

nextTM





ABSTRACT



With significant water crises happening around the world, the practice of water softening is antiquated and harmfully inefficient, but the negative effects of scale are hard to ignore.

A revolutionary technological development touting all the advantages of a water softener without the disadvantages, Template Assisted Crystallization[®] (TAC[®]) offers the first proven effective and consistent scale prevention method with **zero chemicals & zero waste.**



INFORMATION OVERVIEW

- Introduction to Next-ScaleStop
- TAC[®] Technology
- Next-ScaleStop Properties
- Next-ScaleStop Applications
- Next-ScaleStop Features
- Next-ScaleStop Advantages
- Next-ScaleStop Design
- Next-ScaleStop vs Conventional Softening
- Case Studies
- Technological Verification
- Competitive Evaluation
- Regulatory Pressures

NEXT-SCALESTOP : INTRODUCTION

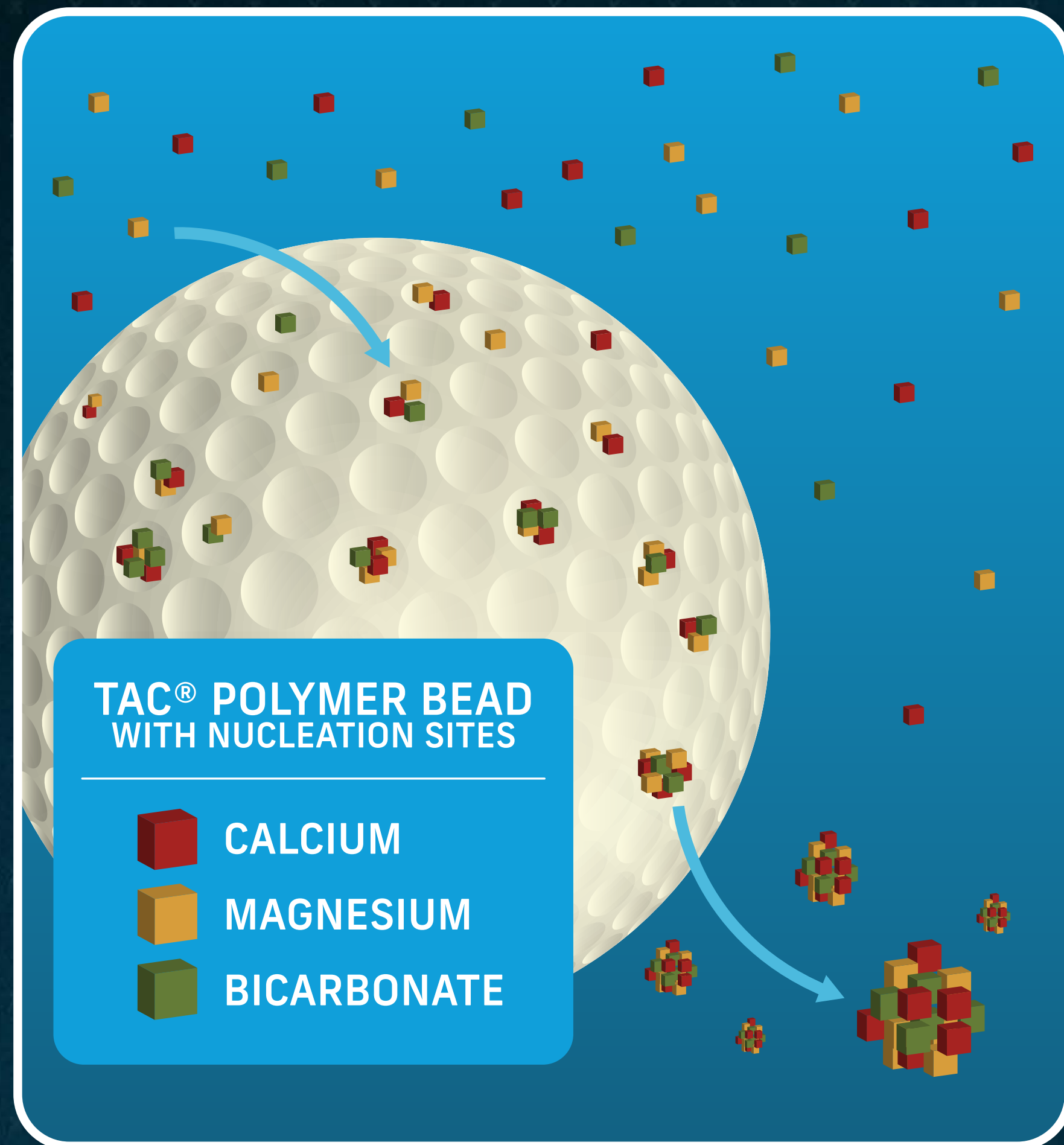
TEMPLATE ASSISTED CRYSTALLIZATION®

A No Salt, No Chemical, Non-Backwashing,
Zero-Discharge Alternative To Softening



Next-ScaleStop is the embodiment of a new technology, Template Assisted Crystallization® (TAC®). Near the Surface of small specially treated polymer spheres, newly formed micro-crystals of dissolved CaCO_3 become preferential Templates or Sites for additional hardness ions as they precipitate. The crystals are relatively insoluble, effectively isolating the CaCO_3 from the water chemistry and anything the water contacts such as pipes or fixtures.

TAC[®] TECHNOLOGY



CRYSTAL FORMATION

The surface of small polymer beads attract scale-causing ions, creating micro-crystals that become preferential templates for other ions to build on.

CRYSTAL RELEASE

Once the crystals grow to a certain size they continue to flow through the pipeline. The crystals in solution keep the hardness out of the water so that it can't form scale or interfere with soap.

This process inactivates the minerals, causing them to flow right through pipes and down the drain, completely unnoticeable without specialized technology.

NEXT-SCALESTOP PROPERTIES

PHYSICAL PROPERTIES

- Composition : Specially Treated Polymer
- Size : 0.3-1 mm (Approx. 20x40 mesh)
- Color : Off-White / Pale Yellow-Beige
- Bulk Density : Approx. 1.71 lbs/L (~776 g/L)
 - Range : 1.68-1.74 lbs/L (763-789 g/L)
- Packaging : 180 Liter Drum (~308 ± 5 lbs or ~140 ± 2.3 kg)

WATER CHEMISTRY & LIMITATIONS

- pH : 6.5 to 8.5
- Hardness, Max. : 75 Grains (1300 ppm CaCO₃)
- Temperature : 41 to 140 °F (5 to 60 °C)
- Chlorine : <3 ppm
- Iron, Ferrous : 0.3 mg/L
- Manganese : 0.05 mg/L
- Copper : 1.3 mg/L
- Oil & Polyphosphates : Remove Prior To Next-ScaleStop Use
- H₂S : Must Be Removed Prior To Next-ScaleStop Use

OPERATING CONDITIONS

- Service Flow : 4 gpm/liter Of Media (Limited By Bed Expansion)
- Bed Depth : 4-10 Inches Typical (Depending On Flow Rate)
- Freeboard : 200% Of Bed Depth (Minimum 20")
- Can Be Used In Continuous Or Intermittent Operation
- Operates In Upflow Mode, No Backwash Required



NEXT-SCALESTOP APPLICATIONS

FOOD SERVICE USES :

- Convection Steamers & Combi Ovens
- Flash Steamers (Easier To Clean Only)
- Proofer Ovens
- Coffee Brewers
- Espresso Machines
- Post Mix
- Dishwashers (Chemical Compatibility)

RESIDENTIAL SCALE PREVENTION USES :

- Piping Systems
- Boilers & Tankless Water Heaters
- Solar Heating Systems
- Irrigation System Spray Head
- Humidifier / Evaporator
- Misting Systems

COMMERCIAL, HOSPITALITY & AGRICULTURAL USES :

- Piping Systems
- Boilers
- Cooling Towers
- Tankless Water Heaters
- Solar Heating Systems
- Injection Molding Equipment
- Distiller Heating Chamber
- Irrigation System Spray Head
- Humidifier / Evaporator
- Misting Systems

**ALL TRANSLATE TO LONGER LIFE FOR
EQUIPMENT, GREATER ENERGY EFFICIENCY
AND GOOD ENVIRONMENTAL STEWARDSHIP**

NEXT-SCALESTOP FEATURES



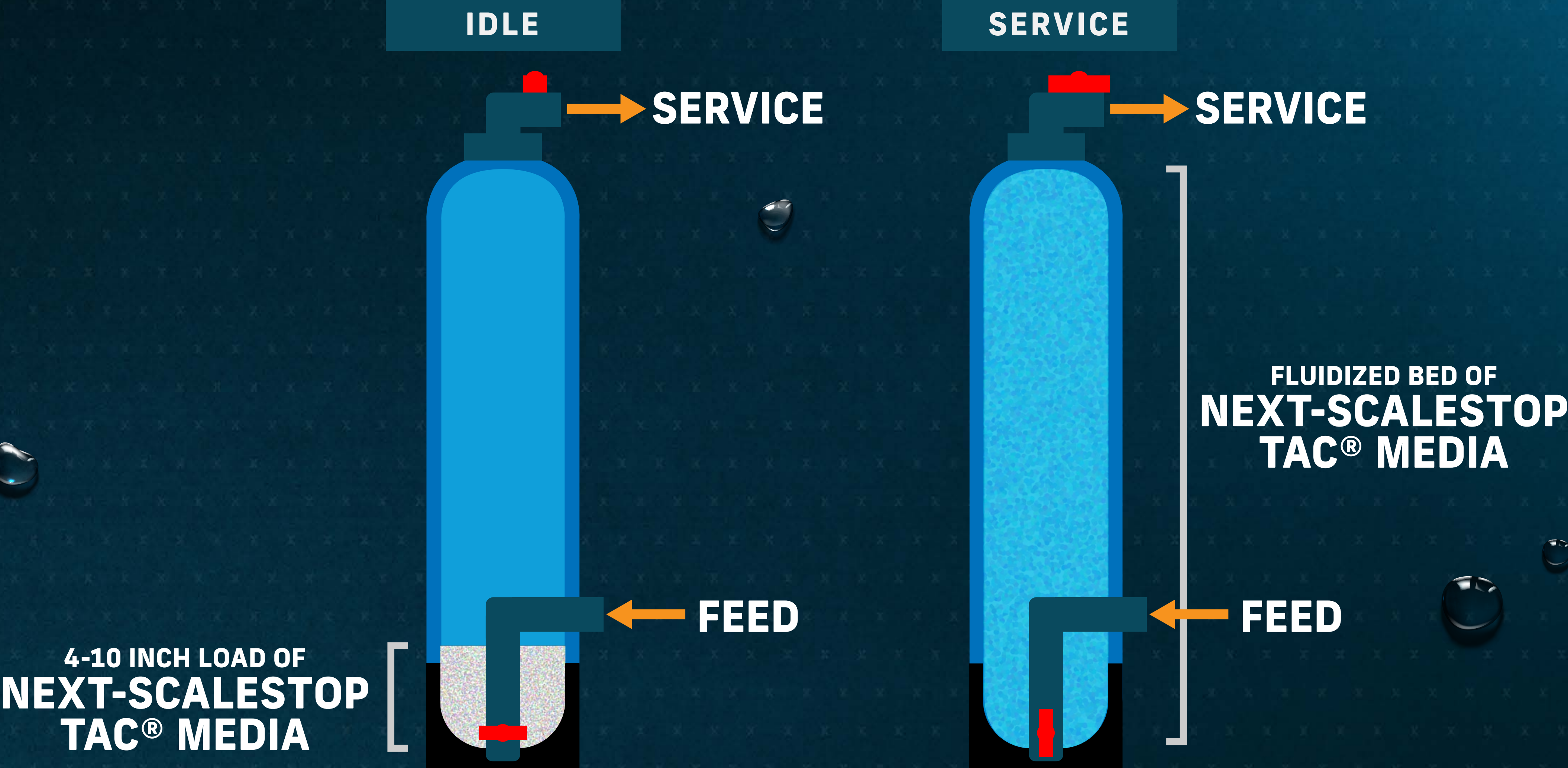
- Extremely efficient
 - 5 seconds contact time regardless of hardness level
 - Conventional ion exchange resin requires 90 seconds
- No salt or other chemical regenerants required
- No backwash waste
 - Can be used in areas where water softeners are banned
 - Protects the environment and reduces water usage
- Long-lasting media
 - Not consumed by the reactions
- No control valve or electricity required
- Media usable in both conventional mineral tanks or POU cartridge form
- Media operates in upflow condition

NEXT-SCALESTOP ADVANTAGES

- Economical & Efficient
- Reduced Energy Expenses
- Environmentally Friendly
- Removes Existing Scale Deposits
- Longer Life Expectancy For Appliances & Pipes
- Increased Efficiency Of Hot Water Tanks
- No Salt
- No Corrosive Chemicals
- No Electrical Power Required
- No Drain Connection Required
- No Discharge
- No Slippery Feeling (Personal Preference & Elderly Safety)
- High Flow Capacity
- Virtually Maintenance Free
- Outstandingly Effective Treatment For Scale Prevention
- Various Supplemental Residential & Commercial Applications

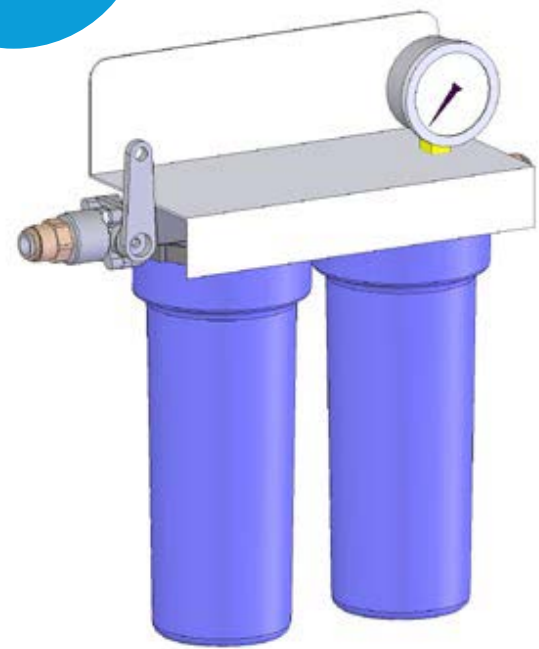


NEXT-SCALESTOP SYSTEM DESIGN



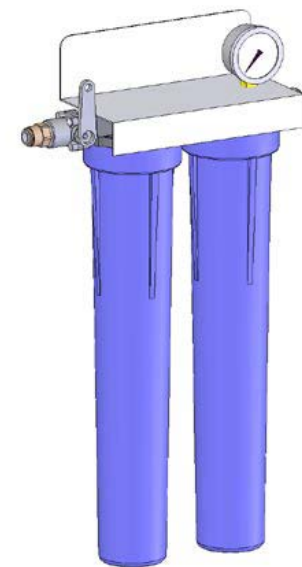
NEXT-SCALESTOP CARTRIDGE DESIGN

1 GPM



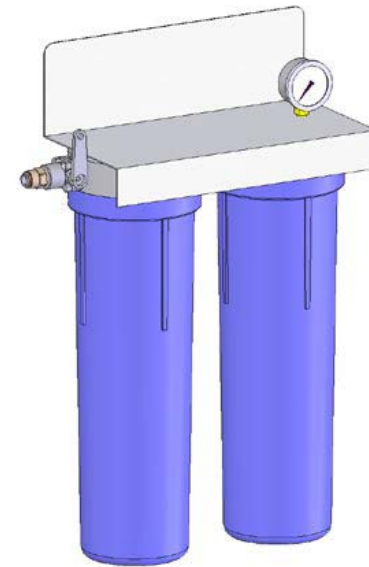
NSS210

2 GPM



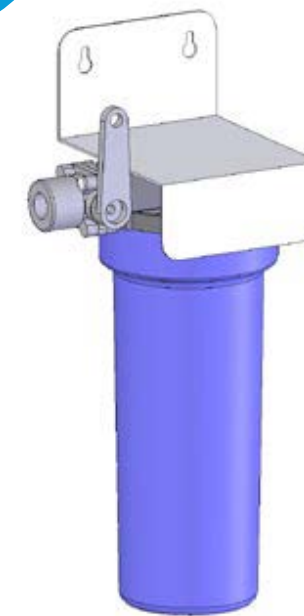
NSS220

4 GPM



NSS220B

1 GPM



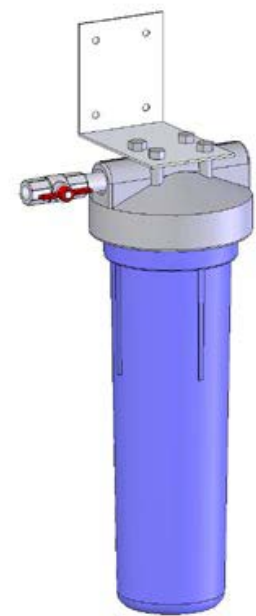
NSS110

2 GPM



NSS120

4 GPM



NSS120B

NEXT-SCALESTOP & CARBON SYSTEMS

NEXT-SCALESTOP ONLY

NEXT-SCALESTOP TANK TYPES [POE]

SIZE	SERVICE FLOW
NSS 744	10 GPM
NSS 844	12 GPM
NSS 948	16 GPM
NSS 1054	20 GPM
NSS 1252	30 GPM
NSS 1465	50 GPM
NSS 1665	75 GPM



NSS 1054



NSS 1665

NEXT-SCALESTOP HIGH-FLOW SYSTEMS [POE]

SIZE	SERVICE FLOW
NSS 2x1465	100 GPM
NSS 2x1665	150 GPM
NSS 3x1665	225 GPM
NSS 5x1465	250 GPM
NSS 4x1665	300 GPM
NSS 5x1665	375 GPM
NSS 6x1665	450 GPM



NEXT-SCALESTOP vs CONVENTIONAL SOFTENING INSTALLATION ADVANTAGES



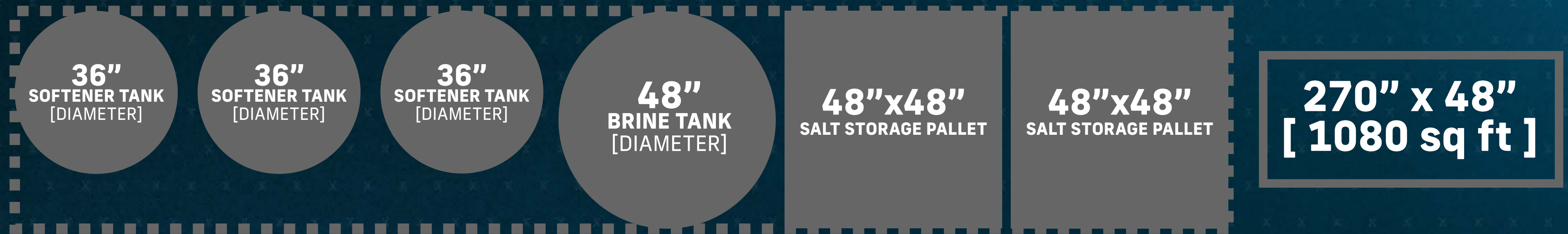
DID THEY FORGET TO TELL YOU
THE SIZE OF THE SOFTENER?

NEXT-SCALESTOP vs CONVENTIONAL SOFTENING

COMPARISON : SPACE REQUIREMENTS

CONVENTIONAL SOFTENER SYSTEM :

(3) 36"x72" TANKS + (1) 48" BRINE TANK + (2) 48"x48" SALT PALLETS



NEXT-SCALESTOP SYSTEM : (4) 16"x65" TANKS

**~85% LESS
SPACE REQUIRED!**



NEXT-SCALESTOP vs CONVENTIONAL SOFTENING

USAGE & COST COMPARISONS : 300 GPM SYSTEMS

	TOTAL AREA	SALT USAGE*	SALT COST*	WASTEWATER VOLUME
NEXT-SCALESTOP	13.33 ft ²	NONE	ZERO	NONE
SOFTENER	88.00 ft ²	64,285 lbs	\$7713	EXCESSIVE

Usage and costs are annual. *Assumes 15 grain water, 1 million gallons per month, 2800 grains/lb of salt, salt cost 0.12/lb delivered.

NEXT-SCALESTOP FUNCTIONAL INSTALL SAMPLES



Systems utilizing Next-ScaleStop are easily installed and managed at most locations' point of entry as they only require a small footprint for a large amount of filtration efficiency.



CASE STUDY #1

RESTAURANT EQUIPMENT - CONCORDIA ESPRESSO MACHINES

BACKGROUND	
LOCATION	LOMBARD, IL & TUCSON, AZ
HARDNESS	HIGH
WATER USAGE	LOW
EQUIPMENT HISTORY	CUNO SYSTEMS WITH WAC (H FORM) RESIN PREVENTED SCALE BUT CAUSED CORROSION / PITTING OF SOLENOID VALVE

NEXT-SCALESTOP DATA	
INSPECTED AT 6 & 12 MONTHS	NO SCALE ACCUMULATION NO CORROSION



CONCORDIA IS NOW PRIVATE LABELING NEXT-SCALESTOP AND PROVIDING IT WITH ALL OF THEIR EQUIPMENT

CASE STUDY #2

RESTAURANT EQUIPMENT - GROEN COMBI OVEN [MODEL HY12YE]

BACKGROUND	
LOCATION	SHERATON-ALBUQUERQUE CONVENTION CENTER
HARDNESS	35 GRAIN/GAL
WATER USAGE	APPROX. 200 GPD
EQUIPMENT HISTORY	CHEMICAL DE-SCALING REQUIRED EVERY 3-4 WEEKS. ANNUAL BOILER REPLACEMENT.

NEXT-SCALESTOP DATA	
INSPECTED AT 9 MONTHS	NO SCALE ACCUMULATION, BOILER OPERATING PERFECTLY
INSPECTED AT 11 MONTHS	WATER LEVEL PROBE MALFUNCTION FROM CRYSTALS WERE REMOVED BY WIPING WITH RAG. FIVE MINUTE SERVICE TIME, 5 YEARS CONSISTENT PERFORMANCE.



THE SERVICE COMPANY INVOLVED CALLS NEXT-SCALESTOP THE "MIRACLE FILTER". THEY ARE NOW INSTALLING NEXT-SCALESTOP ON ALL OF THEIR EQUIPMENT.

CASE STUDY #3

TANKLESS WATER HEATERS - RINNAI 199,000 BTU [COMMERCIAL]

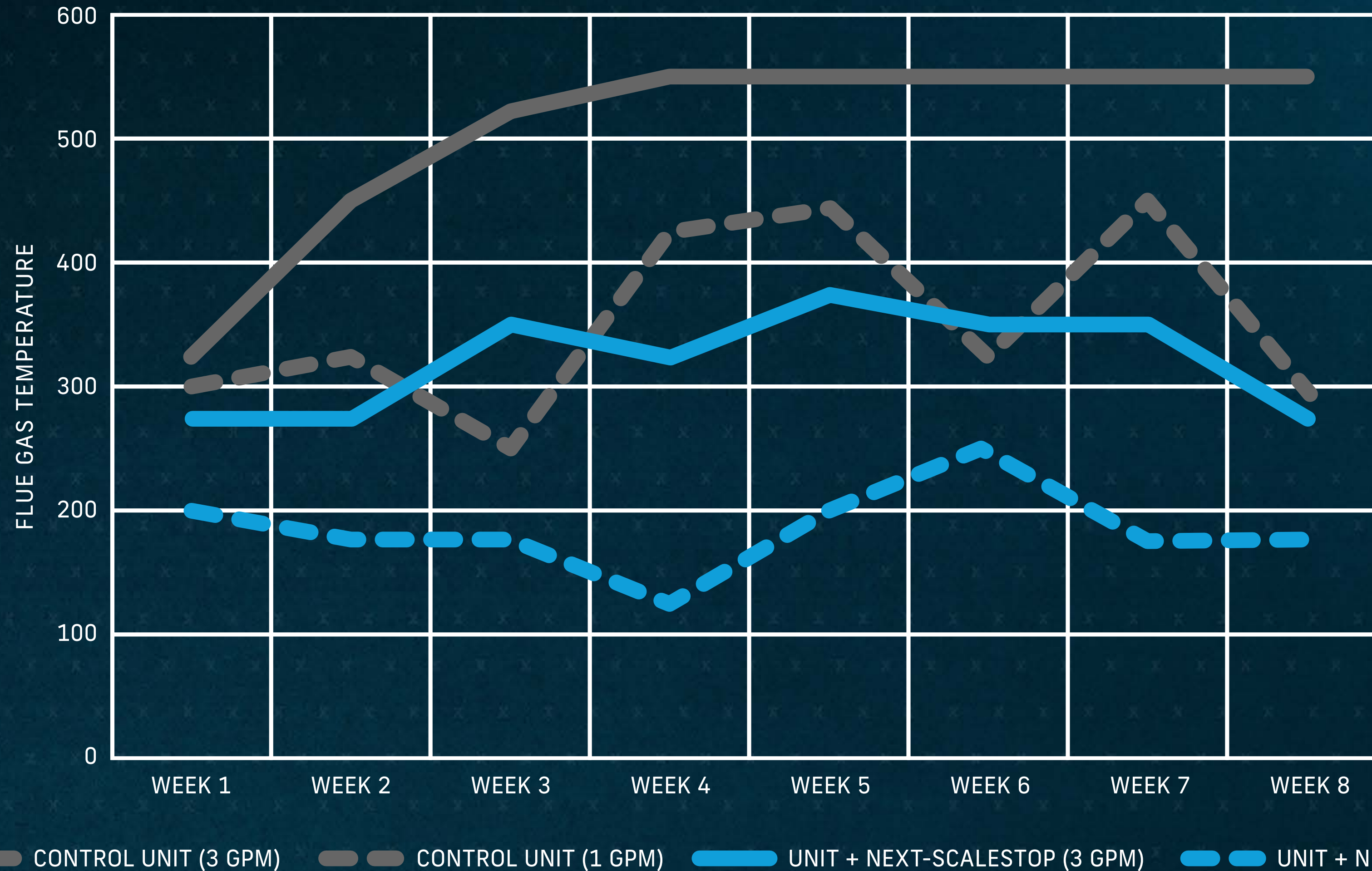
BACKGROUND	
LOCATION	MIDDLEVILLE, MI
HARDNESS	28-31 GRAIN/GAL
WATER USAGE	APPROX. 200 GPD ASHRAE PROTOCOL - 4 PEOPLE
EQUIPMENT SETTINGS	2 SYSTEMS SET AT 190 DEGREES TO ACCELERATE TESTING, ONE TREATED, ONE CONTROL
NEXT-SCALESTOP DATA	
CONTROL UNIT	DROP IN EFFICIENCY NOTICEABLE AFTER ONE WEEK. COMPLETE SYSTEM SHUT DOWN DUE TO SCALE AT 2 WEEKS.
INSPECTED AT 3 MONTHS	NEXT-SCALESTOP TREATED SYSTEM SHOWS NO MEASURABLE EFFICIENCY LOSS
INSPECTED AT 10 MONTHS	THE NEXT-SCALESTOP PROTECTED UNIT REMAINED OPERATING AND EFFICIENT FOR 10 FULL MONTHS IN THIS VERY DEMANDING TEST



NEXT-SCALESTOP
MAINTAINS FUNCTIONALITY 22x LONGER
THAN UNTREATED CONTROL UNITS

CASE STUDY #4

TANKLESS WATER HEATER vs TANKLESS HEATER + NEXT-SCALESTOP



The unit with Next-ScaleStop at 3 gpm consistently ran at lower flue gas temperatures than both control units and never exceeded 390 degrees.

Additionally, the unit with Next-ScaleStop at 1 gpm had the lowest flue gas temperatures, which stayed at approximately 200 degrees for the full 8 week observation period.

CASE STUDY #5

REVERSE OSMOSIS PRETREATMENT [MODEL#R010800G-FL]

BACKGROUND	
LOCATION	EL CAJON, CA
HARDNESS TDS LSI STIFF DAVIS	15 GRAIN 485 mg/l .33 .66
RO CONFIG.	6 - 4040 ELEMENTS (45% RECOVERY)
EQUIPMENT HISTORY	INSTALLED MAY '06. PRODUCES 5000 GALLONS OF PERMEATE PER DAY.

NEXT-SCALESTOP DATA	
PERMEATE TDS	6 PPM (98.7% REJECTION)
PERMEATE FLOW	6 GPM (UNCHANGED FROM START-UP)



HOTEL CASE STUDY #1

EMBASSY SUITES HOTEL [224 ROOMS] - OVERVIEW

BACKGROUND

LOCATION	TEMPE, AZ
HARDNESS	12 GRAINS
PROBLEM	CONSTANT SCALE BUILDUP LED TO REGULAR BOILER FAILURES, INCONVENIENT DOWNTIME AND EXPENSIVE SERVICE REQUIREMENTS.
SOLUTION	THE DOMESTIC HOT WATER SUPPLY HAS BEEN TREATED WITH NEXT-SCALESTOP FOR THE PAST 6 YEARS



HOTEL CASE STUDY #1

EMBASSY SUITES HOTEL [224 ROOMS] - BOILER INSPECTION

OCT-06-2006 13:32 From:HC SERVICE 8055793485 To:408 3564888 P.1/1

ARIZONA BOILER CO., INC.
8282 N. 75th AVE.
PEORIA, ARIZONA 85345
(623) 979-3301
(623) 979-3666 FAX

EMBASSY SUITES
ATTN: ACCOUNTS PAYABLE
4400 S. RURAL RD.
TEMPE, AZ 85282

INVOICE

DATE	NUMBER
04/19/06	0615748-IN

CUSTOMER ACCT# E550
INVOICE DUE 5/19/2006
FOR JOB Q610
JOB LOCATION
PURCHASE ORDER # GREGG JOSEY

OUR TERMS ARE 30 DAYS
ON ALL OPEN ACCOUNTS.
All other invoices are due
upon receipt.

received
H-2206

Quality Service From Arizona's Largest Since 1960

DESCRIPTION	QUANTITY	PRICE	UNIT	GROSS AMOUNT
TOTAL CONTRACT	0.00	625.400	EA	625.40

OUR SERVICE TECHS REMOVED HEADS & O RINGS FROM RBT 8800 SERIES BOILER. THEY INSPECTED THE TUBES FOR ANY SIGNS OF WATER CORROSION OR SCALE BUILD UP. FOUND TUBES TO BE IN EXCELLENT CONDITION WITH NO SCALE BUILD UP. REPLACED O RINGS WITH NEW RBT8800 O RING KIT. RE-INSTALLED HEADS & PIPING. TURNED BOILER ON, CHECKED FOR ANY SIGNS OF LEAKING. NO LEAKS FOUND, BOILER IN OPERATION, TAXES INCLUDED IN QUOTE.

PLEASE REMIT TO:
8282 N. 75th AVE.
PEORIA, AZ 85345

PLEASE READ IMPORTANT INFORMATION:
Fast due invoices are subject to a service charge of 1.5% monthly/18% per annum.
We reserve the right to collect any fees from the customer which may be charged to our company by a collection agency or attorney. You are liable for all sales taxes on this invoice unless we have an exemption form from you.
RETURN POLICY: Shipping is non-refundable. In stock items are refundable at a 25% restocking fee. Special order parts are non-refundable.

INVOICE TOTALS

GROSS:	625.40
RETENTION:	0.00
TAX:	0.00
TOTAL DUE	625.40

Shop Online @ www.azboiler.com

After 9 months of continuous operation and no service, the chief engineer had the boiler tubes inspected.

Quote from service company :

“Boiler tubes were spotless, 100% free from any scale deposits.” The boiler inspector said, “it would not be possible for tubes to be this clean if not for a water softener...”

But, while Next-ScaleStop is not a softener, it effectively eliminated this scale problem.

HOTEL CASE STUDY #2

EMBASSY SUITES HOTEL [205 ROOMS] - OVERVIEW

BACKGROUND

LOCATION

NAPA, CA

HARDNESS

5 GRAINS

PROBLEM

WATER SOFTENER (HOT ONLY) FAILED,
NEEDED REPLACEMENT

SOLUTION

INSTALLED NEXT-SCALESTOP ON DOMESTIC
WATER SUPPLY. AFTER JUST 2 MONTHS,
CHIEF ENGINEER SAID THAT OLD CALCIUM
SCALE DEPOSITS IN GUEST ROOM SINKS
AND FAUCETS WERE DISSOLVING AND
REMAINING CLEAN FOR FIRST TIME.



HOTEL CASE STUDY #2

EMBASSY SUITES HOTEL [205 ROOMS] - INSPECTION RESULTS

NDU 7-2006 11:11 From: W.C. SERVICE 8055793405 To: 815 717 9334 P. 1 of 1
Aug 10 10:33 AM Rieger 660 359-4527 p.1

Paul Rieger Company
Three Generations of Service
Contractor's License No. 620477
1266 Park Pacific Avenue
Pacifica, CA 94044
Phone: (650) 359-4527
Fax: (650) 359-4527

Invoice
Invoice Number: 5594
Invoice Date: 8/11/2006
Terms: Due on receipt

Bill To:
Bruce Stanley
W.C. Service Company, Inc
4680 E Los Angeles Ave., Ste E
Simi Valley, CA 93063-3471

Job Location:
Embassy Suites -Napa

Quantity	Item	Description	Rate	Amount
		The Paul Rieger Company, at the request of W.C. Service Company, Inc. removed head and installed new seals on the heat exchanger, for one (1) Raypak domestic hot water boiler. Upon inspection The Paul Rieger Company found the following conditions: 1. No iron deposits 2. No mineral build up 3. No scale or any other types of deposits on internals of heat exchanger. We recommend that this unit be re-opened in approximately 3 to 6 months to check waterside of heat exchanger.		
1	Lot	Raypak seals	25.80	25.80
1	Labor	Labor	650.00	650.00

Sales Tax (7.75%) \$2.00
Total \$677.80
Payments/Credits \$0.00
Balance Due \$677.80

This invoice is subject to a finance charge of 1.5% per month, annual percentage of 18%, which is allowed by law on all balances over 30 days past due. Purchaser agrees to pay all reasonable attorney's fees if this invoice is placed in the hands of an attorney.

Thank You

After 1 month the chief engineer requested inspection of the 1.6 MBTU boiler.

Inspection results :

- No iron deposits
- No mineral build-up
- No scale or other types of deposits on internals of heat exchanger
- Recommend inspection in 3 to 6 months

System showed consistent performance for more than 5 years now.

HOTEL CASE STUDY #3

(NEW) EMBASSY SUITES HOTEL [146 ROOMS] - OVERVIEW

BACKGROUND

LOCATION

LA QUINTA, CA

PROBLEM

COMMERCIAL SOFTENER BAN

BEFORE OPENING

22 EXCHANGE TANKS
REQUIRED CHANGING 2x MONTH (\$1200+)

SOLUTION

ORDERED NEXT-SCALESTOP
SYSTEM FOR ENTIRE WATER
SUPPLY. SUBSTANTIAL SAVINGS
AND REGULATORY COMPLIANCE



NEXT-SCALESTOP TECH. VERIFICATION

THIRD PARTY TECHNOLOGY VERIFICATION : DVGW W-512

Water Technology Center
Karlsruhe Water Laboratory
Karlsruhe, Germany



Analytic Results

Table 2.1 First Test Series (Test Rigs 1 and 3 are "blind" or untreated)

Ca ²⁺ + Mg ²⁺ (mol)	Test Rig 1 (untreated)	Test Rig 2 (ScaleStop)	Test Rig 3 (untreated)	Test Rig 4 (ScaleStop)
Heating coil	0.414	0.001	0.455	0.001
Container Walls	0.622	0.000	0.691	0.000
Residual >500 µm	0.180	0.011	0.121	0.000
Total	1216	0.012	1267	0.001

Table 2.2 Second Test Series (Test Rigs 2 and 4 are "blind" or untreated)

Ca ²⁺ + Mg ²⁺ (mol)	Test Rig 1 (ScaleStop)	Test Rig 2 (untreated)	Test Rig 3 (ScaleStop)	Test Rig 4 (untreated)
Heating coil	0.001	0.448	0.001	0.470
Container Walls	0.001	0.513	0.001	0.579
Residual >500 µm	0.002	0.189	0.000	0.172
Total	0.004	1.150	0.002	1.221

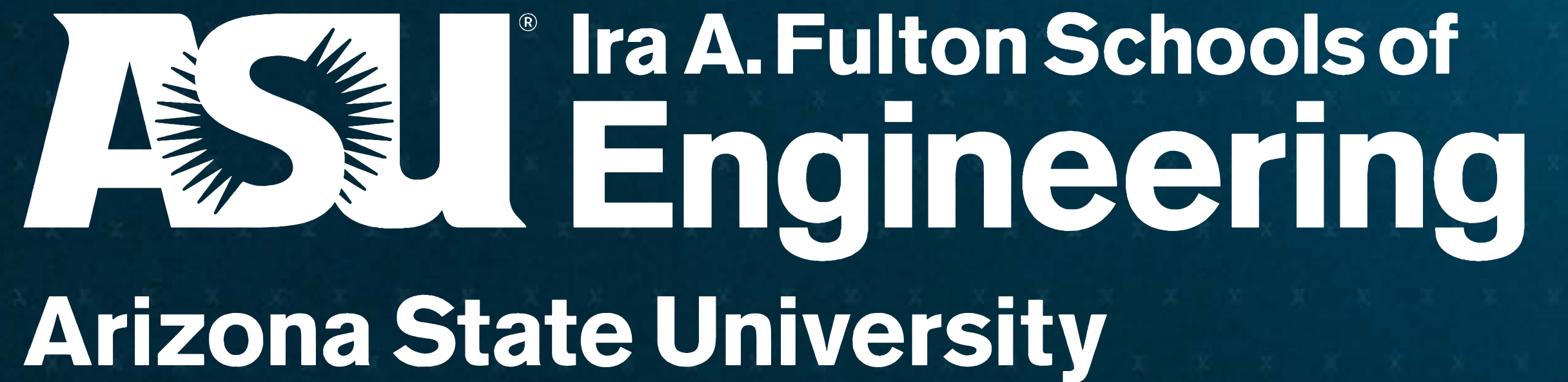
DVGW is the German Technical and Scientific Association for Gas and Water.

W-512 is the standard for testing physical water treatment devices for scale prevention.

ON THIS RIGOROUS TEST, THE ORIGINAL NEXT-SCALESTOP ACHIEVED AN EFFICIENCY RATING OF 99.6% FOR SCALE PREVENTION

NEXT-SCALESTOP COMPETITIVE EVALUATION

EVALUATION OF ALTERNATIVES TO DOMESTIC ION EXCHANGE WATER SOFTENERS



PAPER BY:

Dr. Peter Fox & Mara Ramos ASU
Tim Thomure & Wontae Lee HDR

APRIL 2011

NEXT-SCALESTOP COMPETITIVE EVALUATION

EVALUATION OF ALTERNATIVES TO DOMESTIC ION EXCHANGE WATER SOFTENERS

[ALL TESTS UTILIZED THE SAME HARD TAP WATER FROM TEMPE, ARIZONA]



UNTREATED



ELECTROMAGNETIC



ELECTRICALLY
INDUCED
PRECIPITATION



TEMPLATE
ASSISTED
CRYSTALLIZATION

NEXT-SCALESTOP COMPETITIVE EVALUATION

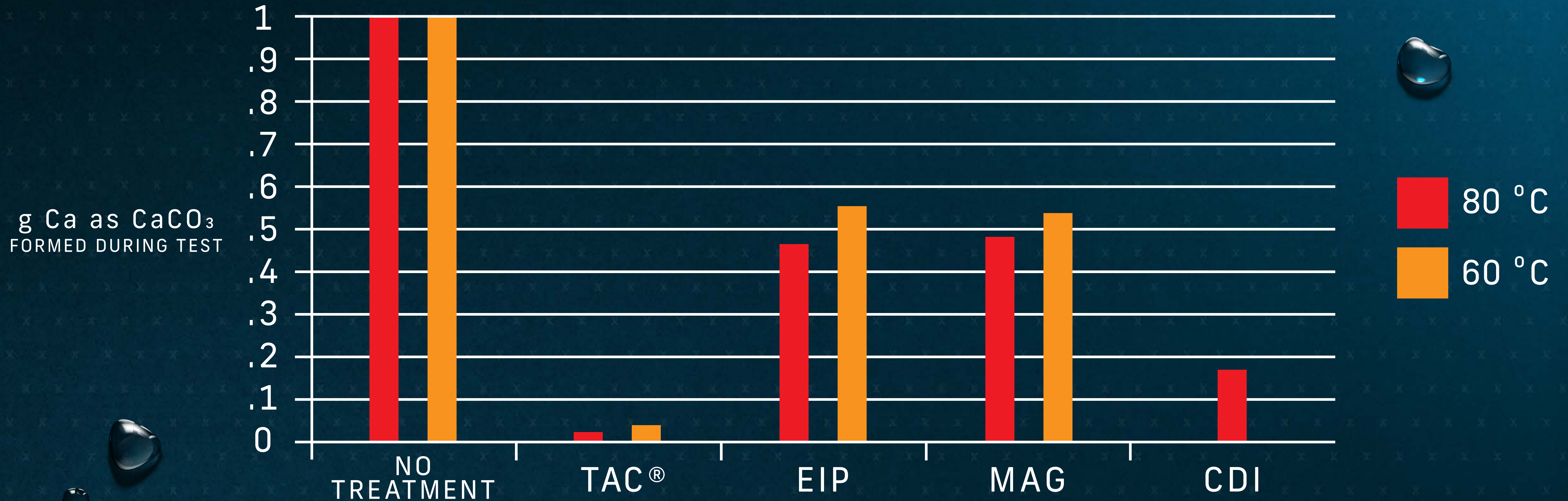
TECHNICAL EVALUATION RESULTS OF WATER SOFTENER ALTERNATIVES

Treatment Used	Scale Scraped Off Of Heating Element (g)	% Ca In Scale Formed	Ca Formed In Solid Scale Precipitate (g Ca)	Scale From Bath & Heating Element Dissolved With HCl (G Ca as CaCO ₃)	Total Calcium Formed During Test (g Ca as CaCO ₃)
No Treatment	-	N/A	0.00	8.36	8.36
TAC®	0.00	N/A	0.00	0.12	0.12
EIP	0.68	34.88	0.24	3.60	3.84
MAG	1.44	34.88	0.50	3.47	3.97
CDI	0.00	N/A	0.00	1.41	1.41

[ALL TESTS UTILIZED THE SAME HARD TAP WATER FROM TEMPE, ARIZONA]

NEXT-SCALESTOP COMPETITIVE EVALUATION

EVALUATION OF SCALE AMOUNTS COLLECTED FOR TEMPE TAP WATER TESTS



- Next-ScaleStop Template Assisted Crystallization worked best (97%+)
 - Capacitive deionization worked well enough to pass DVGW test
- Both electromagnetic treatment and electrically induced precipitation reduced scale formation, but not enough to pass any reasonable test

WATER MARKET : REGULATORY PRESSURES



LEGISLATION BANNING SOFTENERS CALIFORNIA - SB1006, AB334

“Local agencies may regulate water softeners by ordinance to limit or prohibit the use of a water softener if an independent study that shows such regulation is a “necessary means” of achieving compliance with the water reclamation requirements or the master reclamation permit issued by a California regional water quality control board.”

WATER MARKET : REGULATORY PRESSURES



WORLD HEALTH ORGANIZATION REPORT ON NUTRIENTS IN DRINKING WATER :

“We conclude that hard water is good because it contains nutrients valuable in themselves and because these nutrients can decrease impact of toxic elements in the environment. To minimize heart disease risk, the ideal water should contain sufficient calcium and magnesium to be moderately hard. No effort should be made to eliminate trace elements such as copper and iron where these elements are in short, dietary supply.”

“Lower cardiovascular death rates were found in populations where the water supply contained relatively high levels of water hardness or calcium and magnesium compared to populations in areas with low levels. This protective effect was found for populations throughout the world, especially when country-wide studies were conducted.”

nextTM
FILTRATION TECHNOLOGIES



**WATER IS OUR
WAY OF LIFE**

NO WASTE • NO BACKWASHING • NO ELECTRICITY • NO CHEMICALS

THE RIGHT MEDIA AT THE RIGHT TIME

This innovative technology provides superior scale reduction and has all the advantages of a water softener without the disadvantages.

For more info, visit NextFiltration.com | Email: sales@nextfiltration.com