Nelsen Scale Prevention Systems

Installation, Operation & Maintenance Manual



Model Numbers

NSPS-0844-RES NSPS-0948-RES NSPS-1054-RES NSPS-1252-RES NSPS-1354-RES

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Introduction

What is the main difference between water-softening unit & Filtersorb SP3?

The “classical” water-softening unit operates on the basis of ion exchange; exchanging calcium and magnesium ions in water with an equivalent amount of sodium (Salt). When a water softener is used, the result is not only soft water, but also increased sodium content in the water supply. Additionally, these softening units require water for backwashing and common Brine water “salt water” for regeneration. For example, in order to regenerate 100 liters of softening resin, up to 25 kg of salt per regeneration cycle is required. This means an added costly expense of salt is incurred for each and every regeneration cycle. The Filtersorb SP3 water media acts as a catalyst by accelerating the transformation of the calcium and magnesium minerals into harmless “Nano” particles. When the inlet water goes into the water conditioner tank, the up flow pulls the water through the fluidized Filtersorb SP3 media which then acts as a catalyst and pulls the hardness minerals of calcium and magnesium out of the solution and then transforms these minerals into inactive Nano crystal particles. Because the hardness minerals have been transformed into Nano particles, these Nanoscopic particles make their way through plumbing systems without attaching on to pipes, fixtures, valves, or heating elements. Filtersorb SP3 is also a maintenance free system that does not require cost for salt, costs for water or for regeneration material.

How does the calcium get into the water?

Much of our drinking water comes from ground water which originates from precipitation that falls in the form of rain or snow and seeps into the ground, filling the open spaces, or pore space, within layers of sand or gravel (formations) beneath the land surface. As the rain or snow passes through the atmosphere, it becomes enriched with carbon dioxide (CO_2) and combines with the H_2O (water) to form a solvent of calcium known as carbonic acid (H_2CO_3). As the rain seeps into the ground, the carbonic acid extracts calcium from the calcium rich stone and forms hydrogen carbonate [Ca (HCO_3)2]. When the extraction process ends, the water is saturated with calcium and the carbonic acid forming a carbonic acid/ calcium equilibrium. Depending on the ground quality, the amount of calcium and amount of carbonic acid determines whether more or less calcium is extracted into the water.

How does calcium scale develop on pipes and hardware?

Calcium Scale is a hard thick coating or covering of calcium carbonate ($CaCO_3$) that forms on heating elements and on the pipes and hardware of plumbing systems. As the calcium rich water enters into the home, the carbonic acid/ calcium equilibrium becomes interrupted within the pipes. Because the hydrogen carbonate (Ca (HCO_3)2) is a very weak chemical compound, temperature increases or movement cause the compound to breakdown and parts of the calcium (Ca_2), magnesium (Mg_2) and bicarbonate (HCO_3) are no longer dissolved and attach to the surfaces of pipes, heaters, and hardware. Over time, the scale compounds and is very difficult and costly to remove.

What are the effects of calcium prior to treatment?

Negative Effect - The negative effect of calcium is that it creates scale on pipes, hardware, and surfaces. This leads to high energy costs for heaters and expensive repairs for ice machines, coffee machines, and other appliances. The scale also may breed bacteria.

Positive Effect - Calcium enriched water is a health benefit and an important nutrient needed to help prevent or minimize diseases such as heart disease. Ideally, consumable water should contain adequate amounts of calcium and magnesium which are both found in hard water.

Filtersorb SP3 Media

The technologically advanced Filtersorb SP3 Media is an innovative solution that prevents all of the negative effects of calcium and magnesium, while allowing the positive health benefits to remain.
The system is maintenance free, chemical free, salt free and does not require costly regeneration and backwashing.

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System Overview

Your Nelsen Scale Prevention System is complete and ready to use. The “Systems” are either shipped loaded with media or the media may have been shipped separately. Assembly and installation instructions are detailed on the following pages of this manual. Please review operating pressures, temperatures, water chemistry and system limitations to ensure proper application of the system.

Included in the Box



- Enpress Vortech Pressure Vessel
- Riser Tube (Pre-Installed)
- Filter Media (May be Pre-Installed)
- C-Series In/Out Tank Head
- C-Series Bypass
- 1" NPT PVC Plumbing Adapters
- 1" x 10" Big Blue Filter Housing for 8", 9" and 10" Tanks
- 10" GAC Carbon Pre-Filter for 8", 9" and 10" Tanks
- 1" x 20" Big Blue Filter Housing for for 12" & 13" Tanks
- 20" GAC Carbon Pre-Filter for 12" & 13" Tanks
- Filter Housing Wrench
- Wall Mount Bracket for Big Blue Housings



Specifications	08x44	09x48	10x54	12x52	13x54
Inlet/Outlet Connection	3/4" - 1-1/4"				
Temperature	41° - 149° F				
pH	6.5 - 8.5				
Water Pressure	15 -100 psi				
Maximum Service Flow (gpm)	10	12	15	20	25
Filtersorb SP3 Media (Liters)	4	6	8	10	15
Overall System Height	49-3/8"	53-3/8"	59-1/2"	57-7/8"	59-1/2"
Overall System Depth	14-1/4"	14-5/8"	15-1/4"	16-1/4"	16-3/4"
Overall System Width	8-1/2"	9-3/8"	10-5/8"	12-5/8"	13-5/8"

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Precautions and Notes to the Installer

- ! Be sure to wear suitable gloves, breathing and eye/face protection.
- ! Install System on cold water line only.
- ! Do not let the system freeze.
- ! The System must be the last form of water treatment equipment installed in the system. With the exception of an RO unit or POU filter, do not install any water treatment devices after the System.
- ! Do not apply phosphate or any other antiscalant either before or after the System.
- ! Do not use sealants - It is recommended that Teflon® tape be used to seal plastic threaded fittings. Pipe dope and liquid thread sealants may contain a carrier that attacks some plastic materials.
- ! Do not use petroleum based (Vasaline®) lubricants - Petroleum based lubircants cause the swelling of o-rings and seals. The use of other lubricants may attach the Noryl® plastic of the distributor head, by-pass and fittings. It is recommended that only Dow Corning® silicone grease be used as a lubricant for the o-rings in the system.
- *i* Place the system on a smooth, level surface in a vertical position.
- *i* The System is light and only partially filled with media. The upflow operation of the system requires a lot of freeboard to allow the bed to fully fluidize.
- *i* The System is constructed using the Enpress Vortech tank which features a bottom-plate design – there is no gravel underbed. See Figure 1.
- *i* The System operates in the UpFlow mode, the tank connections are opposite from the standard downflow configuration normally found on water softeners and filters. See Figure 2.



Figure 1

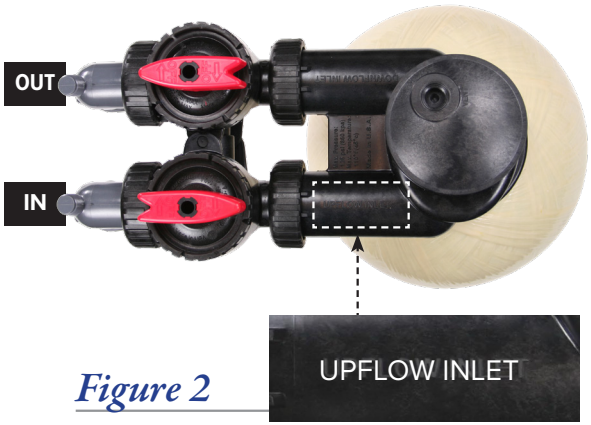


Figure 2

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Pre-Installation – Main Tank Assembly

These directions are to be followed when the System is shipped with the media separate. If the media is installed in the System upon delivery, please skip to "Installation Instructions" on Page 6.

1 Place main tank on a firm, flat surface in a vertical orientation (open end up), and secure to prevent tipping.

2 Verify that the blue cap (supplied), see Figure 3, is inserted partially into the top end of the riser tube as illustrated in Figure 3.
Note: Do not force the cap fully into the tube. The cap functions only to prevent filter material from entering the tube when the tank is filled, and must be removed when the filling process is completed. If cap is unavailable, affix tape across riser tube opening.

3 Position funnel (optional) in tank opening as illustrated in Figure 4.

4 Pour all of the Filtersorb media into the tank.
Note: The media fills less than 1/3 of the tank.

5 Gently rock the tank back and forth slightly to level the media in the tank and assure riser tube is still centered in the top of the tank.

6 Carefully remove the funnel and blue cap from the riser tube. As you remove the blue cap from the riser tube, do not pull up on the tube.

7 Check that the diffuser cone is secured on the bottom of the distributor head and position the distributor head on the tank so the riser tube inserts into the cone. Carefully HAND TIGHTEN the distributor head into the tank. See Figure 5.



Figure 3



Figure 4



Figure 5

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Installation Instructions

The installation of the System must adhere to local and state plumbing codes. It is recommended that installation of the System be done by a professional plumber or water conditioning dealer.

The ***Carbon Pre-filter*** is used as a combination 5 micron sediment filter and also to reduce the negative effects of high chlorine levels on the FilterSorb SP3 Media. At elevated levels, chlorine can have a substantial negative effect on the structural integrity of the resin material in the media. The carbon pre-filter will help protect the longevity of the system. The carbon pre-filter should be installed prior to the System. As previously mentioned, the System should be the last System in the water treatment chain. An RO drinking water system or other POU device are the only systems to be installed downstream from the System.

1 Place the System in the desired location.

2 Close the main house water shut-off valve.

3 Open any nearby cold water faucet to relieve the line pressure.

4 Properly install the pre-filter housing on the cold water line upstream from the System.
Note: There is an INLET and OUTLET embossed in the head of the filter housing, make sure when installing the INLET is on the supply side of the system.

5 Center the pre-filter cartridge in the sump of the pre-filter housing and hand-tighten the sump on the filter housing in/out head. Using the filter housing wrench provided, snug the sump to the head ensuring a proper seal of the o-ring. DO NOT OVERTIGHTEN. It will be necessary to replace the pre-filter cartridge at a later date. Store the filter housing wrench in a safe place for use during pre-filter cartridge replacement.

6 Verify that the System is set to the BYPASS position. See Figures 5 & 6.

Flow of water when IN bypass mode. Water bypasses the System.



Figure 5

Flow of water when OUT of bypass mode. Water flows through the System.



Figure 6

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7 Connect the cold water supply to the port on the distribution head of the system marked “UPFLOW INLET”. This is the INLET for the System. (See Figure 2)
Note: The System operates in an UPFLOW mode which is opposite of a conventional softener.

8 The outlet of the System is marked “DOWNFLOW INLET”. Connect this port to the cold water supply of the home. This is the OUTLET for the System.

9 Open the main house water shut-off valve.

10 Open a nearby faucet, checking for leaks and relieving any trapped air in the lines.

11 Partially open the OUTLET (Marked DOWNFLOW INLET) port on the bypass.

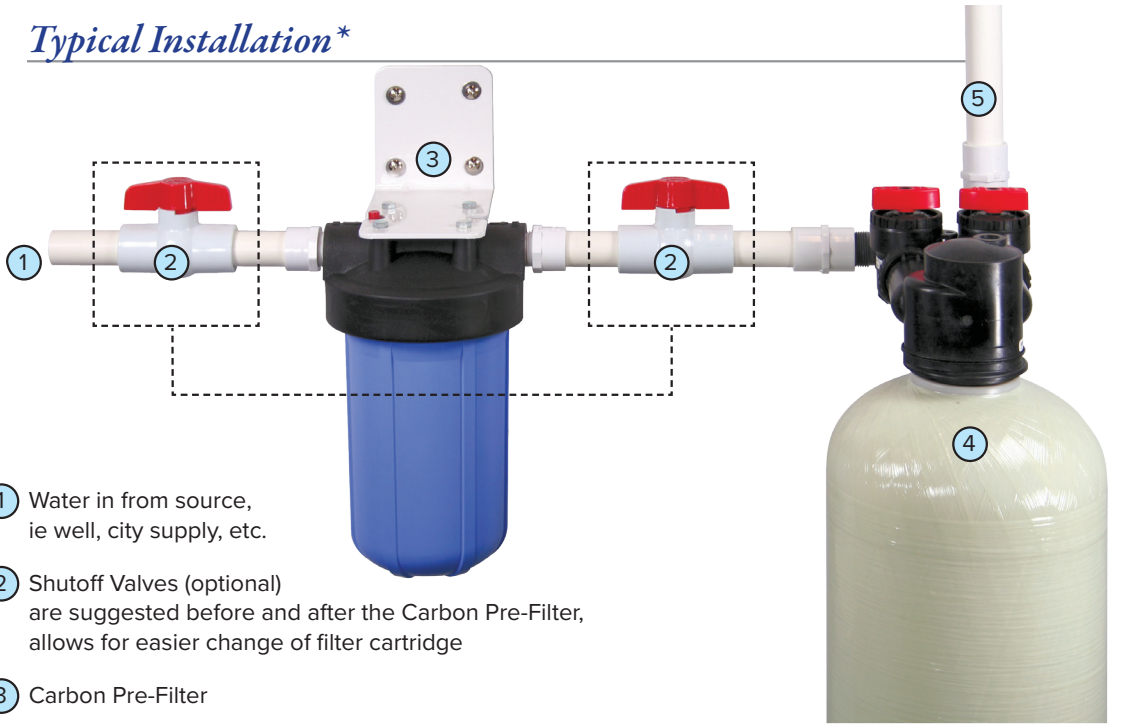
12 Partially open the INLET (Marked UPFLOW INLET) port on the bypass allowing the tank to slowly fill purging excess air from the system.

13 Once the air has been purged from the system and you have checked for leaks, slowly open both the INLET and OUTLET ports on the bypass.

Flush at Max Flow Rate

14 The System is now ready for service.

*Typical Installation**



1. Water in from source, ie well, city supply, etc.
2. Shutoff Valves (optional) are suggested before and after the Carbon Pre-Filter, allows for easier change of filter cartridge
3. Carbon Pre-Filter
4. Scale Prevention System
5. Treated Water - Cold water supply for house

**** Shown using PVC plumbing, your plumbing may differ than that shown; check with the local plumbing authority prior to installation. Also, some plumbing codes may require installation by a licensed plumber.***

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Maintenance Recommendations

Hot Water Tank

The Hot Water Tank should be drained and flushed after the initial 30 days to remove fallen scale in the bottom of the tank caused by the de-scaling action of the System.

Faucets

Faucet aerators and drains may plug occasionally as old scale is removed from your plumbing system and water heater. Unscrew the aerators to clean the screens, then re-install.

Dishwashers

Dishwashers use water from the hot water side of plumbing and the water is extremely hot water and also extremely hot in the drying cycles when cleaning and drying the dishes. You may find unusual initial spotting because of the de-scaling taking place. You also may have existing excessive scale build inside the sidewalls and washing arms of the dishwasher. The best way to eliminate the excising scale in the dishwasher is to put a cup of white vinegar in the upper basket during the washing cycle for the first few weeks. You can also use citric acid instead of the white vinegar. This will help dissolve the existing scale in the washer arms and inside surface of the dishwasher. You may need to do this until all of the scale in the plumbing is dissolved.

Pre-Filter Replacement

Replacement of the pre-filter cartridge is recommended every six to nine months or when necessary by either visual inspection or when household pressure has dropped significantly. Source water that has high particulate content requires more frequent change-out of the pre-filter cartridge.

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