Anton Paar

DSA 5000 M

Density and Sound Velocity Meter

::: Unique Density & Concentration Meters

From 0 to 114 % in 2 Minutes

DSA 5000 M determines the concentration of sulfuric acid and oleum across the whole concentration range. The benefits speak for themselves: sample does not need to be diluted before measurement and the result is ready after only two minutes. Depending on the concentration range of the sulfuric acid/oleum, precise results are provided by measuring either the sound velocity or density of the sample. Therefore, DSA 5000 M measures both the sound velocity and density in one cycle and applies the method with the highest accuracy to calculate the results.

To ensure accurate and reproducible results as well as highly convenient sample handling, DSA 5000 M has a number of unique features:

Filling errors are detected automatically

The **FillingCheck™** feature of DSA 5000 M automatically detects filling errors or bubbles in the sample, alerts you and documents the incident. You can be sure of correct sample filling, whatever the conditions (patent: AT505937).

Verify the quality of the results any time later

The **U-View™** feature uses a camera which takes images of the entire filled-in sample and stores them in the memory. You can follow the sample filling process live on screen or recall stored images later. Browsing these stored images allows you to verify the correct sample filling and measurements at a later time, which is particularly useful when using the automatic sampling system Xsample 22 or Xsample 122 to perform measurements of non-corrosive samples. You can safely walk away and let the instrument do the work.

Taking the ‘time’ out of time-consuming adjustment

DSA 5000 M uses the unique **ThermoBalance™** feature for simple and effective adjustment. After one single adjustment with air and water, the instrument provides highly accurate density results and stable readings over extended periods of time (patent: AT399051).

3-Component Solutions: One Measuring Cycle, Two Results

For ternary solutions, DSA 5000 M simultaneously determines the concentrations of both components in one measuring cycle. This requires measurement of both the sound velocity and density and use of an algorithm stored in DSA 5000 M.

Example applications include the production of phosphoric acid, plastics, fertilizers, water glass, alcopops, formaldehyde/methanol/water and several other 3-component solutions. R&D applications include investigations into phase transitions (e.g. lipids, polysaccarides, proteins, insulin, etc.)

Automatic sample filling

For measuring non-corrosive samples, DSA 5000 M can be operated with semiautomatic and fully automatic Xsample sampling units. These Plug and Play sampling units fit into the housing of DSA 5000 M, which saves you space on the lab bench. Choose a sampling unit according to the number of samples to be measured. Use the sample list to assign a separate method to each sample, if required. Interrupt the pre-configured sequence to insert a priority sample whenever you want. Measure large numbers of samples automatically and carry out other work while the instrument works for you. **FillingCheck™** will alert you of potential filling problems. **U-View™** allows you to verify the results at a later time.

Depending on your requirements, choose from these Xsample sampling units from Anton Paar:

Xsample 22 Sample Filling Unit

Fills sample from a single vial with a peristaltic pump. For low-viscosity samples and non-corrosive samples. An optional upgrade kit for chemical applications is available.

Xsample 122 Sample Changer

Fills sample from a 24-position sample magazine with a peristaltic pump. Xsample 122 takes on routine work and allows you to get on with other tasks while your samples are processed. No preparation or addition of reagents is required. There are five sample loading modes for the bubble-free filling of low-viscosity, non-corrosive samples. An optional upgrade kit for chemical applications is available.

All You Need for Efficient Analysis

➤ Convenient and safe Quality Control

Traditional methods for sulfuric acid measurement, such as titration, involve time-consuming and often dangerous sample preparation. With DSA 5000 M the sample is simply filled into the instrument and measured. The sample remains unchanged throughout the measurement process.

➤ Traceable data handling

Whatever your specific safety regulations, DSA 5000 M provides full 21 CFR Part 11 and cGLP/GMP compliance. All adjustments, measurement results and reports are completely protected by passwords on three user levels. Reports can be electronically signed and exported, including date and time, serial number, user name, sample identification and other vital information.

➤ Finding the best parameters for online production monitoring systems

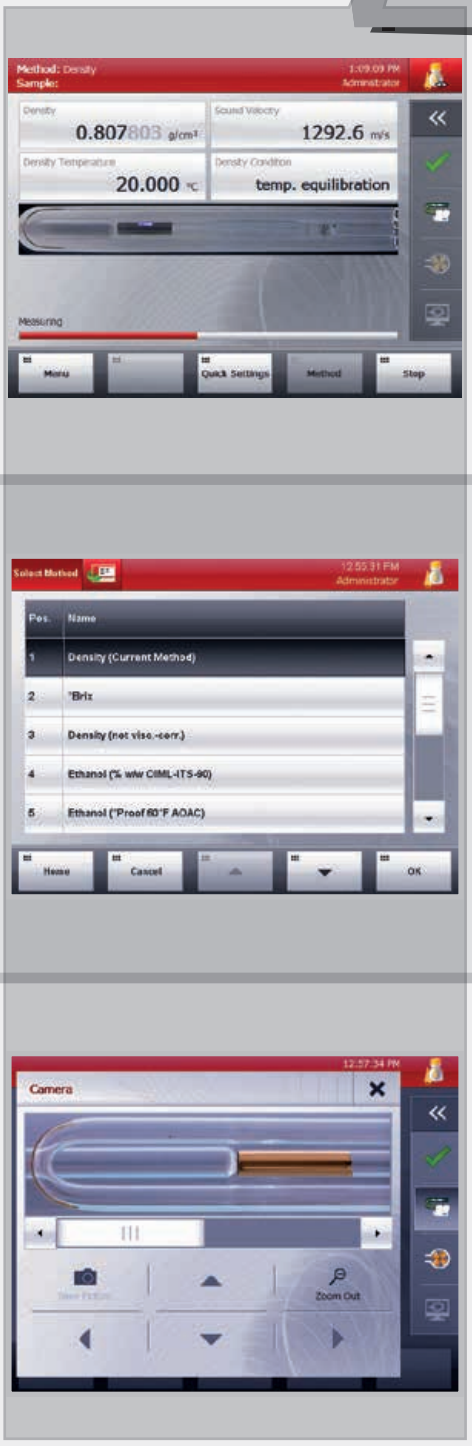
Anton Paar provides a wide range of online and inline process measuring instruments. DSA 5000 M helps you find the best-suited parameters for adjusting process measuring systems and can be used as a reference instrument in the laboratory. To simplify this work, connect a large PC monitor or touchscreen to read the results from a distance or to operate the instrument by remote control.

➤ Built to last in harsh environments

Use the function keys below the touchscreen, a mouse or an external keyboard if you are working in a harsh environment. Sample IDs can also be entered using a bar code reader. The instrument is perfectly protected by a compact, sealed aluminum housing.

➤ Automatic correction

DSA 5000 M provides automatic viscosity correction across the samples' entire viscosity range. For air adjustments, the local air pressure is correctly accounted for.



➤ Adaptable configurations

Choose from common density units such as g/cm^3, kg/m^3, pound/gallon as well as common sulfuric acid and oleum concentration units such as mol/L, %w/w and N. Employ user-defined tables to calculate concentrations in units such as %w/w and %v/v.

➤ Operate with ease

The touchscreen provides a continuously updated display of density, sound velocity and all calculated properties. Symbols on the screen show vital information, such as measurements in progress, FillingCheck™ alerts as well as the current U-View™ picture and the current status of an automatic sampling unit. Open your favorite menu dialogs directly from the main screen using the quick access area.

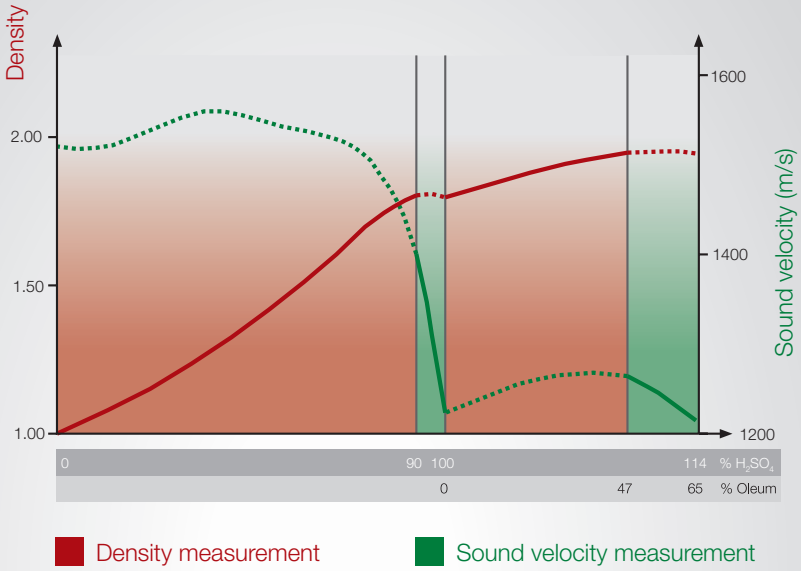
➤ Well connected

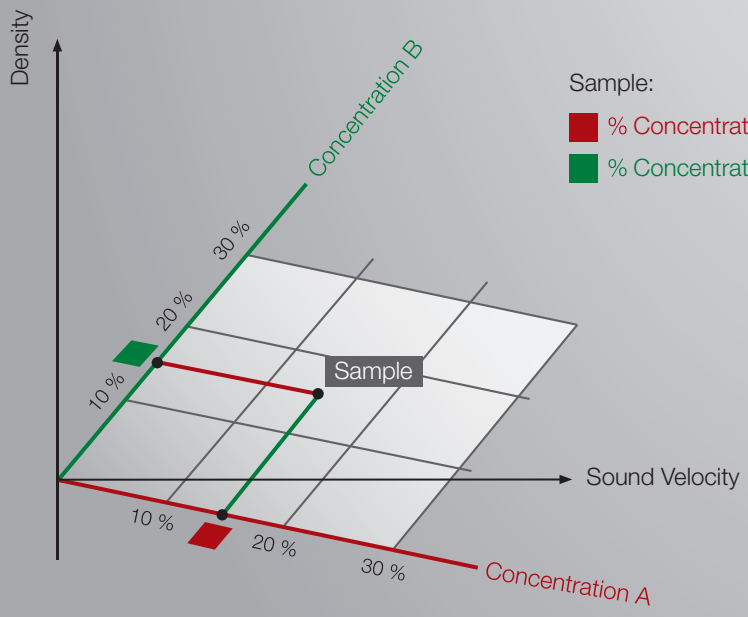
Store your results in the instrument for as long as you want. RS-232, USB and Ethernet interfaces are available for data export via memory stick, printer or Ethernet services. Reports are provided in popular formats such as PDF, TXT and XLS. Anton Paar provides the LIMS bridge software free of charge to connect your Laboratory Information Management System (LIMS) to DSA 5000 M.

Two Parameters at Work

Precise results across the whole range: Oleum and sulfuric acid

Depending on the concentration range, DSA 5000 M uses either density or sound velocity measurement to calculate the concentration value of sulfuric acid and oleum. Depending on the concentration range, also reflecting the samples' viscosity, these measurements can be performed at 20 °C (68 °F) or 40 °C (104 °F).





Sample:

- % Concentration A
- % Concentration B

Simultaneous results: Ternary solutions

DSA 5000 M determines the concentration of both components dissolved in a solvent by simultaneously measuring the density and sound velocity of your ternary solution in a temperature range from 0 °C to 70 °C (32 °F to 158 °F).

Measure Additional Parameters

The following Plug and Play measuring modules can be connected to DSA 5000 M:

For pH measurement

Combining a pH ME measuring module with DSA 5000 M provides the simultaneous determination of concentration and pH value. The pH measurement is performed with commercially available pH electrodes, the module is operated and supplied with power via DSA 5000 M.

For Refractive Index measurement

DSA 5000 M can be combined with the highly precise digital refractometer Abbemat HP or WR. With these setups, density, sound velocity and the refractive index are measured simultaneously and can be used as the basis for further calculations, either programmed into DSA 5000 M or carried out on a PC. All results are displayed on the DSA 5000 M screen.

Technical Specifications

Measuring range	
Density	0 g/cm^3 to 3 g/cm^3
Sound velocity	1000 m/s to 2000 m/s
Temperature	0 °C to 70 °C (32 °F to 158 °F)
Pressure	0 bar to 3 bar (0 psi to 44 psi)
Repeatability s.d.	
Density	0.000001 g/cm^3
Sound velocity	0.1 m/s
Temperature	0.001 °C (0.002 °F)
Sulfuric acid & oleum	0 % to 100 % H_2SO_4: 0.02 % H_2SO_4 0 % to 28 % free SO_3: 0.04 % free SO_3 28 % to 65 % free SO_3: 0.1 % free SO_3
Predefined tables and customer functions	- ethanol tables - extract / sugar tables - acid / base tables - 80 freely programmable custom functions
Data memory	1000 measuring results (ring buffer option);
Power supply	AC 100 V to 240 V; 50 to 60 Hz; 190 VA
Required sample per measurement	3 mL
Measuring time per sample	1 to 4 minutes
Display	6.5 inches, TFT touchscreen 640 x 480 pixels
Input options	Touchscreen, softkeys, optional keyboard, mouse and bar code reader
Materials in contact with the sample	PTFE, borosilicate glass, stainless steel, SS 316 Ti, silicone, Tygon
Dimensions	475.8 mm x 350.7 mm x 230.5 mm (18.7 x 13.8 x 9.1 inches)
Weight	22.5 kg (49.6 lbs)
Interfaces	S-BUS, RS-232, USB, CAN, VGA, Ethernet

Specifications subject to change without notice.
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