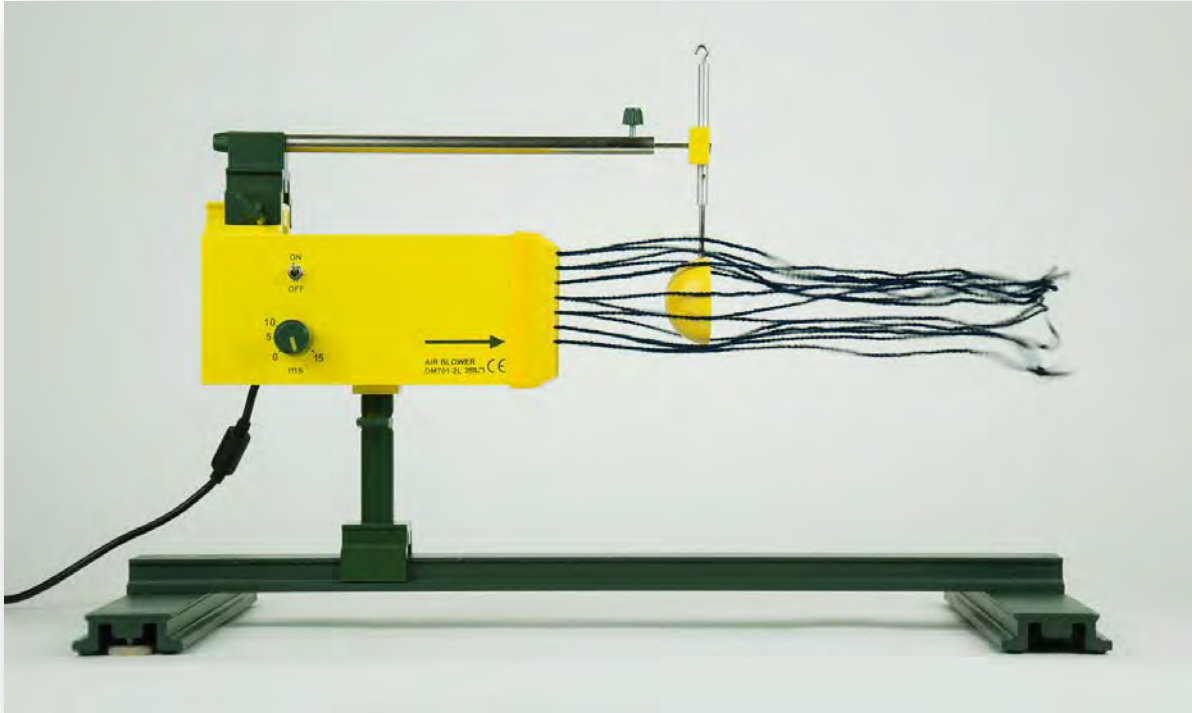


FLOW PATTERNS AND TURBULENCE AROUND VARIOUS OBJECTS

MED 19.12



Material:

Item Code	Qty	Description
DS101-1G	1	Support base, large, L=500 mm
DS103-7G	1	Sliding saddle, H=70 mm
DM701-2L	1	Blower 12 V
P3130-2Q	1	Fixed voltage transformer 12V DC/10 A
DM702-2L	1	Streamline adapter
DM712-1F	1	Support rod for aerodynamic objects
P7251-2T	1	Tube holder for 1 tube
DM712-1H	1	Stand for aerodynamic objects
DM710-2S	1	Aerodynamic objects, set

FLOW PATTERNS AND TURBULENCE AROUND VARIOUS OBJECTS

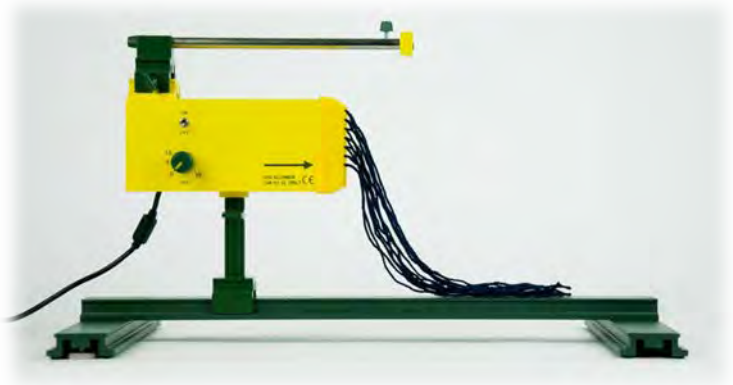
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Purpose

Flow configurations show the behavior of stationary flows. The streamlines show the paths of the air particles. In this model, the streamlines are shown by the woolen threads.

Preparation

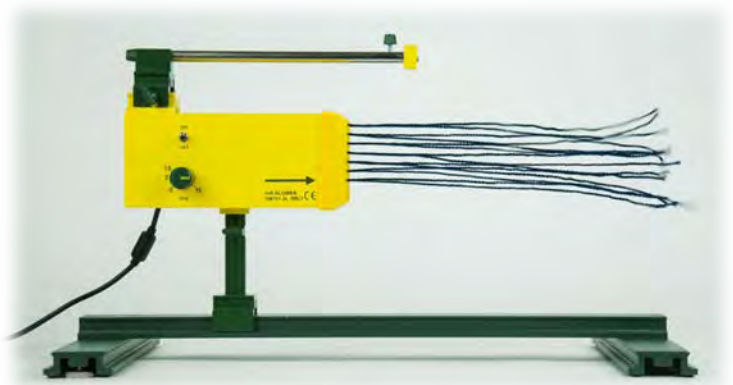
- the streamline adapter is fixed to the blower
- the support rod on sliding saddle fixed on top of the blower, on the front end the tube holder is mounted
- the rotary knob for the flow speed of the blower is turned to the very left
- the blower is powered by a fixed voltage transformer (12 V DC, min. 6 A)
- the sliding saddle is fixed on the support base
- the blower is inserted into the sliding saddle and screwed down tightly



Experiment

We turn on the blower and slowly increase the flow speed to 12 m/s.

We observe the shape of streamlines and the motion of the wool threads as they are showing us the streamlines.



FLOW PATTERNS AND TURBULENCE AROUND VARIOUS OBJECTS

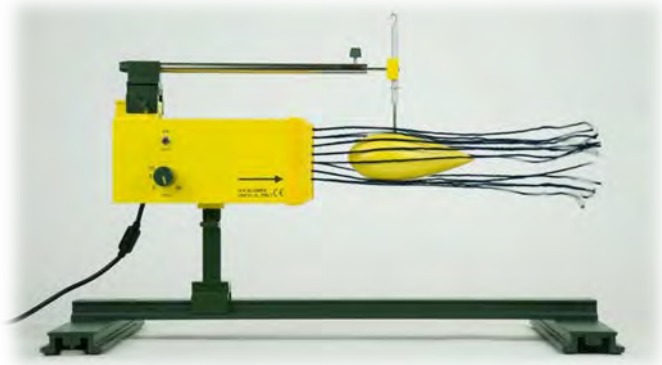
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Airflow body, ovoid shaped, smooth

We mount the streamline-shaped body at the tube holder and fix it so that the body is placed in the centre of the streamlines.

Again, we observe the shape of streamlines and the motion of the wool threads before and after the body.

Afterwards we try to describe the image of the streamlines.

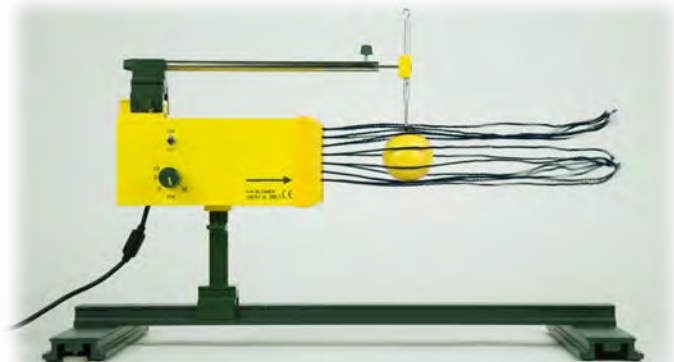


Airflow body, ball, $D = 48 \text{ mm}$

We mount the ball-shaped body at the tube holder and fix it so that the body is placed in the centre of the streamlines.

Again, we observe the shape of streamlines and the motion of the wool threads before and after the body.

Afterwards we try to describe the image of the streamlines.



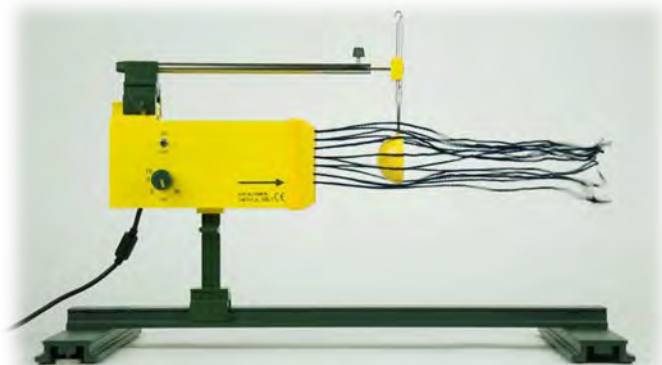
Airflow body, Hemisphere, $D = 48 \text{ mm}$

We mount the semicircle-shaped body at the tube holder and fix it so that the body is placed in the centre of the streamlines

Again, we observe the shape of streamlines and the motion of the wool threads before and after the body.

Afterwards we try to describe the image of the streamlines.

Afterward the hemisphere is turned by 180° and the streamlines are observed again.



FLOW PATTERNS AND TURBULENCE AROUND VARIOUS OBJECTS

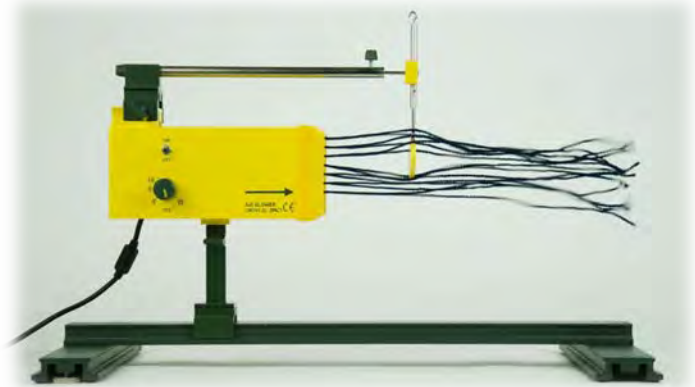
MED 19.12

Airflow body, disk, small

We mount the small disk-shaped body at the tube holder and fix it so that the body is placed in the centre of the streamlines

Again, we observe the shape of streamlines and the motion of the wool threads before and after the body.

Afterwards we try to describe the image of the streamlines.

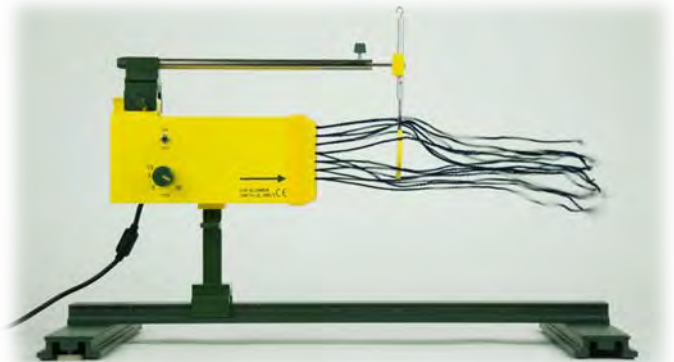


Airflow body, disk, big:

We mount the big disk-shaped body at the tube holder and fix it so that the body is placed in the centre of the streamlines

Again, we observe the shape of streamlines and the motion of the wool threads before and after the body.

Afterwards we try to describe the image of the streamlines.



Result

These images make whirls/turbulences visible on one hand and on the other hand they allow us to draw conclusion on the pressure conditions around the surrounded body.

If the streamlines run almost parallel, the flow resistance of the surrounded body is minimal.

The body with the streamline-shaped profile produces the slightest swirling of the wool threads (streamlines); it is the body with the lowest flow resistance.