


# ZAHN VISCOSIMETER

**WESCHLER  
INSTRUMENTS** 

**DIVISION OF HUGHES CORPORATION**

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The Zahn viscosimeter is a portable device for quickly checking the viscosity of paint, varnish, lacquer, inks, syrups, or other liquids. The viscosity of a liquid, when measured by the Zahn viscosimeter, is expressed in Zahn seconds; that is, the time required for a definite volume (44cc) of liquid to flow through the orifice in the bottom of a metal cup.

The Zahn viscosimeter (formerly manufactured by G.E.), consists of a bullet-shaped, corrosion-resistant, stainless-steel cup with a precision drilled orifice. A looped handle (approximately 11-1/4 inches long) is attached to the cup. A small ring is provided at the top of the handle which aligns the cup in a vertical position when withdrawing it from the liquid being tested.

## **OPERATION**

The following method of operation of the Zahn viscosimeter is recommended. The unit of measurement is Zahn seconds.

1. Measure the temperature of the liquid as it is being stirred thoroughly.
2. Hold the viscosimeter in a vertical position (by means of the small ring at the end of the handle) and dip it into the liquid being tested.
3. Simultaneously lift the viscosimeter out of the liquid and perform the following timing operations:
  - a. Start the timing device when the top edge of the viscosimeter cup breaks the surface.
  - b. Stop the timing device when the steady flow of liquid from the orifice suddenly stops.Note: Timing device is to be furnished by the user.
4. Check the time in seconds against the graph of a previously determined standard in order to determine if the liquid has the correct viscosity.

If the viscosimeter is not left in the liquid between readings, it should be cleaned with an appropriate solvent and dried with a soft tissue. Care should be taken not to scar, or damage, the orifice.

## **VISCOSITY-TEMPERATURE CURVE**

Temperature will affect the viscosity of a liquid; therefore, it is recommended that several tests be made, of the same liquid, over the expected temperature range, and a table prepared (if a viscosity-temperature curve is not used) similar to Table A on page 2.

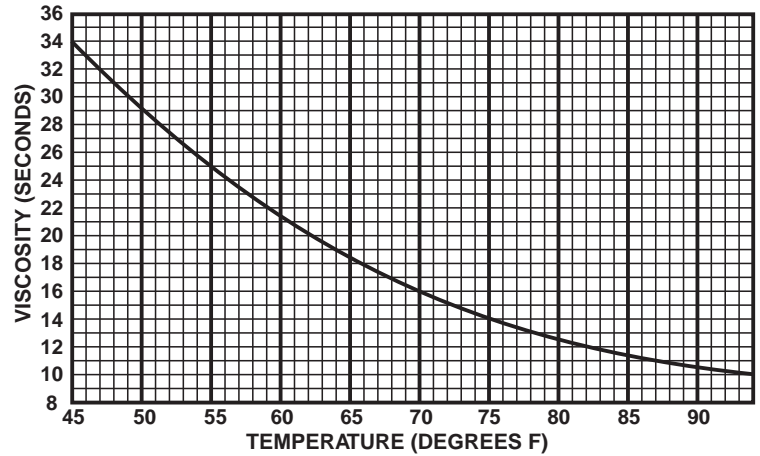
A viscosity-temperature curve (see Fig. 1) is useful for quality control purposes. To prepare such a curve, obtain a sample of the liquid to be controlled when the liquid is at optimum viscosity. Then determine the viscosity, in Zahn seconds, in 5-degree or 10-degree steps over the range which will be encountered in practice. A complete viscosity-temperature curve, similar to that in Fig. 1, can be prepared in a short time.

With the preceding data, viscosity comparisons can be made in the production area or in the laboratory with any viscosimeter of the same Cat. No.

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**TABLE A**

Material	Viscosity in Zahn Seconds	Temperature of Liquid (Deg. F)	Viscosimeter Cup No. (G No.)
111	20	70	2
	19.5	80	2
	19	90	2
7508	34	70	2
	33	80	2
	28.5	90	2



**FIG. 1. Typical viscosity-temperature curve**

## SELECTION OF ZAHN VISCOSIMETER

For best results, select a viscosimeter which will allow the liquid to flow through the calibrated orifice in approximately 20 to 40 seconds. Five orifice sizes are available, see Table B. The capacity of the cup used on all Zahn viscosimeters is 44 cubic centimeters.

## ACCURACY

The Cat. No. 9109697G1 and G2 viscosimeters are accurate within one second of a known standard. The Cat. No. 9109697G3, G4 and G5 viscosimeters are accurate within two seconds. These accuracies are verified by comparison of production units with a known standard.

## CONVERTING TO OTHER UNITS

There is no general formula to convert Zahn seconds to other viscosity terminology. However, the simple method of using the Zahn viscosimeter minimizes the need for converting to other units.

## CERTIFICATE OF CONFORMANCE

A certificate of conformance is available for a nominal fee. Contact Weschler Instruments for details.

In special cases where a direct correlation is required, a conversion curve can be constructed from actual test data, but will apply only to the particular liquid used in obtaining the data.

The reason an empirical formula cannot be applied is that all liquids do not have the same flow characteristics with respect to the cup's surface even though they may have the same absolute viscosity. Thus, a value of Zahn seconds is equal to a definite value in other units only when referred to a specific liquid.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired, contact Weschler Instruments.

**TABLE B  
TECHNICAL DATA**

Cat. No.	Approx. Orifice Size (in.)	Recommended Centipoise Range*	Range In Zahn Seconds	Use
9109697G1	0.078	20-85	40-85	Very thin oil or very thin mixtures
-G2	0.108	30-170	20-70	Thin oil, mixed paints, lacquers, etc.
-G3	0.148	170-550	25-60	Medium oil and mixed paints, etc.
-G4	0.168	200-900	20-65	Heavy mixtures
-G5	0.208	250-1200 (and above)	15-60	Extremely heavy mixtures

\* These figures are given only for the purpose of selecting the proper viscosimeter. They are not intended for use in converting centipoises to Zahn seconds.

Manufactured and Serviced by:



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