Softener, Carbon System Start-up Procedure

1) **If possible, fill the mineral tank with water and allow the media to soak for 1 hour for softening resin, 48 hours for GAC.**
2) **If soaking the media is not feasible, continue below.**
3) **Before turning on the water to the system, cycle the valve to the "Backwash" position.**
4) **Unplug the power from the wall to stop the timer.**
5) **Open the inlet valve slightly allowing water to enter the system very slowly. You will hear air running to the drain.**
6) **As soon as water is seen at the drain, plug the power in and immediately cycle the valve to the "Rapid Rinse" position.**
7) **Open the inlet valve fully and unplug the power. Allow the system to run to the drain for no less than 20 minutes to clean out the media.**
8) **Plug the power back in and cycle the valve to the "Home" position.**
9) **For softeners, add approximately 5-10 inches of water to the brine tank. Fill the brine tank with water softener salt.**
10) **Initiate a full regeneration cycle and allow the system to complete the regeneration uninterrupted.**
11) **For carbon systems: If fines persist after the first few days, put the system into a backwash cycle and unplug the system for 1 hour. Plug the unit back in and allow it to finish its cleaning cycle. You may need to repeat this multiple times depending on the application. A post sediment filter can be also be installed if desired.**

Carbon Basics

Granular activated carbon is commonly used for reducing organics and residual disinfectants from water supplies. This improves taste and protects water treatment components such as reverse osmosis membranes and ion exchange resins from possible damage due to oxidation or organic fouling. Typical surface area for activated carbon is approximately 1,000 square meters per gram (m2/gm). However, different raw materials produce different types of activated carbon varying in hardness, density, pore and particle sizes, surface areas, extractables, ash and pH. These differences in properties make certain carbons preferable over others in different applications. The two principal mechanisms by which activated carbon removes contaminants from water are adsorption and catalytic reduction. Organics are removed by adsorption and residual disinfectants are removed by catalytic reduction. While more expensive, catalytic carbon is far superior for the reduction of chloramines and other contaminants. Catalytic carbon can generally be used in lieu of non catalytic carbon.

Important Carbon Considerations

pH:

Organics are less soluble and more readily adsorbed at a lower pH. As the pH increases, removal decreases. A rule of thumb is to increase the size of the carbon bed by twenty percent for every pH unit above neutral (7.0).

Particle size:

Activated carbon is commonly available in 8 by 30 mesh (largest), 12 by 40 mesh (most common), and 20 by 50 mesh (finest). The finer mesh gives the best contact and better removal, but at the expense of higher pressure drop.

Flow rate:

The lower the flow rate, the more time the contaminant will have to diffuse into a pore and be adsorbed. A 20 by 50 mesh carbon can be run at twice the flow rate of a 12 by 40 mesh, and a 12 by 40 mesh can be run at twice the flow rate of an 8 by 30 mesh. When considering higher flow rates with finer mesh carbons, maintain a peak flow of <10 GPM ft^2 to mitigate pressure drop issues. Higher water temperatures decrease the solution viscosity and can increase the dye diffusion rate, thereby increasing adsorption. Higher temperatures can also disrupt the adsorptive bond and slightly decrease adsorption. It depends on the organic compound being removed, but generally, lower temperatures seem to favor adsorption.