

Technology Fact Sheet: Magnetic separator

Short description

With the BFI magnet separator technology a chemical free, energy saving and very efficient separation of magnetic particles is possible. The high efficiency is based on the optimized positioning of the magnets for ensuring maximum removal efficiency up to 99% considering the particle properties and the use of permanent magnets. The energy saving consists of the pressureless operation compared to discontinuous sand filter requiring a pressure of 4 bar, leading to a high pump energy demand. A further advantage is the achievement of high concentration factors (ratio of solid content inlet magnetic separator/solid content produced sludge) up to 1000 depending on process and steel grads compared to sand filters: factor 10 – 20. Furthermore are the back flush water volumes of the BFI magnet separator technology with 0.06% of the treated flow much lower compared to 3 – 5% at discontinuous sand filtration, leading to lower sludge dewatering efforts (investment costs, operational costs).

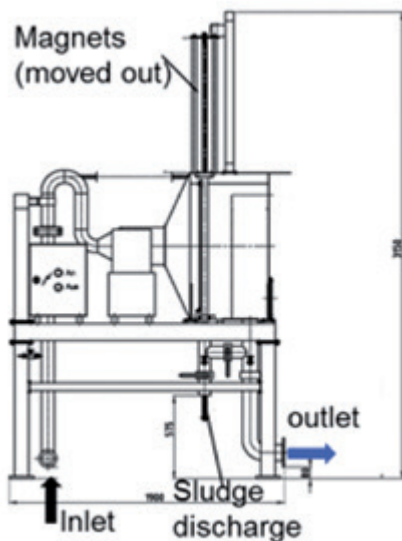
Working principle

- ▶ Particle separation by permanent magnets, shifted arranged in three lines in a flow through tank considering the particle properties
- ▶ Permanent magnets are placed in non-magnetic protection tubes

- ▶ Magnet/protection tube cleaning with two movable nozzle bars after emptying the tank and moving out of the magnets by hydraulic system
- ▶ Tailored water saving magnet cleaning by variation of spray time and water pressure
- ▶ Total cleaning time between stopping and restarting the feed flow about 5 minutes
- ▶ Flow rate of 50 m³/h with compact dimensions of height: 3.15 m, width: 1.47 m and length 1.90 m with a transport weight of 750 kg

Advantages

- ▶ High concentration of particles about factor 250 to 1000
- ▶ Solids contents in sludge up to 30 wt.-%
- ▶ Low backwashing water: Magnetic separator 0.06%, Sand filter: 3 – 5% of treated volume flow
- ▶ Low space demand
- ▶ Reduction of energy demand (no operation pressure needed)
- ▶ Constant particle content despite fluctuating inlet particle content



Pattern



Field trial



Covered Magnets



In- and Outlet

General data

Potential applications	Cooling water (e.g. hot rolling, scarfing) Gas washing water (e.g. blast furnace, basic oxygen furnace) Metal working emulsions (e.g. cold rolling, grinding) Quenching bathes (e.g. polymer)
Average energy consumption	none
Average chemical consumption	none

Remarks

- ▶ Reduction of disposal costs by internal metallurgical re-use of separated iron containing particles as ore or scrap substitute

References, patents and licensee

References: –

Patents: –

License: oxytec GmbH, Hamburg

Contact

**VDEh-Betriebsforschungsinstitut
GmbH**

Sohnstr. 65
40237 Düsseldorf
Germany

Dipl.-Ing. Martin Hubrich

Tel.: +49 211 6707 343;

Fax: +49 211 6707 923 343

E-Mail: martin.hubrich@bfi.de

www.bfi.de



University of Applied Sciences and Arts
Northwestern Switzerland



www.inspirewater.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723702.