

## Viscosity at Low Temperature (Borderline Pumping Temperature) - Mini-Rotary Viscometer - MRV/TP-1 (automatic)

- Constant Shear Stress Viscometer -

ASTM D 3829, ASTM D 4684, ASTM D 6821, ASTM D 6896

**Product group(s):** Oil, Viscosity

**User group(s):** Engine Oil, Oil, Transmission Fluid

**Scope:** These methods are used to determine the lowest temperature (in the range of -40 to +10°C) at which an engine oil can be continuously and adequately supplied to the oil pump inlet of a passenger car engine.

### Yield Stress and Apparent Viscosity of Engine Oils at Low Temperature

ASTM D 4684 - ASTM D 6896

A cooled engine oil is forming a gel structure that results in either excessive yield stress or viscosity of the engine oil, or both, and can cause failures due to lack of oil pumpability.

Suitable for: engine oils

### Borderline Pumping Temperature of Engine Oil

ASTM D 3829 - The borderline pumping temperature is a measure of the lowest temperature at which an engine oil can be continuously and adequately supplied to the oil pump inlet of an automotive engine.

Suitable for: engine oils

### Low Temperature Viscosity of Drive Line Lubricants - Constant Shear Stress Viscometer -

ASTM D 6821 - The viscosity at low temperatures can become critical for both, gear lubrication and the circulation of the fluid in automatic transmissions.

Suitable for: drive line lubricants (gear oils, automatic transmission fluids, torque, and tractor fluids etc.)

- up to 10 test placed
- no external refrigeration or heating unit
- no liquid cooling medium



### Mini-Rotary Viscometer - MRV/TP-1

or

Constant Shear Stress Viscometer acc. ASTM D 6821

to be composed of:

- Mini-Rotary Viscometer - MRV/TP-1
- Driveline-Rotor
- Driveline-Weight Set

### Technical Data

<u>Test Capacity:</u>	10 samples
<u>Temperature Range:</u>	+80 to - 40 °C (+176 to -40 °F)
<u>Temp. Contol:</u>	±0.1 °C across all test cells
<u>Heating Capacity:</u>	600 Watts
<u>Cooling Rate:</u>	5 °C per minute maximum
<u>Cooling Type:</u>	direct refrigeration without liquids
<u>Dimensions (W x D x H):</u>	390 x 320 x 340 mm

## Main Unit

<b>16-2430</b>	<p><b>Mini-Rotary Viscometer - MRV/TP-1</b>            ASTM D 3829 - ASTM D 4684 - ASTM D 6896 - SAE J300 - ILSAC GF-3&amp;4            with further accessories for ASTM D 6821</p> <p><u>Consisting of:</u>            Fully self-contained unit for up to 10 samples, stainless steel &amp; durable thermoplastic housing, no external refrigeration or heating apparatus needed and advanced direct refrigeration technology eliminates the need for liquid cooling mediums such as methanol. An internal hermetic refrigeration system provides direct, instant cooling. Microprocessor temperature controllers store all testing profiles in memory. Power-saver feature allows testing profile to resume in the event of a brief power interruption. Removable test cells allow for easy cleaning, sample agitation and advance sample preparation. The rotor design eliminates possible interference with water and ice. Internal gas system provides a continuous blanket of dry gas over samples to eliminate moisture buildup. Safety features include high-pressure cutout and high temperature limits.</p> <p><u>Supplied with:</u>            10 removable Rotor/Stator sets            1 Rotor/Stator Holding Rack            1 Stator Removal Tool            1 Moisture Cover            1 Air Filter Dryer with desiccant            Accessories for up to 10 samples, Calibration &amp; Certification            Power supply: 220 V, 50 Hz</p>
<b>16-2431</b>	<p><b>Mini-Rotary Viscometer - MRV/TP-1</b>  <u>Like 16-2430 but:</u>            Power supply: 220 V, 60 Hz</p>
<b>16-2432</b>	<p><b>Mini-Rotary Viscometer - MRV/TP-1</b>  <u>Like 16-2430 but:</u>            Power supply: 110 V, 60 Hz</p>

## Options & Accessories

<b>16-2447</b>	<p><b>Rotor - Driveline (ASTM D 6821)</b></p>
<b>16-2448</b>	<p><b>Weight Set - Driveline (ASTM D 6821)</b></p> <hr/>
<b>16-2449</b>	<p><b>Software Kit - MRV single unit</b>            The automation configuration software collects, calibrates, interprets and calculates viscosities from the data and can generate a report for any of the test methods selectable in the software.  <u>Supplied with:</u> a Laptop computer</p>
<b>16-2450</b>	<p><b>Software Kit - MRV multi-unit</b>            This automation configuration software can be connected to up to 4 MRV units!  <u>Supplied with:</u> a Laptop computer</p> <hr/>
<b>16-0157</b>	<p><b>Reference Liquid - Type: N 105 B</b>            Content: 470 ml / 1 pint  <u>Viscosity at: -20°C = approx. 30 000 mPa·s (cP)</u>            for ASTM D 3829 - ASTM 4684 (Borderline Pumping Temperature)</p>
<b>16-1464</b>	<p><b>Reference Liquid - Type: N 400 B</b>            Content: 470 ml / 1 pint  <u>Viscosity at: -25°C = approx. 60 000 mPa·s (cP)</u>            for ASTM D 3829 - ASTM 4684 (Borderline Pumping Temperature)</p>

**Spare Parts**

16-2435	Stator Insert & Removal Tool (SIRT)
16-2436	Moisture Cover, square
16-2437	Rotor/Stator Set
16-2438	Rotor/Stator Set, (10 qty.)
16-2439	Carriage Wheel Assembly
16-2440	Thumb Nut, stainless steel
16-2441	Rotor/Stator Holding Rack for convenient cleaning, drying and storage
16-2442	Weight Set - Standard
16-2443	String Set, (10 qty.)
16-2445	Air Filter Dryer, with desiccant
16-2446	Desiccant Media (453 g / 1 lb.)

**Order Guideline**

Minimum equipment: 16-2430  
 Spares (approx. 1 year): 16-2446  
 Additional requirements: