

Kinematic Viscometer Series

SVM Series



Welcome to New Viscometry!

Progress and innovation, high-precision craft, and a passion for research – these values define Anton Paar. They underpin the viscosity measurement solutions we've been supplying to our customers for over 20 years. Components produced with the highest attention to detail, innovative measuring principles, and well-designed user interfaces represent our standard of quality. Building on our strong technological leadership, the SVM series is once again revolutionizing the world of viscometry, utilizing the latest technology to deliver the best kinematic viscometers on the market.

MEASURING PRINCIPLE

The highly precise SVM smart viscometers are based on a modified Couette measuring principle and consist of a viscosity cell and a density cell. The compact viscosity measuring cell contains a tube that rotates at constant speed and is filled with sample fluid while a measuring rotor with a built-in magnet floats freely in the sample. The sample's shear forces drive the rotor while magnetic forces delay its rotation. Shortly after the measurement begins, the rotor reaches equilibrium speed, which translates into the fluid's viscosity. The kinematic viscosity is automatically calculated from the dynamic viscosity and density of the sample.

UNIQUE TECHNOLOGY

The patented design of SVM enables tool-free access to the measurement cell. The revolutionary, patented FillingCheck™ monitors the filling quality of the density cell in real-time to ensure the most accurate viscosity measurements.

STANDARD COMPLIANCE

SVM is the only kinematic viscometer that delivers results in both ASTM D7042 and D445, providing full compliance. Furthermore, SVM's unique test method is referenced in a multitude of national and international standards, and product specifications such as:

- SAE J300
- ASTM D2270
- ASTM D396
- ASTM D975
- ASTM D1655
- ASTM D6751
- ASTM D7467
- JIG AFQRJOS
- ISO 23581

An SVM for Every Challenge

SVM is one of the most trusted kinematic viscometers worldwide. Thousands of customers have been using their SVMs for decades, not only because they're the smartest way to perform measurements, but because several other benefits make a crucial difference inside – and outside – the lab.

High flexibility: No need for 12 or more glass capillaries to cover your full viscosity range – measure all your samples with just 1 viscometer.

Zero errors: Automatic calculations, along with digital data recoding and storage, provide error-free measurements and excellent traceability.

Improved safety: Metal measuring cell for zero glass breakage and Peltier temperature control for safe handling without flammable liquids.

Save costs – and the planet: Keep your environmental footprint low – analyze with just 5 mL of sample, 6 mL of solvent, and use only 50 W of power.

Save time: Increase your sample throughput with automated measurements and calibration, and free up operators for other tasks.

SVM 1001 / 1001 SIMPLE FILL



SVM 1001

- Kinematic viscosity



SVM 1001 SIMPLE FILL

- Kinematic viscosity
- With funnel filling

SVM 2001 / 3001 / 3001 COLD PROPERTIES / 4001



SVM 2001

- Kinematic viscosity
- Dynamic viscosity
- Density
- Viscosity index (VI) (optional)



SVM 3001

- Kinematic viscosity
- Dynamic viscosity
- Density (ASTM D4052)
- Viscosity index (VI)
- API grade
- Temperature scan
- Time scan



SVM 3001 COLD PROPERTIES

- Kinematic viscosity
- Dynamic viscosity
- Density (ASTM D4052)
- Viscosity index (VI)
- API grade
- Temperature scan
- Time scan
- Cloud point
- Freeze point
- Temperature at 12 cSt (viscosity borderline temperature)
- Standard above freeze point (SFP)



SVM 4001

- Kinematic viscosity
- Dynamic viscosity
- Density (ASTM D4052)
- Viscosity index (VI)
- API grade
- Temperature scan
- Time scan
- Dual, simultaneous viscometers and density meters

FIND OUT MORE



www.anton-paar.com/svm-series



The World Is Not Made of Glass

SVM 1001 and SVM 1001 Simple Fill are your budget-friendly entry tickets into the world of digital automatic kinematic viscometry. The unbreakable measuring cell lets you measure samples from diesel to lubricants without needing a stopwatch, temperature bath, or additional glass capillaries. ASTM-compliant results are delivered in both D7042 and D445. The SVM 1001 series offers 150 % higher throughput and consumes 95 % less energy and 75 % less solvent compared to manual glass capillary viscometers. With SVM 1001 Simple Fill, you can directly pour the sample into the funnel, eliminating consumable costs for pipettes or syringes and making viscosity measurements easier than ever before.



1 measuring cell instead of 12 capillaries

The SVM 1001 series covers a wide viscosity range, from 0.3 to 5,000 mm²/s, with a single, unbreakable metal measuring cell. This saves you time while reducing your costs for purchasing, calibrating, and replacing capillaries. When measuring unknown samples, no trial-and-error is needed to select the right capillary. This eliminates operator impact, saves further time and effort, and ensures precise measurements.



Higher throughput than any manual D445 viscometer

The SVM 1001 series has a 150 % higher throughput compared to its manual D445 glass capillary viscometer counterparts. It handles up to 37 samples per hour (single determination) and 10 samples per hour (repeated determination according to ASTM). Rapid temperature equilibration is usually done in 1 minute or less instead of the 30 minutes as recommended in ASTM D445. This gives operators time to focus on other tasks.



Simplicity at its best

Measuring viscosity has never been so easy. Just fill the sample directly from the container and press the start button. No pipette or syringe is needed. Cleaning and drying is easy – pour the solvent in the funnel and let the SVM 1001 Simple Fill do the rest. The SVM 1001 series can be battery powered, so you can take the instrument with you into the field or keep measuring during power outages.



SVM 1001: Error free

Thanks to its automatic digital data handling, the SVM 1001 series eliminates errors due to manual transcription and calculations. The internal data storage means no loss of data, and you can export data directly from the measuring device to a PC (using the free V-collect software) or a USB drive for further data processing.



Safety is key

SVM 1001 is the only budget-friendly, ASTM-compliant kinematic viscometer on the market with zero risk of glass capillary breakage. Operators have less exposure to hazardous solvents, as only a few mL of solvent are required for cleaning. Since built-in Peltier thermostating is used, no hot or flammable bath fluids are needed, further reducing operator risk and improving laboratory safety.



Minimal environmental footprint

The SVM 1001 series significantly reduces your environmental footprint: Energy consumption is 50 W instead of 1000 W or more for manual glass capillaries. ASTM-compliant measurements require 5 mL of sample instead of 25 mL and only 6 mL of solvent per determination instead of 40 mL. This helps you save on yearly solvent purchasing and disposal costs, which ensures a sustainable measuring process.

SVM 1001

The Budget-Friendly Choice



LUBRICANTS



DIESEL



IN-SERVICE OIL



FUEL OIL



HEAVY FUEL

↑

COMPLIANT WITH ASTM D396, D975, D3699, D6158, D6823, D7467, D8029, AND MANY MORE STANDARDS

- Ready to measure in less than five minutes
- Intuitive user interface guides you through the measurement
- For kinematic viscosity at a constant temperature of choice between +15 °C and +100 °C; second temperature is available as an option
- Results can be shown as ASTM D7042 and D445 (using the integrated ASTM-defined bias correction)
- Digital data handling for high traceability: no stopwatch, no mathematical errors due to manual calculations, and no manual reporting
- Five minute operator time per measurement
- Minimal sample required: just 1.5 mL

SVM 1001 Simple Fill

Simple. Safe. Magical



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COMPLIANT WITH ASTM D396, D975, D3699, D6158, D6823, D7467, D8029, AND MANY MORE STANDARDS

- Pour and play: Directly pour the sample into the funnel, and you're ready to go
- No pipette or syringe needed
- Effortless cleaning: Pour the solvent into the funnel and let SVM 1001 Simple Fill do the rest
- Automatic drying with an integrated air pump prepares the instrument for the next test
- Two minute operator time per measurement
- 150 % higher throughput than any manual glass capillary viscometer
- For kinematic viscosity at a constant temperature of choice between +15 °C and +100 °C; second temperature is available as an option
- 1 unbreakable measuring cell instead of 12 Ubbelohde viscometers

LUBRICANTS



DIESEL



FUEL OIL



HEAVY FUEL



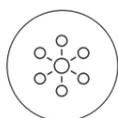
IN-SERVICE OIL





One Instrument, Many Samples

The SVM 3001, SVM 3001 Cold Properties, and SVM 4001 are the perfect solution for users who are looking for measurements beyond kinematic viscosity, such as ASTM D4052-compliant density, viscosity index, freeze point, and cloud point, or who require a wider temperature range and advanced automation with full connectivity for traceable data handling. The highly versatile SVM 2001/3001/3001 Cold Properties/4001 deliver multiple test results for a wide range of samples from jet fuel to diesel and lubricants across an extensive temperature (-60 °C to +135 °C with SVM 3001) and viscosity (0.2 to 30,000 mm²/s) range in both D7042 and D445. Automated solutions enable fully unattended measurements overnight and during weekends. SVM 2001, 3001, 3001 Cold Properties, or 4001 brings you flexibility you can afford.



Multiple parameters from a single sample

SVM 2001/3001/3001 Cold Properties /4001 deliver a number of parameters beyond kinematic viscosity: dynamic viscosity, density, API grades, viscosity index, cloud point, freeze point, temperature at 12 cSt (viscosity borderline temperature), and standard above freeze point (SFP) – all from a single syringe. Gone are the days of having to perform these measurements on different instruments.



Flexibility for every application

SVM 2001/3001/3001 Cold Properties /4001 let you cover a wide viscosity range, from 0.2 to 30,000 mm²/s, with a single, unbreakable, metal measuring cell. Measure a huge variety of samples with zero capillary changing.



445 inside

Implementation of ASTM bias statements for a multitude of samples (e.g., jet fuels, diesel and biodiesel fuels, fuel oils, formulated oils, and residual fuels) means you profit from the full range of benefits that come with our SVM smart viscometers while reporting your results in D7042 and D445.



Wide temperature range

The wide temperature range of SVM 3001 (-60 °C to +135 °C) and SVM 3001 Cold Properties (-60 °C to +100 °C) allows tests on a wide variety of samples (e.g., jet fuels, diesels, lubricants, waxes) with a single instrument. Temperatures down to -20 °C can be reached without external counter-cooling, and the fast heating and cooling rates of up to +20 °C/min. help you quickly collect information about the properties of your sample across the entire temperature range.



Top-quality density measurements

SVM 2001/3001/3001 Cold Properties /4001 don't just measure viscosity but also density. The SVM 3001, SVM 3001 Cold Properties, and SVM 4001 measure density fully compliant with ASTM D4052 and provide additional API parameters (API gravity or ° API). The patented FillingCheck™ monitors the filling quality of the density cell and alerts the user in case of bubbles, which eliminates errors. These unique capabilities make this SVM series the most versatile kinematic viscometer on the market.

SVM 2001

Out-of-the-Box Flexibility



SVM 3001

The Gold Standard



↓

COMPLIANT WITH ASTM D396, D975, D3699, D6158, D6823, D7467, D8029, AND MANY MORE STANDARDS

- For kinematic viscosity at any temperature between +15 °C and +100 °C
- 3-digit digital density measurement included
- Optional determination of viscosity index (VI)
- Choice of full automation from a wide portfolio of sample changers: from single sample handling to overnight automation with multi-position samplers
- Both heated and non-heated autosamplers are available



LUBRICANTS



DIESEL



FUEL OIL



HEAVY FUEL



IN-SERVICE OIL



FUEL (DIESEL, JET, MARINE, BIOFUEL)



LUBRICANTS



HEAVY FUEL



CRUDE OIL



ADDITIVES



IN-SERVICE OIL



CHEMICALS



WAXES



↑

COMPLIANT WITH ASTM D396, ASTM D975, ASTM D1655, D2880, D3699, D6158, D6751, D6823, AND MANY MORE STANDARDS

- One instrument for all samples – from jet fuel to wax
- Widest temperature range – from -60 °C to +135 °C
- Cooling down to -20 °C without external counter-cooling
- Rapid heating and cooling rates (up to +20 °C/min.)
- Density measurements according to ASTM D4052
- Quick temperature scan delivers information about the temperature behavior of your sample
- FillingCheck™ detects bubbles caused by improper filling (as required by ASTM D4052)
- Connectivity to LIMS and AP Connect for the paperless lab of the future

SVM 3001

Cold Properties

You Can Have It All



↓

COMPLIANT WITH ASTM D1655, D2880, D7566, DEF STAN 91-091, AFQRJOS, D396, D975, EN ISO 16896, AND MANY MORE STANDARDS

- Your all-in-one solution for low-temperature applications
- Approved for jet fuel certification and fully compliant with ASTM D1655
- Approved for diesel fuel certification and fully compliant with ASTM D975
- Density measurement according to ASTM D4052
- Kinematic viscosity, density, cloud point, and freeze point in one run
- Jet fuel viscosity at -20 °C and -40 °C, and temperature at 12 cSt (viscosity borderline temperature), for safe operation of aircraft engines
- Cooling down to -20 °C without counter-cooling
- Quick temperature scans for pumpability behavior of jet fuel
- Cleaning and drying at sub-zero temperatures without warming up in between



JET FUEL



DIESEL



BIODIESEL



HYDRAULIC FLUIDS



LUBRICANTS



BRAKE FLUIDS



SVM 4001

Twice the Benefit



↑

COMPLIANT WITH ASTM D6158, D6823, D7467, D8029, D396, D975, D3699, AND MANY MORE STANDARDS

- Fastest viscosity index on the market: Measure in two measuring cells at +40 °C and +100 °C simultaneously
- Fully compliant to ASTM D2270
- Integrated viscosity-temperature extrapolation according to ASTM D341
- Viscosity index from the lowest sample volume on the market (minimum: 2.5 mL)
- Innovative and dependable dual viscosity and density meters for simultaneous measurements at any two temperatures between +15 °C and +100 °C. For example:
 - +40 °C and +100 °C for viscosity index of base oils and lube blends
 - +50 °C and +100 °C for viscosity of heavy fuel oils
 - +15 °C for density and +40 °C for viscosity of fuel oils
- Self-contained: no additional equipment required (e.g., PC, external software)
- No tube replacement required

LUBRICANTS



FORMULATED OIL



BASE STOCK



ADDITIVES



HYDRAULIC FLUIDS



IN-SERVICE OIL



FUEL OIL



HEAVY FUEL



Customization That Delivers Results

MAKE THE MOST OF YOUR SAMPLE

Modulyzers provide multiple parameters from a single sample in only one measuring cycle, delivering all the results you need on one screen at the push of a button.

THE ULTIMATE LUBE ANALYZER

Modulyzer Oil determines the viscosity index and carbon-type analysis in a single setup in one run – it's a real time saver for laboratories dealing with the quality control of base oils and formulated lubricants such as engine, gear, or transformer oils. Analysis of carbon-type composition and carbon distribution is performed according to ASTM D2140 and D3238. All parameters are automatically calculated and displayed on the SVM screen within six minutes. Choose one turnkey solution instead of three separate measurements.

THE ALL-IN-ONE JET FUEL ANALYZER

Modulyzer Jet Fuel is a versatile solution for jet fuel analysis, which delivers crucial parameters such as viscosity, density, cloud point, freeze point, temperature at 12 cSt, and refractive index – all in a single test. With this configuration, jet fuel certification according to ASTM is economical and resource-optimizing. Operational costs are minimal thanks to low sample and solvent volumes, as well as low energy consumption. In short, Modulyzer Jet Fuel is the best solution on the market at the most competitive price.

FIND OUT MORE



www.anton-paar.com/apb-modulyzer



MAXIMIZE YOUR PRODUCTIVITY FOR IN-SERVICE OIL MEASUREMENTS

- SVM 1001: the fastest kinematic viscosity measurements with the lowest acquisition and running costs
- Heated magnetic particle trap (MPT) for effective removal of ferromagnetic particles from used oils



MEASURE HIGHLY VISCOUS SAMPLES WITH EASE

- Hot Filling Attachment (HFA) for easy measurement of samples with a high melting or pour point, such as waxes, fuel oils, or heavy fuels, is available for SVM 2001 and SVM 3001
- Alternatively, the heated sample changers Xsample 610 and 630 provide fully unattended filling and cleaning, along with temperatures of up to +95 °C (available for SVM 2001, SVM 3001, and SVM 4001).



HIGH THROUGHPUT VISCOMETER (HTV): WHEN THROUGHPUT IS PARAMOUNT

- Ready-made solution based on Anton Paar's high-throughput platform (HTX)
- Customized automation for high sample throughput and/or complex sample handling
- Can be equipped with up to eight SVM 2001/3001/3001 Cold Properties/4001 viscometers to process up to 2,500 samples per day
- Fully automated cleaning and periodical recalibration with standard oils
- Fully compliant with ASTM D7042

ASTM D7042:

The Better Alternative to D445

FULL COMPLIANCE

The ASTM D7042 test method – unique to SVM – is referenced in several national and international standards such as ASTM, ISO, SAE, IP, EN, DIN, DEFSTAN, MIL, GB, GOST, and many more.

Years of interlaboratory studies at ASTM have resulted in the ASTM bias corrections in SVM. Bias statements are available for a wide variety of samples, including for formulated oil, diesel, biodiesel, jet fuel, and residual fuel. That's why D7042 is the official alternative to D445 accepted by ASTM. Just select the desired bias correction on the SVM user interface. SVM does the rest for you and shows the bias-corrected D445 results on the display. This lets you enjoy all the benefits of D7042 while reporting in D445 (if needed).

D7042 is also the better and more sustainable alternative to the traditional D445 test method: It requires less sample, less solvent, and much less energy, helping you save time and costs while reducing your environmental footprint. You can also measure a wide variety of samples without having to change capillaries with D7042. One measurement cell instead of several glass capillary viscometers also ensures highly accurate viscosity results, eliminates operator-to-operator variability, and reduces the quality control workload since far fewer documents need to be produced and maintained.



PETROLEUM INDUSTRY

Whether you're certifying jet fuel according to ASTM D1655 or JIG AFQRJOS, performing quality control on diesel or biodiesel (ASTM D975 or ISO 23581), or classifying your engine oils in accordance with SAE J300, SVM is fully compliant with these standards. Additionally, with SVM 3001, SVM 3001 Cold Properties, and SVM 4001, you can measure the density of your petroleum samples according to ASTM D4052/ISO 12185 and determine various API parameters such as API gravity, ° API for crude oil classification, and more.



PHARMACEUTICAL INDUSTRY

SVM viscometers are fully compliant with USP Chapters 912 and 841,* Ph. Eur. Chapters 2.2.5 and 2.2.10,* and are aligned with PQP qualification requirements.** You're also compliant with 21 CFR Part 11 on data integrity** and thus satisfy all relevant Pharmacopeia and other pharma industry-related standards and regulations. Our ready-to-use PQP documents save you time by reducing the qualification effort by up to 60 %.



PASS INTERNAL AND EXTERNAL AUDITS

Do you require complete traceability and consistency during measurement and documentation procedures? The SVM 2001/3001/3001 Cold Properties/4001 viscometers leave a meticulous audit trail and include user management, electronic signature, non-storage mode, and many more features that will help you easily pass internal and external audits. Full compliance with GMP 4 Annex 11 & 15/GLP, ALCOA+, and 21 CFR Part 11** means you're aligned with the data integrity and traceability standards these audits require.



YOUR PAPERLESS LAB

Eliminate transcription errors, trigger measurements with 10+ parameters, and centralize and access your data – regardless of where your office is located. With the AP Connect lab execution software, your data is just a click away and accessible from any network computer. Streamlining your data flow frees up time for analysis. Digital data handling is your key to an efficient, paperless lab.



*SVM 3001, SVM 3001 Cold Properties, and SVM 4001. ** Not available for SVM 1001 series.

Support & Education

Every challenge can be overcome with the right partner. From helping you find the right measurement system to giving you all the background information and education you need, we at Anton Paar are committed to outstanding service and support – whenever you need it.

SIGN UP FOR DEMOS & WEBINARS

You never stop learning. Neither do we. We regularly offer free online webinars and demonstrations where you can learn about various viscometry topics and meet our experts. Recordings of our previous webinars are available in our library. Interested in an exclusive live demonstration? Then get in touch.

FIND OUT MORE



www.anton-paar.com/apb-visco-webinars

DIG IN TO OUR EXTENSIVE KNOWLEDGE DATABASE

Access our big content hub of application reports, product documentation, and tutorial videos, or pick up some background knowledge from our Wiki.

FIND OUT MORE



www.anton-paar.com/apb-wiki-visco

CONTACT OUR EXPERTS

We're proud of our reputation for excellent service and support. We have over 3,400 employees worldwide, a network of more than 30 Anton Paar subsidiaries, and over 60 responsible partners – so one of our viscometry experts is always just a call away and happy to help. Call us to discuss – in your language – solutions to any problems you're having or challenges you're facing. We look forward to being your reliable partner.



“
We're confident in the high quality of our instruments. That's why we provide **a full warranty for three years.**
”

All new instruments* include repair for three years.
You avoid unforeseen costs and can always rely on your instrument.
Alongside the warranty we offer a wide range of additional services and maintenance options.

*Due to the technology they use, some instruments require maintenance according to a maintenance schedule. Complying with the maintenance schedule is a prerequisite for the three-year warranty.

Service and support directly from the manufacturer

Our comprehensive service provides you with the best individual coverage for your investment so that maximum uptime is ensured.



SAFEGUARDING YOUR INVESTMENT

Regardless of how intensively you use your instrument, we help you keep your device in good shape and safeguard your investment – including a three-year warranty.



THE SHORTEST RESPONSE TIMES

We know that sometimes it's urgent. That's why we provide a response to your inquiry within 24 hours. We give you straightforward help from real people, not from bots.



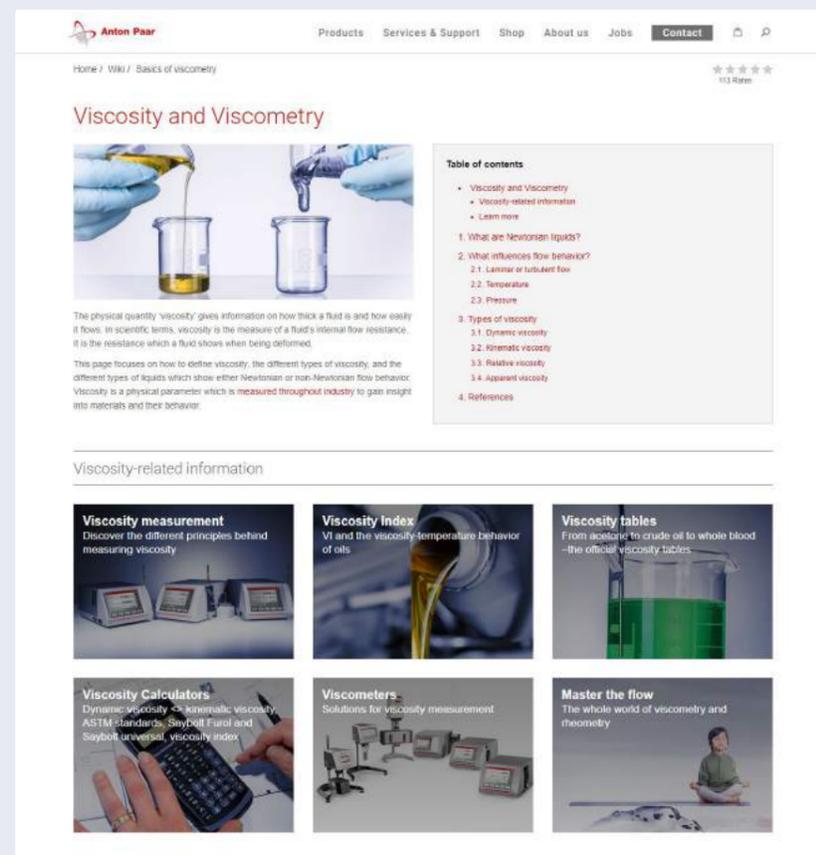
CERTIFIED SERVICE ENGINEERS

The seamless and thorough training of our technical experts is the foundation of our excellent service provision. Training and certification are carried out at our own facilities.



OUR SERVICE IS GLOBAL

Our large service network for customers spans 86 locations with a total of 350 certified service engineers. Wherever you're located, there's always an Anton Paar service engineer nearby.



	SVM 1001	SVM 1001 SIMPLE FILL	SVM 2001	SVM 3001	SVM 3001 COLD PROPERTIES	SVM 4001
Patents	AT5160588 (B1), US10036695 (B2), CN105424556			AT5160588 (B1), US10036695 (B2), CN105424556, AT516302 (B1), CN105628550		
Test methods	ASTM D7042, D445 bias corrected, ISO 23581, EN 16896	ASTM D7042, D445 bias corrected, ISO 23581, EN 16896	ASTM D7042, D445 bias corrected, ISO 23581, EN 16896	ASTM D7042, D445 bias corrected, ISO 23581, EN 16896, ASTM D4052, ISO 12185	ASTM D7042, D445 bias corrected, ISO 23581, EN 16896, ASTM D4052, ISO 12185, ASTM D2386 equivalent or better, ASTM D2500 equivalent or better	ASTM D7042, D445 bias corrected, ISO 23581, EN 16896, ASTM D4052, ISO 12185
MEASURING RANGE						
Viscosity	0.3 to 5,000 mm ² /s	0.3 to 5,000 mm ² /s	0.2 mm ² /s to 30,000 mm ² /s	0.2 mm ² /s to 30,000 mm ² /s*	0.2 mm ² /s to 30,000 mm ² /s	0.2 mm ² /s to 30,000 mm ² /s
Density	–	–	0 g/cm ³ to 3 g/cm ³	0 g/cm ³ to 3 g/cm ³	0 g/cm ³ to 3 g/cm ³	0 g/cm ³ to 3 g/cm ³
Temperature	+15 °C to +100 °C (+59 °F to +212 °F) (one temperature as standard, second temperature optional)		+15 °C to +100 °C (+59 °F to +212 °F)	-60 °C to +135 °C (-76 °F to +275 °F)	-60 °C to +100 °C (-76 °F to +212 °F)	+15 °C to +100 °C (+59 °F to +212 °F)
PRECISION						
Viscosity repeatability**	0.1 %	0.1 %	0.1 %	0.1 %	0.1 %	0.1 %
Viscosity reproducibility**	0.35 %	0.35 %	0.35 %	0.35 %	0.35 %	0.35 %
Density repeatability**	–	–	0.0002 g/cm ³	0.00005 g/cm ³	0.00005 g/cm ³	0.00005 g/cm ³
Density reproducibility**	–	–	0.0005 g/cm ³	0.0001 g/cm ³	0.0001 g/cm ³	0.0001 g/cm ³
Cloud/freeze point repeatability**	–	–	–	–	<0.5 °C / <0.5 °C	–
Cloud/freeze point reproducibility**	–	–	–	–	<2.5 °C / <1.3 °C	–
Temperature repeatability	0.005 °C (0.009 °F)	0.005 °C (0.009 °F)	0.005 °C (0.009 °F)	0.005 °C (0.009 °F)	0.005 °C (0.009 °F)	0.005 °C (0.009 °F)
Temperature reproducibility	0.03 °C (0.054 °F) from +15 °C to +100 °C			0.03 °C (0.054 °F) from +15 °C to +100 °C, 0.05 °C (0.09 °F) outside this range		0.03 °C (0.054 °F) from +15 °C to +100 °C
PERFORMANCE						
Sample volume min. / typical	1.5 mL / 5 mL	3.5 mL / 8 mL	1.5 mL / 5 mL	1.5 mL / 5 mL	1.5 mL / 5 mL	2.5 mL / 6 mL
Solvent volume min. / typical	1.5 mL / 6 mL	5 mL / 10 mL	1.5 mL / 6 mL	1.5 mL / 6 mL	1.5 mL / 6 mL	2.5 mL / 10 mL
Max. sample throughput	37 samples per hour	21 samples per hour	33 samples per hour	33 samples per hour	30 samples per hour	24 samples per hour
FEATURES						
Optional upgrades	Second temperature	Second temperature	Automatic VI determination	Chemical upgrade kit, modularity with Abbemat refractometers 300/500, 350/550, 450/650	Modularity with Abbemat refractometers 300/500, 350/550, 450/650	Modularity with Abbemat refractometers 300/500, 350/550, 450/650
Accessories	Magnetic particle trap (MPT)	None	Magnetic particle trap (MPT) Hot filling attachment (HFA)	Magnetic particle trap (MPT) Hot filling attachment (HFA)	Magnetic particle trap (MPT)	Magnetic particle trap (MPT)
Automation	None	Integrated Simple Fill Filling Device	Optional Autosampler (Xsample 340, 520, 530, 610, 630) + High-Throughput Platform HTV	Optional Autosampler (Xsample 340, 520, 530, 610, 630) + High-Throughput Platform HTV	Optional Autosampler (Xsample 340, Xsample 530) + High-Throughput Platform HTV	Optional Autosampler (Xsample 340, 530, 610, 630) + High-Throughput Platform HTV
TECHNICAL DATA						
Data memory	1,000 measurement results			1,000 measurement results		
*HID (Human Interface Device)	7" touchscreen			10.4" touchscreen, optional keyboard, mouse, and 2D bar code reader		
Interfaces	4 x USB (3 x A, 1 xB)	4 x USB (3 x A, 1 xB)	4 x USB (2.0 full speed), 1 x Ethernet (100 Mbit), 1 X CAN bus, 1 x RS-232, 1 x VGA	4 x USB (2.0 full speed), 1 x Ethernet (100 Mbit), 1 X CAN bus, 1 x RS-232, 1 x VGA		
Compliance	CE mark; EMC directive EN 61326-1; LV directive EN 61010-1; RoHS			CE mark; EMC directive EN 61326-1; LV directive EN 61010-1; RoHS		
Power supply	At instrument: DC, 24 V /3A, AC adapter 90 VAC to 264 VAC, 47 Hat to 63 Hz, < 75W	At instrument: DC, 24 V /3A, AC adapter 90 VAC to 264 VAC, 47 Hat to 63 Hz, < 75W	AC 100 V to 240 V, 50 Hz to 60 Hz, 250 VA max.	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			15 °C to 35 °C (59 °F to 95 °F), max. 80 % r.h. non-condensing		
Net weight in kg (in lbs)	5.6 kg (12.3 lbs)	6.6 kg (14.6 lbs)	15.9 kg (35.1 lbs)	17.6 kg (38.8 lbs)	18.0 kg (39.7 lbs)	17.8 kg (39.2 lbs)
Dimensions (W x D x H)	26.5 cm x 36.5 cm x 18 cm (10.4 in x 14.4 in x 7.1 in)	33 cm x 36.5 cm x 20.5 cm (13 in x 14.4 in x 8.1 in)	33 cm x 51 cm x 23.1 cm (13 in x 20 in x 9.1 in)	33 cm x 51 cm x 23.1 cm (13 in x 20 in x 9.1 in)		

*Viscosity range with chemical upgrade kit from 1 to 10 000 mPa·s.

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

