

Whole House Filtration

POE Filter Addresses Contaminant Concerns

Water does not get an easy time of it these days. It is treated at source, filtered during transit, chlorinated, fluorinated, UV radiated and ozonated. Like modern-day air travelers, it is scrutinized for carrying dangerous “weapons.” Yet still, as recent events in Washington, D.C. showed, contaminants *can* get through. The massively high doses of lead in water reaching a community’s homes caused national concern and alarm to hundreds of families.

Whole house filtration systems are the end of the line in defense against contaminated water. They are becoming more popular as a non-visible way (compared with end of faucet filters) to ensure safety at point of entry in the house. The key is to build in the broadest array of filtration devices to catch any number of undesirable contaminants that the water may have picked up along the way.

POE Filter Removes Metals

A Canadian company has been developing a whole-house filtration system with a proprietary design combining both traditional and new technological methods to remove water pollutants at POE in the home. Watermate Filtration Systems, Inc., based in Kitchener, Ontario, has been tackling the issue from all angles. First, the company worked on redesigning the carbon structure to improve the mechanical capacity of the filter. Standard carbon blocks are extruded and compression molded with polymers to bind the carbon granules together, but unfortunately this produces ‘blinded sites’ that reduce efficacy up to 50 percent. Using a different engineering process, the filters are rigid, virtually indestructible,

monolithic carbon blocks that are unaffected by temperature and moisture extremes. A lack of blinded sites results in more than 95 percent of the carbon being active and, therefore, available to remove unwanted contaminants. Furthermore, it provides a high flow rate (22 lpm on a 10-inch block) and operates in low water pressure environments (greater than 20 psi). Consequently, this improved efficacy increases the filter life by a factor of five to 10 and makes the product cost effective when measuring dollars per filtered gallon. Industrial quality housing made from 316 stainless steel also ensures longevity.

Secondly, the whole house filter incorporates a variety of advanced mechanisms to more effectively sift out dangerous contaminants as well as the standard hazards of chlorine, MTBE and volatile organic compounds. The filter, for example, has built in a powerful adsorbent not just to remove lead but also other harmful metals including mercury, trivalent chromium and cadmium. Registered under the NSF Standard 53 Protocol, it is a ceramic, cationic ion-exchanger with a high specificity for lead and harmful metals, and this preferential adsorption spares competing beneficial ions such as calcium and magnesium. It can reduce lead to non-detectable levels (less than 1 ppb), well below the EPA limit of 15 ppb and the shocking 300+ppb found in some Washington D.C. households earlier this year.

Arsenic Concerns

Another highly publicized danger to drinking water is arsenic +3 and +5. Excessively high arsenic concentrations are found in the groundwater of many

countries, with an estimated 100 million people drinking arsenic-contaminated water worldwide. In the United States, regions such as Wisconsin, the North Eastern Seaboard and the Southwest are known to be subject to particularly high levels of the toxin that leaches out of the natural ores and minerals in the water-bearing aquifer. Many medical studies have shown that long-term contamination at such concentrations can lead to changes in the skin (hyperkeratosis) and even carcinoma with links between exposure to arsenic and other types of cancer also reported. In 1992, the World Health Organization recommended a threshold limit for arsenic in drinking water of 10 µg/L, and following a decision by the EPA in October 2001, the United States also committed itself to complying with the threshold of 10 µg/l by 2006. To meet this challenge, the Watermate whole house filter cartridges incorporate a specially designed agent, based on iron hydroxide oxide granules with finely structured surfaces in the nanometer range that adsorb the arsenic. Filtered water results in maximum concentration levels below these regulatory levels.

Antimicrobial threats are not always easy to remove from water and new technological advances have been made in the fight against waterborne pathogens. The wet, carbon environment of filters is inherently conducive to bacterial, mold and algae proliferation, with colonies and biofilms clogging up the free main path of water. Thus, a problem faced by filter users is a loss of efficiency unless additional pressure is applied to drive the water through, which may require larger pumps as



well as additional electrical costs. The whole house filters incorporate an EPA-registered, NSF-certified and FDA-listed antimicrobial agent that is based on an inert ceramic zeolite containing silver ions. These are control-released to bind to microbes and the agent has been shown to achieve up to a five-log reduction in microbial growth on treated products. The entire wetted path of the system is coated with a Teflon layer containing this antimicrobial agent. Thus, bio-fouling is prevented, dangerous microbes such as *E. coli* and *Salmonella*, as well as many others, are removed. Combined with the proprietary carbon block design mentioned above, pathogens such as *Cryptosporidium* and *Giardia* cysts also are filtered out by the tiny pores of the filtration media. This prevents premature failure of the cartridge and helps extend the life of the filter system.

In addition to the filtration agents engineered into the whole house

Excessive Lead Levels Concern Arlington and D.C.; Residents File Suit; Poses No Threat to White House

Since November 2002, D.C. Water and Sewer Authority (WASA) samples taken from thousands of water lines in the city have indicated lead levels exceeding the 15 parts per billion established as safe by the Environmental Protection Agency.

WASA reported that only approximately 23,000 residents that had lead service lines had the elevated levels. However, later it was reported in homes in Arlington, Va., with homes that did not.

The District of Columbia faced potentially toxic levels of lead in portions of the water supply. It was assured, however, that the president was not in any danger. The White House has its own filtering system to ensure safe drinking water to the building.

Meanwhile, D.C. residents have filed a suit that alleges that WASA first discovered unacceptable levels of lead in 2001 but covered up the findings and failed to alert the public after tests in subsequent years confirmed the findings. However, WASA told a congressional hearing that it alerted the city Health Department and affected customers in 2002 and had since made numerous public announcements. The suits seek to force authorities to supply alternate clean drinking water and clean up the lead. No illnesses have been reported and the city pointed out its efforts to distribute water filters to residents even before EPA's order.

Lead is commonly used in household plumbing materials and water service lines. Excessive levels of lead could cause kidney problems and high blood pressure in adults and delays in physical and mental development in children.

WQP

About the Author

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system, ultraviolet radiation is added just to ensure that when the tap is turned on, will not be any contaminants left in the water.

Of course, all of these filtration mechanisms might sound good in theory, but if they are not made easy to use then their effectiveness becomes irrelevant. The system can be fitted retroactively and new into households and is hard plumbed like a standard hot water tank. In a typical consumer household, the filters must be user friendly so that installation is practical, cartridges are replaced appropriately and the families actually benefit from the technology built into the system. To this end, the company designed the system so that change out of replacement filters is quick, leak-free and without the need for tools. And, seeing as filter change out is unlikely to be most people's top

priority, an optional monitoring process based on number of gallons filtered is offered.

Ultimately, however, the way most households will judge whether or not their filtration system is working is by the smell and taste of the water. "Safety improvement is what we are looking for," said Hank Hunse, president and CEO of Watermate. "But if the freshly filtered water does not taste as good as natural spring water, kids and adults are less likely to drink it."

Whole house filtration products—especially when used in conjunction with disinfection systems—are important not only for taste and to protect against bacteria and viruses that may be lurking, but also to keep pipes and appliances clean and free of those same contaminants. **WQP**

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