

# TM 605

## Coriolis force



### Description

- visualisation of the Coriolis force effect
- rotating reference system
- water jet as moving mass

When a mass moves relative to the reference system within a rotating reference system, this movement is deflected. This deflection is caused by the Coriolis force, an apparent or inertial force. The Coriolis force plays a crucial role in meteorology and physical oceanography, since it influences the course of air and water currents due to the Earth's rotation.

In engineering, the Coriolis force occurs when a rotational motion interferes with a further movement of the same object. This can occur for example in cranes, gearboxes or robots.

The TM 605 experimental unit is designed to clearly demonstrate the effect of the Coriolis force in a rotating reference system. A transparent water tank with submersible pump is placed on a rotatable arm and then rotated. Within the rotating reference system, the pump produces a water jet in a radial direction. Depending on the flow rate of the pump or the water velocity, as well as speed and direction of rotation, the water jet is visibly deflected due to the Coriolis force. The degree of deflection can be determined by means of a scale on the water tank. The speed is continuously adjustable, electronically controlled and digitally displayed.

### Learning objectives/experiments

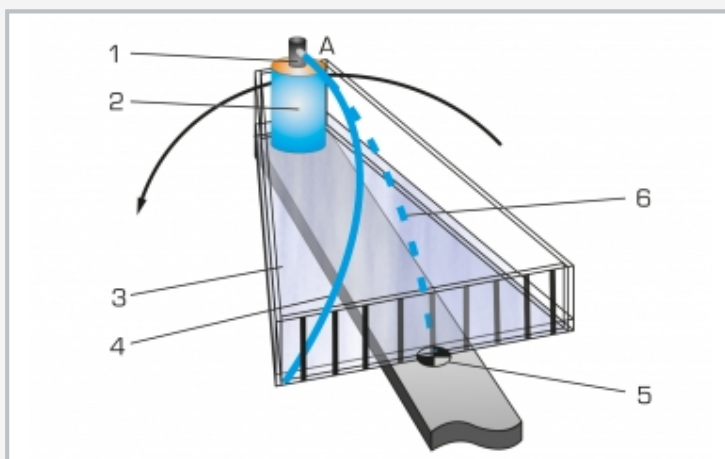
- inertial or apparent force
- interference of a rotational movement on a translational movement
- visualisation of the Coriolis force effect

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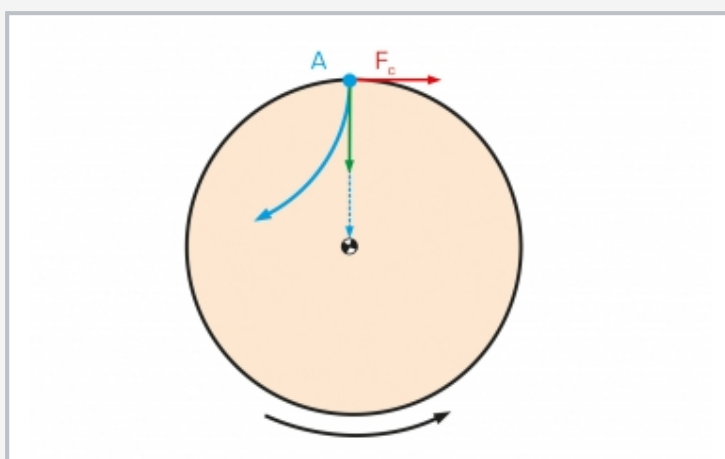
## Coriolis force



1 pump, 2 water tank, 3 speed display, 4 switch for direction of rotation, 5 speed adjustment, 6 rotating arm, 7 water jet



1 nozzle for water jet, 2 pump, 3 tank, 4 deflected water jet, 5 pivot point of the arm, 6 water jet with a stationary arm, 7 direction of rotation; A starting point of the moving mass



Effect of the Coriolis force: A starting point of the moving mass,  $F_c$  Coriolis force; orange: rotating reference frame, red: direction of the Coriolis force, green: current motion of the mass, dashed blue: direction of movement without rotation, blue: actual direction of movement with rotation

### Specification

- [1] visualisation of the Coriolis force effect
- [2] rotating reference frame consisting of transparent water tank with submersible pump on a rotating arm
- [3] deflection of a water jet in radial direction dependent on the speed and direction of rotation
- [4] scale to read the deflection of the water jet
- [5] closed water circuit
- [6] speed sensor with digital display

### Technical data

#### Rotating arm

- continuously adjustable speed:  $0 \dots 60 \text{ min}^{-1}$
- adjustable direction of rotation

#### Submersible pump

- flow rate:  $10 \text{ L/min}$

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase

UL/CSA optional

LxWxH:  $420 \times 400 \times 320 \text{ mm}$

Weight: approx. 25kg

### Scope of delivery

- 1 experimental unit
- 1 set of tools
- 1 set of instructional material

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## Coriolis force

Optional accessories

020.30009

WP 300.09

Laboratory trolley