

DYNAMIC PRESSURE OF AN AIR STREAM

MED 19.07



Material:

Item Code	Qty	Description
DM701-2L	1	Blower 12 V
P3130-2Q	1	Fixed voltage transformer 12V DC/10 A
DM360-5S	1	Ball, D=60 mm, Styrofoam

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Purpose

Demonstration of the pressure in gas streams.

Preparation

- 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)
- turn on the blower and adjust the flow speed to approximately 5 m/s (it is indicated on the scale at the rotary knob)
- please make sure that the inflow opening of the blower is free.

Experiment 1

We hold the blow vertically and place the Styrofoam ball in the air stream.

As soon as the ball is in the center of the air stream we let it loose.

While the blower is in vertical position we change the flow speed between 5 and 10 m/s.

What does the ball do?

Result

The higher the flow speed the further the ball is away from the blower.

The ball "oscillates" in the center of the air stream.

Experiment 2

At a flow speed of approximately 8 to 10 m/s we tilt the blower slowly to the side.

What does the ball do?

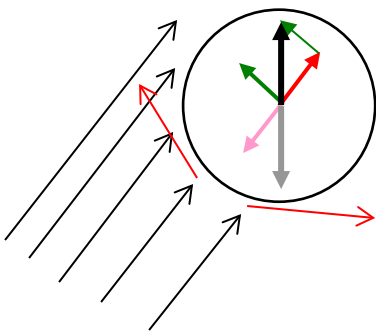
Tilt the blower further and further.

Until a certain inclination the ball is able to stay within the air stream, afterwards it drops out.

Result

The compressive force of the incoming air as well as the compressive force of the overpressure of the slower passing air maintains the equilibrium of the weight of the ball.

Note



Pink arrow: Force for diverting the particles

Red arrow: Counterforce

Green arrow: Force from the overpressure of the particles that do not move as quickly outside the air stream

Black arrow: Resultant of the weight

Grey arrow: Holds the equilibrium