

CE 283

Drum cell filter



Learning objectives/experiments

- learning the basic principle and method of operation of a drum cell filter
- fundamentals of cake filtration
- variation in time of filtrate quantity, filter cake mass and thickness
- filter cake mass and thickness dependent on filtrate quantity, negative pressure and drum speed

Description

- separation of solids from suspensions with a drum cell filter
- continuous removal of filter cake
- practical experiments on a laboratory scale

Drum cell filters can be used to separate solids continuously from suspensions.

The suspension unit CE 285 produces a suspension of diatomite and water. A pump conveys the suspension into the suspension tank of the drum cell filter. A stirrer keeps the solid particles in the suspension suspended. Part of the rotating drum dips into the suspension. The jacket of the drum is perforated and covered over with a filter cloth. The drum is divided into cells.

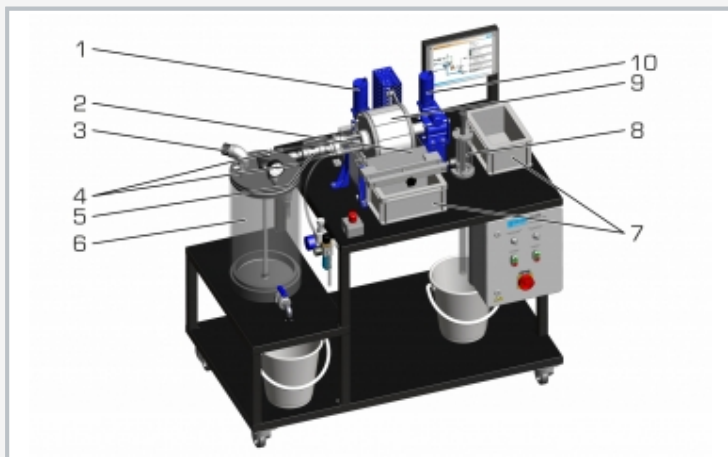
Each cell is joined by a hollow shaft to a vacuum line. The vacuum sucks filtrate through the filter cloth into the drum. From there it is carried in a collector tank which is under vacuum. The solid is separated off at the filter cloth. Consequently, a filter cake which steadily grows in the direction of rotation is created on the immersed part of the drum. When the filter cake is drawn out of the suspension by the rotating motion, it is drained of water by the applied vacuum. A scraper scrapes the filter cake off of the drum before the drum dips back into the suspension. Compressed air can also be used to remove the filter cake. The filter cake drops into a collector tank.

The flow rate of the supplied suspension is adjusted on the suspension unit. The level in the suspension tank of the drum cell filter can be adjusted by way of an adjustable overflow. The applied negative pressure is indicated by a manometer on the vacuum tank. The rotation speed of the drum is infinitely variable.

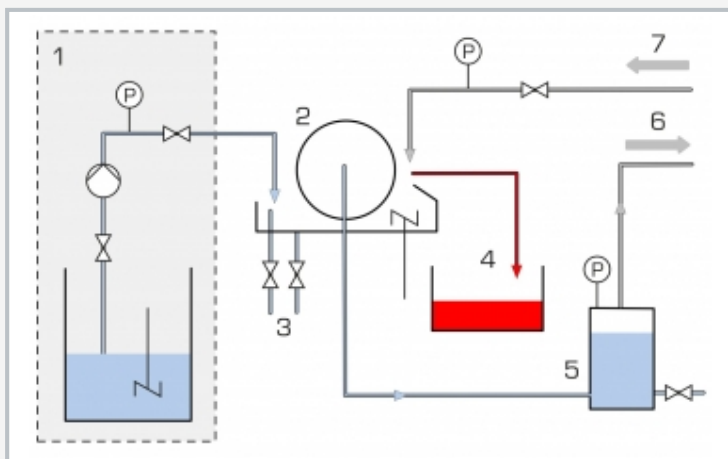
Compressed air and vacuum connections are required to operate the trainer.

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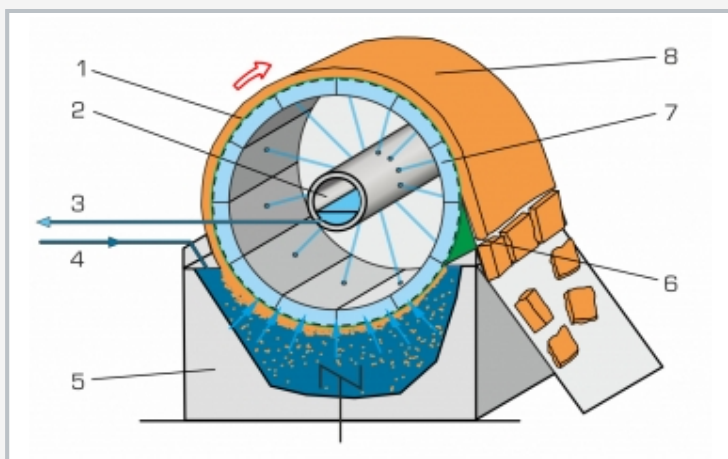
Drum cell filter



1 motor (stirrer), 2 scraper, 3 vacuum connection, 4 filtrate vacuum lines, 5 suspension inlet, 6 filtrate vacuum tank, 7 filter cake collector tank, 8 suspension tank overflow and outlet, 9 drum, 10 motor (drum)



1 suspension unit (CE 285), 2 drum cell filter, 3 suspension tank overflow and outlet, 4 filter cake collector tank, 5 filtrate vacuum tank, 6 vacuum connection, 7 compressed air connection with pressure limiter; P manometer



Fundamental principle of a drum cell filter: 1 perforated drum with filter cloth, 2 hollow shaft, 3 vacuum (filtrate), 4 suspension inlet, 5 suspension tank, 6 filter cake removal, 7 cell, 8 filter cake

Specification

- [1] continuous cake filtration of suspensions with a drum cell filter
- [2] rotating perforated drum, partially immersed in suspension, with filter cloth
- [3] vacuum inside drum to draw off filtrate and dry filter cake
- [4] continuous removal of filter cake with adjustable scraper or compressed air
- [5] drum speed infinitely variable
- [6] plastic vacuum tank to collect filtrate
- [7] suspension tank with stirrer and overflow
- [8] plastic collector tank for filter cake
- [9] production and transport of suspension with suspension unit CE 285

Technical data

- Drum**
- filter area: approx. 0,1m²
 - speed: approx. 0,1...2min⁻¹
 - motor power consumption: approx. 200W

- Stirrer**
- speed: approx. 15min⁻¹
 - motor power consumption: approx. 200W

- Tanks**
- filtrate vacuum tank: approx. 30L
 - filter cake collector tank: approx. 8L
 - suspension: approx. 3L

- Measuring ranges**
- pressure:
 - ▶ -1...0bar (vacuum tank)
 - ▶ 0...2bar (compressed air for cake removal)

- 230V, 50Hz, 1 phase
- 230V, 60Hz, 1 phase
- 120V, 60Hz, 1 phase
- LxWxH: 1400x800x1800mm
- Weight: approx. 140kg

Required for operation

compressed air, vacuum connection
drain

Scope of delivery

- 1 drum cell filter
- 1 collecting tanks
- 1 set of hoses
- 1 set of filter cloths
- 1 set of instructional material