Density Meter for the Heavy Petroleum Industry

Anton Paar

DMA™ 4200 M

From routine QC to sophisticated R&D

The only density meter that masters even heavy petroleum samples

Outstanding and new

The new DMA™ 4200 M density meter is made for exceptional conditions: It is the only density meter that measures at temperatures up to 200 °C and pressures up to 500 bar. In the temperature range of 0 °C to 150 °C, it reaches an accuracy of 0.0002 g/cm³. The Repeated Fade-out Method used by DMA™ 4200 M delivers the most stable density results based on comprehensive knowledge of the oscillation characteristics. DMA™ 4200 M improves, accelerates, and simplifies density measurement of heavy petroleum samples.

Highly specialized

DMA™ 4200 M is a must-have tool for laboratories at petroleum refineries and is specially designed for heavy samples. It determines the density of gas and liquids and also the specific gravity of solid samples with a melting point below 200 °C.
It is your eager beaver for routine quality control of end products and is ASTM D4052 and ASTM D5002 compliant.

Tough

With its heart of Hastelloy C276 the new DMA™ 4200 M is resistant to highly corrosive acids and bases, such as hydrochloric acid, sour gas, sodium hydroxide, and even hydrofluoric acid. As a result, DMA™ 4200 M is highly recommended for high-precision density measurements in the chemical industry.

Scientific

Researchers worldwide rely on the accurate density measurements of DMA™ 4200 M. With its sample consumption of only 2 mL, the instrument is ideal for research studies on density at high pressures up to 500 bar.

Features

Compliant results

DMA™ 4200 M has a new automatic bubble detection feature, FillingCheck™. If a bubble occurs during measurement, it is detected. This makes the new DMA™ 4200 M ASTM D4052 and ASTM D5002 compliant and gives you the certainty that the reported density result is correct. The influence of viscosity is eliminated by a new and fast viscosity correction method, ensuring density results with an accuracy of up to 0.0002 g/cm³.

Easy filling and fast cleaning of heavy samples

Constant temperature control from the syringe to the inlet and outlet of DMA™ 4200 M ensures highly fluid bitumen/asphalt or residual fuel oil during the filling procedure. The rapid cleaning procedure will save you valuable time: Calculate one minute of cleaning and one minute for drying and you are ready for the next measurement.

Measure under pressure

It is easy to determine density-pressure relations at pressures between 0 bar and 500 bar for every single pressure step. Just fill a small amount of sample into the Hastelloy C276 measuring cell and start the high-pressure pump connected to your system. When the main screen of DMA™ 4200 M shows the stable pressure reading from the connected pressure sensor, the density measurement is complete.

Immediate measurement

The new Temperfect™ feature of DMA™ 4200 M makes it possible to conduct immediate density measurements at any temperature between 0 °C and 150 °C at ambient pressure. No prior adjustment is needed. Just fill the sample and get the density result. The new and patented Repeated Fade-out Method (AT 516420 B1) of exciting the U-tube gives you faster results than ever before.

Convenient operation

It has never been so easy to keep the touchscreen of DMA™ 4200 M clean. The gesture control touchpad is an accessory for DMA™ 4200 M to operate the instrument without touching it. By a simple gesture like swiping you can start and stop a measurement, turn the air pump on and off, and select a method.

Saves you time, money, and solvent

The new DMA™ 4200 M enhances your lab productivity and saves operation costs. It delivers results 10 times faster than a manual method like pycnometers and needs only small amounts of sample and cleaning solvents.

Accessories

Syringe heating accessory
The syringe heating accessory guarantees fast, easy, and safe filling of DMA™ 4200 M. It is specially designed for heating the sample inlet, sample outlet, and the special syringe for filling samples like bitumen, asphalt, and waxes. The samples are kept hot at up to 200 °C throughout the entire density measurement so they do not clog up the outlet.

LPG adapter
The LPG adapter for DMA™ 4200 M is the perfect link between your gas container and the DMA™ 4200 M density meter. You can couple your gas container to the LPG adapter within seconds without any tools. Just by opening two valves you can fill the liquefied petroleum gas into the measuring cell.

Quality control

Density measurement of petroleum samples by DMA™ 4200 M:

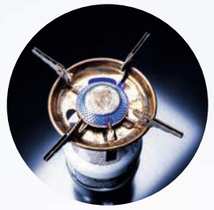
- From upstream to downstream
- On incoming crude oil
- On intermediate and process samples to give a quick feedback on the refining process
- Quality control of LPG and heavy samples, e.g. asphalt/bitumen, heavy fuel oil
- For converting volume to mass when trading asphalt/bitumen

Crude oil
Live crude oil

Asphalt
Bitumen
Tar

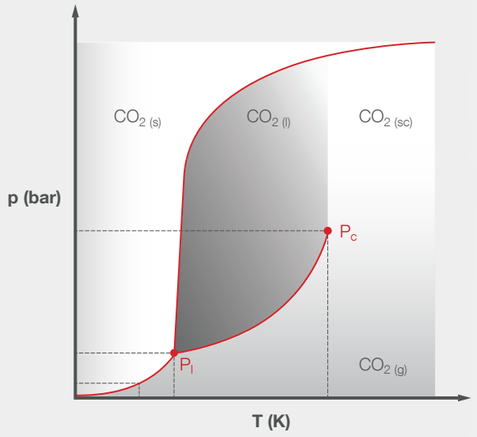
Fuel
Diesel

Heavy fuel oil
Navy special fuel oil
Bunker fuel oil



Liquefied petroleum gas (LPG)

Research studies



Density results provided by DMA™ 4200 M are used in research:

- Determination of equation of state
- Calculation and configuration of production processes
- Pressure-volume-temperature (PVT) analysis of crude oil
- Bubble-point determination of crude oil

Researchers around the world rely on the density results at high pressures and temperatures provided by the unique DMA™ 4200 M density meter.

Specifications

	DMA™ 4200 M
Measuring range	
Density	0 g/cm³ to 3 g/cm³
Temperature	-10 °C to 200 °C (14 °F to 392 °F)
Pressure range	0 bar to 500 bar (7250 psi)
Accuracy*	
Density	0.0002 g/cm³
Temperature	0.03 °C (0.05 °F)
Repeatability s.d.**	
Density	0.00005 g/cm³
Temperature	0.01 °C (0.02 °F)
Reproducibility s.d.**	
Density	0.0001 g/cm³
FillingCheck™	Yes (at ambient pressure and up to 150 °C)
Temperfect™	Yes (at ambient pressure)
Full-range viscosity correction	Yes (at ambient pressure)
Repeated Fade-out Method	Yes
Minimum sample volume	2 mL
Wetted materials	Hastelloy C276
Footprint	510 mm x 330 mm (20 in x 13 in)
ASTM standards	D4052, D5002
Power supply	AC 100 to 240 V, 50 to 60 Hz, 250 VA
Connections	10.4 inches, TFT PCAP touchscreen 640 x 480 Px
Interfaces	4 x USB (2.0 full speed) |1 x Ethernet (100 Mbit) 1 x CAN bus | 1 x RS-232 | 1 x VGA

** this is valid under ideal measuring and sample conditions only (at ambient pressure)*
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