

# Identifying the type of crude oil and final products by means of density measurement with DMA 35 Ex Petrol

Relevant for: Petroleum industry

The density helps identifying the type and quality of petroleum-based samples. The quality of crude oil can be screened directly on-site such as at fuel depots, deep well drilling plants or pipelines by means of density measurement with DMA 35 Ex Petrol.

When crude oil is bought or sold by volume, the correct weight has to be known. Here, the determination of the density allows the volume-to-weight conversion.



## 1 Introduction

In the distillation tower of an oil refinery, crude oil is split into several different fractions with different densities and boiling points – from fuel for ships, to lubricants and gasoline for vehicles. No matter whether inspecting the quality of a product in the refinery itself, at a gas station, airport or on a ship, the density is an important piece of the puzzle when identifying fuels.

In addition, during biodiesel production, determination of the density is used to distinguish between the original raw materials (such as vegetable oil, waste oil and alcohols) as well as the separated fractions ester and glycerol developed during transesterification.

## 2 Play it safe!

The intrinsically safe portable density meter version DMA 35 Ex Petrol (Ex marking II 2 G Ex ib IIB T4) from Anton Paar (**Figure 1**) is designed to perform quick density checks in hazardous environments – a unique feature on the market!

The instrument meets the requirements of the EU type-examination certificate.

The special housing of DMA 35 Ex Petrol is resistant to petroleum and numerous organic solvents. It fully complies with the IP 559 and ASTM D7777 standards.



Figure 1: The portable density meter DMA 35 Ex Petrol

DMA 35 Ex Petrol is also fit for use on-site (**Figure 2**) and needs only small sample amounts of 2 mL.

On top of its robustness and high accuracy, DMA 35 Ex Petrol offers the patented feature of an exchangeable glass measuring cell (AT 516421 (B1)). Thus, a broken glass cell does not represent a huge problem anymore; the exchange of the measuring cell can be carried out by certified Anton Paar service technicians.

The implemented gesture control enables measurements to be initiated or stopped by defined movements of the instrument. This is especially useful as one hand remains free and represents an

additional safety aspect if measurements have to be carried out in places that are difficult to access.



Figure 2: Using DMA 35 Ex Petrol on-site

**Notice:** With the intrinsically safe DMA 35 Ex Petrol, use only alkaline batteries type Varta Industrial 4006.

### 3 30 seconds later: yes, it is diesel!

After taking up some milliliters of sample, the robust DMA 35 Ex Petrol measures the density and temperature within seconds. The result is displayed as API Gravity, API Density or API Specific Gravity (SG) for product groups A, B and D (crude oils, fuels and lubricants), temperature compensation to 15 °C, 20 °C, 29.5 °C or 60 °F is carried out automatically.

### 4 Filling viscous samples? No problem!

When filling highly viscous samples (e.g. lubricants), the instrument can be filled with a syringe as shown in **Figure 3** instead of filling with the pump lever and filling tube.



Figure 3: Filling DMA 35 Ex Petrol with a syringe

In that case the screen of the instrument rotates automatically. The density results are accurate to 0.001 g/cm<sup>3</sup> and the influence of viscosity is automatically corrected.

### 5 Data storage and transfer

DMA 35 Ex Petrol is equipped with an RFID (“Radio Frequency Identification”) interface: Samples are identified quickly and conveniently by means of RFID tags which are programmed with a sample ID and method. The ID is stored with the result ensuring full traceability of all results.

The transfer of the stored measured data to a printer or PC is done wirelessly using the integrated Bluetooth interface. Before data can be printed in the data memory on a Bluetooth printer, the Bluetooth connection needs to be set up once.

**Tip:** The Instruction Manual and Safety Information for the DMA 35 portable density meter (E281B002) describes in detail how to proceed to set up the Bluetooth connection.