FACT SHEET

Copper-Silver Mineral Sanitizers

Brought to you by the PHTA Recreational Water Quality Committee (RWQC)

I. INTRODUCTION

Copper and silver ionizers are devices that actively (electrochemically) generate copper/silver ions using electrically charged anodes; or passively (slow dissolution) using a reservoir of water-soluble silver and/or copper mineral media. This fact sheet examines the properties of *passive* mineral ionizers, referred to as "mineral sanitizers," for use in swimming pool and spa sanitation.

II. SUMMARY OF CHARACTERISTICS

- Copper/silver mineral sanitizers are mineral-based devices that release silver and/or copper ions into the pool or spa water passively by slow dissolution.
- Silver ions act as a bactericide.
- Copper ions are an effective algicide and algae inhibitor.
- Mineral sanitizers must have the EPA Registration number and EPA Establishment number printed on the product label.[1]
- Mineral sanitizers must be used in accordance with the EPA-accepted manufacturer's instructions and labeling.

III. GENERAL DESCRIPTION

A. What It Is — A copper/silver mineral sanitizer is typically a vessel and/or cartridge installed in a pool or spa circulation/filtration system. The vessel or cartridge contains media with the active ingredient of either silver, copper, or a combination of both. When the filtration system circulates water through the vessel contacting the mineral media, positively charged silver (Ag) and/or copper (Cu) ions are released and dispersed into the pool or spa water.

B. What It Does — Positively charged silver ions function as a bactericide in the pool and spa.[2] Positively charged copper ions act as an algicide or algae inhibitor. Mineral sanitizers may allow for reduced chemical use, as permissible by their EPA-accepted labeling and instructions. Always follow the manufacturer's EPA-accepted instructions for use. When manufacturers register pool/spa sanitizers with the EPA, they provide both efficacy and toxicity data. EPA determines minimum and maximum use concentrations based on efficacy and toxicity levels.[3,4]

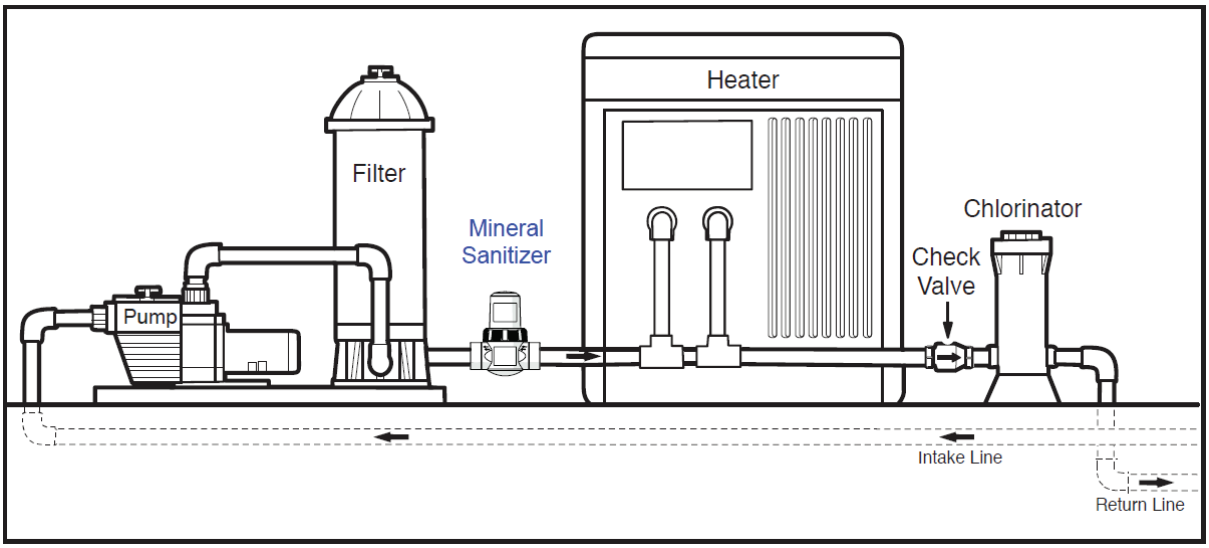
C. What It Does Not Do — By itself, mineral sanitizers do not fully sanitize a pool or spa. Mineral sanitizers must be used in conjunction with a compatible EPA-registered primary sanitizer (chlorine or bromine).[4] Mineral sanitizers are supplemental to the use of an EPA-registered primary sanitizer.

Mineral ions do not oxidize organic contaminants. Refer to the manufacturer's instructions for proper and compatible oxidation treatment methods, such as oxidizing with chlorine, bromine or the use of potassium peroxymonosulfate (MPS). pH and total alkalinity adjusting chemicals may be needed to maintain balanced water.

IV. APPLICATION

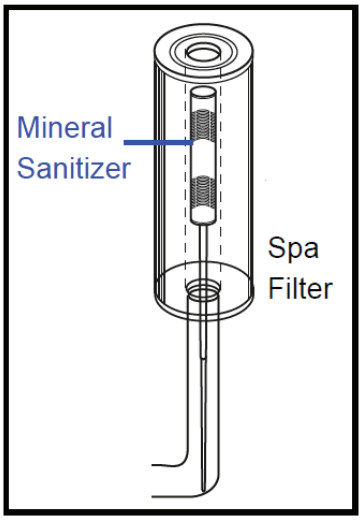
A. Installation — Mineral sanitizers are typically installed in a pool or spa return line. Typical installation of mineral sanitizers includes hard plumbing, as illustrated in Figure 1.

Figure 1: Typical Plumbed Install



Or placing the mineral cartridge inside a compatible filter cartridge, as illustrated in Figure 2.

Figure 2: Typical Spa Filter Cartridge Install



Refer to the manufacturer's installation instructions for all compatible equipment and devices, and always follow all manufacturer's warnings and precautions for use.

B. Operation — Follow the manufacturer's EPA-accepted operating instructions for use. The operating instructions for mineral sanitizers typically include:

- Start-Up
- Water Balancing
- Oxidizing
- Circulation
- Water Testing

As water flows through the mineral sanitizer contacting the active media, silver and/or copper ions are dispersed into the pool or spa continuously for the life of the mineral cartridge. Follow the manufacturer's instructions for replacement intervals of mineral cartridges, which are typically four (4) to six (6) months.

C. EPA-Registered Primary Sanitizer Requirement — Mineral sanitizers must be used in accordance with their EPA-accepted instructions, which may include the use of a compatible EPA-registered primary sanitizer (chlorine or bromine).[4]

D. Oxidizer Requirement — Mineral sanitizers do not oxidize organic contaminants, and therefore must be used with an oxidizing treatment such as oxidizing with chlorine, bromine or the use of potassium peroxymonosulfate (MPS).

E. Testing Methods — Follow manufacturer's instructions for testing pool or spa water chemistry and minimum primary sanitizer residual.

The determination of metal concentration in pool water is not straightforward. Metal ions that are oxidized by chlorine, bromine, or other oxidizers are no longer dissolved in the water and tend to discolor (stain) the water and/or pool surface. Metals in this undissolved form are typically not measured by metal tests. Additionally, most metal tests do not measure sequestered ions. Therefore, these tests frequently underreport the concentration of metals in pool and spa water containing sequestering agents. Follow the ionizer manufacturer's instructions for the frequency of metal testing of pool or spa water, and the testing device manufacturer's instructions to properly interpret test results.

F. Benefits

- **Reduced chemical use:** The EPA-accepted manufacturer label may include the reduction of minimum chlorine or bromine residual.
- **UV Resistance:** Silver and copper ions are unaffected by sunlight and may remain active bactericides and algicides for long periods in the water.
- **Passive Ionization:** Does not require electrical power for continuous mineral ionization of the pool and spa water.

V. PRECAUTIONS

A. Health Effects — Always follow the manufacturer's precautions, warnings, and Safety Data Sheets which may include handling, exposure, unintended ingestion of mineral media, and proper disposal of mineral cartridges.

Having copper ions function as a bactericide may be problematic as certain bacteria (including various *Pseudomonas* species) can develop resistance to copper ions.[5]

B. Compatibility — Copper/silver mineral sanitizers may not be compatible with all sanitizing systems. Typically, these mineral sanitizers may not be used with biguanide (Polyhexamethylene biguanide or PHMB); or in conjunction with other copper-based algicides due to the increased risk of copper toxicity and staining.

Always follow the manufacturer's instructions for compatibility to other pool and spa treatment products and equipment.

C. Non EPA-Registered Mineral Sanitizers and Counterfeits — With the rise of online shopping, many mineral-based pool and spa products have entered the market with false claims of water sanitation and EPA registration. It is critical to always verify the EPA registration of any pool or spa sanitizing product, which can be done using the EPA's online pesticide search directory.[6] If a sanitizer's EPA registration cannot be verified, or if an EPA Registration number does not appear on the label, then the product should not be used for pool or spa treatment.

Counterfeit products have also been identified in the marketplace. Contact the manufacturer if there is any doubt about the authenticity of a product.

D. Metal Staining — Excess metal concentrations in pool or spa water may cause surface staining. It is important to follow the manufacturer's instructions to minimize the risk of metal staining. It would also be advisable to test the source water for metal content. Excessive metal levels may require the use of metal control agents to prevent staining.

VI. REFERENCES

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VII. ADDITIONAL INFORMATION

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