

AERODYNAMIC PARADOX – CURVED SHEET

MED 19.09



Material:

Item Code	Qty	Description
DS101-1G	1	Support base, large, L=500 mm
DS093-04	2	Sliding saddle "Sepp", H=40 mm
P7240-1C	2	Support rod, round, L=250 mm, D=10 mm
P7240-1F	2	Support rod, round, L=150 mm, D=10 mm
DS400-3K	2	Bosshead cross-pattern, Demo, green
DM710-2L	2	Aluminium sheet, curved
DM701-2L	1	Blower 12 V
P3130-2Q	1	Fixed voltage transformer 12V DC/10 A
DM701-2K	1	Tube adapter for blower

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Purpose

The negative pressure in fast streaming gases can have a bigger effect as the force through inflow.

Preparation

- the two sliding saddles are fixed on the support base at a distance of 10 cm
- the support rods with 250 mm are inserted into the sliding saddles; afterwards the cross-patterned bossheads are attached and the support rods with 150 mm are inserted
- the curved aluminum sheets are pushed onto the support rods (make sure that they can freely oscillate)
- the rotary knob for the flow speed of the blower is turned to the very left
- the blower is powered by a fixed voltage transformer (12 V DC, min. 6 A)
- the tube adapter is put onto the blower



Experiment

We turn on the blower and slowly increase the flow speed to 5 m/s.

The blower is held centered above the two curved aluminum sheets so that the air stream is blowing through the center.

Result

Upon blowing between the two vertically suspended aluminum sheets, they will not move away from each other, but because of the resultant negative pressure between the plates, they will be pressed towards each other from the outside.



Note

This is a good pre-experiment for the lift on the aerofoil.

The corresponding (hydrodynamic) paradox also applies to bodies with liquids flowing around them.