

**Features :**

- Removal of solids by depth filtration (sand filter)
- Pressure loss: plotting of Micheau diagrams
- The backwash of sand filters

Tesca Depth Filtration Apparatus with sand filters is a key unit operation in water treatment. 32099 enables this process to be demonstrated.

Raw water contaminated with solids is pumped from above into a sand filter. The solids are captured and retained as the raw water flows through the filter bed. The water itself passes through the filter bed and emerges at the bottom end of the sand filter. The treated water (filtrate) flows into a tank. Over time, more and more solids are deposited in the filter bed which increases its flow resistance. This process is detectable by the increasing pressure loss between the sand filter inlet and outlet. The flow through the sand filter decreases. Backwashing with treated water cleans the filter bed and reduces the pressure loss again.

The sand filter is equipped with a differential pressure gauge. There are also several pressure measuring points along the filter bed. The pressures are transmitted to tube manometers via hoses and displayed there as water columns. This can be used to plot Micheau diagrams. The flow rate, temperature, differential pressure, and system pressure are measured. The flow velocity in the filter bed (filter velocity) can be adjusted. Samples can be taken at all relevant points. An Optional software program is provided to control the operating states and measure data. A process schematic shows the current operating states of the individual components and the measured data. For E.g. diatomite can be used to produce raw water.

**Specifications:**

- Depth Filtration With Sand Filter
- A Separate Supply Unit With Tank And Pump For Raw Water

Note: Specifications are subject to change.

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- Pump For Backwashing A Sand Filter
- 10 Tube Manometers To Measure The Pressures In The Filter Bed
- Plotting Of Micheau Diagrams
- Electromagnetic Flow Rate Sensor
- 4 Electrically Driven Shut-off Valves
- Measurement Of Flow Rate, Differential Pressure, System Pressure, And Temperature
- Filter Velocity Adjustable
- Software With Control Functions And Data Acquisition Via Usb Under Windows 7, 8.1, 10

### Technical Specifications:

- Sand filter
  - ◊ 1 outer diameter: 120mm
  - ◊ 2 inside diameter: 106mm
  - ◊ 3 filter bed height: approx. 700mm
- Raw water pump
  - ◊ Max. flow rate: approx. 150L/min
  - ◊ Max. head: approx. 7,6m
- Backwash pump
  - ◊ Max. flow rate: approx. 50L/min
  - ◊ Max. head: approx. 14m
- Tanks for raw water and treated water
  - ◊ Capacity: each 180L
- Measuring ranges
  - ◊ Flow rate: 0...1300L/h
  - ◊ Tube manometers: 10x 0...1500mmWC
  - ◊ Differential pressure: -1...1bar
  - ◊ System pressure: 0...2,5bar
  - ◊ Temperature: 0...100°C
- Filter velocity: 0...70m/h

### Experiments:

- Learning the fundamental principle of depth filtration by sand filters
- Observation of the pressure conditions in a filter bed
- Determination of pressure losses
- Plotting of Micheau diagrams
- Principle of backwash

### Services Required:

- Mains power supply: 220-240V, 1Ph, 50Hz
- Water: Tap water supply & Drain.

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