Density by ASTM D4052

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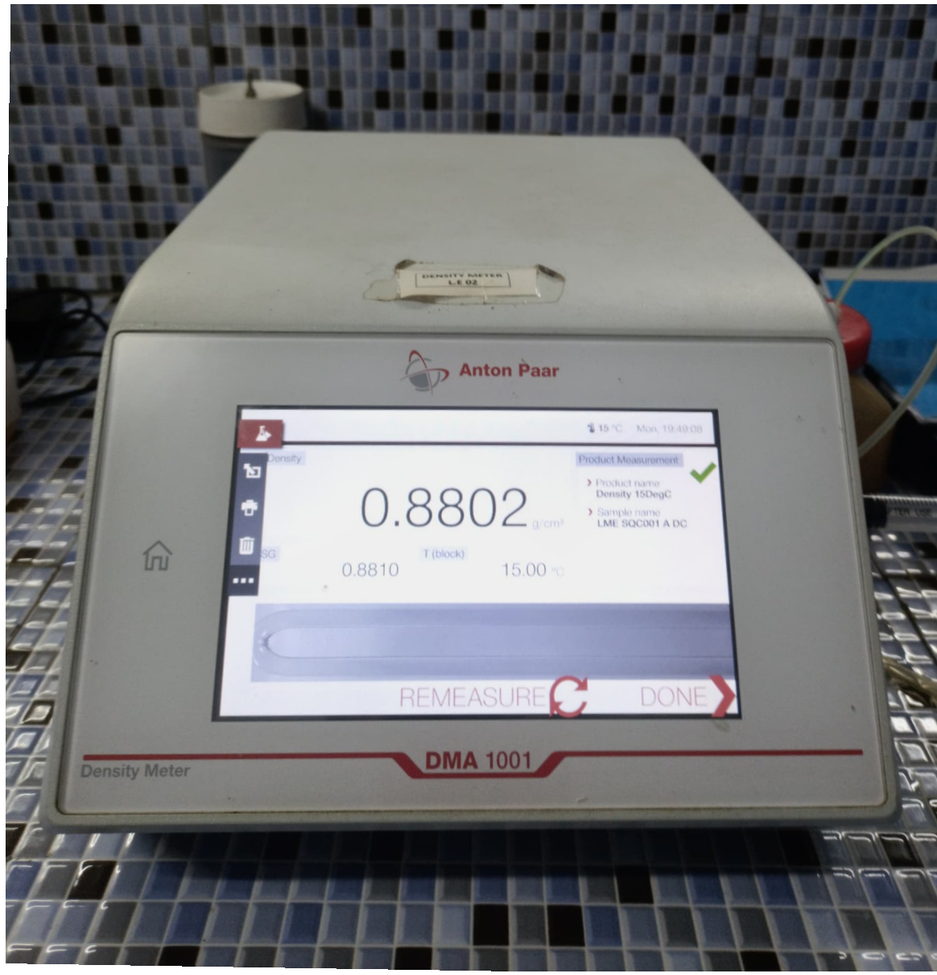
Density is a substance's mass per unit of volume.

Why Do We Test Density

Fuel density is an important quality parameter of diesel, gasoline, and jet fuel. It’s a fundamental physical property that can be used in conjunction with other properties to characterise both the light and heavy fractions of petroleum and petroleum products.

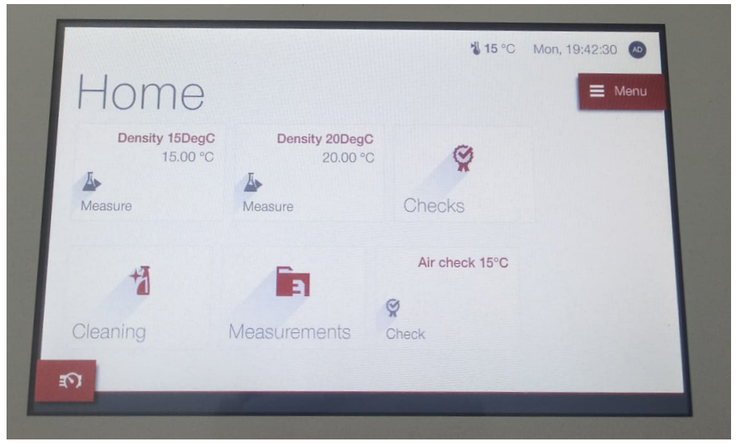


Density by ASTM D4052 is a quick & simple test to perform to check the quality of the petroleum samples. If there is contamination of the fuel, then the fuel mixture will either become heavier or lighter, depending on what the fuel is contaminated with. If the contaminant is heavier than the fuel, then the density of the substance will increase.

When fuel is traded it's not possible measure the weight of a whole vessel, storage tank or installation, so it's critical to ensure that the fuel density is measured to allow for the conversion of the measured volume to weight of the fuel product for invoicing.

How Does It Work

A volume of approximately 2 mL of liquid sample is added to an oscillating U-tube within a Densitometer and the change in oscillating frequency caused by the change in the mass of the U-tube is used in conjunction with calibration data to determine the density, relative density, or API Gravity of the sample.



Potential Issues and Solutions:

- Incorrect temperature will lead to an incorrect density, therefore care must be taken to set the densitometer to the correct temperature.
- Insufficient cleaning & drying of the densiometer will lead to contamination of the sample & therefore incorrect density measurement. The DMA 1001 densiometer utilised in the SISA laboratory will not allow the density measurements to be performed until the measurement cell is clean & dry.
- Air bubbles can also cause incorrect density measurements, the DMA 1001 has a built in FillingCheck™ which automatically detects gas bubbles in the measuring cell and will generate a warning message in that case. Additionally the analysts can visually inspect the measuring cell on the real-time camera image (U-View™).

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