



## FILTRATION MEDIA

Tel: 847-382-7810  
800-663-4371  
Fax: 847-382-5814  
Web: www.matt-son.com  
Email: greg@matt-son.com

### FILOX-R™ MEDIA

#### IRON, HYDROGEN SULFIDE, MANGANESE REMOVAL

Filox-R™ is used for removing iron, hydrogen sulfide, and manganese from water supplies. It is a media that utilizes an oxidation-reduction reaction and filtration process similar to Greensand, but at a much higher level of performance. Filox-R™ contains 80% manganese dioxide in an extremely unique cluster format for enhanced performance and maximized capacity. Filox-R™ out performs Greensand, Brim, etc. due to the purity of its particles, superior oxidation/filtration capacity, and durability. Filox-R™ is a standard, stocked media. Contact Matt-Son with your requirements.

### TECHNICAL SPECIFICATIONS

#### OPERATING CONDITIONS

Active Ingredient . . . . .75% - 85% Manganese Dioxide  
Service Flow . . . . .6 gpm/cu.ft.  
Freeboard . . . . .30% - 50%  
Backwash Rate . . . . .12 - 15 gpm/sq.ft. @ 60°F  
Bed Depth . . . . .20 inch minimum  
pH Range . . . . .5.0 - 9.0  
Removal Capacity (@Exhaustion)  
Iron . . . . .27 ppm  
Hydrogen Sulfide . . . . .17 ppm  
Manganese . . . . .11 ppm

#### PHYSICAL PROPERTIES

Color . . . . .grey-black  
Physical Form . . . . .granular  
Screen Size . . . . .12 x 40  
Bulk Density . . . . .114 lbs/cu.ft.  
Odor and Taste . . . . .none  
Standard Package . . . . .1/2 cu.ft. bags (57 lbs ea)  
Life Expectancy . . . . .essentially unlimited for low  
contaminant concentrations

For general information and not to be used as purchase specifications.

### COMPARATIVE INFORMATION

PRODUCT NAME	ACTIVE INGREDIENT	RELATIVE LIFE EXPECTANCY*
FILOX-R™	75% - 85% MANGANESE DIOXIDE	7500
GREENSAND	0.5% MANGANESE DIOXIDE	50
BIRM	LESS THAN 0.01% MANGANESE DIOXIDE	1

\*Relative life expectancy using Brim as the measure of comparison.

™ Filox-R is a trademark of Matt-Son, Inc.



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### FILOX-R™ MEDIA APPLICATION PARAMETERS

Filox-R™ is so simple to use, and a little bit can go a long way if a few basic guidelines are followed.

#### WATER TESTING

The first step in the proper installation of a Filox-R™ filtration system is to have a reliable knowledge of the subject water's chemistry. Always test the water as accurately as possible before designing a system.\*

The nature of the water's chemistry will affect how the system is to be designed and operated. Filox-R™ by itself is capable of removing the following contaminant levels chemical free:

Iron .....15.0ppm  
Hydrogen Sulfide .....7.0ppm  
Manganese .....3.0ppm

While Filox-R™ is capable of removing higher contaminant levels, such applications should be considered as special cases. Pilot testing and the use of additional treatment such as oxidizing agents, chemical regeneration, or tannin removal media should be considered.

#### BACKWASHING

The next important step in ensuring a proper Filox-R™ installation is to make sure the media receives a thorough backwashing. A strong backwash is important to break loose the contaminant particles and keep the bed clean so that it can continue to filter the water at peak level. Filox-R™ is a rather heavy media, weighing 114 lbs/cu.ft. A valve capable of lifting the bed at least 20% to 50% at a rate of 12 to 15 gpm/sq.ft. @ 60°F during backwash must be used. If the media is not lifted during backwash, the bed will eventually foul and the system will fail.

A daily backwash is highly recommended, but not always necessary, depending on the water's chemistry. Because of Filox-R's superior oxidation/filtration capabilities, it loads up much more quickly than other media. Daily backwashing is recommended to maximize Filox-R's removal capacity. Since Filox-R™ has such great particle strength, it is able to withstand the rigors of frequent backwashing and at the same time deliver 20 to 100 times the oxidation/filtration capability of other manganese-based media.

#### ADDITIONAL TREATMENTS

The third step is to consider the use of oxidizers, chemical regeneration, and other additional treatments in special cases. When the subject water's contaminant levels exceed the recommended removal limits, Filox-R™ will continue to outperform the competition. However, the use of an additional oxidizing agent (e.g. oxygen, chlorine, ozone, hydrogen peroxide, potassium permanganate, etc.) is recommended. Oxidizers will not adversely affect Filox-R™. As a matter of fact, they will enhance its performance. They super-oxidize the media, which enables Filox-R™ to perform quicker and keep cleaner. As a matter of good measure, it is always a safe practice to install an oxidation method upstream (in front) of the Filox-R™ bed to ensure that the oxidation reduction reaction is 100% complete. Similarly, the use of chemical regeneration, while often not necessary for Filox-R™ to operate properly, will not harm the media, and if performed regularly, will extend the life of the media.

Tannin removal media, mixed bed resins, or carbon polishing filters may also be necessary depending upon the specific water's chemistry. Consult an experienced design engineer with specific application problems and establish a pilot test site. An iron, hydrogen sulfide, and manganese removal installation, regardless of contamination levels, will surely benefit from having Filox-R™ properly designed into the system.

Filox-R™ is clearly the choice for any residential, commercial, and industrial iron, hydrogen sulfide, and manganese removal application. Its superior particle strength, high removal capacities, and ease of installation allow Filox-R™ to leave the competition behind in terms of performance and value.

\*Testing recommended for soluble iron, heme iron, hydrogen sulfide, manganese, pH, TDS, and Oxygen Reduction Potential (ORP).

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**FILOX-R™ MEDIA**  
**TESTING FOR ORP**

Oxidation Reduction Potential (ORP) can be the most important factor to take into consideration in certain waters. Highly reducing waters may cause premature exhaustion or even destruction of the Filox-R™ bed.

Precautions can be taken prior to installation that can prevent ORP problems. Use one of the screening tests and follow the instructions below if the subject water has reducing properties that will require additional oxidants.

**THE SIMPLE TEST**

Mix 1.75 ounces (50 grams) water with 0.75 ounces (22 grams) of potassium permanganate crystals. Then take 2 drops of the mixture and stir into a fresh 1/4 gallon (1 liter) sample of the subject water. Let the subject water stand for 15 minutes. If the pink color remains, Filox-R™ can be installed without additional oxidants. If the pink color disappears, additional oxidants will be needed for Filox-R™ to function properly.

**THE ORP METER TEST**

Note: Must use a calibrated ORP meter. Any reading that is above a negative 170 millivolts indicates that Filox-R™ can be used effectively without additional oxidants. Any reading falling below a negative 170 millivolts indicates that additional oxidants will be required.

The amount of oxidant required for proper installation can be determined by measuring the amount of oxidant added to a specific volume of subject water until the solution remains pink or the meter reads at negative 170 millivolts or above. An extrapolation can then be made to determine the correct feed rate for the oxidant with respect to the subject water flow rate. Once installed, sample the solution after the injector and mixer and repeat the above test to confirm that the feed rate is correct.

Air, hypochlorite, hydrogen peroxide, ozone, or potassium permanganate are all suitable oxidants. Generally the weaker oxidants like air and/or hypochlorite will suffice for the majority of applications. The more extreme cases will require stronger oxidants.

Filox-R™ is the best choice where no oxidants or weak oxidants are required. If the subject water can only be treated with the strong oxidant potassium permanganate, manganese greensand may be more appropriate.

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**FILOX-R™ MEDIA****APPLICATION CONSIDERATIONS**

Filox-R™ is the raw, unrefined ore used in the manufacture of Filox-R™ filtration media. Chemically, Filox-R™ (Raw) is a naturally occurring ore that has been properly screened and sized. Essays on the material compare it favorably to the products known as Pyrox or Catalyst. In field performance and general specifications, Matt-Son's Filox-R™ will be very comparable to Pyrox or Catalyst.

To help you become familiar with Filox-R™ filtration media, listed below are some general specifications and applications considerations:

**pH**

Filox-R™ media is stable within a range of 5.0 to 9.0 pH. However, keep in mind that the generally acceptable range for drinking water is 6.5 to 8.5 pH. At extreme ranges of pH (both low and high), contaminant removal and bed stability are adversely affected. This should be considered in applications operating at the high and low ends of Filox-R's 5.0 to 9.0 pH range.

**OXIDIZERS**

The use of oxidizers (e.g. oxygen, chlorine, ozone, hydrogen peroxide, potassium permanganate, etc.) greatly enhances the action of Filox-R™. An added benefit of using oxidizers with Filox-R™ is the media's ability to remove 70% to 100% of the oxidizers, thereby eliminating the need for additional water treatment equipment.

**ORGANIC IRON (HEME, PINK-WATER, ETC.)**

This problem can be overcome by the use of potassium permanganate on a continuous basis. Intermittent regeneration with potassium permanganate has been highly successful.

**TDS**

The maximum acceptable TDS level for drinking water is 500 ppm. Filox-R™ media may be successfully applied at levels exceeding 1100 ppm TDS. However, at high TDS levels, highly ionized salts, such as sodium chloride, will require the use of added oxidizers.

% ACTIVE INGREDIENT(S)	
FILOX®	100%
FILOX-R™	80%
Manganese Greensand	3%
Birm	1%

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### FILOX-R™ MEDIA SIZING CHART (7" THRU 10" TANKS)

#### SUGGESTED SYSTEM CONFIGURATIONS:

##### 7 INCH TANK

Backwash:	Cold water (less than 60°F)	4 gpm
	Warm water	6 gpm
Valve:	Autotrol 163 with ABW	
	Erie Series 568	
	Fleck 5600	
7 x 35 Tank	0.4 cu.ft. media	2.5 gpm service rate
7 x 44 Tank	0.66 cu.ft. media	4.0 gpm service rate

##### 8 INCH TANK

Backwash:	Cold water (less than 60°F)	5.25 gpm
	Warm water	7.7 gpm
Valve:	Autotrol 163 with ABW	
	Erie Series 568	
	Fleck 2500	
8 x 35 Tank	0.5 cu.ft. media	3.0 gpm service rate
8 x 40 Tank	0.66 cu.ft. media	4.0 gpm service rate
8 x 44 Tank	0.75 cu.ft. media	4.5 gpm service rate

##### 9 INCH TANK

Backwash:	Cold water (less than 60°F)	6.6 gpm
	Warm water	9.7 gpm
Valve:	Autotrol 163 with ABW	
	Erie Series 568	
	Fleck 2700	
9 x 12 Tank	0.2 cu.ft. media	1.0 gpm service rate
9 x 18 Tank	0.33 cu.ft. media	2.0 gpm service rate
9 x 35 Tank	0.75 cu.ft. media	4.5 gpm service rate
9 x 40 Tank	0.9 cu.ft. media	5.5 gpm service rate
9 x 48 Tank	1.0 cu.ft. media	6.0 gpm service rate

##### 10 INCH TANK

Backwash:	Cold water (less than 60°F)	8.25 gpm
	Warm water	12.1 gpm
Valve:	Autotrol 180	
	Erie Series 568	
	Fleck 2700	
10 x 35 Tank	0.9 cu.ft. media	5.5 gpm service rate
10 x 40 Tank	1.0 cu.ft. media	6.0 gpm service rate
10 x 44 Tank	1.2 cu.ft. media	7.0 gpm service rate
10 x 54 Tank	1.4 cu.ft. media	8.5 gpm service rate

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### FILOX-R™ MEDIA

#### SIZING CHART (12" THRU 18" TANKS)

##### SUGGESTED SYSTEM CONFIGURATIONS:

##### 12 INCH TANK

Backwash:	Cold water (less than 60°F)	11.9 gpm
	Warm water	17.4 gpm
Valve:	Autotrol 180	
	Fleck 2700	
12 x 48 Tank	1.5 cu.ft. media	9.0 gpm service rate
12 x 52 Tank	1.9 cu.ft. media	11.5 gpm service rate

##### 13 INCH TANK

Backwash:	Cold water (less than 60°F)	13.8 gpm
	Warm water	20.2 gpm
Valve:	Autotrol 180	
	Fleck 2700	
13 x 54 Tank	2.4 cu.ft. media	14.5 gpm service rate

##### 14 INCH TANK

Backwash:	Cold water (less than 60°F)	16.0 gpm
	Warm water	23.5 gpm
Valve:	Autotrol 180	
	Fleck 2700	
14 x 47 Tank	2.33 cu.ft. media	14.0 gpm service rate
14 x 65 Tank	2.66 cu.ft. media	22.0 gpm service rate

##### 16 INCH TANK

Backwash:	Cold water (less than 60°F)	21 gpm
	Warm water	30.8 gpm
Valve:	Autotrol 180	
	Fleck 2850	
16 x 28 Tank	1.75 cu.ft. media	10.5 gpm service rate
16 x 40 Tank	2.6 cu.ft. media	15.5 gpm service rate
16 x 53 Tank	3.2 cu.ft. media	19.0 gpm service rate
16 x 65 Tank	4.33 cu.ft. media	26.0 gpm service rate

##### 18 INCH TANK

Backwash:	Cold water (less than 60°F)	26.6 gpm
	Warm water	38.9 gpm*
Valve:	Autotrol 180	
	Fleck 2850	
18 x 65 Tank	5.5 cu.ft. media	33.0 gpm service rate

\* Check with valve manufacturer to obtain this backwash rate.