

1.4.08-00 Lift and drag (resistance to flow)



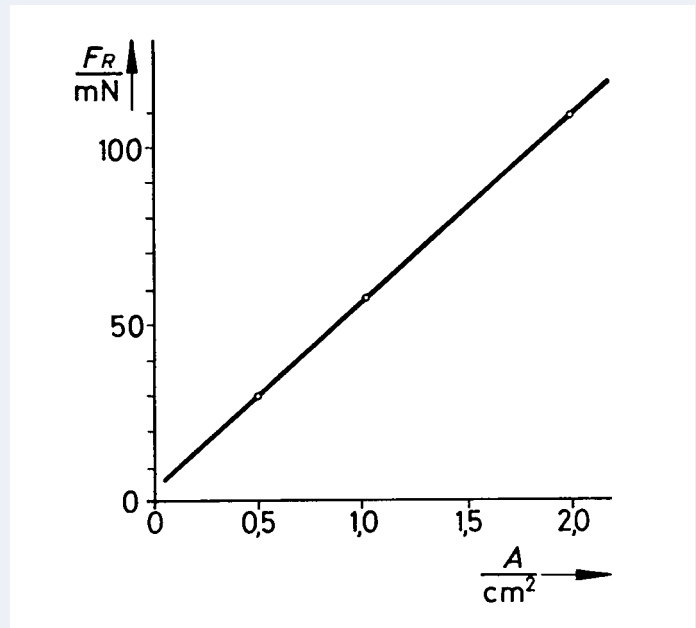
- What you can learn about ...**
- Resistance to pressure
 - Frictional resistance
 - Drag coefficient
 - Turbulent flow
 - Laminar flow
 - Reynolds number
 - Dynamic pressure
 - Bernoulli equation
 - Aerofoil
 - Induced resistance
 - Circulation
 - Angle of incidence
 - Polar diagram

- A) Objects of different cross-section and shape are placed in a laminar air stream. The drag is examined as a function of the flow velocity and the geometry of the objects.
- B) A rectangular plate or an aerofoil in a stream of air experiences a buoyant force (lift) and a resistance force (drag). These forces are determined in relation to area, rate of flow and angle of incidence.

What you need:

Aerodynamic models, set of 14	02787.00	1
Aerofoil model	02788.00	1
Pitot tube, prandtl type	03094.00	1
Precision manometer	03091.00	1
Holder with bearing points	02411.00	1
Double shaft holder	02780.00	1
Precision pulley	11201.02	1
Spring balance 0.1 N	03061.01	1
Vernier caliper	03010.00	1
Blower, mains voltage 220 V	02742.93	1
Rheostat, 500 Ω, 220 V	06111.93	1
Support base -PASS-	02005.55	1
Support rod -PASS-, square, l = 1000 mm	02028.55	1
Barrel base -PASS-	02006.55	1
Universal clamp	37715.01	1
Right angle clamp -PASS-	02040.55	4
Rod with hook	02051.00	2
Stand tube	02060.00	2
Rod, pointed	02302.00	1
Silk thread, l = 200 m	02412.00	1
Rule, plastic, l = 200 mm	09937.01	1
Rubber tubing, i.d. 7 mm	39282.00	1
Aerofoil model	02788.00	1

**Complete Equipment Set, Manual on CD-ROM included
Lift and drag (resistance to flow) P2140800**



Drag of an object as a function of its cross-sectional area A (q = 0.85 hPa).

Tasks:

- A) Determination of the drag as a function of:
1. the cross-section of different bodies,
 2. the flow velocity,
 3. determination of the drag coefficients cw for objects of various shape.
- B) Determination of the lift and the drag of flat plates as a function of:
1. the plate area
 2. the dynamic pressure
 3. the angle of incidence (polar diagram)
 4. Determination of the pressure distribution over the aerofoil for various angles of incidence.