

Laboratory Focus

Revolutionise your laboratory with cutting-edge concentration measurement technology

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In the fast-paced world of industrial and chemical processes, precision is paramount. Traditional methods for determining the concentration of sulphuric acid, such as titration, involve handling this highly corrosive substance, which poses significant safety risks. Our state-of-the-art combined density and sound velocity meter is a groundbreaking solution designed to enhance accuracy while minimising handling and safety concerns.

Key benefits of our advanced instruments

- **Minimal sample requirement:** Our meter requires only 3.5 mL of sample, streamlining your workflow by eliminating the need for dilution or preparation steps.
- **Rapid measurement:** Achieve precise concentration readings in just 0.5 min to 6 min, boosting your efficiency and productivity.
- **Durable and reliable:** Built to endure even the most concentrated sulphuric acid and oleum, with a measuring range of 0% to 114% sulphuric acid (65% SO_3)
- **Enhanced accuracy:** Incorporates sound velocity measurement to account for the non-linear relationship between concentration and density in sulphuric acid solutions.



Figure 1: DMA 5001 provides 6-digit accuracy in density and offers a precise measurement mode on top for measurements requiring the utmost precision.

Strategic applications across Asia

Our advanced measurement technology addresses critical needs across various sectors including fertiliser production, chemical manufacturing, petroleum refining, metal processing, automotive batteries, and the textile industry.

Versatile measurement capabilities

Our instrument is not limited to sulphuric acid. It excels in measuring binary solutions and offers additional versatility by incorporating sound velocity measurement. This unique capability allows for accurate determination of concentration ranges in solutions where density does not increase steadily. For instance, it effectively measures acetic acid that peaks rather than increases linearly.

Furthermore, our technology is adept at analysing ternary systems, such as formaldehyde/methanol/water or sulphuric acid/nitric acid/water. This is achievable as long as the density and sound velocity of the components vary sufficiently.

Advanced research & development

For research and development applications, simultaneous measurements of density and sound velocity at varying temperatures enable the calculation of further physical properties, providing comprehensive data for diverse scientific and industrial needs. The detailed analysis and precise control offered by our instrument support innovation and optimisation in various fields, from materials science to chemical engineering.

In the spotlight: Sulphuric acid concentration determination

Our advanced combined density and sound velocity meter offers unparalleled precision, safety, and efficiency. By integrating this

technology, you can streamline your measurement processes, enhance accuracy, and significantly improve safety when handling hazardous substances.

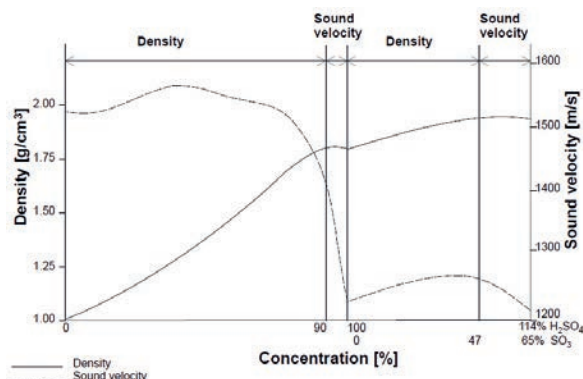


Figure 2: Density and sound velocity characteristics of sulfuric acid and oleum

Examining Figure 2, it becomes clear that at 40°C, density measurements can accurately determine concentrations ranging from 0% to 90%. However, for concentrations between 90% and 100%, sound velocity is required as density changes very little in this range compared to sound velocity. For free SO₃ concentrations between 0% and 47%, density measurements are used, since sound velocity data do not provide a precise correlation. Beyond 47% free SO₃, the instrument shifts to sound velocity for accurate concentration determination.

The measurement temperature can be set to either 20°C or 40°C, based on the sample's physical properties. Samples with up to 27% free SO₃ can be measured at 20°C. For samples with higher free SO₃ concentrations, the temperature should be set to 40°C. At 40°C, the instrument's software can accurately measure concentrations from 0% H₂SO₄ to 65% SO₃.

Market-leading density measurement with Anton Paar

Our density measurement technology leverages the renowned precision and reliability of Anton Paar's DMA instruments. Highlights include:

- **U-View:** To ensure absolute precision, this camera displays a zoomable image of the measuring cell so users can monitor sample filling in outstanding detail.
- **ThermoBalance:** Enables fast and accurate measurements at a range of different temperatures without the need for calibrations at multiple temperatures.
- **User-friendly interface:** The intuitive software simplifies operation with advanced data analysis and reporting features for a streamlined workflow.
- **Robust design:** Engineered for durability, Anton Paar density meters are built to withstand harsh environments and demanding applications.

Enhance your laboratory with Xsample and Anton Paar density meters

Combining the precision of Anton Paar density meters with the advanced Xsample sample handling unit optimises your laboratory's workflow, offering unparalleled efficiency, accuracy, and safety.

With so many Xsample sample changers to choose from, Anton Paar's Xsample series offers you more automation options than you

will find anywhere else. Combine yours with a range of Anton Paar density meters, viscometers and refractometers to provide the exact automation workflow you need.

Models like the Xsample 320/330 or Xsample 520/530 provide high precision when it comes to filling, can handle multiple fillings from the same vial and prevent sample carry-over with automatic rinsing and drying after each sample.



Figure 3: Xsample 530 is ready to measure a great variety of samples in one run.

Data at your fingertips

Eliminate transmission errors, share data easily within your company and to third parties, and do all that on the go! With Anton Paar Connect, you're always connected.

Centralise your laboratory data in one digital location and transfer the data from all your measuring instruments to your data management system via a single interface. Allow the software to manage your data flow whilst you get on with analysis, freeing up time and resources for more important tasks.

It's also straightforward to use with integrated software that simplifies laboratory data management, thereby minimising training requirements and boosting overall productivity.



Figure 4: With Anton Paar's AP Connect lab execution software, your data is available from any network computer.

Choose innovation. Choose precision. Choose our advanced measurement technology.

Elevate your laboratory's capabilities with this cutting-edge solution. Experience the future of concentration measurement and meet the demands of modern industrial and scientific applications across Asia.

For more information, visit the Anton Paar website at www.anton-paar.com