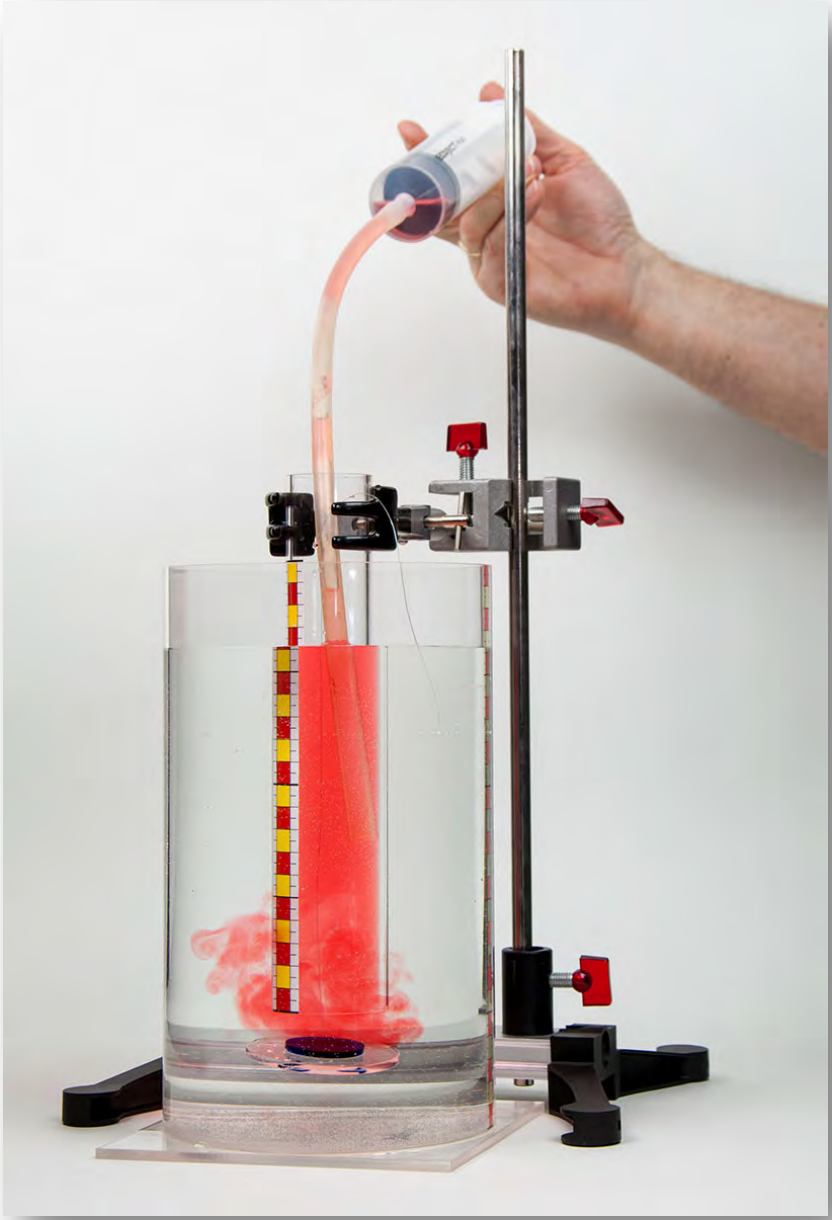
UPWARDS HYDROSTATIC PRESSURE

MED 15.05



Material

Item-no.	Qty.	Description
DM440-1A	1	Upwards hydrostatic pressure apparatus
DM425-2G	1	Tower tank with scale
P7050-1A	1	Powder dye, red
DS090-3K	1	Claw base "Sepp", 260 x 220
P7240-1G	1	Support rod, L=500 mm, D=10 mm
DS095-3K	1	Bosshead cross-pattern, demo 03
C7002-1A	1	Universal clamp 0 - 80 mm
C6100-2A	1	Syringe, 120ml, plastics
C7445-5S	1	Hose, silicone, D=7/9 mm, L=100cm
C1000-1E	1	Beaker glass, 400 ml, low form, Borosilicate

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Purpose
The pressure in a resting liquid results from the weight pressure of the liquid itself.

Preparation
- fill the tower tank with coloured water up to 20 cm
- fix the 500 mm support port to the claw base
- fix the boss head at a height of 30 cm
- the universal clamp is mounted in the boss head
- the upwards hydrostatic pressure apparatus is mounted in vertical position on the universal clamp (on its bottom end)
- position the tower tank in the centre of the claw base.

Experiment 1
Moisten the top of the base plate of the upwards hydrostatic pressure apparatus. This plate is pressed onto the lower edge of the upwards hydrostatic pressure apparatus (as far as possible in the centre) by pulling on the cord.

Loosen the screw of the universal clamp so that the upwards hydrostatic pressure apparatus can be immersed in the water.

The tube is immersed so far that we can fix it at the upper end with the universal clamp.

Conclusion
The base plate is pressed against the opening of the cylinder by the weight pressure of the liquid - no water should penetrate into the interior of the cylinder.
This pressure is called “upwards hydrostatic pressure”.

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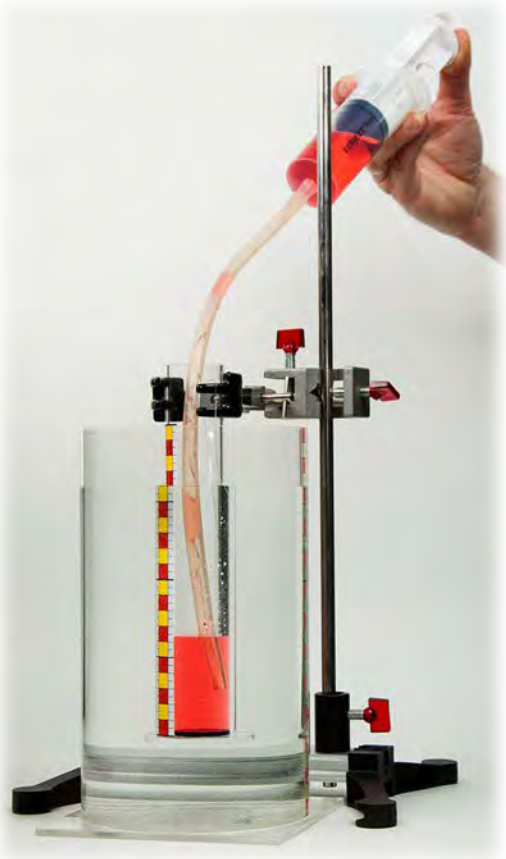
Experiment 2
Fill a beaker with about 200 ml of coloured water.

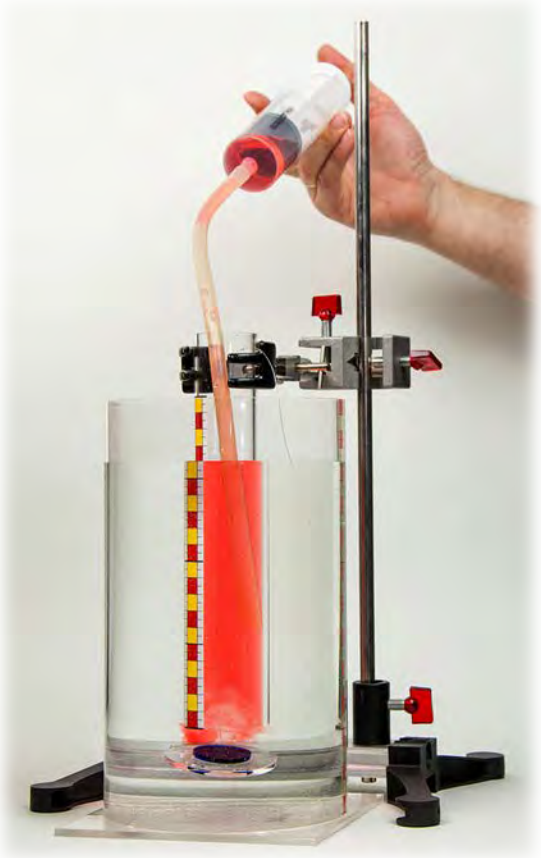
Connect a 40 cm piece of the silicone hose to the syringe; afterwards draw up coloured water with the syringe.

Insert the hose into the cylinder of the upwards hydrostatic pressure apparatus. The end of the hose should be touching the wall of the cylinder and nearly reaching the bottom plate.

Carefully fill the coloured water now in with the syringe. It will be required to draw up the syringe another time – this time the end of the hose should reach a bit below the water level of.

Fill enough water in the cylinder until the base plate falls off the cylinder.





Result
When the external liquid level is reached the plate falls off and the coloured water spreads out.

Upward hydrostatic pressure = weight pressure of the liquid

Note
If the upward hydrostatic pressure would not be equal to the weigh pressure of the liquid pillar above, it would have to sink, if it were larger, it would have to be lifted
(Explanation of Stevin for the upward hydrostatic pressure)

If a car sinks under water (assuming that there is air and not water inside the car) the pressure from outside - as shown in our experiment - is greater which is why it is (theoretically) recommended to wait until the car is filled before opening the doors.