

TRANSPORT PROPERTIES OF HYDROGEN PEROXIDE

All properties of propellant-grade solutions of H_2O_2 that involve the transfer of mass or energy at the molecular level are presented in the following paragraphs.

Viscosity

Experimental determinations of the viscosity of liquid H_2O_2 - H_2O solutions ranging in composition from 0 to 100 w/o H_2O_2 , have been reported in Ref. 1, Ref. 2, and Ref. 3. Curve fits of these data at 0, 20, 25, and 50 C (32, 68, 77, and 122 F) are graphically illustrated as a function of w/o H_2O_2 (from 50 to 100 w/o) in Fig. 2.18 and 2.18a. In addition, viscosity measurements have been conducted on 98 w/o H_2O_2 (Ref. 4) from 20 to 85 C (68 to 185 F) and on 90 w/o H_2O_2 (Ref.5) from 77 to 325 F (25 to 162.8 C). The data for 98 and 70 w/o H_2O_2 from the various sources has been plotted as a function of temperature and compared to the viscosity of water in Fig. 2.19 and 2.19a.

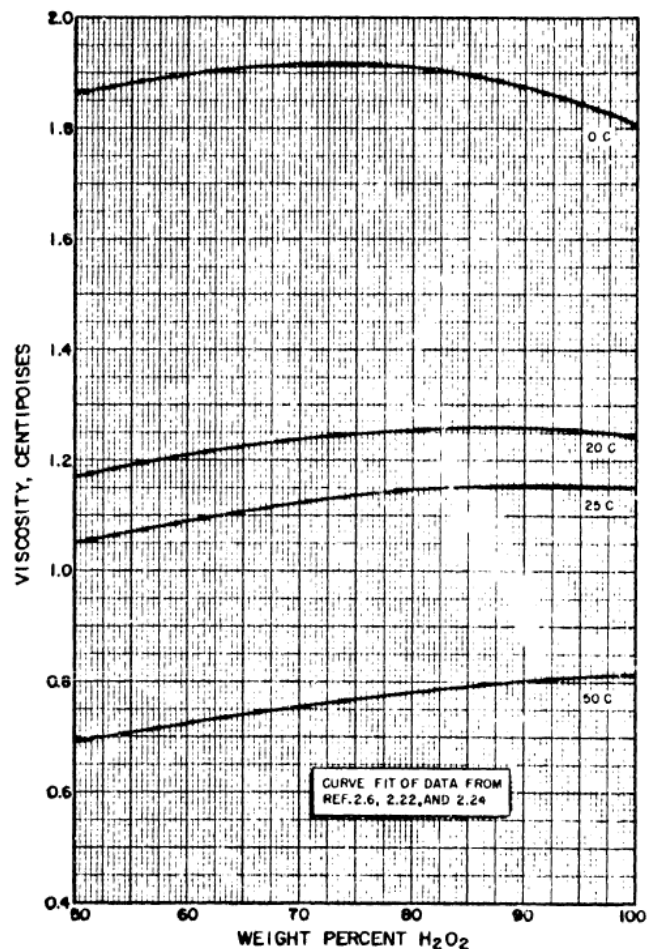


Figure 2.18. Viscosity of Liquid Hydrogen Peroxide-Water Solutions

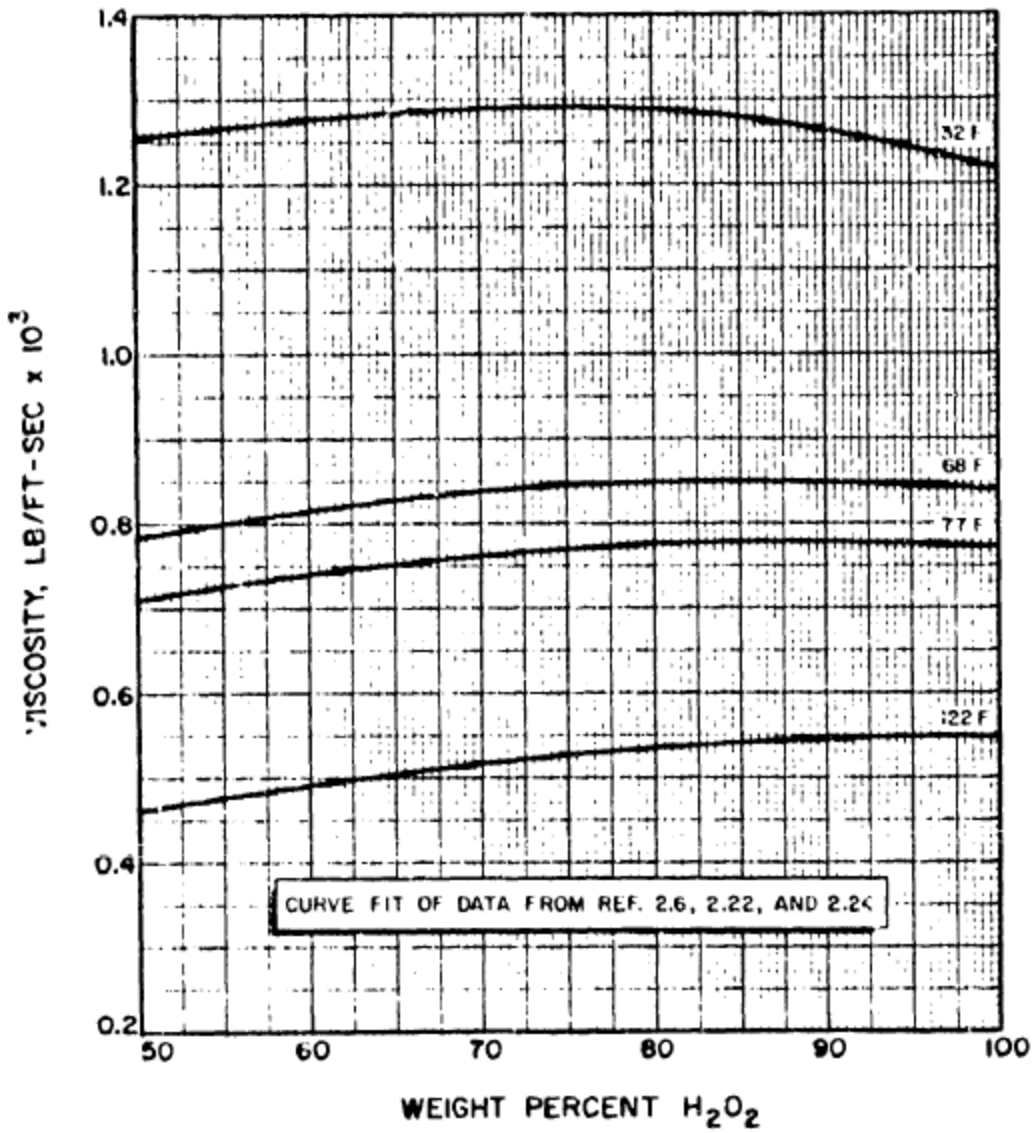


Figure 2.18a. Viscosity of Liquid Hydrogen Peroxide-Water Solutions

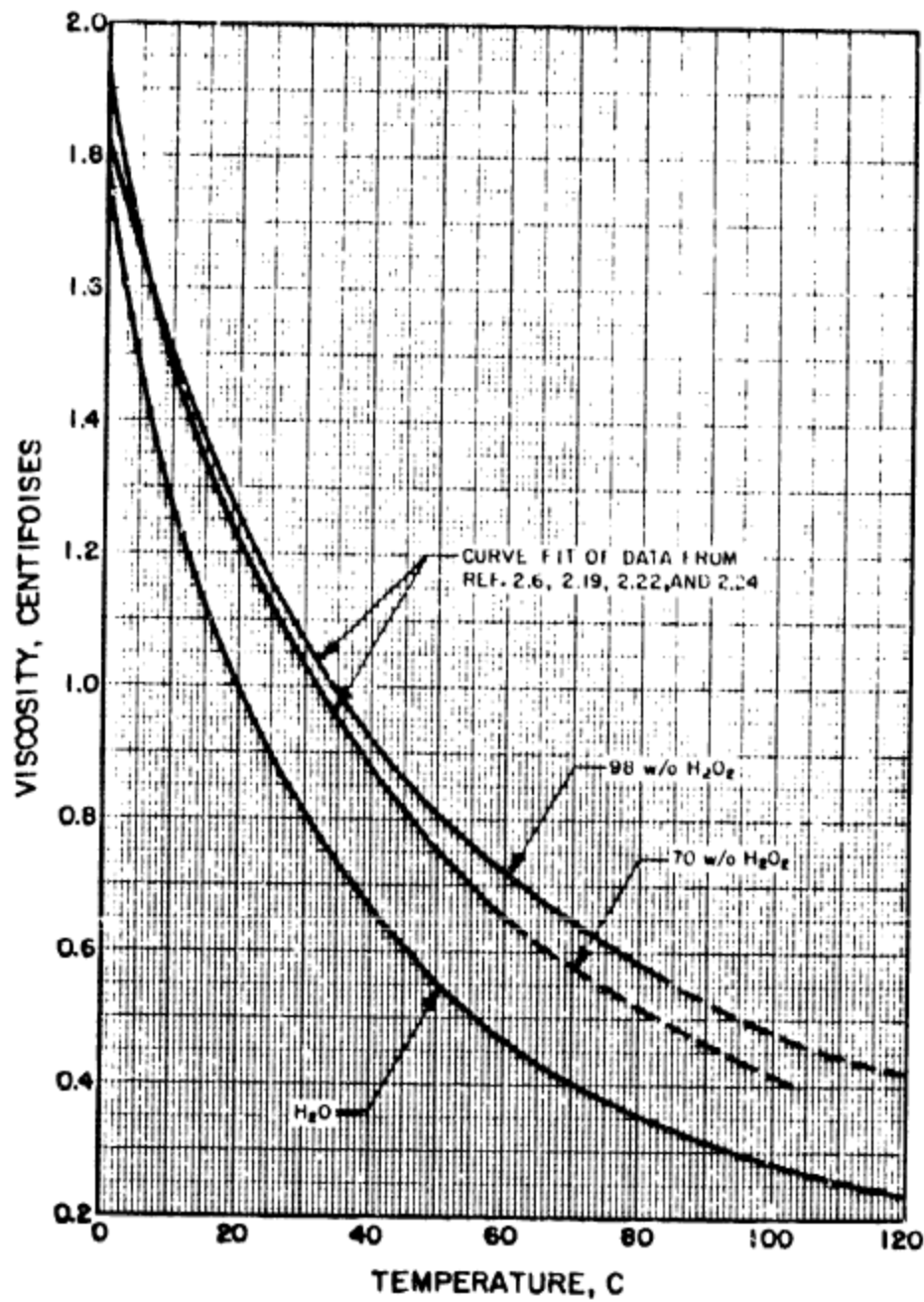


Figure 2.19. Viscosities of 98 w/o Hydrogen Peroxide, 70 w/o Hydrogen Peroxide, and Water

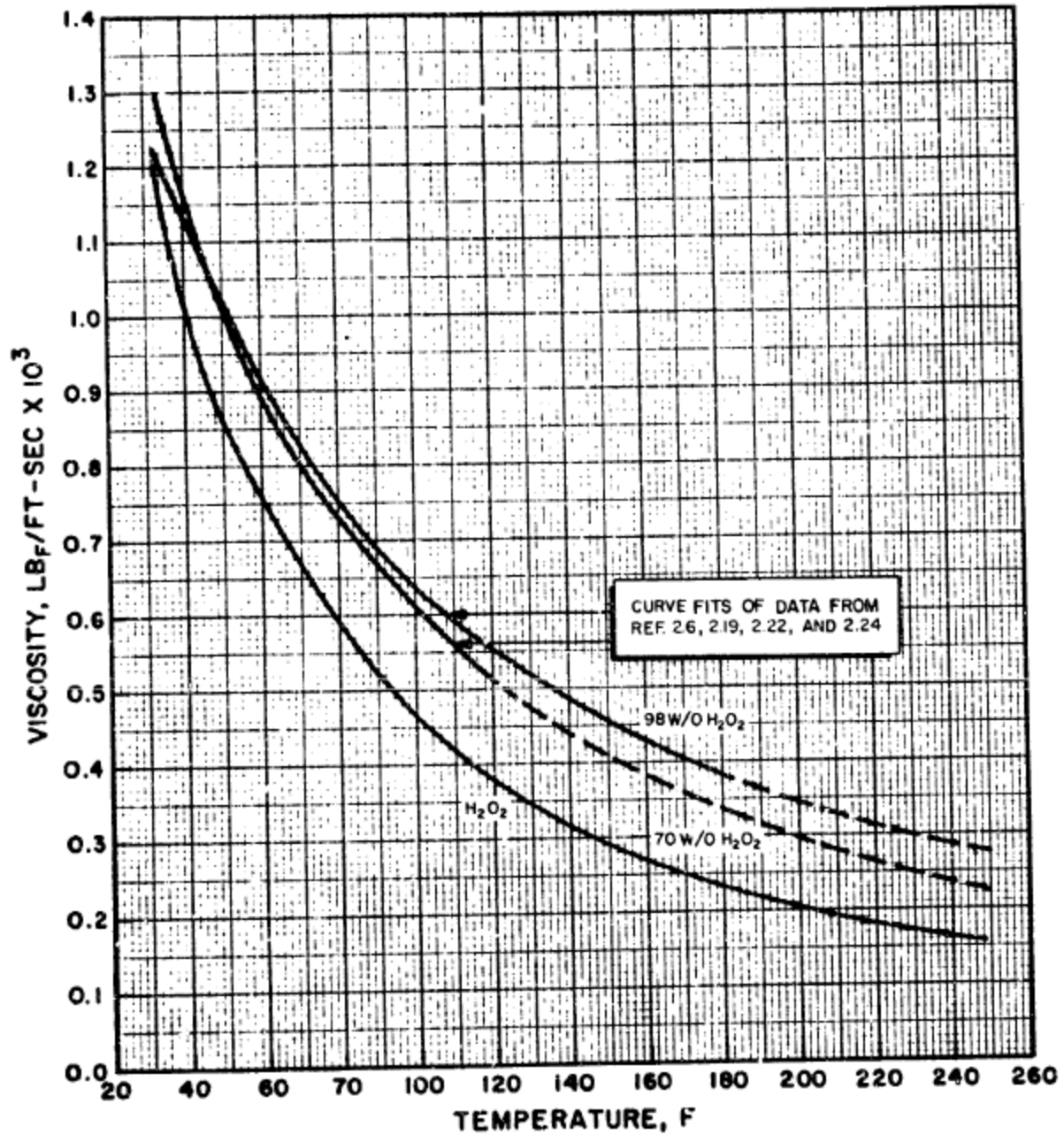


Figure 2.19a. Viscosities of 98 w/o Hydrogen Peroxide, 70 w/o Hydrogen Peroxide, and Water

An equation representing these data from 100 to 300 C (212 to 540 F) with an estimated precision of ± 2 percent is given as:

$$\mu \text{ (micropoises)} = 134 + 0.35 [T_{(C)} - 100] - 14 Y$$

where

Y = mole fraction H₂O₂ in vapor

This equation, comparing the vapor viscosity of water with 100 w/o H₂O₂, is graphically represented in Fig. 2.20.

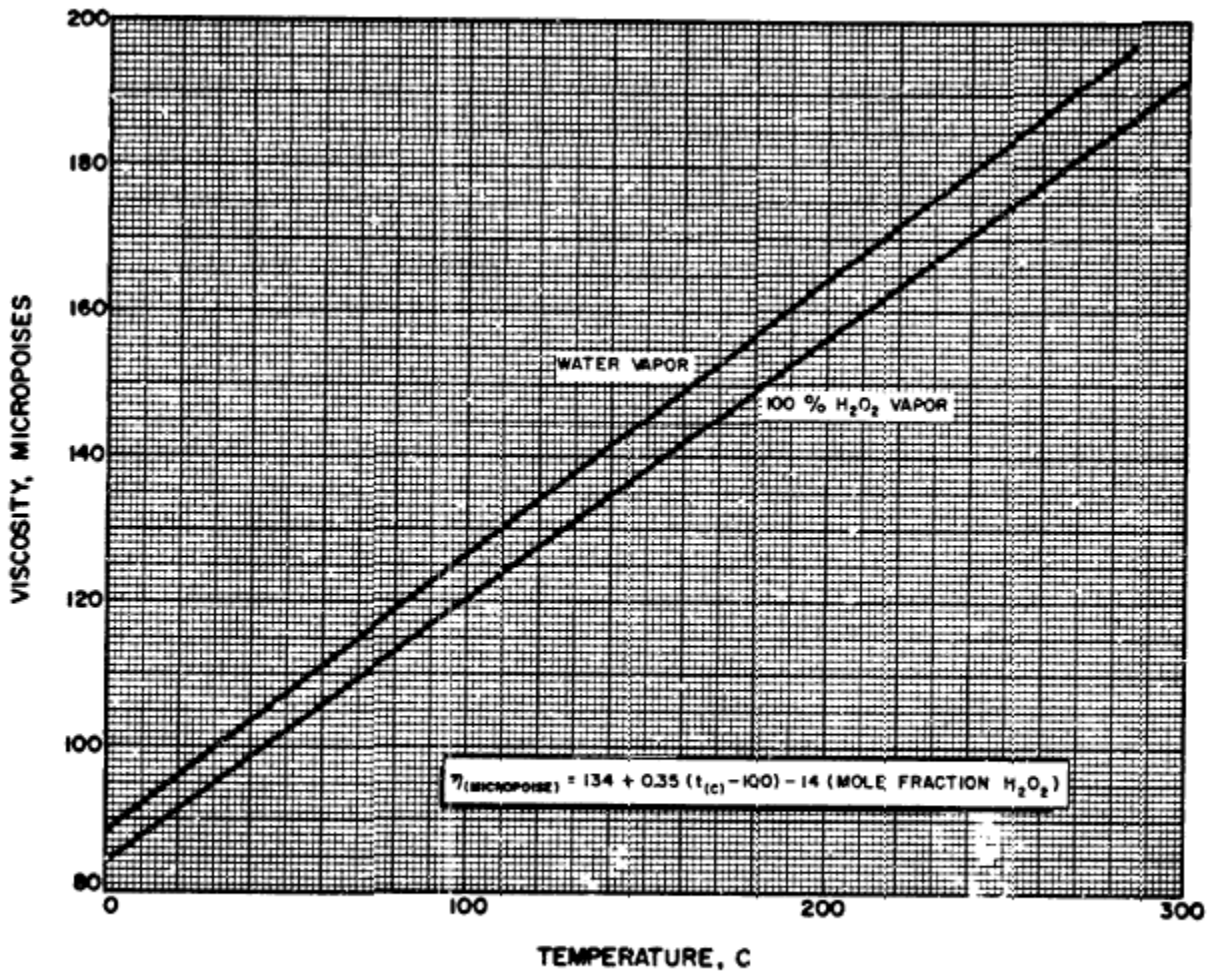


Figure 2.20. Viscosity of Hydrogen Peroxide and Water Vapor

Source : <http://www.diyspaceexploration.com/transport-properties-of-hydrogen-peroxide/>