ROQED PHYSICS LAB

Study of Archimedes' law

Purpose of the work:
to measure the Archimedean force and to make sure that it depends on the volume of a body immersed in a liquid, as well as on the density of the liquid.

Tools:
019 - Graduated cylinder,
--- liquids (water, vegetable oil, kerosene, alcohol),
018 - Dynamometer.
003 - Cargo

Theoretical part
We meet with Archimedean force quite often, for example, sailing on ships or just watching the float when fishing. If the weight of the body is greater than the force of Archimedes, then it sinks; if less, it pops up. In this work, we will define the Archimedes force acting on a specific body immersed in water. To do this, we will measure (using a dynamometer) its weight in air and in different liquids. The difference in body weight in air P_0 and in liquid P and will be equal to the Archimedes force: $\mathbf{F_A = P_0 - P}$
Submerging the body in water only half, we will confirm the dependence of the Archimedean force on the volume of the body according to the law: $\mathbf{F_A = p_w V_t g}$
Where p_w is the density of the liquid, V_m is the volume of the body, g is the acceleration of gravity.

Work order:

1. Assemble the installation shown on the board.

2. Start the simulation.

3. Measure the body weight in airwith a dynamometer P_1.Performanenter into the table.

4. Pour 200 ml into the measuring cylinder. water.

5. Lowering the dynamometer, immerse the body in the measuring cylinder with water. Record in the Table the level of the raised fluid V_2 and the body weight in the fluid P_2.

6. Collect the formula for calculating the volume of the body.

$V = V_2 - V_1$

7. Make a formula for calculating the buoyancy force depending on the initial and final weight:
$F_A = P_1 - P_2$

8. Make a formula for calculating the buoyancy force depending on the density of the liquid, and the volume of the body
$F_A = p_w V g$.

9. Repeat the experiment replacing the water in the cylinder with kerosene, vegetable oil, alcohol.

10. Enter the measurement results in the Table.

№ experience	liquid	ρ_g (kg / m3)	V_1 (mL)	V_2 (mL)	V (mL)	F_1 (H)	R_2 (H)	F_A (meas.) (N)	F_A (calc.) (H)
1.	Water	1000	200	...		...			
2.	Kerosene	900							
3.	Vegetable oil	930							
4.	Alcohol	800							

Conclusion:
A. Archimedean force depends on the volume of the body and the density of the fluid, the higher the density of the fluid, the greater the Archimedean force. The resulting force, which determines the behavior of a body in a fluid, depends on the mass, volume of the body and the density of the fluid.
V. Archimedean force depends on the volume of the body, but does not depend on the density of the liquid. The resulting force, which determines the behavior of a body in a liquid, depends only on the mass and volume of the body.
S. Archimedean force depends only on the density of the fluid and does not depend on the volume of the body. The lower the density of the liquid, the greater the Archimedean force.