

SUCTION AND PRESSURE PUMP

MED 16.17



Material:

Item-no.	Qty.	Description
DM580-2S	1	Suction pump, working model, acrylic
DM580-2D	1	Pressure pump, working model, acrylic
DM340-2W	1	Tank, round, with outlet-tube
P7050-1A	1	Powder dye, red
C5991-1S	1	Silicone oil for syringes, 3 ml, bottle with brush

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Purpose

Demonstration of the functioning and operation of a suction pump and a pressure pump as well as the function of the valves in these pumps.

Suction pump

Preparation

- check the tank to see if the spout is screwed on
- place the suction pump on the tank; the notch of the support plate must snap into the inner edge of the tank to ensure a stable hold
- in order to check whether the piston also runs smoothly, it is slowly moved up and down.
(If this is not the case, see the maintenance note below)
- about 500 ml of water are lightly coloured and poured into the tank
- make sure that the suction hose reaches the water

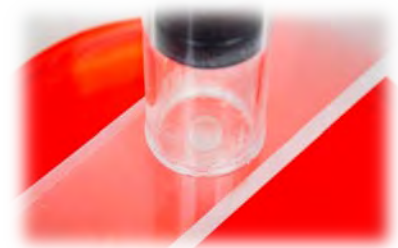


Experiment

Move the piston slowly up and down.

Observe the effect of the air pressure when sucking up the water.

The opening and closing of the valve (the ball) must also be shown.



Note

The output of a suction pump is limited by the size of the air pressure at the place of use. The suction height can therefore be maximum 10 m!



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- 1 Conveyor cylinder
- 2 Piston
- 3 Cap for conveyor cylinder
- 4 Handle for piston
- 5 Conveyor opening
- 6 Pump valve
- 7 Inlet valve
- 8 Suction hose
- 9 Outlet opening
- 10 Tank
(not included in the delivery)

Suction pump - theoretical basics

Pulling up the piston (2) creates an underpressure in the lower part of the conveyor cylinder (1). This opens the inlet valve (7), which allows the liquid to flow from the tank (10) through the suction hose (8) into the lower part of the conveyor cylinder.

As soon as the piston is no longer moved up, the inlet valve closes.

If pressure is now exerted on the piston, the inlet valve remains closed and the liquid presses on the pump valve (6) which opens it.

The liquid flows through conveyor openings (5) into the upper part of the conveyor cylinder.

When the piston has reached the lowest point of the conveyor cylinder, the pump valve closes due to the liquid pressure on it. If you now move the piston upwards water is sucked back into the lower part of the conveyor cylinder and at the same time the liquid in the upper part of the delivery cylinder is pressed out through the outlet opening (9).

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Emptying the tank

To remove the coloured water from the suction pump unscrew the cover caps and empty the device simply. To push the water out of the piston hold the model at an specific angle so that the valve ball runs out of the cone (see illustrations).

If necessary you have to shake the model a little.

If the valve ball is on the side, the liquid can simply be pushed out with the piston - also empty the coloured water from the tank. Pour clear water into the tank and do an entire pumping process with clear water, then empty the pump model and the tank again.



Note

Do not push in the piston completely, leave a distance of about 2 cm.
If the pump model is not used for a long time, the piston seal can “stick” to the conveyor cylinder. If this happens, you can lightly hit the handle of the piston with the ball of your hand before the seal loosens again.

Piston maintenance

If the pressure piston is very difficult to move or if the pressure piston is not tight enough, the existing seal can be adjusted.

To do this, the cap of the piston must be unscrewed and the piston and cap pulled out of the cylinder (caution: do not lose the valve ball!).

Clean the lower outer edge of the piston and lightly brush with silicone oil.

Then insert the piston and screw the cap back on.

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Pressure pump

Preparation

- check the tank to see if the spout is screwed on
- place the pressure pump on the tank; the notch of the support plate must snap into the inner edge of the tank to ensure a stable hold
- in order to check whether the piston also runs smoothly, it is slowly moved up and down.
(If this is not the case, see the maintenance note below)
- about 500 ml of water are lightly coloured and poured into the tank
- make sure that the suction hose reaches the water

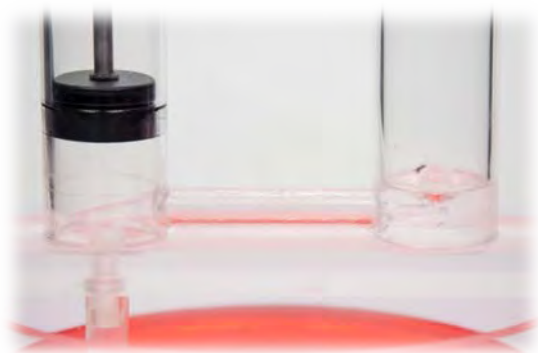


Experiment

Move the piston slowly up and down.

Observe the effect of the air pressure when sucking up the water.

The opening and closing of the valve (the ball) must also be shown.

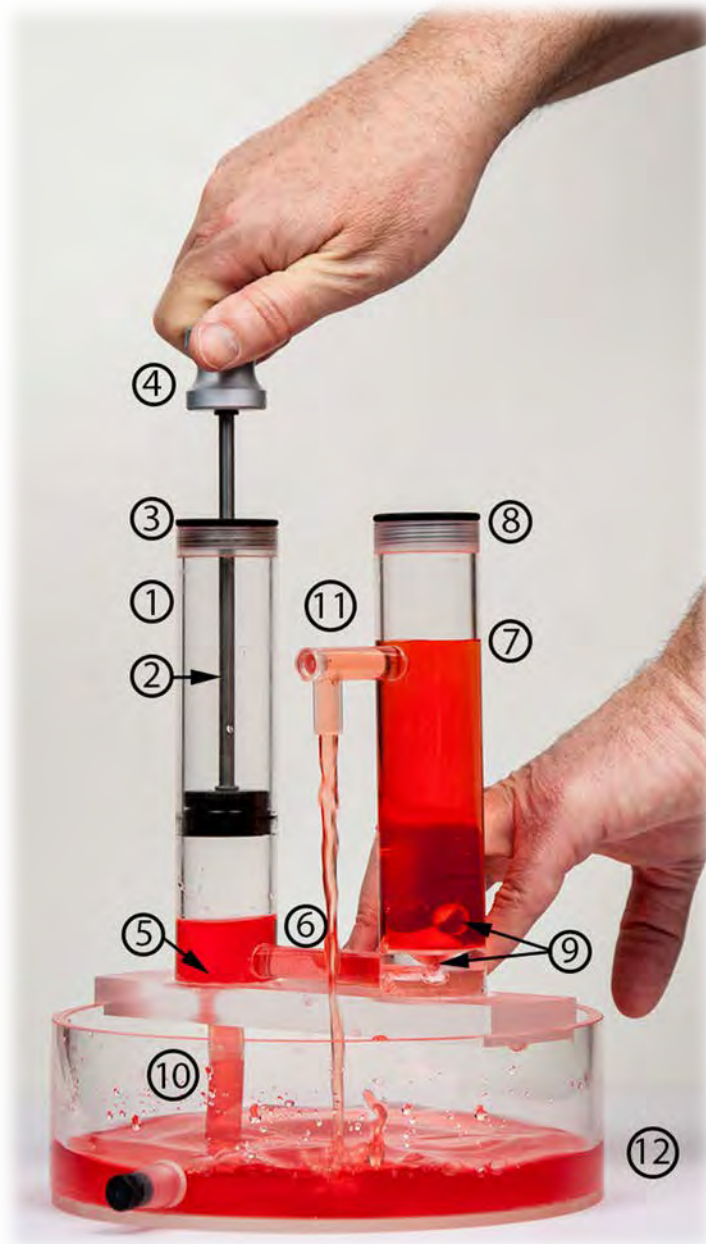


Note

In contrast to the suction pump, the maximum output that can be achieved with this pressure pump is only limited by the length of the conveyor cylinder and not by the air pressure

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- 1 Pressure cylinder
- 2 Piston
- 3 Cap for piston
- 4 Handle for piston
- 5 Piston valve
- 6 Junction
- 7 Conveyor cylinder
- 8 Cap for conveyor cylinder
- 9 Conveyor valve
- 10 Suction hose
- 11 Outlet opening
- 12 Tank
(not included in the delivery)

Pressure pump - theoretical basics

Pulling up the piston (2) creates an underpressure in the pressure cylinder (1).

This opens the piston valve (5) which allows the liquid from the tank (12) to flow into the piston via the suction hose (10).

As soon as the piston is no longer moved upwards the piston valve closes.

If pressure is now exerted on the piston, the piston valve remains closed and the liquid is pressed through the junction (6) to the conveyor valve (9).

The pressure on the conveyor valve opens it and the liquid flows into the conveyor cylinder (7).

The same pressure now also causes the liquid level in the conveyor cylinder to rise, thereby pushing liquid through the outlet opening (11).