

VISCOSIMETER, ZAHN CUP-TYPE OPERATING INSTRUCTIONS

MODEL NUMBERS 27134-001, -002, -003, -004 & -005

1. INTRODUCTION

The Zahn Cup-Type Viscosimeter is a portable device for quickly measuring the viscosity of such liquids as paint, lacquer, varnish, syrup and oil. The viscosity of a liquid measured by this device is expressed in Zahn numbers, that is, the time in seconds required for a definite volume (44 ml) of liquid to flow through the Viscosimeter. Five models are available to measure viscosities ranging from 18 to 1725 centistokes. The models differ only in the size of the orifice in the bottom of the cup.

Boekel Viscosimeters offer many advantages.

- Simplicity of use; no special skill is required.
- Convenience; it is small and lightweight.
- Fast Operation; measurement usually can be made in less than a minute.
- Durability; cup is a one-piece construction.

2. SPECIFICATIONS

Model Number 27134	-001	-002	-003	-004	-005
Orifice Diameter, Inches	0.078	0.108	0.148	0.168	0.208
Zahn Range in Seconds, Approx.	45-80	25-80	20-75	20-80	20-75
Centistoke Range, Approx.	18-56	40-230	150-790	220-1100	460-1725+
Applications	Very thin oil	Thin oil or Lacquer	Medium oil or mixed paints	Heavy Mixtures	Very Heavy Mixtures

Overall Length, Inches – 13 3/4, Depth, cup – 2 3/8, Width, cup – 1 3/8, Cup Capacity, ml - 44

3. OPERATION

Procure a stop watch and a dial thermometer with spike stem for use with the Zahn Viscosimeter.

- 1) Insert the thermometer into the holes of the bracket of the Viscosimeter.
- 2) Stir the liquid thoroughly, dip the cup into the liquid and record the temperature.
- 3) Raise the bracket so the thermometer stem is out of the cup.
- 4) Place a finger in the ring, lift the Viscosimeter completely out of the liquid and start the stop watch when the top edge of the cup breaks the surface.
- 5) Stop the watch when the steady flow of the liquid from the orifice suddenly breaks.
- 6) Repeat steps 2 through 5 until consistent results are obtained.
- 7) Express viscosity in Zahn seconds.
- 8) Clean the Viscosimeter with an appropriate solvent and dry with soft, lint-free tissue.

For quality control purposes a viscosity-temperature curve is useful. To prepare such a curve, first 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 bracketing the temperature range which will be encountered in control measurements.

4. MAINTENANCE

The Zahn Cup-Type Viscosimeter requires no special maintenance other than taking precautions to avoid damage to the orifice. After use clean the device with appropriate solvent and dry with soft, lint-free tissue.

METHODS FOR CONVERTING ZAHN SECONDS TO CENTISTOKES

GENERAL FORMULA

$$V = K(T-C)$$

V = KINEMATIC VISCOSITY (cSt)

T = EFFLUX TIME (ZAHN SECONDS)

K & C = CONTANTS (REF. #1)

SPECIF FORMULAS:

ZAHN CUP #	FORMULA	"T RANGE SECONDS"
1	$V = 1.1 (T - 29)$	45-80
2	$V = 3.5 (T - 14)$	25-80
3	$V = 11.7 (T - 7.5)$	20-75
4	$V = 14.8 (T - 5)$	20-80
5	$V = 23 (T - 0)$	20-75

NOTES:

1. All measurements at liquid temperature of 77°F (25°C)
2. For accuracy, each cup should have a correction factor determined by comparing the measured viscosity to a certified viscosity standard appropriate for the size cup being used.

REFERENCE:

1. ASTM # D 4212: Viscosity by dip-type viscosity cups.