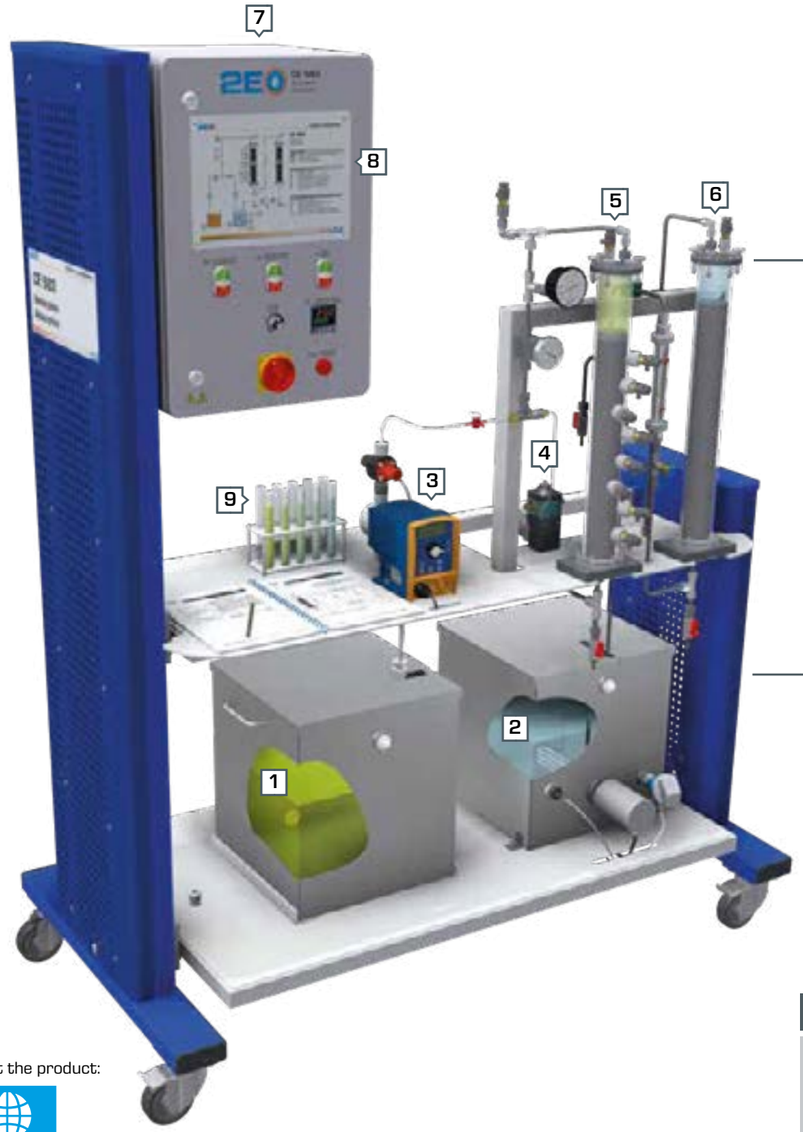
CE 583
Adsorption

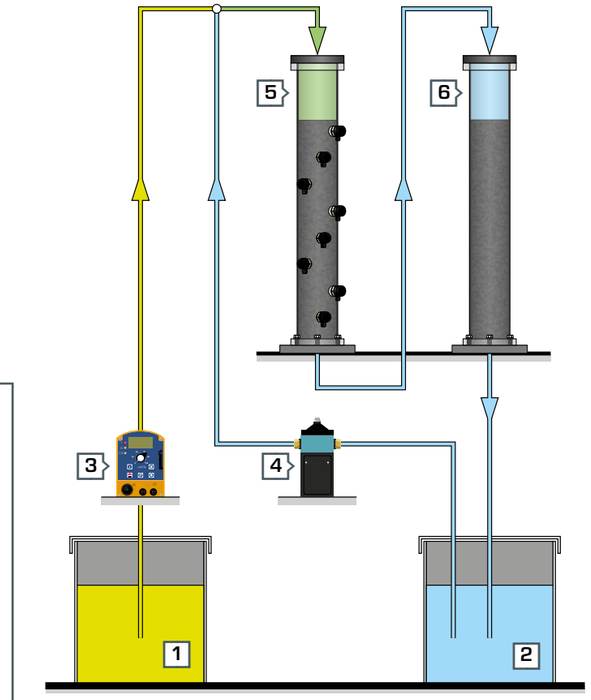
Adsorptive water treatment in continuous operation

Adsorption on activated carbon is an effective and often practised alternative to the removal of non-biodegradable organic substances, such as chlorinated hydrocarbons. Our CE 583 device allows you to demonstrate the fundamentals of this process in continuous operation and therefore under very practical conditions.

The main components of this device are two series-connected adsorbers which are filled with granulated active carbon. The first adsorber is equipped with sampling valves so that you can determine concentration profiles. Concentration profiles are essential for understanding adsorption.



1 adsorbate concentrate
2 treated water
3 metering pump
4 circulation pump
5 first adsorber
6 second adsorber
7 switch cabinet
8 process schematic
9 test tubes for sampling



i Adsorbate

Adsorbate refers to the substance dissolved in the water which is to be eliminated by adsorption

Principle of operation

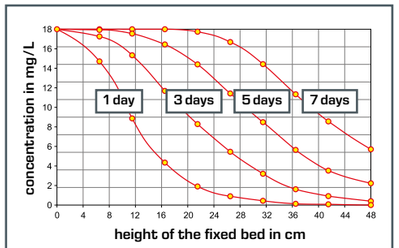
Treated water is circulated through both adsorbers. A metering pump injects concentrated adsorbate solution into the inlet area of the first adsorber in the circuit. The metering pump allows very precise adjustment of the flow rate. This allows you to adjust the desired feed concentration of the adsorbate very precisely. The second adsorber ensures that the circulated water doesn't contain any more adsorbate even at full breakthrough of the first adsorber. This ensures a constant adsorbate concentration in the inlet of the first adsorber, even in long-term experiments.

Temperature control

The device is equipped with a temperature control system. This allows you to study how water temperature influences the adsorption process.

i Our recommendation

You can deliver a particularly impressive demonstration of adsorption when you use a water-soluble and adsorbable dye as the adsorbate. Such substances include methylene blue or fluoresceine.



Excerpt from the CE 583 manual: concentration profiles at various times for methylene blue

Learning objectives

- recording of concentration profiles
- recording of breakthrough curves
- relationship between concentration profiles and breakthrough curves
- determining the mass transfer zone
- an adsorber's efficiency and mass balance
- predicting breakthrough curves
- scale-up of the results to industrial scale
- factors influencing the adsorption
  - contact time
  - temperature
  - mode of operation

About the product:

www