

Standard Operating Procedure <b>General Chemical Sanitization Procedure for DI  Distribution Loops</b>	SOP No. 6.022
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DCR No.: 05009  
Revision No.: 0

**Effective:** 03-03-2005  
**Supersedes:** 03-03-2005  
**Revision Date:** 03-03-2005  
**Page No.:** 1 of 6

## 1 Purpose

- 1.1 This procedure is to provide a general procedure how to chemical sanitize deionized (DI) distribution loop.
- 1.2 General equipment in the DI distribution loop include DI storage tank, loop circulation pump, DI bottles, DI post filters, ultra-violet (UV) sterilizer, and final filters.

## 2 Scope

- 2.1 This procedure applies to plastic (e.g. PVC, PP or PVDF) DI distribution loop.
- 2.2 This procedure does not apply to stainless steel material.

## 3 Responsibility

- 3.1 Service technician shall carefully read through the procedures prior to sanitizing DI distribution loop.
- 3.2 Service technician shall notify customer when to do the sanitization.
- 3.3 Service technician shall prepare sufficient materials to be used during the sanitization.

## 4 Material and Tools

- 4.1 Safety Glass
- 4.2 Plastic Gloves
- 4.3 Regenerated service DI bottles for replacement and make up DI water.
- 4.4 1% Solution of Minncare® Cold Sterilant (Peracetic Acid Solution, pH 3.5)
- 4.5 1% Minncare® Test Strips
- 4.6 Minncare® Residual Test Strips

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Revision No.	SOP No.	Page
0	6.022	2 of 6

- 4.7 pH Sensor or Litmus Paper
- 4.8 ¼" Tubing or 500 mL Spray Bottle
- 4.9 15-20 feet of 1" hose and 1" adapters (union x hose barb / adapter x hose barb) and Hose Clamps.
- 4.10 2 lbs Baking Soda for Neutralization
- 4.11 5-Gallon Bucket

## 5 Procedures

- 5.1 **IMPORTANT: Tag all points of use (POU): "DO NOT USE, CHEMICAL SANITIZATION IN PROGRESS" prior to performing the sanitization.**  
Also, notify customer about the sanitization is in progress.
- 5.2 Turn off UV sterilizer. Verify that the UV is off.
- 5.3 Turn off loop circulation pump(s). Verify that the pump is off.
- 5.4 Turn off loop make up water. Verify that water is not being introduced into storage tank.
- 5.5 Close DI bottle(s) inlet & outlet isolation valves, then open bleed valves to relieve pressure and drain lines.
- 5.6 In order not to pass chemical sanitizer through DI bottles, bypass DI bottles by disconnecting DI bottle(s) inlet & outlet hoses and connecting them together.
- 5.7 Close DI bottle(s) bleed valves.
- 5.8 Open DI bottle(s) inlet and outlet isolation valves.
- 5.9 Slowly open storage tank's drain valve and drain water 2 inches above low-low level setpoint. **Note: DO NOT drain water below Low-Low Level Setpoint.**
- 5.10 Turn on loop circulation pump. Verify that the pump is running.
- 5.11 Follow Minncare instruction to add sufficient 1% solution of Minncare® Cold Sterilant into storage tank.
- 5.12 Circulate water with Minncare® cold sterilant for approximately 25 minutes to allow time for mixing.

Revision No.	SOP No.	Page
0	6.022	3 of 6

- 5.13 Add 2 cups of baking soda in a 5-gallon bucket. The baking soda is used to neutralize the 1% Minncare® cold sterilant to pH 7.
- 5.14 Collect sample in the bucket. Sample at points of use by opening user drop valve and test water with 1% Minncare® test strip to confirm the loop water contains 1% concentration of Minncare. Note: If necessary, add more Minncare into storage tank to achieve 1% concentration.
- 5.15 After confirming to achieve 1% Minncare® concentration in the loop, record start time of chemical sanitization on form # 6.022.1, Chemical Sanitization.
- 5.16 If the storage tank does not have spray ball(s), collect 500mL of 1% Minncare® cold sterilant in a spray bottle and spray the 1% solution to the upper internal surface of storage tank. Be sure to get all internal surfaces of the tank in order to ensure sanitization. Note: If possible, connect a ¼" flexible hose to a nearby sample valve in the loop (possible on loop return, close to tank) and use this to sanitize the upper interior surface of the tank.
- 5.17 Allow the water to circulate in the loop for approximately 60 minutes.
- 5.18 Open user drop valve and collect sanitizer in the bucket.
- 5.19 Test sample with 1% Minncare® test strip to confirm 1% Minncare® concentration. Allow the sanitizer pass through user drop valve for 45 seconds to ensure sanitization of points of use and test sample again with 1% Minncare® test strip.
- 5.20 After all points of use have been sanitized and complete of 60 minutes of sanitization in the loop, turn on the loop make-up in order to dilute the Minncare solution. **Note: if loop make-up rate is slow (e.g. less than 2 GPM, you can feed city water into a DI polish bottle, producing DI water, and add to storage tank.**  
  
**Note: When adding water by feeding city water through a DI bottle, total organic carbon (TOC) is not being removed from the water.**
- 5.21 Open the loop storage tank's drain valve to maintain the tank level (feed & bleed).
- 5.22 Continue the feed & bleed dilution for 1-2 hours.
- 5.23 Rinse the interior surface of the storage tank with DI water in order to rinse the sanitizer off the tank walls.

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Revision No.	SOP No.	Page
0	6.022	4 of 6

- 5.24 Collect sample at points of use by opening user drop valve with the 5-gallon bucket. Make sure sufficient baking soda has been added in to bucket.
- 5.25 Test sample at the points of use with Minncare® residual test strip to confirm the water concentration is less than 1 ppm residual concentration. **Note: This may take longer than 1-2 hours.**
- 5.26 When the residual is less than 1 ppm, allow water to flow through user drops for 45 minutes to ensure the sanitizer is flushed from the point.
- 5.27 Cycle ball valves in DI system to ensure chemical is not held-up in the valve's internal surface.
- 5.28 Once the Minncare® residual is less than 1 ppm, drain the storage tank to the low-low level then close the drain valve and turn off the loop circulation pump. Note: The tank should be filled primarily with the make-up system (e.g. reverse osmosis system). This will keep the TOC level to a minimum.
- 5.29 Close DI inlet and outlet valves and break the connection of inlet and outlet hoses.
- 5.30 Connect inlet hose to inlet port of new (regenerated) DI bottle(s). Slowly open inlet valve and fill water through the regenerated DI bottle(s).
- 5.31 Until water level appears at the outlet port of the regenerated DI bottle(s), connect DI outlet hose to the outlet port of the regenerated DI bottle(s).
- 5.32 Open DI bleed valve to flush DI bottle(s) to drain for at least 3 minutes. **Note: The loop circulation pump may be needed to accomplish this.**
- 5.33 With the loop circulation pump off, valve off and remove cartridge filter(s) (DI post filter and final filter) and replace with new filters.
- 5.34 Return all valves to their normal operating position.
- 5.35 Turn on the loop circulation pump. Verify that the pump is running.
- 5.36 Turn on the UV sterilizer. Verify that the UV is on.

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Revision No.	SOP No.	Page
0	6.022	5 of 6

- 5.37 After the system has been stabilized for 15 minutes, record the operating conditions on form # 6.022.1, Chemical Sanitization.
- 5.38 Remove Tag at all points of use. Notify customer about the completion of sanitization.

Revision No.	SOP No.	Page
0	6.022	6 of 6


## Document Approval

  
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3-3-05  
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03-03-2005  
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