Determination of density by measurement of the buoyancy (Item No.: P1297300)

Curricular Relevance

Area of Expertise: Physik
Education Level: Klasse 7-10
Topic: Mechanik
Subtopic: Mechanik der Flüssigkeiten
Experiment: Dichtebestimmung durch Messung des Auftriebs

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Intermediate	10 Minutes	10 Minutes	1 Student

Additional Requirements:

- Spirit, ca. 400 ml

Experiment Variations:

Keywords:

Principle and equipment

Principle

It is to be shown, how the density of solid and liquid substances can be determined from a measurement of the buoyancy.

Equipment

Position No.	Material	Order No.	Quantity
1	Demo Physics board with stand	02150-00	1
2	Torsion dynamometer	03069-03	1
3	Sinker, aluminum	03903-01	1
4	Support plate on fixing magnet	02155-00	1
5	Glycerol, 250 ml	30084-25	2
6	Glass beaker DURAN®, tall, 600 ml	36006-00	1
Additional material:			
	Spirit, ca. 400 ml		

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Set-up and procedure

1. Experiment

- Fasten the torsion dynamometer at the upper edge of the demo-board.
- Hang the sinker on, measure the weight force of it in air ($F_{G,L}$) and note this value.
- Position the shelf underneath the sinker at the lower edge of the board, then place the glass beaker containing about 400 ml of water on it (Fig. 1).
- Lower the dynamometer with sinker, until the sinker is completely immersed in the water.
- Measure the weight force $F_{G,W}$ with which the sinker now pulls on the dynamometer, and note this value.

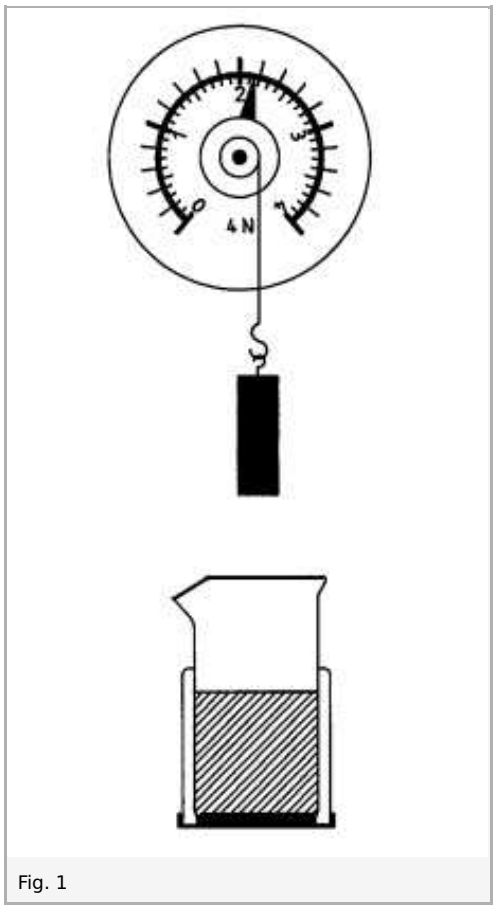

Fig. 1

2. Experiment

- Use the set-up as in Experiment 1, but pour alcohol into the glass beaker instead of water.
- Lower the dynamometer, with the sinker hung on it, until the sinker is completely immersed in the alcohol.
- Measure the weight force $F_{G,Sp}$ with which the sinker pulls on the dynamometer and note this value.
- Replace the alcohol in the beaker with glycerol and carry out the same procedure to measure and note the force $F_{G,Gl}$.

Observation and evaluation

Observation

Evaluation