START-UP AND CONDITIONING INSTRUCTIONS

CalgonCarbon
A Kuraray Company

BACKWASH AND CONDITIONING

Prior to placing a recently filled GAC vessel online, adequate media backwash and media conditioning are required. The following steps are intended to serve as guidelines whereby the GAC media will be ready for use immediately following what is listed. Therefore, media is not "ready for service" until the following steps are taken. These steps may be able to be tailored to accommodate site specific constraints. For more information, please contact your Calgon Carbon sales or technical representative.

INITIAL BACKWASH

Following GAC media exchange, soak the new media overnight (approx. 16 hours). Then, slowly fill the vessel with water in the up-flow direction until the vessel is full. Fill using flow rates that provide less than 5% bed expansion.

Once the vessel is full, conduct the backwashing process by completing each of the steps outlined below:

Initial Backwash
1. Flow @ 5% expansion for 2 minutes
2. Flow @ 10% expansion for 2 minutes
3. Flow @ 15% expansion for 2 minutes
4. Flow @ 30% expansion for 30 minutes
5. Flow @ 15% expansion for 2 minutes
6. Flow @ 10% expansion for 2 minutes
7. Flow @ 5% expansion for 2 minutes

In addition to the initial backwash process that is outlined above, an identical backwash procedure is recommended when an adsorber is restarted after an extended shutdown or restarted after the bed has been drained.

Routine Backwash
1. Flow @ 5% expansion for 2 minutes
2. Flow @ 10% expansion for 2 minutes
3. Flow @ 15% expansion for 2 minutes
4. Flow @ 30% expansion for 10 minutes
5. Flow @ 15% expansion for 2 minutes
6. Flow @ 10% expansion for 2 minutes
7. Flow @ 5% expansion for 2 minutes

STANDARD MEDIA CONDITIONING

The NSF/ANSI 61 protocol uses an exposure volume equivalent to approximately 60 empty-bed volumes (EBV) of water; however, an acceptable effluent water quality can be achievable with less water. For reference, the EBV for each 20,000 lb. of GAC is 5,000 gal.

Following the end of the backwash process outlined above, each single Model 10 or Model 12 vessel should be conditioned as follows:

1. If the vessel is not already filled with water, fill the adsorber in up-flow direction at 200 gallons-per-minute (gpm) for 30 minutes with potable water (contaminant free).

2. Rinse in downflow at 500 gpm for 10 hours to expose the GAC bed to the same EBVs as the exposure volume used in the NSF/ANSI 61 test procedure.

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For an individual Model 12-40 vessel, after completing the backwash as outlined above, follow the conditioning steps below:

1. If the vessel is not already filled with water, fill the adsorber in up-flow direction at 200 gallons-per-minute (gpm) for 30 minutes with potable water (contaminant free).

2. Rinse in downflow at 500 gpm for 10 hours to expose the GAC bed to the same EBVs as the exposure volume used in the NSF/ANSI 61 test procedure.

If site limitations prevent ready discharge of this volume of water, or if less water consumption is desired, effluent water quality can be tested as conditioning progresses, and conditioning can be continued until the target effluent quality has been achieved. For example, the effluent could be examined with each 10 bed volume increment, where 10 bed volumes is approximately equal to 100 minutes of operation with a 10 ft vessel operated at 500 gpm, or 200 minutes with a 12-40 vessel at 500 gpm. Please check with your local Calgon Carbon representative for expectations regarding discharge and sampling if you need more

GAC BACKWASH AND CONDITIONING FOR DRINKING WATER APPLICATION

The reasons for backwashing before initially placing granular activated carbon (GAC) into service are to:

1. Size-segregate the carbon (largest, densest particles at bottom, smallest, least-dense particles on top), so that:

   - Future backwashing will return the GAC to the same relative depth in the vessel
   - Interstitial grain space will be maximized to minimize pressure drop

2. Any remaining air is removed from the bed

3. Carbon fines are removed which will increase pressure drop

The National Sanitation Foundation (NSF) / American National Standards Institute (ANSI) Standard 61 establishes minimum health effects requirements for materials used in municipal drinking water treatment. The standard restricts the levels of chemical contaminants and impurities that are imparted to drinking water from products, components, and materials which contact the water during treatment. The NSF/ANSI 61 testing protocol for GAC media is designed to mimic the critical procedural steps of a GAC adsorber start up in the field, including backwashing and conditioning. In order for the effluent water quality at adsorber start up and the NSF/ANSI 61 test results to be comparable, the field and lab procedures must be consistent with one another. A conditioning step with water flushed to waste is recommended after the initial backwash.