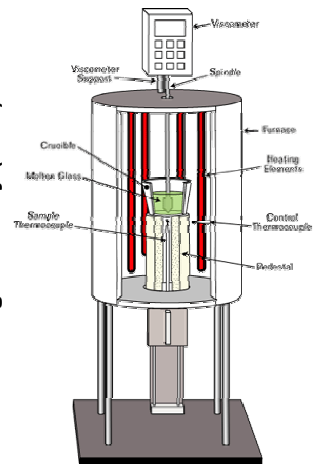
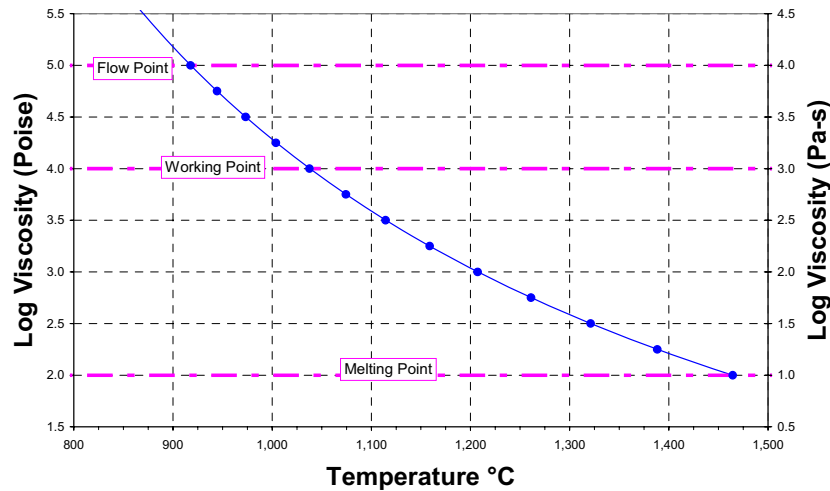


### Molten Glass Viscometer

(Rotating Spindle Viscometer – for ASTM C-965 Procedure A)

Molten Glass Viscosity as a Function of Temperature



### Orton Model RSV-1600

The Orton Model RSV-1600 Viscometer is designed to measure the viscosities of a molten glasses at various temperatures according to the ASTM C-965 Procedure A. The Model RSV-1600 is a rotating spindle viscometer using the constant angular velocity method to measure viscosities at specific temperatures in order to generate a curve of the visco-elastic behavior of a molten glass, as shown in the graph above. This system can also be used for testing according to ASTM C-1276 guidelines.

Orton designs the system to accommodate the platinum crucible provided by the user. The photo above and on the left is a 1,600°C, laboratory bench top system designed for a platinum crucible approximately 60 mm (2.36") tall with a top and bottom OD of 73 mm (2.87") and 57 mm (2.24") respectively, which contains approximately 300 grams of glass.

The figure at the top right is a cross section concept sketch of this system showing the primary components. The crucible containing the glass sample is positioned on the top of the pedestal, and is heated by the vertical tube furnace with molybdenum disilicide heating elements and type "S" control thermocouple. The Universal Temperature Control (UTC) console (not shown) contains a multi-segment user programmable PID controller, phase angle fired SCR's, current limiting SCR power control module, ammeter, and digital temperature display, and is used to control the thermal cycle of the furnace during the various ramps and holds. The molten glass is held at a predetermined soak temperature until the thermal equilibrium is reached, and is monitored by the sample thermocouple at the base of the crucible, which sends its signal to the digital display in the UTC console. The spindle is manually lowered into the molten glass and the Brookfield viscometer rotates the spindle at a predetermined rotational speed. The readings on the Brookfield display are manually monitored and recorded as a function of rotational velocity and glass temperature. This process is repeated for a variety of rotational speeds and a variety of soak temperatures. Data is compiled and the viscosities are calculated according to the ASTM C-965 Procedure A guidelines.

The furnace position is fixed on the support structure. The crucible pedestal is raised and lowered into and out from the furnace via a motorized lift system for safe and easy handling of a crucible of molten glass. The rotating spindle assembly and viscometer head are manually lowered into and raised from the crucible of molten glass. The entire system is designed around the purchaser's crucible size, range of viscosities, component movement method, and budgetary constraints.

#### Model RSV-1600 Specifications

Sample Crucible	System made to suit Purchaser's crucible size (supplied by Purchaser)
Viscometer Spindle	Design to suit the crucible (supplied by the purchaser according to Orton specifications)
Maximum Temperature	1,600°C
Heating Element	Molybdenum Disilicide
Temperature Control System	User programmable PID controller
Rotational Viscometer	Brookfield Series – choice of log viscosity ranges (poises): log 2 to 5.5; log 1.4 to 4.9; or log 1 to 4.6
Power Requirements	240 VAC, 15 amp, 50/60 Hz (step down transformer included)