SAFE WATER TECHNOLOGIES, INC



Field Notes By Rusty Waters

"Unscientific wisdom from a collection of the greatest minds in water quality improvement" (We ain't passin' judgement,...we're passin' ideas!)



"How much carbon makes a consumer happy?"

"How long will this cartridge last?" I've been asked. They say there are no fool questions, only fools that ask them! (or something like that), but I swear this question always puts a bind in my shorts anyway. So, we have developed our own fool answer: "I dunno! What's in the water?" (Unless we're talking to somebody with an MBA in marketing, or a CPA. Then we answer: "I cannot give a categorical response to a hypothetical situation." That usually freezes them for a second.)

Look you young'ens, how can I possibly give you an answer to that question if you have no idea what every single element in your water supply is, and how much of it is there ? What's your flow rate per minute? How much water are you going to use per day? Per week? What's the temperature, of the water? pH level?

Have you noticed that filter media manufacturers will not guarantee the performance of their media. They will only guarantee that each batch is consistent to a physical specification. That one batch will generally be the same as the next one. That is because they have no idea where their media is going, or on to what kind of water, or if the person installing it knows how to install it properly.

Let's use carbon as an example. One manufacturer's carbon gets filled into another manufacturer's cartridge, which gets put into another manufacturer's system, which can get sent to any corner of the world. How long will that carbon cartridge last? As a manufacturer, I know that every cartridge will last exactly the same, if every carbon batch and cartridge size is identical. Now, my only problem is to find two identical applications, and I'm in heaven. While this can be done in a tightly controlled lab by a bunch of eggheads, you and I both know that this cannot be done out in the field.

That is why the most reputable of companies will not make a lot of claims as to their cartridges' performance, and be leery of manufacturer's that do.

Fact 1: Most GAC manufacturers recommend a service flow rate of 2 gpm per cubic foot of carbon.

Fact 2: One cubic foot of carbon fills about 44 standard 10 inch GAC cartridges.

Question 1: How fast then, should water flow through a standard cartridge to stay within a carbon manufacturer's guidelines?

Hint: What is 2 gpm divided by 44?

Answer: 5.82 ounces of water per minute. (That's less than would fill a cup of coffee.)

Question 2: Then why do most carbon cartridge manufacturers recommend a flow rate of 1 gpm through their cartridges?

Answer: I dunno! What's in the water?

Or a better question is: What are you really trying to remove? It just so happens that of all the bad things carbon is good at removing, chlorine is one of the fastest in terms of reaction time with carbon, as opposed to something like radon (yes, carbon has been shown to reduce radon levels), which may require an even slower flow rate than 2 gpm per cubic foot. This is one reason that carbon cartridges are not typically used for radon removal. (Continued on next page)

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Here are some good rules of thumb to remember about carbon. (Remember that these are not absolute truths.)

— Typically, one cubic foot of 12 x 40 mesh coal based carbon at a flow rate of 5 gpm can remove 1 ppm of chlorine for 1,000,000 gallons of water. (This is about three years in an average household.) 8x30 mesh carbon will remove about half that amount at a slower flow rate. 20 x 50 mesh carbon will remove about 50% more chlorine, at a slightly faster flow rate.

- 8x30 mesh is used in commercial applications.
- 12x40 mesh is used in whole house residential.
- 20x50 mesh is used in most GAC cartridges.

— Carbon blocks will perform even better in the right applications with up to 5 times the active area of a GAC cartridge. Generally, the smaller the mesh size of carbon, the better the performance, and the better the mechanical (sediment) filtration capabilities, but the greater the pressure drop and cost.

- For chemical reduction using carbon, the slower the flow rate, the better. This means < 2 gpm per cubic foot in a household application, unless the manufacturer has supplied specific, contrary information.

- Generally, when comparing carbons, a couple of quick things should be looked at:

- lodine Number The higher the better. 650 for a low grade, 950+ for a high grade.
- Molasses Number This is a quasi indicator of color removal capabilities. The higher the better.
- Ash Content The lower the better. Acid washed carbons are generally low in ash content.
- Hardness You don't want the carbon to break up in the backwash cycle, but this is not as critical a concern in cartridges. Softer carbons with more ash will be a lot dustier when filling or rebedding tanks.
- What is the carbon made of? Coal, wood, coconut shell? I prefer coal based for most applications. It has been proven to me that it's the most balanced of the carbons when it comes to removing chemicals, taste, odor, chlorine. But there are a few people that like coconut based carbon for color removal, or ozone reduction. Coconut is also harder.

- Carbon can become coated easily with iron and/or hydrogen sulfide, which will drastically reduce it's performance and life.

Yep, it's a lot to absorb (no pun intended). By now your thinkin' the only way to know for sure when it is time to change a cartridge is to do a water analysis. I guess I didn't make y'er life any easier. The day-to-day reality of it though, is that not many people are going to shell out \$200.00 for laboratory water analysis to install a \$10.00 cartridge. But at least you have something to tell a homeowner next time he asks "How long will my carbon cartridge last?" Just say "I dunno! What's in your water?" or do what I do...

Tell 'em "Change it every 6 months, or sooner if the water starts tasting bad or stops coming out."

Rusty

If you have an unscientific idea that you would like to share with your fellow water quality improvement professionals, by all means let us hear it so we can pass the information along. Design by experience and evolution can be more reliable than what the eggheads can do in the lab or on a computer. We here at SWT believe that knowledge is meant to be shared. We do not presume to know more than our customers, and we really enjoy the exchange of ideas.





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