Welcome to New Viscometry

This is Wilhelm. He’s a little old-fashioned and doesn’t like change. That’s why he used glass capillaries to measure viscosity – up until recently.

Although he was skeptical, Wilhelm allowed a young colleague to show him the new SVM™ viscometer from Anton Paar. He was really surprised by how fast and easy SVM™ delivers a number of important parameters at once. As Wilhelm is smart, he immediately recognized the great potential of this new approach. He got one of these viscometers for his own work and is now overjoyed at how easy it is to operate. Without his new SVM™, Wilhelm would have to sit for hours in front of his capillaries – waiting and waiting.

But not anymore. A new world has opened up for him: the world of New Viscometry.

SVM™ gives you more parameters than any other kinematic viscometer on the market. So you can expect more.
The highly precise Stabinger Viscometers™ are based on the Couette measuring principle and have an integrated density measuring cell. The small viscosity measuring cell contains a tube which rotates at a constant speed and is filled with sample fluid. A measuring rotor with a built-in magnet floats freely in the sample. The sample’s shear forces drive the rotor while magnetic effects retard its rotation. Shortly after the measurement start, the rotor reaches equilibrium speed. This speed is a measure of the fluid’s viscosity. The kinematic viscosity is automatically calculated from the dynamic viscosity and density of the sample.

Expect more – Measuring viscosity with an SVM™ is easy, fast, and accurate.

Your benefits at a glance
- Multiple parameters from just one syringe
- Low sample and solvent volume
- Unbeatable ease of operation
- Wide measurement range for viscosity, density, and temperature
- One measuring cell for the entire measurement range
These features make the difference

There is an SVM™ viscometer for every application: ranging from measuring lubricating oils, used oils, crude oils, heavy fuels, distillate fuels to vegetable oils and fats. While SVM™ 3001 has unparalleled heating rates of up to 20 °C/min, SVM™ 4001 is the best choice for fast Viscosity Index determination. Results are obtained much faster than using the glass capillary principle.

### SVM™ 4001

**The best solution for Viscosity Index**
- Innovative double-cell design for simultaneous measurements at 40 °C and 100 °C
- The fastest ASTM-(D2270)-compliant Viscosity Index determination from the lowest sample volume
- State-of-the-art intuitive software with 15 different parameters shown on the main screen

**Twice the benefits**
- Simultaneous determination of viscosity and density at any two temperatures between 15 °C and 100 °C
- Viscosity-temperature extrapolation according to ASTM D341
- Freely selectable API grades shown on the 10 x 4” touchscreen

### SVM™ 3001

**Wide temperature range from -60 °C to +135 °C**
- From jet fuel and diesel fuel to lubricating oils and wax – with one integrated cell
- Fast heating and cooling rates of up to 20 °C/min
- Built-in air cooling down to -20 °C
- Cooling down to -60 °C using external cooling (i.e. water/glycol mixture)

**More information with temperature scans**
- Temperature scans deliver fast and easily obtainable information on the temperature-dependent behavior of your liquid
- Temperature table scans for viscosity and density determinations at freely selectable temperatures
- Low-temperature studies on pumpability behavior

### Unbeatable ease of operation
- Factory-adjusted: ready for immediate use
- Simply inject the sample with a syringe and start the measurement
- Easy and safe handling without leaks or breakage
- Tool-free access to measurement cell for easy cleaning
- Low-maintenance

### Multiple parameter measurement from a single syringe
- Kinematic viscosity (ASTM D7042, EN 16696, DIN 51659-2)
- Viscosity Index VI (ASTM D2270)
- Density (EN ISO 12185, ASTM D4052, IP 200)
- Dynamic viscosity (ASTM D7042)
- API grades (ISO 91, API 2540, ASTM D1950, IP 200)
- Saybolt viscosity (ASTM D2161)

### FillingCheck™
- Newly developed density oscillator with patented FillingCheck™
- FillingCheck™ monitors the filling quality of the density cell in real time
- Compliant with D4052 requirements
- Saves valuable operating time
Your application – Your benefits

**Distillate fuels**
- Fast heating and cooling rates of up to 20 °C/min
- Simultaneous determination of kinematic viscosity and density at any chosen temperature over a broad range
- Robust metal measuring cells
- Optional autosampler with up to 71 positions

Compliance with: ASTM D7042, D2980, and D4052, EN 16896

Product specifications: ASTM D975 and D986

**Heavy fuels**
- Robust measuring cells made of metal
- Precise Peltier temperature control up to +135 °C
- Unprecedented heating and cooling rates of up to 20 °C/min
- Simultaneous determination of kinematic viscosity and density
- Tool-free access to the measurement cell for easy cleaning

Compliance with: ASTM D7042 and D4052, ISO 12185

**Low temperature: Jet fuel, brake fluids, hydraulic fluids**
- Measurements at -20 °C without external cooling
- Methanol-free cooling down to -60 °C, no flammable cooling liquids necessary
- Temperature scans for comprehensive information on low-temperature fluidity
- Cleaning and drying at sub-zero temperatures without warming up in between

Compliance with: ASTM D7042 and D4052

Product specifications: ASTM D1655, D7566, DEF STAN 91-91, and JIG AFQRJOS

**Transformer oils: Carbon-type composition**
- Modular combination of SVM™ with Anton Paar refractometers
- Simultaneous measurement of viscosity, density and refractive index from one syringe
- Calculations of carbon-type composition and carbon distribution according to ASTM D2140 and D3238
- All results are automatically calculated and displayed on the main screen within minutes

Compliance with: ASTM D7042, D4052, D341, D2501, D2502, D3238, and D1218 (refractive index)

Calculations according to: ASTM D2140 and D3238

**Lubricating oils, base oils and additives | Oil condition monitoring**
- Simultaneous measurements at two different temperatures for fast Viscosity Index determination
- Simultaneous measurement of kinematic viscosity and density for each temperature
- Heated and non-heated sample changers (optional)
- Newly developed magnetic particle trap (optional)

Compliance with: ASTM D7042, D4052, D7152 and DIN 51659-2; ISO 12185, ISO 91

Standard practices: ASTM D2270, D341, D6074

**Vegetable oils and fats | Raw materials for cosmetics**
- Simultaneous determination of dynamic and kinematic viscosity
- Measurements at any temperature between 15 °C and 100 °C
- Easy and fast measurement from one syringe
- Optional autosampler with up to 71 positions

Compliance with: ASTM D7042
**Accessories that enable results**

**Automated sample changing**
Maximize your productivity and minimize costs by employing sample changers from Anton Paar. Select an automatic system according to your needs and plug it in – SVM™ automatically recognizes it and is ready to go – you are free to do other important work. Choose either Xsample™ 340, a single unit for different types of syringes, or Xsample™ 530, a magazine sample changer for up to 71 vials. The newly developed Xsample™ 630 allows precisely controlled heating of 36 samples up to 95 °C.

**Removal of magnetic particles from used oil samples**
The newly developed magnetic particle trap is an accessory designed to remove ferromagnetic particles from in-service oils. It is located close to the sample inlet to gather magnetic particles and keep them away from the measuring cell. The magnetic trap is electrically heated for optimized removal of ferromagnetic particles from the sample by decreasing the sample’s viscosity.

**Easy filling of highly viscous samples**
The hot filling attachment keeps your sample warm for easy filling and prevents sample freezing (available for SVM™ 3001 and SVM™ 2001). Highly viscous samples are easily refilled for repeat measurements. The hot filling attachment is designed for constant temperature from 15 °C to 100 °C.

**Simple determination of carbon-type composition**
Your SVM™ can be combined with Anton Paar’s Abbemat refractometer for simultaneous measurement of viscosity, density and refractive index from one syringe. This enables you to calculate carbon-type composition and carbon distribution according to ASTM D2140 and D3238. All results are automatically calculated and displayed on the main screen within minutes. Available with SVM™ 3001 and SVM™ 4001.

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**Specifications**

<table>
<thead>
<tr>
<th>SVM™ 2001</th>
<th>SVM™ 3001</th>
<th>SVM™ 4001</th>
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</thead>
<tbody>
<tr>
<td><strong>Patents granted</strong></td>
<td>AT5 AT16058 (B1), AT516302 (B1)</td>
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</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>+15 °C to +100 °C</td>
<td>-60 °C to +135 °C</td>
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<tr>
<td><strong>Viscosity range</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Density range</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Density repeatability</strong></td>
<td>0.0001 g/cm³</td>
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</tr>
<tr>
<td><strong>Temperature reproducibility</strong></td>
<td>0.005 °C (0.009 °F)</td>
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</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supported precision classes</strong></td>
<td>Ultrastat, Fast and Precise</td>
<td>Ultrastat, Fast, Precise and Ultraprecise</td>
</tr>
<tr>
<td><strong>Sample volume min./typical</strong></td>
<td>1.5 mL / 5 mL</td>
<td>1.5 mL / 5 mL</td>
</tr>
<tr>
<td><strong>Syringe volume min./typical</strong></td>
<td>1.5 mL / 6 mL</td>
<td>1.5 mL / 6 mL</td>
</tr>
<tr>
<td><strong>Maximum sample throughput</strong></td>
<td>30 samples per hour</td>
<td>24 samples per hour</td>
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<tr>
<td><strong>Peltier temperature control</strong></td>
<td>Designed for constant temperature</td>
<td>Designed for fast heating/cooling over a wide range</td>
</tr>
<tr>
<td><strong>Optional automation</strong></td>
<td>Non-heated: Single syringe (2 mL, 5 mL or 10 mL) or 45 vials (35 mL) or 71 vials (12 mL)</td>
<td>Heated: 36 vials (12 mL) or single sample filling (from 12 mL vial)</td>
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</tr>
<tr>
<td><strong>Cooling</strong></td>
<td></td>
<td>Countercooling, FillingCheck™</td>
</tr>
<tr>
<td><strong>Cooling range</strong></td>
<td>0.03 °C (0.054 °F) from 15 °C to 100 °C</td>
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</tr>
<tr>
<td><strong>Main standards</strong></td>
<td>ASTM D7042, EN 16966</td>
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</tr>
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<td><strong>Supported standards</strong></td>
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</tr>
</tbody>
</table>

**Data memory**
1000 measurement results

**HD (Human Interface Device)**
Touchscreen; optional keyboard, mouse and 2D bar code reader

**Interfaces**
4 x USB (2.0 full speed); 1 x Ethernet (100 Mbit); 1 x CAN bus; 1 x RS-232; 1 x VGA

**Power supply**
AC 100 V to 240 V; 50 Hz to 60 Hz; 250 VA max.

**Ambient conditions**
15 °C to 35 °C (59 °F to 95 °F), max. 80 % r.h., non-condensing

**Net weight/shipping weight**
15.9 kg/20.5 kg 17.6 kg/22.2 kg 17.8 kg/22.4 kg

**Dimensions (W x D x H)**
33 cm x 51 cm x 23.1 cm (13 in x 20 in x 9.1 in)

**Compliance**
CE mark; EMC directive EN 61326-1, LV directive EN 61010-1; RoHS

**Special features**
Optional automation

**Valid for ideal measuring and sample conditions within the works adjustment range.**

*Attested at the points of the works adjustment or at calibration correction points, not including the uncertainty of the standards.

All data refer to stand-alone instruments.

For more information, please contact your Anton Paar representative.