

# CE 280

## Magnetic separation



### Description

- sorting with a drum-type magnetic separator
- feed through vibrating trough with adjustable throw
- practical experiments on a laboratory scale

During sorting, a solid compound is separated according to its material characteristics.

Magnetic separation is a method of sorting which utilises the magnetisability of components of a solid compound. Magnetic separators are often used in coal and ore preparation.

In the CE 280, the solid compound to be separated is charged into the feed hopper. A vibrating trough conveys the compound onto a rotating, non-magnetic drum. Its speed can be adjusted by way of a potentiometer. In one area of the drum there is a fixed permanent magnet.

Non-magnetisable components drop into a collector tank due to gravity. Magnetisable components adhere to the drum in the area of the magnet, are carried along and drop into a different tank as soon as they are beyond the magnetic zone. The mass flow of the feed material can be adjusted by way of the distance of the hopper outlet from the vibrating trough and by the throw and frequency of the trough. A mixture of sand and small steel items, such as hexagon nuts, is recommended for use as the feed material.

### Learning objectives/experiments

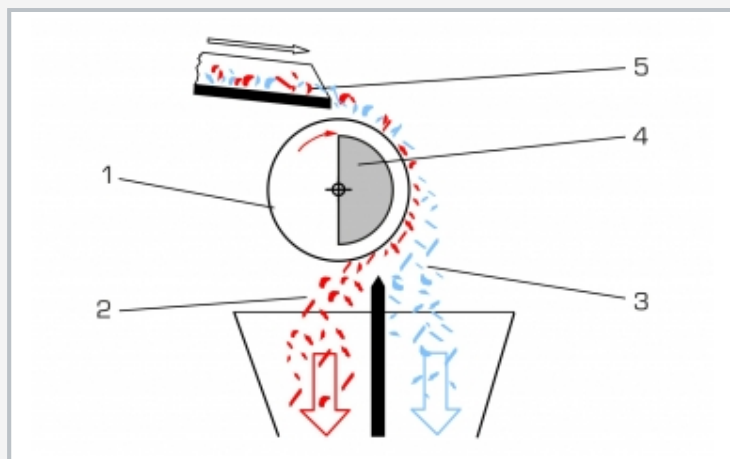
- learning the fundamental principle and the method of operation of a drum-type magnetic separator
- efficiency of separation process dependent on
  - ▶ mass flow of feed material
  - ▶ mixing ratio of feed material
  - ▶ type of feed material
  - ▶ drum rotation speed

# CE 280

## Magnetic separation



1 feed hopper with height adjuster, 2 vibrating trough controls, 3 magnetic separator controls, 4 solid compound tank, 5 magnetic materials tank, 6 non-magnetic materials tank, 7 magnetic separator, 8 vibrating trough



Fundamental principle of drum-type magnetic separators: 1 rotating drum (non-magnetic), 2 magnetisable components, 3 non-magnetisable components, 4 permanent magnet, 5 feed material

### Specification

- [1] drum-type magnetic separator for separation of magnetisable components from a solid compound
- [2] separation by a fixed permanent magnet in an area of a rotating, non-magnetic drum
- [3] feed hopper with vibrating trough for feed of solid compound to drum
- [4] dosage of feed material by way of distance of hopper outlet from vibrating trough, throw and frequency of vibrating trough
- [5] drum rotation speed adjustable by electric motor with potentiometer
- [6] 2 steel tanks for separated fractions and 1 tank for solid compound

### Technical data

Feed hopper capacity: 25L

Vibrating trough

- throw: 0,2...1,5mm
- vibration frequency: 50Hz or 100Hz

Drum

- diameter: 220mm
- length: 300mm
- magnetic field range: 180°
- speed: 0...30min<sup>-1</sup>

Motor

- power consumption: 250W

Max. particle size

- non-magnetic: 20mm
- magnetic: 20mm

Tanks

- 2x 15L
- 1x 20L

230V, 50Hz, 1 phase

LxWxH: 1500x700x1700mm

Weight: approx. 175kg

### Scope of delivery

- 1 trainer
- 1 shovel
- 1 set of instructional material