

Pro-OX Manganese Dioxide Filter Media



Iron, Manganese, Hydrogen Sulfide, Arsenic Removal

Pro-OX is a black, granular, naturally mined filter media composed of high purity manganese dioxide. Unlike coated filter media such as manganese greensand, Pro-OX is a solid manganese dioxide offering higher flow rates and faster reaction times.

Calculate Removal

Based on total oxidant demand*	10,000 mg/L Cl ₂ /cu. ft. (28.3 L)
For iron (Fe ⁺²)	10,000 mg/L Fe/cu. ft. (28.3 L)
For manganese (Mn ⁺²)	5,000 mg/L Mn/cu. ft. (28.3 L)
For hydrogen sulfide (H ₂ S)	2,000 mg/L H ₂ S/cu. ft. (28.3L)



Note: removal capacities must be based on the total combined concentration of iron, manganese, and hydrogen sulfide if present. (See example given below).

*The oxidant demand is equivalent to the total quantity of chlorine ("Cl₂) required to oxidize soluble iron, manganese, and hydrogen sulfide in the raw water.

The oxidant demand and gallons between regenerations can be approximated by the following formula:

$$\text{Oxidant demand} = [1 \times \text{mg/L Fe}] + [2 \times \text{mg/L Mn}] + [5 \times \text{mg/L H}_2\text{S}]$$

Raw Water:

$$\begin{aligned} 2.0 \text{ mg/L Fe} \times 1.0 &= 2.0 \text{ mg/L Cl}_2 \text{ equiv.} \\ 0.2 \text{ mg/L Mn} \times 2.0 &= 0.4 \text{ mg/L Cl}_2 \text{ equiv.} \\ 0.2 \text{ mg/L H}_2\text{S} \times 5.0 &= 1.0 \text{ mg/L Cl}_2 \text{ equiv.} \\ &= 3.4 \text{ mg/L oxidant demand} \end{aligned}$$

Capacity:

$$\frac{10,000 \text{ mg/L Cl}_2}{\text{cu. ft.}} \times \frac{1}{3.4 \text{ mg/L oxidant demand}} = 2941 \text{ gallons/regeneration/cu. ft.}$$

Regeneration Process

Soluble iron and manganese are removed by contact oxidation directly on the Pro-OX media.

Hydrogen sulfide utilizes the oxidizing capacity of Pro-OX with the resultant precipitates removed by filtration in the Pro-OX bed.

Continuous regeneration of the Pro-OX media is achieved by oxidizing soluble iron, manganese, hydrogen sulfide and arsenic prior to the Pro-OX filter.

This is accomplished by the continual pre-feed of a solution of chlorine or ozone. The oxidized precipitates are then filtered out in the Pro-OX bed with subsequent removal during backwashing.

In some applications aeration alone is sufficient to keep the Pro-OX media regenerated. This includes dissolved oxygen injection, compressed air injection or aeration by spray nozzles in a storage tank.

Note for arsenic removal a sufficient amount of iron must be present. A general guideline is to have 1 mg/L of iron for every 20 ug/L of arsenic with sufficient pre-chlorination and contact time to allow iron to combine with arsenic.

Specs and Operation

- Active ingredient: > 85% Manganese Dioxide
- Mesh size: 20 x 40 (Other Mesh Sizes Available)
- Weight: 114 lbs per cubic foot
- Packaged in 1/2 cubic foot 57 lb bags or 1 ton super sacks.
- Service Flow Rate: 5 to 10 GPM per Square Foot
- pH Recommended: 7 - 8 (pH 7 - 9 maximum)
- Bed depth: 30 to 48"
- Backwash flow rate: 12 to 15 GPM / sq ft.
- Backwash expansion: 15% to 30%
- Oxidant types recommended: air, chlorine, potassium permanganate, ozone. Hydrogen peroxide is not recommended.
- Oxidant contact time prior to filter: 10 to 30 seconds
- Removes up to 28 PPM Iron 15 PPM manganese 30 PPM hydrogen sulfide
- Life expectancy: 15 to 20 years