

Mechanics of liquids and gases

Buoyancy

Falling, floating, rising

Object of the experiment

1. Demonstrating falling, floating, and rising of a Cartesian diver

Setup



- Fill the cylinder with water up to the brim, put the diver into the water, and close the cylinder firmly with the stopper.

Apparatus

1 Divers, glass, pair	683 62
1 Self-supporting cylinder, 400 ml, smooth ground.....	664 215
1 Rubber stopper, solid, 34-41 mm diam.....	667 270

Carrying out the experiment

- Press the stopper with your thumb until the diver falls.
- Reduce the pressure so that the diver floats at a certain height.
- Then reduce the pressure so that the diver returns to its initial position.
- Allow the students to observe the water level in the diver.

Evaluation

When pressure is applied, water enters the diver through a small hole near the tail, whereby the diver's gravitational force is changed.

Falling:

The gravitational force of the diver is greater than the buoyancy force: $G > F_b$.

Floating:

The gravitational force of the diver equals the buoyancy force: $G = F_b$.

Rising:

The gravitational force of the diver is smaller than the buoyancy force: $G < F_b$.

Remark:

The rotation performed by the diver while it is falling and rising is a result of a tangential force acting while water enters or escapes.