



**NORTH STAR**<sup>TM</sup>  
WATER TREATMENT SYSTEMS



**TAP OUR EXPERTISE**

PROFESSIONAL  
**WATER TREATMENT**  
SOLUTIONS CATALOG

# IMPROVING WATER **SHOULDN'T BE HARD.**

WHETHER YOU HAVE EXPERIENCE OFFERING **WATER TREATMENT PRODUCTS** OR ARE JUST BEGINNING, LOOK NO FURTHER.

**North Star Water Treatment Systems™** has everything you need to provide your customers with the solutions they're seeking.

## THERE'S NO SUBSTITUTE FOR **EXPERIENCE.**

**NORTH STAR** IS AT THE FOREFRONT OF INNOVATION.

We pioneered the most advanced water treatment technologies designed to deliver clean, clear, soft water while providing the optimal customer experience. From unique solutions to advanced connectivity, our systems have introduced better ways to make water better since 1925. In fact, that makes us one of the largest manufacturers of water treatment systems in the world.

**NOW THAT'S EXPERIENCE.**

WE'VE ALWAYS BEEN DEDICATED TO THE **PROFESSIONAL CONTRACTOR.**

We're committed to working with expert trades which is why **North Star** water treatment products are sold exclusively through professional contractors. You won't find our brand at big box stores or water treatment dealerships.

## OUR **SUPPORT** IS UNPARALLELED.

- Free water testing makes it easy to find the proper solution
- Extensive manufacturer's representative network provides outstanding assistance and response
- Manufacturer based sales and business development team continually works with you to maximize your water treatment potential
- Our commitment to R&D provides a constant stream of new products and technologies that give you the edge in your market
- Our experienced team of technical support personnel provide application, installation and service assistance
- **North Star's** customer service team ensures your order and shipment experiences are beyond your expectations



## WANT TO **KNOW MORE?**

Additional information and detailed specifications about North Star water treatment systems are available at [www.northstarwater.com](http://www.northstarwater.com).

WE WANT **NORTH STAR** ON THE TIP OF  
YOUR TONGUE WHEN CUSTOMERS ASK YOU  
ABOUT **WATER TREATMENT SOLUTIONS.**

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# INSTRUCTIONS FOR ORDERING.

**Wholesale Distributors:** To place an order, contact your local North Star representative.

The North Star Customer Support Center can assist you with checking on order status, verifying pricing, checking parts and unit availability, and resolving related problems. Customer Support Representatives are available from 8:00 a.m. to 5:00 p.m. CST Monday through Friday. For the protection of our valued distributors, please have your **customer ID # available**.

**For More Information:** 800-972-0135 (Phone)  
800-531-7497 (Fax)

## ABOUT YOUR ORDER.

- Softeners, Tank Filters, Reverse Osmosis Systems, and Cartridge Filter units will ship within five (5) business days from order date; service parts ship within three (3) business days from order date.
- Softeners and Tank Filters from Minnesota can not be combined with ROs, Whole House Housings, or Drinking Water Systems from Mississippi to reach higher discount levels. See Confidential Wholesaler's Discount Schedule for additional discount information.
- Prices quoted are for shipment and invoicing to one destination and are F.O.B. factory.
- Discounts apply as per Confidential Wholesaler's Discount Schedule.
- Terms are 2% 10th Prox.
- Prices are subject to change without notice.

## FREIGHT TERMS.

### MINNESOTA Shipments

- 1-3 Softeners & Tanks Filters, FOB Woodbury. Add \$50 crating fee to single-unit shipments.
- 4 or more pieces, pre-paid freight.
- Commercial units (Category D), 1 or more pieces, pre-paid freight.
- Scale Management Systems and Cartridges (Category S), 1+ piece, FFA

### MISSISSIPPI Shipments

- Net order value of \$500 or more from Categories B, C, E, & P qualifies for pre-paid freight. Case quantities only.
- If under \$500, customer pays freight.
- Orders under \$100 net will incur a \$20.00 handling fee.
- All service parts and Category M items, customer pays freight.



**NORTH STAR**<sup>™</sup>  
WATER TREATMENT SYSTEMS



**TAP OUR EXPERTISE**

**POINT OF ENTRY**  
PRODUCTS

## YOU DESERVE **THE SOFT LIFE.**

Once you've experienced soft water, you won't want to live without it. That silky clean feeling. A cleaner home. Better wash results. Even savings on cleaning supplies and detergents. Your house and family will thank you!

### WATER WITH **BENEFITS**

#### **Stay Cleaner and Prevent Dry Skin and Hair**

That same film that's on your shower door ends up on your skin when you have hard water. Soft water does a much better job of rinsing soaps and shampoos to prevent their drying effects.

#### **Keep Everything Cleaner and Prevent Hard Water Damage**

Soft water doesn't leave scale and scum on your faucets, tubs and shower doors making it much easier for you to keep them clean and prevent hard water buildup that can cause damage.

#### **Protect Your Favorite Clothing and Linens**

Hard water is hard on fabrics, wearing them prematurely, and causing fading and brittleness. Soft water can extend the life of your clothes and household textiles by removing the dissolved minerals that create problems.

#### **Reduce Soap and Detergent Use**

Use up to 75 percent less detergent and get the same or better cleaning results with soft water on the job.

#### **Reduce Energy Consumption**

By preventing scale buildup inside of your water heater, you can make it up to 30 percent more efficient since it won't have to heat your water through a layer of scale buildup.

#### **Extend the Life of Your Appliances and Plumbing**

Your water-using appliances and plumbing stay cleaner, work more effectively and last longer with soft water.



## PROFESSIONAL **PLUMBERS KNOW WATER.** THEY'VE RECOMMENDED **NORTH STAR WATER SOFTENERS** FOR DECADES.

Choose from our professional collection of cabinet and two-tank softening systems that boast advanced high-efficiency technology, pro-grade materials and the high flow rates requires by today's demanding households.

### CHOOSING A WATER SOFTENER **SHOULDN'T BE HARD.**

#### **High Impact Cabinet**

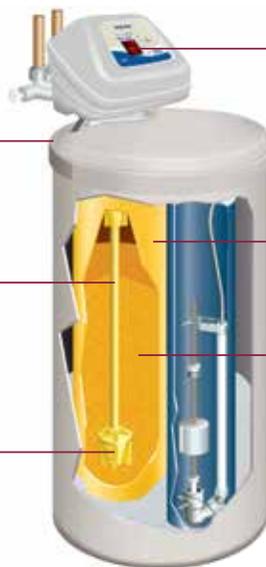
Our tough-as-nails enclosure ensures maximum protection even in harsh environments.

#### **High Efficiency Regeneration**

North Star systems use reverse flow during regeneration, proven to be the most effective way to clean a resin bed of hardness minerals.

#### **Media Bed Agitator**

North Star systems use water pressure to keep the media bed in motion to prevent iron, dirt and other solids from disturbing the softening process.



#### **H2Oracle™ Predictive Technology**

North Star's advanced softener control feature monitors your water use to determine the optimal time for regeneration, maximizing efficiency and minimizing salt and water use.

#### **Heavy Grade Reinforced Media Tank**

We use only double-lined tanks for strength and durability.

#### **High Capacity Media**

Our long-lasting softening resin has more hardness holding capacity than standard resins, allowing you to go longer between regenerations for maximum efficiency and savings.

# WHICH NORTH STAR WATER SOFTENER IS **RIGHT FOR YOUR CUSTOMER?**

All North Star water softeners are built with the same quality and efficiency and are designed to save you time and money. Which model is right for your customer? Use the steps below to help guide you in your decision.

## Step 1—Capacity

Determine the grain capacity of the unit. Family size, peak flow rate needs, hardness and iron minerals in water, and desired regeneration frequency, are some of the considerations to use when sizing the proper system. The chart below is a general reference.

### MINIMUM CAPACITY NEEDED

Number of People in House	Grains of Hardness in Water			
	3-6	5-11	10-21	21+
2				
3				
4				
5+				

	15,000-30,000
	25,000-30,000
	40,000+

## Step 2—Style

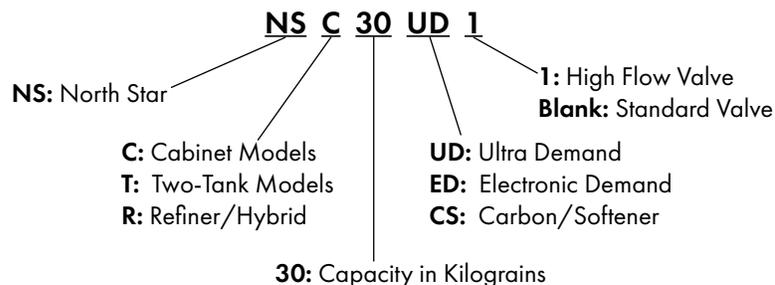
Choose between space saving cabinet models or versatile two-tank models.

## Step 3—Electronics

With some models, you can choose the electronic package.

Ultra Demand—UD	Electronic Demand—ED
Backlit LCD Display—Easier to read. Perfect for basement or poorly lit locations.	Standard LCD Display.
H2Oracle™ predictive technology for peak performance.	H2Oracle™ predictive technology for peak performance.
Quick Set-up. Set the time and hardness and you are done.	Quick Set-up. Set the time and hardness and you are done.
Display shows: Time, Hardness, Regeneration Time % Remaining Capacity, Current Flow Total Daily Usage and Average Daily Usage	Display shows: Time, Hardness and Regeneration Time
Efficiency Selector—Choose either normal or high efficiency mode.	Efficiency Selector—Choose either normal or high efficiency mode.
Diagnostics: Electronic Self Diagnosis, Days in Service Total Number of Regenerations, Turbine Check and Switches Check	
Gallons/Liters choice	
12 or 24 hour choice	
Selectable Fixed Recharge Frequency	
Adjustable Backwash Setting	

### SAMPLE NORTH STAR MODEL NUMBER BREAKDOWN:



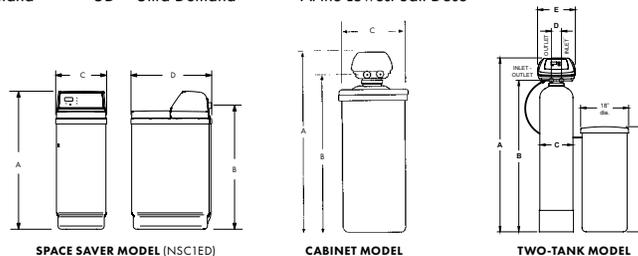
**FEATURES AND BENEFITS**



- **Backlit LCD display** – Easy to read in dark basements
- **Super Cap® time keeper** – With 72-hour memory maintains accurate time and settings in the event of a power loss
- **Permanent program memory** – History log
- **Easy to set** – Just enter time and hardness
- **Recharges according to actual use...not estimates**
- **No vacation settings necessary**
- **Enviroseal™ circuitry protection** – Protects against salt corrosion and high humidity
- **No timer gears to wear out**
- **Protection from static, power surges, and interference**
- **Installation Ready** – Includes bypass valve and 12 ft. of drain line
- **Ultra demand controller** – Optional fully programmable settings and diagnostics on some models only
- **Heavy duty valve** – Has fewer moving parts for reliable operation
- **Counter-current regeneration** – Optimized regeneration process that minimizes the use of salt and water
- **High capacity resin** – Special long-life resin for efficient use of salt and water
- **Resin bed agitator** – Keeps the bed free of iron, dirt and other solids for maximum efficiency
- **Double-lined, reinforced mineral tank** – Providing added strength and durability
- **Low voltage system** – 24 V electrical system

SPECIFICATIONS	CABINET MODELS (All-in-one construction)						TWO-TANK MODELS (Separate resin & brine tanks)		
	NSC15ED	NSR17CS*	NSC25ED	NSC30UD	NSC30UD1	NSC40UD1	NST30ED	NST45ED1	NST70ED1
MODEL NUMBER	NSC15ED	NSR17CS*	NSC25ED	NSC30UD	NSC30UD1	NSC40UD1	NST30ED	NST45ED1	NST70ED1
Part Number	7267598	7351062	7267603	7267629	7267645	7267653	7366431	7366449	7366457
Max Capacity (Grains)	15,700	18,900	26,600	30,200	34,300	39,000	30,200	45,300	70,000
Resin (cu. ft.)	0.55	0.62	0.7	0.78	0.97	1.08	0.78	1.26	1.94
Standard Connection Size	1"	1"	1"	1"	1"	1"	1"	1"	1"
Valve	Standard	Standard	Standard	Standard	High Flow	High Flow	Standard	High Flow	High Flow
Rated Service Flow Rate (gpm)	5.3	6	6	7.3	7.5	10	7.3	10	13.5
Intermittent Flow Rate (gpm @ 15 psi drop)	8.8	8.2	7.5	7.3	11.0	10.2	7.3	12.1	13.5
Rated Clear Water Iron Removal (ppm)	4	-----	7	8	5	5	8	12	19
Electronics	ED†	UD††	ED†	UD††	UD††	UD††	ED†	ED†	ED†
Maximum Efficiency (grains removed per lb of salt)**	4,160	5,075	5,000	5,090	4,960	5,070	5,090	5,070	5,060
Weight (lbs.)	75	73	82	85	110	120	77.5	107	181
<b>DIMENSIONS</b>									
Dimension A	32"	42"	48.75"	48.75"	50.375"	50.375"	48.75"	50"	65.75"
Dimension B	27.25"	37"	41.25"	41.25"	41.625"	41.625"	41.25"	41.25"	57"
Dimension C	11.5"	11.875"	18.25"	18.25"	18.25"	18.25"	8.25"	10.5"	12.25"
Dimension D	18.75"	18.375"	-----	-----	-----	-----	3.375"	3.75"	3.75"
Dimension E	-----	-----	-----	-----	-----	-----	11.5"	14"	14"
<b>WARRANTY</b>									
<b>1 year</b> on complete unit   <b>3 years</b> on electronic control board and valve   <b>10 years</b> on salt storage tank and mineral tank									

\*CS – Carbon/Softener    †ED – Electronic Demand    ††UD – Ultra Demand    \*\* At the Lowest Salt Dose



## WHICH NORTH STAR WHOLE HOUSE FILTER IS **RIGHT FOR YOU?**

If your home has water problems which cannot be corrected with a water softener alone, **North Star has a solution!** The North Star line of specialty filtration systems treat your water's special needs and rid it of sediment, iron, bad tastes and odors and high levels of pH.

North Star's whole house filters and central water system reduce sediment and rust particles throughout the entire home. Our whole home automatic sediment filter and central water system even clean their own filters, eliminating the need for replacement filters! By filtering sediment from all your water, other appliances like your water softener, water heater, washing machine and dishwasher will perform better and last longer!

## **NORTH STAR** HAS A SOLUTION TO YOUR PROBLEM WATER!

### **PROBLEM WATER SHOULDN'T AFFECT YOUR LIFE.**

Whether your water comes from a private well or a municipal water supply, one thing is clear, the water in every home is unique. Older pipes, a water main break, and even the distance your water travels before it reaches your home can introduce additional contaminants into the water you consume.

North Star offers an expanded line of state-of-the-art filters to deal with households with water contamination issues that may be easy to see such as iron, chlorine, hydrogen sulfide and low-pH to arsenic, microbiologicals and pharmaceuticals which are undetectable.

WHETHER YOU'VE NOTICED ONE INDICATION OR SEVERAL PROBLEMS WITH YOUR WATER, **NORTH STAR WATER HAS THE SOLUTION!**

### **In-Line Cartridge Filtration**

Our expanded line of filtration products allows you to install simple solutions for water clarity and/or chemical reduction.

### **Scale Reduction**

Scale reduction without softening provides another treatment option in demand by many consumers who want to protect their water heaters and plumbing.

### **Whole-House Automatic Filter Systems**

Eliminate iron, sulphur, chlorine and other problems with our automatic whole-house filters.

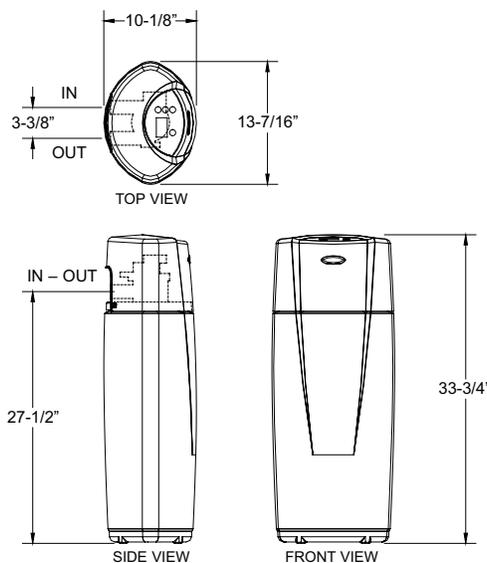




## FEATURES AND BENEFITS

- **A proven system for removing chlorine, taste and odor**
- **Delivers clean, filtered premium water to every faucet in your home, including your shower!**
- **Removes unpleasant chlorine taste and odor, leaving great-tasting water**
- **Eco-friendly**
  - No salt is used
  - Low energy usage, 28V power supply
  - Reduces environmental impact of plastic water bottles
- **Designed for high performance and maximum efficiency**
  - Sediment, chlorine taste and other adverse contaminants that affect taste and odor are removed
  - Automatically cleans itself, no filter cartridges to change or replace, saving you time and money
  - High flow rate of 9.6 gpm
  - High-tech LED display with push button controls
  - Space-saver, less than 1 sq. ft. footprint

SPECIFICATIONS	MODEL
<b>MODEL NUMBER</b>	<b>NSWHCW</b>
Part Number	7358179
Service Flow Rate	6.0 gpm / (22.7 L/min.)
Water Pressure Limits (min./max.)	30 - 125 psi (206.8 - 861.8 kPa)
Water Temperature Limits (min./max.)	40 - 100°F (5 - 38°C)
Drain Flow Rate	3.4 gpm
Estimated Total Capacity	570,000 gallons



**FEATURES AND BENEFITS**



- Features exclusive SMS scale reduction media  
- patent pending
- Eco-friendly
- Clean and easy-to-use
- Compact installation
- Easy to maintain
- Inhibits scale build-up (mineral)
- No electricity needed
- No drain required
- No corrosive citric acid
- No poly-phosphates added
- Extends plumbing life

SPECIFICATIONS	MODELS		
MODEL NUMBER	NSAS 6500	NSAS 4500	NSAS 2500
Part Number	7336999	7337000	7337018
Size	7.2" x 23"	7.2" x 13"	4.9" x 11.5 "
Weight (lb)	14	8	4.5
Peak Flow Rate (gpm)	12	10	5
Maximum Pressure	100 PSI (6.9 bar)	100 PSI (6.9 bar)	100 PSI (6.9 bar)
Capacity	about 50,000 gallons	about 35,00 gallons	about 20,000 gallons
Replacement Cartridges	Uses 4.5" x 20" replacement cartridges (part # 7337115)	Uses 4.5" x 10" replacement cartridges (part # 7337686)	Uses 2.5" x 10" replacement cartridges ( part # 7337131)
Built-in Pressure Relief Valve	Yes	Yes	Yes
Bracket	Included	Included	Included
Inlet/Outlet	1"	1"	3/4"
Replacement Cartridge	NSAS6520 7337115	NSAS4510 7337686	NSAS2510 7337131



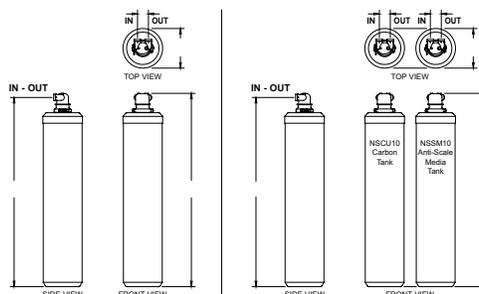
### FEATURES AND BENEFITS

- **Environmental choices for water treatment**
- **SMS anti-scale media** – Reduces hard water scale from forming in plumbing and appliances.
- **Up-flow design** – Increases contact time with media for improved scale reduction and higher flow rates.
- **By-pass valve** – Allows for easy maintenance and servicing.
- **Coconut-shell carbon** (NSSM10C only) – Filters the water throughout the home without compromising water flow. Removes chlorine taste and odor and eliminates the need for separate carbon filter changes.
- **Multi-wrap fiberglass reinforced tank** – Durable; doesn't deteriorate, rust, or corrode.
- **Self-cleaning distributors** – Distributors exhibit excellent flow rates and are cleaned automatically by counter-current water pressure.
- **No electricity** – Simplifies installation, maintenance and reduces electrical hazards.
- **No salt or added chemicals needed** – Uses environmentally friendly "green" technology for areas with water or brine-discharge restrictions.
- **Zero waste water** – No backwashing required and zero discharge.
- **Sediment filter** – 50 micron sediment filter included with both systems.
- **Standard plumbing connection** – 1" NPT Male connection for easy installation. Larger 1-1/4" and 1-1/2" plumbing adapters available.

SPECIFICATIONS		MODELS	
MODEL NUMBER	NSSM10	NSSM10C	
Part Number	7353658	7353056	
Nominal Mineral Tank Size	10" dia. x 47" (1)	10" dia. x 47" (2)	
Service Flow Rate	10 gpm	10 gpm	
Intermittent Flow Rate @ 15 psi Pressure Drop **	20 gpm	20 gpm	
SMS Anti-Scale Media*	24 lbs.	24 lbs.	
Coconut Shell Carbon	-	14 lbs.	
HDPE	3 lbs.	6 lbs. (3 lbs./tank)	
Supply Water Pressure Limits (min./max.)	20 - 125 psi	20 - 125 psi	
Water Temperature Limits (min./max.)	40 - 120°F	40 - 120°F	
WATER CHEMISTRY			
pH	6.0 to 9.0	6.0 to 9.0	
Hardness (maximum)	25 grains	25 grains	
Chlorine	<3 ppm	<3 ppm	
Iron (maximum)	0.3 mg/L	0.3 mg/L	
Copper	none allowed	none allowed	
Oil & H2S	none allowed	none allowed	
Polyphosphate	none allowed	none allowed	
Silica (maximum)	10 ppm	10 ppm	

\*SMS Media can be added to a system two times before system should be replaced or system re-bedded.

\*\*Intermittent flow rate does not represent the maximum service flow rate. Continuous operation at flow rates greater than the service flow rate may affect performance.

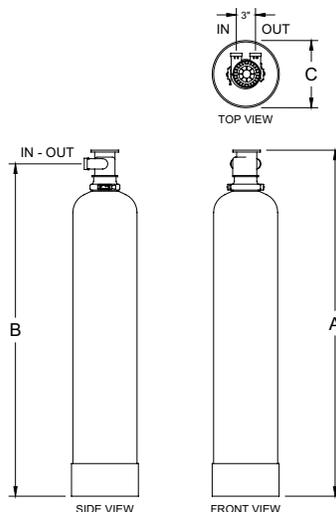


**FEATURES AND BENEFITS**



- Raises pH from 6.0-7
- Eliminates corrosion of metallic pipes and fixtures
- No water or chemicals required
- Neutralizes pH of 6.0 or higher
- Chemical free
- High flow rate – 10/12 gpm
- Suitable for most homes
- Multiple parallel units can be used for maximum flows
- Upflow design does not require water for backwashing
- Large 1" connections with bypass
- 75% Calcium Carbonate/25% Magnesium Oxide
- Fill port on IN/OUT adapter - allows addition of media without removing the adapter
- "See-through" tank - allows for easy media level monitoring

SPECIFICATIONS	MODELS			
MODEL NUMBER	UAN10	UAN12	IOAPF10	IOAPF12
Part Number	7353496	7353501	7356127	7356119
Nominal Mineral Tank Size	10" x 47"	12" x 54"	10" x 47"	12" x 54"
Type of Mineral	Neutralite/Magnesium Oxide	Neutralite/Magnesium Oxide	-	-
Amount of Mineral (cu. ft.)	1.0	2.0	-	-
Inlet Water Pressure Limits (PSI)	20 - 125	20 - 125	20 - 125	20 - 125
Maximum Water Temperature (°F/°C)	120/49	120/49	120/49	120/49
Service Flow Rater (gal/min)	10	12	-	-
Inlet/Outlet Pipe Size (in)	1	1	1	1
Supply Water pH Limits	6.0 - 6.8	6.0 - 6.8	6.0 - 6.8	6.0 - 6.8
DIMENSIONS				
Dimension A	53.75"	59.5"	53.75"	59.5"
Dimension B	51.375"	57.125"	51.375"	57.125"
Dimension C	10.5"	12.25"	10.5"	12.25"

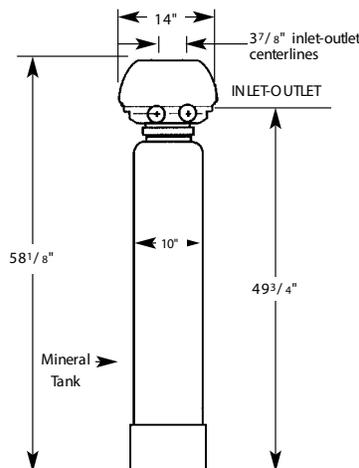




**FEATURES AND BENEFITS**

- Neutralize acid water conditions
- Controls the etching and blue-green stains on fixtures, glasses, etc.
- The neutralizing tank filter contains an acid neutralizing media that slowly dissolves as the water passes through it, raising the pH of the water toward neutral (or 7 on the pH scale.)
- You must periodically add new media to the tank. The frequency of adding the media depends on the severity of the problem and the water use.

SPECIFICATIONS	MODEL
<b>MODEL NUMBER</b>	<b>NSANSSA</b>
Part Number	7263146
Nominal Mineral Tank Size	10" x 47"
Type of Mineral	Neutralite / Magnesium Oxide
Recommended Limitation Level	6.0 - 6.8
Recommended Amount of Filtering Mineral (cu. ft.)	1.0
Inlet Water Pressure Limits (PSI)	20 - 125
Maximum Water Temperature (°F)	120
Minimum Inlet Water Flow (gal/hour)	270
Pipe Size	1"
Electrical Rating	24V 60Hz
Service Flow Rates (gpm @ 10 PSI pressure drop)	12
Type of Backwash Process	Automatic





### FEATURES AND BENEFITS

- Removes up to 10 ppm of clear or red iron
- No bleach, no potassium permanganate, no chemicals
- Naturally aspirated air used to oxidize contaminants, zeolite media filters contaminants out and backwashes them to the drain
- No pumps, air is aspirated into system after the backwash cycle
- One inch plumbing connections
- Easy-to-use 24-volt controller — just plug transformer into wall outlet
- Full one-inch diameter riser tube — for increased flow rate
- Multi-wrap™ fiberglass reinforced resin tank
- Multi-cycle valve with easy-clamp ring and patented coated disc
- Zeolite with washed quartz underbedding
- Includes bypass valve and installation kit

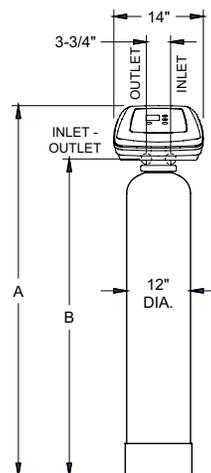
SPECIFICATIONS		MODELS		
MODEL NUMBER	NSAIV10	NSAIV12	NSEIV10	
Part Number	7336127	7336630	7344861	
Nominal Mineral Tank Size	10" Dia. x 47"	12" Dia. x 54"	10" Dia. x 47"	
Maximum Water Pressure (psi)	80	80	80	
Supply Water Temperature Limits (°F) <sup>2</sup>	40 - 120	40 - 120	40 - 120	
Flow Rate (gpm)	7 - 10	9 - 15	7 - 10	
Minimum Backwash Flow Rate (gpm)	7 <sup>1</sup>	10 <sup>1</sup>	7 <sup>4</sup>	
Electrical Rating (transformer provided)	24V-50/60Hz	24V-50/60Hz	24V-50/60Hz	
Media (cu. ft.)	1.0	2.0	-	
Contaminant Removal Limitations <sup>2</sup>	Up to 10 ppm iron <sup>3</sup>	Up to 10 ppm iron <sup>3</sup>	Consult media specifications for contaminant limitations	
DIMENSIONS				
Dimension A	57"	62.5"	57"	
Dimension B	50"	55.75"	50"	

<sup>1</sup> Actual performance may vary depending on local water conditions.

<sup>2</sup> Well pump must be able to provide the minimum flow for 30+ minutes.

<sup>3</sup> Except, bacterial and organically bound iron.

<sup>4</sup> Install a backwash flow control that is appropriately sized for the media used.





### FEATURES AND BENEFITS

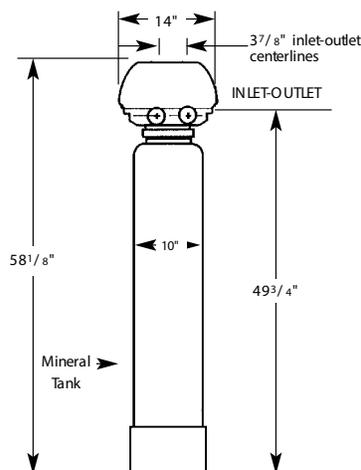
- Significantly reduces chloramines from city water
- Greatly reduces chlorine taste and odor from city water
- Backwashing for extended media life
- Clean and easy-to-use
- Chemical free
- High flow rate – 14 gpm
- Suitable for most homes
- Multiple parallel units can be used for maximum flows
- Self-flushing
- Skin protection from chlorine and chloramines
- Large 1" connections
- Coconut shell, high activity catalytic carbon
- Reduces some hydrogen sulfide when present

#### How It Works:

Water is passed through a bed of catalytic carbon, trapping chloramines, chlorine taste & odor. The system automatically backwashes itself periodically to flush away trapped particles.

Catalytic carbon eventually loses its ability to trap tastes and odors, and the bed must be replaced. The carbon life is dependent on the amount of water used and the severity of the problem.

SPECIFICATIONS	MODEL
<b>MODEL NUMBER</b>	<b>NSCCOSSA</b>
Part Number	7340794
Nominal Mineral Tank Size	10" x 47"
Type of Mineral	Catalytic Carbon
Recommended Amount of Filter Sand (lbs.)	10
Recommended Limitation Level	Variable
Recommended Amount of Filtering Mineral (cu. ft.)	0.6
Inlet Water Pressure Limits (PSI)	20 - 125
Maximum Water Temperature (°F)	120
Minimum Inlet Water Flow (gal/hour)	270
Pipe Size	1"
Electrical Rating	24V 60Hz
Service Flow Rates (gpm @ 10 PSI pressure drop)	14
Type of Backwash Process	Automatic

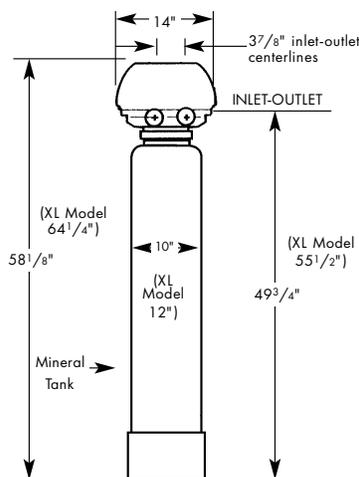




**FEATURES AND BENEFITS**

- Select the mineral and configuration for your application
- Full one-inch diameter riser tube — for increased flow rate
- One inch plumbing connections
- Easy-to-use 24-volt controller — just plug transformer into wall outlet
- Multi-wrap™ fiberglass reinforced resin tank
- Do not include filtering mineral

SPECIFICATIONS	MODELS	
MODEL NUMBER	NSAPFSSA	NSAPFXLA
Part Number	7263154	7263104
Nominal Mineral Tank Size	10" x 47"	12" x 54"
Type of Mineral	not supplied	not supplied
Recommended Amount of Mineral (cu. ft.)	1.0	2.0
Recommended Amount of Gravel Base (lbs.)	17	29
Recommended Amount of Filter Sand (lbs.)	10	15
Inlet Water Pressure Limits (PSI)	20 - 125	20 - 125
Maximum Water Temperature (°F)	120	120
Minimum Inlet Water Flow (gal/hour)	270	420
Backwash Flow Rate (gal/min)	2.5, 5 or 7	2.5, 5 or 7
Pipe Size	1"	1"

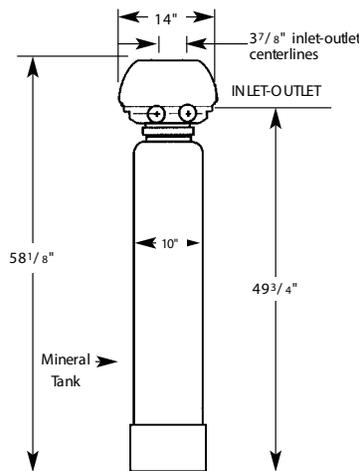




**FEATURES AND BENEFITS**

- Clear up dirty or cloudy water
- Water is passed through a bed of extremely hard, fine aggregate that traps dirt, sand, silt and other particles.
- Automatic backwashing at pre-determined intervals flushes sediment from the system.
- Backwash time/lenght is adjustable.
- Media never requires replacement under normal operating conditions.

SPECIFICATIONS	MODEL
<b>MODEL NUMBER</b>	<b>NSSFSSA</b>
Part Number	7263120
Nominal Mineral Tank Size	10" x 47"
Type of Mineral	Filter Aggregate
Recommended Limitation Level	20 Microns
Recommended Amount of Filtering Mineral (cu. ft.)	1.0
Inlet Water Pressure Limits (PSI)	20 - 125
Maximum Water Temperature (°F)	120
Minimum Inlet Water Flow (gal/hour)	270
Pipe Size	1"
Electrical Rating	24V 60Hz
Service Flow Rates (gpm @ 10 PSI pressure drop)	10
Type of Backwash Process	Automatic



**FEATURES AND BENEFITS**



- Pressure release button on opaque housing
- Easy to change filter cartridges
- Ideal for point-of-entry applications
- NSV200T - Clear sump for easy viewing and bypass valve
- Pressure relief/bleed button on the cap
- Filter not included

SPECIFICATIONS	MODELS							
MODEL NUMBER	NSV200T	NS200	NS900	NS2002	NS9002	NS9003	NSS510	NSS520
Part Number	7358420	7358438	7358454	7358446	7358462	7358470	7358543	7358551
Description	10" Clear Housing, Valve in head	10" Opaque Housing	10" Opaque Housing	20" Opaque Housing	20" Opaque Housing	20" Opaque Housing	Stainless Steel	Stainless Steel
Replacement Cartridge	2.5" x 10"	2.5" x 10"	4.5" x 10"	2.5" x 20"	4.5" x 20"	4.5" x 20"	2.5" x 10"	2.5" x 20"
Color	Blue	Blue	Blue	Blue	Blue	Blue	Stainless Steel	Stainless Steel
Plumbing Connection (Inlet / Outlet)	3/4"	3/4"	1"	3/4"	1"	1.5"	3/4"	1"
Filter Options	NSF217 NS217 NS205 NS225 NS250	NSF217 NS217 NS205 NS225 NS250	NSF917 NS917 NS905 NS925 NS950	NS2052	NS9172 NS9052 NS9252	NS9172 NS9052 NS9252	Rated for hot water temperature cartridges	Rated for hot water temperature cartridges
Certification	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	na	na
Product Dimensions	14" x 5.5"	13.5" x 4.5"	13.25" x 7.25"	23.5" x 7.25"	23.5" x 7.25"	23.5" x 7.25"	13.5" x 4.25"	23.5" x 4.25"

**FEATURES AND BENEFITS**



**Grooved Cartridge**

- provides more surface area and greater capacity

**Carbon Block**

- improves taste and odor of drinking water
- reduces chlorine

**Premium Carbon with Fact®**

- reduces chlorine taste and odor
- low pressure drip allows for high flow rate
- high sediment filter - resistant to clogging

SPECIFICATIONS	MODELS					
	NS205	NS217	NSF217	NS225	NS250	NS2052
MODEL NUMBER	7358323	7358226	7358234	7358331	7358349	7358357
Part Number	7358323	7358226	7358234	7358331	7358349	7358357
Description	Grooved Sediment Cartridge	Carbon Block	Premium Carbon with FACT®	Grooved Sediment Cartridge	Grooved Sediment Cartridge	Grooved Sediment Cartridge
Dimensions	2.5" X 10"	2.5" x 10"	2.5" x 10"	2.5" x 10"	2.5" x 10"	2.5" x 20"
Micron Rating	5	5	0.7	25	50	5
Flow Rate (gpm)	9	4	5	9	9	18
Reduces	Sediment	Sediment Chlorine Taste & Odor	Sediment Chlorine Taste & Odor	Sediment	Sediment	Sediment
Maximum Water Temperature	140°F / 60°C	100°F / 40°C	100°F / 40°C	140°F / 60°C	140°F / 60°C	140°F / 60°C
Package	2-Pack	2-Pack	2-Pack	2-Pack	2-Pack	Single
Compatible with Filtration Housing	NSV200T NS200	NSV200T NS200	NSV200T NS200	NSV200T NS200	NSV200T NS200	NS2002
Certification	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42

**FEATURES AND BENEFITS**



**Grooved Cartridge**

- provides more surface area and greater capacity

**Carbon Block**

- improves taste and odor of drinking water
- reduces chlorine

**Premium Carbon with Fact®**

- reduces chlorine taste and odor
- low pressure drip allows for high flow rate
- high sediment filter - resistant to clogging

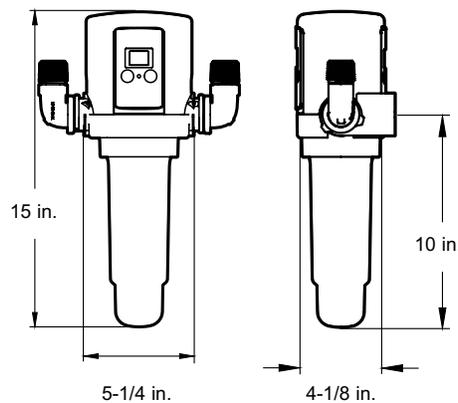
SPECIFICATIONS	MODELS							
MODEL NUMBER	NS905	NS917	NSF917	NS925	NS950	NS9052	NS9172	NS9252
Part Number	7358365	7358200	7358242	7358373	7358381	7358399	7358218	7358404
Description	Grooved Sediment Cartridge	Carbon Block	Premium Carbon with FACT®	Grooved Sediment Cartridge	Grooved Sediment Cartridge	Grooved Sediment Cartridge	Carbon Block	Grooved Sediment Cartridge
Dimensions	4.5" x 10"	4.5" x 10"	4.5" x 10"	4.5" x 10"	4.5" x 10"	4.5" x 20"	4.5" x 20"	4.5" x 20"
Micron Rating	5	25	0.7	25	50	5	25	25
Flow Rate (gpm)	20	25	22	20	20	50	25	50
Reduces	Sediment	Sediment Chlorine Taste & Odor	Sediment Chlorine Taste & Odor	Sediment	Sediment	Sediment	Sediment Chlorine Taste & Odor	Sediment
Maximum Water Temperature	140°F / 60°C	100°F / 40°C	100°F / 40°C	140°F / 60°C	140°F / 60°C	140°F / 60°C	140°F / 60°C	140°F / 60°C
Package	Single	Single	Single	Single	Single	Single	Single	Single
Compatible with Filtration Housing	NS900	NS900	NS900	NS900	NS900	NS9002 NS9003	NS9002 NS9003	NS9002 NS9003
Certification	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42	NSF/ANSI 42



**FEATURES AND BENEFITS**

- **Intended to filter water for entire home**
- **Rated 35 gpm**
- **Self-Cleaning**
  - Effectively rinses loose particulate from the filter screen
  - Minimal pressure drop due to dirty/plugged filters
  - Programmable cleaning
  - Backlit LCD display shows number of days until next clean cycle
- **Battery Operated - 9V**
  - Optional 24 volt transformer
  - Low battery indicator
- **1" NPT Connections**
  - Quick Insert/Clip System
  - 90° Elbows for easy up or down installation
- **Large Capacity Filter Screen**
  - More screen area for less pressure drop
  - Longer interval between cleaning
  - Filter can be manually cleaned by using the Clean Now button
- **Filter Screens**
  - Heavy-duty stainless steel screen
  - Three mesh sizes available to fit all applications
  - 60 micron standard
- **Clear Sump**
  - Allows viewing flow, sediment removal and auto clean feature
- **Includes All Necessary Installation Equipment**
  - Drain Line - 3/8" I.D. x 10 ft.
  - Battery
  - Bracket

SPECIFICATIONS	MODEL
<b>MODEL NUMBER</b>	<b>NSASF100</b>
Part Number	7358268
Service Flow Rate	35 gpm (132 lpm)
Water Pressure Limits (min./max.)	30 - 100 psi (207 - 689 kPa)
Water Temperature Limits (min./max.)	40 - 120°F (5 - 49°C)
Inlet - Outlet Adaptors	1" NPT male threaded





**NORTH STAR**<sup>™</sup>  
WATER TREATMENT SYSTEMS



TAP OUR **EXPERTISE**

**POINT OF USE**  
PRODUCTS

# CLEAN, CLEAR, GREAT-TASTING DRINKING WATER RIGHT AT YOUR FINGERTIPS.

## WHY WATER FILTRATION?

Common disinfection methods can cause undesirable tastes and odors in tap water. And even water that meets all applicable standards when it leaves the water plant can collect contaminants from outdated distribution systems and plumbing. If you get your water from a private well, it could be influenced by groundwater contaminants and even issues on the surface that trickle below. But there's no need to worry when you have the proper water filtration system to protect you and your family.



# GREAT BENEFITS YOU CAN RAISE A GLASS TO.

## EVERYTHING IS BETTER **WITH BETTER WATER.**

Your favorite recipes, drinks and even your ice will enjoy better taste and clarity. And you'll be able to rest easy knowing that your system is significantly reducing chemicals and other contaminants that are undesirable or make your water taste and smell bad.

## YOUR FAMILY AND EVEN YOUR PETS **WILL THANK YOU!**



### **Clean, Clear Drinking Water and Ice**

Get the clean, refreshing water you deserve.

### **Better Tasting Juices**

Clean water lets the natural flavor of your favorite fruit juices come through.

### **Better Tasting Coffee and Tea**

Enjoy more robust coffee and tea without tastes and odors masking their true flavors.

### **Better Water for Cooking**

Prepare your foods with clean, contaminant-free water.

### **Better Water for Pets**

Even your pets will choose **North Star** water over tap water!

### **Get Off the Bottle**

Save money and prevent hundreds of plastic bottles from going to landfills.



# NORTH STAR WATER FILTRATION SYSTEM COMPARISONS



**NSRO42C4**



System tested and certified by NSF International against NSF/ANSI Std. 58 for the claims specified in the owner's manual. Post-filter tested and certified by NSF International against NSF/ANSI Std. 42 for the reduction of chlorine taste and odor.



**NSDW500**



System tested and certified by NSF International against NSF/ANSI 42 & 53 for the reduction of claims specified in the owner's manual.



**NSDW300**



System tested and certified by NSF International against NSF/ANSI 42 & 53 for the reduction of claims specified in the owner's manual.

SPECIFICATIONS	NSRO42C4	NSDW500	NSDW300
Daily Production Rate	18.4 gallons (69.6 litres)		
Storage Tank Capacity	2.4 gallons		
Flow Rate at Faucet	Up to 1.0 gallon/minute	0.5 gallon/minute	2.0 gallon/minute
Filter Life	750 gallons - 6 months	270 gallons - 6 months	2000 gallons - 6 months
RO Membrane Life	1-3 years		
CONTAMINANT REDUCTION	NSRO42C4	NSDW500	NSDW300
Sediment - Sand, Soil, Silt	●	●	●
Rust	●	●	●
Chlorine Taste & Odor	●	●	●
Cysts	●	●	●
Lead	●	●	
MTBE		●	
VOC		●	
Sodium	●		
Sulfates	●		
Nitrates / Nitrites	●		
Copper	●		
Zinc	●		
Barium	●		
Chromium	●		
Arsenic	●		
Radium	●		
TDS (Total Dissolved Solids)	●		
WARRANTY	NSRO42C4	NSDW500	NSDW300
One Year Limited Warranty	●	●	●

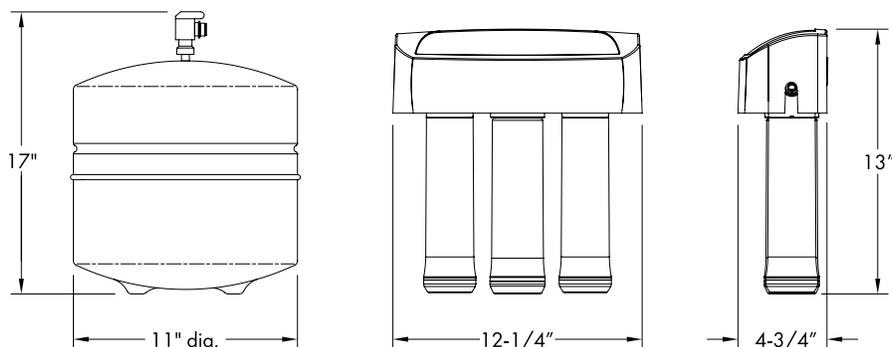
**FEATURES AND BENEFITS**



- Chrome faucet included with Water Quality Monitor that automatically indicates when to change filters and membrane
- Easy to install slim line design easily fits under the sink
- Large tank capacity
- Installation kit includes all components needed for typical install
- 6 month filter life
- Quick change auto shutoff cartridges
- One year limited warranty

SPECIFICATIONS		MODEL
<b>MODEL NUMBER</b>		<b>NSRO42C4</b>
Part Number		7287695
Reduces		Chlorine, Sediment, Cysts, Lead, Chemicals, Dissolved Solids
Min. - Max. Supply Water Pressure		40-100 psi (280-689 kPa)
Min. - Max. Supply Water Temperature		40-100 °F (4-35°C)
Maximum Total Dissolved Solids (TDS)		2,000 ppm
Maximum Water Hardness @ 6.9 pH		10 gpg
Maximum Iron, Manganese, Hydrogen Sulfide		0 ppm
Maximum Chlorine in Water Supply		2.0 ppm
Supply Water pH Range		4-10
Daily Production Rate <sup>1</sup>		18.4 gallons (69.6 liters)
Minimum TDS Reduction (new membrane) <sup>1</sup>		86.5%
Automatic Shutoff Control		Yes
Replacement Filters & Membrane		Replacement Filter Set (pre and post) # 7287506 Replacement Membrane # 7287514
Certification		NSF / ANSI 58 & 42

<sup>1</sup> @ Feed water supply at 50 psi, 77°F, and 750 TDS --- Quality water production, amount of waste water and percent rejection all vary with changes in pressure, temperature and total dissolved solids.

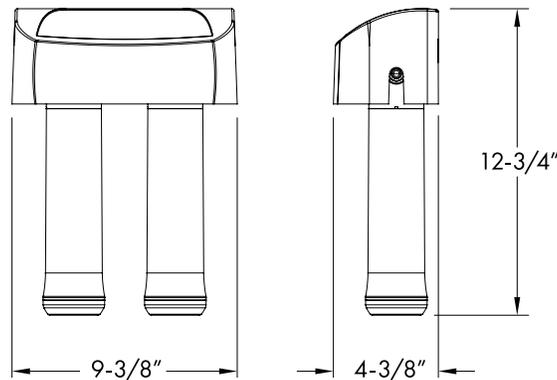


**FEATURES AND BENEFITS**



- Delivers high quality water at your sink
- Easy to install slim line design easily fits under the sink
- Includes installation fitting and tubing
- 6 month filter life - 270 gallons
- Quick change auto shutoff cartridges
- Faucet required - sold separately
- One year limited warranty

SPECIFICATIONS		MODEL
<b>MODEL NUMBER</b>		<b>NSDW500</b>
Part Number		7358187
Reduces		Chlorine, Sediment, Cysts, Lead, Chemicals
Min. - Max. Supply Water Pressure		100 psi (689 kPa)
Min. - Max. Supply Water Temperature		40-100 °F (4-35°C)
Rated Service Flow (with separate faucet)		0.5 gpm (1.89 Lpm)
Inlet - Outlet		3/8" quick connect fittings or 3/8" MIP
Replacement Filter (2 pack)		NSDW500R Dual Water System Replacement Filter, Lead, Cyst, MTBE, VOC # 7358195
Certification		NSF / ANSI 42 & 53

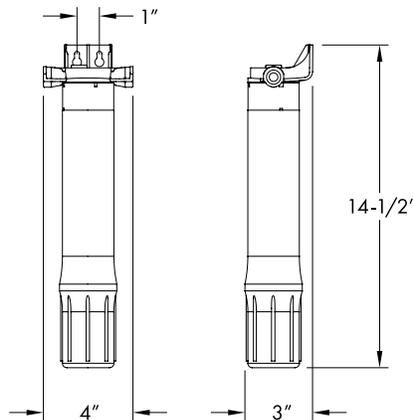


**FEATURES AND BENEFITS**



- Delivers high quality water to your existing faucet
- Full flow design is great for kitchens or bathrooms
- Easy to install slim line design easily fits under the sink
- No separate faucet required
- Quick change auto shutoff cartridge
- Installation instructions included
- 2,000 gallon filter included
- One year limited warranty

SPECIFICATIONS		MODEL
<b>MODEL NUMBER</b>		<b>NSDW300</b>
Part Number		7358276
Reduces		Chlorine, Sediment, Cysts
Min. - Max. Supply Water Pressure		30-100 psi (207-689 kPa)
Min. - Max. Supply Water Temperature		40-100 °F (4-35°C)
Rated Service Flow (with separate faucet)		2.0 gpm (7.57 Lpm)
Inlet - Outlet		3/8" quick connect fittings
Replacement Filter		NSDW300R Full Flow Replacement Filter # 7358284
Certification		NSF / ANSI 42 & 53





**FEATURES AND BENEFITS**

- Easy installation to 1/4" plastic or copper tubing
- Fits all refrigerator brands and ice makers
- Great for refrigerator water dispensers, ice makers, campers/motorhomes, boats...

SPECIFICATIONS	MODELS	
MODEL NUMBER	NSIF100	NSIF200
Part Number	7358488	7358315
Reduces	Sediment, Chlorine	Sediment, Chlorine
Filter Life*	6 months / 1,350 gallons	5 years / 7,500 gallons
Dimensions	10,25" x 2" x 2"	12" x 2.75" x 2.75"
Min. - Max. Supply Water Temperature	40-100 °F (4-35°C)	40-100 °F (4-35°C)
Inlet - Outlet	1/4" Push to Connect	1/4" Push to Connect and 1/4" Compression
Certification	NSF/ANSI 42	NSF/ANSI 42



**NORTH STAR**<sup>™</sup>  
WATER TREATMENT SYSTEMS



TAP OUR **EXPERTISE**

SPECIALTY & ACCESSORIES

### **O-RING KIT FOR 10" SUMP**



- NSORK100 # 7363425
- Replacement o-rings for NSV200T, NS200, NS900
- Includes grease packet

### **BRACKET**



- # EP2BR00
- Bracket for 3/4" whole home housing
- Fits NSV200T and NS200

### **STRAP WRENCH**



- # EPUSW00
- Use with 12.5" or 14.25" whole home housings

### **FAUCET WITH AIR GAP**



- 3/8" Tubing Connection
- Chrome Faucet # WHERCHR
- Brushed Nickel Faucet # WHEFSAT



**NORTH STAR**<sup>™</sup>  
WATER TREATMENT SYSTEMS



**TAP OUR EXPERTISE**

**COMMERCIAL**  
WATER TREATMENT

## LIFE DOESN'T HAVE TO BE SO HARD.

With all the problems hard water can cause, it's easy to see how you can save money and resources by conditioning your water.

### Save on Energy Expenses

Use up to 29 percent less energy to heat soft water because it minimizes the scale that prevents heat transfer inside boilers and water heaters.

### Reduce Plumbing Repairs

Eliminate hard water-related plumbing system malfunctions including hard water mineral buildup that causes flow restrictions and pipe damage.

### Prolong Appliance Life

Commercial warewashers and other machines last longer without harmful scale buildup that can damage parts and restrict operation.

### Reduce Chemical Use

Soft water cuts detergent and chemical use by as much as 75 percent since it doesn't require extra chemicals to create desired results.

### Make Cleaning Easier

Spend less time cleaning without the scale and scum associated with hard water.

### Reduce Fixture Wear

Prevent damage-causing scale buildup on faucets, sinks and tubs. Eliminate additional scrubbing that can cause premature wear.

### Eliminate Hard Water Spots on Glassware and Flatware

Avoid hard water spots that can spoil customer experiences and require additional cleaning of dishes, glasses and flatware.

### Prolong Linen and Textile Life

Prolong the life of commercial linens and textiles without the damaging effects of hard water minerals like premature wear and fading.

### Provide a Better Customer Experience

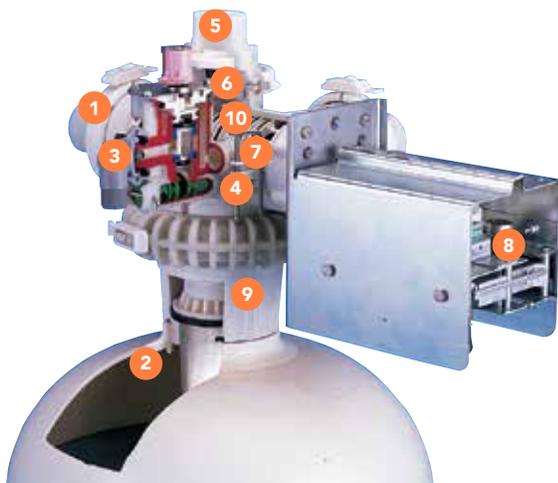
Customers who use soft water for cleaning and bathing enjoy luxuriously softer, silkier skin and hair, and less soap and shampoo.

### Additional Advantages for Steam Boiler Pretreatment

Reduce scale buildup that requires additional cleaning and downtime in commercial steam applications.



## FEATURES THAT MAKE NORTH STAR'S COMMERCIAL SERIES BEST-IN-CLASS.



- 1 Snap Clamp Rings for Ease of Connecting
- 2 Screened Top Distributor
- 3 Brine Make-Up Flow Control
- 4 Pin Quick Disconnect Injector Housing
- 5 Up to 2" NPT Union Connections
- 6 Adjustable Backwash Flow Control
- 7 Up to 2" Ported Flow Passage in Plastic Valve Housing
- 8 High Torque 24 V-DC Motor
- 9 Valve Tank Adaptor Allows Easy Access into Tank with Clamp Ring Connector
- 10 High-Strength, Corrosion Resistant Piston



# COMMERCIAL HEAVY DUTY WATER SOFTENING SYSTEM WITH 1" HIGH PERFORMANCE VALVE

## SPECIFICATIONS

Salt Dosage <sup>1</sup>		PA070	PA100	PA130	PA190	PA250	PA320
		Grains Capacity <sup>2</sup>					
Grains Capacity at Salt Dosage	4 lbs./cu. ft.	37,000	54,000	72,000	108,000	144,000	180,000
	6 lbs./cu. ft.	50,000	72,000	96,000	144,000	192,000	240,000
	8 lbs./cu. ft.	61,000	84,000	112,000	168,000	224,000	280,000
	10 lbs./cu. ft.	67,000	93,000	124,000	186,000	248,000	310,000
	12 lbs./cu. ft.	71,000	99,000	132,000	198,000	264,000	330,000
Resin Tank Size (in.)	12.3" x 55"	17.6" x 59.5"	17.6" x 59.5"	24" x 76"	24" x 76"	24" x 76"	24" x 76"
Resin Quantity (cu. ft.)	2	3	4	6	8	10	10
Connecting Pipe Size	1"	1"	1"	1"	1"	1"	1"
Drain Line Connection Size (in.)	5/8" I.D. Hose	5/8" I.D. Hose	5/8" I.D. Hose	5/8" I.D. Hose	5/8" I.D. Hose	5/8" I.D. Hose	5/8" I.D. Hose
Salt Tank Size (in.)	17" x 38.5"	24" x 50.5"	24" x 50.5"	31" x 51"	31" x 51"	31" x 51"	31" x 51"
Salt Tank Capacity (lbs.)	340	1,000	1,000	1,500	1,500	1,500	1,500
Operating Pressure	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi
Operating Temperature	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F
Max. Drain Flow (gpm)	5	7	7	10	10	10	10
Recharge Water Used (gal.)	108	166	180	286	293	302	302
Max. Clear Water Iron <sup>3</sup>	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm
Electrical Rating	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts

All systems are available in single, duplex, triplex and quadplex configurations

<sup>1</sup> Salt dosages can be set to maintain desired efficiencies or changed to auto adjusting, salt-efficiency or boiler option. See manual for details.

<sup>2</sup> Grains capacity is for counter-current regeneration sizing purposes. The actual capacity could be 5% - 10% greater than shown for each salt dosage.

<sup>3</sup> Increased amount of clean water iron (ferrous) can reduce softening efficiency and capacity. Periodic use of resin bed cleaner may be necessary. Iron removal will depend on water conditions (i.e. pH, hardness, content and type of iron)

## OPERATIONAL FLOWS\*

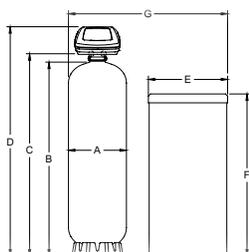
Model	Flow Rate (GPM) and Pressure (PSI) Loss ( ΔP)							
	5 gpm	10 gpm	15 gpm	20 gpm	25 gpm	30 gpm	35 gpm	40 gpm
PA070	2.6 ΔP	6.6 ΔP	11.8 ΔP	18.3 ΔP	26.0 ΔP	34.8 ΔP	-	-
PA100	1.3 ΔP	3.8 ΔP	7.3 ΔP	11.8 ΔP	17.4 ΔP	24.1 ΔP	31.8 ΔP	-
PA130	1.4 ΔP	4.0 ΔP	7.8 ΔP	12.7 ΔP	18.6 ΔP	25.7 ΔP	33.7 ΔP	-
PA190	1.2 ΔP	3.1 ΔP	6.3 ΔP	10.5 ΔP	16.3 ΔP	21.9 ΔP	29.1 ΔP	37.3 ΔP
PA250	1.2 ΔP	3.3 ΔP	6.6 ΔP	10.9 ΔP	16.8 ΔP	22.6 ΔP	30.0 ΔP	38.4 ΔP
PA320	1.2 ΔP	3.5 ΔP	6.9 ΔP	11.3 ΔP	17.3 ΔP	23.3 ΔP	30.9 ΔP	39.5 ΔP

- System design flow rates
- For intermittent use only
- Not for use at these flow rates

\* Data obtained from tests run by the University of Minnesota St. Anthony Falls Engineering Lab and is based on non-fouled filters.

All specifications listed are for SINGLE unit operation.

## DIMENSIONS



Model	A Resin Tank Diameter	B Resin Tank Height	C Inlet - Outlet Height	D Overall Height	E Brine Tank Diameter	F Brine Tank Height	G Simplex
PA070	12.3"	55"	58"	63.75"	17"	38.5"	36"
PA100, PA130	17.6"	59.5"	62.5"	68.25"	24"	50.5"	48"
PA190, PA250, PA320	24"	76"	79.8"	85.5"	31"	51"	61"

Duplex = 1 Brine Tank | Triplex = 2 Brine Tanks | Quadplex = 2 Brine Tanks

# COMMERCIAL HEAVY DUTY WATER SOFTENING SYSTEM WITH 1-1/2" HIGH PERFORMANCE VALVE

## SPECIFICATIONS

Salt Dosage <sup>1</sup>		PA1015	PA1315	PA1615	PA1915	PA2515	PA3215	PA3615	PA4515
		Grains Capacity <sup>2</sup>							
Grains Capacity at Salt Dosage	4 lbs./cu. ft.	54,000	72,000	90,000	108,000	144,000	180,000	216,000	270,000
	6 lbs./cu. ft.	72,000	96,000	120,000	144,000	192,000	240,000	288,000	360,000
	8 lbs./cu. ft.	84,000	112,000	140,000	168,000	224,000	280,000	336,000	420,000
	10 lbs./cu. ft.	93,000	124,000	155,000	186,000	248,000	310,000	372,000	465,000
	12 lbs./cu. ft.	99,000	132,000	165,000	198,000	264,000	330,000	396,000	495,000
Resin Tank Size (in.)		17" x 58"	17" x 58"	17" x 72"	24" x 72"	24" x 72"	24" x 72"	30" x 72"	30" x 72"
Resin Quantity (cu. ft.)		3	4	5	6	8	10	12	15
Connecting Pipe Size		1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT
Drain Line Connection Size (in.)		1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT	1-1/2" NPT
Salt Tank Size (in.)		24" x 50"	24" x 50"	24" x 50"	31" x 51"	31" x 51"	31" x 51"	41" x 51"	41" x 51"
Salt Tank Capacity (lbs.)		1,000	1,000	1,000	1,500	1,500	1,500	2,500	2,500
Operating Pressure		30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi
Operating Temperature		35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F
Max. Drain Flow (gpm)		7	7	7	12	12	12	24	24
Recharge Water Used (gal.)		151	166	181	271	302	332	543	588
Max. Clear Water Iron <sup>3</sup>		20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm
Electrical Rating		24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts

All systems are available in single, duplex, triplex and quadplex configurations

<sup>1</sup> Salt dosages can be set to maintain desired efficiencies or changed to auto adjusting, salt-efficiency or boiler option. See manual for details.

<sup>2</sup> Grains capacity is for counter-current regeneration sizing purposes. The actual capacity could be 5% - 10% greater than shown for each salt dosage.

<sup>3</sup> Increased amount of clean water iron (ferrous) can reduce softening efficiency and capacity. Periodic use of resin bed cleaner may be necessary. Iron removal will depend on water conditions (i.e. pH, hardness, content and type of iron)

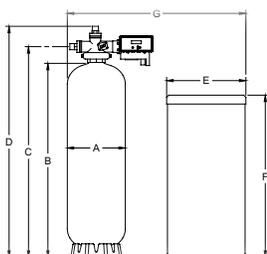
## OPERATIONAL FLOWS\*

Model	Flow Rate (GPM) and Pressure (PSI) Loss ( ΔP)						
	10 gpm	20 gpm	30 gpm	40 gpm	50 gpm	60 gpm	70 gpm
PA1015	1.5 ΔP	3.5 ΔP	7 ΔP	10.5 ΔP	16 ΔP	20.4 ΔP	-
PA1315	2 ΔP	4.5 ΔP	8.5 ΔP	12.5 ΔP	18 ΔP	19 ΔP	33.9 ΔP
PA1615	2.5 ΔP	5 ΔP	10 ΔP	14.5 ΔP	21.4 ΔP	26.9 ΔP	37.9 ΔP
PA1915	1 ΔP	2 ΔP	4 ΔP	8 ΔP	12.4 ΔP	15.9 ΔP	23.9 ΔP
PA2515	1 ΔP	2.5 ΔP	5.5 ΔP	8.5 ΔP	12.9 ΔP	16.4 ΔP	24.9 ΔP
PA3215	1 ΔP	3 ΔP	6 ΔP	9 ΔP	13.9 ΔP	17.9 ΔP	26.9 ΔP
PA3615	-	2 ΔP	4.5 ΔP	7 ΔP	10.9 ΔP	13.9 ΔP	21.9 ΔP
PA4515	-	2.5 ΔP	5 ΔP	6.5 ΔP	10.5 ΔP	14.9 ΔP	20.9 ΔP

- System design flow rates
- For intermittent use only
- Not for use at these flow rates

All specifications listed are for SINGLE unit operation.

## DIMENSIONS



Model	A Resin Tank Diameter	B Resin Tank Height	C Inlet - Outlet Height	D Overall Height	E Brine Tank Diameter	F Brine Tank Height	G Simplex
PA1015, PA1315	17"	58"	64"	70.5"	24"	50"	44"
PA1615	17"	72"	77"	83.5"	24"	50"	44"
PA1915, PA2515, PA3215	24"	72"	77"	83.5"	31"	51"	59"
PA3615, PA4515	30"	72"	81"	87.5"	41"	51"	75"

Duplex = 1 Brine Tank | Triplex = 2 Brine Tanks | Quadplex = 2 Brine Tanks

# COMMERCIAL HEAVY DUTY WATER SOFTENING SYSTEM WITH 2" HIGH PERFORMANCE PLASTIC VALVE

## SPECIFICATIONS

Salt Dosage <sup>1</sup>		PA102	PA132	PA162	PA192	PA252	PA322	PA362	PA452	PA602
		Grains Capacity <sup>2</sup>								
Grains Capacity at Salt Dosage	4 lbs./cu. ft.	54,000	72,000	90,000	108,000	144,000	180,000	216,000	270,000	360,000
	6 lbs./cu. ft.	72,000	96,000	120,000	144,000	192,000	240,000	288,000	360,000	480,000
	8 lbs./cu. ft.	84,000	112,000	140,000	168,000	224,000	280,000	336,000	420,000	560,000
	10 lbs./cu. ft.	93,000	124,000	155,000	186,000	248,000	310,000	372,000	465,000	620,000
	12 lbs./cu. ft.	99,000	132,000	165,000	198,000	264,000	330,000	396,000	495,000	660,000
Resin Tank Size (in.)		17" x 58"	17" x 58"	17" x 72"	24" x 72"	24" x 72"	24" x 72"	30" x 72"	30" x 72"	36" x 72"
Resin Quantity (cu. ft.)		3	4	5	6	8	10	12	15	20
Connecting Pipe Size		2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT
Drain Line Connection Size (in.)		2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT
Salt Tank Size (in.)		24" x 50"	24" x 50"	24" x 50"	31" x 51"	31" x 51"	31" x 51"	41" x 51"	41" x 51"	41" x 51"
Salt Tank Capacity (lbs.)		1,000	1,000	1,000	1,500	1,500	1,500	2,500	2,500	2,500
Operating Pressure		30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi	30 - 125 psi
Operating Temperature		35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F	35 - 100°F
Max. Drain Flow (gpm)		7	7	7	12	12	12	24	24	32
Recharge Water Used (gal.)		151	166	181	271	302	332	543	588	784
Max. Clear Water Iron <sup>3</sup>		20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm	20 ppm
Electrical Rating		24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts	24VDC - 65 Watts

All systems are available in single, duplex, triplex and quadplex configurations

<sup>1</sup> Salt dosages can be set to maintain desired efficiencies or changed to auto adjusting, salt-efficiency or boiler option. See manual for details.

<sup>2</sup> Grains capacity is for counter-current regeneration sizing purposes. The actual capacity could be 5% - 10% greater than shown for each salt dosage.

<sup>3</sup> Increased amount of clean water iron (ferrous) can reduce softening efficiency and capacity. Periodic use of resin bed cleaner may be necessary. Iron removal will depend on water conditions (i.e. pH, hardness, content and type of iron)

## OPERATIONAL FLOWS\*

Model	Flow Rate (GPM) and Pressure (PSI) Loss (ΔP)											
	10 gpm	20 gpm	30 gpm	40 gpm	50 gpm	60 gpm	70 gpm	80 gpm	90 gpm	100 gpm	110 gpm	120 gpm
PA102	1.5 ΔP	3.5 ΔP	6 ΔP	9 ΔP	12.5 ΔP	16.5 ΔP	-	-	-	-	-	-
PA132	2 ΔP	4.5 ΔP	7.5 ΔP	11 ΔP	15.5 ΔP	20 ΔP	25 ΔP	-	-	-	-	-
PA162	2.5 ΔP	5 ΔP	9 ΔP	13 ΔP	18 ΔP	23 ΔP	29 ΔP	35 ΔP	-	-	-	-
PA192	1 ΔP	2 ΔP	4 ΔP	6.5 ΔP	9 ΔP	12 ΔP	15 ΔP	19 ΔP	23 ΔP	-	-	-
PA252	1 ΔP	2.5 ΔP	4.5 ΔP	7 ΔP	9.5 ΔP	12.5 ΔP	16 ΔP	20 ΔP	24 ΔP	28 ΔP	-	-
PA322	1 ΔP	3 ΔP	5 ΔP	7.5 ΔP	10.5 ΔP	14 ΔP	18 ΔP	22 ΔP	26 ΔP	31 ΔP	-	-
PA362	-	2 ΔP	3.5 ΔP	5.5 ΔP	7.5 ΔP	10 ΔP	13 ΔP	16 ΔP	20 ΔP	23 ΔP	27 ΔP	31 ΔP
PA452	-	2.5 ΔP	4 ΔP	6 ΔP	8 ΔP	11 ΔP	14 ΔP	17 ΔP	21 ΔP	25 ΔP	29 ΔP	33 ΔP
PA602	-	-	3 ΔP	5 ΔP	7 ΔP	9 ΔP	12 ΔP	15 ΔP	18 ΔP	21 ΔP	25 ΔP	29 ΔP

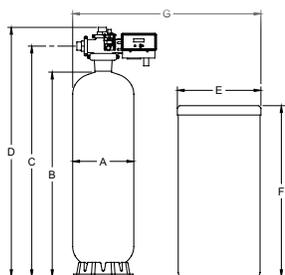
System design flow rates

- For intermittent use only
- Not for use at these flow rates

\* Data obtained from tests run by the University of Minnesota St. Anthony Falls Engineering Lab and is based on non-fouled filters.

All specifications listed are for SINGLE unit operation.

## DIMENSIONS



Model	A Resin Tank Diameter	B Resin Tank Height	C Inlet - Outlet Height	D Overall Height	E Brine Tank Diameter	F Brine Tank Height	G Simplex
PA102, PA132	17"	58"	64"	70.5"	24"	50"	44"
PA162	17"	72"	77"	83.5"	24"	50"	44"
PA192, PA252, PA322	24"	72"	77"	83.5"	31"	51"	59"
PA362, PA452	30"	72"	81"	87.5"	41"	51"	75"
PA602	36"	72"	88.5"	94"	41"	51"	80"

Duplex = 1 Brine Tank | Triplex = 2 Brine Tanks | Quadplex = 2 Brine Tanks

# PROBLEM WATER SHOULDN'T HURT YOUR BUSINESS.

Because every business uses water differently, it's easy to see why the flexibility of North Star's commercial units can save you money and resources by treating your water.

### Reduce Plumbing Repairs

Eliminate sediment and particulate matter from your plumbing system that causes flow restrictions and pipe damage.

### Prolong Appliance Life

Commercial warewashers and other machines last longer without harmful scale buildup that can damage parts and restrict operation.

### Make Cleaning Easier

Spend less time cleaning without the stains and scum associated with problem water.

### Reduce Fixture Wear

Prevent damage-causing buildup on faucets, sinks and tubs. Eliminate additional scrubbing that can cause premature wear.

### Prolong Linen and Textile Life

Prolong the life of commercial linens and textiles without the staining caused by iron and problem water.

### Provide a Better Tasting Water and Beverages

Eliminate chlorine, taste and odor from your water and offer better tasting beverages to your customers.



# COMMERCIAL HEAVY DUTY WATER FILTERS

## WITH 1" HIGH PERFORMANCE VALVE

### SPECIFICATIONS

MULTI-PURPOSE FILTERS (SOLD WITHOUT MEDIA)		PA121XS 12" x 54" Tank	PA171XS 17" x 58" Tank
<b>Sediment Removal</b>	Contaminant Limits	based on water analysis	
Type of Mineral: <i>Filter Aggregate</i>	Lbs./Cu. Ft.	52/2	104/4
Washed Quartz (Sold in 17# bags)	Lbs./Cu. Ft.	17/.17	100/1
Service Water Flow Rate (GPM)		4-8	8-18
Required Drain Flow Backwash and Fast Rinse (GPM)		7	15
<b>Acid Neutralizer</b>	Lower pH Limit	6.0	6.0
Type of Mineral: <i>Neutralite</i>	Lbs./Cu. Ft.	200/2	400/4
Washed Quartz (Sold in 17# bags)	Lbs./Cu. Ft.	17/.17	100/1
Service Water Flow Rate (GPM)		4-8	8-18
Required Drain Flow for Backwash and Fast Rinse (GPM)		7	15
TASTE AND ODOR FILTERS		PA121CS 12" x 54" Tank	PA171CS 17" x 58" Tank
Type of Mineral: <i>Activated Carbon</i>	Contaminant Limits	based on water analysis	
	Lbs./Cu. Ft.	84/2	168/4
Washed Quartz (Sold in 17# bags)	Lbs./Cu. Ft.	17/.17	100/1
Service Water Flow Rate (GPM)		4-8	8-18
Required Drain Flow for Backwash and Fast Rinse (GPM)		7	15
IRON FILTERS		PA121GS 12" x 54" Tank	NA
Amount of Mineral			
Washed Quartz (lbs./cu. ft.) Sold in 17# bags		17/.17	
Garnet (lbs./cu. ft.) Sold in 50# bags		25/.19	
Greensand (lbs./cu. ft.) Sold in 85# bags		128/1.5	
Anthracite (lbs./cu. ft.) Sold in 52# bags		26/.5	
Service Water Flow Rate (GPM)		4-8	
Required Drain Flow for Backwash and Fast Rinse (GPM)		10	
Iron Removal Limits (parts per million)		20	
MULTI-MEDIA DEPTH FILTERS		PA121MS 12" x 54" Tank	
Amount of Mineral			
Washed Quartz (lbs./cu. ft.) Sold in 17# bags		34/.34	
Garnet (lbs./cu. ft.) Sold in 50# bags		25/.19	
Filter Sand (lbs./cu. ft.) Sold in 50# bags		50/.5	
Anthracite (lbs./cu. ft.) Sold in 52# bags		52/1	
Service Water Flow Rate (GPM)		4-8	
Required Drain Flow for Backwash and Fast Rinse (GPM)		10	
SUPPLY WATER LIMITS		All Tanks	
Supply Water Pressure Limits (PSI)		30-125	
Supply Water Temperature Limits (°F/°C)		35-100 / 2-38	

All systems are available in single, duplex, triplex and quadplex configurations

### OPERATIONAL FLOWS\*

Model	Flow Rate (GPM) and Pressure (PSI) Loss ( ΔP)								
	2 gpm	4 gpm	6 gpm	8 gpm	10 gpm	12 gpm	14 gpm	16 gpm	18 GPM
PA121XS, PA121CS, PA121GS, PA121MS	1 ΔP	2.3 ΔP	3.9 ΔP	5.7 ΔP	7.9 ΔP				
PA171XS, PA171CS	.6 ΔP	1.1 ΔP	2.2 ΔP	3.3 ΔP	4.6 ΔP	5.9 ΔP	7.4 ΔP	9.7 ΔP	13.68 ΔP

\* Data obtained from tests run by the University of Minnesota St. Anthony Falls Engineering Lab and is based on a non-fouled filter.

# COMMERCIAL HEAVY DUTY WATER FILTERS

## WITH 1-1/2" HIGH PERFORMANCE VALVE

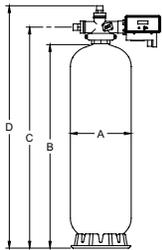
### SPECIFICATIONS

MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ				
	OPTIMUM	PEAK								
<b>FILTER (no media)</b>										
PA1715XS	Media Dependent		17" x 58"	1-1/2"	Media Dependent	100#/1 cu. ft.				
PA2415XS	Media Dependent		24" x 72"	1-1/2"	Media Dependent	150#/1.5 cu. ft.				
MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ	CARBON MEDIA			
	OPTIMUM	PEAK								
<b>CARBON FILTERS</b>										
PA1715CS	8 gpm	16 gpm	17" x 58"	1-1/2"	15 gpm	100#/1 cu. ft.	104#/4 cu. ft.			
PA2415CS	15 gpm	30 gpm	24" x 72"	1-1/2"	30 gpm	150#/1.5 cu. ft.	260#/10 cu. ft.			
PA3015CS	25 gpm	50 gpm	30" x 72"	1-1/2"	50 gpm	250#/2.5 cu. ft.	390#/15 cu. ft.			
MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ	GARNET MEDIA	FILTER SAND MEDIA	ANTHRACITE MEDIA	
	OPTIMUM	PEAK								
<b>MULTI-MEDIA FILTERS</b>										
PA1715MS	15 gpm	30 gpm	17" x 58"	1-1/2"	25 gpm	100#/1 cu. ft.	50#/.4 cu. ft.	100#/1 cu. ft.	156#/3cu. ft.	
PA2415MS	30 gpm	60 gpm	24" x 72"	1-1/2"	50 gpm	150#/1.5 cu. ft.	150#/1.2 cu. ft.	250#/2.5 cu. ft.	312#/6 cu. ft.	
MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ	GARNET MEDIA	FILTER SAND MEDIA	ANTHRACITE MEDIA	
	OPTIMUM	PEAK								
<b>GREENSAND FILTERS</b>										
PA1715GS	8 gpm	13 gpm	17" x 58"	1-1/2"	25 gpm	100#/1 cu. ft.	50#/.4 cu. ft.	255#/3 cu. ft.	78#/1.5 cu. ft.	
PA2415GS	30 gpm	60 gpm	24" x 72"	1-1/2"	50 gpm	150#/1.5 cu. ft.	150#/1.2 cu. ft.	510#/6 cu. ft.	156#/3 cu. ft.	

All systems are available in single, duplex, triplex, and quadplex operation.

Note: The filters are operated on a demand basis utilizing a water meter and control with an override option to initiate a backwash on a more frequent basis. The filter will operate very effectively at the optimum flow rates and should be operate at the peak flow for only short periods of time.

## DIMENSIONS



Model	A	B	C	D
	Resin Tank Diameter	Resin Tank Height	Inlet - Outlet Height	Overall Height
PA1715	17"	58"	64"	70.5"
PA2415	24"	72"	77"	83.5"
PA3015	30"	72"	81"	87.5"

# COMMERCIAL HEAVY DUTY WATER FILTERS

## WITH 2" HIGH PERFORMANCE VALVE

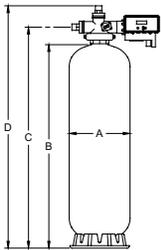
### SPECIFICATIONS

MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ	CARBON MEDIA		
	OPTIMUM	PEAK							
<b>CARBON FILTERS</b>									
PA172CS	8 gpm	16 gpm	17" x 58"	2"	15 gpm	100#/1 cu. ft.	104#/4 cu. ft.		
PA242CS	15 gpm	30 gpm	24" x 72"	2"	30 gpm	150#/1.5 cu. ft.	260#/10 cu. ft.		
PA302CS	25 gpm	50 gpm	30" x 72"	2"	50 gpm	250#/2.5 cu. ft.	390#/15 cu. ft.		
PA362CS	35 gpm	70 gpm	36" x 72"	2"	70 gpm	300#/3 cu. ft.	520#/20 cu. ft.		
MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ	GARNET MEDIA	FILTER SAND MEDIA	ANTHRACITE MEDIA
	OPTIMUM	PEAK							
<b>MULTI-MEDIA FILTERS</b>									
PA172MS	15 gpm	30 gpm	17" x 58"	2"	25 gpm	100#/1 cu. ft.	50#/.4 cu. ft.	100#/1 cu. ft.	156#/3cu. ft.
PA242MS	30 gpm	60 gpm	24" x 72"	2"	50 gpm	150#/1.5 cu. ft.	150#/1.2 cu. ft.	250#/2.5 cu. ft.	312#/6 cu. ft.
PA302MS	50 gpm	100 gpm	30" x 72"	2"	70 gpm	250#/2.5 cu. ft.	200#/1.6 cu. ft.	350#/3.5 cu. ft.	520#/10 cu. ft.
MODEL	DESIGN FLOW RATES		TANK SIZE	PIPE SIZE	BACKWASH FLOW RATE	WASHED QUARTZ	GARNET MEDIA	FILTER SAND MEDIA	ANTHRACITE MEDIA
	OPTIMUM	PEAK							
<b>GREENSAND FILTERS</b>									
PA172GS	8 gpm	13 gpm	17" x 58"	2"	25 gpm	100#/1 cu. ft.	50#/.4 cu. ft.	255#/3 cu. ft.	78#/1.5 cu. ft.
PA242GS	15 gpm	24 gpm	24" x 72"	2"	50 gpm	150#/1.2 cu. ft.	150#/1.2 cu. ft.	510#/6 cu. ft.	156#/3 cu. ft.
PA302GS	25 gpm	38 gpm	30" x 72"	2"	70 gpm	250#/2.5 cu. ft.	200#/1.6 cu. ft.	765#/9 cu. ft.	260#/5 cu. ft.

All systems are available in single, duplex, triplex, and quadplex operation.

Note: The filters are operated on a demand basis utilizing a water meter and control with an override option to initiate a backwash on a more frequent basis. The filter will operate very effectively at the optimum flow rates and should be operate at the peak flow for only short periods of time.

## DIMENSIONS



Model	A	B	C	D
	Resin Tank Diameter	Resin Tank Height	Inlet - Out-let Height	Overall Height
PA172	17"	58"	64"	70.5"
PA242	24"	72"	77"	83.5"
PA302	30"	72"	81"	87.5"
PA362	36"	72"	88.5"	94"



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