

# Thermophysical Properties of Refrigerants

This section presents data for the thermodynamic and transport properties of refrigerants, arranged for the occasional users. The refrigerants have a thermodynamic property charge on pressure-enthalpy coordinates with an abbreviated set of tabular data for the saturated liquid and vapor on the facing page.

1. Refrigerant 717 (Ammonia)
2. Refrigerant 22 (Chlorodifluoromethane)
3. Refrigerant 134a (1,1,1,2-Tetrafluoroethane)
4. Refrigerant 404A [R-125/143a/134a (44/52/4)]
5. Refrigerant 507A [R-125/143a (50/50)]
6. Refrigerant 290 (Propane)
7. Refrigerant 744 (Carbon Dioxide)



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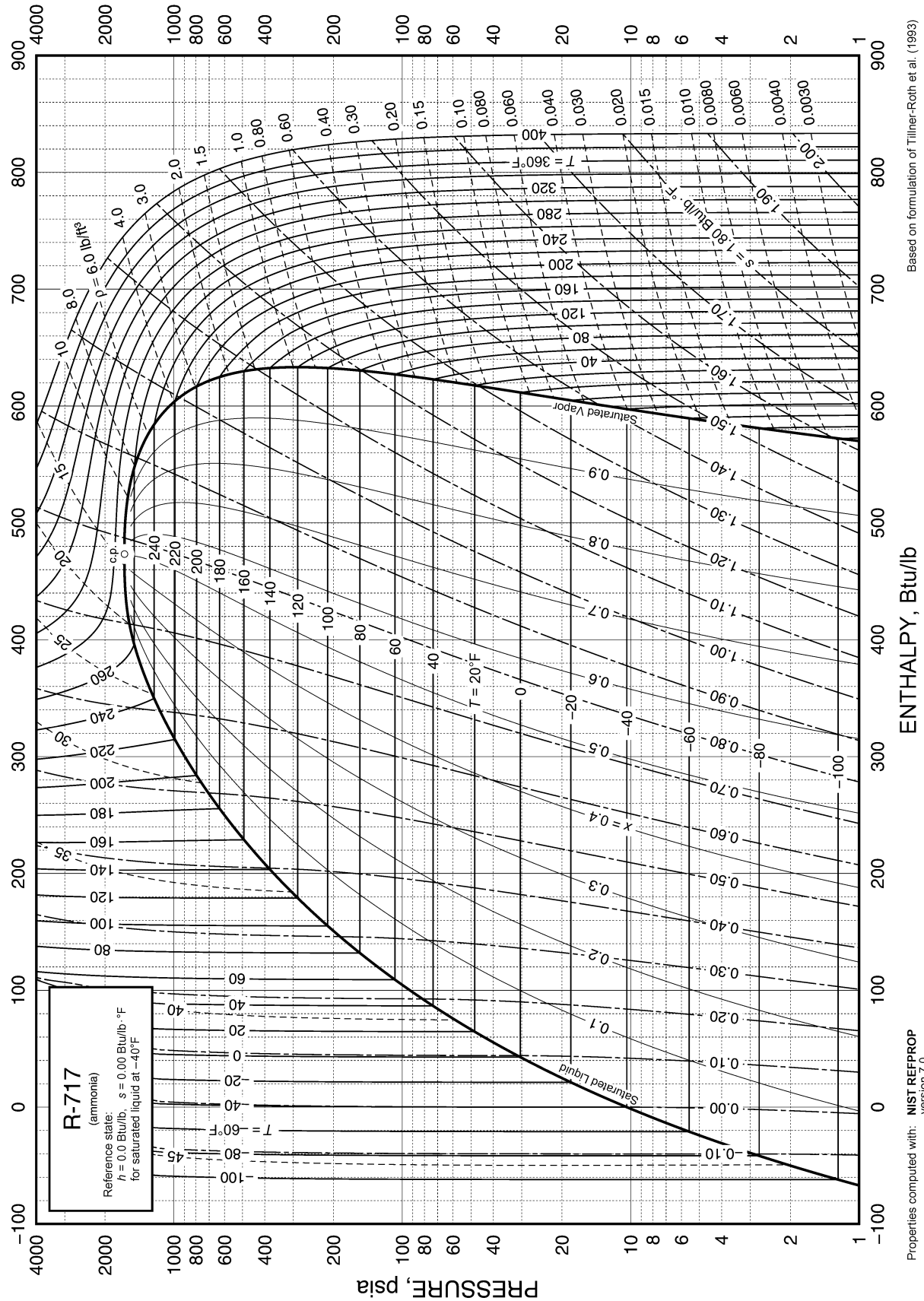


Fig. 18 Pressure-Enthalpy Diagram for Refrigerant 717 (Ammonia)

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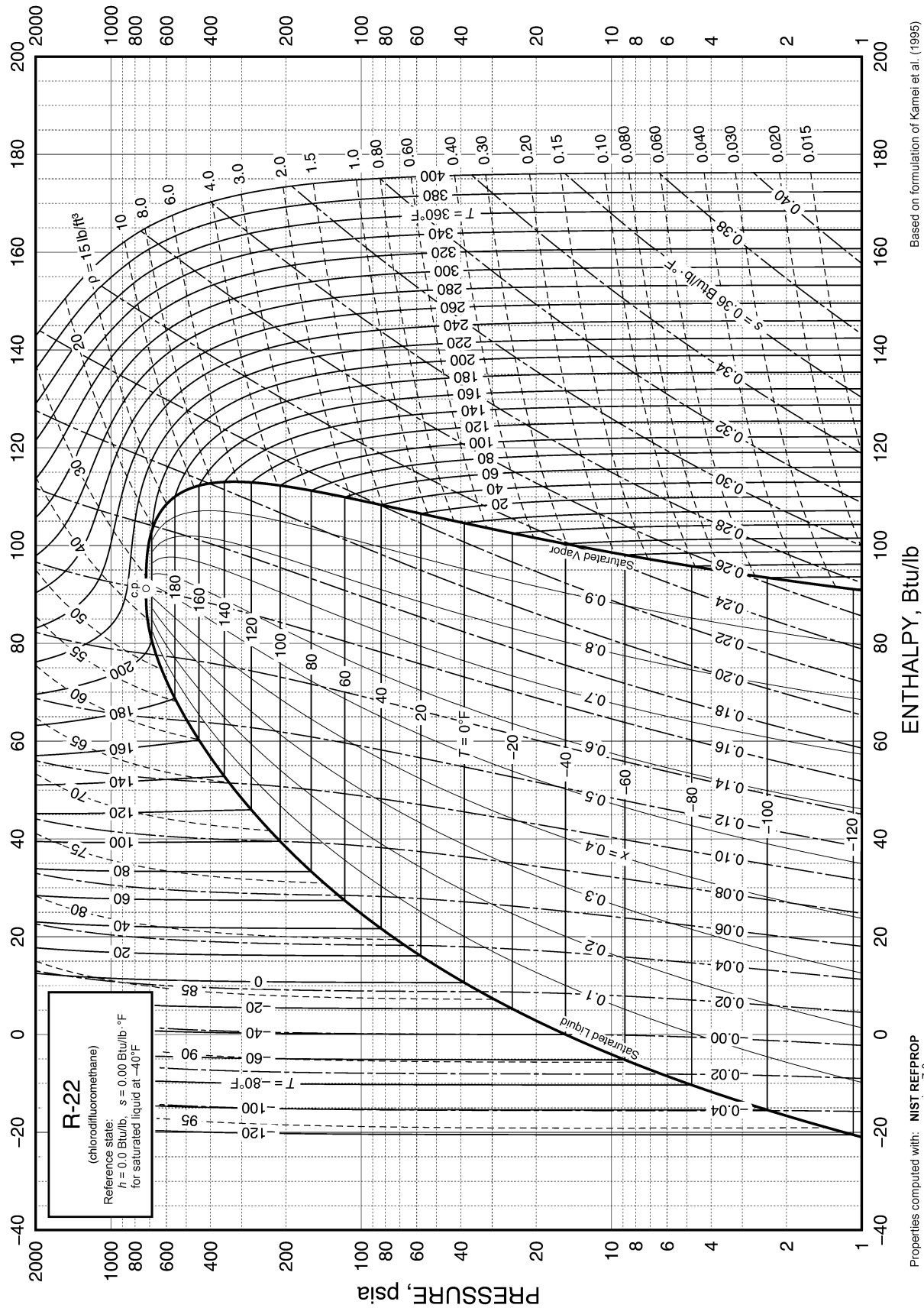


Fig. 2 Pressure-Enthalpy Diagram for Refrigerant 22

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Refrigerant 22 (Chlorodifluoromethane) Properties of Saturated Liquid and Saturated Vapor

Table with 18 columns: Temp.,\* (°F), Pres-sure, psia, Density, lb/ft³ (Liquid, Vapor), Volume, ft³/lb (Liquid, Vapor), Enthalpy, Btu/lb (Liquid, Vapor), Entropy, Btu/lb·°F (Liquid, Vapor), Specific Heat c\_p, Btu/lb·°F (Liquid, Vapor, Vapor), Vel. of Sound, ft/s (Liquid, Vapor), Viscosity, lb\_m/ft·h (Liquid, Vapor), Thermal Cond., Btu/h·ft·°F (Liquid, Vapor), Surface Tension, dyne/cm, Temp.,\* (°F). Rows range from -150 to 205.06.

\*Temperatures on ITS-90 scale

^bNormal boiling point

^cCritical point



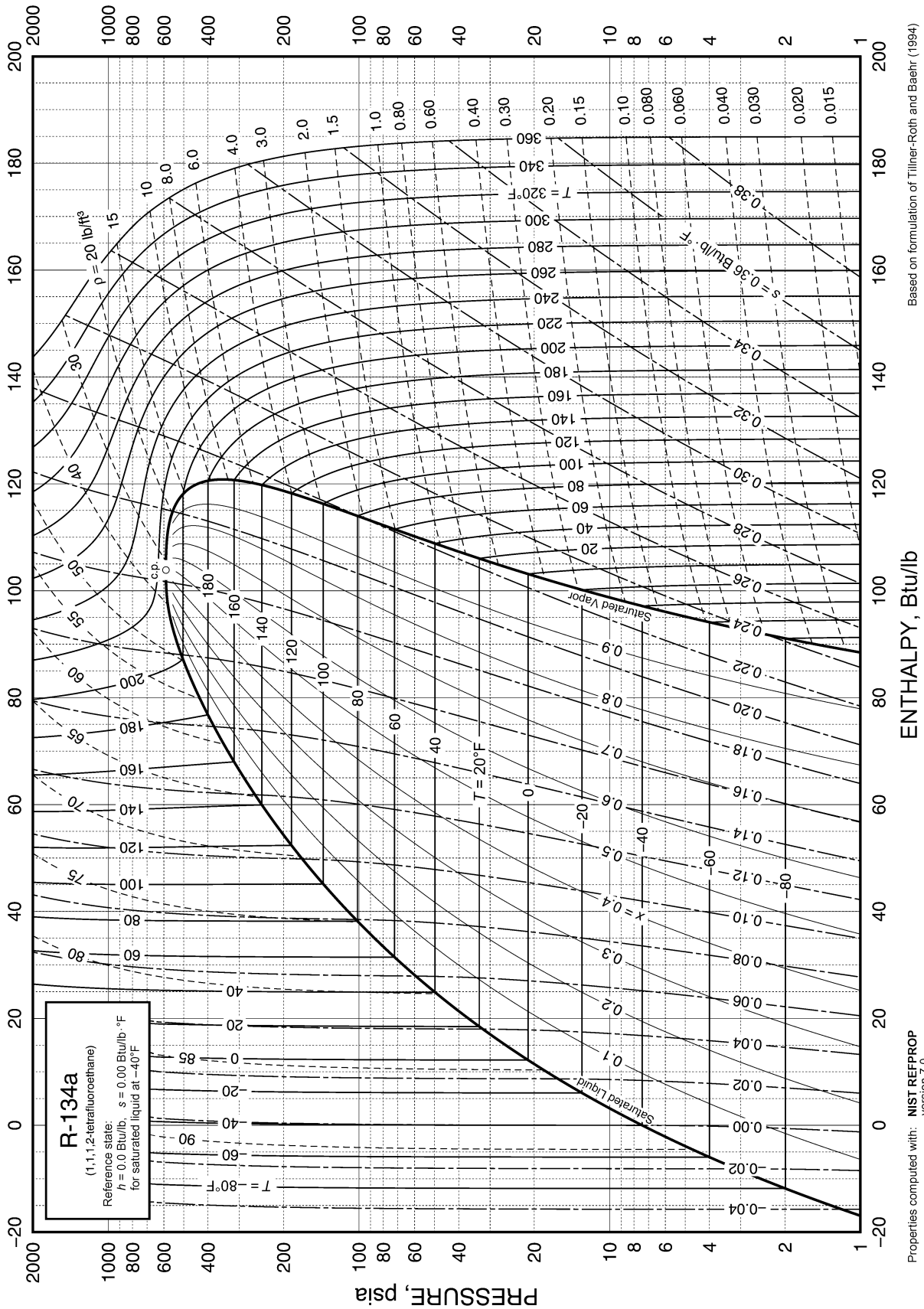


Fig. 8 Pressure-Enthalpy Diagram for Refrigerant 134a

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Refrigerant 134a (1,1,1,2-Tetrafluoroethane) Properties of Saturated Liquid and Saturated Vapor

Table with 21 columns: Temp., Pres-sure, Density, Volume, Enthalpy, Entropy, Specific Heat, Cp/Cv, Vel. of Sound, Viscosity, Thermal Cond., Surface Tension, and Temp. Rows range from -153.94 to 213.91.

\*Temperatures on ITS-90 scale

†Triple point

‡Normal boiling point

§Critical point





Refrigerant 134a Properties of Superheated Vapor (Concluded)

Table with 15 columns: Temp., Density, Enthalpy, Entropy, Vel. Sound. It is organized into 15 sub-tables based on pressure (psia): 225.00, 250.00, 275.00, 300.00, 325.00, 350.00, 375.00, 400.00, and 600.00. Each sub-table includes saturated and superheated vapor data points.

\*Temperatures on ITS-90 scale

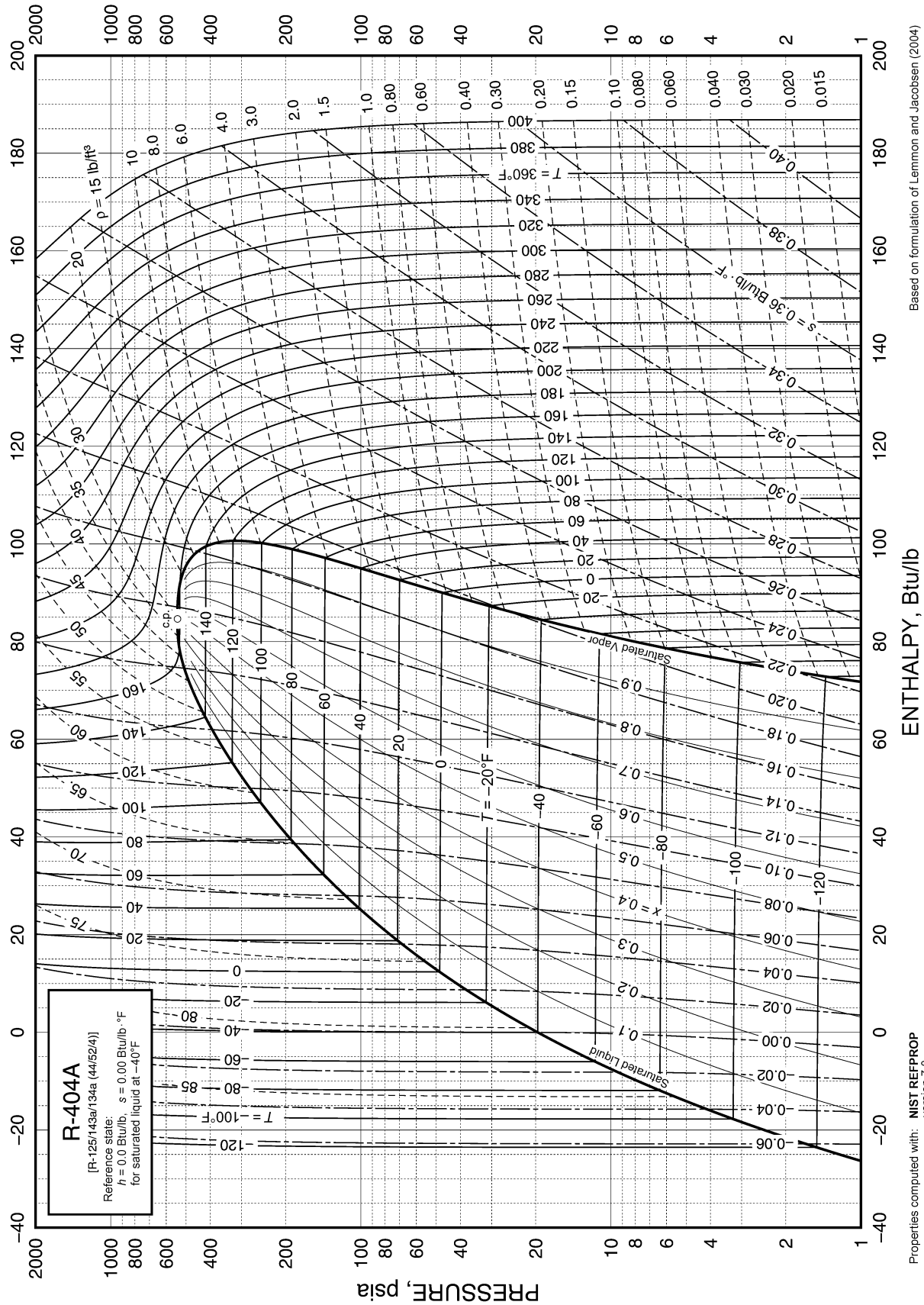


Fig. 14 Pressure-Enthalpy Diagram for Refrigerant 404A

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Refrigerant 404A [R-125/143a/134a (44/52/4)] Properties of Liquid on Bubble Line and Vapor on Dew Line

Table with columns: Pressure (psia), Temp. (°F) Bubble and Dew, Density (lb/ft³) Liquid and Vapor, Volume (ft³/lb) Liquid and Vapor, Enthalpy (Btu/lb) Liquid and Vapor, Entropy (Btu/lb·°F) Liquid and Vapor, Specific Heat (Btu/lb·°F) Liquid, Vapor, and Cp/Cv, Vel. of Sound (ft/s) Liquid and Vapor, Viscosity (lbm/ft·h) Liquid and Vapor, Thermal Cond. (Btu/h·ft·°F) Liquid and Vapor, Surface Tension (dyne/cm), and Pressure (psia). Rows include temperature points from 1 to 548.24°.

\*Temperatures on ITS-90 scale

†Bubble and dew points at one standard atmosphere

‡Critical point

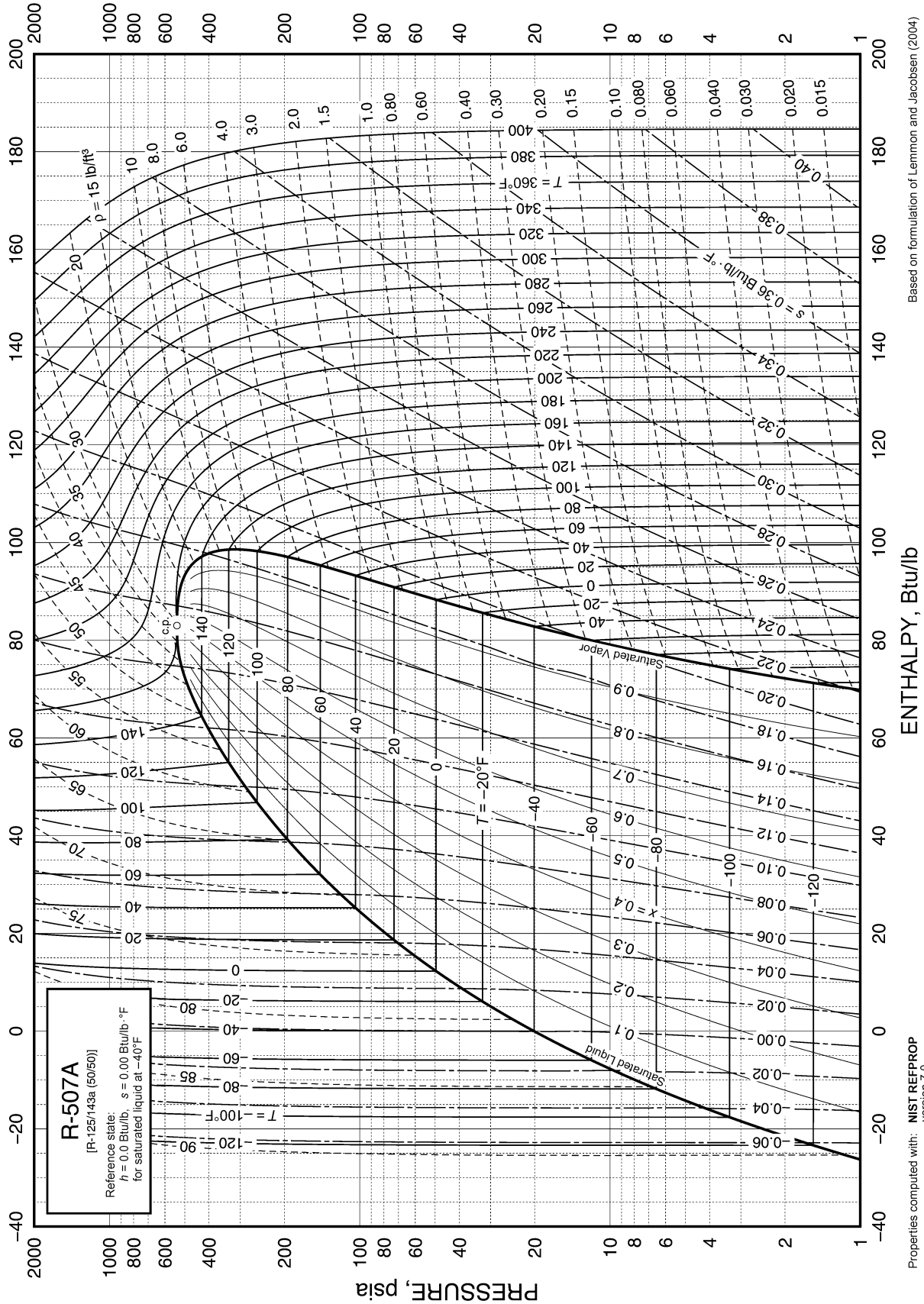


Fig. 17 Pressure-Enthalpy Diagram for Refrigerant 507A

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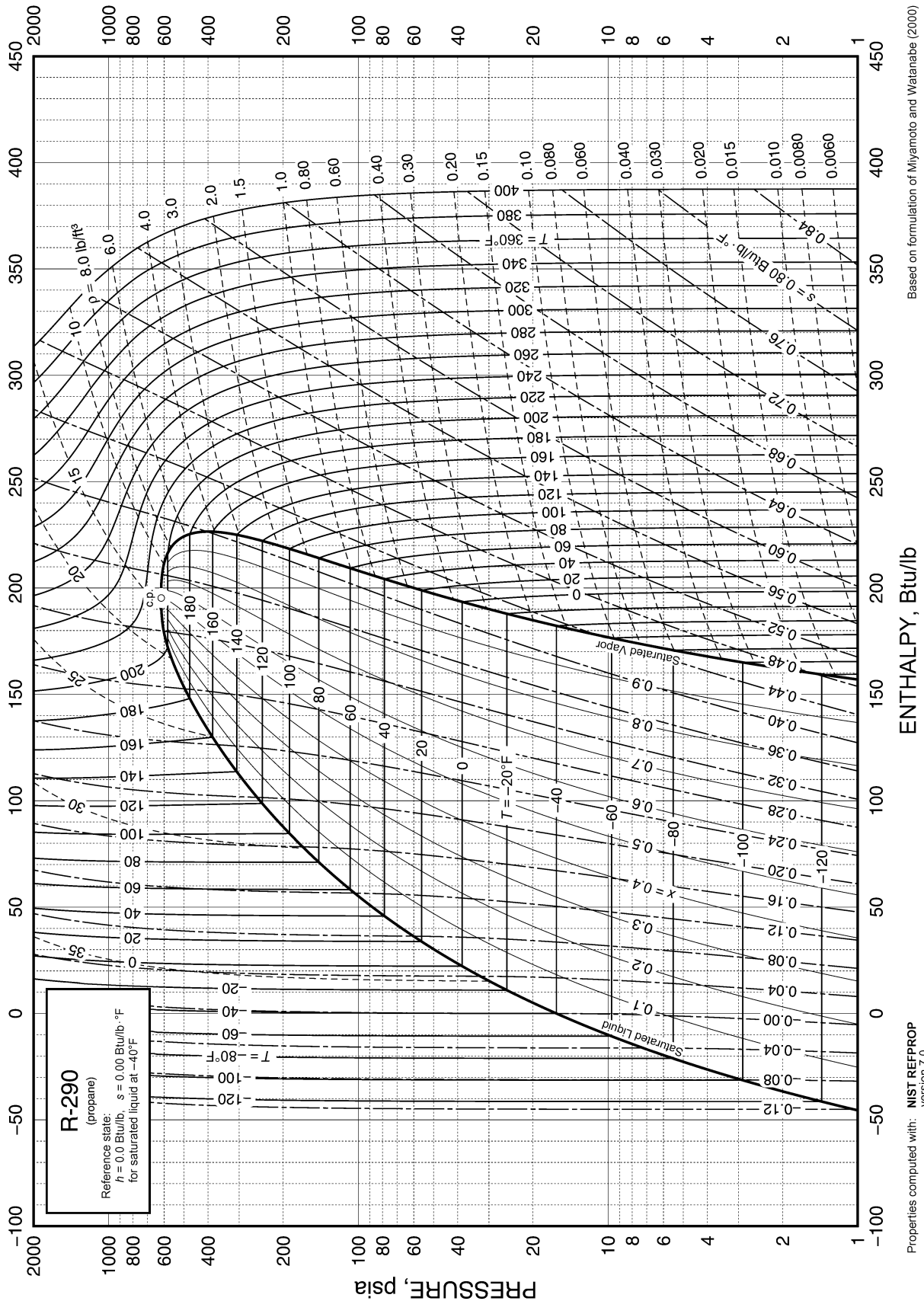


Fig. 23 Pressure-Enthalpy Diagram for Refrigerant 290 (Propane)

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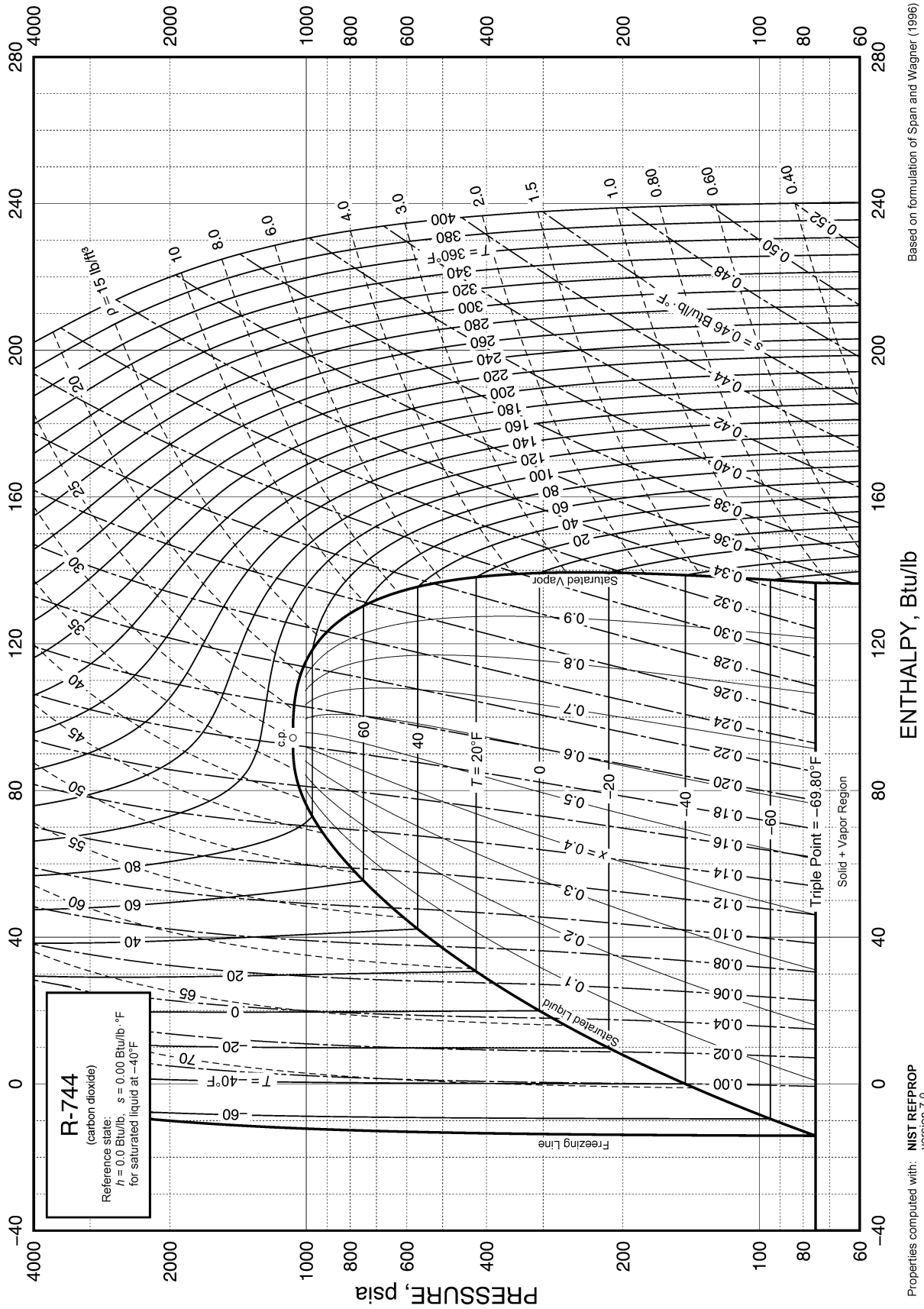


Fig. 20 Pressure-Enthalpy Diagram for Refrigerant 744 (Carbon Dioxide)

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Refrigerant 744 (Carbon Dioxide) Properties of Saturated Liquid and Saturated Vapor

Table with 19 columns: Temp., Pres., Density, Volume, Enthalpy, Entropy, Specific Heat, Vel. of Sound, Viscosity, Thermal Cond., Surface Tension. Rows range from -69.80°F to 87.76°F.

\*Temperatures on ITS-90 scale

†Triple point

‡Critical point