Mechanical Engineers)  
AIChE (American Institute of Chemical Engineers)

IACT (International Association of Chemical Thermodynamics)  
IUPAC (International Union of Pure and Applied Chemistry)

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

H.-J. Kretzschmar, I. Stoecker, I. Jaehne, D. Seibt, and M. Kunick

The program libraries developed for calculating thermophysical properties of working fluids can be used for 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 inverse functions can be calculated.

The following property libraries will be presented:

- *LibHuGas* for humid combustion gas mixtures at high pressures calculated as ideal mixtures of real fluids. The library also includes mixtures of steam and carbon dioxide. The dissociation at high temperatures, the Poynting effect, and the condensation of water are considered.
- *LibAirWa* for humid air at high pressures calculated as an ideal mixture of the real fluids of dry air, steam and water or ice. The dissociation at high temperatures and the Poynting effect are considered.
- *LibAmWa* for mixtures of ammonia and water in the Kalina cycle, in absorption-refrigeration processes or in absorption heat pumps.
- *LibWaLi* for mixtures of water and lithium bromide in absorption-refrigeration processes or in absorption heat pumps.
- *LibIF97* for water and steam calculated from the Industrial Formulation IAPWS-IF97 and all new backward equations of the four supplementary standards adopted by IAPWS between 2001 and 2005.
- *LibIdGasMix* for 25 ideal gases and their mixtures.
- *LibHe* for helium.
- *LibH2* for hydrogen.
- *LibCO2* for carbon dioxide.
- *LibNH3* for ammonia.
- *LibR134a* for the refrigerant R134a.
- *LibPropan* for propane.
- *LibButan\_Iso* and *LibButan\_n* for Iso-butane and n-butane.

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

The following software solutions will be presented:

- DLLs for Windows<sup>®</sup> applications,
- the Add-In *FluidEXL* for Excel<sup>®</sup>,
- the Add-On *FluidMAT* for Mathcad<sup>®</sup>,
- property libraries for pocket calculators.

Student versions of all programs are available.