



Paul N. Gardner Company

ISO MINI DIP CUP VISCOMETERS

Instructions for measuring efflux time,
converting results to viscosity, and
caring for the ISO Mini Dip Viscosity
Cups.



ISO Mini Dip Cup



ISO Mini Dip Viscosity Cups measure the efflux time of liquids flowing through precision 3 mm, 4 mm, or 6 mm orifices. The measured time is recorded in seconds and can be converted to kinematic viscosity in centistokes using the applicable Mini Dip Cup formula or the [GARDCO Viscosity Calculator](#).

Designed primarily for field use, the Mini Dip Cups are counterparts to the GARDCO Standard ISO Cups used in the laboratory. Each Mini Dip Cup has half the capacity of the corresponding Standard Cup and is designed to provide half its efflux time when fitted with the same orifice size.

The cup body is machined from solid aluminum bar stock with a removable stainless-steel “Snap-In, Snap-Out” orifice. The Mini Dip Cup has an attached handle for support and does not have the overflow ring found on the Standard Cup. Its inverted-cone bottom terminates in the precision orifice to help provide a distinct drainage endpoint.

Cup Size Overview

Orifice	Efflux-Time Range	Nominal Viscosity Range	Midrange Sensitivity	Recommended Calibration Oil / Centistokes
3 mm	27–120 seconds	4.6–52 cSt	0.5 cSt/second	G-10, nominally 19 cSt
4 mm	21–120 seconds	19–163 cSt	1.4 cSt/second	G-35, nominally 68 cSt
6 mm	17–120 seconds	84–823 cSt	7.1 cSt/second	G-100, nominally 233 cSt

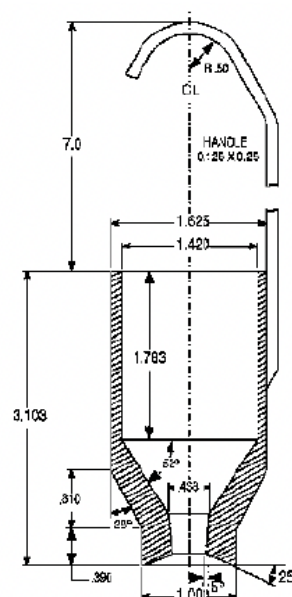
Nominal centistoke values are shown. Refer to the standard-oil bottle label for the actual viscosity value.

Midrange sensitivity is stated as centistokes per second of efflux time.

Cup Construction

The GARDCO ISO Mini Dip Cup series uses removable “Snap-In, Snap-Out” orifices. This design allows a damaged orifice to be replaced without replacing the complete cup.

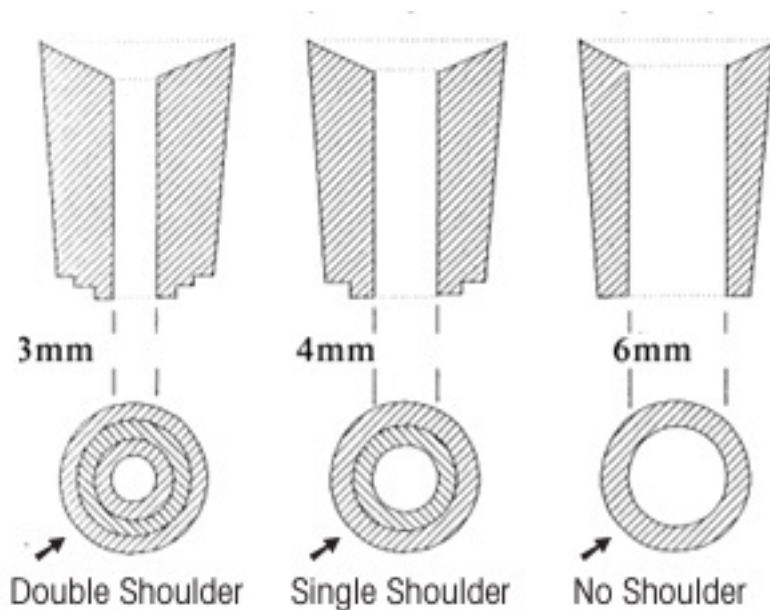
For non-certified cups, 3 mm, 4 mm, and 6 mm orifices may be interchanged within a cup or between compatible GARDCO ISO cups. For convenience and best results, keep orifice interchanges to a minimum. This interchange provision does not apply to certified cups.



Orifice Identification

Production tolerances permit 3 mm, 4 mm, and 6 mm orifices to be interchanged within a cup or between compatible GARDCO Standard ISO and Mini Dip Cups. For convenience and best results, keep interchanges to a minimum.

This interchange provision does not apply to certified cups.



Understanding Centistokes

Efflux cups measure the time required for a liquid to flow through a specified orifice under gravity. The resulting time is called efflux time and is recorded in seconds.

Kinematic viscosity is commonly expressed in centistokes, abbreviated cSt. Kinematic viscosity accounts for the relationship between a liquid's resistance to flow and its density.

Use the cup specific formula, conversion table, or [GARDCO Viscosity Calculator](#) to convert between efflux time and centistokes.

ISO Mini Dip Cup



Instructions for Use

1. Select the Mini Dip Cup and orifice size appropriate for the expected viscosity. Ensure that the cup and orifice are clean.
2. Adjust the test material to the specified measurement temperature, if necessary.
3. Lower the cup into the material until its top rim is submerged.
4. Place a thermometer in the immersed cup and measure the temperature of the sample inside it.
5. Remove the thermometer. Hold the cup vertically with your index finger through the handle ring.
6. Lift the cup out of the sample in a quick, steady motion. Start the timer when the cup breaks the liquid surface.
7. During drainage, hold the cup no more than 6 in. above the sample surface.
8. Stop the timer at the first definite break in the stream at the base of the cup.
9. Record the cup/orifice size, material identification, measured temperature, and efflux time.
10. If required, convert the measured time to viscosity using the applicable Mini Dip Cup formula or conversion table.
11. Clean the cup promptly after use, paying particular attention to the orifice.

Temperature Control

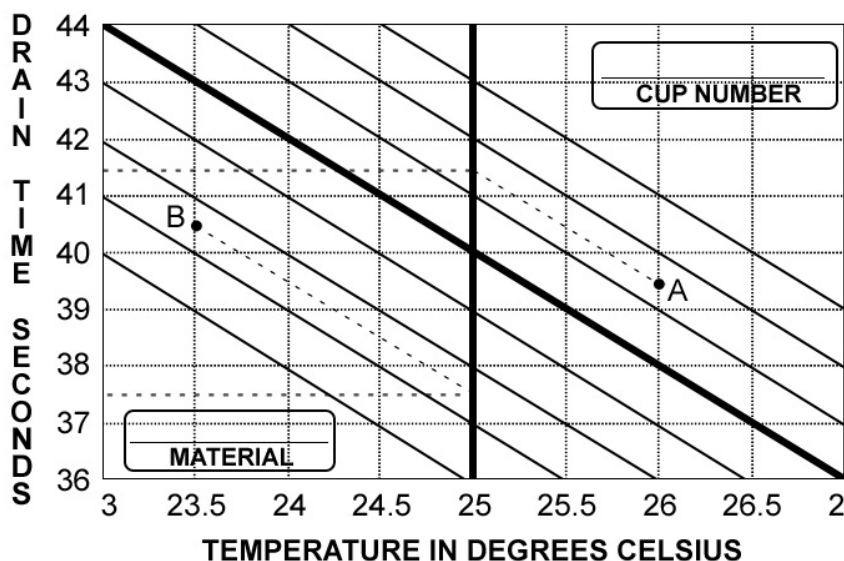
Most materials change in viscosity as their temperature changes. The original guidance notes changes of approximately 3–8% per degree Celsius for materials commonly measured with viscosity cups. Measure and record the sample temperature whenever an efflux-time result is taken.

For repeatable comparisons, use the temperature specified by the test method or product specification.

Temperature-Correction References

When frequent measurements are made on similar products, a material-specific graph can be developed to relate measured temperature and efflux time to a selected reference temperature, normally 25 °C.

Use temperature corrections cautiously. Even within ± 2 °C, the relationship between viscosity and temperature may not be linear. Thinning materials may also change that relationship.



Care of Cup

ISO Mini Dip Viscosity Cups are precision instruments. With reasonable care and thorough cleaning after use, they can provide many years of service. Take particular care when cleaning the orifice to avoid deposits or scratches on its internal surfaces.

Orifice Removal and Installation

Never strike the orifice directly.

To remove it, place the supplied dowel against the orifice and tap the dowel while catching the released orifice. Before inserting an orifice, ensure that its exterior and the cup's receiving cone are clean.

Cleaning Procedure

1. Allow remaining material to drain.
2. Flush the cup and orifice with a suitable solvent for the test material.
3. Dry the cup with a soft, lint-free cloth.
4. If necessary, use a compatible volatile solvent for a second cleaning to remove residual cleaning solvent.
5. Allow the cup to dry completely or use a low-velocity stream of clean air.
6. Inspect the orifice for remaining residue before the next test.

Avoid rapid solvent evaporation that excessively cools the cup and causes moisture to condense on its surface. Nylon fishing line may be used carefully to clean the orifice.

ISO Mini Dip Cup



G Series Viscosity Standards

GARDCO viscosity cups are calibrated using G Series Viscosity Standards. The centistoke viscosity of these standards is traceable to the National Institute of Standards and Technology.

G Series Viscosity Standards are used to periodically verify the performance of GARDCO viscosity cups. Select the standard oil recommended for the cup/orifice size being checked.

ISO Mini Cup Orifice	Recommended Standard Oil	Nominal Viscosity at 25 °C
3 mm	G10	19 cSt
4 mm	G35	64–68 cSt
6 mm	G100	230–233 cSt

- Use only clean cups, containers, thermometers, and stirring devices with viscosity standards.
- Return the standard oil to its labeled bottle immediately after use and secure the cap.
- Avoid contamination with water, solvents, dust, or test material.
- Replace the standard if contamination is suspected or if the expiration date has passed.
- Do not use silicone fluids to calibrate cups intended for non-silicone materials.

Important: Use GARDCO G Series standards only with GARDCO cups unless the other cup manufacturer has supplied compatible conversion formulas and cup tolerance information.

Available Accessories



Stainless Steel Griffin Beakers

Collects test material during the efflux measurement.

[Buy at gardco.com](https://gardco.com)



Certified Pro Ultimate Stopwatch

Measures efflux time to the required resolution for accurate testing and conversion.

[Buy at gardco.com](https://gardco.com)

Available Accessories (continued)



Stem Precision Thermometer

Measures test material temperature during viscosity cup testing. Available with 8 in and [12 in](#) stems.

[Buy at gardco.com](#)



Dial Thermometer

Measures test material temperature during viscosity cup testing. Available in Fahrenheit or [Celsius](#) versions.

[Buy at gardco.com](#)



ISO Cup Orifice

Replacement stainless steel orifices are available for 3 mm, [4 mm](#), [6 mm](#) and [8 mm](#) ISO Cups.

[Buy at gardco.com](#)



G Series Viscosity Standards

G10, [G35](#), [G100](#), and [G350](#) Viscosity Standards are available for periodic cup verification.

[Buy at gardco.com](#)