HOFFER FLOW CONTROLS, INC.
Perfecting Measurement™
107 Kitty Hawk Lane • P.O. Box 2145 • Elizabeth City, North Carolina 27906-2145
1-800-628-4584 • (252) 331-1997 • FAX (252) 331-2886
www.hofferflow.com • Email: info@hofferflow.com



TECHNICAL NOTES

# USING THE UNIVERSAL VISCOSITY CURVE

A unique form of presenting the calibration data for a turbine flowmeter targeted for service in varying viscosity fluids is the Universal Viscosity Curve.

Basically consisting of a semilog plot of K-Factor as a function of the ratio of output frequency to kinematic viscosity, the Universal Viscosity Curve represents the performance of the meter over the viscosity range and flow range over which the calibrating testing was performed. As such, the viscosity effects, which vary with flow rate, are uniquely presented in a convenient form.

The Universal Viscosity Curve may be utilized to determine the K-Factor either graphically, or in the case of an intelligent instrument, algorithmically, for a measured set of flowing conditions.

The procedure for graphical determination is as follows:

(1) Measure the output frequency (Hz).
(2) Determine the kinematic viscosity from either an indirect temperature measurement or directly from a measurement of viscosity.
(3) Calculate the ratio of frequency to centistokes.
(4) On the Universal Viscosity Curve, read up from the Hz/cstk to the intersection of the curve.
(5) Read over to the K-Factor axis to find the K-Factor.
(6) Calculate the following:

**Equation 1**

$$\text{Flow Rate GPM} = \frac{\text{Frequency X 60}}{\text{K-Factor}}$$

**Equation 2**

$$\text{Flow Total Gallons} = \frac{\text{Number of Counts}}{\text{K-Factor}}$$

Often, an intelligent instrument may be used to eliminate the viscosity effects of the flowmeter, if a viscosity of temperature input of flowing conditions is also available.