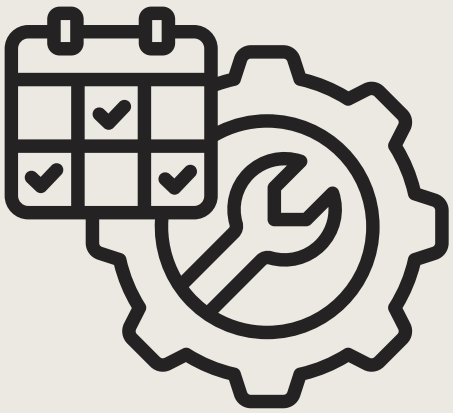
Nanobubble water conditioning for Commercial Facilities.

CRS
CHEMICAL REDUCTION SOLUTIONS

Cleaner Water. Less Scale. Fewer Failures.



Building Maintenance Is Hard

Mineral scale, intermittent hardness breakthrough, and variable demand reduce system efficiency, increase energy consumption, and accelerate wear across domestic hot water, HVAC, and plumbing systems.

All of this quietly increases operating costs, maintenance burden, and capital replacement risk for building owners and operators.

CRS Solution

CRS installs a patent-pending, SHAFT® nanobubble generator inline on the building's domestic water systems or hot-water recirculation system. The device uses hydrodynamic cavitation and electro-ionization to continuously condition water upstream of boilers, heat exchangers, and plumbing systems.

Key Benefits

- Scale prevention and removal
- Biofilm and bacteria control
- Reduced chemical usage
- Improved efficiency and reliability
- Extended equipment life
- Fewer service calls
- No consumables

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Water Treatment Designed for Real-World Building Loads

RPROTECTING EQUIPMENT WHEN PEAK DEMAND PUSHES TRADITIONAL SYSTEMS BEYOND THEIR LIMITS

CRS Nanobubble Solution

During periods of low demand, the SHAFT® generates high concentrations of stable nanobubbles that:

- Dissolve and destabilize existing scale
- Condition internal pipe and equipment surfaces
- Reduce mineral adhesion and nucleation

This system-wide conditioning effect persists through peak demand events, mitigating the impact of intermittent hardness breakthrough without requiring oversized softening equipment

Water Softeners Cannot Handle Peak Demand

Water softeners are rarely sized for true peak demand due to cost, space, and operational constraints. During these peak flow events, hardness minerals break through, seeding scale throughout domestic hot water systems, boilers, heat exchangers, cooling loops, and fixtures

Over time, this intermittent exposure leads to:

- Scale Accumulation
- Reduced Thermal Efficiency
- Equipment Failure
- Increased Energy Costs
- Fouled Fixtures
- Waterborne Bacteria Accumulation

The Hidden Cost of Breakthrough Scale Accumulation

Energy Penalty

As little as 1/16" of scale on heat-transfer surfaces can increase energy consumption by 5–10%, raising utility costs across domestic hot water and HVAC systems

Accelerated Capital Spend

Scale drives premature failure of boilers, heat exchangers, water heaters, mixing valves, and pumps, shortening equipment life and pulling capital expenditures forward

Scale Fuels Biofilm—and Biofilm Harbors Bacteria

Scale and fouling inside building water systems encourage biofilm growth, which can harbor bacteria linked to waterborne illnesses such as Legionnaires' disease—raising operational, regulatory, and liability concerns for owners

Maintenance & Chemicals

Ongoing descaling, chemical treatments, and emergency service calls add recurring labor and chemical costs that rarely appear in a single line item—but compound year after year

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WHAT IS A NANOBUBBLE?

Tiny. Stable. Game Changing.

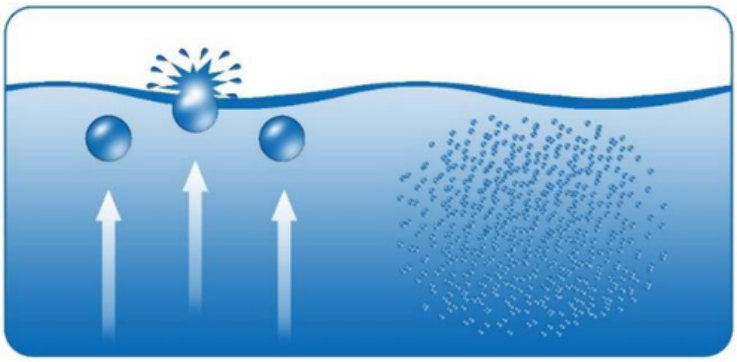
2500 times smaller than a grain of sand, nanobubbles are so small that they have a lower bouyancy and will remain suspended in water for a long time

Industrially Useful

Nanobubbles are useful in removing and preventing scale and biofilm growth, improving heat transfer, inhibiting rust, reducing surface tension and improving filtration efficacy

We are the future of your business

CRS is on a mission to use their economical and simple nanobubble generator, The Shaft, to improve profitability and reliability of water systems



nanobubbles remain suspended in water

575+
CRS SHAFTS DEPLOYED IN 2025

MORE THAN
15 years
OF EXPERIENCE

500+ million
GALLONS OF WATER TREATED BY THE SHAFT PER MONTH

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HOW ARE NANOBUBBLES FORMED?

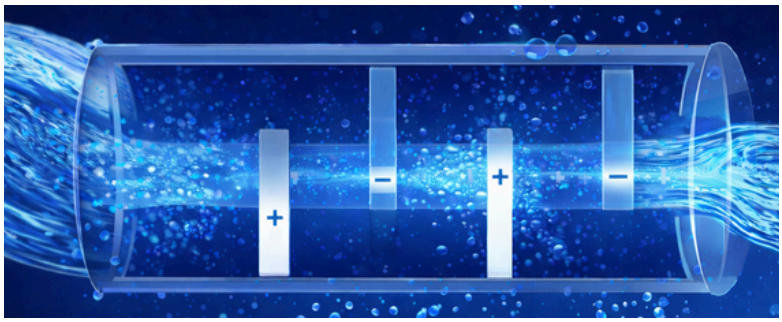
Hydrodynamic Cavitation

As water flows through The Shaft, the internal geometry creates localized pressure differentials and high shear zones. Under appropriate flow conditions, these effects induce controlled hydrodynamic cavitation

Ionization of Entrained Gas

Nanobubbles are formed under more lenient flow conditions when the gasses that are entrained in water are ionized or charged by The Shaft's proprietary metal alloy baffles

Hydrodynamic cavitation plus entrained gas ionization



Hydrodynamic cavitation is a well-documented physical phenomenon in which microscopic vapor- or gas-filled cavities form and collapse due to transient pressure reductions in a moving liquid. In The Shaft, this process also results in the formation of stable micro- and nanobubbles

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TURBO SHAFT® NANOBUBBLE GENERATOR

Main Line Installation Instructions

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APPLICATIONS

- Suitable for large commercial building water systems
- Installs on the main water line
- Eliminates the need for a salt-based water softener
- Scalable for any sized commercial facility with zero pressure drop through the unit

INSTALLATION STEPS

01 Shut Off Water Supply
and relieve pressure by opening a downstream fitting

02 Build Turbo SHAFT® loop out of suitable plumbing material

03 Install Pump and SHAFT®
Using appropriate thread sealant and fittings

04 Ensure the Flow is Correct
The pump should flow water in a loop that runs with the system flow

05 Check for Leaks

06 Flush and Return to Service
If system is badly scaled a good flush should be done before re-using

TECH NOTES (FOR SERVICE MANAGERS)

- No pressure drop impact on the water system
- Pump should run 24/7/365
- Safe for drinking water applications

INSTALLATION TIPS

- Licensed plumber should install the Turbo SHAFT®
- Install the Turbo SHAFT® on a bypass for ease of installation and pump replacement (pump has a three year manufacturer's warranty)

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SHAFT® NANOBUBBLE GENERATOR

Domestic Hot Water Installation Instructions

APPLICATIONS

- Suitable for all commercial domestic hot water systems
- No power, no programming, no maintenance required
- Can flow in either direction

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IMPORTANT INSTALL LOCATION

The SHAFT® should be installed on the hot water recirculation line, ideally on the discharge end of the circulator pump.

Circulator Flow Rate	SHAFT® Model
1 - 5 GPM	CRS15
5 - 9 GPM	CRS39
10 - 14 GPM	CRS614
15 - 20 GPM	CRS1020
20 - 30 GPM	CRS1525
30 - 45 GPM	CRS2040

THREAD SEALANT REQUIREMENT

- Use Loctite 55 cord or another NSF-certified thread sealant
- Apply to all NPT threads
- Do not use pipe dope that is not NSF-rated

INSTALLATION STEPS

01 Shut Off Water Supply
and relieve pressure by opening a downstream fitting

02 Disconnect the water line immediately after the circulator pump

03 Install the SHAFT® inline
Using appropriate thread sealant and fittings

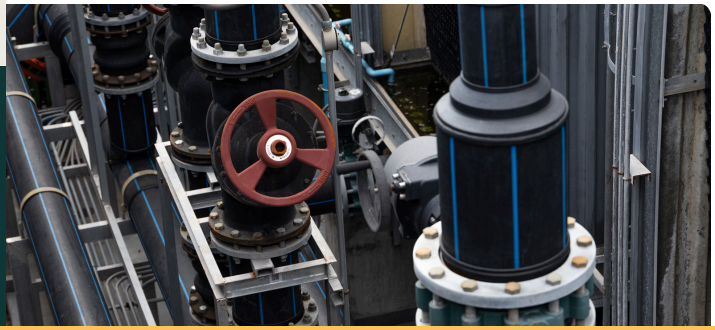
04 Restore Water Supply

05 Check for Leaks

06 Flush and Return to Service
If system is badly scaled a good flush should be done before re-using

TECH NOTES (FOR SERVICE MANAGERS)

- No pressure drop impact on hot water system
- Passive device – cannot fail electrically
- Safe for drinking water applications



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SHAFT® NANOBUBBLE GENERATOR

Shower Unit Installation Instructions

APPLICATIONS

- Suitable for commercial and residential shower installations
- Designed for municipal or treated water supplies
- No power, no programming, no maintenance required
- Installs inline on the shower head
- Bi-directional flow compatible

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SHOWER UNIT BENEFITS

Improved Skin and Hair Feel
Nanobubbles reduce surface tension, helping water wet skin and hair more evenly and rinse away residues more effectively

Reduced Scale and Soap Scum Buildup
Nanobubble conditioning helps limit mineral adhesion, keeping fixtures and tile cleaner over time

Cleaner Shower Environment
Reduced scale and residue make it harder for biofilm to establish on surfaces

THREAD SEALANT REQUIREMENT

- Shower unit comes with a rubber gasket so thread sealant may not be neccesary
- Apply to all NPT threads (if applicable)
- Do not use excessive sealant
- Do not use pipe dope that is not NSF-rated

INSTALLATION STEPS

01 Unscrew Shower Head

02 Connect SHAFT® Shower Unit Directly on Shower Head

03 Check for Leaks and Return to Service

CRS03 SHAFT® NANOBUBBLE GENERATOR

Ice Machine Installation Instructions

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APPLICATIONS

- Suitable for all commercial ice machines up to 6,500 lb/day
- Designed for municipal or treated water
- No power, no programming, no maintenance required
- Installs before the filter
- Can flow in either direction

IMPORTANT INSTALL LOCATION

The CRS03 MUST be installed BEFORE the water filter

Why? Nanobubbles cause suspended minerals and impurities to coagulate, which:

- Extends filter life
- Improves filtration effectiveness
- Reduces scale and biofilm inside the ice machine

THREAD SEALANT REQUIREMENT

- Use Loctite 55 cord or another NSF-certified thread sealant
- Apply to all NPT threads
- Do not use excessive sealant
- Do not use pipe dope that is not NSF-rated

PART SELECTION (MATCH TO FILTER INLET)

3/8" Filter Inlet: Use CRS03MF (3/8" Male/Female) and install directly inline with no additional fittings

1/2" Filter Inlet: Use CRS03 (1/2" F/F) and add a 1/2" stainless steel close nipple

3/4" Filter Inlet: Use CRS03 (1/2" F/F) and use 3/4" to 1/2" reducer nipple and adapter to install on filter

INSTALLATION STEPS

01 Shut Off Water Supply
and relieve pressure by opening a downstream fitting

02 Disconnect the water line immediately before the filter

03 Install CRS03 inline
Using appropriate thread sealant and fittings

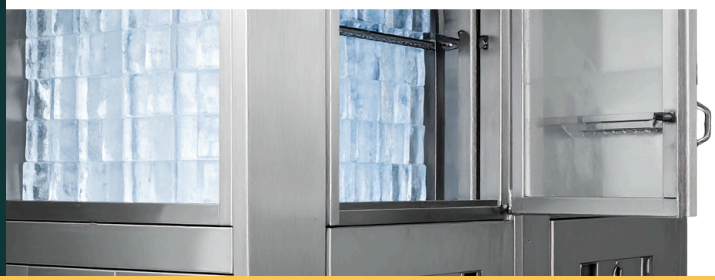
04 Restore Water Supply

05 Check for Leaks

06 Flush and Return to Service
If machine is badly scaled a good flush should be done before re-using

TECH NOTES (FOR SERVICE MANAGERS)

- No pressure drop impact on ice machines
- Compatible with carbon, sediment, and RO pre-filters
- Passive device – cannot fail electrically
- Safe for drinking water applications



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