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Bayoxide® E 33 HC – Drinking Water Quality Synthetic Iron Oxide Adsorber

Bayoxide® E 33 HC is an NSF Standard 61 approved, granular iron oxide media specifically designed for use in drinking water applications in which it serves as an effective selective filter adsorbent for removal of various species. It is a dry amorphous nanoparticulate α -Ferric oxide hydroxide with a particularly high surface area and adsorption capacity. At the same time, it also offers extremely high abrasion resistance to the stream of water, which means that the filter bed remains clear without additional washing or filtering. **Bayoxide® E 33 HC** is applied in a simple passive pump-and-treat system applying the technology of fixed-bed adsorption.

Applications

- Arsenic removal from drinking water in which arsenate As(V) as well as arsenite As(III) are safely adsorbed below 5 $\mu\text{g/l}$ (for demanding and highly contaminated waters)
- Phosphate removal from well water and surface water, such as ponds, lakes, and pools
- Phosphate and silicate removal from seawater and freshwater aquariums in case NSF-certified media is required
- Antimony, vanadium, and selenium removal from drinking water
- Heavy metal removal from drinking water, e.g., copper, lead, nickel, and zinc

Benefits

- Arsenic removal safely below < 5 $\mu\text{g/l}$
- Very high adsorption capacity by outstanding surface area (300 m^2/g) and advanced adsorption kinetics
- Extremely high abrasion stability
- Specified metal content
- Simple once-through treatment system with low maintenance requirements
- No additional chemicals requirements for regeneration
- Delivered as dry material
- Arsenic exhausted material disposable via non-hazardous landfill
- Wide operational pH range of pH 5.5 to 8.5

Bayoxide® E 33 HC has been developed specifically for the removal of arsenic from drinking water and can also be used as adsorbent for various applications within standard water purification installations. Relative to conventional adsorbent media, **Bayoxide® E 33 HC** has a particularly high capacity whereby it can be used in the purification of highly contaminated groundwater or industrial waters. **Bayoxide® E 33 HC** exhibits an exceptionally high level of abrasion resistance when utilized in water purification systems. It offers a high resistance against oxidants and affords very low backwash water volumes.

The operating capacity and therefore life expectancy of Bayoxide® E33HC for all applications depends on the quality and composition of water to be treated and factors such as pH value, temperature, and targeted effluent limit. Bayoxide® E33HC selectively adsorbs oxoanions even during the presence of other anions such as chloride, sulfate, or nitrate. Therefore, a detailed water quality analysis including a wide range of parameters should serve as the basis for the selection of the most appropriate adsorber system and amount.

The following information provides a basis for a standard Bayoxide® setup system. Before each implementation, prior small scale and pilot testing is recommended. For this rapid small scale column tests (RSSCT) are preferable.

Specifications

- Certified under NSF/ANSI Std 61 “Drinking Water Systems Components – Health Effects”
- Specified in the List of Preparation Substances and Disinfection Processes in compliance with § 11 German Drinking Water Ordinance 2001, DIN EN 15029 (valid throughout Europe)

Proper and safe handling of spent media is tested in accordance with US EPA’s Toxicity Characteristics Leaching Procedure TCLP RCRA (40 CFR 261) and, therefore, can be treated as non-hazardous waste. This is especially relevant for the removal of hazardous materials, such as arsenic, from water.

¹ Empty bed contact time.

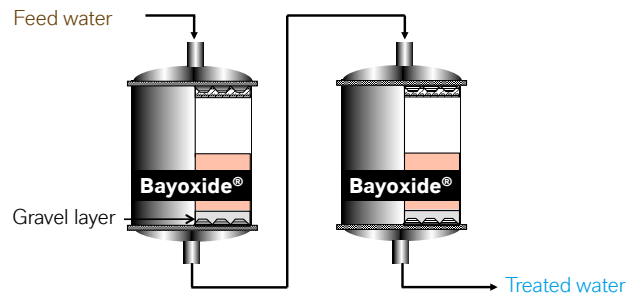


Figure 1: Standard technical setup of Bayoxide® E33HC

Standard recommendations

- Gravel underbedding
- Simplest configuration contains two adsorber filters with parallel flow, treatment of higher contaminant feed concentrations requires two or three adsorber filters in series flow configuration
- Contact time (EBCT¹) between 5 to 10 minutes, for specialized applications EBCT is increased up to 20 minutes
- Periodic backwash for dirt and fines removal and for media fluffing for maximum capacity utilization

Technical conditions

- Filter arrangement: lead-lag, merry-go-round
- Operation mode: downflow
- Flow rate: 5–10 BV/h
- Freeboard: 100%
- EBCT¹: 5–15 min.

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