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Blue Earth Products®

Filter Wall and Trough Cleaning Guidelines

Essential instructions for the planning and implementation of filter wall and trough chemical cleanings

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Table of Contents

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. Check access/escape routes and verify that ladders and hatches are safe and secure

    - **NOTE: IT IS CRITICAL YOU ALWAYS COMPLY WITH OSHA CONFINED SPACE AND FALL PROTECTION PROCEDURES**

3. Verify that electrical power is available for running the compressor and ensuring proper lighting

    - Use Shock Buster connectors for electrical equipment

4. Remove all power cables inside the filter
5. Install rinse water supply (fire or garden hose)
6. Safety Assessment Form must be finalized and posted
7. Remove filter from service

    - Lock Out Tag Out Safety Protocol will apply

8. Place boot rinsing tray at entry and fill with 1:10 diluted Blue Earth Products Catalyst® or 12% Bleach

    - Step into tray each time you enter the filter

9. Make sure the filter has been locked out/tagged out
10. Ensure effluent valve is closed to prevent runoff from entering clearwell

Personal Protective Equipment

- Chemical coverall - wear legs and sleeves outside boots and gloves
- Rubber boots - no lace-ups
- Full-face respirator with combination organic vapor / acid gas cartridges with a minimum of a N95 pre-filter attached.
- Rubber gloves
- Hard hat
- Harness (for deep filter bays)

- Fall protection line grab and descent control device (for deep filter bays)

Spraying Equipment

- Electrical compressor
- Chemical pump
- Polyethylene (PE) hose
- Quick-connect fittings
- Spraying wand
- Spraying nozzles

Cleaning Procedure

1. See “Quality Control Measures” for some quality control suggestions.
2. Mix cleaning chemistry of choice [CSR Plus® or Filter Fit®] as directed by your Blue Earth Products representative, with Floran® Catalyst at a 10:1 ratio

    - Only mix one container at a time.
    - Use the entire mixed amount even if the filter looks clean. **[IMPORTANT: CLEANERS THAT HAVE BEEN MIXED WITH FLORAN CATALYST MUST NEVER BE RECLOSED]**
    - On stainless steel, CSR Plus may be used alone. A mixture of CSR Plus with Floran Catalyst is not recommended for use on stainless steel.

3. Spray filter sidewalls and all troughs and pipes, use jet nozzle to reach hard to get locations. Allow solution to react for 1-10 minutes before rinsing off – foaming is common. Repeat as needed for heavily contaminated areas. [NOTE: Do not let foam and solution dry on filter surfaces. Use a test patch when treating bare metal surfaces such as stainless steel or aluminum. When applying to bare metal always rinse as quickly as possible]
4. Flush filter surfaces with garden or fire hose
5. Once surfaces are clean, and rinsed, backwash filter to export removed deposits.
6. Check backwash pH. Neutralization is not normally necessary, however, if the pH is below acceptable limits, please refer to the “Runoff Treatment and Disposal Procedure” section for additional instructions
7. Flush pump with water
8. Perform final disinfection per AWWA Standard and stare regulatory requirements
9. Place filter back in service.

Runoff Treatment and Disposal Procedure

Filter cleaning treatments using Blue Earth Products chemical products produce backwash runoffs that should be neutralized by the volume of water required for a backwash. However, for large cleaning jobs, neutralization of the backwash water may be necessary due to by state, local, and federal safety and environmental requirements. It is very important to discuss the discharge procedures with the customer before scoping or pricing a job. Customers might have their own concerns in addition to regulatory issues, but in most cases operation personnel are helpful in determining the correct procedure.

Filter cleanings produce significantly lower volumes of runoff than filter media treatments. The runoff consists of the chemicals used, the rinse water and the dissolved and suspended solids that are dislodged from the walls and present in residual sediment. Final disinfection, if required, must be performed after all runoff is removed. No further flushing is done after disinfection.

Discharge of the runoff to the sewer or sludge lagoon is the preferred method of disposal. Some filter system's backwash is required to meet the limits of a National Pollutant Discharge Elimination System (NPDES) permit in accordance with the Clean Water Act. For discharge to the sewer, the pH of the runoff usually has to be adjusted to 6-9. Blue Earth Products has three products that can be utilized to accomplish the neutralization process: pHinish-L®, pHinish-S® & pHaze®.

Runoff Neutralization

1. Check pH using a pH strip. The backwash runoff will usually be acidic (pH 3.0 - 6.0)

4. **pHinish-L** - Pump pHinish-L into the backwash water as it is flowing out of the filter. The maximum amount needed is 75% of the volume of the cleaning chemistry (see "Neutralization Table") used (e.g. 3 gal of pHinish-L per 4 gal of Filter Fit). Start with no more than 1/3 of the maximum amount of pHinish-L required.

   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.

pHaze – This product is buffered and dissolves quickly. There is no risk of overshooting the pH, therefore it may be applied in its dry form. In confined spaces, the use of pHaze poses a risk of suffocation as it evolves carbon dioxide gas during the neutralization reaction. Neutralize outside of the confined space whenever possible. If neutralization must be performed in the confined space, adequate air movement and exchange must be provided for. A personal oxygen gas meter should always be used.

5. After initial neutralization treatment. Check pH and add neutralizer until pH is above 6.0 – **then stop*** [Note: add neutralizer outside of filter if possible to avoid recontamination with precipitated particles]
6. If de-chlorination is required before disposal (for storm drain discharge), spread sodium thiosulfate across the surface of the runoff at approximately 5 oz. (140 g) per 1,000 gallons of runoff – mix
7. If filtration is required for storm drain discharge, attach a filtration dirt bag to pump discharge hose and pump the runoff through the bag. The bag can be disposed of in any landfill.
8. Rinse and drain or pump out the tank

* A strong neutralizer such as pHinish-L or pHinish-S can easily cause the run-off to become highly basic, therefore care must be taken not to over dose.

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
1 lbs - neXt®	0.28	0.11	0.70

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

Final Filter Disinfection

Disinfection according to AWWA Standard C 652-92

1. Prepare a chlorine solution of at least 200 ppm free chlorine. This is equal to 1 cup of 10% (available chlorine) NSF Standard 60 bleach in 15 gallons of water. Bleach (same as sodium hypochlorite solution) can be obtained in different strengths. Make sure to adjust bleach dosage to strength (e.g. double the dosage for 5% bleach).
2. Spray the mixture onto every surface that comes into contact with water. Include all plumbing the ladder and your boots. Spray the insides of inflow/outflow pipes as far as possible. Pour remaining bleach into inflow/outflow pipe(s).
3. Exit filter and close manhole. The filter should sit for 30 minutes before re-filling.
4. Sample and report Bacteria Testing (BacT) as required by regulatory agencies.

Quality Control Measures

1. Take photos of the filter before and after treatment
2. Have a certified tank inspector prepare a filter inspection report to identify repair needs and condition of paint coatings

Benefits and Results

1. Complete removal of surface deposits from all filter surface materials
    - Removes disinfectant demand and contribution to disinfection byproduct (DBP) generation and improves finished water quality
    - Water quality improvement from elimination of water-borne surface contamination
    - Reduction or elimination of risk of microbiological corrosion (MIC) and under deposit corrosion
2. Improved filter inspection:
    - Early detection of paint coating failure and corrosion, extended paint coatings lifetime, clearly visible filter surfaces
    - Non-aggressive towards materials used in water filter construction
    - No surface damage from high-pressure spray applications and brushing of surfaces
3. Low labor and downtime for cleaning
    - Reduces out of service time

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 neutralizer of choice can cause long-lasting, slow healing burns and severe eye damage. (The use of pHaze® can help eliminate the hazards of handling hazardous caustic products). Avoid contact and flush extensively if you get splashed. Do not ignore any small contact even if it does not burn immediately.

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.