Fluid Properties Handbook

A single source compilation has been made of the most accurate available physical property data pertaining to helium, hydrogen, oxygen, and nitrogen. This handbook is organized as follows:

**HELIUM**
- Density
- Specific Volume
- Compressibility Factor
- Specific Heat, $C_v$, $C_p$
- Specific Heat Ratio $C_p/C_v$
- Specific Heat, $C_s$, of Liquid Helium at Saturation
- Viscosity (Gas)
- Thermal Conductivity
- Internal Energy Charts
- Velocity of Sound
- Enthalpy and Entropy Charts
- W/A for Sonic Flow

**HYDROGEN**
- Vapor Pressure
- Density of Liquid and Gaseous Hydrogen
- Compressibility Factor
- Specific Heat $C_p$, $C_v$, and $C_s$ for LH$_2$
- Specific Heat $C_p$ and $C_v$ for GH$_2$
- Specific Heat Ratio $C_p/C_v$
- Viscosity (Liquid and Gas)
- Thermal Conductivity
- Internal Energy Charts
- Velocity of Sound
- Surface Tension
- Heat of Vaporization
- Heat Transfer Rate to Boiling Hydrogen
- Heat Transfer Rate from Condensing Hydrogen
- Rate of Uncatalyzed Conversion of the Ortho-Para Hydrogen
- T-S, H-S, H-P, and H-T Diagrams
- Equilibrium Constant for Dissociation

**OXYGEN**
- Vapor Pressure
- Density of Oxygen and Liquid Oxygen
- Compressibility Factor
- Specific Heat $C_p$ for Liquid Oxygen
- Specific Heat $C_p$ and $C_v$ for Gaseous Oxygen
- Specific Heat Ratio for Gaseous Oxygen
- Viscosity
- Thermal Conductivity
- Internal Energy Charts
- Velocity of Sound
- Surface Tension
- Heat of Vaporization
- Enthalpy Chart
- T-S and Mollier Diagrams

**NITROGEN**
- Vapor Pressure
- Density of Liquid and Gaseous Nitrogen (Saturated)
- Density of Nitrogen
- Compressibility Factor
- Specific Heat $C_p$ for Liquid Nitrogen
- Specific Heat $C_p$ and $C_v$ for Gaseous Nitrogen
- Specific Heat Ratio for Gaseous Nitrogen
- Viscosity
- Thermal Conductivity
- Velocity of Sound
- Surface Tension
- Heat of Vaporization
- Equilibrium Diagrams for Oxygen–Nitrogen
- T-S and Mollier Diagrams

**MISCELLANEOUS**
- Specific Heat of Titanium
- Thermal Conductivity of Titanium, Teflon, and Stainless Steel
- Heat Capacities of Aluminum and Stainless Steel

(continued overleaf)
Note:
Copies of this handbook are available from:
Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
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