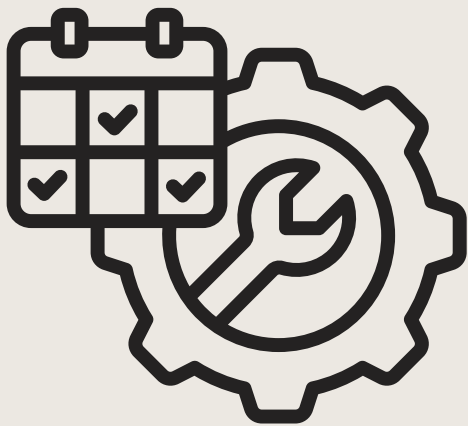


Nanobubble **water conditioning** for Reverse Osmosis Machines.



CRS
CHEMICAL REDUCTION SOLUTIONS

Drier Cars. Cleaner RO Water. Less Maintenance.



RO Feed Water Is Working Against You

Mineral scaling, particulate fouling, and unstable water behavior limit RO performance, reduce spot-free capacity, and accelerate membrane fouling.

The result is shorter membrane life, lower permeate output, inconsistent rinse quality, increased chemical cleaning, and unplanned maintenance, all of which cap throughput and increase operating costs.



CRS Solution

CRS installs a patent-pending, passive nanobubble generator inline on key car wash water lines. Using hydrodynamic cavitation and electro-ionization, the system continuously conditions water before it reaches RO machines and rinse stages.

Key Benefits



- Improved pretreatment and filtration efficiency
- Higher quality spot-free rinse
- Reduced scale and fouling in RO membranes and plumbing
- Improved RO reliability and uptime
- Extended membrane and equipment life
- Less algae growth in bays
- 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

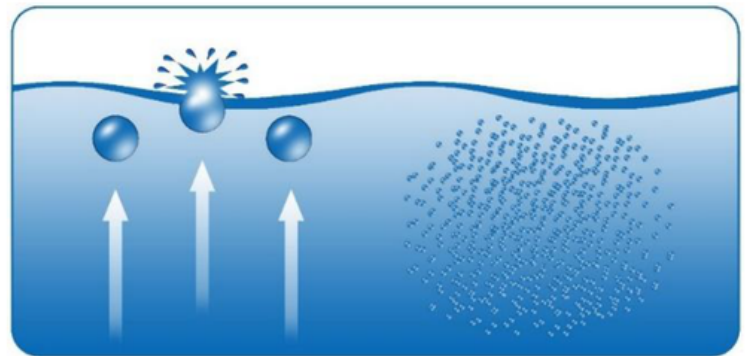


Industrially Useful

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 NANO BUBBLES FORMED?



Hydrodynamic Cavitation

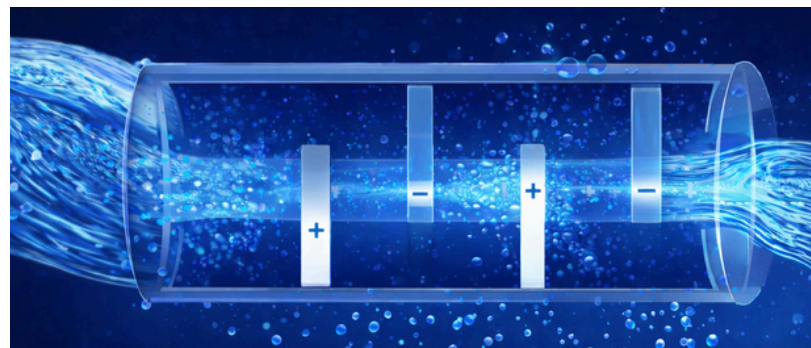
As water flows through The Shaft, the internal geometry creates localized pressure differentials and high shear zones. Under appropriate flow conditions, these effects induce controlled hydrodynamic cavitation



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.

SHAFT® NANOBUBBLE GENERATOR

Spot Free Rinse Installation Instructions

APPLICATIONS

- Suitable for all reverse osmosis machines
- Designed for municipal or treated water
- No power, no programming, no maintenance required
- Installs before the pre-filter
- Can flow in either direction

IMPORTANT INSTALL LOCATION

The SHAFT® 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 RO machine



THREAD SEALANT REQUIREMENT

- Use Loctite 55 cord
- Apply to all NPT threads
- Do not use excessive sealant

TWO INSTALLATION STRATEGIES (SIMPLE & PERFORMANCE BOOSTING)

Single Pass: Place the Shaft upstream of your earliest pre-filter to protect your RO system, improve pre-filtration, lower scale buildup and infuse both RO permeate and reject water with nanobubbles

Multi-Pass Recirculation (Premium Drying Performance): Create a recirculation loop inside the RO permeate tank using a submersible pump. With each pass through the SHAFT, ORP and drying performance improves



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 CRS SHAFT® 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 RO machines
- Compatible with carbon, sediment, and other pre-filters
- Passive device – cannot fail electrically



BETTER WATER. BETTER EQUIPMENT. BETTER ECONOMICS.

SHAFT® NANOBUBBLE GENERATOR

Spot Free Rinse Unit Model Selection

INSTALL TIPS

- Use the lowest flow SHAFT® that will NOT trigger a low pressure fault on the RO machine
- After initial installation and after running the SHAFT® for several days, change RO pre-filters to maximize effect
- The SHAFT® cannot repair RO membranes with channels and holes, but can improve lifespan



CRS
CHEMICAL REDUCTION SOLUTIONS



SHAFT® MODEL SIZING

01

Measure the Total RO Flow

Permeate Flow + Reject Flow =
Total Flow

02

Choose the Right SHAFT®

TOTAL RO FLOW
(Permeate + Reject)

SHAFT® UNIT

1 - 2 GPM

CRS03

3 - 4 GPM

CRS15

5 - 7 GPM

CRS39

8 - 13 GPM

CRS614

14 - 20 GPM

CRS1020

SONNY'S MODEL NUMBERS

SONNY'S RO Machine	SHAFT® UNIT
VROF-2	CRS39
VROF-4	CRS614
VROF-6	CRS1020
VROF-8	CRS1020
VROF-12	CRS2040



BETTER WATER. BETTER EQUIPMENT. BETTER ECONOMICS.