

## FILTRATION MEDIA

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**MID-ATLANTIC ENVIRONMENTAL EQUIPMENT, INC.**

Main Phone:  
877-MAE2inc  
(877-623-2462)  
mae2.com

**Corporate Headquarters**

15 Carroll Drive  
Bluffton, SC 29910  
843-836-1804  
Fax: 843-836-1805  
Email: sevans@mae2.com

**Manufacturing Facility**

Hardeeville, SC  
843-296-4580

**Field Support Services**

Canton, GA  
843-247-4087

**Regional Sales Office**

182 Spring Oaks Lane  
Ruckersville, VA 22968  
434-531-3472  
Fax: 434-985-1214  
Email: jfrydl@mae2.com

## FILTRATION MEDIA

### Anthracite

Crushed anthracite makes an excellent medium density filtration media. Because of its fractured shape, some of the sediment penetrates deeper into the bed. When compared to equivalent filter sands, this means longer filter runs and less head loss. Backwash rates are also reduced.

Anthracite, because of its unique density, can be used in multi-media filters. At 56 lbs./sq. ft., it will hydraulically lassify and remain above heavier media such as filter sand or Manganese Greensand providing a prefiltration layer.

### Physical Properties

Property	Value
Color	Black
Density	56 lbs./cu. ft.
Sphericity	0.6
Hardness (Moh's Scale)	3.0 - 3.8
Acid Solubility	<1%
Caustic Solubility	<1%
Apparent Specific Gravity	1.65
Temperature, °F (max)	140°

### Physical Properties by Product

Product	#1 Anthracite	#2 Anthracite	#3 Anthracite
Part #	A8029	A8030	A2031
Effective Size	0.6 - 0.8 mm	0.85 - 0.95 mm	1.7 - 2.0 mm
Uniformity Coefficient	1.5	1.6	1.5
Mesh Size	14 x 30	10 x 20	4 x 12
Back Wash Rate	12 - 18 gpm/sq. ft.	18 - 25 gpm/sq. ft.	use air scour
Bed Depth	24 - 36 in., 10 - 18 in. in multi-bed filters	24 - 36 in., 10 - 18 in. in multi-bed filters	24 - 36 in., 10 - 18 in. in multi-bed filters
Backwash Bed Expansion	35 - 50% of bed depth	35 - 50% of bed depth	35 - 50% of bed depth
Service Flow Rate gpm/ft <sup>2</sup>	5 GPM/ft <sup>2</sup> or higher	5 GPM/ft <sup>2</sup> or higher	5 GPM/ft <sup>2</sup> or higher

\*\*The information provided in this literature contains merely general descriptions or characteristics of performance, which in actual case of use do not always apply as, described or which may change as a result of further product development. Specifications provided herein are subject to change without prior notice.

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## FILTRATION MEDIA

### BIRM®

Birm is an efficient and economical method of removing dissolved iron and manganese compounds from raw water supplies. It may be either gravity fed or pressurized water treatment systems. Birm acts as an insoluble catalyst to enhance the reaction between dissolved oxygen (D.O.) and the iron compounds. The physical characteristics of Birm provide an excellent filter media which is easily cleaned by backwashing to remove the precipitant. Birm is not consumed in the iron removal operation and therefore offers a tremendous economic advantage over many other iron removal methods.

Birm is furnished in two grades, regular and fine. Regular is generally recommended for industrial, municipal, and most domestic installations. Fine is recommended on domestic installations where backwash rates are limited.

Birm may also be used for manganese removal with the same dependability as iron removal.

### Regular BIRM Physical Properties

Property	Value
Color	Black
Density	47- 50 lbs./ cu. ft.
Effective Size	0.61 mm
Uniformity Coefficient	1.72

### Fine BIRM Physical Properties

Property	Value
Color	Black
Density	47- 50 lbs./ cu. ft.
Effective Size	0.49 mm
Uniformity Coefficient	2.14

### Conditions for Operation

Condition	Specific Value
Alkalinity	Should be greater than two times the combined sulfate and chloride concentration
pH	6.8+
Dissolve Oxygen	Content must be equal to at least 15% of the iron (and manganese) content
Bed Depth	30 - 36 in.
Backwash Rate Regular BIRM	10 - 20 gpm/sq. ft.
Backwash Rate Fine BIRM	8 - 10 gpm/sq. ft.
Backwash Expansion Rate	35 - 50% of bed depth
Service Flowrate	3.5 - 5 gpm/sq. ft. intermittent flow rates and/or favorable local conditions may allow higher flow rates

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## FILTRATION MEDIA

### 4\*10 and 8\*30 Re-Activated Carbon

Select Re-Activated carbon from domestic sources is quality screened during our purchasing process for activity, density and fines. The use of re-activated carbon is recommended as a lower cost alternative for most sites where drinking water quality is not necessary. In many cases our re-activated carbon meets and exceeds imported virgin carbon. In addition, all carbon either sold by itself or installed in our filtration units is traced by lot number to the installation or sale.

#### 8\*30 (Liquid Phase)

Standard Specifications	Standard	Value
Iodine Number	ASTM D-4607	800 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	8x30 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

#### 4\*10 (Vapor Phase)

Standard Specifications	Standard	Value
Carbon Tetrachloride Activity Level	ASTM D-3467	40 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	4x10 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

#### Packaging

50 Pound Bags	50 Pound Drums	Bulk Tanker
1,000 Pound Bulk Sacks	200 Pound Drums	

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## FILTRATION MEDIA

### 4\*10 and 8\*30 Virgin Carbon

Select virgin carbon is quality screened during our purchasing process for activity, density and fines. The use of virgin carbon is recommended where drinking water quality is necessary. All carbon either sold by itself or installed in our filtration units is traced by lot number to the installation or sale.

#### 8\*30 (Liquid Phase)

Standard Specifications	Standard	Value
Iodine Number	ASTM D-4607	1200 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	8x30 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

#### 4\*10 (Vapor Phase)

Standard Specifications	Standard	Value
Carbon Tetrachloride Activity Level	ASTM D-3467	60 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	4x10 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

### Packaging

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1,000 Pound Bulk Sacks	200 Pound Drums	

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## FILTRATION MEDIA

### EC-100<sup>®</sup>

EC-100 is a granular, organically modified clay filtration medium for water treatment systems. A blend of bentonite and anthracite treated with a quaternary amine, EC-100 removes mechanically emulsified oil and grease, large molecular weight chlorinated hydrocarbons and heavy metals.

EC-100 used as a pre-treatment to liquid carbon filtration systems can provide longer run times than with carbon alone and therefore decreased operational costs.

### Physical Properties

Property	Value
Color	Grey/Tan/Black
Density	61 lbs./cu. ft.
Effective Size	8 x 30 U.S. Mesh Size
Moisture	8% Max
Water Retention Drained	10%

### Conditions for Operation

Condition	Specific Value
Hydraulic Loading	2-5 gpm/sq. ft.
Support Bed	2" Over Underdrain Required (Gravel or Anthracite)
Backwash Expansion	20% of Bed Depth
Bed Depth	36 in.
Retention Time	7-10 Minutes

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## FILTRATION MEDIA

### Filter-Lite

Filter-Lite granules have irregular surface characteristics affording maximum removal of suspended matter throughout the filter bed. Filter-Lite can be applied to systems designed for either pressure or gravity flow.

Filter-Lite has many outstanding advantages over the more common granular filter medias used for suspended solids removal. Substantial savings can be realized, when designing a system using Filter-Lite, because equipment can be smaller, requiring less square foot area. Filter-Ag is a lightweight substance, which means additional savings in backwash rates. Filter-Lite typically removes the normal suspended solids, down to the 20-40 micron

#### Advantages

- There is less pressure loss though a bed of Filter-Ag than most other filter medias.
- Light weight requires lower backwash rates than those required for other filter media.
- High service rates result in lower equipment costs and a savings in space.
- High dirt removal capacity results in longer filter run, with a substantial savings in labor costs, backwash water and time out service.

#### Conditions for Operation

Condition	Specific Value
Max. Temperature	140° F (60° C)
Bed Depth	24 - 36 in.
Backwash Rate	8 - 10 gpm/sq. ft.
Backwash Expansion Rate	35 - 50% of bed depth
Service Flow	5 gpm/sq. ft., although considerably higher rates are often used

#### Physical Properties

Property	Value
Color	Light Grey
Density	24 - 26 lbs./cu. ft.
Effective Size	0.57 mm
Uniformity Coefficient	1.66

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### Manganese Greensand

Manganese Greensand is formulated from a glauconite greensand which is capable of removing iron, manganese, and hydrogen sulfide from water through oxidation and filtration. Soluble iron and manganese are oxidized and precipitated by contact with higher oxides of manganese on the greensand granules. The hydrogen sulfide is eliminated by oxidation to sulfate and an insoluble precipitate. Precipitates are then filtered and removed by backwashing. When the oxidizing capacity power of the Manganese Greensand bed is exhausted, the bed has to be regenerated with a weak potassium permanganate (KMnO<sub>4</sub>) solution thus restoring the oxidation capacity of the bed.

Two to four ounces of potassium permanganate, in solution, /cu ft. of Manganese Greensand is sufficient for normal regeneration. It is advisable to vigorously backwash and regenerate the bed when it is placed in service and before its oxidation capacity is totally exhausted. To operate the bed after its oxidation capacity is exhausted may reduce its service life.

### Physical Properties

Property	Value
Color	Black
Density	85 lbs./cu. ft.
Effective Size	0.30 - 0.35 mm
Uniformity Coefficient	1.6
Mesh Size	16 - 60
Attrition Loss Per Year	2%

### Capacity

Capacity/cubic foot	Specific Value
Iron Alone	550 gr. (10,000 gal. of water containing 1 ppm iron/cu. ft.)
Iron and Manganese	400 gr. (7,000 gal. of water containing 1/2 ppm iron and 1/2 ppm manganese/cu. ft.)
Hydrogen Sulfate	175 gr. (3,000 gal. water containing 1 ppm hydrogen sulfide/cu. ft.)

### Conditions for Operation

Condition	Specific Value
Raw Water pH	6.2 - 8.8
Bed Depth	30 in.
Freeboard	35 - 50%
Service Flow Rate	5 gpm/sq. ft., 8 - 10 gpm/sq. ft. intermittent flow possible
Backwash Flow Rate	8 - 12 gpm/sq. ft.
Max. Temperature Raw Water	80°F. - 26.7°C.
Max. Practical Limit if Iron or Manganese in Raw water	15 ppm
Max. Practical Limit of Hydrogen Sulfide (H <sub>2</sub> S)	5 ppm

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## FILTRATION MEDIA

### MTBE Removal Carbon

MTBE Removal Carbon is designed specifically for the removal of methyl tert-butyl ether (MTBE) from groundwater. It is available as a coal based or coconut shell based product. The pore structure of MTBE is designed for increased capacity for trace and weakly adsorbed organics such as MTBE. Studies have shown that its capacity for MTBE significantly exceeds that of standard carbon. As the cost of MTBE exceeds standard GAC we recommend the use of traditional GAC filters upstream when other more easily adsorbed compounds are present.

#### Specifications

Standard Specifications	Standard	Value
Iodine Number	ASTM D-4607	900 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	8x30, 12x40 US Mesh
Ash	ASTM D-2866	5% Maximum
Apparent Density	ASTM D-2866	.45~.56 g/cm <sup>3</sup>
Ball Pan Hardness	ASTM D-3802	95 Minimum

#### Packaging

50 Pound Bags	50 Pound Drums	Bulk Tanker
1,000 Pound Bulk Sacks	200 Pound Drums	

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## FILTRATION MEDIA

### Filter Sand

Filter Sand is a naturally occurring, river washed, glacial deposit products. Its excellent chemical properties - high in silica content and low in soluble calcium, magnesium and iron compounds - meet AWWA-B100-89 specifications. Precision sizing and uniform grading to close limits meet the rigid specifications of professional engineers throughout the United States, Canada and overseas.

Purpose - Filter Sand is graded specifically for water filtration plants. It can be used in municipal, industrial or residential applications.

### Conditions for Operation

Condition	Specific Value
Bed Depth	18 - 30 in.
Backwash Rate	15 - 20 gpm/sq. ft.
Backwash Expansion	35 % of bed depth
Service Flow Rate	Municipal: 1.5 - 2 gpm/sq. ft. .
	Industrial: 3 gpm/sq. ft
	Domestic: 5 gpm/sq. ft

### Physical Properties

Property	Value
Color	Light tan to reddish brown
Density	100 lbs./cu. ft.
Effective Size	0.45 - 0.55 mm
Uniformity Coefficient	1.6 or less
Acid Solubility	0.3 - 1.6%
Specific Gravity	2.65 - 2.75

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