

**Clack MTM<sup>®</sup> is used for reducing iron, manganese and hydrogen sulfide from water supplies.**

# MTM<sup>®</sup>

Clack MTM<sup>®</sup> is a granular manganese dioxide filtering media used for reducing iron, manganese and hydrogen sulfide from water. Its active surface coating oxidizes and precipitates soluble iron and manganese. Hydrogen sulfide is oxidized to a sulfur. The precipitates are filtered out in the granular bed and removed by backwashing.

MTM<sup>®</sup> consists of a light weight granular core with a coating of manganese dioxide. MTM is an example of contact oxidation where the media itself provides the oxidizing potential. This allows for a much broader range of operation than many other iron removal medias. A pH level as low as 6.2 can be treated. Dissolved oxygen is not essential. The media's light weight reduces backwash water requirements.

When the oxidizing power of MTM<sup>®</sup> is reduced, the bed has to be regenerated with a weak solution of potassium permanganate (KMnO<sub>4</sub>), thus restoring its oxidizing capacity. A regenerating solution of 1 □ to 2 ounces (dry

weight) of potassium permanganate per cubic foot is sufficient for normal regeneration. Upon start-up a new bed should be backwashed and caution taken to insure that the lightweight media is not backwashed to drain. A new bed should be regenerated the evening of installation. **Operating the filter after its oxidizing capacity is exhausted will reduce its service life and may cause staining.**

**Untreated water should periodically be monitored for raw water parameters. Treated water should periodically be monitored for manganese and if present iron and hydrogen sulfide shortly before a regeneration and immediately after a regeneration to monitor how the filter system is functioning. Elevated treated water manganese concentrations before regeneration may mean that the filter media is being destroyed or bed reduction capacity has been exceeded. Take corrective actions as necessary.**

**Low pH, lack of chlorine oxidant or lack**

**of permanganate oxidant are the most likely conditions leading to media destruction.**

MTM<sup>®</sup> requires either intermittent or continuous regeneration to maintain its oxidizing capacity. A solution of potassium permanganate (or chlorine then potassium permanganate) can be pre-fed to maintain capacity. In the latter case, the manganese dioxide coating acts as a catalyst to enhance the oxidation reaction and as a buffer to reduce any excess potassium permanganate concentration and prevent it from entering the service lines.

**Addition of other chemicals to influent or backwash water which contacts MTM<sup>®</sup> media may inhibit iron, manganese or hydrogen sulfide removal or may break down or coat MTM<sup>®</sup> media. Before adding any chemical to the influent or backwash water, other than chlorine or potassium permanganate, the chemical's compatibility with MTM<sup>®</sup> should be thoroughly tested.**



#### ADVANTAGES

- Broad operating range for iron reduction
- Lower pressure loss through the bed with high flock holding capacity
- Effective hydrogen sulfide, iron and manganese reduction.
- Light weight requires lower backwash rates and reduces pumping requirements
- Chlorine can be beneficial in extending filter run times
- Low attrition loss for long bed life
- Lower shipping cost

#### PHYSICAL PROPERTIES

- Color: Dark brown
- Bulk Density: 45-50 lbs./cu. ft.
- Specific Gravity: 2.0 gm/cc
- Effective Size: 0.43 mm
- Uniformity Coefficient: 2.0
- Mesh Size: 12 x 50

#### CONDITIONS FOR OPERATION

- Water pH range: 6.2-8.5
- Maximum water temp: 100°F/38°C
- Bed depth: 24-36 in.
- Freeboard: 50% of bed depth (min.)
- Service flow rate: Continuous 2-5 gpm/sq. ft., intermittent flows up to 10 gpm/ft.<sup>2</sup>
- Backwash flow rate: At 60°F 8-10 gpm/sq. ft. for tanks ≤ 12" diameter, 10-12 gpm/sq. ft. for tanks > 13"
- Backwash expansion rate: 20-40% of bed depth (min.)

#### MAXIMUM PRACTICAL LIMIT

- Iron 15 ppm
- Manganese 5 ppm
- Hydrogen Sulfide 2 ppm

#### INFLUENT AND BACKWASH LIMITATIONS

- Oil: None present
- Polyphosphates: None present
- Air Scour not allowed

#### CONTINUOUS REGENERATION

- Use Cl<sub>2</sub>, KMnO<sub>4</sub> or both

#### INTERMITTENT REGENERATIONS

- The largest Clack Pot Perm Feeder delivers a maximum of 6 oz of potassium permanganate. As a result if using potassium permanganate to regenerate a tank containing more than 3 cubic feet of media use continuous regeneration.
- KMnO<sub>4</sub> Dosage 1.5-2.0 oz (by dry weight)/ft<sup>3</sup>
- Use an injector size that is two sizes larger than one that is sized for a typical softener application
- Draw/slow rinse time greater than 50 minutes
- Down flow rinse (Fast Rinse) 8 minutes minimum
- Rinse until all traces of KMnO<sub>4</sub> are gone
- 10,000 gallons of water containing 1 mg/L Iron per cu.ft. regeneration
- 5,000 gallons of water containing 1 mg/L Manganese per cu.ft. regeneration
- 2,000 gallons of water containing 1 mg/L Hydrogen Sulfide per cu.ft. regeneration

- For dilute solutions mg/L = ppm
- 37,850 mg KMnO<sub>4</sub> demand
- KMnO<sub>4</sub> demand = [1 x mg/L Fe] + [2 x mg/L Mn] + [5 x mg/L H<sub>2</sub>S]

#### Example Calculation:

Soluble Fe = 3.0 mg/L Fe, Soluble Mn = 0.3 mg/L Mn, H<sub>2</sub>S = 0.2 mg/L H<sub>2</sub>S

KMnO<sub>4</sub> demand = [1 x 3.0 mg/L Fe] +

[2 x 0.3 mg/L Mn] + [5 x 0.2 mg/L H<sub>2</sub>S]

KMnO<sub>4</sub> demand = [3.0 mg/L] + [0.6 mg/L] + [1.0 mg/L]

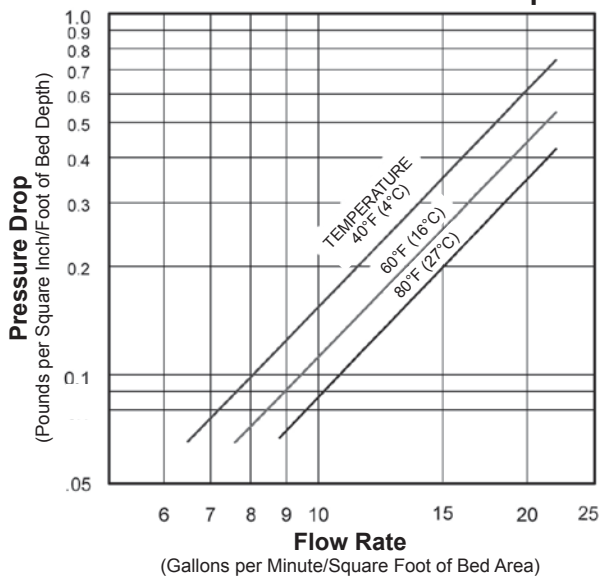
KMnO<sub>4</sub> demand = 4.6 mg/L

$$\frac{37,850 \text{ mg KMnO}_4 \text{ demand per cu. ft. regen.}}{4.6 \text{ mg/L KMnO}_4 \text{ demand}}$$

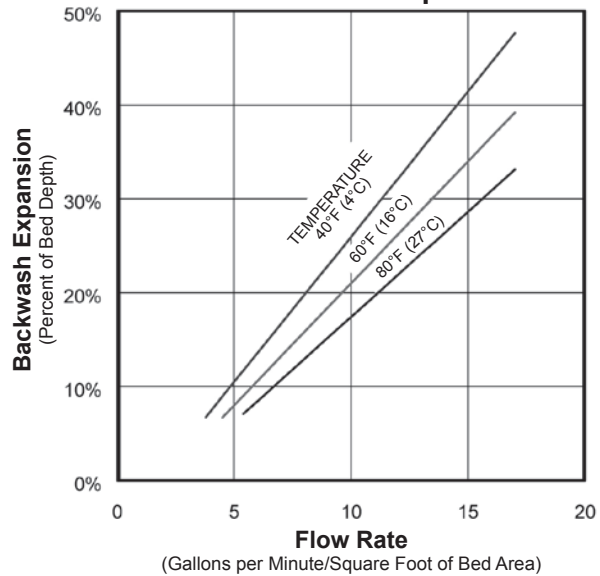
$$\frac{1 \text{ gallon}}{3.785 \text{ Liters}}$$

2,174 gallons per cu. ft. regenerated

### Service Flow Pressure Drop



### Backwash Bed Expansion



Certified to NSF/ANSI Standard 61

### ORDER INFORMATION

Part No.	Description	Cu. Ft./Bag	Wt./Cu. Ft.	Bags/Pallet	Weight/Pallet	Pallet Dimensions
A8012	MTM *	1	45-50 lbs.	40	1850-2050 lbs.	40" x 48" x 42"

MTM \* is a federally registered trademark of Clack Corporation.

### NOT FOR INSTALLATION IN CALIFORNIA

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The filter medias listed in this brochure do not remove or kill bacteria. Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

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