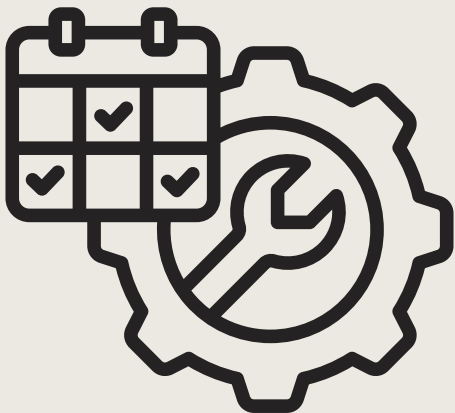


Nanobubble **water conditioning** for Commerical Ice Machines.



CRS
CHEMICAL REDUCTION SOLUTIONS

Cleaner Ice. Less Scale. Fewer Service Calls.



Ice Machine Maintenance Is Hard

Mineral scale, biofilm, and bacteria reduce ice output, increase energy use, and drive frequent chemical cleanings and service calls

All this adds cost and labor expense to any ice machine business



CRS Solution

CRS installs a patent-pending, passive nanobubble generator inline on the ice machine's water feed. Using hydrodynamic cavitation and electro-ionization, the system continuously conditions incoming water before it reaches the filter



Key Benefits

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

Connect with
CRS

www.chemicalreduction.com

BETTER WATER. BETTER EQUIPMENT. BETTER ECONOMICS.



CRS

CHEMICAL REDUCTION SOLUTIONS

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

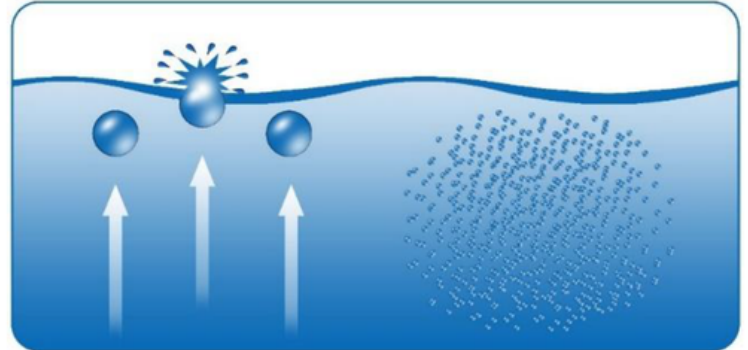


Industrially Useful

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



Connect with CRS

www.chemicalreduction.com

BETTER WATER. BETTER EQUIPMENT. BETTER ECONOMICS.



CRS
CHEMICAL REDUCTION SOLUTIONS



HOW ARE NANOBUBBLES FORMED?



Hydrodynamic Cavitation

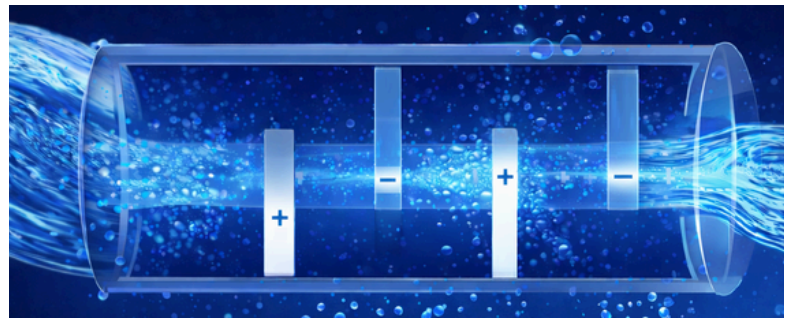
As water flows through The Shaft, the internal geometry creates localized pressure differentials and high shear zones. Under appropriate flow conditions, these effects induce controlled hydrodynamic cavitation



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

575+

CRS SHAFTS
DEPLOYED IN 2025

MORE THAN

15 years

OF EXPERIENCE

500+ million

GALLONS OF WATER
TREATED BY THE SHAFT PER
MONTH



**Connect with
CRS**

www.chemicalreduction.com

BETTER WATER. BETTER EQUIPMENT. BETTER ECONOMICS.

CRS03 SHAFT® NANOBUBBLE GENERATOR

Commercial Ice Machine Installation Instructions

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



CRS

CHEMICAL REDUCTION SOLUTIONS



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



BETTER WATER. BETTER EQUIPMENT. BETTER ECONOMICS.