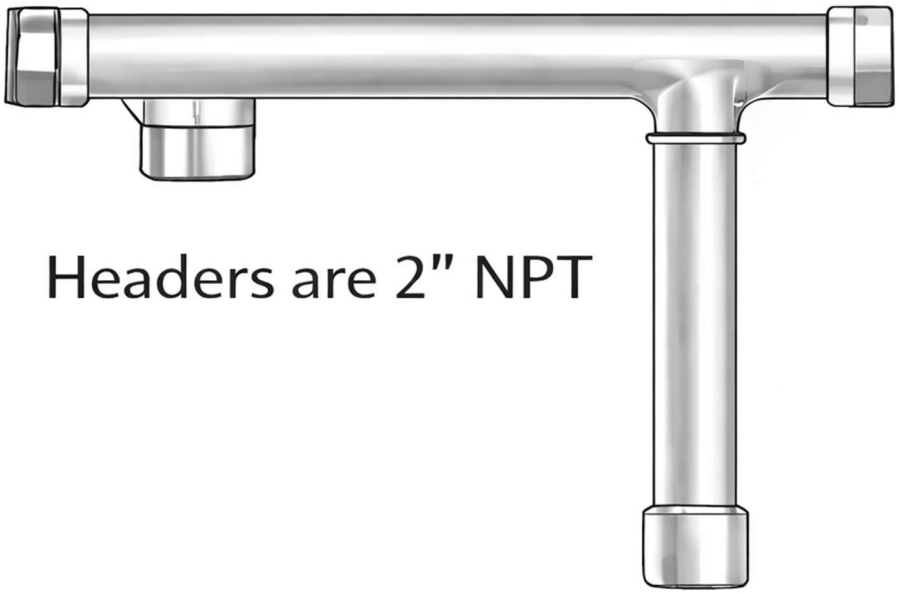
NanoSoft®

THE WATER SOFTENER REPLACEMENT

POWERED BY NANOBUBBLE TECHNOLOGY

USER MANUAL AND INSTALLATION GUIDE

(Welded 316 Stainless Steel)



Headers are 2" NPT

SIMONIZ®

CRS

CHEMICAL REDUCTION SOLUTIONS

General Safety Information

Icon Legend:

 **— DANGER! … Injury or death and property damage are *imminent***

 **— WARNING! … Injury or death and property damage are *possible***

 **— CAUTION! … Potential property damage, expensive repairs, and/or voiding the equipment warranty *may result***

 **BURN HAZARD! Direct exposure to steam, hot water, or hot metal surfaces can cause severe skin burns. Skin contact with 140°F (60°C) water or metal for only five (5) seconds may cause a second-degree burn.**

Failure to comply with instructions following a safety icon may result in adverse consequences including, property damage, personal injury, or, in extreme cases, death.

General Safety Guidelines:

1. Inappropriate use of this product (beyond typical, intended use) could cause damage to the product and other property. It may also result in personal injury or, in extreme cases, death.
2. Only designated, qualified, and competent personnel should conduct installation, maintenance, and service in accordance with the directions in this product instruction manual.
3. Installation shall comply with all applicable federal, state, and local, electrical and construction, regulatory codes.
4. Improper installation, start-up, operation, maintenance, or service may void the product warranty.
5. When installing, commissioning or servicing this product:
   a. ALWAYS select and wear appropriate personal protective equipment (PPE) before carrying out any physical work at the job site. Appropriate PPE may include hard hats, safety glasses, gloves, boots or shoes w/ non-slip soles and toe guards, and protective overalls.
   b. ALWAYS scan the work area and take note of potential hazards before entering. Adjust your travel path or work position to avoid hazards and personal injury.
   c. ALWAYS observe designated safety procedures when working in hazardous locations (areas containing explosive and combustible gases, vapors, and dusts) and confined spaces (locations where the breathable air supply may be limited or variable or where entrapment could occur).
   d. ALWAYS use appropriate lockout-tagout procedures to disconnect power sources and de-energize machinery before conducting installation, service, and repair.
   e. ALWAYS use great care and appropriate safety gear when working above ground level, especially on ladders and platforms or in the presence of overhead, electrical power lines.
   f. ALWAYS ensure that all “live” steam, water supply, and condensate return lines are isolated before breaking or loosening any plumbing joints.
   g. ALWAYS carefully relieve any residual internal pressure in the system or connecting pipe work before breaking or loosening any plumbing joints.
   h. ALWAYS allow hot parts to cool before commencing work to avoid the risk of skin burns.

Table of Contents

1. Product Description

The CRS and Simoniz® NanoSoft® Ionization-Enhanced Nanobubble Generator (hereinafter referred to as the **"NanoSoft®"**) is a next-generation water-conditioning solution engineered to dramatically improve the performance, efficiency, and reliability of car wash systems. The NanoSoft® reduces surface tension, enhances chemical dispersion, increases dissolved oxygen, removes and prevents scale and biofilm, keeps injectors and nozzles free-flowing, improves drying, boosts foam quality, and stabilizes both alkaline and RO-treated processes.

Powered by Simoniz's® and CRS's advanced ionized nanobubble technology, the NanoSoft® produces up to 150% more nanobubbles than previous generations while eliminating minimum-flow requirements. The nanobubble generator core contains no moving parts inside the water path, requires no chemical additives, and operates with minimal electrical demand.

Designed for simple installation and long service intervals, the NanoSoft® can be used as a standalone main-line water treatment device. Once installed, the NanoSoft® continuously conditions water to prevent scale formation—even in extremely hard water—while improving the performance of soaps, waxes, sealants, RO membranes, and all downstream equipment.

2. What is in the Box

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NanoSoft® x 1

Grundfos UPS 43-100 SF (Stainless Steel) x 1

Grundfos 40/43 Bronze Flange Pair x 1

2" x 1-1/2" MIP x FIP Brass Bushing (Lead Free) x 2

1-1/2" x Close Stainless Steel Nipple x 3

1-1/2" FIP WaterFlex Flexible Corrugated Stainless Steel Hose x 1

14/3 Power Cord, 90° Plug (6 Feet) x 1

1/2" Liquidtight Cord Grip, Non-Metallic x 1

Loctite 55 Cord x 1

Note: For all fittings, use Loctite 55 cord. Wrap a strand of cord in each thread carefully then wrap in a cross hatched pattern. Use the appropriate number of turns based on the manufacturer's recommendation as described on the container. Loctite 55 cord should be used on all NPT fittings of the NanoSoft® to ensure leak free connections.

Note: In the diagrams below, the "Adapters" refer to the 2" to 1-1/2" hex bushings combined with 1-1/2" close nipples.

3. Product Operation

How the NanoSoft® Operates

Once installed in the correct location, the NanoSoft® or NanoSoft® Mini immediately begins generating ionized nanobubbles and charged particles as soon as water flows through the device.

- There is no minimum flow requirement for operation—unlike the original NanoBubblizer®, both NanoSoft® models are engineered to activate even at very low or intermittent flows.

- The maximum flow rate for each model represents the point at which insufficient nanobubble concentration would be achieved. Staying at or below the listed maximum flow preserves optimal system efficiency.

Model Selection Overview

NanoSoft® Mini (up to 40 GPM)

Designed for:

- RO machine feed lines
- Chemical panel / injector supply lines
- Low-flow, high-efficiency pre-treatment

NanoSoft® (up to 125 GPM)

Designed for:

- Main water line of a car wash
- Partial or full replacement of water softeners
- Whole-site scale prevention and chemistry optimization

Car Wash Sizing & Placement Guidelines

1. RO System Feed Line (Use the NanoSoft® Mini)

The NanoSoft® Mini should be installed on the pressurized line feeding the RO machine.

Sizing is simple:

- **Typical RO production flows:** 6–8 GPM
- **Peak flows:** 14–20+ GPM depending on storage tank draw
- The NanoSoft® Mini (40 GPM max) easily handles all RO feed conditions at almost all commercial washes.

Purpose:

- Prevent scale and biofilm from fouling RO membranes
- Reduce backflushing frequency on GAC prefilters

- Increase permeate quality and extend membrane life
- Dramatically improve spot free drying of cars

2. Chemical Panel Feed Lines (Use the NanoSoft® Mini)

Install the NanoSoft® Mini upstream of the chemical injection panel or injector manifold.

If the wash is consistently busy:

- Size to average flow across all active chemistry nozzles.
- One NanoSoft® Mini per chemical panel is sufficient in most tunnel and busy IBA applications.

Benefits:

- Eliminates injector fouling
- Enhances foam quality, color pop, and fragrance
- Improves dispersion of presoaks, waxes, sealants, and drying agents

3. Main Water Line (Use the NanoSoft® – full size)

The NanoSoft® (max 125 GPM) is designed for installation on the primary incoming water line ahead of the car wash equipment or manifolds.

Purpose:

- Replace or supplement salt-based water softeners
- Prevent scale formation site-wide
- Improve drying performance
- Lower surface tension for better rinsing and sheeting
- Enhance performance of all downstream chemistry

Recommended placement:

- Immediately downstream of the backflow preventer
- Upstream of the water softener (if being supplemented) or in place of the water softener if replacing it
- Ahead of all chemical injection points, RO feed lines, and heat exchangers

4. Product Installation

⚠ IMPORTANT:

- The NanoSoft® and NanoSoft® Mini must always stay full of water (“flooded”) while running.
- Never run the pump dry. Running dry will damage the pump permanently.
- Ensure that the pump is flowing water in the loop WITH the mainline water flow and never AGAINST the mainline water flow. The NanoSoft® runs water in a small loop and that loop should be flowing WITH mainline water flow.

A licensed plumber or mechanical contractor is recommended for installation.

Installing a NanoSoft® Nanobubble Generator

1. Identify Which NanoSoft® You Are Installing

NanoSoft® (full size) — up to 125 GPM

- For the **main water line** of the car wash.
- Often used instead of or in addition to a water softener.

NanoSoft® Mini — up to 40 GPM

- RO feed line
- Chemical panel feed line
- Small dedicated flow lines

2. Make Sure You Have the Correct Fittings

NanoSoft® (full size):

- Has 2" NPT female connections

NanoSoft® Mini:

- Has 1" NPT female connections
- Can be “soft plumbed” using flex hose or 1" NPT adapters

3. Before You Start

Do **ALL** of these before touching any pipes:

- Turn off water to the area where you will install the NanoSoft®
- Relieve pressure by opening a nearby valve
- Make sure you know which direction the water flows
- Lay out all hoses, barbs, adapters, and clamps

4. Install the NanoSoft®

Choose one of the following installation options based on your plumbing layout.

Option 1: Install the NanoSoft® on a Bypass

Primary benefit: simpler replacement of the pump if it ever needs to be replaced.

Step 1: Cut in the bypass assembly
Cut into the main supply line and install the two tees shown in the diagram so water can be diverted through the NanoSoft® bypass loop. Install the normally open gate valves on the vertical bypass legs and the normally closed gate valve on the straight main line between the tees.

Step 2: Install the bypass plumbing
Connect the bypass loop exactly as shown:

- **Tee down to 90° elbow**
- **Union**
- **NanoSoft® body**
- **Union**
- **90° elbow back up to tee**

Make sure the NanoSoft® is installed in the correct flow direction shown by the blue arrows.

Step 3: Connect the circulator pump and flexible hose
Install the 2" to 1.5" adapters, 1.5" flanges, circulator pump, 1.5" close nipple, and flexible hose exactly as shown in the diagram. Confirm that the pump direction matches the intended flow path.

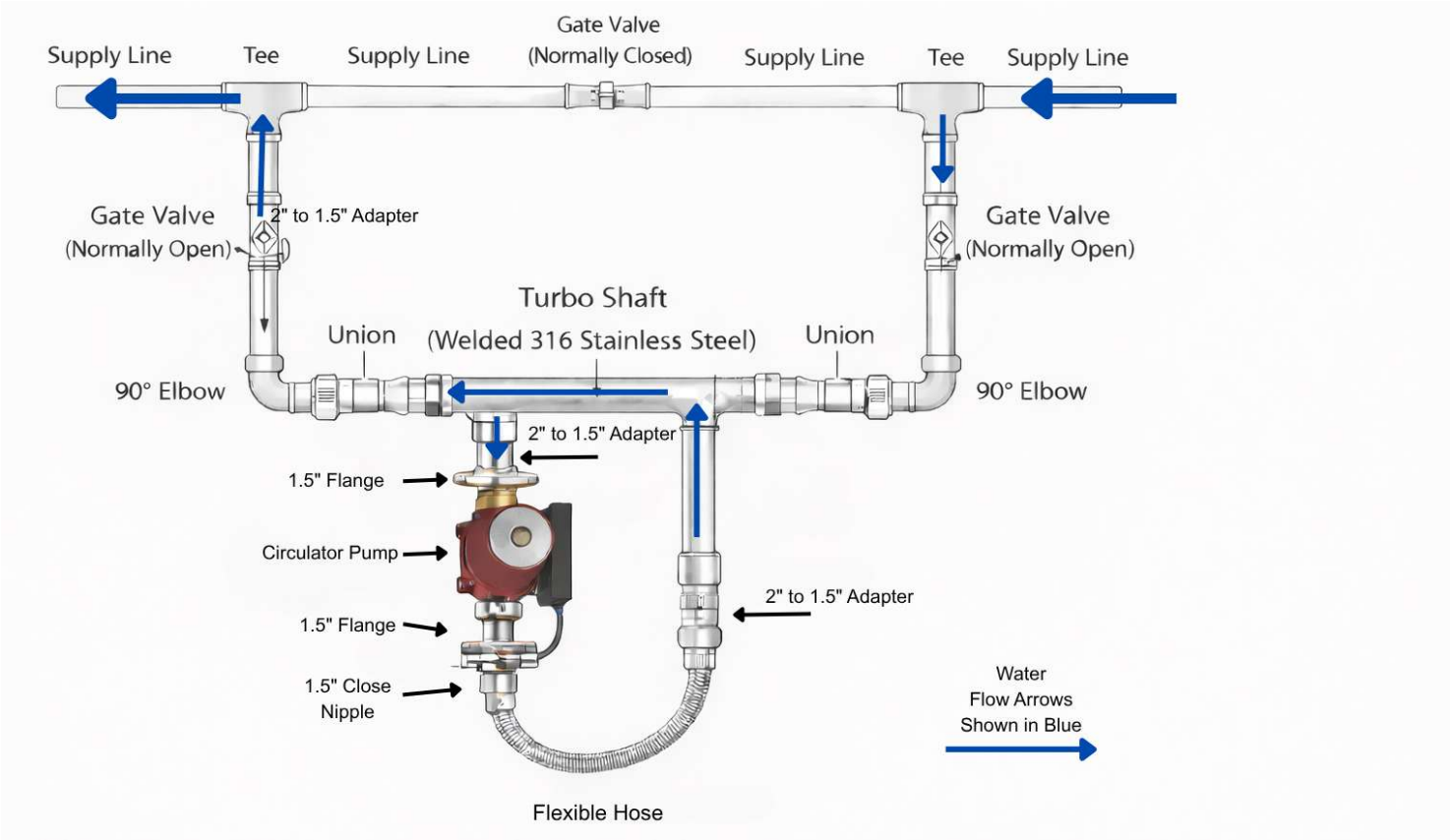
Step 4: Tighten and seal all fittings

- Tighten clamps, unions, flanges, valves, and NPT fittings
- Do not overtighten NPT threaded connections
- Use Loctite 55 cord or another suitable thread sealant on all NPT threaded connections
- Verify that all unions are fully seated for future serviceability

Step 5: Set valve positions for operation
For normal bypass operation:

- Keep the two bypass gate valves open
- Keep the straight-through main line gate valve closed

This forces water through the NanoSoft® bypass loop as shown.



Option 2: Install the NanoSoft® on the Main Water Line Without a Bypass

Primary benefit: simpler piping layout with fewer components.

Step 1: Cut out the section of main supply line
Cut out the section of the main water line where the NanoSoft® assembly will be installed.

Step 2: Install the NanoSoft® directly in-line
Connect the main supply line to the NanoSoft® assembly exactly as shown:

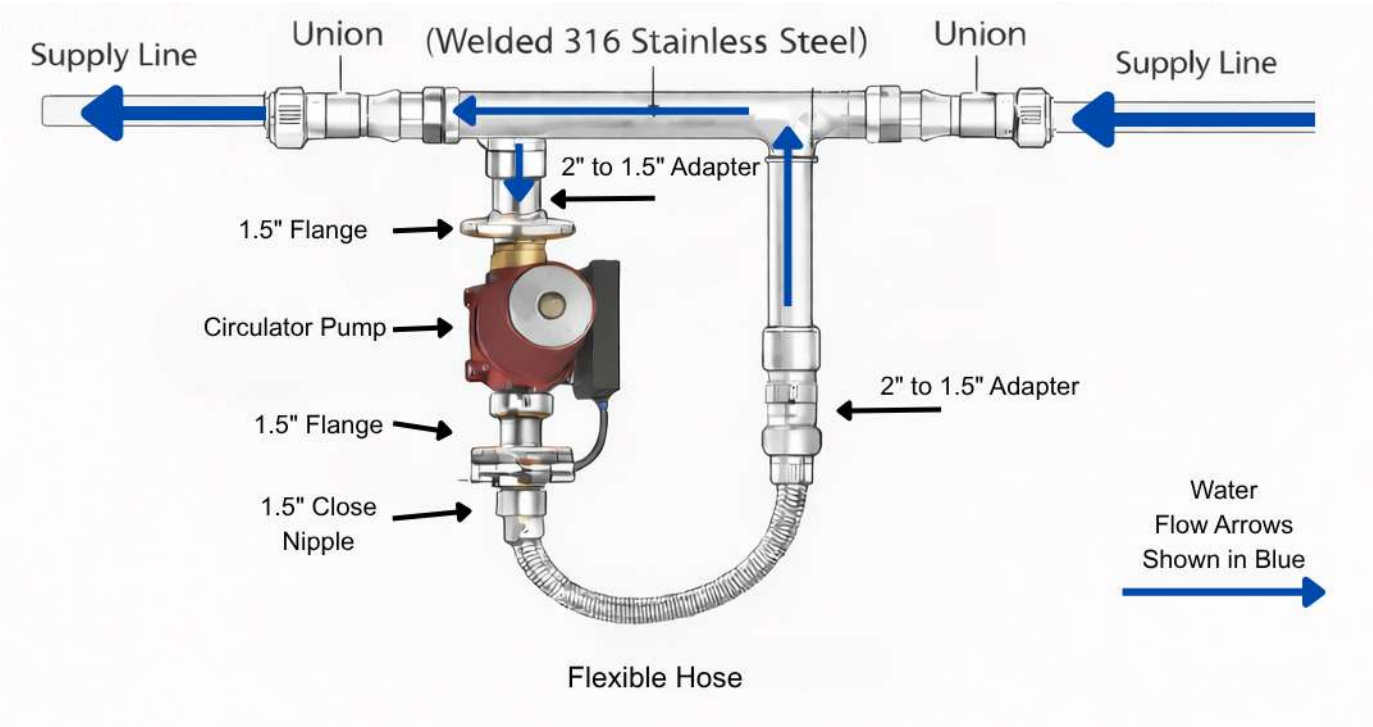
- Supply line
- Union
- NanoSoft® body
- Union
- Supply line

Make sure the unit is installed in the correct direction of flow shown by the blue arrows.

Step 3: Connect the circulator pump and flexible hose
Install the 2" to 1.5" adapter, 1.5" flanges, circulator pump, 1.5" close nipple, and flexible hose exactly as shown in the diagram. Confirm that the pump direction matches the intended flow path.

Step 4: Tighten and seal all fittings

- Tighten clamps, unions, flanges, and NPT fittings
- Do not overtighten NPT threaded connections
- Use Loctite 55 cord or another suitable thread sealant on all NPT threaded connections



THIS IS THE MOST IMPORTANT STEP.

⚠ **The NanoSoft® must be full of water before it is powered on. Running it dry will cause damage.**

To flood the system:

1. Turn on the water slowly
2. Allow the pipes, hoses, and NanoSoft® to fill completely
3. Check for leaks
4. Make sure water is flowing smoothly with no air pockets

Do not power the pump until you confirm it is fully flooded.

6. Wire the Circulator Pump

Use the included 3-wire cord to wire the pump.

Basic wiring:

- Green = Ground
- Black = L (Line / Hot)
- White = Neutral

Instructions:

1. Make sure all power is turned off before wiring the pump.
2. Route the included 3-wire cord into the pump wiring compartment.
3. Install and tighten the included wire strain relief grommet where the cord enters the pump.
4. Connect:
   - Green wire to the ground terminal
   - Black wire to L
   - White wire to neutral
5. Double-check that all wire connections are secure and that no bare wire is exposed.
6. Reinstall the pump wiring cover before energizing the unit.

Important:
All pump wiring should be completed by a licensed electrician and in accordance with all applicable local electrical codes.

7. Power Up and Run the NanoSoft®

Now that the system is full of water:

1. Turn on electrical power to the NanoSoft®
2. The pump will run continuously (24/7)
3. Leave the system operating — it is designed for continuous operation
4. Verify that water continues to flow through the unit

8. Final Checks

- Look for leaks at all connections
- Make sure the NanoSoft® is installed in the correct flow direction
- Confirm the system stays flooded while running
- Check that downstream equipment (RO, chemical panel, manifolds) is receiving stable flow

9. You're Done

The NanoSoft® requires no regular maintenance, but the system must:

- Stay full of water
- Stay powered on
- Have correct inlet/outlet orientation

5. What to Expect at Initial Startup

When the NanoSoft® is first installed and turned on, the system may behave differently for the first few hours. The reactions listed below are completely normal and are part of the startup and cleaning process.

1. You May See Discolored Water or Small Debris

As the NanoSoft® begins generating ionized nanobubbles, it immediately starts loosening:

- Old scale
- Rust particles
- Biofilm
- Mineral buildup inside pipes

This material can temporarily come out of the system as:

- Slightly cloudy or discolored water
- Small bits of debris

This is normal and will clear on its own as the system cleans itself internally.

2. Increased Flow of Debris to Filters, Nozzles, or RO Pre-Filters

Because the NanoSoft® breaks loose old buildup, you may notice:

- Faster loading of prefilters
- Some strainers or screens catching debris that was previously stuck inside pipes

This is a **short-term startup effect** and should stabilize within a few hours to a few days.

3. Why Initial System Flushing Matters

To speed up system stabilization:

- Run water through the system to push out loosened debris
- Check and clean any prefilters or screens after the first few hours
- If your RO system has a GAC prefilter, it may require an early backflush

Once the initial debris is cleared, the system will remain much cleaner going forward.

4. System Will Stabilize as Pipes Become “Conditioned”

Once the NanoSoft® has been running for a short period, the pipework becomes saturated with nanobubbles and:

- Water clarity improves
- Scale stops forming
- Injectors and RO membranes see cleaner flow
- Chemistry dispersion improves
- Drying quality increases

Summary

If you see cloudy water, small debris, faster prefilter loading, or temporary discoloration during the first few hours—**it is completely normal.**

It means the NanoSoft® is working and cleaning the system from the inside out.

6. Installation, Validation, & Ongoing Monitoring Protocols

Key References – WICRA (Water Infection Control Risk Assessment), TJC (The Joint Commission), TIR 34 (Technical Information Report), AAMI ST79 (Association for the Advancement of Medical Instrumentation), WMP (Facility Water Management Plan),NSF/ANSI 61 (National Science Foundation/ American National Standards Institute), Water Infection Control Risk Assessment (WICRA).

1. Planning Phase

a. The Facility shall develop a water sampling, testing, flushing, and ongoing monitoring (STFM) plan before installation of the NanoBubblizer® which will be followed throughout the installation, start-up, and post-install monitoring time. The Facility shall recommend a third-party review of the STFM for sufficiency. Elements of this plan are as follows:

1. Review current water systems testing, monitoring, and treatment plan, including existing WICRA and WMP, for a compatible and complimentary overall strategy for the affected portion(s) of the Facility. Additional testing, monitoring, flushing and treatment may be added to existing WMP based on a NanoBubblizer® risk assessment.

2. The Facility may perform its own NanoBubblizer® risk assessment for systems that could be affected to inform the installation, validation, and ongoing monitoring phases. For example, collection points of biofilm debris, e.g., aerators, water hammer arrestors, and in-line filters, including integral filters, e.g., integral biofilters in disinfection-type medical equipment or ice machines, which are not easily cleaned by flushing.

3. The Facility should conduct baseline microbial sampling and water quality testing at control points per the Facility's WMP. Additional locations could be added as determined by the NanoBubblizer® risk assessment, part 1.a.2 above.

i. Microbial sampling should include Total CFU (colony forming units, bacterial and fungal), or Heterotrophic Plate Counts (HPC), and can include more specific total coliform quantification as per EPA drinking water standard (<200cfu/ml). (In critical environments, testing for species of pathogenic microorganisms, such as Mycobacterium, and Pseudomonas can be added).

ii. Biofilm marker testing can include Total Organic Carbon (TOC) and/or Total Protein (Wilson C et.al 2017)

iii. Endotoxin testing is recommended as a pre-installation baseline, post installation and during the flushing stage. Routine endotoxin testing is not recommended as per the EPA drinking water recommendations.

iv. Rapid ATP (Adenosine Triphosphate) water testing can be conducted on-site as a screening tool for ongoing monitoring. Baseline should be established before and after installation (Wilson C et.al 2017).

v. Other water quality testing can include hardness (<150mg/L tap; <1mg/L critical), conductivity (<500mS/cm tap; <10mS/cm critical), pH (6-9 tap; 5-7 critical), chlorides (<250mg/L tap; <1mg/L critical). (AMI Guide TIR34:2014/R(17), Section 4).

4. As part of the planning phase, the Facility should assess the need for strainers and filters installed and maintained by the Facility during start-up and ongoing if desired. See 2.a below.

2. Installation Phase

a. The Facility shall install an in-line strainer (type and size may vary with a screen mesh of 40 as a good rule of thumb) upstream of the nanobubble water treatment device and routine cleaning should be included in the Facility's maintenance schedule.

b. The Facility may choose to install filters to protect distal points per the STFM. Include routine inspection and cleaning in the Facility's maintenance schedule.

c. The Facility shall flush the system upon start-up of the NanoBubblizer®. The Facility should continue following the flushing protocol per their WMP or updated WMP that includes NanoBubblizer® protocols, see 1.a.i above. Note: if the protocol has a rotation of flushing distal points (not all performed on the same unit of time), supplemental testing of the system served by the NanoBubblizer® should be added.

d. The Facility shall conduct microbial sampling and water quality testing at control points per the STFM and the Facility's WMP and/or updated NanoBubblizer® WMP.

3. Validation Phase

a. The validation phase serves to independently ensure the safety of the water treated by the NanoBubblizer® as compared to baseline, and to validate the efficacy of the NanoBubblizer® in improving water quality for the Facility.

b. If Facility chooses to do so; A third party shall conduct and/or oversee microbial sampling and/or water quality testing at control points per part 1.a.iii above. The testing may be conducted by the facility maintenance personnel defined in the WMP (the WMP or updated NanoBubblizer® WMP must include training of Facility maintenance personnel who will be responsible for sample collection, proper handing (sterility, temperature, holding time and transportation of samples, as well as PPE) if applicable).

c. The third party shall receive, analyze, and report the independent laboratory data to the Facility.

d. Once validation of the system has been achieved and safety and efficacy have been approved, validated water quality may serve as the new baseline for ongoing monitoring, see below.

e. After the NanoBubblizer® efficacy is validated, the Facility shall update maintenance and cleaning schedules in the WMP to reflect the needs of the new system addition.

4. **Ongoing Monitoring Phase**
   a. The purpose of the ongoing monitoring phase is to ensure the achieved NanoBubblizer® water quality improvements and/or validated baselines, are maintained.
   b. The ongoing monitoring phase should be conducted or overseen by a third party, and should include control limits, control measures, corrective actions, and contingency response per the STFM and the Facility's WMP and/or updated NanoBubblizer® WMP.
   c. As with the validation phase, trained Facility maintenance personnel may collect samples. Independent laboratory data receipt, analysis, interpretation, and reporting are the responsibility of the third-party consultant. Recommendations for corrective actions are the responsibility of the third-party consultant. Implementation of the corrective actions are the responsibility of the Facility.
   d. Validation of corrective actions should follow the validation phase as per 3.a-d above, prior to resuming ongoing monitoring.

Definitions:

Biofilm: Densely packed communities of microbial cells that grow on living or inert surf aces and surround themselves with secreted polymers.

Building water systems: Includes hot and cold-water distribution and all devices that use water. This can include items, such as hot tubs, decorative fountains, and cooling towers.

Control: To manage the conditions within your building according to your water management program.

Building Water Management Program (WMP): a facility or system policy prescribing controls, control limits, control measures, and control points, contingency response, and corrective actions to maintain acceptable levels to protect patients, team members, and visitors from water borne pathogens.

Control limits: The maximum value, minimum value, or range of values that are acceptable for the control measures that you are monitoring to reduce the risk for Waterborne pathogens growth and spread.

Control measures: Engineering controls and practices you implement in your building water system to limit growth and spread of Waterborne pathogens, such as heating, adding disinfectant, or cleaning.

Control points: Distal points in the water systems where a control measure can be applied.

Contingency response: Reaction to control measures that are persistently outside of control limits or events that pose an immediate risk to control of your building water systems; required for all instances when Legionnaires' disease occurs, but may also be appropriate for unexpected events such as equipment failure or acts of nature that disrupt the water system.

Corrective action: Steps taken to return control measures to acceptable levels.

Dead legs: Piping that is subject to low or no flow due to design or decreased water use such as capped pipes or unused faucets.

Disinfectant: Chemical or physical treatment used to kill germs, such as chlorine, monochloramine, chlorine dioxide, copper-silver ionization, ultraviolet light, or ozone.

Distal point: a location near the end of a distribution system branch where water is dispensed, and potential stagnation can occur based on usage.

Filtering: Removes small contaminants that may pass through a strainer.

Hazardous conditions: Anything that, if not controlled, can contribute to the growth, and spread of water borne pathogens to a person.

Heterotrophic plate counts: A measure of the number and variety of bacteria that are common in water; a high count may indicate a high microbial load and the need for corrective action but cannot be substituted for Waterborne pathogens testing.

Waterborne pathogens: Bacteria of fungal genus which encompasses species that can cause disease.

IOM: Installation, Operation, and Maintenance manual

PPE: Personal Protective Equipment

Residual: The amount of disinfectant available in water to kill microbes

Scale and sediment: The mineral build-up in a water system that uses up disinfectant and supports microbial growth and/or survival.

Stagnation: When water does not flow well, areas of stagnant water encourage biofilm growth and reduce temperature and level of disinfectant.

Straining: Removes larger contaminants and smaller contaminants may pass through.

Water Infection Control Risk Assessment (WICRA): CDC's risk assessment tool for water systems in facilities designed to prevent water borne pathogen exposure. This risk assessment may recommend and provide details to be included in the Facility's WMP.

Limited Warranty and Remedy

Chemical Reduction Solutions LLC ("CRS") warrants to the original user of those products supplied by it and used in the service and in the manner for which they are intended, that such products shall be free from defects in material and workmanship for a period of three (3) years from the date of installation, [unless a Special Warranty Period applies, as listed below]. This warranty does not extend to any product that has been subject to misuse, neglect or alteration after shipment from the CRS factory. Except as may be expressly provided in a written agreement between CRS and the user, which is signed by both parties, **CRS DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE**.

The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to the products or to defects or any condition or use of the products supplied by CRS, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other basis or theory, is limited to CRS's repair or replacement of the part or product, excluding any labor or any other cost to remove or install said part or product, or at CRS's option, to repayment of the purchase price. As a condition of enforcing any rights or remedies relating to CRS products, notice of any warranty or other claim relating to the products must be given in writing to CRS: (i) within 30 days of last day of the applicable warranty period, or (ii) within 30 days of the date of the manifestation of the condition or occurrence giving rise to the claim, whichever is earlier. **IN NO EVENT SHALL CRS BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OR PROFITS OR INTERRUPTION OF BUSINESS**. The Limited Warranty and Remedy terms herein apply notwithstanding any contrary terms in any purchase order or form submitted or issued by any user, purchaser, or third party and all such contrary terms shall be deemed rejected by CRS.

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