



LayneOx

High-Rate Granular Filter Media



This Johnson Creek, Wisconsin 500 gpm capacity water treatment plant utilizes LayneOx media to remove water contaminants efficiently and economically.

LayneOx™ operates both as a classical filter working with an oxidant and as a catalytic media due to its ability to accelerate the reaction between the oxidizing agent and the iron, manganese, arsenic and hydrogen sulfide present.

In groundwater, all chemical constituents are in a state of equilibrium in a reducing environment. Dissolved iron, manganese, arsenic and hydrogen sulfide will stay in solution until they are exposed to an oxidizing environment. Utilizing LayneOx and an oxidant additive immediately before the raw water enters the filter causes these compounds to adsorb, oxidize, and precipitate.

Iron and manganese that are not oxidized become catalytically precipitated and then adsorbed directly on the media. Most of the manganous manganese is rapidly removed in the first few inches of the media where it is further oxidized to manganese dioxide.

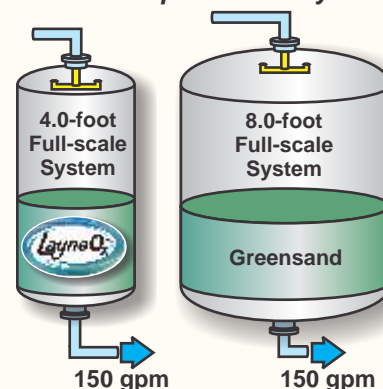
The adsorbed manganese, iron, arsenic and precipitated sulfur are expelled during backwash. Any insoluble ferric hydroxide particulate growths are also expelled during backwash.

For arsenic removal, the arsenic is coprecipitated with the iron onto the LayneOx media as ferric arsenate. When hydrous manganese oxide (HMO) is added, radium is also removed with LayneOx.

A continuous reaction occurs with the addition of the oxidant, regenerating the media surface and replenishing the manganese dioxide. Adsorption kinetics relate manganese dioxide removal to a media's manganese oxide concentration.

Because it contains a naturally high manganese dioxide content, LayneOx provides a higher adsorption capacity and faster reaction kinetics than other media.

Smaller Footprint with LayneOx™



LayneOx Advantages

- High surface loading rates of 6-12 gpm/sq. ft. are possible
- Catalytic media using backwash to remove contaminant solids
- Utilizes chlorine or other oxidants
- 10-30 second reaction time w/ oxidant
- Catalyzes the oxidation and removal of iron, manganese and H₂S
- Oxidized contaminants precipitate onto media and are backwashed away
- Reduces operating costs by removing manganese without permanganate
- Reduces equipment size
- Eliminates need for detention basin
- Superior to manganese greensand in capacity and reaction rate



800.407.4449

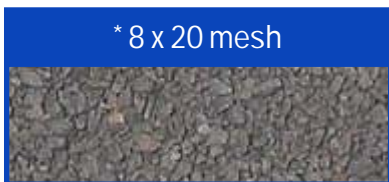
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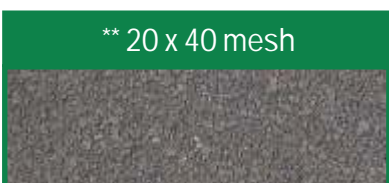
Water Technologies:
Define
Develop
Deliver



LayneOx Media Specifications



* 8 x 20 mesh



** 20 x 40 mesh

- Screen size, US sieve: **8 x 20 mesh***; **20 x 40 mesh****
- Physical form: black granular particulate
- Moisture content: under 0.5% shipped
- Bulk density: 120 pounds/cu. ft. as shipped
- Backwashed density: 110 pounds/cu. ft.
- Uniformity coefficient: <1.65
- Effective size: **1.0-1.3mm***; **0.3-0.5mm****
- Manganese dioxide content: 70-80% by weight throughout media matrix
- CAS# 1313-13.9
- NSF 61 compliant
- H₂S capacity: 300 gr./cu. ft.



Typical System Features

- Two or three vessel configurations
- ASME Section VIII, Div. 1 Code pressure vessels
- Filter vessels, piping for raw water, backwash supply, backwash return, rinse-to-drain and controls shipped as integrated shop-assembled system
- Automated valves and PLC controlled operation flow control for each filter and backwash
- Flow rate and integrated flow indication
- Differential pressure indicators
- Strategically located sample points
- Ductile iron, carbon steel piping
- Primed and painted vessels, piping
- Galvanized support skid
- NSF epoxy lining
- Delivery, installation and startup

Optional System Features

- Vessel sizes 36-120 inch
- Design pressures to suit applications
- NSF abrasion-resistant vessel lining
- Manual valve systems
- Vessel relief valves
- PVC piping
- Oxidant feed system and oxidant residual analyzer
- Air scour system
- High-efficiency backwash system
- Ancillary equipment available

System Operating Conditions

pH range	6-9
Temperature	ambient
Surface loading rate	8-15 gpm/sq. ft.
Pressure drop (bed + underdrain)	2 psig @ 15 gpm/sq. ft.* 4 psig @ 9 gpm/sq. ft.**
Terminal P.	10 psig
Bed depth	36 inches - 48 inches
Media contact time	2 minutes minimum
Air scour rate	3 scfm/sq ft with 5 gpm/sq. ft. water for 10 minutes, followed by 12-15 gpm/sq. ft. (water only) for 5 minutes
Backwash (without air scour)	30 gpm/sq. ft.*; 25 gpm/sq. ft.** 5 min
Bed expansion freeboard	50% of bed depth
Typical oxidant	Chlorine
Oxidant form	Gas or 12.5% sodium hypochlorate
Oxidant contact time	10-30 seconds
Oxidant point of addition	Inlet to LayneOx filter
Typical oxidant dosage	0.5-2.0 ppm
Media life	Over 10 years
Removal efficiency	Up to 99%+ for iron, manganese
Backwash frequency	Typically once every 24-48 hours

* Values for 8 x 20 mesh media

Product specifications are subject to change without notice.

** Values for 20 x 40 mesh media

Contact your
Layne Christensen Company
Water Technologies representative:

800.407.4449
www.laynechristensen.com