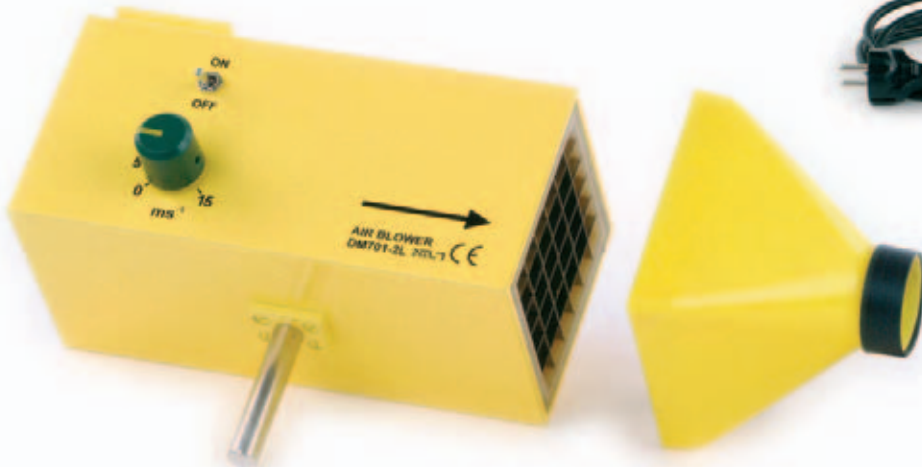




aerodynamics



Recommended power supply:

P3130-2P

Mains transformer 12 V DC

Voltage source: 100...230 V AC

Power output: max. 5.8 mA

Plastic case with power cord, output lead

equipped with 2.5/5 mm DC jack

Dimensions: 170x90x55 mm

DM701-2L Blower 12 V

Fan blower with electronic speed regulator for performing experiments in aerodynamics; continuously variable flow velocity 0... max. 15 m/s, on/off switch, 12 V DC power supply connected by means of two 4 mm safety jacks or 2.5 mm hollow jack for mains transformer 12 V/5.8 A P3130-2P; powder-coated aluminium housing with grating to allow airflow at both ends, with special NTL profile for attachment to rail with slots, support rod D=10mm, L=80 mm
Dimensions: 170x80x80 mm (excluding support rod)

DM701-2K Tube adapter for blower

Plastic adapter for blower DM701-2L, for performing experiments in aerodynamics requiring a concentrated air stream, may also be used as an adapter for other apparatus (e.g. Venturi tube, funnel); air outlet: D=28 mm
Dimensions: 80x80x77 mm



DT816-2A

Anemometer „inno“

Digital anemometer for magnetic mounting, with external measuring vane; the 26 mm LED display allows readings to be taken even from a distance

On/off switch, measuring range : 20 m/s, display in 0.1 m/s intervals

Measuring accuracy: approx. 2 %

Power supply: 4 x 1.5 V mignon cells (included) or external power supply 6 V/500 mA, P3120-6N

Case: plastic, ABS

Dimensions: approx. 160x120x45 mm

Weight: approx. 500 g (with sensor)



DT816-3A Anemometer „handy“

Handheld digital device for measuring flow velocity

Measuring range: 0.8 ... 30 m/s,

Resolution 0.1 m/s

Units may be set to m/s, km/h, ft/min, knots

Accuracy of +/- 3 % for the entire measurement range;

Complete with very low-friction flow sensor with a high degree of measurement precision at low as well as high flow velocities

Power supply: 9V battery

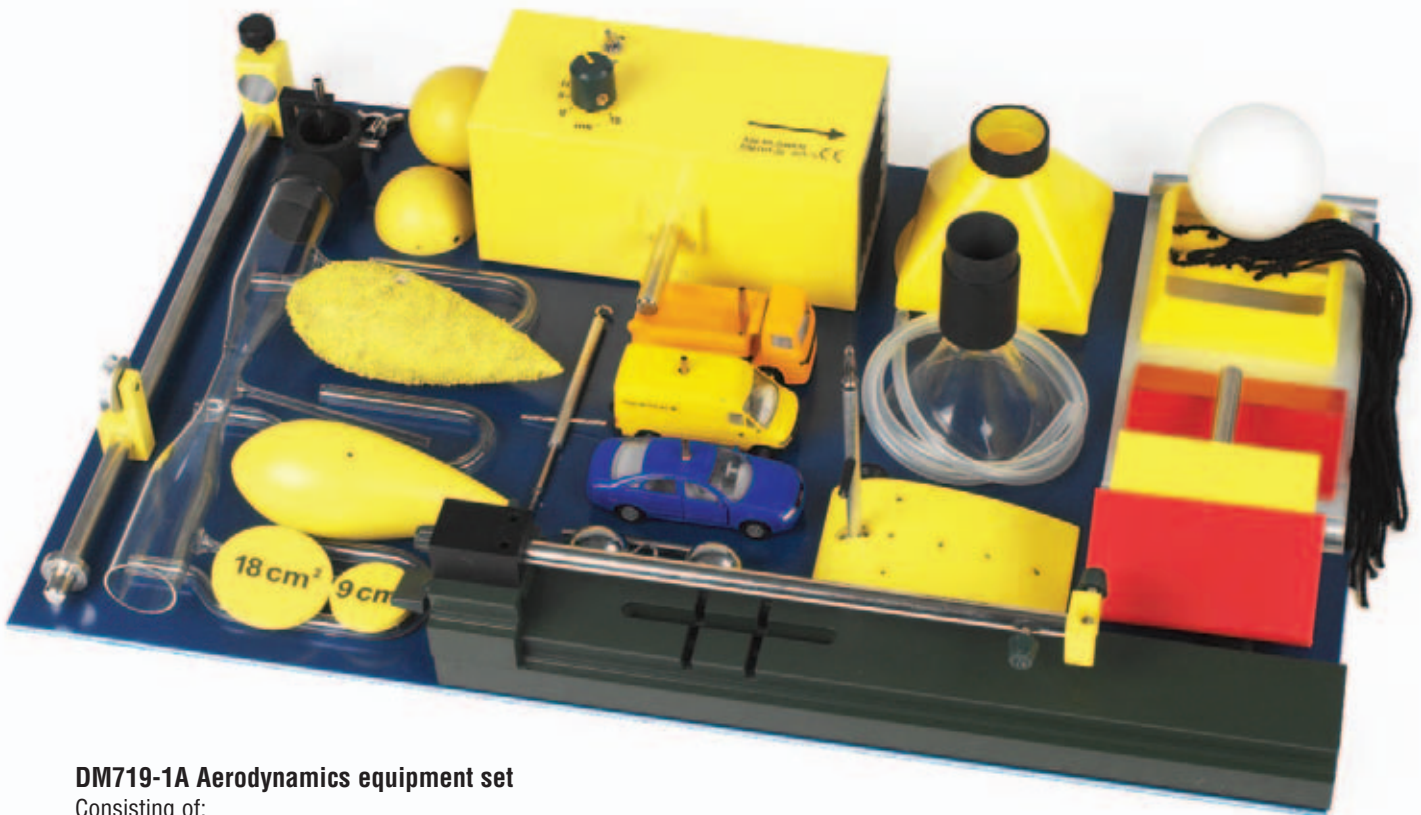
Dimensions: 180x73x23 mm; sensor: D=72 mm

Weight: 381 g (with sensor)

Experiment:

Measuring flow velocity





DM719-1A Aerodynamics equipment set

Consisting of:

- DM701-2L 1x Blower 12 V
- DM701-2K 1x Tube adapter for blower
- DM730-4S 1x Disk with tube adapter
- DM730-5S 1x Disk with rim
- DM730-3T 1x Funnel with sleeve
- DM360-5S 1x Ball, Styrofoam, D=60 mm
- DM710-2L 2x Aluminium sheet, curved
- DM385-2S 2x Pendulum bob, steel, D=1 inch
- DM730-1A 1x Venturi tube
- DM710-2S 1x Aerodynamic objects, set
- DM712-1H 1x Stand for aerodynamic objects
- DM710-2T 1x Aerofoil, model
- DM710-2R 1x Pipe probe with hose
- DM702-2L 1x Streamline adapter
- DM715-2S 1x Adapter rail
- DM712-1F 1x Support rod with sliding saddle
- P7251-2T 1x Tube holder
- DM710-1K 1x Dynamometer mount with pulley
- DM714-1D 1x House, model
- DM714-2D 1x Roof accessory for model house
- DM714-1L 1x Truck, model
- DM714-1P 1x Delivery van, model
- DM714-1S 1x Car, model
- DM713-1S 1x Pitot tube, apparatus set
- P7811-2A 1x Box insert for aerodynamics
- P7806-1B 1x Storage box, large

Suggested accessory:

- P1225-1S 1x Degree scale, 90°, "compact"



Experiment: Measuring the aerodynamic resistance of the model delivery van



aerodynamics



Apparatus for demonstrating aerodynamic paradoxes

DM730-4S Disk with tube adapter

Flat acrylic disk with flow tube, may be connected to tube adapter for blower DM701-2K; additionally required: disk with rim DM730-5S
Disk D=88 mm, tube D=29 mm

DM730-5S Disk with rim

Flat plastic disk (D=92 mm) with rim along edge; additionally required:
Disk with tube adapter DM730-4S

DM730-3T Funnel with sleeve

Glass funnel (D=80 mm) with plastic adapter, may be connected to tube adapter for blower DM701-2K; additionally required: Styrofoam ball DM360-5S

DM360-5S Ball, Styrofoam, D=60 mm



DE722-2D Manometer differential, „inno“

Digital device for magnetic mounting, used to measure pressure differences in gases (under- and overpressure)
The 26 mm LED display allows readings to be taken even from a distance; rotating knob for setting to zero; two different measuring ranges:
100 hPa - resolution 0.1 hPa
For low pressure, e.g. immersion probes, capsules, Pitot tube, Venturi tube 1000 hPa - resolution 1 hPa
For higher pressures, e.g. experiments in compression

and expansion

Max. pressure: 2 bar; measurement error: max. 1.5%; sensor inputs are not suitable for use with aggressive media

Power supply: 4 x 1.5 V mignon cells (included) or external power supply 6 V/500 mA, P3120-6N

Case: plastic, ABS

Dimensions: approx. 160x120x45 mm

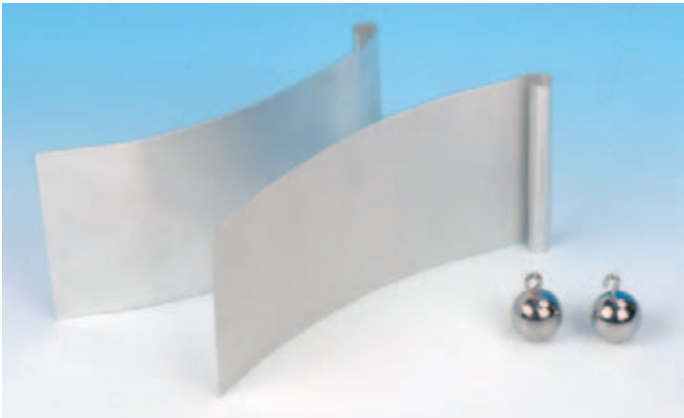
Weight: approx. 405 g

Recommended accessory:

C7445-3S Hose, silicone, D=3/6 mm, L=100 cm

Experiments: Aerodynamic paradoxes



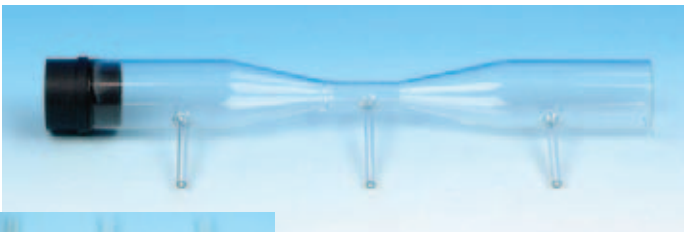


DM710-2L Aluminium sheet, curved

For demonstrating lift in an air stream
Aluminium sheet, 100x200 mm, with one rolled end for mounting on rods max. 10 mm in diameter.

DM385-2S Pendulum bob, steel, D=1 "

Steel pendulum bob, D=1" (25.4 mm), with hook



DM730-1A Venturi tube

For investigating changes in pressure of air flowing through a tube containing a constriction; glass tube with constriction and 3 connectors, plastic sleeve at one end, manometer tubes (L=130 mm) with silicone hose connector
Dimensions: L=250 mm, D=28 mm / 10 mm at contraction



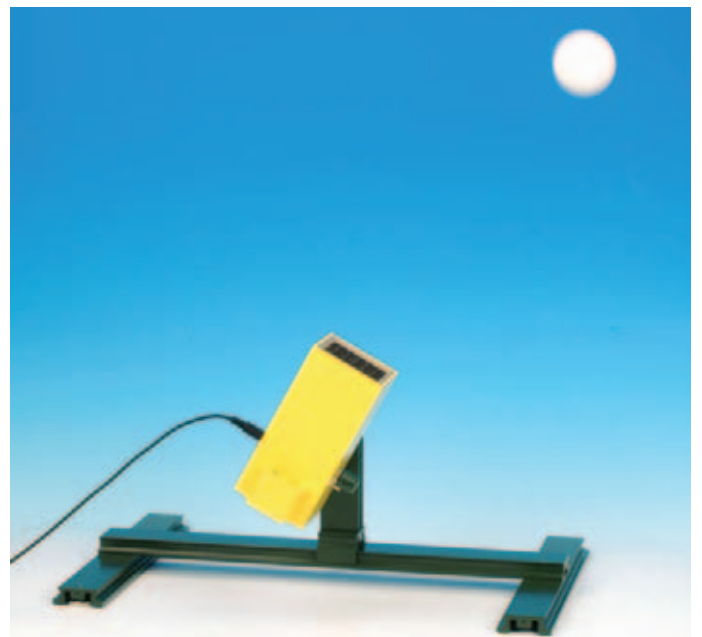
Experiment: Lift in an air stream



Experiment:
Aerodynamic paradox with two curved aluminium sheets



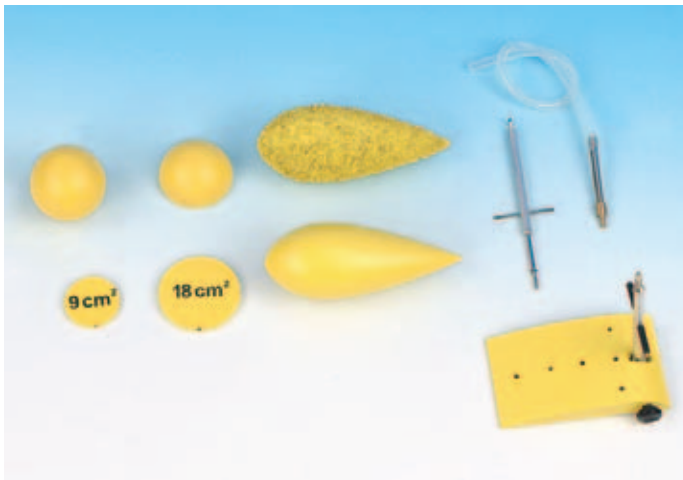
Experiment: Pressure within an air stream - Venturi tube



Experiment: Dynamic pressure in an air stream



aerodynamics



DM710-2S Aerodynamic objects, set

Six objects useful for investigating the relationship between aerodynamic resistance and the shape and type of surface of an object; models with 2 mm hole for mounting in stand DM712-1H

- 1 x Sphere, D=48 mm
- 1 x Hemisphere, D=48 mm
- 1 x Round disk, 9 cm², D=34 mm
- 1 x Round disk, 18 cm², D=48 mm
- 1x Streamlined object, smooth, D=48 mm, L=125 mm
- 1x Streamlined object, rough, D=48 mm, L=125 mm

DM712-1H Stand for aerodynamic objects

Metal rod (6x125 mm) with 2 mm plug pin for holding aerodynamic objects DM710-2S, with rod for mounting in slit in rail DM715-2S

DM710-2T Aerofoil, model

For investigating aerodynamic resistance and lift at various angles of attack; wooden aerofoil on adjustable support rod, with holes for measuring under- and overpressure using pipe probe DM710-2R
Dimensions: 105x60x16 mm

DM710-2R Pipe probe with hose

For measuring over- and underpressure along the aerofoil model DM710-2T; metal probe 5x60 mm, D=1.5 mm, with length of transparent hose, for the connection with the manometer differential "inno" DE722-2D



DM715-2S

Adapter rail with slits

Special aluminium profile, powder-coated, for screwing onto blower DM701-2L and for holding aerodynamic objects and the aerofoil model; L=350 mm

DM712-1F Support rod for aerodynamic objects

Support rod with hole on the face for attaching tube holder P7251-2T, with sliding saddle for fastening to blower DM701-2L

P7251-2T Tube holder

U-shaped aluminium bracket on support rod (D=3 mm) for attaching rod with max. diameter of 8 mm



DM710-1K Dynamometer mount with pulley

Used together with precision dynamometer DM130-1A or DM130-1B (not included) for measuring aerodynamic resistance of objects DM710-2S and model automobiles DM714-ff
Support stand rod that mounts in adapter rail DM715-2S; includes a clamp for mounting a dynamometer up to 19 mm in diameter; very low-friction pulley

DM702-2L Streamline adapter

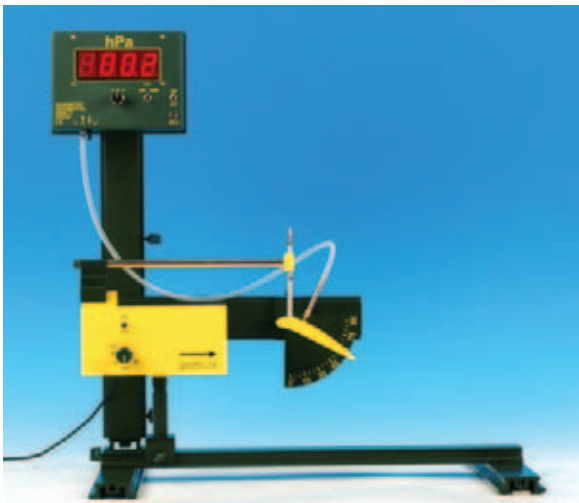
For visualizing flow patterns and turbulence around an object in an airflow; plastic adapter for blower DM701-2L including two sets of streamers
Dimensions: 84x84x25 mm; streamer L=240 mm

Detail:

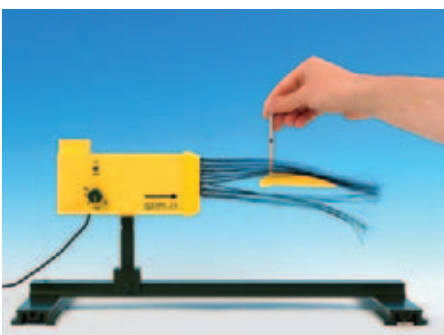
Blower DM701-2L with mounted streamers DM702-2L



Experiment: Lift under an aerofoil



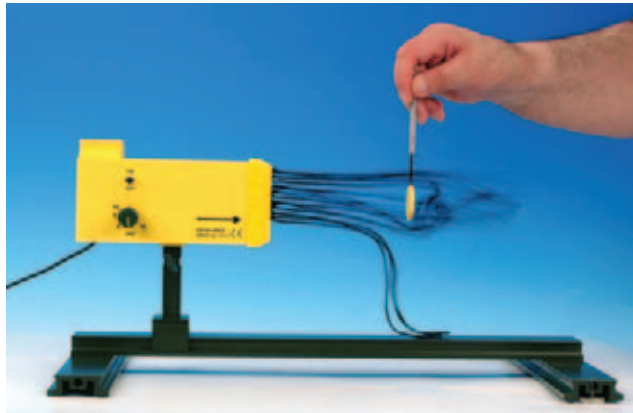
Experiment: Distribution of pressure over an aerofoil



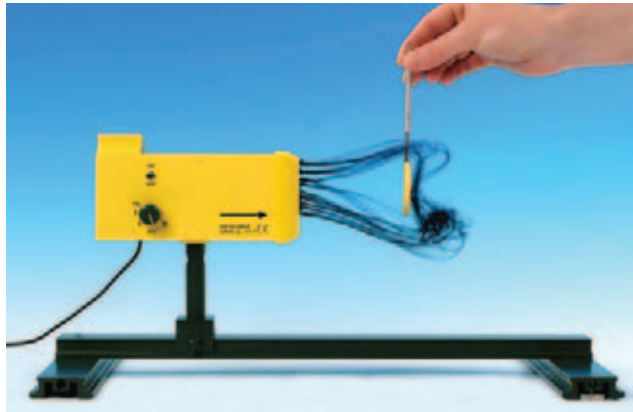
Experiment: Flow patterns at different aerofoil positions



aerodynamics



Aerodynamic body;
circle disk 9 cm²

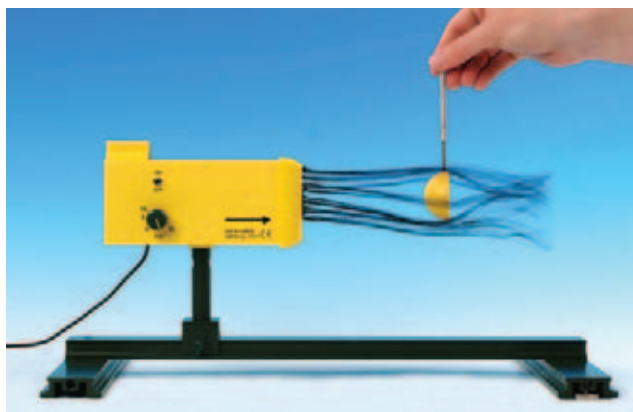


Aerodynamic body;
circle disk 18 cm²

Aerodynamic experiments on various objects:

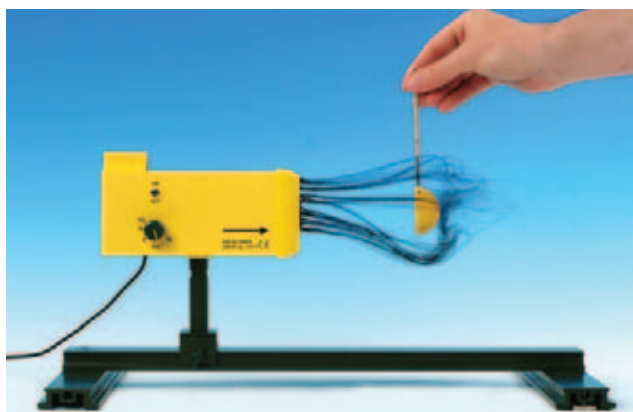
left: Recording aerodynamic resistance quantitatively

right: Flow patterns and turbulence



for technical details on Milli-newtonmeter "inno" DM723-1N s. page 72

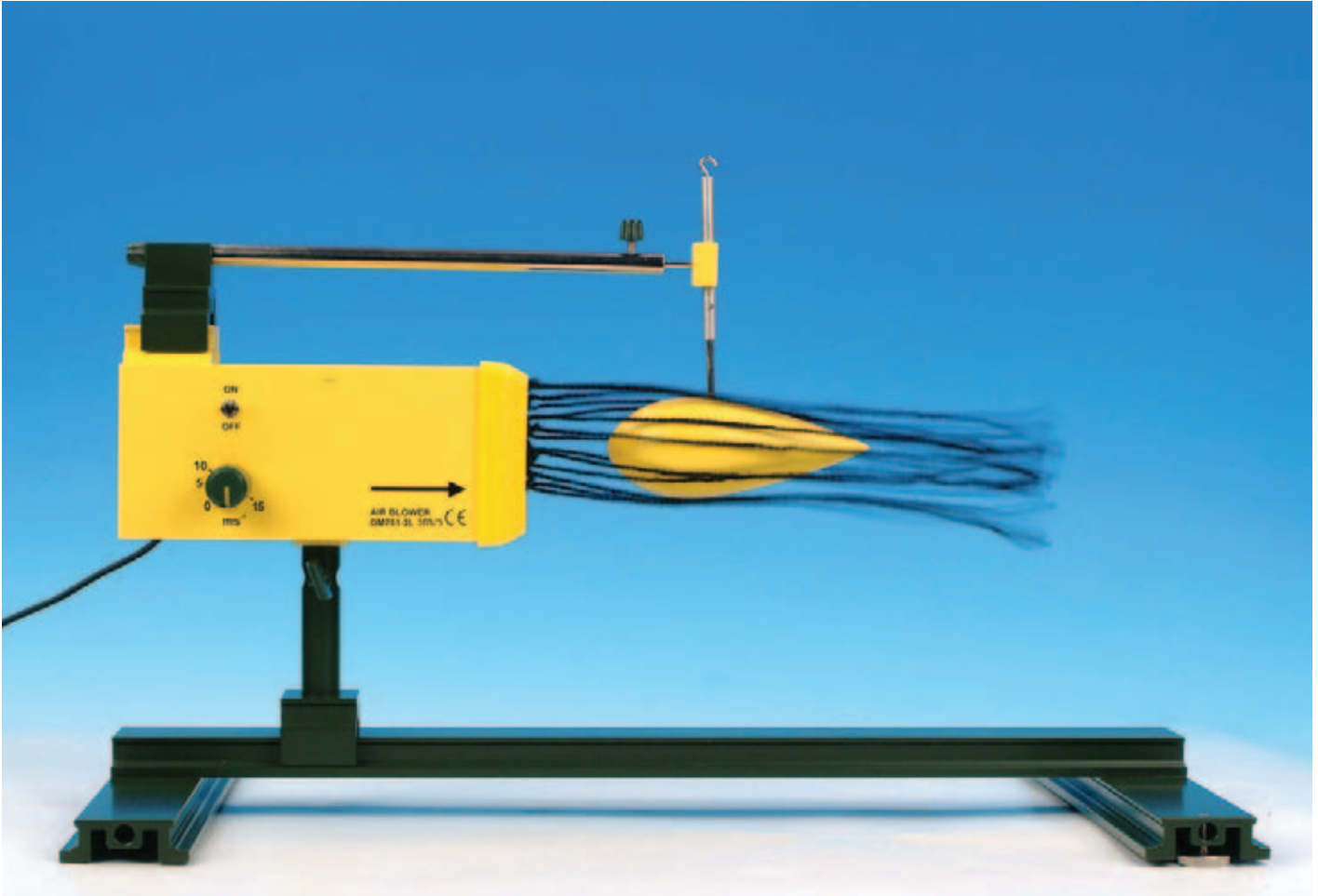
Aerodynamic body;
Hemisphere, vaulted surface



Aerodynamic body;
Hemisphere, plane surface



Experiment: Airflow around an aerodynamic object



Experiment: Measuring the aerodynamic resistance of objects with the same diameter yet with different shapes and surfaces



Aerodynamic body;
Ball with smooth surface



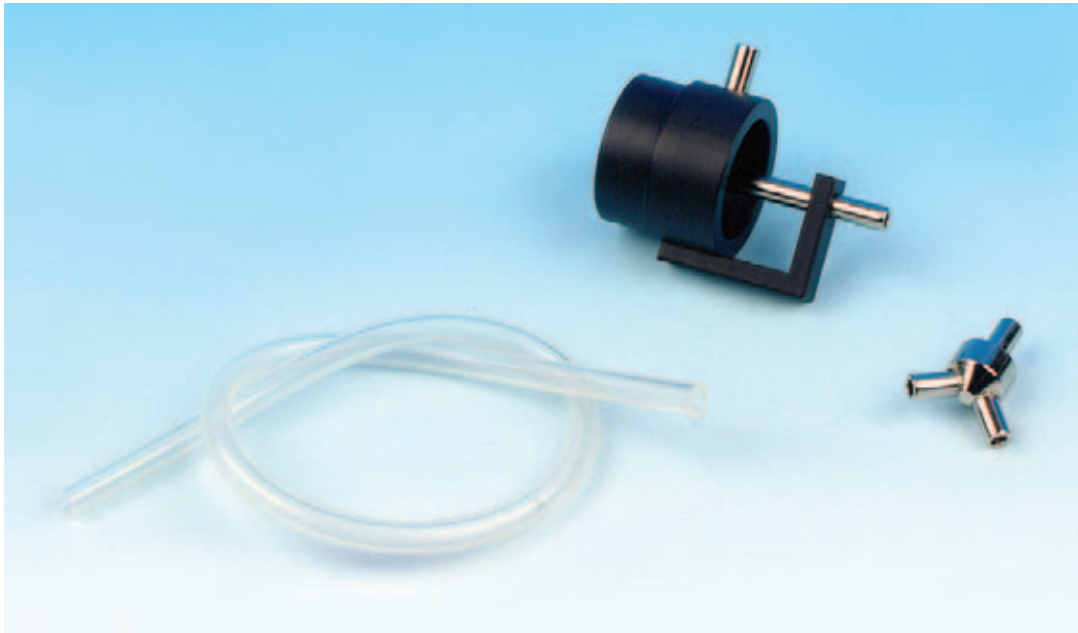
Aerodynamic body;
Aerodynamic profile of a smooth surface



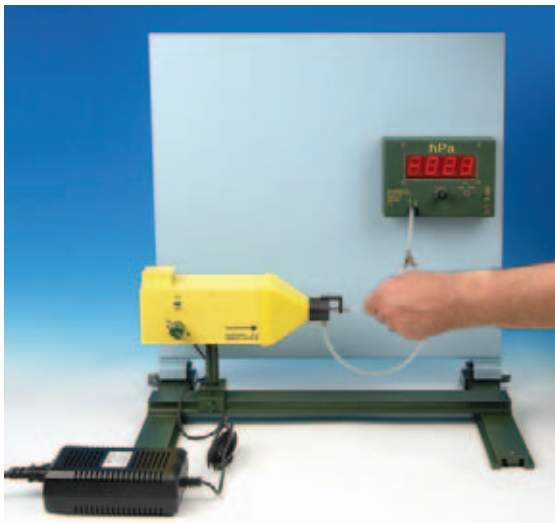
Aerodynamic body;
Aerodynamic profile of a rough surface



aerodynamics



DM713-1S
Pitot tube, apparatus set
For measuring dynamic, static and total pressure in gas flows; plastic cylinder, may be mounted on tube adapter for blower DM701-2K, with two metal tubes for measuring pressure and y-connector for combining the two pressure values for measuring total pressure; silicone hose 3/6 mm, L=100 cm



Experiment: Measuring static, dynamic and total pressure using the Pitot tube by pinching off the pressure hose with the fingers



DM714-1D House, model

Model of a house for experiments in aerodynamics; plastic model on support rod (10x70 mm); removable, slightly sloped roof

Dimensions: 80x60x45 mm; roof slope: 25 °

DM714-2D Roof accessory for model house

Accessory for model house for experiments in aerodynamics; plastic model to be placed onto the model house with a removable pointed roof

Dimensions: 80x60x65 mm; roof slope: 55 °

Vehicles of various designs for measuring aerodynamic resistance; each fitted with a 2 mm metal pin so that they may be fastened to the stand for aerodynamic objects DM712-1H

DM714-1L Truck, model

Cross-section: approx. 30x36 mm

DM714-1P Delivery van, model

Cross-section: approx. 30x36 mm

DM714-1S Sports car, model

Cross-section: approx. 35x26 mm



Experiment: Flow pattern over a roof



Experiment: Slightly sloped house roof being blown off by a strong airflow (storm)



Experiment: Measuring the aerodynamic resistance of various vehicles