



Clean Water Made Easy

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CWS Time Clock Neutralizer Installation & Start-Up Guide

Thank you for purchasing a Clean Water System! With proper installation and a little routine maintenance your system will be providing neutral pH water for many years.

Your new system comes with a printed CWS Service manual, which along with this start-up guide will help guide you in the installation and start-up of your new system. The CWS service manual covers other types of systems as well such as water softeners and filters, so there may be information in your CWS service manual that does not pertain to your system. Please review this start-up guide entirely before beginning to install your system and follow the steps outlined for best results.

CALCITE MEDIA CONTAINS DUST. USE PAPER MASK AND VENTILATE TO AVOID BREATHING DUST.

Questions?

Call us toll-free: 1-888-600-5426 or 1-831-462-8500

Email us: support@cleanwaterstore.com

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Packing List

Neutralizer 1.0 cubic foot size

Quantity 1 CWS TimeClock Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 10" x 44" filter tank with distributor tube

Blue media funnel for adding the Calcite media

12lbs. Filter gravel

1 cubic foot of Calcite media

Neutralizer 1.5 cubic foot size

Quantity 1 CWS TimeClock Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 10" x 54" filter tank with distributor tube

Blue media funnel for adding the Calcite media

16lbs. Filter gravel

1.5 cubic foot of Calcite media

Blend 1.0 cubic foot size

Quantity 1 CWS TimeClock Backwash Control Valve w/ Bypass Assembly and Pipe connector kit (1" or ¾")

Quantity 1 10" x 44" filter tank with distributor tube

Blue media funnel for adding the Calcite media

12lbs. Filter gravel

1 cubic foot of Calcite media

15 lbs. of Corosex

Blend 1.5 cubic foot size

Quantity 1 CWS Time Clock Backwash Control Valve w/ Bypass Assembly and Pipe connectors(1" or ¾")

Quantity 1 10" x 44" filter tank with distributor tube

Blue media funnel for adding the Calcite media

12lbs. Filter gravel

1.5 cubic foot of Calcite media

15 lbs. of Corosex

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Pre-Installation

1. Review your packing list and make sure you have received all the parts before beginning installation.
2. If you are going to be turning off the water to the house and you have an electric water heater, shut off the power to the water heater before beginning installation in case water heater is accidentally drained.
3. Pick a suitable location for your filter system on a dry level spot where it won't be exposed to freezing temperatures. A minimum of 20 PSI is required. Maximum pressure is 90 PSI.
4. Get all of your plumbing parts together before beginning installation. Installation typically takes 3 to 5 hours. However, after installation the Neutralizer must be allowed to run through a complete backwash and rinse cycle.
5. After the system is installed and running, your water may be discolored, or full of sediment or rust, particularly if this is older or corroded piping. This typically clears up over a day or two.

Best Practices for Piping & Drain Installation

1. See typical installation on page 7 (Fig 2). The Neutralizer is installed after the pressure tank.
2. Make sure to connect the IN pipe to the CWS Time Clock inlet and the OUT pipe to the outlet (see Fig 2). As you face the CWS Time Clock control from the front, the water enters on the right and exits on the left. From the back (see Fig 2) the water enters on the left. The inlet and outlet are attached to the bypass valve, which is marked with arrows as well.
3. Make sure there is a working gate or ball valve before the CWS Time Clock Neutralizer and also one after as shown in Fig 2. The pressure gauges are optional and perhaps not necessary but a hose bib (which is a faucet that you can attach a garden hose to) is strongly recommended after the Neutralizer and before the second ball valve. This makes it easy to rinse your new Neutralizer on start-up and gives you a place to test the water before it enters your household plumbing.

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4. If you will be using copper piping, do not sweat the copper pipe directly on to the CWS Time Clock control valve. Avoid heating up the CWS Time Clock control valve plastic with the torch.
5. If have copper pipe before the Neutralizer and it is too difficult to change out, you may still experience some copper staining of fixtures and have a copper residual in the water because this section of pipe will still have acidic water flowing through it. We recommend PEX or PVC pipe up to the Neutralizer and then copper after it, if you have copper plumbing.
6. You do not need unions to install your CWS Time Clock control valve. If you need to remove it, the CWS Time Clock has quick-release couplings that make it easy to put the Neutralizer on by-pass and remove the filter system from the piping.
7. The drain line tubing (not supplied) is connected to a drain from the drain outlet using flexible ½" ID tubing. Note that the drain can run up above the CWS Time Clock control and into a drain, it does not have to drain down, as the filter backwashes under line pressure from your well pump. Most plumbing codes require an air-gap connection, so that if your sewer or septic tank backs up, it cannot cross connect with the drain tubing.

How Your Neutralizer Works

See Fig 1 below. In your Neutralizer the water enters the top of the tank (red arrows) and flows down through the media and up the distributor tube (blue arrows). The downflow type Neutralizer raises the pH of your water and can be backwashed, which cleans and re-classifies the Calcite, preventing channeling. During backwash the flow of water is reversed and water flows down the distributor tube and up through the media, lifting and expanding the Calcite media. During the backwash the Calcite is cleaned by the action of the water flowing through it.

Fig 1 - Neutralizer Filter Tank Water Flow

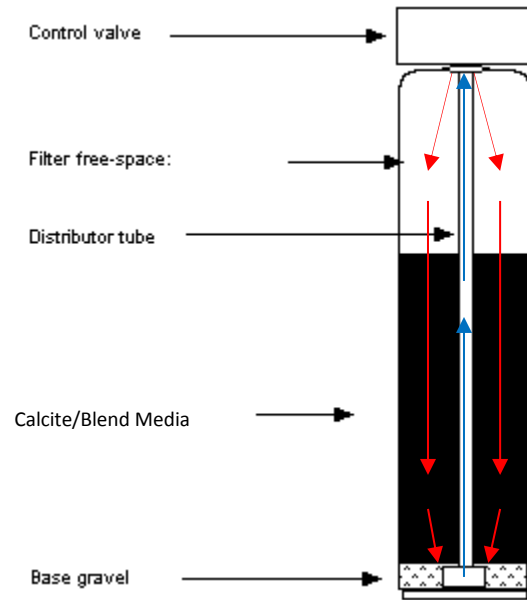


Fig 2 - Typical Neutralizer CWS Time Clock piping installation with ball valve and hose bib after the filter

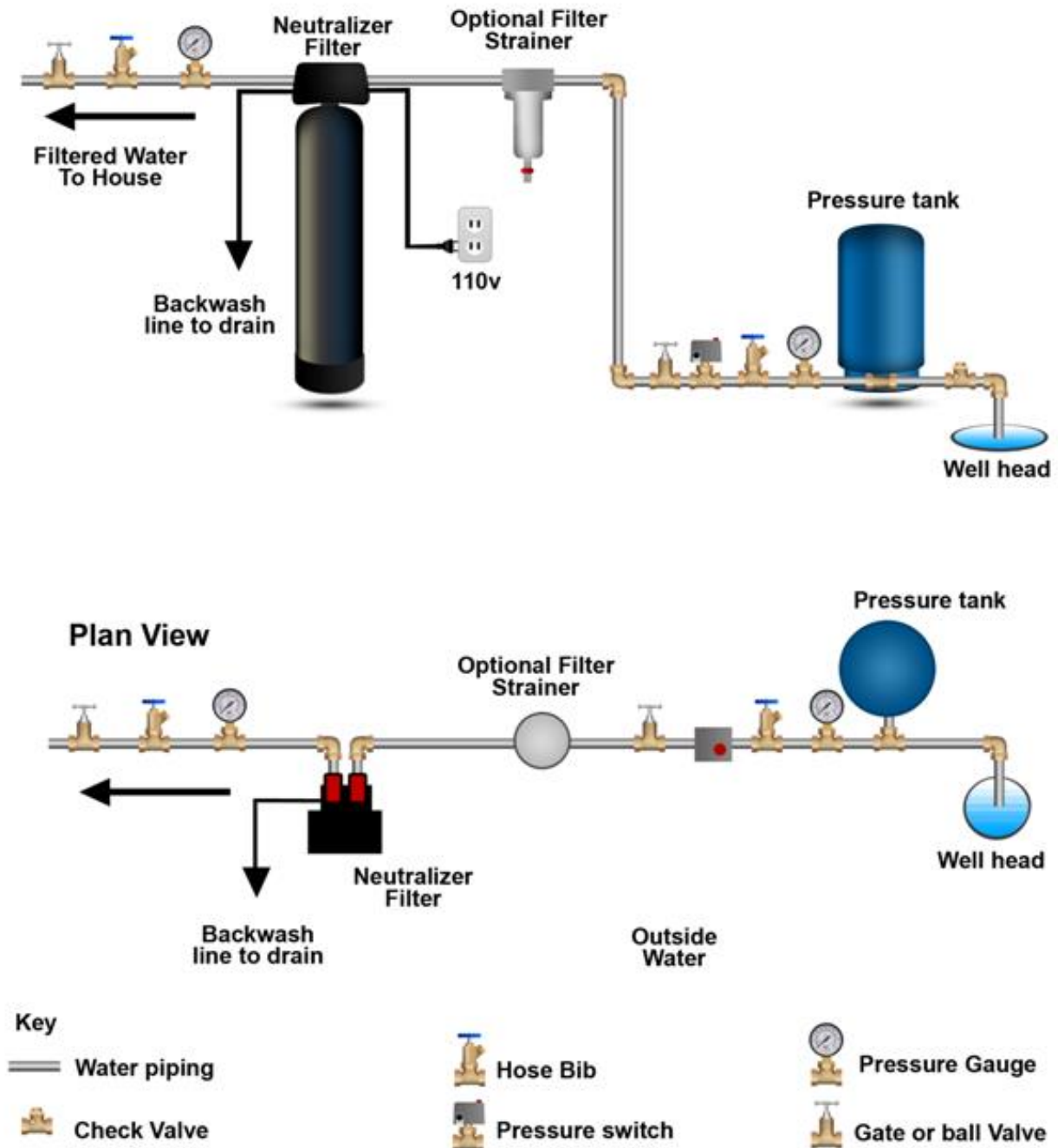


Fig 3: CWS Time Clock from the rear showing the inlet (left) and outlet (right) end-connector fittings 1" or 1-1/4" NPT in Noryl plastic. Brass end-connectors are also available for connecting to copper tubing.

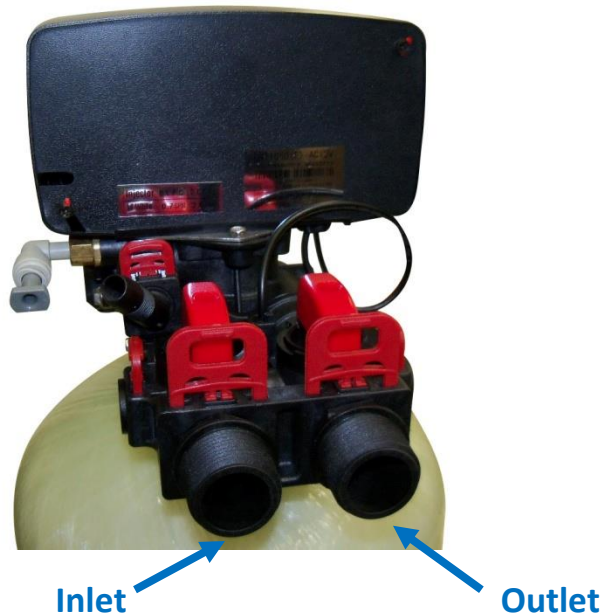
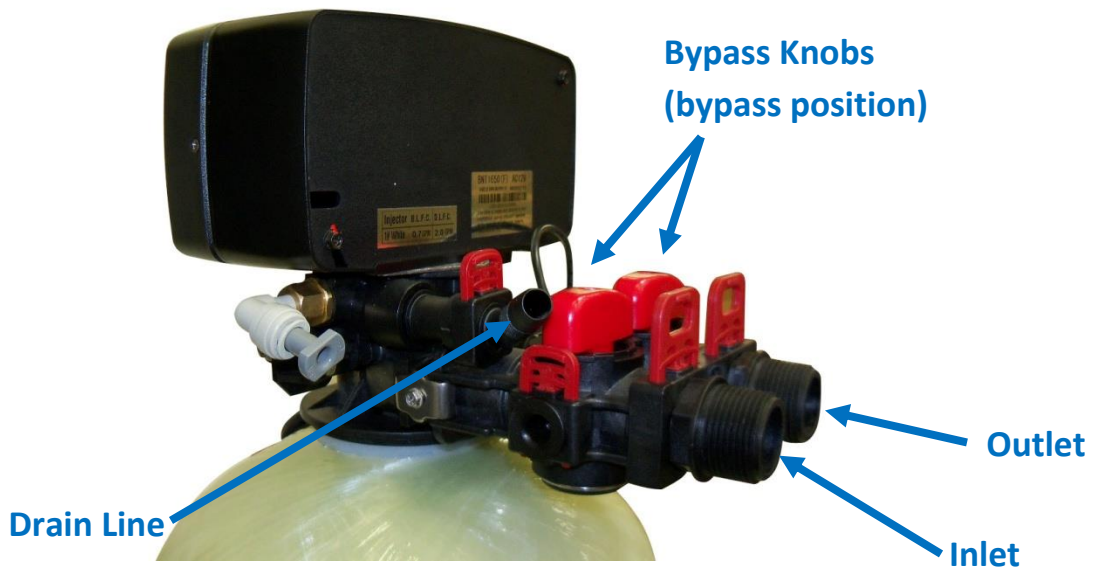


Fig 4 CWS Time Clock side view



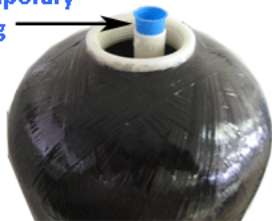
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Assembly and Installation Instructions

1. By hand, unscrew the entire CWS Time Clock control valve from the top of the tank if it was shipped screwed on. Place distributor tube in tank if not already inside. If not already done, make sure the blue cap is on top of distributor tube, or wrap the top of distributor tube with electrical or duct tape. You do not want gravel or Calcite to go down the distributor tube.

Plug or tape top of distributor tube to prevent media from entering distributor tube when adding media. Remove when finished.

Temporary plug



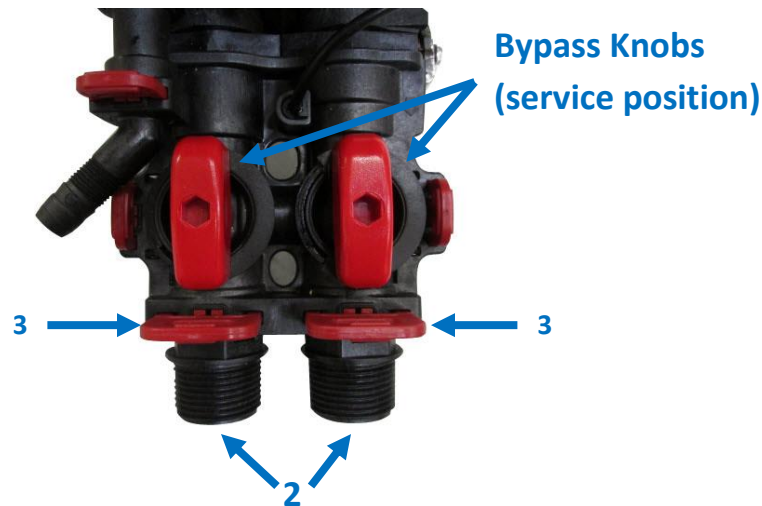
2. Add the filter gravel that came with your order. You want the gravel to cover the bottom distributor screen before adding the Calcite media.
3. Next add Calcite media. The tank will be about 2/3rds full of media.
4. Remove cap or tape from top of distributor tube. Be careful not to pull up distributor tube when removing cap or tape.
5. If possible at this point, fill the tank completely with water. This will allow the Neutralizer media to settle and eliminate the need of "purging" the air out of the tank later.
6. Attach plastic top screen to the under-side of the CWS Time Clock control valve. It is a funnel-shaped plastic screen that snaps on to the control valve and prevents resin from being backwashed out to drain during the regeneration cycles.



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7. Add a small amount of silicone grease or vegetable cooking oil to the tank threads and screw on CWS Time Clock control valve carefully. Do not use pipe-joint compound, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.
8. See how the CWS by-pass is connected. Note that Items 2 in Fig 3 below are the pipe connectors and the other end is what gets attached to the control valve. Items 3 are the red clips that hold the pipe connectors to the by-pass valve. **Your CWS Time Clock is usually shipped in the by-pass position, as in Figure 4.**

Fig 5 CWS Time Clock By-Pass and Pipe Connectors

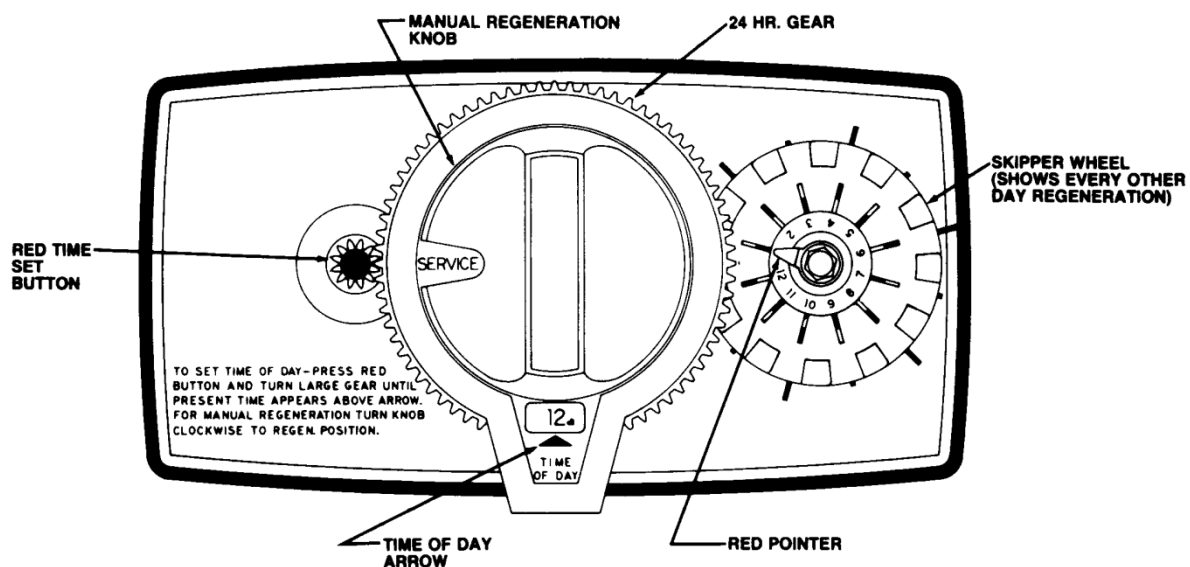


9. Lubricate the by-pass valve o-rings with some vegetable oil or silicone grease and connect the bypass assembly to the CWS Time Clock control by sliding the bypass valve firmly into the body of the CWS Time Clock. Once bypass is in far enough, you will be able to insert the red connector clips.
10. Next lubricate the end-connectors (#2 in Fig 3) with some silicone grease or vegetable cooking oil and insert them into the bypass valve and then insert the red clips (#3).
11. Note that the CWS Time Clock is usually shipped in the bypass position. There is a bypass valve knob on both the inlet and the outlet (Fig 3 #1). You can easily tell if it is in bypass because the two knobs will be in line with each other (Fig 4). If the valve is in the Service position (Fig 5) the knobs will be parallel to each other. Make sure both sides are in the by-pass position.
12. Do NOT remove the red clips in order to put the bypass valve in either bypass or service, it is not necessary nor desired to remove the red clips on the bypass valve hand knobs (see Fig 3 item 1, which are the knobs you will turn to move the bypass valves).
13. Now install your water pipes to the CWS Time Clock bypass end connectors. Make sure inlet is installed to the 'In' pipe connector on the bypass valve and outlet is on the "Out" connector.

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14. Connect some flexible tubing from the drain connection on the CWS Time Clock control valve to a suitable drain such as a septic tank or drain to a sewer. It is OK to run the drain line up and over the CWS Time Clock Neutralizer up to 4 feet above the top of the tank. If the drain line will be more than 20 feet, use larger diameter tubing such as $\frac{3}{4}$ " or 1". Note that it is desirable to be able to run the drain line into a bucket in order to test the backwash flow rate in the future. This is why hard piping the drain line is discouraged: however, if you do use hard PVC piping for the drain line, and you are able to remove the hard PVC drain piping and attach flexible tubing should you ever desire for testing purposes, it is OK to use rigid PVC pipe for the drain. Make sure the drain tubing is firmly clamped to the barbed fitting with a hose clamp to prevent leaks.

Fig 6 CWS Time Clock Diagram



15. Plug your CWS Time Clock control valve into an outlet. Your neutralizer filter comes preset to backwash at 2:00 am if the timer is set to real time of day.
16. Set timer so it reads the real time of day
17. Slide two pins outward on the skipper wheel (Fig 6) to set the system to backwash once every six days (two pins sticking out).
18. Start a manual backwash by turning the Manual Regeneration knob clockwise to backwash. Very slowly turn the inlet knob on the bypass valve towards the service position, but DO NOT open the valve all the way. We want to allow all of the air in the tank to escape before allowing the water to flow freely. The bypass valve knobs may be a little stiff at first.

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19. Once water begins to flow from the drain line open the inlet valve all the way. Continue to let the water run from the drain line for about five minutes or until any media fines in the water are no longer present.
20. If possible verify that the backwash flow is 5 gallons per minute, which is the recommended backwash flow rate for 1.0 and 1.5 cubic foot models. If you have a 2.5 cubic foot Neutralizer it should be backwashing at 10 gallons per minute. You can easily run the drain hose to a bucket and using a watch verify the flow rate in gallons per minute. An adequate backwash is critical to properly clean the Calcite media and prevent it from cementing together.
21. Allow to go through full cycle automatically. Wait 2 hours and initiate another backwash, or set the skipper wheel so it backwashes the same night as the installation. The filter media (calcite or calcite/corosex blend) should be backwashed twice for best results when the media is new. This eliminates any potential for milky colored water in the household water, and allows the media to be rinsed thoroughly.
22. After backwashing is completed, open up hose bib, or bath tub faucet or other faucet such as a bathtub without an aerator screen in house and allow water to run for 5 to 10 minutes. If piping inside house is corroded, turning on and off the water may dislodge some loose mineral or material. Aerators on faucets may need to be cleaned later if some of the fixtures inside house start to run more slowly.
23. Pull out two pins so it backwashes every six days; the numbers on the skipper wheel represent a 12 day cycle, so sliding pins 1 and 7 out would be every 6 days. If your water has a lot of sediment or iron in it, set to backwash every 3 - 4 days. If your water is very clean, clear water, and there are only 1 or 2 people in the house, you can set it backwash every 12 days.
24. Maintenance: Check level of media in neutralizer tank every six months by putting control on bypass using the bypass valve, then putting control valve into a backwash (to relieve pressure), and unscrewing the top access plug. If media is less than 2/3rds full, add more media to raise the level to proper depth, and repeat steps 7 through 9 to backwash and clean new media.

How to Add Calcite Media to the CWS Plus Neutralizer Filter

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1. Begin by putting the neutralizer filter on bypass, or turning the water pressure off before the neutralizer.
2. Initiate a manual backwash cycle. Since it is on bypass, this will relieve the pressure inside the control valve so you safely unscrew the Media Fill Plug located on top of the neutralizer tank.
3. Unplug the control valve cord from the wall outlet.

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4. Unscrew the media fill plug with channel locks or pliers, and using a tube or hosesiphon 2 to 3 gallons of water out of the filter tank. If you don't siphon water out before adding filter media, water will flow out the fill plug hole and onto the floor. If water on the floor is OK, then you do not have to siphon water out first before pouring Calcite media into the fill plug hole.
5. Add neutralizer filter media until the tank is 2/3rds full. Do not over-fill; be sure to leave at least 12" of free space above the media to allow room for it to expand during a backwash.
6. Put the top fill plug back in. You can lubricate the threads with some vegetable oil or silicone grease, but do not use Teflon tape or plumbing grease.
7. Plug the control valve back in and press the Extra Cycle button so the CWS Plus control is in a backwash cycle.
8. Turn on the bypass valve - slowly at first - back to the service position (if it is in "service" this means it is in the proper position for filtering and neutralizing).
9. Allow the system to go through a complete backwash and rinse cycle. Repeat this backwash and rinse cycle by starting another manual cycle, so the neutralizer is thoroughly backwashed and rinsed before going back into service.

When to Use Calcite Blends

If the water pH is less than 6.0, Calcite alone may not be enough to bring the pH up to the desired range of 7.0 to 7.8. In this case, a blend of Calcite and Corosex should be used. Calcite is a calcium media consisting of calcium carbonate and will raise the pH slowly. Calcite will not raise the pH much over 7.2. Corosex is a natural mineral media consisting of magnesium oxide. It reacts much faster and raises the pH much higher than Calcite alone.

Corosex is almost never used alone as it will raise the pH too high and in some cases will over-correct and create a highly basic (high pH) condition. It can also cement together like concrete in the neutralizer tank if you add too much and there is not sufficient backwash.

For most residential well applications, a 90% Calcite and 10% Corosex is best. However, in some cases an 80%/20% mix or even a 70%/30% is used. It is always better to start with a 90%/10% mix at first as this solves the majority of low pH problems in the range of 4.5 to 5.9.

For a pH of 6.0 to 6.9 use Calcite alone.

For a pH of 5.0 to 6.0 use a blend of Calcite and Corosex usually 90% Calcite and 10% Corosex, or more Corosex as needed if the pH is less than 5.0.

How to Mix and Use Calcite Blends

The Calcite and Corosex media is sold and shipped in separate boxes. It does not have to be completely blended together to use as it will mix during the backwash and rinse cycles. Still, when you are adding the Calcite and Corosex it is better to blend it lightly in a 5 gallon bucket and then add it. You can also add some Calcite and then add some Corosex as you are filling the tank. Do not fill tank more than about 2/3rds full.

Note the following:

- Calcite is shipped in 50 lb boxes and one box of Calcite is equal to 0.55 cu ft.
- Corosex is shipped in 10 lb boxes and 1 box is equal to 0.13 cu ft.
- 50 lbs of Calcite = 0.55 cubic foot of media
- 50 lbs of Corosex = 0.66 cubic foot of media

Neutralizers 1.0 Cubic Foot: use 90lbs Calcite and 10 lbs Corosex

Your new 1.0 CF neutralizer includes:

- Calcite 100 lbs (2 50-lb boxes) 1.1 cu ft
- Corosex 10 lbs (1 10 lb boxes) .13 cu ft

Neutralizers 1.5 Cubic Foot: use 150 lbs Calcite and 10lbs Corosex

Your new 1.5 Cubic Foot Neutralizer Blend filter includes:

- Calcite 150 lbs (3 50-lb boxes) 1.65 cu ft
- Corosex 10 lbs (1 10 lb boxes) .13 cu ft

Neutralizers 2.0 Cubic Foot: use 150 lbs Calcite and 20lbs Corosex

Your new 2.0 Cubic foot Neutralizer Blend filter includes:

- Calcite 150 lbs (3 50-lb boxes) 1.65 cu ft
- Corosex 20 lbs (2 10 lb boxes) .26 cu ft

Neutralizers 2.5 Cubic Foot: use 200 lbs Calcite and 20 lbs Corosex

Your new 2.5 Cubic Foot Neutralizer Blend filter includes:

- Calcite 200 lbs (4 50-lb boxes) 2.2 cu ft
- Corosex 20 lbs (2 10 lb boxes) .26 cu ft

Troubleshooting the CWS Plus Neutralizer Filter

pH is Too High!

If the pH after your neutralizer is greater than 8.5, your pH kit may turn the color of the reagent, a purple color. This is nothing to be alarmed about. In some cases, too much Corosex added to the neutralizer-Calcite-Corosex blend can cause this problem; it almost never happens with Calcite only systems. If this happens, set the backwash cycle frequency to every night for a couple of weeks, which will cause the media to be washed more thoroughly and use up the excess Corosex. Alternatively, you can manually backwash it several times on a given day, etc. Secondly, you can open up the bypass valves slightly, and allow some untreated water to lower the pH by blending in some lower pH water. When you go to add more media in 6 to 12 months, just add less Corosex.

pH is Too Low!

This can happen if the water entering the neutralizer has a pH less than 6.0. Generally the water after your neutralizer should have a pH of 7.0, and the pH reagent in your pH test kit should turn a light green to darker green depending on the pH. Give your neutralizer some time, and after several weeks, if the pH is still coming out less than 7 and the test reagent is yellowish in color, you may need to add some Corosex to the neutralizer tank to raise the pH. Contact our office if you don't have any Corosex on hand and/or you ordered a Calcite-only system. The Calcite-only systems work best if your water's pH is between 6 and 6.9 and are desirable as they add fewer minerals to the water, so it is best to start out with a Calcite only system if your pH is 6.0 to 6.9. This works for a majority of our customers.

White Spots on Fixtures and Glasses

Calcite neutralizers work by adding natural calcium minerals to the water. Many natural well or spring waters that are acidic (with a pH of less than 7.0) are low in minerals and are considered "soft" water. This lack of natural buffering calcium minerals contribute to the corrosive nature of these waters. After the water has passed through the neutralizer, the water will be higher in calcium and "harder" but typically not hard enough to warrant a water softener, which removes calcium hardness.

It is more common to see some white film or spotting on fixtures if you are using a blend of Calcite and Corosex. In some cases, it might be that too much Corosex was used originally in the mix of media.

If you are starting to see white spots and films on surfaces after the neutralizer has been installed, you might want to take these steps:

Set the backwash frequency for every 3 days for a couple of months.

Check the hardness level before and after. If your hardness is higher than 5 grains per gallon after the neutralizer, your neutralizer may be adding more minerals than is needed, and you can open up the bypass valves a slight amount in order to blend in some untreated water.

Check the pH before and after. You only need the pH to be in the 7.0 to 7.5 range. If the pH is higher than that, you may be adding more minerals than is necessary.

Backwash Flow Rate:

One problem that may occur if you do not have enough backwash flow rate to properly clean the Neutralizer filter is a drop in water pressure, due to fouling of the media from rust or sediment. You can verify the backwash flow rate by running the drain line into a bucket and timing it when the CWS Plus is in Cycle 1 or backwash. A 1.0 or 1.5 cubic foot system should have 5 gallons per minute and a 2.5 cubic foot system should have 10 gallons per minute of backwash.