

Minnicare® Cold Sterilant

Application Notes: Calculating Volume Required for Distribution Systems

The purpose of this Application Note is to assist water system users on how to calculate a 1% concentration of Minnicare and how to effectively add, test and safely rinse the chemical out of the system.

Determine Quantity of Water

To determine the amount of Minnicare required for the disinfection of a water distribution system, first determine the holdup water volume in the high purity water system. This includes storage tanks, piping, U.V. systems and filter housings. Add to the estimated storage volume the estimated volume of water in the pipe. Estimate the volume of water in the pipe using the following table:

| Schedule 80 PVC Pipe Size | Gallons Per 1 Foot of Pipe Length |
|---------------------------|-----------------------------------|
| .5 INCH | .0122 GALLONS |
| .75 INCH | .0225 GALLONS |
| 1 INCH | .0374 GALLONS |
| 1.25 INCH | .0666 GALLONS |
| 1.5 INCH | .0918 GALLONS |
| 2 INCH | .1534 GALLONS |
| 2.5 INCH | .2202 GALLONS |
| 3 INCH | .3432 GALLONS |

Example: A high purity water system with a 500 gallon storage tank and 1500 feet of 1.5 inch PVC piping.

Pipe volume in gallons = 1500 feet X .0918 gallons = 137.7 gallons in 1500 feet of pipe.

U.V. System + Filter housings = 12 gallons

Total system volume = 500 gallons + 137.7 gallons + 12 gallons = 649.7 gallons.

Minnicare Cold Sterilant required for a 1% concentration = 649.7 x 0.01 = 6.5 gallons of Minnicare.

If you sanitize infrequently, we recommend using the entire tank volume or use a non-particle shedding brush for scrubbing to ensure that Minnicare Cold Sterilant solution contacts the entire tank surface as the system recirculates. Alternatively, a spray nozzle (spray ball) on the system return may be used for dispersing Minnicare Cold Sterilant onto the tank surface. You may drain the tank to just above the low level cut-out of the distribution pumps. Use this lower volume to calculate the amount of Minnicare Cold Sterilant required.

Time Required for Sanitization

Minnicare Cold Sterilant will achieve a 6 log reduction of bacteria contamination with 36 minutes contact time. The length of time required to break down any biofilms will vary depending on the time from the last system disinfection. It is recommended that a minimum of one hour contact time is maintained in the system; however, longer exposure times will not cause any harm to the piping system. If the system has a build-up of biofilm, a 4 hour minimum to 12 hour maximum contact time is suggested.

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Adding Minncare and Setting Equipment

The calculated amount of Minncare Cold Sterilant can be pumped or poured directly into storage tanks. Safety equipment such as rubber gloves, an apron, and eye protection should be used. During the recirculation of the Minncare solution, any resin beds must be off-line. In addition, all ultraviolet sterilizers should be shut off because the U.V. light causes Minncare Cold Sterilant to break down. U.V. lamps should be returned to service when rinsing Minncare Cold Sterilant from the system.

Post filters, depending on the filter characteristics, may need to be removed and then replaced after Minncare Cold Sterilant is rinsed from the system. Some characteristics include:

- Length of time in service
- Pressure loss across the filters
- Compatibility with Minncare

If a filter is compatible with Minncare Cold Sterilant (for example, the FiberFlo® hollow fiber cartridge filter), it can be sanitized in-line. Some installations require new filters to be sanitized before installation into the system.

Testing for Minncare

The Minncare® 1% Test Strips will indicate the presence of a 1% Minncare Cold Sterilant solution at any test port in the system. The Minncare® Residual Test Strips colorimetrically indicate Minncare Cold Sterilant chemical levels at 100, 30,10, 1 and 0 PPM. These residual test strips allow you to determine when the Minncare Cold Sterilant has been thoroughly rinsed out of the system.

Rinsing the Minncare Solution

You may drain your storage tank to the waste neutralization system or rinse directly to the drain with an acid neutralizer. Minncare Cold Sterilant has an approximate pH of 3.5 when used at 1% (See Minncare Application Notes: Sanitization of High Purity Piping). Verify local regulations regarding the acceptable discharge pH level. Refill the make-up storage tank and system with freshly treated water. Recirculate fresh water and bleed the return water to the waste neutralization system. Restart the U.V. system to assist in the breakdown and removal of Minncare Cold Sterilant. Test each water system outlet with Minncare residual strips. When the test strip indicates the presence of less than one ppm of Minncare Cold Sterilant, resin beds can be put on-line and filters reinstalled if applicable. The sanitization procedure is then complete and the system is ready for use.

NOTE:

High purity water systems vary in their designs and associated distribution loops. Please contact your BioScience Mar Cor Purification BioScience sales representative or inhouse technical support specialist for questions or application assistance by calling toll-free, 1-800-633-3080.

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