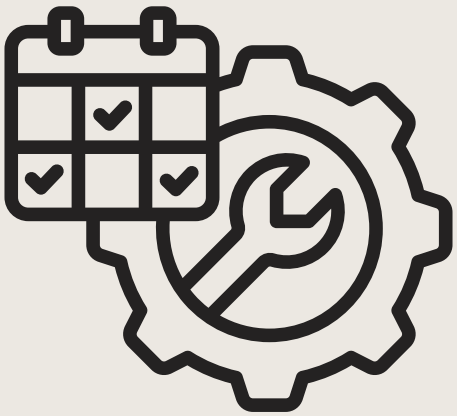
# Nanobubble water conditioning for Commerical Ice Machines.

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

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# CRS

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## WHAT IS A NANOBUBBLE?

### Tiny. Stable. Game Changing.

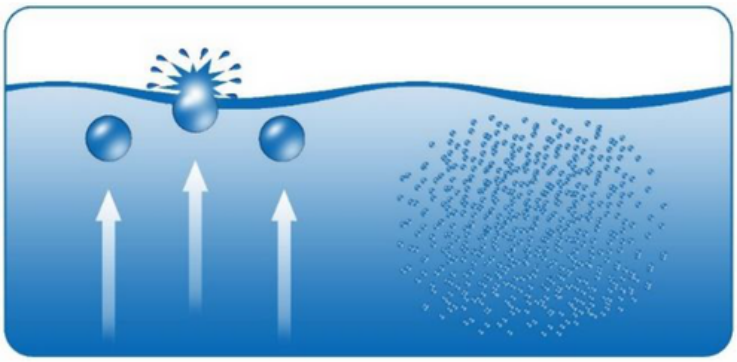
2500 times smaller than a grain of sand, nanobubbles are so small that they have a lower bouyancy and will remain suspended in water for a long time

### 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?

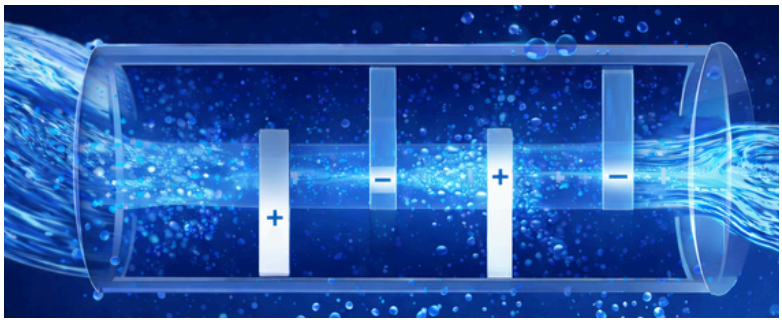
### Hydrodynamic Cavitation

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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# CRS79 SHAFT® NANOBUBBLE GENERATOR

## Commercial 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 CRS79 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 CRS79MF (3/8" Male/Female) and install directly inline with no additional fittings

**1/2" Filter Inlet:** Use CRS79 (1/2" F/F) and add a 1/2" stainless steel close nipple

**3/4" Filter Inlet:** Use CRS79 (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 CRS79 inline
Using appropriate thread sealant and fittings

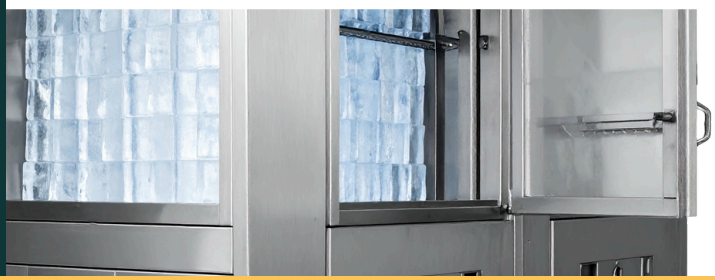
**04** Restore Water Supply

**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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