

**DMA 501  
DMA 1001**



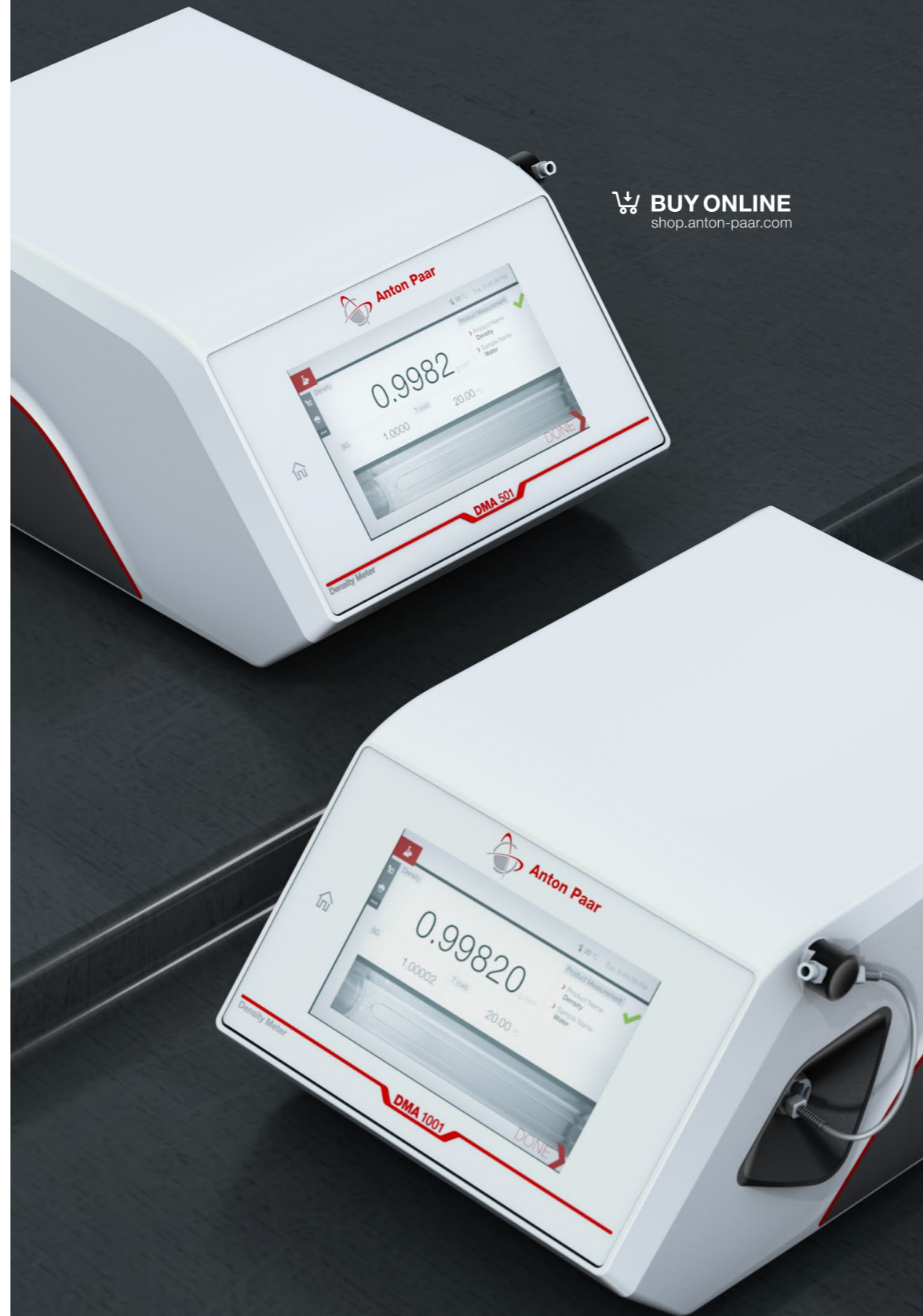
## Compact Density Meters

# Change for the Better

## IT'S TIME TO UPGRADE YOUR DENSITY CHECKS

DMA 501 and DMA 1001 are entry-level digital density meters which will revolutionize your work in the lab as well as your quality checks at the production line and storage facilities. Both instruments make digital density measurement accessible for everybody: First, they come with an unmatched price tag. Second, their guided user workflows, customizable screen layouts, and condition monitoring ensure they can be operated after only minutes of training.

**UPGRADE YOUR DENSITY MEASUREMENTS AND LEAVE YOUR TIME-INTENSIVE, BREAKAGE-PRONE HYDROMETERS BEHIND.**



- ← **DMA 501**  
Your entry ticket to the world of 3-digit digital density measurement from the market leader

**3-digit accuracy**

**Only 1 mL sample volume**

**7" glove-friendly touchscreen**

**60+ conversion tables integrated**

- ← **DMA 1001**  
The world's most technologically advanced 4-digit density meter with a price tag everybody can afford

**4-digit accuracy**

**One-point water adjustment**

**Repeatability of 0.00005 g/cm<sup>3</sup>**

**Full compliance with relevant industry standards**



# Better Features for Better Results

FULL COMPLIANCE TO →

ASTM D4052,  
ASTM D5002, ISO 12185  
(DMA 1001)



USP <841>, Ph. Eur. 2.25,  
JP 17 2.56, FDA CFR 21 Part 11  
(DMA 1001)



ChP 2020 (Vol IV) 0601  
(DMA 501 & DMA 1001)



ISO 17025-calibrated  
out-of-the-box



## MINIMUM TRAINING AND 100 % DOCUMENTED OPERATION

Illustrated SOPs and guided user workflows

Automated filling with peristaltic pump  
Xsample 200

FillingCheck™ for the most reliable bubble and  
particle detection on the market

Unique inspection camera U-View™ with  
high-resolution image, backlight adaption, zoom  
and frame repositioning function

## RESULTS IN 2 MINUTES

One-point water adjustment for the fastest  
time-to-measure (DMA 1001)

60+ integrated conversion tables for automatic  
calculation of results

400 freely configurable measuring methods

Ready for data printout, exports via network file  
share or via USB

Data centralization via connection to AP Connect,  
our lab execution software

## BUILT TO WITHSTAND YOUR INDUSTRIAL WORKSPACE

Splash-proof front and a protective ledge at the  
back to protect from sample spills

Ventilation-free cooling unit prevents corrosion of  
the electronics

Smart condition monitoring ensures 100 %  
elimination of external influences

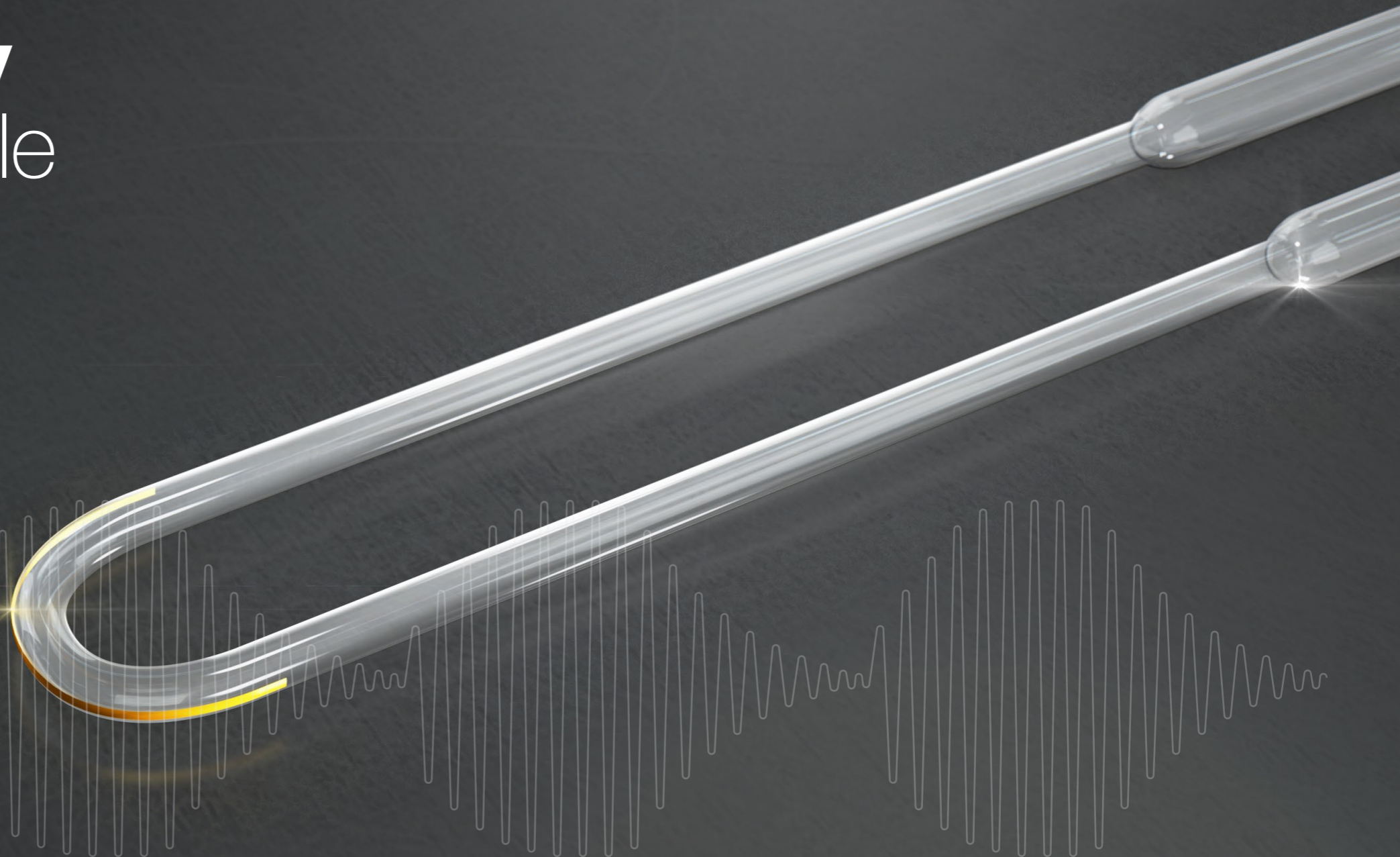
## BEST-IN-CLASS ACCURACY

Implements the patented Pulsed Excitation Method  
(PEM) for the most precise results and two times  
better viscosity correction

Temperature range from 15 °C to 60 °C  
(DMA 1001), 15 °C to 40 °C (DMA 501)

# A Revolutionary Measuring Principle

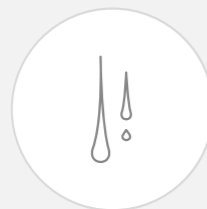
The sample is introduced into a U-shaped tube made from borosilicate glass that is excited to oscillate at its characteristic frequency which is directly related to the density of the sample. After reaching a stable oscillation, the excitation is switched off and the oscillation fades out freely. This excitation and fade-out sequence is repeated continuously (patented Pulsed Excitation Method). By evaluating this pattern, highly precise density results are obtained, the effects of viscosity are compensated, and air bubbles or particles are detected.



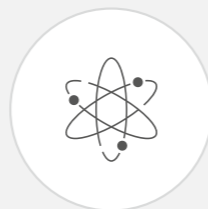
## YOUR BENEFITS AT A GLANCE

The unique design of the measuring cell and the novel way of evaluating the oscillation characteristics with the Pulsed Excitation Method lead to ...

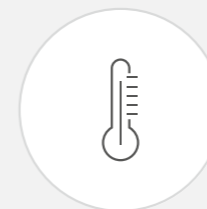
Digital density measurement with DMA requires very little sample volume, does not change the sample's composition, and consumes no chemicals. It determines concentrations from 0 % to 100 % with the utmost precision and allows you to always offer first-rate product quality.



**Viscosity correction two times better than with any other density meter**



**Better detection of gas bubbles or particles in the sample**






**Improved temperature management**



**Measuring results unaffected by external influences**



# Ready for All Samples

PASTE-LIKE SAMPLES	HAZARDOUS SAMPLES	SAMPLES WHICH REQUIRE COMPLIANCE
		
<p><b>CHALLENGE</b></p>	<p><b>CHALLENGE</b></p>	<p><b>CHALLENGE</b></p>
<p>It is difficult and time-consuming to fill pasty samples (i.e. creams, lotions, ointments) into the pycnometer and the cleaning is time-intensive, too.</p>	<p>Monitoring the production process may include testing corrosive acids and bases. What is the best way to protect the operator?</p>	<p>Measurements need to be compliant to USP &lt;841&gt; or other important Pharmacopeia (EU, Japan, China) to be accepted in the target markets.</p>
<p><b>SOLUTION</b></p>	<p><b>SOLUTION</b></p>	<p><b>SOLUTION</b></p>
<p>With DMA 501/1001 you fill pasty samples in minutes with the help of the optional pasty sample kit.</p>	<p>Safety first: DMA 501 only needs approx. 1 mL of sample and filling with the peristaltic pump reduces contact to a minimum. The touchscreen can be operated wearing gloves.</p>	<p>The measuring technology, accuracy, and repeatability provided by DMA 1001 are fully compliant with major Pharmacopeia (USP &lt;841&gt;, Ph.Eu. 2.2.5, JP 17 2.56, and ChP 2020 (Vol IV) 0601).</p>
<p><b>YOUR BENEFITS</b></p>	<p><b>YOUR BENEFITS</b></p>	<p><b>YOUR BENEFITS</b></p>
<p>Using the pasty sample kit you fill pasty samples bubble-free within minutes. You can save 25 to 30 minutes per sample compared to using a pycnometer. Cleaning is fast and needs only a few milliliters of solvent.</p>	<p>Your operators have minimal contact with dangerous substances, especially when using the peristaltic pump Xsample 200.</p>	<p>Compliance to all major Pharmacopeia allows you to sell your products to global markets.</p>
<p>∨</p>	<p>∨</p>	<p>∨</p>
<p><b>Results in three minutes</b></p>	<p><b>Minimum contact when filling</b></p>	<p><b>USP &lt;841&gt; and important Pharmacopeia</b></p>
<p><b>Fill difficult samples</b></p>	<p><b>Glove-friendly touchscreen</b></p>	<p><b>Audit trail functionality</b></p>

COSTLY SAMPLES	SAMPLES IN HARSH ENVIRONMENTS	SAMPLES WITH PARTICLES
		
<p><b>CHALLENGE</b></p>	<p><b>CHALLENGE</b></p>	<p><b>CHALLENGE</b></p>
<p>When measuring the density of expensive samples the top priority is to use as little as possible.</p>	<p>Density checks are often carried out in cluttered and cramped workspaces by operators wearing wet gloves. Samples may be spilled on or around the instrument.</p>	<p>Liquid samples with particles or inhomogeneous samples are difficult to measure but the protocol requires a result.</p>
<p><b>SOLUTION</b></p>	<p><b>SOLUTION</b></p>	<p><b>SOLUTION</b></p>
<p>DMA 501/1001 delivers results from approx. 1 mL of sample, requires 5 mL to 10 mL of solvent for cleaning, and reduces your environmental impact.</p>	<p>DMA 501/1001 has a splash-proof front display and a protective ledge at the back which protects the interfaces and outlets from sample spills.</p>	<p>With DMA 501/1001 you can measure the density of all samples you are able to fill and remove, without limitations.</p>
<p><b>YOUR BENEFITS</b></p>	<p><b>YOUR BENEFITS</b></p>	<p><b>YOUR BENEFITS</b></p>
<p>You waste less sample, save costs, and still get the results you need for production control.</p>	<p>The uptime and product lifetime of your density meter are maximized.</p>	<p>You get density results for all samples, including pasty, inhomogeneous, sedimenting, and particle-containing samples, and even aerosol sprays.</p>
<p>∨</p>	<p>∨</p>	<p>∨</p>
<p><b>Results from approx. 1 mL sample</b></p>	<p><b>Maximized uptime</b></p>	<p><b>100 % correctly filled sample</b></p>
<p><b>Low cost of analysis</b></p>	<p><b>Spill-proof</b></p>	<p><b>Even for sedimenting samples and aerosols</b></p>

# Pharma and Cosmetics Industry

# Flavors and Fragrances Industry

RAW MATERIAL CHECK	CHECKING FILLING VOLUMES	TRACEABLE QUALITY CONTROL
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CHALLENGE	CHALLENGE	CHALLENGE
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When checking the quality and/or purity of raw material before use I need to get the concentration value immediately, even when the substance is highly concentrated.	The final filling of packages must meet legal requirements while still being cost-efficient with no errors.	I need to document the test results for each product and all actions carried out on the instrument. The values need to be traceable.
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SOLUTION	SOLUTION	SOLUTION
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DMA 501 has stored tables for the concentrations of chemicals. The density is measured, automatically converted into concentration, and shown within seconds. Your own tables can be imported if you need custom quantities and calculations.	The 3-digit accuracy of DMA 501 is sufficient for converting the weight and measured density into the filling volume. For each product filled you can set the lower and upper limits for acceptable volumes and see the value at a glance.	With DMA 1001 you can assign roles and responsibilities and implement audit trail to log all activities and electronically sign the final results.
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YOUR BENEFITS	YOUR BENEFITS	YOUR BENEFITS
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No need to look up values in tables or calculate the concentration yourself. You save up to 10 minutes per measurement with no risk of calculation errors. This means you make pass/fail decisions quickly and based on correct information.	Never overfill or underfill again while meeting all regulations and requirements.	Achieve absolute certainty in your results and data. You can certify the quality of your products for shipment and sales and have all the right information at hand for audits by regulatory authorities and in case of customer complaints.
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<b>Save 10 min/measurement</b>	<b>Never overfill, never underfill</b>	<b>21 CFR Part 11 compliance &amp; audit trail</b>
<b>Quick pass/fail decisions</b>	<b>Eliminates human error</b>	<b>Be ready for audits</b>

QUALITY OF COSTLY SAMPLES	PRODUCTION CONTROL	IN-PROCESS CONTROL
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CHALLENGE	CHALLENGE	CHALLENGE
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We deal with expensive raw materials, intermediate, and final products. Using our current density method costs us up to 50 mL per measurement. Is there an alternative?	The results depend on the experience and skill of the operator in charge of analysis.	In production control, I need a quick and easy way to check that the current production batch is according to specifications.
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SOLUTION	SOLUTION	SOLUTION
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DMA 1001 makes it nearly impossible to waste sample. It needs only approx. 1 mL of sample per measurement, monitors the filling, and documents an image of each filling with the result.	DMA 501 and DMA 1001 are so easy to handle your operators only need minimum training and no sample preparation is required.	On DMA 501/1001 you can define the acceptable range of density values and what counts as "out-of-spec". After a measurement time of 2 to 3 minutes the density meter shows a clear "pass" or "fail" result.
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YOUR BENEFITS	YOUR BENEFITS	YOUR BENEFITS
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You save your expensive samples and reduce the cost of production.	This easy-to-use device saves you training costs, increases work efficiency, and eliminates human errors.	You immediately see if measured values are outside specifications and lose no time in correcting production. Using DMA 501/1001 minimizes your wasted product.
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<b>Needs approx. 1 mL of sample</b>	<b>No human errors</b>	<b>Flags out-of-spec product</b>
<b>Monitored filling</b>	<b>Minimum training required</b>	<b>Minimizes product loss</b>



# Chemical Industry

FINAL QC

BATCH CONTROL OF ACIDS, BASES

CHECKS ON CORROSIVE SAMPLES



## CHALLENGE

Titration is time-consuming and requires high amounts of solvents and reagents. What is the alternative?

For our workspace we need a device that can cope with spills, knocks, and vapors in the air and still run reliably.

We need to test corrosive acids and bases while upholding the highest of safety standards.

## SOLUTION

DMA 501 is fast: it only takes 3 to 5 minutes to complete the analysis and there is no need to use solvents for the measurement.

DMA 501 is splash-proof and protected from sample spills. Unlike other density devices, it works without needing ventilation so it doesn't suck contaminated air into the electronics.

Operators have only minimum contact with hazardous samples when using DMA 501. Approx. 1 mL of sample is filled via the peristaltic pump. The touchscreen can be operated wearing gloves.

## YOUR BENEFITS

You save time because DMA 501 is 5 times faster than titration. You also save around 100 mL of solvents each time compared to using titration – and this reduces costs.

With this ventilation-free density meter you get maximized uptime, have no repair costs, and maximum instrument lifetime, even in harsh industrial environments.

You protect your operators from dangerous substances and still get the results you need.



**5-times faster measurement**

**Maximized uptime**

**Protection for operators**

**For quick product release**

**No repair costs**

**Glove-friendly touchscreen**

# Petroleum Industry

PRODUCT CERTIFICATION

BLENDED PROCESS

TRADING



## CHALLENGE

Official product certification according to defined product specifications requires measurements in full compliance with established test methods, e.g. ASTM D4052 and ISO 12185.

Using a hydrometer to measure the density of fuel or lubes at temperatures other than the reporting temperature and then converting the result to the reference temperature includes too many sources of error.

Some trading partners do not accept results from our density meter and raise concerns about the quality of the device as well as the calibration procedure. How can I counter this?

## SOLUTION

DMA 1001 has everything ASTM D4052 stipulates: 4 digits in measuring accuracy in density, full-range viscosity correction, and real-time bubble detection via FillingCheck™.

For any kind of fuel or lube, DMA 1001 automatically compensates the density measured at elevated temperatures to the desired reference temperature according to API table 53 B or D.

DMA 1001 can be calibrated according to ISO 17025 using traceable standards at Anton Paar's accredited calibration laboratory. This 100 % certifies the use of DMA 1001 for volume-to-mass conversions in trade.

## YOUR BENEFITS

Forget disputes about standard compliance. You have the peace of mind that you can measure density in-house – in full compliance and with 100 % traceability.

Automatic conversion means you don't need to do manual calculations for all different product groups (fuels, lubes) which reduces potential human calculation errors to zero.

Calibration according to ISO 17025 paves the way for accurate and internationally acknowledged results. You benefit from 100 % traceability to the International System of Units (SI).



**ASTM D4052 & ISO 12185**

**Correct results every time**

**Prevent reclamations**

**Full traceability**

**Zero conversion errors**

**100 % certified use**



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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.

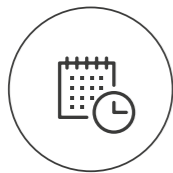
#### SERVICE AND SUPPORT DIRECTLY FROM THE MANUFACTURER

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



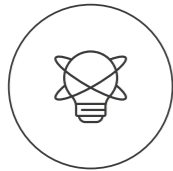
#### SAFEGUARDING YOUR INVESTMENT

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.

	DMA 501	DMA 1001
Patents	EP3012612B1, AT520632B1, US10145771B2	
Measuring range	Density: 0 g/cm <sup>3</sup> to 3 g/cm <sup>3</sup> Pressure: 0 bar to 10 bar (0 psi to 145 psi)	
	Temperature: 15 °C to 40 °C (59 °F to 104 °F)	Temperature: 15 °C to 60 °C (59 °F to 140 °F)
Accuracy*	Density: 0.001 g/cm <sup>3</sup> Temperature: 0.3 °C (0.6 °F)	Density: 0.0001 g/cm <sup>3</sup> Temperature: 0.05 °C (0.09 °F)
Repeatability, s.d.**	Density: 0.0002 g/cm <sup>3</sup> Temperature: 0.1 °C (0.2 °F)	Density: 0.00005 g/cm <sup>3</sup> Temperature: 0.02 °C (0.04 °F)
Reproducibility, s.d.**	Density: 0.0004 g/cm <sup>3</sup>	Density: 0.00007 g/cm <sup>3</sup>
U-View™	Yes	
FillingCheck™	Yes	
Full-range viscosity correction	Yes	
Minimum sample volume	Approx. 1 mL	
Output parameters	Density, Specific Gravity (SG), alcohol tables, sugar/extract tables, various acid/base tables, API functions	
Wetted parts	Borosilicate glass, PTFE	
Dimensions (L x W x H)	375 mm x 265 mm x 180 mm (14.8 in x 10.4 in x 7.0 in)	
Weight	13.5 kg (29.8 lb)	
Power supply	AC 100 to 240 V; 47 to 63 Hz; DC 24V, 3A	
Display	7 inches, TFT WVGA (800 x 480 Px); PCAP touchscreen	
Controls	Touchscreen, optional keyboard, mouse, and bar code reader	
Communication interfaces	1 x Ethernet, 3 x USB, 1 x RS232	
Internal storage	5000 measured results plus image of the filled-in sample	
Other special functions	Integrated temperature and humidity sensor for intelligent condition monitoring Built-in pressure sensor for adjustments	
	-	Quick one-point water adjustment
Industry standards	ISO 15212-1	
		ASTM standards D4052, D5002, D6448, D2501, D5931, D1475, D1250, D4806; DIN 51757; ISO 12185; EN 14214; ISO 18301; ISO 2811-3; JIS K 0061; JIS K 2249; JP 17 2.56
	ChP 2020 (Vol IV) 0601	USP <841>, Ph. Eur. 2.25, JP 17 2.56, ChP 2020 (Vol IV) 0601
Available options & upgrades	Peristaltic pump Xsample 200 Printers Aerosol filling adapter Filling kit for pasty samples ISO 17025 calibration Pharma Qualification Package AP Connect lab execution software	

\*under conditions according to installation requirements

\*\*according to ISO 5725



