



# Freon™ 407C

Refrigerant (R-407C)

Transport Properties—Viscosity, Thermal Conductivity, and Heat Capacity for Liquid and Vapor

## Technical Information

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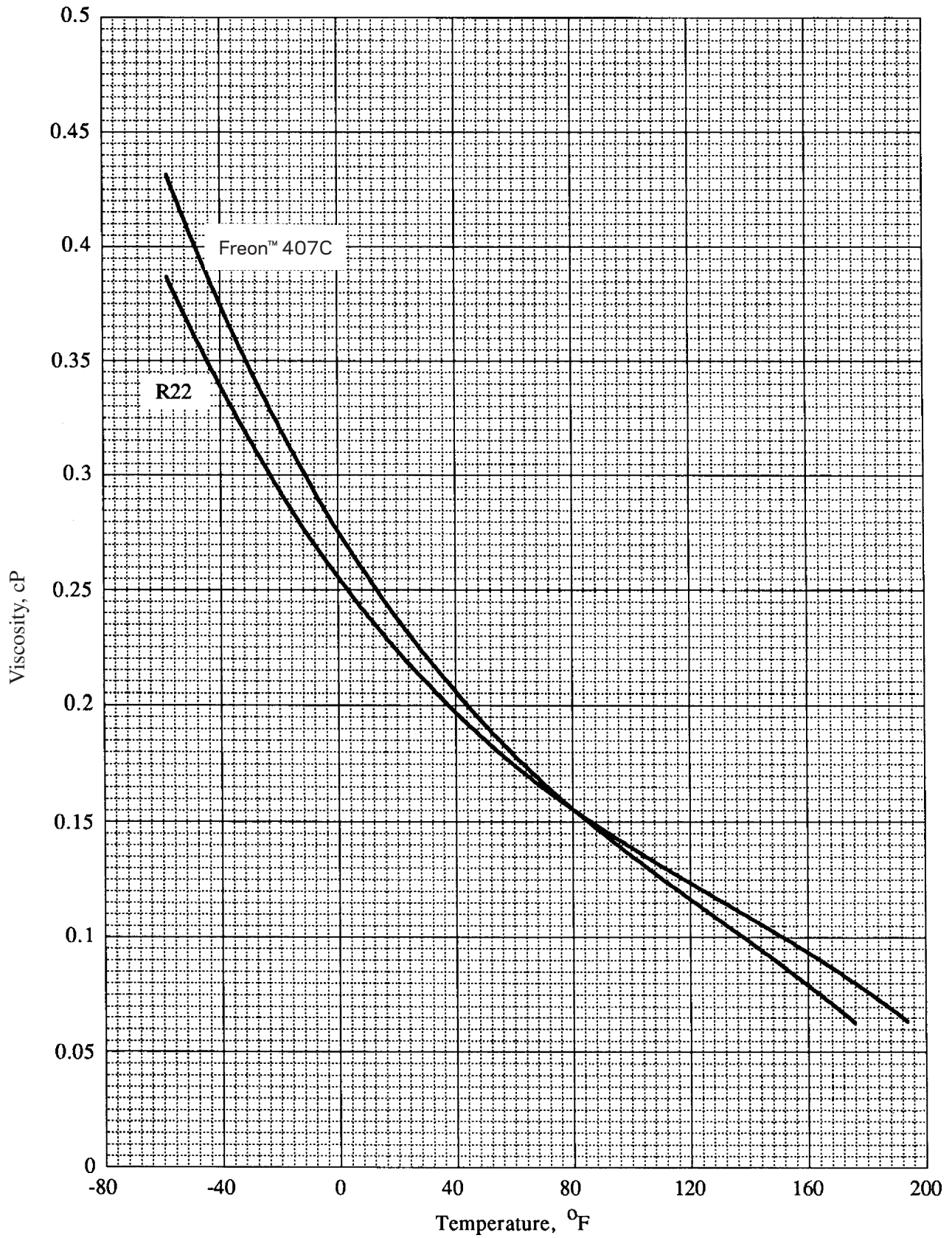
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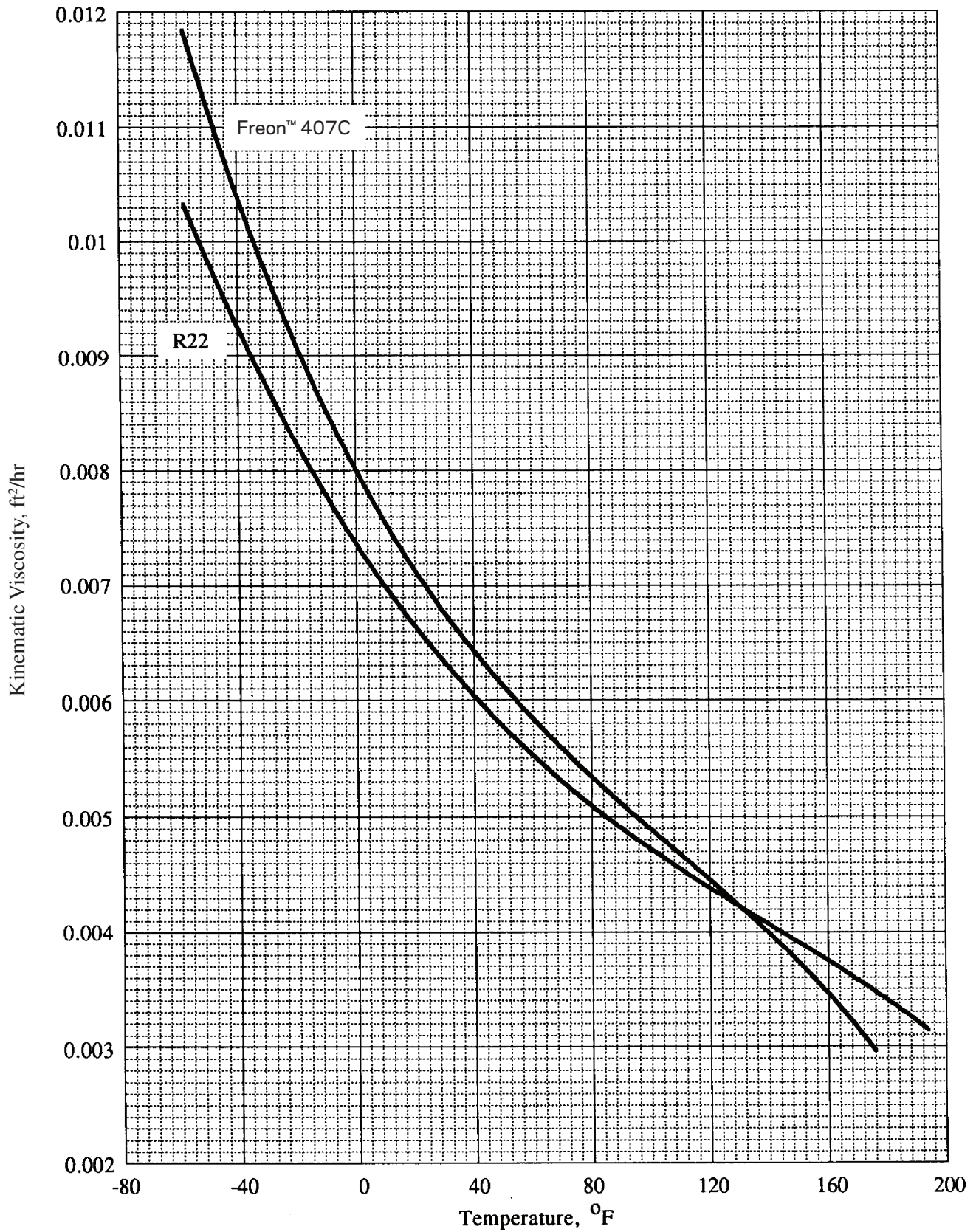


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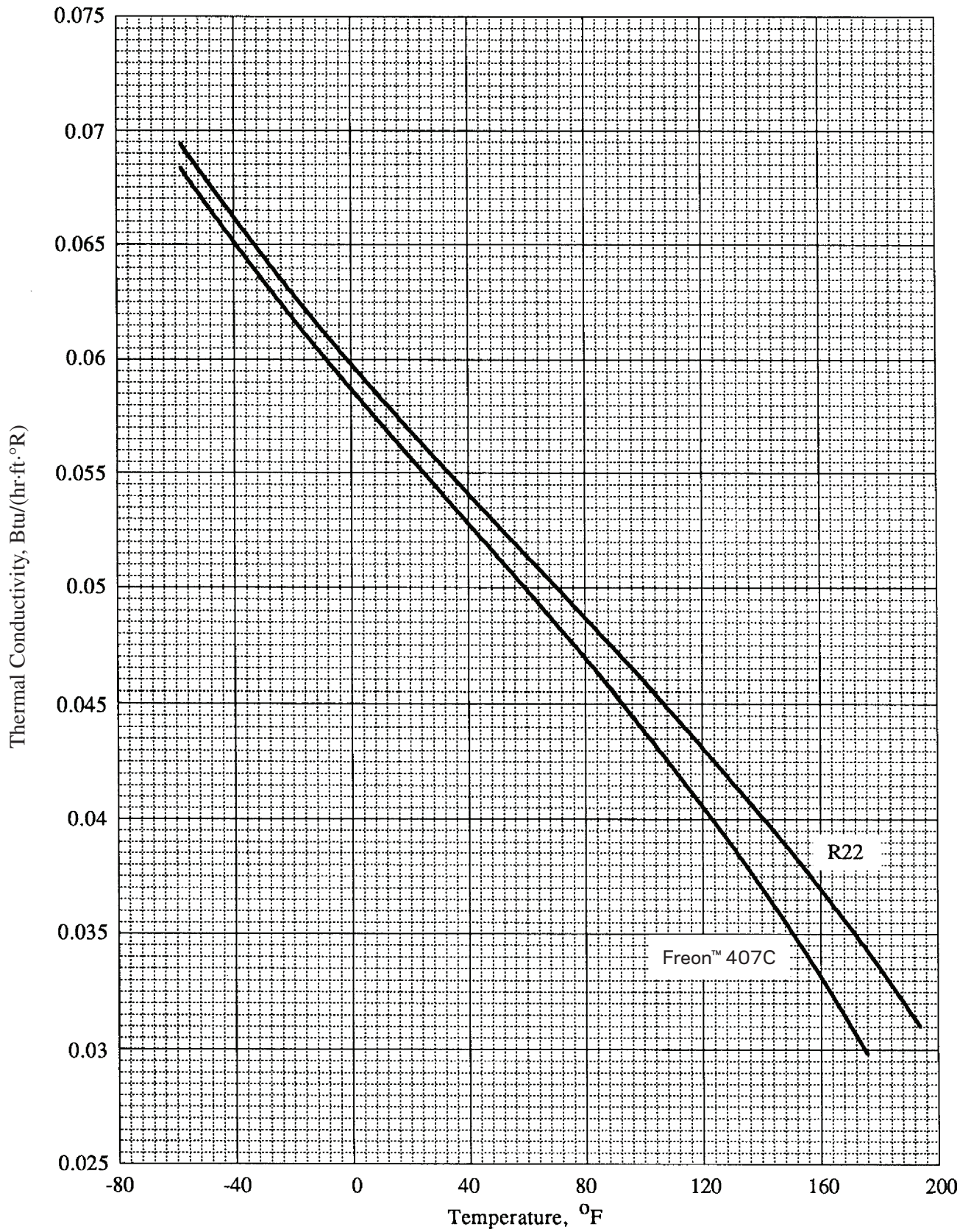
### Saturated Liquid Viscosity



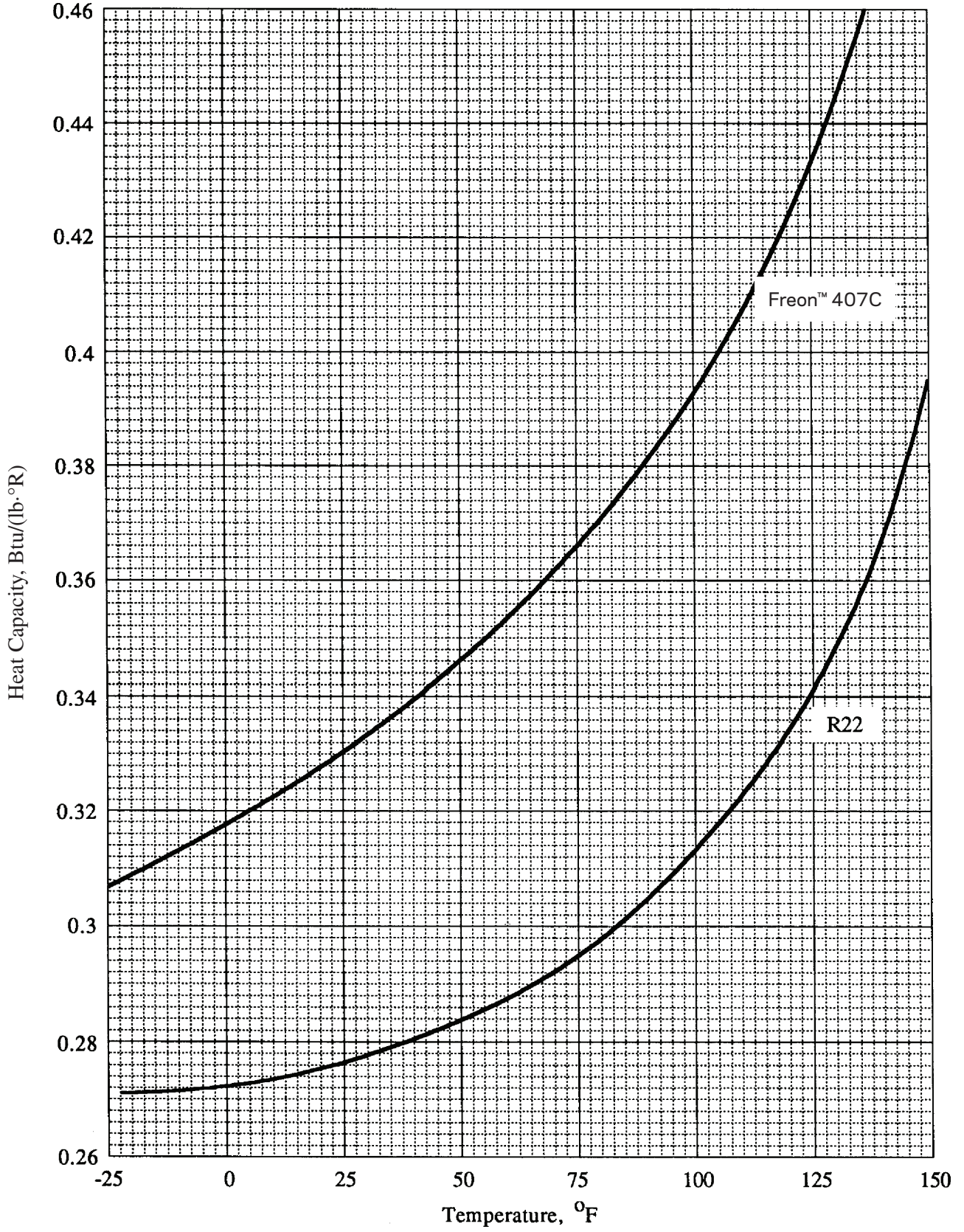
### Saturated Liquid Kinematic Viscosity



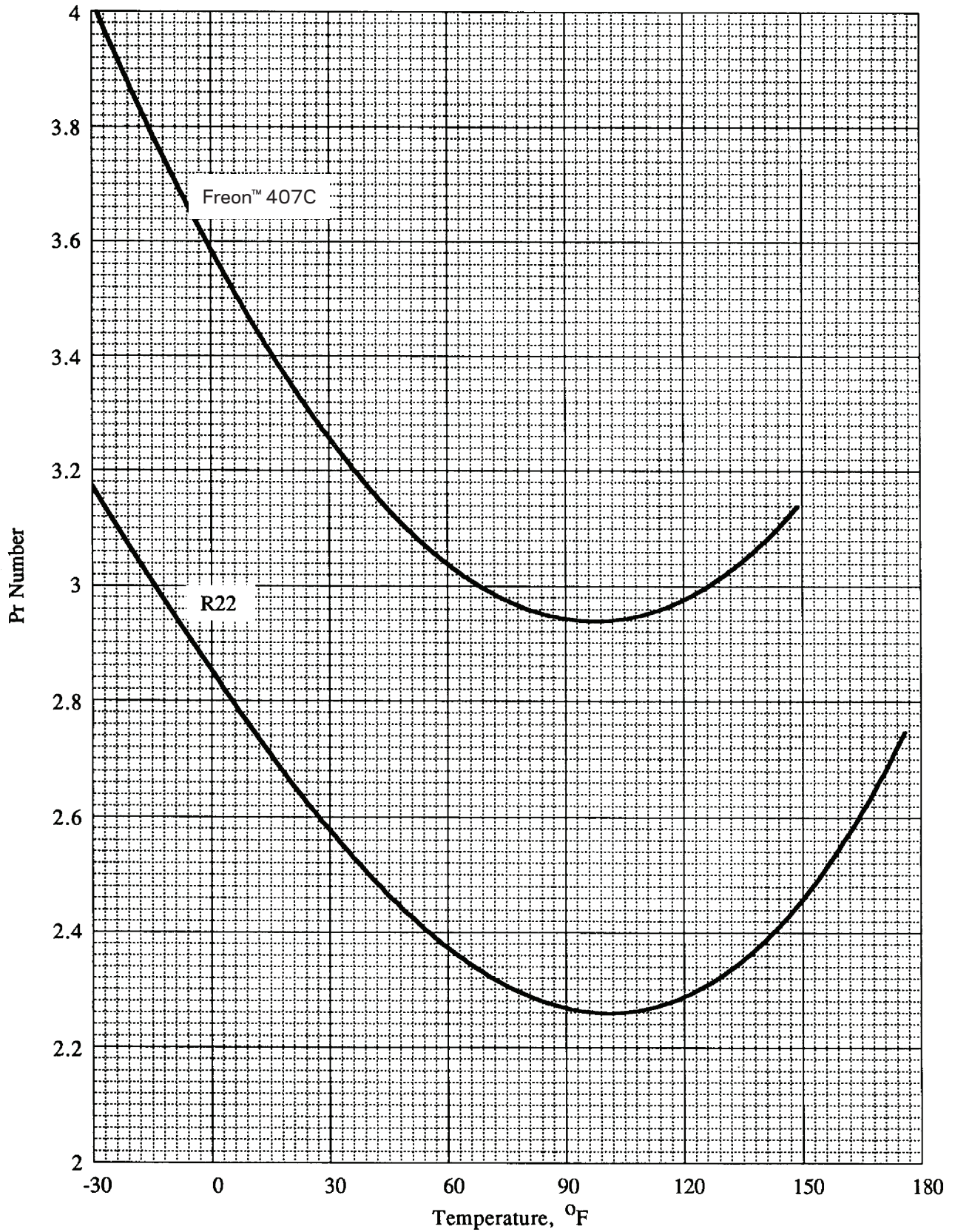
### Saturated Liquid Thermal Conductivity



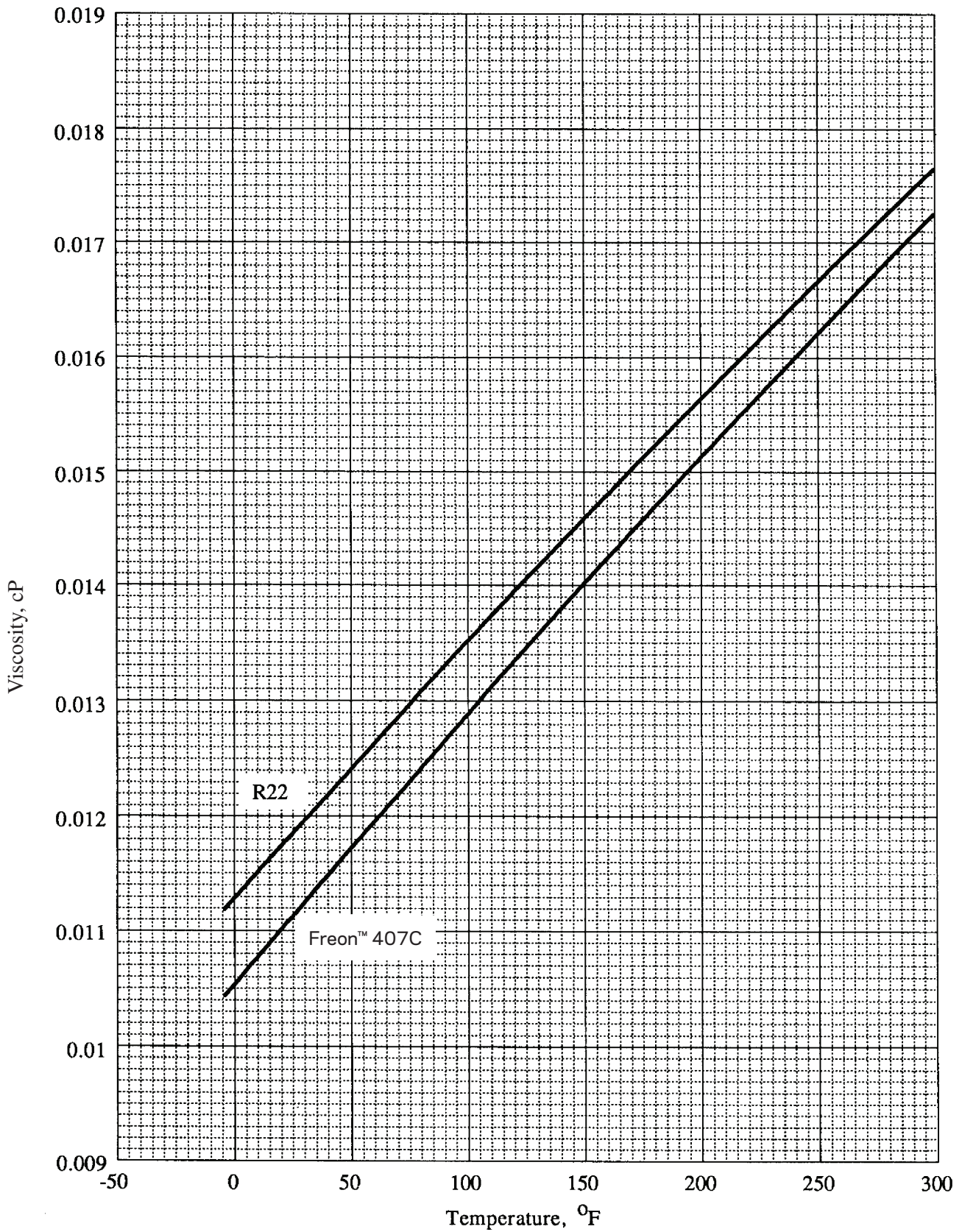
### Saturated Liquid Heat Capacity



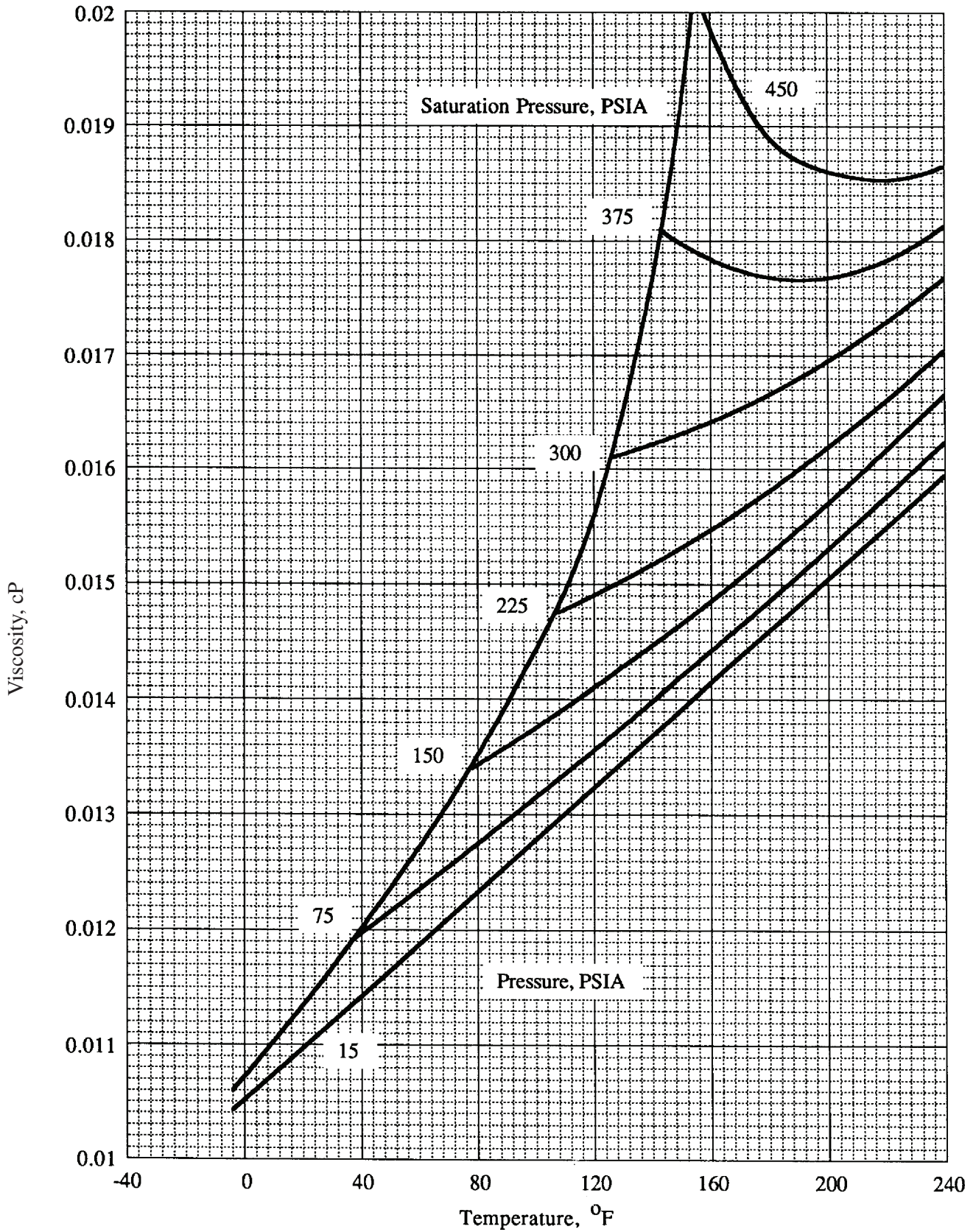
### Saturated Liquid Pr Number



### Gas Viscosity at Atmospheric Pressure

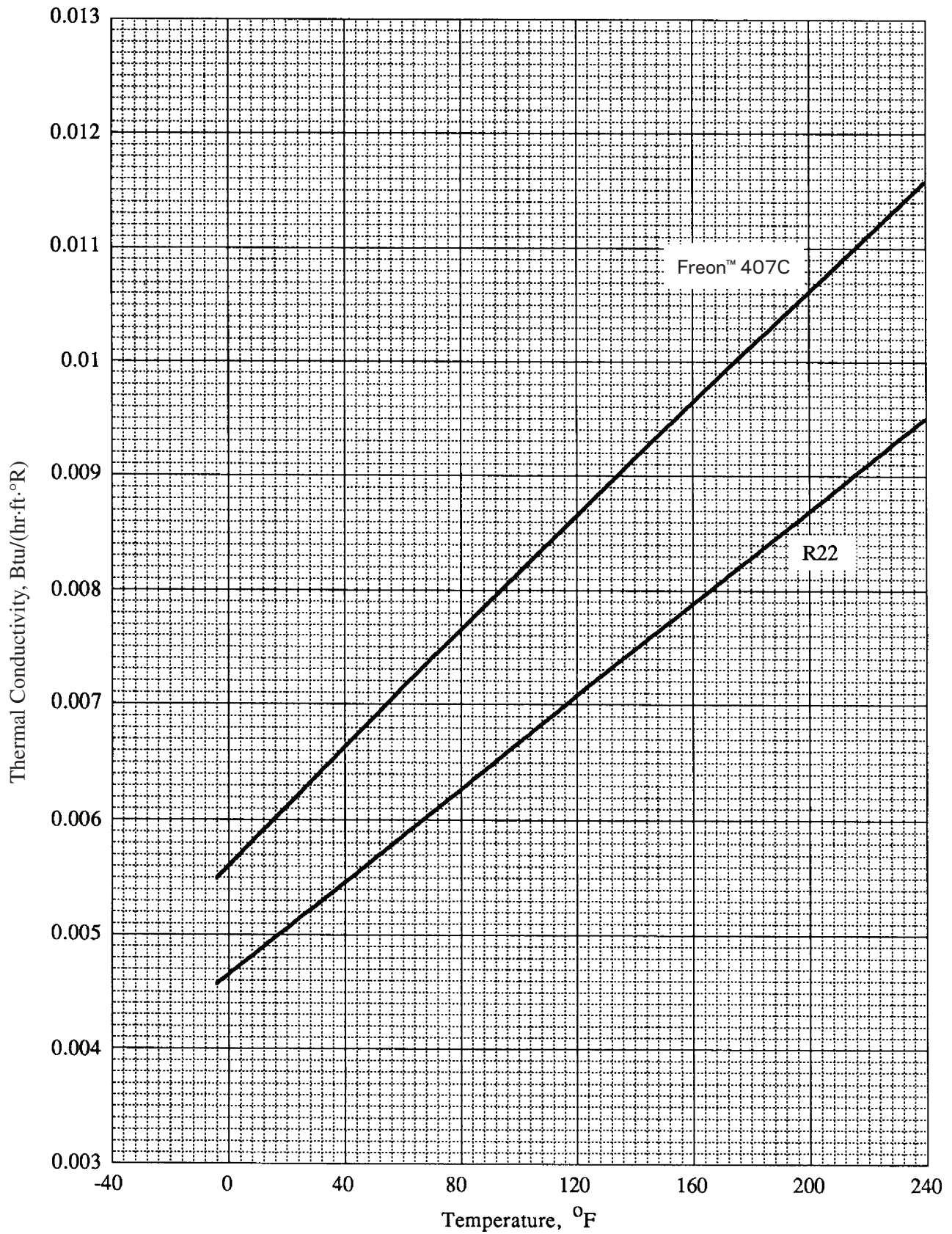


### Vapor Viscosity

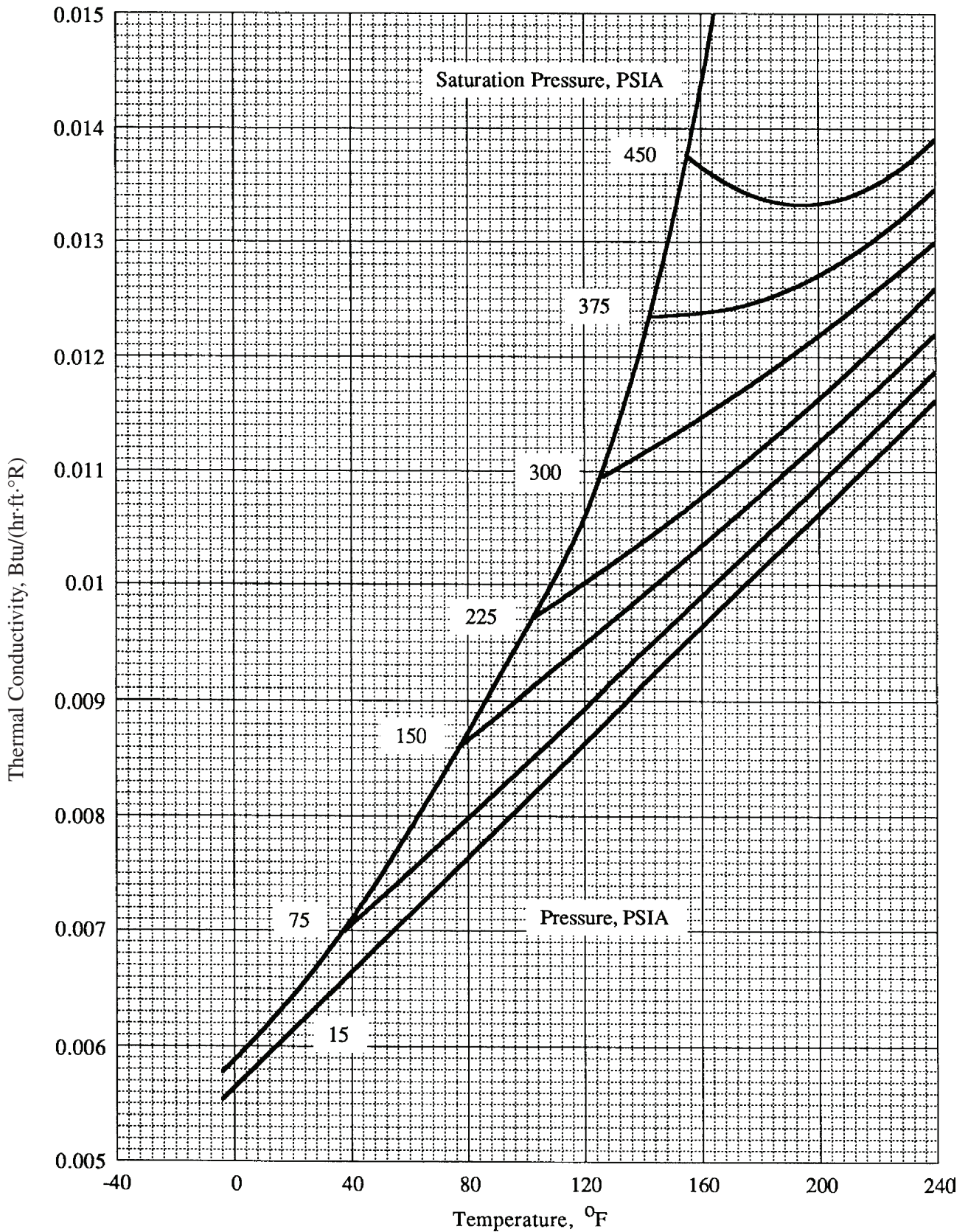




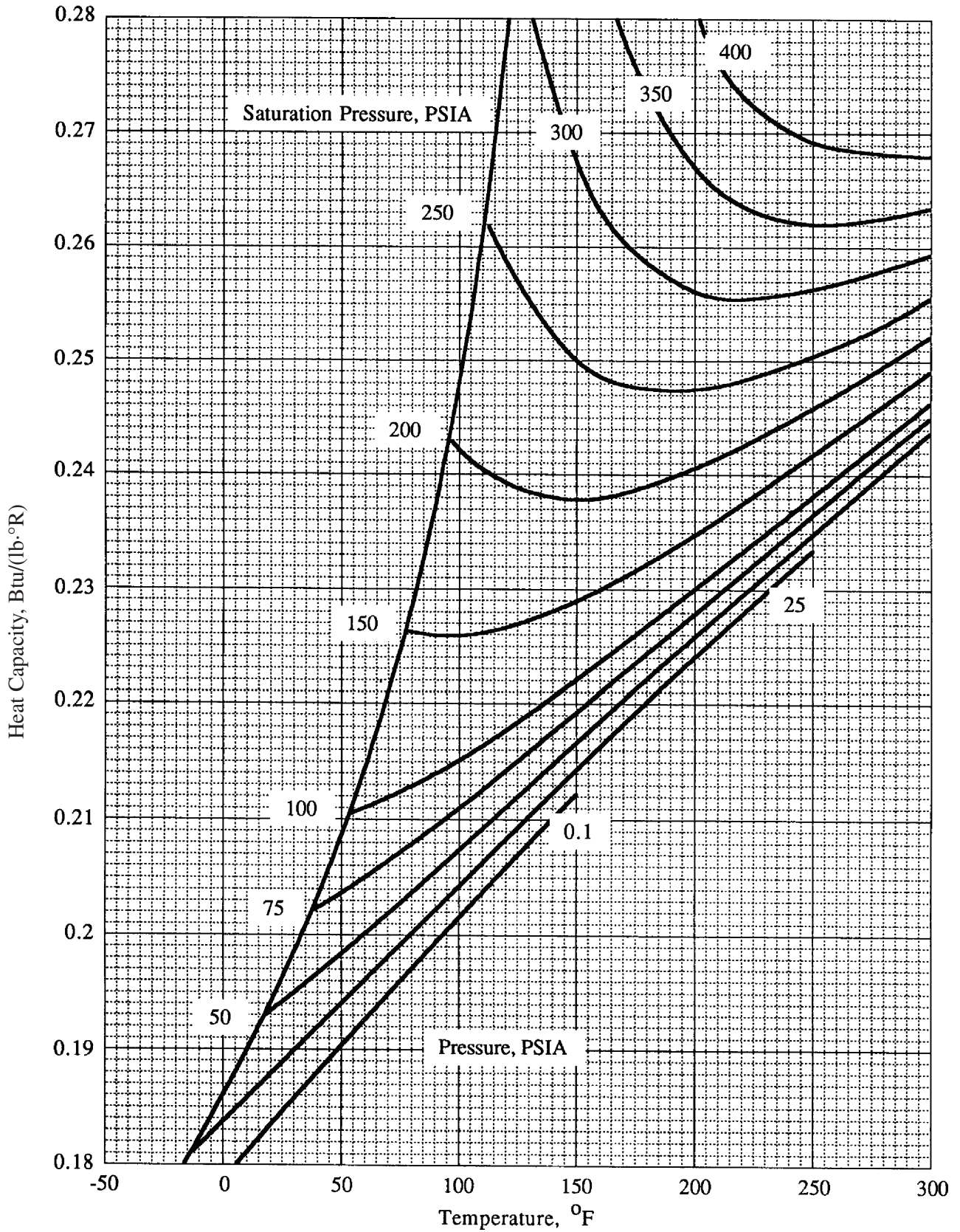
### Gas Thermal Conductivity at Atmospheric Pressure



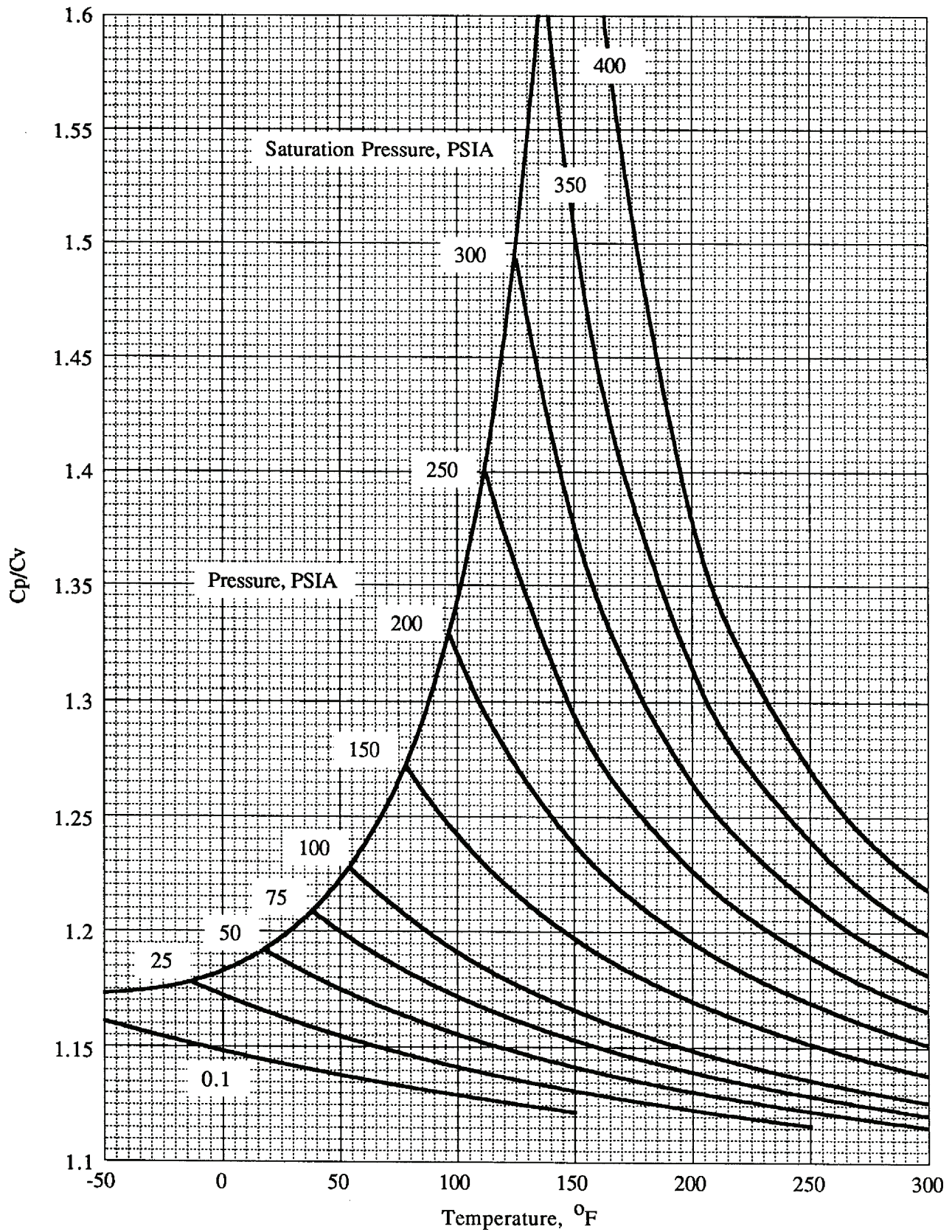
### Vapor Thermal Conductivity



### Vapor Heat Capacity



### Vapor Heat Capacity Ratio



## Equations for Property Estimation

### English Units

Curves have been fitted to the measured data to obtain the following equations for estimation of properties within the ranges specified.

#### Saturated Liquid Viscosity in cP (-60 to 180 °F)

$$\mu = 0.276 - 2.08E-3 T + 9.04E-6 T^2 - 2.34E-8 T^3$$

#### Saturated Liquid Kinematic Viscosity in ft<sup>2</sup>/hr (-60 to 180 °F)

$$\nu = 8.01E-3 - 4.85E-5 T + 2.53E-7 T^2 - 8.01E-10 T^3$$

#### Saturated Liquid Thermal Conductivity in Btu/(hr·ft·°R) (-60 to 180 °F)

$$k = 5.87E-2 - 1.52E-4 T + 1.66E-7 T^2 - 1.35E-9 T^3$$

#### Saturated Liquid Heat Capacity in Btu/(lb·°R) (-40 to 140 °F)

$$C_p = 0.319 + 4.56E-4 T - 5.30E-7 T^2 + 3.40E-8 T^3$$

#### Saturated Liquid Pr Number (-40 to 150 °F)

$$Pr = 3.59 - 1.28E-2 T + 5.76E-5 T^2 + 5.34E-8 T^3$$

#### Gas Viscosity at Atmospheric Pressure in cP (-20 to 300 °F)

$$\mu = 1.052E-2 + 2.25E-5 T$$

#### Gas Thermal Conductivity at Atmospheric Pressure in Btu/(hr·ft·°R) (-20 to 300 °F)

$$k = 5.61E-3 + 2.49E-5 T$$

#### Saturated Vapor Viscosity in cP (0 to 180 °F)

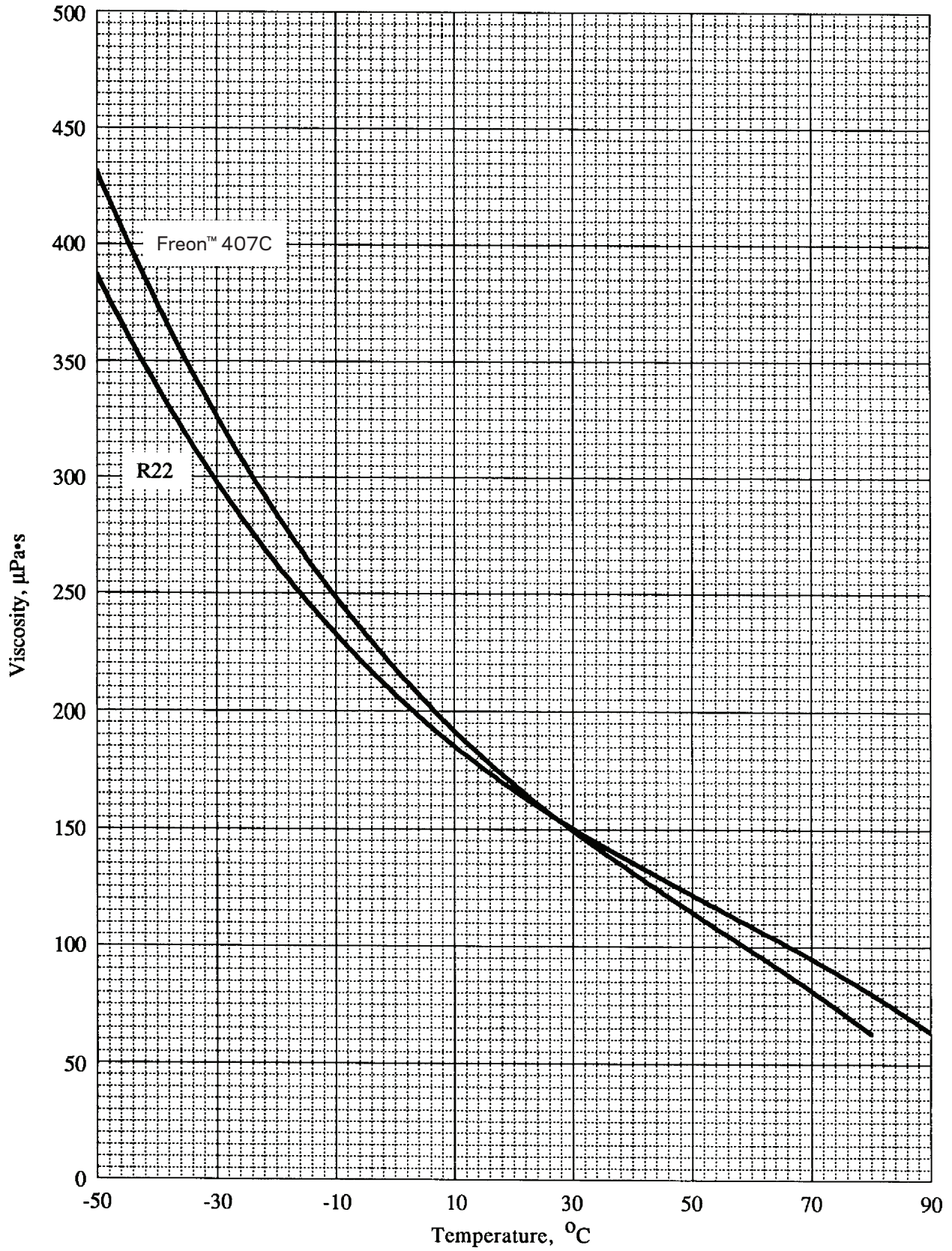
$$\mu = 1.070E-2 + 4.63E-5 T - 4.25E-7 T^2 + 3.24E-9 T^3$$

#### Vapor Thermal Conductivity in Btu/(hr·ft·°R) (0 to 180 °F)

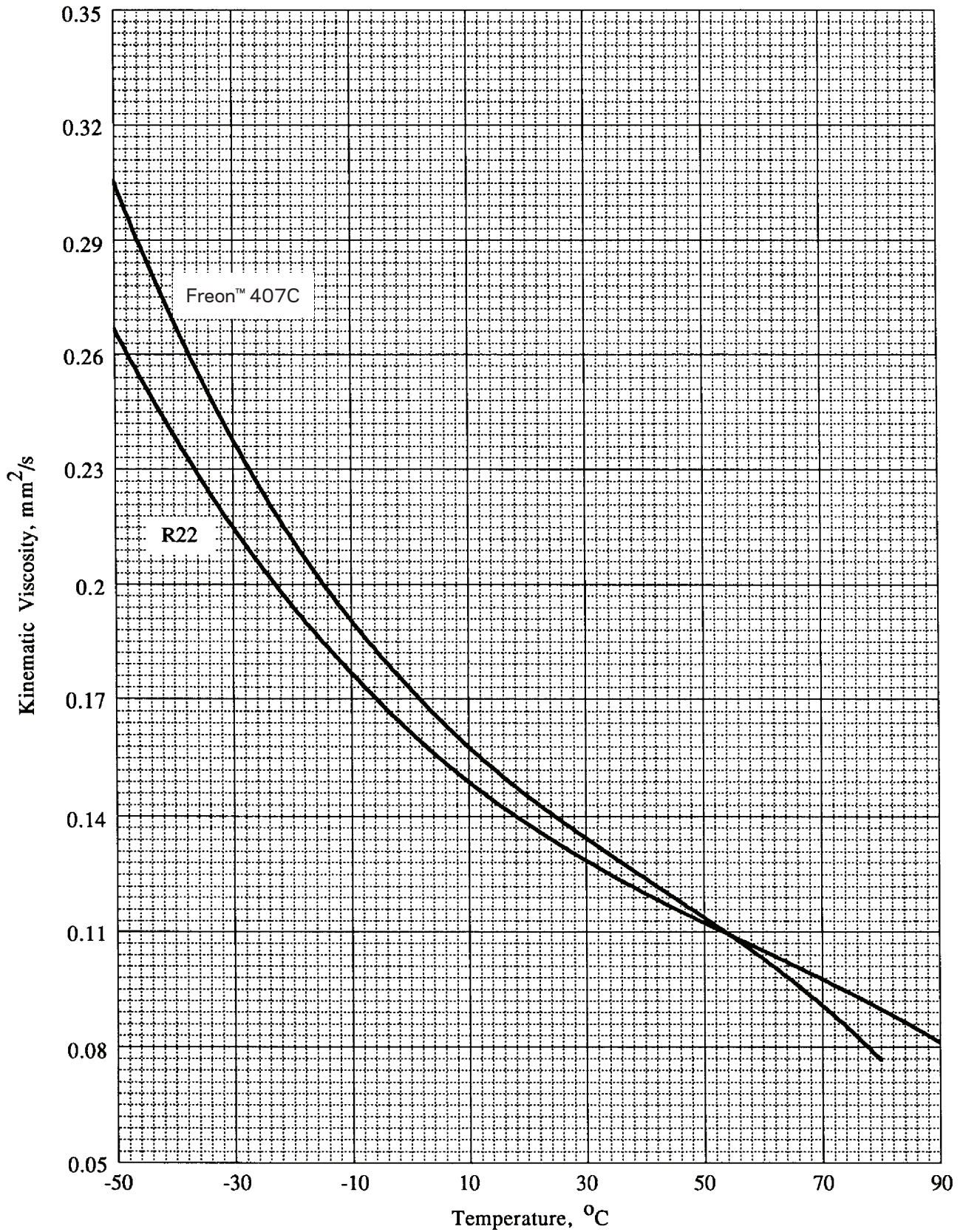
$$k = 5.85E-3 + 3.19E-5 T - 5.94E-8 T^2 + 1.12E-9 T^3$$

Where T = Temperature, °F

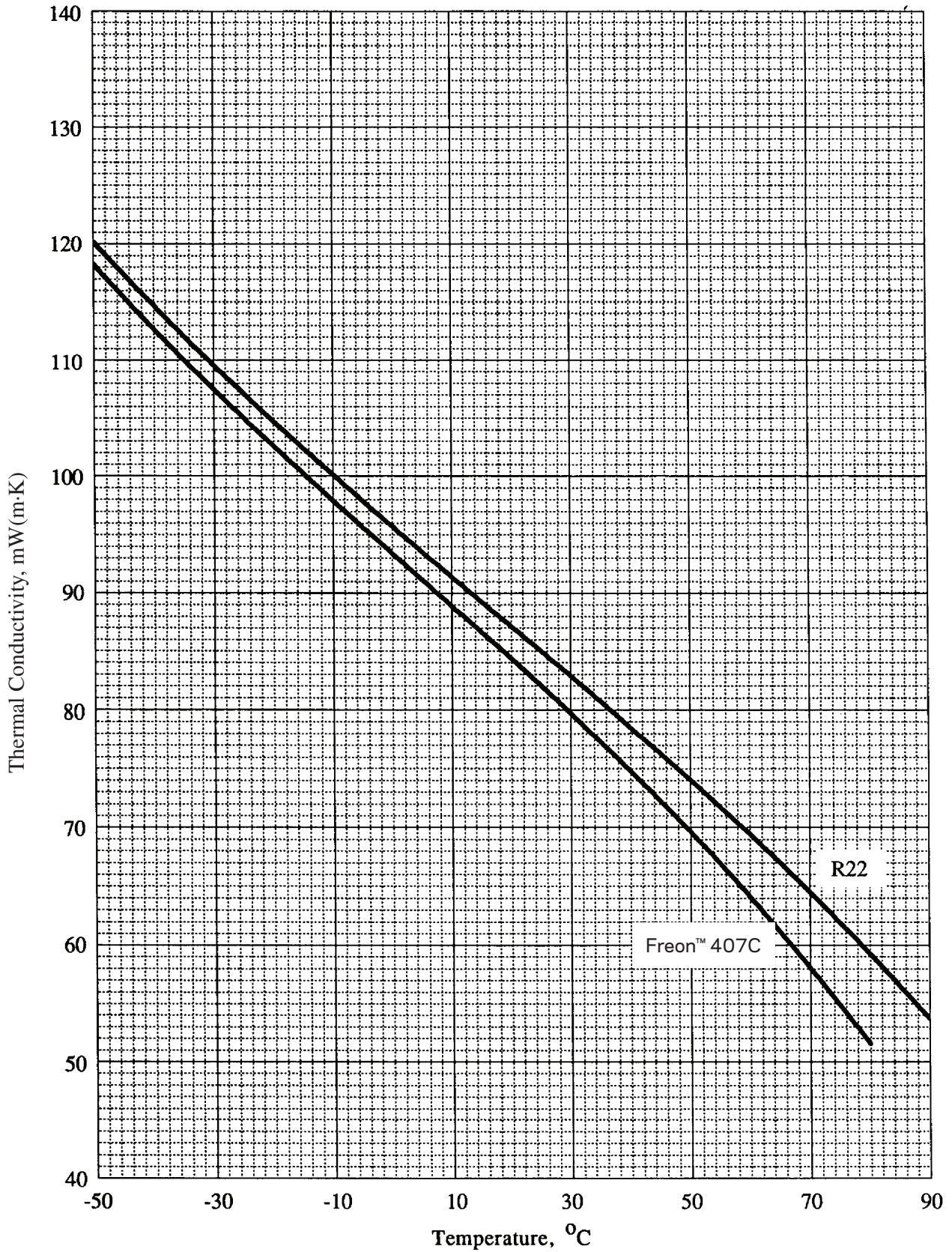
### Saturated Liquid Viscosity



### Saturated Liquid Kinematic Viscosity

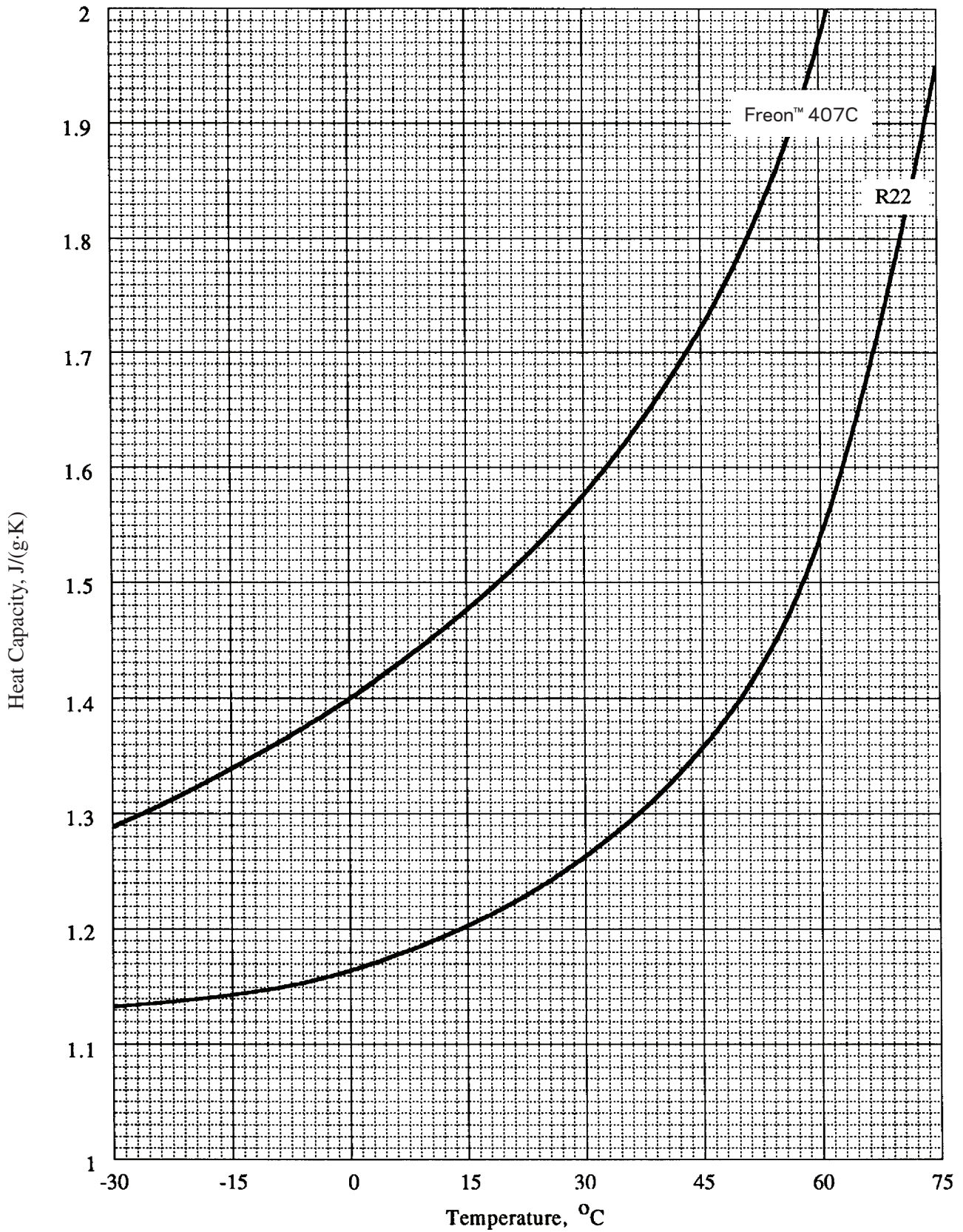


### Saturated Liquid Thermal Conductivity

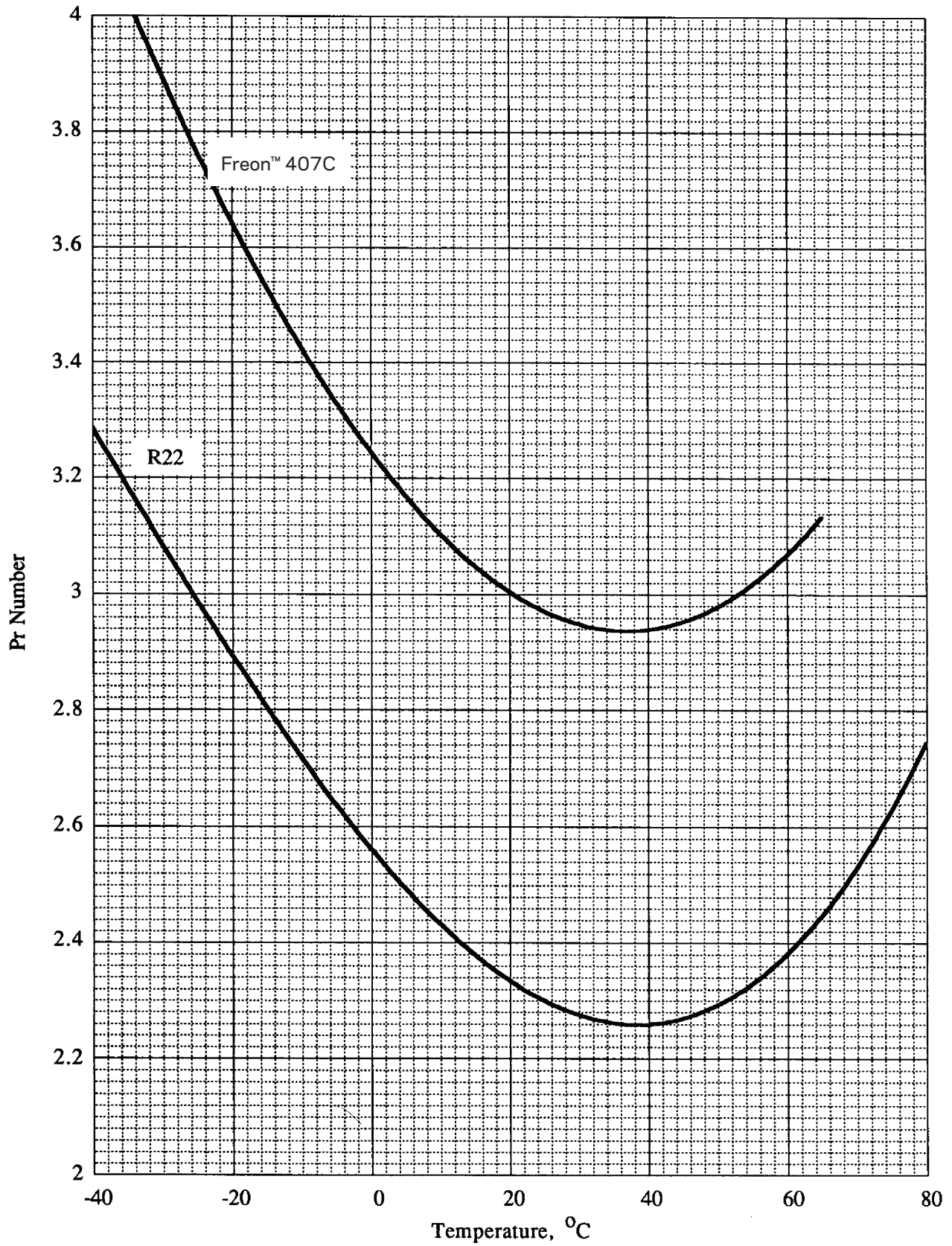




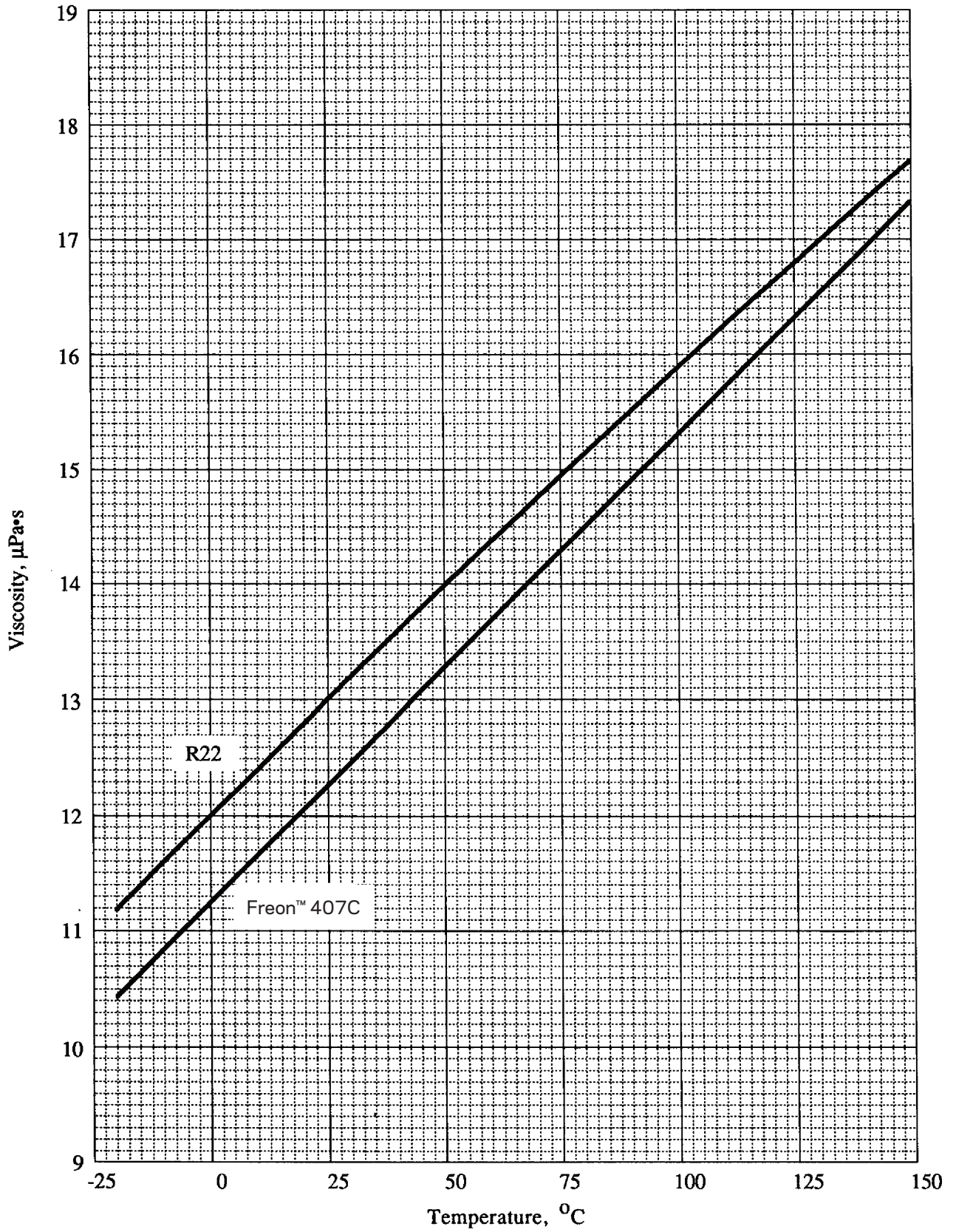
### Saturated Liquid Heat Capacity



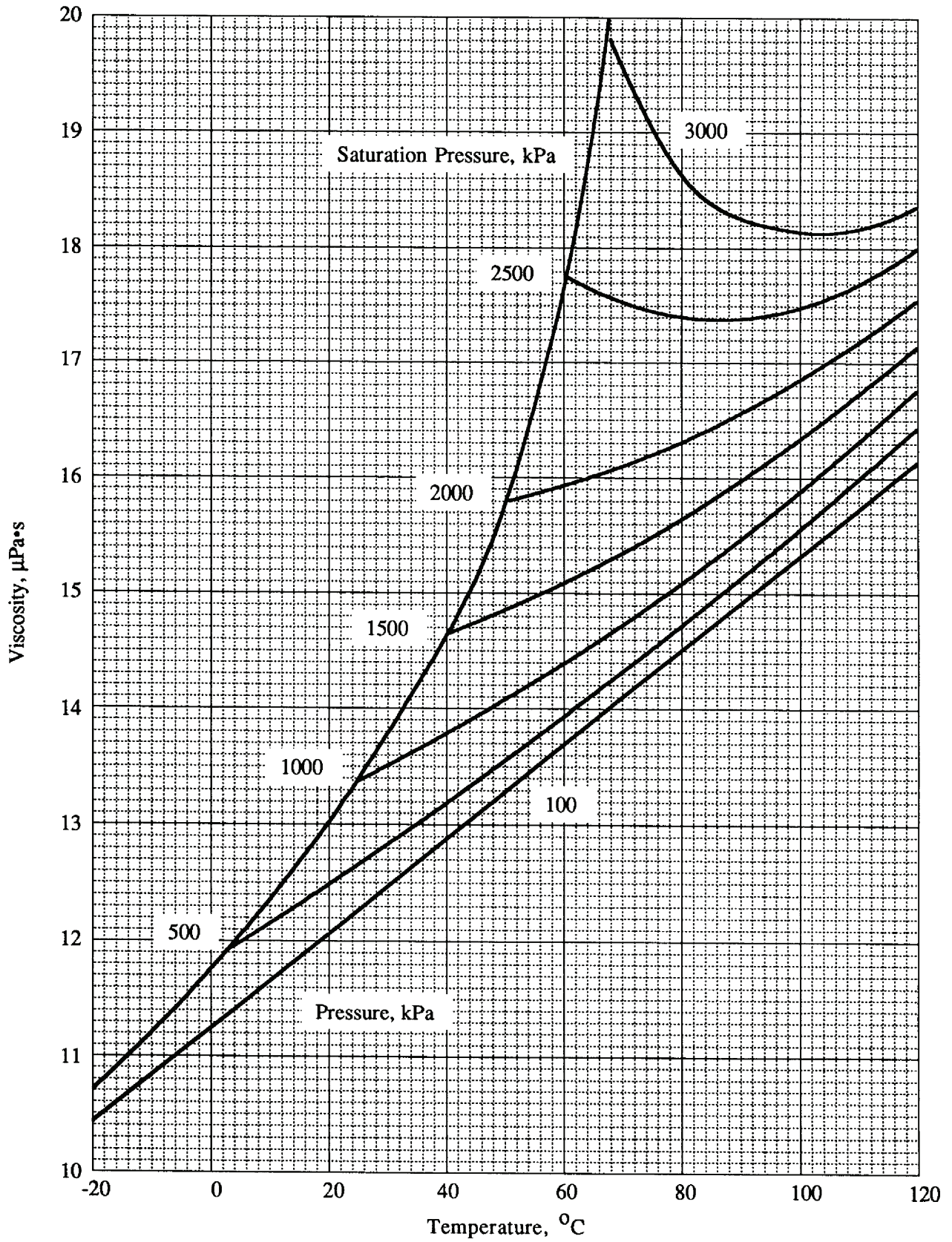
### Saturated Liquid Pr Number



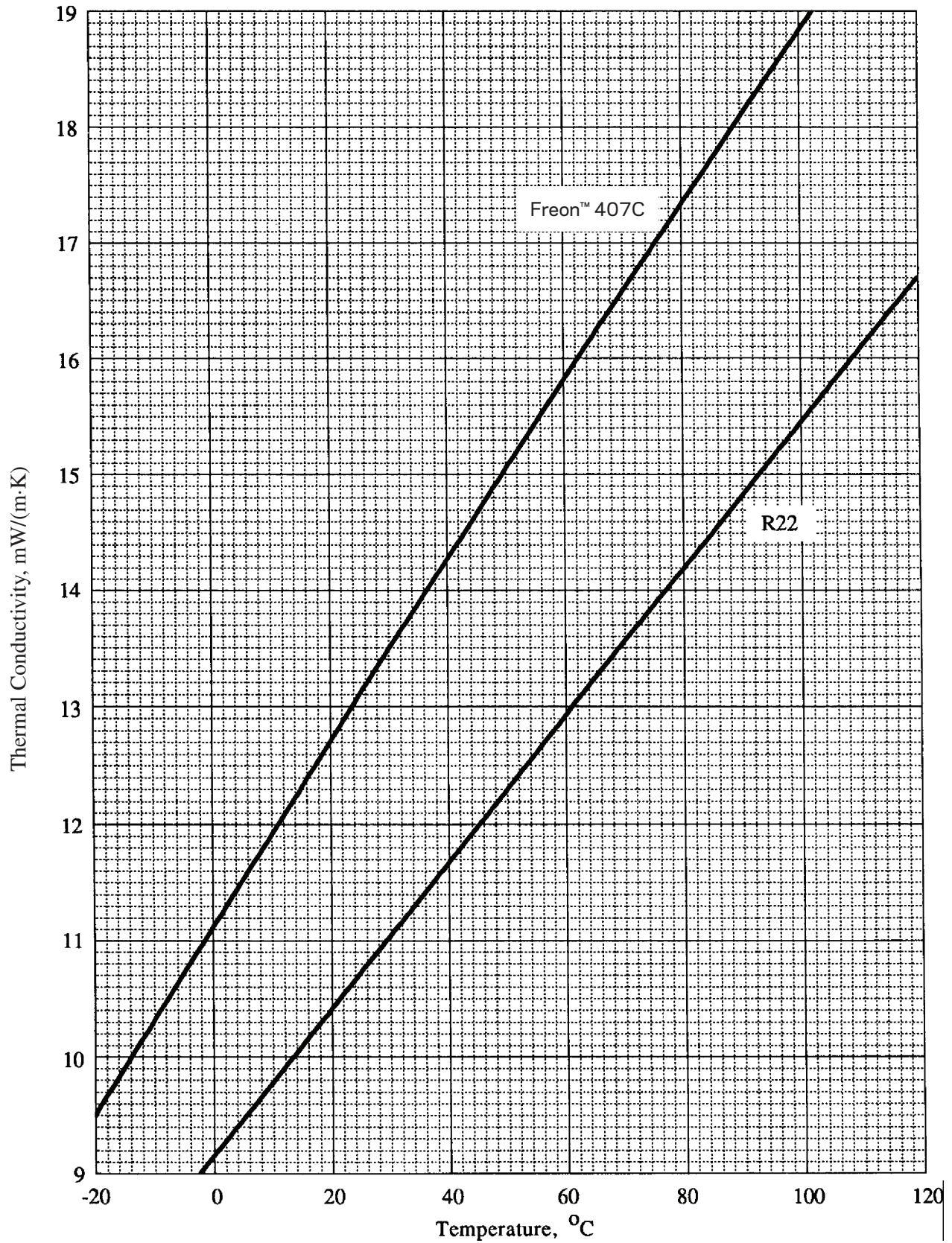
### Gas Viscosity at Atmospheric Pressure



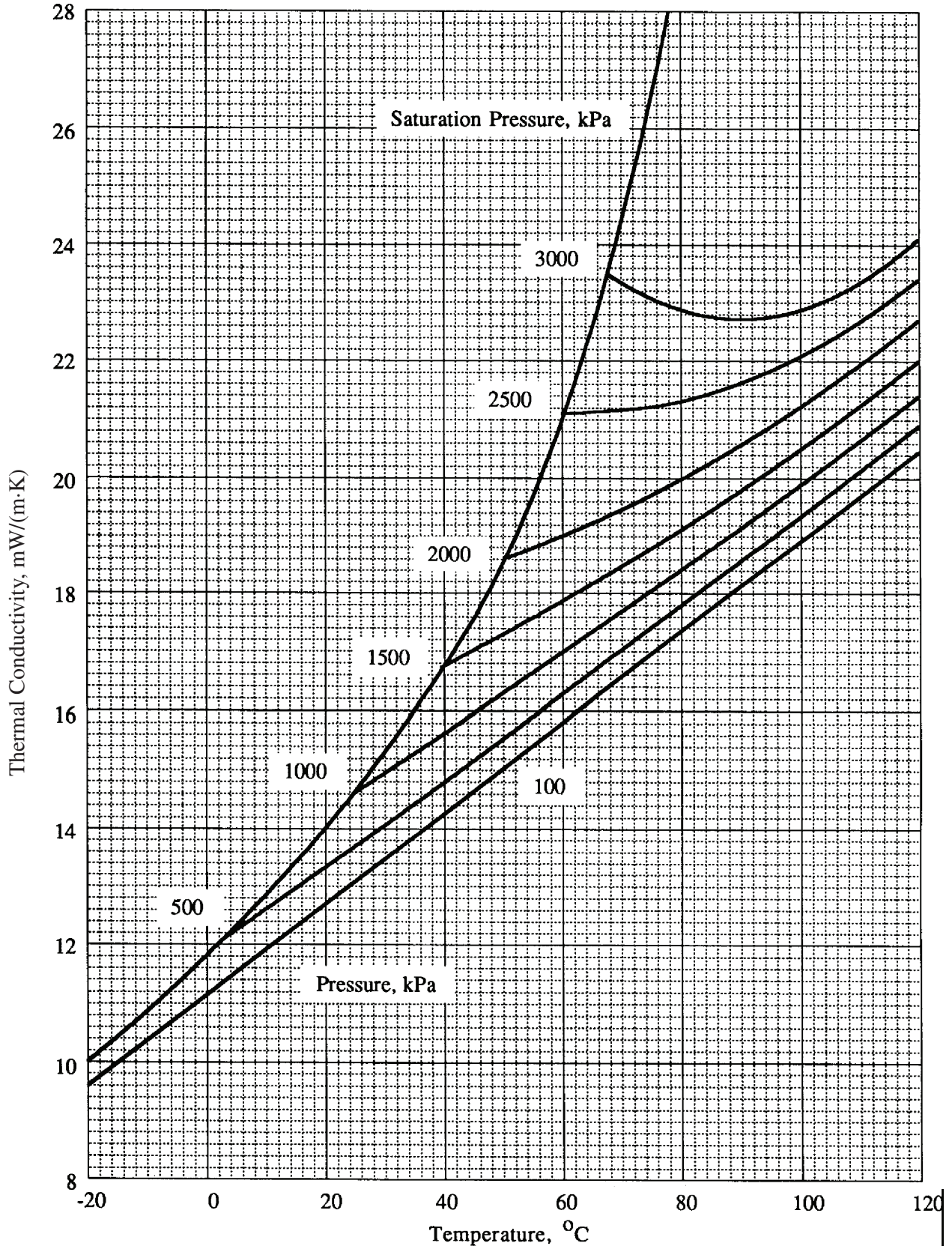
### Vapor Viscosity



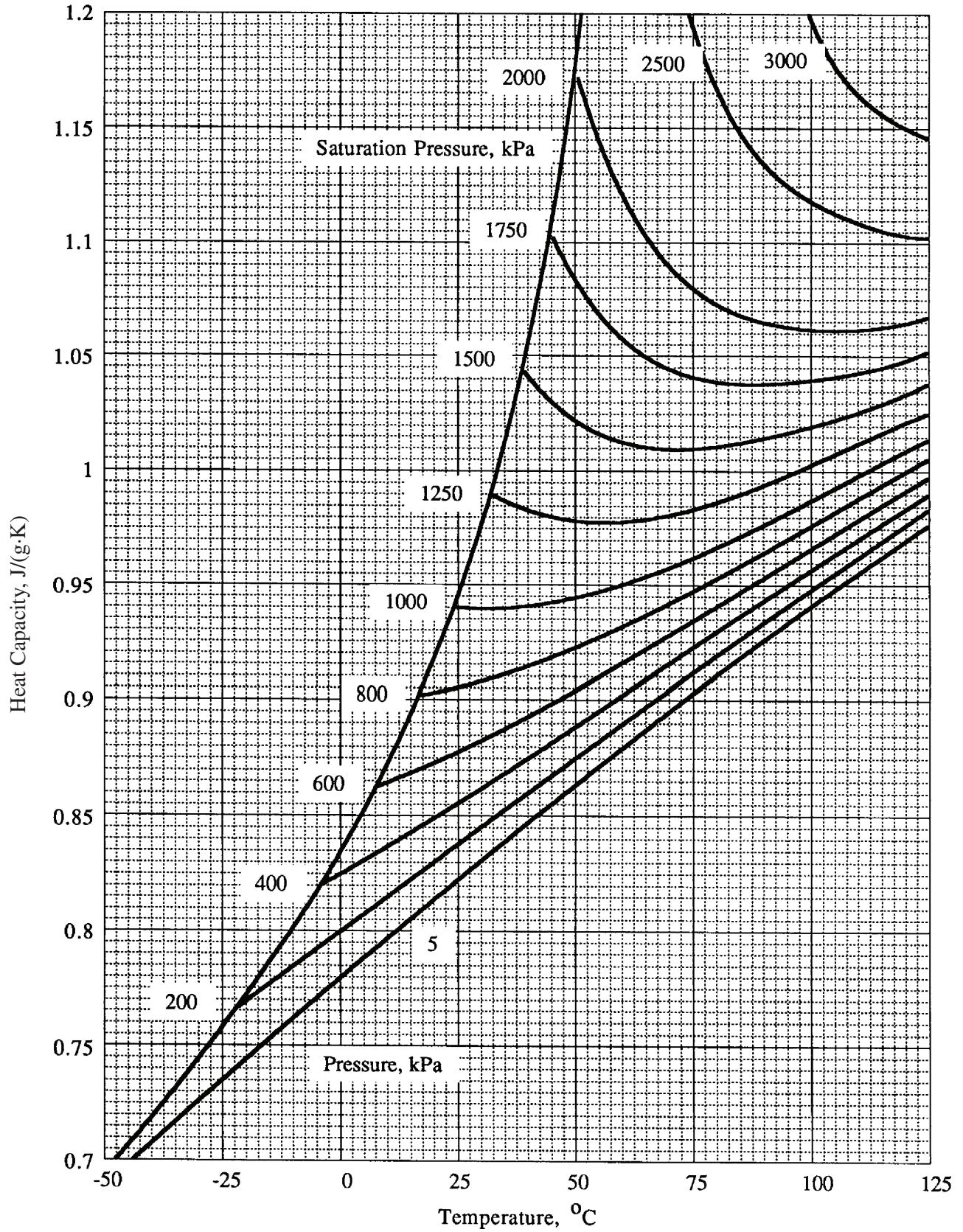
### Gas Thermal Conductivity at Atmospheric Pressure



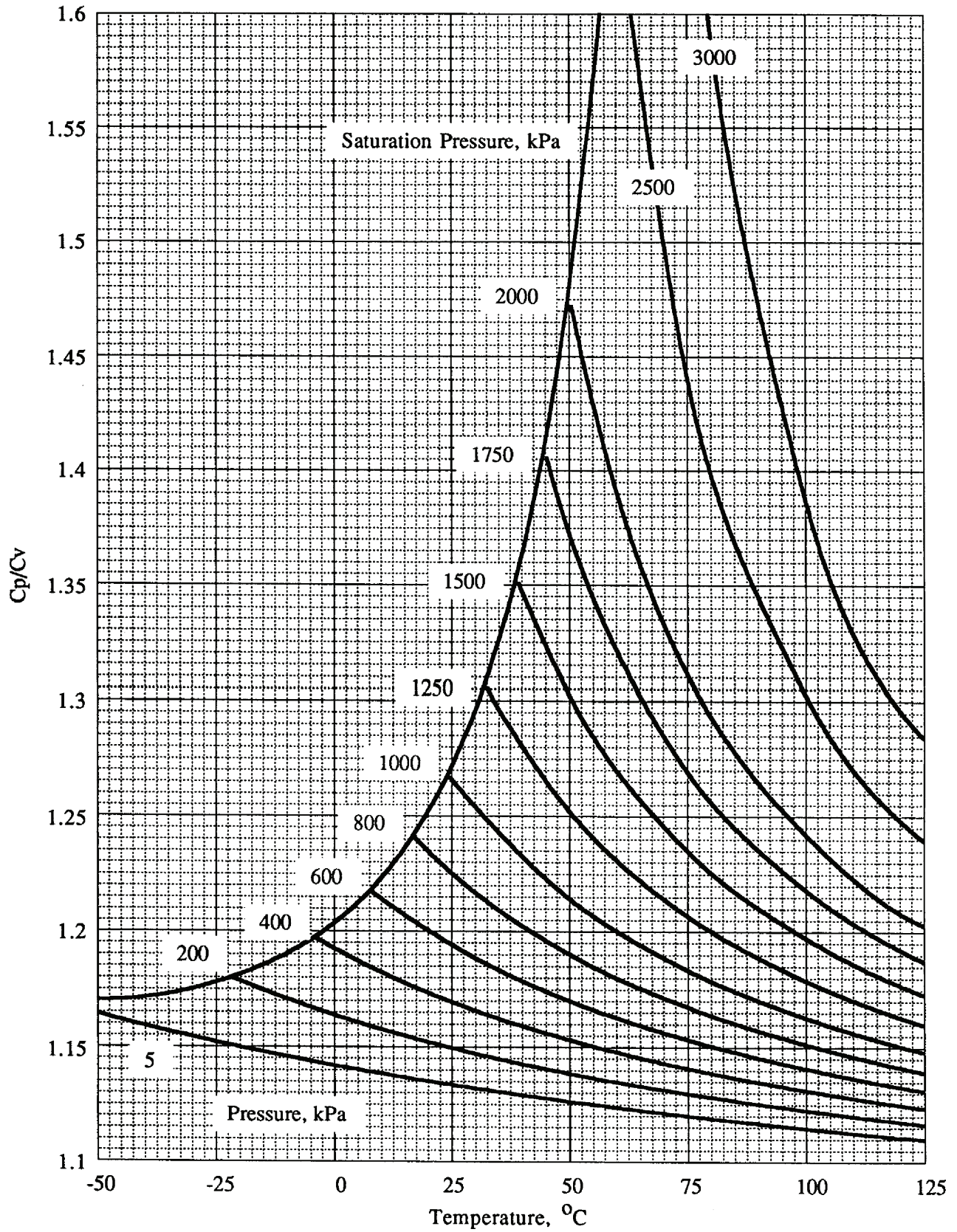
### Vapor Thermal Conductivity



### Vapor Heat Capacity



### Vapor Heat Capacity Ratio





## Equations for Property Estimation

### Metric Units

Curves have been fitted to the measured data to obtain the following equations for estimation of Freon™ 407C properties within the ranges specified.

#### Saturated Liquid Viscosity in $\mu\text{Pa}\cdot\text{s}$ (-50 to 80 °C)

$$\mu = 218 - 2.83 T + 2.20\text{E-}2 T^2 - 1.38\text{E-}4 T^3$$

#### Saturated Liquid Kinematic Viscosity in $\text{mm}^2/\text{s}$ (-50 to 80 °C)

$$\nu = 0.173 - 1.62\text{E-}2 T + 1.47\text{E-}5 T^2 - 1.19\text{E-}7 T^3$$

#### Saturated Liquid Thermal Conductivity in $\text{mW}/(\text{m}\cdot\text{K})$ (-50 to 80 °C)

$$k = 93.4 - 0.333 T + 2.23\text{E-}4 T^2 - 1.42\text{E-}5 T^3$$

#### Saturated Liquid Heat Capacity in $\text{J}/(\text{g}\cdot\text{K})$ (-40 to 65 °C)

$$C_p = 1.40 + 3.975\text{E-}3 T + 3.14\text{E-}5 T^2 + 9.14\text{E-}7 T^3$$

#### Saturated Liquid Pr Number (-40 to 65 °C)

$$\text{Pr} = 3.25 - 1.61\text{E-}2 T + 1.96\text{E-}4 T^2 + 3.95\text{E-}7 T^3$$

#### Gas Viscosity at Atmospheric Pressure in $\mu\text{Pa}\cdot\text{s}$ (-20 to 150°C)

$$\mu = 11.25 + 4.06\text{E-}2 T$$

#### Gas Thermal Conductivity at Atmospheric Pressure in $\text{mW}/(\text{m}\cdot\text{K})$ (-30 to 130 °C)

$$k = 11.09 + 7.74\text{E-}2 T$$

#### Saturated Vapor Viscosity in $\mu\text{Pa}\cdot\text{s}$ (-20 to 80 °C)

$$\mu = 11.86 + 5.36\text{E-}2 T - 3.55\text{E-}4 T^2 + 1.84\text{E-}5 T^3$$

#### Vapor Thermal Conductivity in $\text{mW}/(\text{m}\cdot\text{K})$ (-20 to 80 °C)

$$k = 11.98 + 9.20\text{E-}2 T - 2.43\text{E-}4 T^2 + 2.14\text{E-}5 T^3$$

Where T = Temperature, °C

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**For more information on Freon™ refrigerants, visit [freon.com](http://freon.com).**

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