

# Density Determination of Solids

## 7 Tips and Tricks

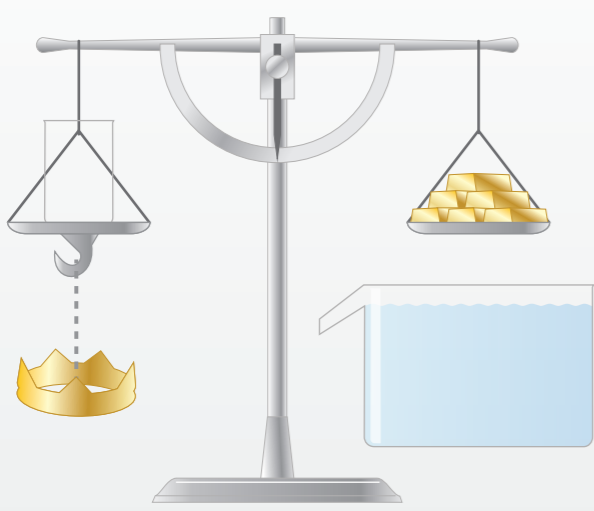
Use your balance and a density kit to determine the density of a solid sample with the help of Archimedes' principle: Perform one weighing in air and one in liquid, then let your METTLER TOLEDO balance do the rest.

Our 7 tips and tricks support you in using the right tools and creating suitable conditions to measure density correctly and accurately.



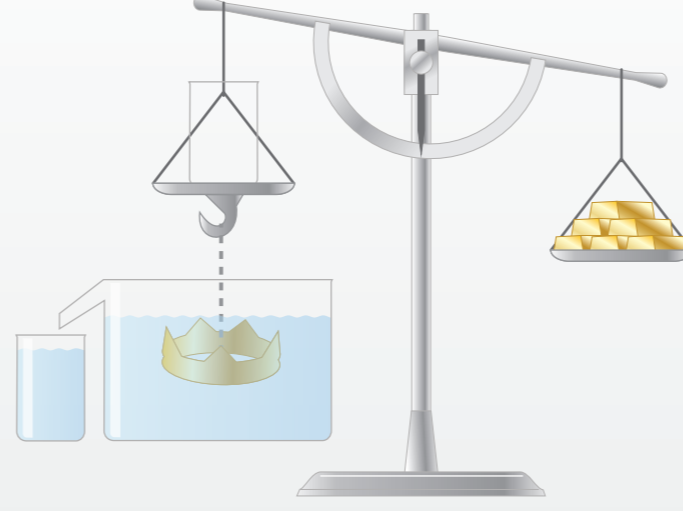
### Good to Know

A. Mass Determination



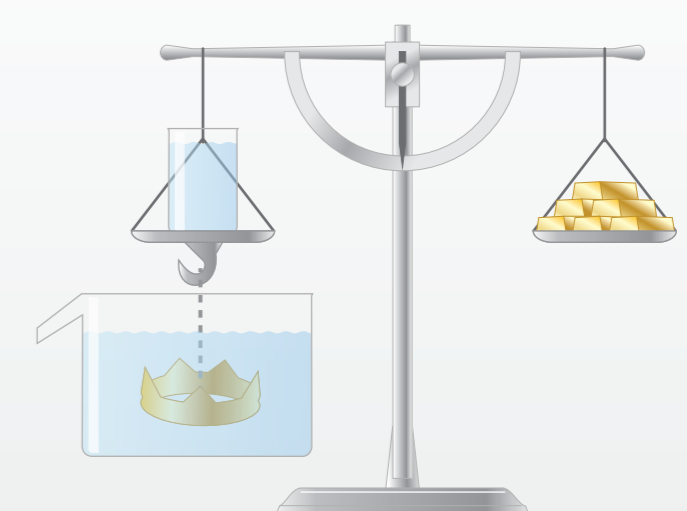
$$M_{\text{Crown}} = M_{\text{Gold}}$$

B. Volume Determination



$$V_{\text{Crown}} = V_{\text{Water Displaced}}$$

C. Density Determination



$$\rho_{\text{Crown}} = \frac{M_{\text{Crown}}}{V_{\text{Crown}}} = \frac{M_{\text{Crown in Air}}}{M_{\text{Crown in Air}} - M_{\text{Crown in Water}}}$$

"Any object totally or partially immersed in a fluid is buoyed up by a force equal to the weight of the fluid displaced by the object."  
— Archimedes of Syracuse, 250 BC

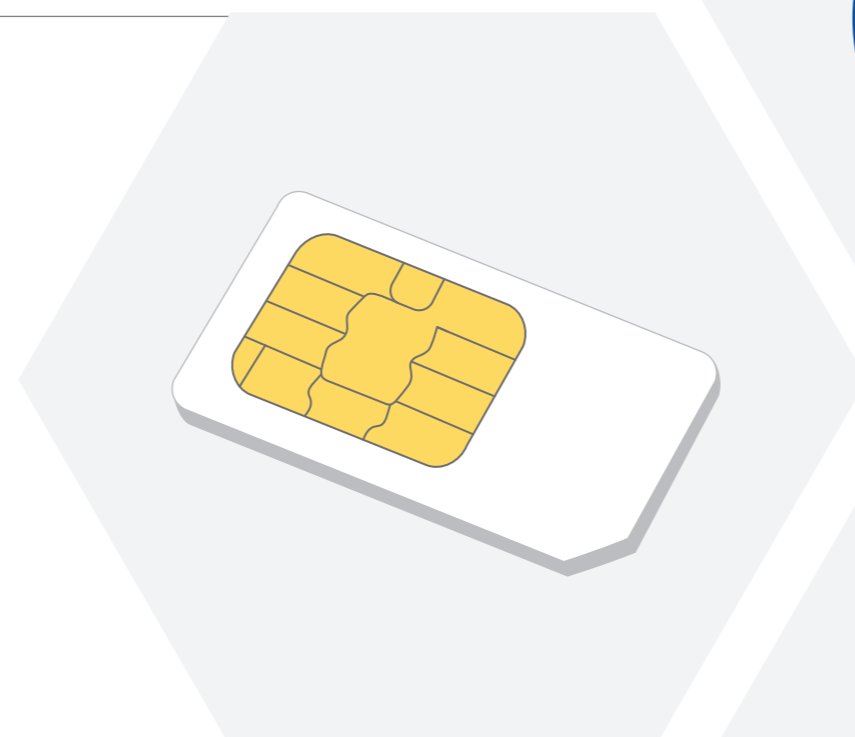
## 01 Use the Right Liquid

Use a suitable liquid with a known density, such as deionized or freshly distilled water, that will not affect the sample. To help avoid air bubbles, you may add less than 0.1% of a wetting agent.



## 02 Challenging Sample?

Not every sample is well-suited for density applications: Different materials in one sample or a cavity inside the sample can falsify the results.



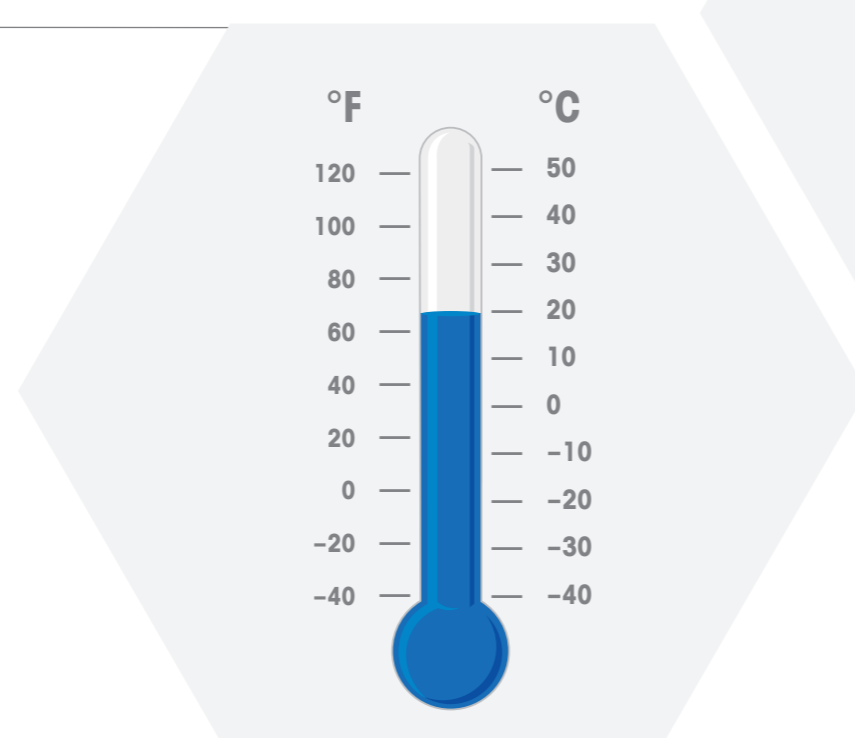
## 03 Avoid Bubbles

Remove air bubbles with a fine brush to avoid their buoyancy effect. A bubble with a 1 mm diameter can cause a buoyancy of up to 0.5 mg.



## 04 Maintain a Constant Temperature

Keep the temperature stable within  $\pm 0.5$  °C. Temperature changes can affect density on an order of magnitude from 0.1 to 1% per °C.



## Use the Right Tools

# 05

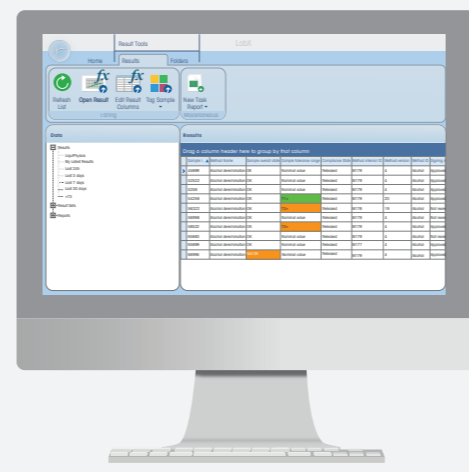
Use gloves or forceps to handle the sample. Touching the sample with bare hands may deposit skin acid on the surface and can affect mass by up to +50 µg.



## Collect and Calculate Results Efficiently

# 06

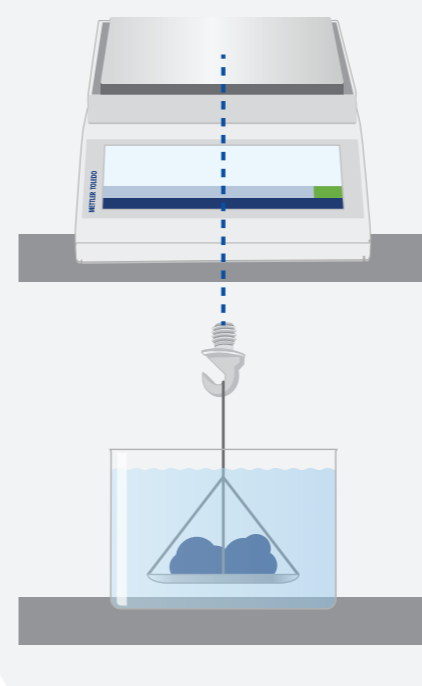
Manual transcription of data and calculations is time-consuming and error-prone. METTLER TOLEDO solutions ensure efficient, secure data management.



## Handle Bulky Samples Easily

# 07

Measure the density of bulky samples with the help of an optional, dedicated hook mounted below the balance.



[www.mt.com/labtec-density-solids](http://www.mt.com/labtec-density-solids)

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