

Blue Earth Products®

Filter Cleaning Guidelines – Media Master

Essential instructions for the planning and implementation of filter chemical cleanings



Table of Contents

Pre-Cleaning Preparation.....	3
Preparation of the filter:.....	3
Personal Protective Equipment	3
Pumping Equipment	3
Miscellaneous Equipment.....	3
Filter Media Cleaning Procedure – Slurry Application.....	4
Day One:.....	4
Day Two:	5
Filter Media Cleaning Procedure – Powder Application.....	6
Day One:.....	6
Day Two:	6
Filter Bay and Trough Cleaning Procedure	8
Runoff Treatment and Disposal Procedure	9
Neutralization Tables	11
Quality Control Measures	12
Benefits and Results.....	12
Important Safety Notice	13

Note:

The procedures described within this guideline and the attachments are proprietary and may be subject to one or more copyrights, patents or pending patent applications.

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Pre-Cleaning Preparation

Preparation of the filter:

1. Read the “Important Safety Notice” at the end of this manual
2. Verify that filter effluent valves are closed tightly
3. Install water supply for emergency supply and slurry preparation (slurry application)
4. Install containment berm
5. Check forklift – to be operated ONLY by a trained and authorized operator
6. Secure ladders (if used)
7. Fill water drum (for flushing pumps) and keep drum next to slurry tank
8. Install, prime and test slurry pump and check tightness of connections
9. Verify runoff discharge procedure
10. Have a copy of the Filter Media Analysis available
11. Have dosage information available

Personal Protective Equipment

- Chemical coverall - wear legs and sleeves outside boots and gloves
- Rubber boots - no lace-ups
- Face Shield
- Goggles
- Rubber gloves
- Hard hat - most worksites

Pumping Equipment

- Portable gas-powered pump (non-metallic, chemical rated pump housing and fittings), hose, intake and discharge pipes
- Slurry tank (slurry application)

Miscellaneous Equipment

- Core sampler - most jobs

Filter Media Cleaning Procedure – Slurry Application

Day One:

1. Backwash and drain filter - done by customer
2. Close effluent valve(s) - done by customer
3. Set effluent valve to “filter-to-waste” if possible - done by customer
4. Collect “Before” sample
5. See “Quality Control Measures” for some additional suggestions
6. Prepare Media Master Slurry:

50 lbs bags

- Position slurry tank in containment berm
 - Dump contents of bags or buckets into slurry tank
 - Add water to at least two feet above solid level
7. Position discharge and intake
 8. Start pump
 9. Pump Media Master slurry:
 - Draw water from the top surface of submerged powder (creating a slurry in the pump)
 - Always keep enough water entering intake to prevent pump seizure
 - Feed water to the same area where suction is being picked up
 - Do not clog the pump by drawing too much solids. Keep intake pipe moving across the submerged powder surface
 - Lift intake up occasionally to flush pump. When stopping, flush the pump and line first. If necessary, use water from the drum.
 10. Discharge the mixed slurry evenly across the filter bed
 11. Flush slurry pump when finished
 12. Raise water level in filter until just above the media ($\leq 2''$), using a slow backwash flow - done by plant personnel
 13. Pump required amount of Floran Catalyst[®] directly from the container into filter. Distribute across filter surface.
 14. Flush pump
 15. Air-scour after 3-4 hours (aeration helps mixing)- if specified, done by plant personnel
 16. Leave the solution to react for 24-48 hours contact time as described by your Blue Earth Products representative

Day Two:

1. Prepare to take “After” media sample after backwash is complete
2. Filter walls and troughs may be cleaned at this time (see Filter Bay and Trough Cleaning Procedure)
3. In the case of a pressure filter replace the gasket and inspection hatch prior to backwashing
4. Prepare pump for feeding the specified amount of neutralizer (if using liquid)
5. Position solid neutralizer above trough or waste tanks (if using solid)
6. See “Runoff Treatment and Disposal Procedure” for additional instructions
7. Start backwash - done by plant personnel (several quick backwashes are more effective)
8. Introduce neutralizing chemistry into backwash flow (effluent channel, sump, or lagoon) – **Do not add to media bed**
9. Check pH in backwash holding facility (lagoon, basin, tank or at sewer entry)
10. Add neutralizer until pH is approximately 6.0 - then stop. Allow time for neutralizer to react.
11. Check backwash water pH and clarity
12. Let filter rest for 30 minutes and perform a second standard backwash.
13. Flush pump and line with water
14. Rinse out empty neutralizer and Floran Catalyst drums. Container runoff should be disposed into backwash holding facility or sewer drain. Securely cap all half-empty neutralizing chemistry containers.
15. Drain Filter
16. Take “After” media sample
17. For greensand and artificial greensand, add permanganate (per OEM guidelines for new media application) and let set overnight. Backwash until the backwash water is no longer pink. This should be performed as standard backwashes, with a 30-minute rest between backwashes.

Filter Media Cleaning Procedure – Powder Application

Day One:

1. Backwash and drain filter - done by customer
2. Close effluent valve(s) - done by customer
3. Set effluent valve to “filter-to-waste” if possible - done by customer
4. Collect “Before” sample
5. See “Quality Control Measures” for some additional suggestions
6. Open 50 lbs bags of Media Master or Media Master RR
7. Pour evenly over filter media bed, do not pour into troughs
8. Raise water level in filter until just above the media (≤ 2 ”), using a slow backwash flow - done by plant personnel
9. Pump required amount of Floran Catalyst directly from the container into filter. Spread across filter surface using the slurry pump.
10. Flush pump
11. Air-scour after 3-4 hours (aeration helps mixing)- if specified, done by plant personnel
12. Leave the solution to react for 24-48 hours contact time as described by your Blue Earth Products representative

Day Two:

1. Prepare to take “After” media sample after backwash is complete
2. Filter walls and troughs may be cleaned at this time (see Filter Bay and Trough Cleaning Procedure)
3. In the case of a pressure filter, replace the gasket and inspection hatch prior to backwashing
4. Prepare pump for feeding the specified amount of neutralizer (if using liquid)
5. Position solid neutralizer above trough or waste tanks (if using solid)
6. See “Runoff Treatment and Disposal Procedure” for additional instructions
7. Start backwash - done by plant personnel (several quick backwashes are more effective)
8. Introduce neutralizing chemistry into backwash flow (effluent channel, sump, or lagoon) – **Do not add to media bed**
9. Check pH in backwash holding facility (lagoon, basin, tank or at sewer entry)
10. Add neutralizer until pH is approximately 6.0 - then stop. Allow time for neutralizer to react.
11. Check backwash water pH and clarity
12. Let filter rest for 30 minutes and perform a second standard backwash.
13. Flush pump and line with water

14. Rinse out empty neutralizer and Floran Catalyst drums (if used). Container runoff should be disposed into backwash holding facility or sewer drain. Securely cap all half-empty neutralizing chemistry containers.
15. Drain Filter
16. Take “After” media sample
17. For greensand and artificial greensand, add permanganate (per OEM guidelines for new media application) and let set overnight. Backwash until the backwash water is no longer pink. This should be performed as standard backwashes, with a 30-minute rest between backwashes.

Filter Bay and Trough Cleaning Procedure

The filter should be shut down to prevent runoff from entering effluent.

1. Rinse down entire filter area with water to provide a wetted surface for chemicals to adhere to
2. Mix Filter Fit[®] and Floran Catalyst at a 10:1 ratio. Utilize all Filter Fit that is mixed.
 - a. **Never store product that has been activated with catalyst.**
 - b. **Use a test patch when treating bare metal surfaces.**
 - c. **When applying to bare metal always rinse as quickly as possible.**
 - d. **A mixture of CSR Plus with Floran Catalyst is not recommended for stainless steel.**
3. With spray units, apply chemical mixture on top of the wetted, fouled surface and allow it to run down the face of the wall and trough area
4. Foam reaction will occur and the material will become sticky
5. Continue to clean from the top down until all areas are covered
6. For best results, do not allow application area to dry. Rinse material off before it dries.
7. Reapply to areas that need additional attention
8. Rinse all areas and backwash filter
9. Return filter to normal operation

Runoff Treatment and Disposal Procedure

Filter media treatments using Blue Earth Products' chemical products produce runoffs that need to be discharged of properly in order to comply with environmental requirements. It is very important to discuss the discharge procedures with the customer before doing a job. Customers might have their own concerns in addition to the regulatory issues, but in most cases operation personnel are helpful in determining the correct procedure.

The runoff generated during filter media jobs is the backwash created as part of the cleaning treatment. It consists of a large volume of wash water (usually 2-4 filter bed volumes), unreacted product (if any), dislodged deposits and any sludge that was present in the deeper layers of the filter bed before they were cleaned. Several quick backwashes produce better results than one long, extended backwash. Filter media has a surface area much greater than the surface area of a tank. Additionally, the deposits on filter media are usually more dense. Thus, backwash water can initially be very dirty early in the backwash before it gradually begins to clear.

Filter treatment runoffs vary in pH but are normally acidic (pH 1.5-6.0). The approximate amount of neutralizing chemistry needed is calculated in the laboratory and given in the lab report. The amount of neutralizing chemistry of choice amount might need to be adjusted down in the field due to buffering agents in the rinse water and the unaccounted for deposits in the underdrain.

The backwash water is either recycled to the head of the plant where it re-enters the treatment process at about 5% of the inflow volume or it is discharged to the sanitary or storm sewers. The customer will need an NPDES permit to discharge the backwash into the storm sewer. Most plants have a backwash holding facility in which the backwash is collected to allow sludge to settle. This can be a tank, a basin or a lagoon.

Backwash recycling should be avoided whenever possible. While our NSF certification allows for recycling with proper dilution, we would much rather discharge to the sewer with a NPDES permit. The reason being that recycling can affect the quality of the produced water and then create problems for the customer. When there is no other option, recycling is possible when either of these conditions are met:

- Media Master RR is used instead of Media Master
- The residual disinfectant in the distribution system is monochloramine and not free chlorine.

In each case, there might still be a temporary drop in chlorine residual, which has to be discussed with the customer before starting the job. Blue Earth Products recommends doing one filter first and evaluating the results before scheduling the entire plant.

Recycling Media Master runoffs in free chlorine systems causes chloramine formation that is unwanted in most cases.

Many plants can discharge their backwash directly into the sewer or drain their backwash holding facility into the sewer. This is the preferred option of disposal. Others might normally recycle, but can either pump or drain to the sewer if needed. pH adjustment is necessary (pH 6-9) for sewer discharge.

Other plants prefer to collect the filter backwash water and clarify sludge in ponds or lagoons. This is a suitable destination for the backwash. The lagoons/ponds are used to accumulate and settle the sludge. The overflowing water is recycled to the head of the plant, drained into the sewer or discharged to a ditch or river (customer has NPDES permit). Neutralization is necessary for discharging backwash water to a lagoon; however, if the lagoon contains sludge from lime softening, neutralization is normally not necessary.

Neutralizer comes in 3 forms, pHinish-L™ is a liquid caustic solution or as pHinish-S™ dry caustic pearls. One gallon of pHinish-L is equal to 2.63 pounds of pHinish-S in terms of its acid-neutralizing capacity. pHaze™ is a DOT non-hazardous neutralizer that buffers and will not go above a pH of 9.0. One pound of pHinish-S is equivalent to 2.5 lbs of pHaze in terms of its acid-neutralizing capacity. Due to the lower shipping cost of pHaze and pHinish-S™, we prefer these for larger filter jobs. pHinish-L is also susceptible to solidify or gel in cold temperatures, preventing pumping. For additional information see the “Neutralization Table.”

1. **pHaze** - position calculated number of bags or buckets along the filter. Have utility knife ready. Let end of bag protrude a few inches over the filter side.

pHinish-L - ensure that the product has not gelled. Prime pump.

pHinish-S - When using pHinish-S, the most common mistake is overshooting the pH. This occurs primarily because pHinish-S must first dissolve before the neutralization reaction occurs thereby resulting in a delayed reaction and overshooting. The way to combat this is to first mix 4-5 lbs of pHinish-S in a 5-gallon bucket with 4-5 gallons of water. Always wear PPE and perform the operation slowly because the dilution reaction is exothermic (significant heat generation - the water could rapidly boil if improperly mixed). When pHinish-S is in solution it will neutralize the runoff almost instantly and completely making your pH checks more accurate.

2. Start backwash
3. When the water level in the filter reaches the top of the troughs, start adding the selected neutralizer by starting the pump or cutting the bags. Cut one bag at a time

and dump contents into the trough or gusset area at a moderate pace. Empty the bag completely before opening the next one.

4. Add neutralizer until calculated amount is reached or pH is elevated to 6-9 standard units.
5. Use garden hose to rinse boots, gloves, handrails and anything that has come into contact with the caustic. Rinse into the filter.
6. Check pH in the backwash holding facility during the later stage of the backwash and after the backwash.
7. The backwash water should be pH 6.0 or above. If not, add additional neutralizer during a second backwash or add more to the next filter to be treated (the backwashes mix in the holding facility).

Neutralization Tables

The following tables can be used to determine the maximum amount of neutralizing chemical needed to neutralize a unit volume of Blue Earth Products cleaning chemistry.

	pHinish-S (lbs)	pHinish-L (gal)	pHaze (lbs)
1 gal mix - CSR Plus® w/Floran® Catalyst	1.32	0.50	3.29
1 gal mix - Top Ultra® w/Floran® Catalyst	2.01	0.76	5.03
1 gal mix - Filter Fit® w/Floran® Catalyst	2.01	0.76	5.03

Table 1 – Neutralization conversions for acidic cleaning solutions (max amount required).

	pHinish-S (lbs)	pHinish-L (gal)	pHaze (lbs)
1 lbs - Media Master®	0.40	0.15	0.99
1 lbs - Media Master® RR	0.30	0.12	0.76

Table 2 – Neutralization conversions for acidic cleaning solids (max amount required).

Quality Control Measures

- Take media samples before and after media cleaning
- Follow recommended chemical dosages outlined in the media analysis report
- Take pictures of the filtration basin before and after treatment
- Measure media height before and after treatment. Add new media to restore filter to original specifications
- Determine chlorine demand before and after cleaning
- Compare water quality data upstream and downstream of the filter before and after cleaning

Benefits and Results

- Complete removal of surface deposits from filter media and filter walls and troughs
- Improved filtration performance
- Reduce oxidant demand
- Improved flow rates
- Low labor and downtime for cleaning

Important Safety Notice

You are working with corrosive chemicals. These can be acids, caustics or oxidants. The products used can do harm through contact with the skin and eyes, ingestion and inhalation. The products are certified for use in drinking water facilities under Standard NSF 60. This means that they do not pose a health risk for drinking water customers if applied properly. This does not mean they do not pose a risk for those who apply the products.

Flush immediately if you come in contact with any of the chemicals. The neutralizing chemistries pHinish-L and phinish-S cause long-lasting, slow healing burns and severe eye damage. Avoid contact and flush extensively if you get liquid or dust in mucus membranes, eyes or skin and seek professional care. Do not ignore any small contact even if it does not burn immediately.

In all cases, do the following prior to the start of any job.

1. Review all Safety Data Sheets (SDS) for the products to be used prior to starting
2. Find out the local emergency phone number that is used at the water plant in case you need medical attention
3. Install a garden hose equipped with a nozzle as an emergency water supply. Leave water turned on and place nozzle where it can be easily reached. Use this for rinsing if you come in contact with any chemicals.
4. Complete Safety Assessment Form