# EFFECTS OF AIR PRESSURE – REDUCED INTERNAL PRESSURE

**MED 16.13b**

***Material:***

| Item-no. | Qty. | Description |
|---|---|---|
| DM503-1B | 1 | Vacuum pump, electric 15, one stage |
| C1520-1M | 1 | Vacuum hose, plastics, D=6 mm, L=100 cm |
| DM550-2M | 1 | Magdeburg hemispheres, pair |
| DM530-1B | 1 | Bubble burster with hose fitting |
| DM530-1P | 1 | Cellophane film, set of 10 |
| DM530-1R | 1 | Rubber bands, wide, set of 2 |
| DM590-1D | 1 | Metal can with stopper and tube |
| DM590-2D | 1 | Metal cans, set of 3 |

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**Purpose**
Demonstration of the considerable size of the air pressure and the resulting forces by reducing the pressure inside a container.

## Magdeburg Hemispheres

**Preparation**
- press the two hemispheres carefully together
  (by turning them a little bit you can make sure that they are ideally positioned)
- the tap of the full sphere has to remain open
- connect the sphere to the vacuum pump with the silicone hose;
  make sure that the hose is connected firmly

**Experiment**
Turn the pump on.

Already after a short period of time the air inside the sphere has been evacuated.

Close the tap and turn off the pump, afterwards remove the hose from the sphere.

**Attention**
When the pump is switched off, the tap on the lid of the vessel must be closed immediately, otherwise the pump's oil will be sucked into the vacuum vessel!

Now two people try to disconnect the hemispheres by pulling on them.

**Pay attention to the risk of injury!**

**Explanation**
The lack of air pressure inside demonstrates the size of the air pressure from the outside.

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## Bubble burster

**Preparation**

- The PE film is stretched over the bubble burster.
- The film is tightened with the two wide rubber bands. The two rubber bands should cover the entire inner surface of the groove and must not be twisted.
- If the surface of the film is not smooth, it should now be retightened. The hose safety clamp is pressed together at the handles, held over the rubber rings and released again. Both metal rings must be in the groove.

**Experiment**

Connect the bubble burster to the vacuum pump with the silicone hose.

Turn the vacuum pump on and observe the surface of the polyethylene film.

**Result**

By sucking out the air in the interior, the film is pressed inwards by the greater external air pressure. If the film no longer withstands the tension, it bursts.

**Note**

The sudden penetration of air after the polyethylene film bursts is an implosion. Depending on the type of film that is used it can be very loud.

**Attention!**

**Never hold your ear directly against the bubble burster!**

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## Metal can

**Preparation**
- place the plastic adapter in the silicone stopper
- press the silicone stopper firmly into the opening of the metal can

**Experiment**
Connect the metal can to the vacuum pump with the silicone hose.

Turn the vacuum pump on and observe what is happening to the metal can.

**Result**
By sucking out the air in the interior, the can is deformed by the greater external air pressure.

**Attention**
When the pump is switched off, the tap on the lid of the vessel must be closed immediately, otherwise the pump's oil will be sucked into the vacuum vessel!