



## Clean Water Made Easy

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### CWS Plus 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 Service manual, which along with this start-up guide will help guide you in the installation and start-up of your new system. The service manual covers other types of systems as well such as water softeners and filters, so there may be information in your 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](mailto:support@cleanwaterstore.com)

See more information on our website: [www.cleanwaterstore.com/resources](http://www.cleanwaterstore.com/resources)



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### Packing List

#### Neutralizer 1.0 cubic foot size

Quantity 1 CWS Plus 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 included with Calcite-Corosex Blend systems

#### Neutralizer 1.5 cubic foot size

Quantity 1 CWS Plus 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

\*15 lbs. of Corosex included with Calcite-Corosex Blend systems

#### Neutralizer 2.0 cubic foot size

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

Quantity 1 12" x 48" filter tank with distributor tube

Blue media funnel for adding the Calcite media

20lbs. Filter gravel

2.0 cubic foot of Calcite media

\*20 lbs. of Corosex included with Calcite-Corosex Blend systems

### 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 Plus inlet and the OUT pipe to the outlet (see Fig 2). As you face the CWS Plus 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 Plus 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.
4. If you will be using copper piping, do not sweat the copper pipe directly on to the CWS Plus control valve. Avoid heating up the CWS Plus 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 Plus control valve. If you need to remove it, the CWS Plus has quick-release couplings that make it easy to put the Neutralizer on by-pass and remove the filter system from the piping.

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- 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 Plus 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**

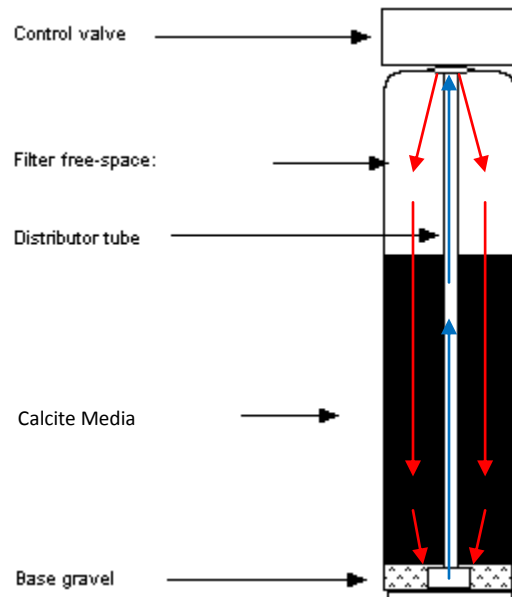
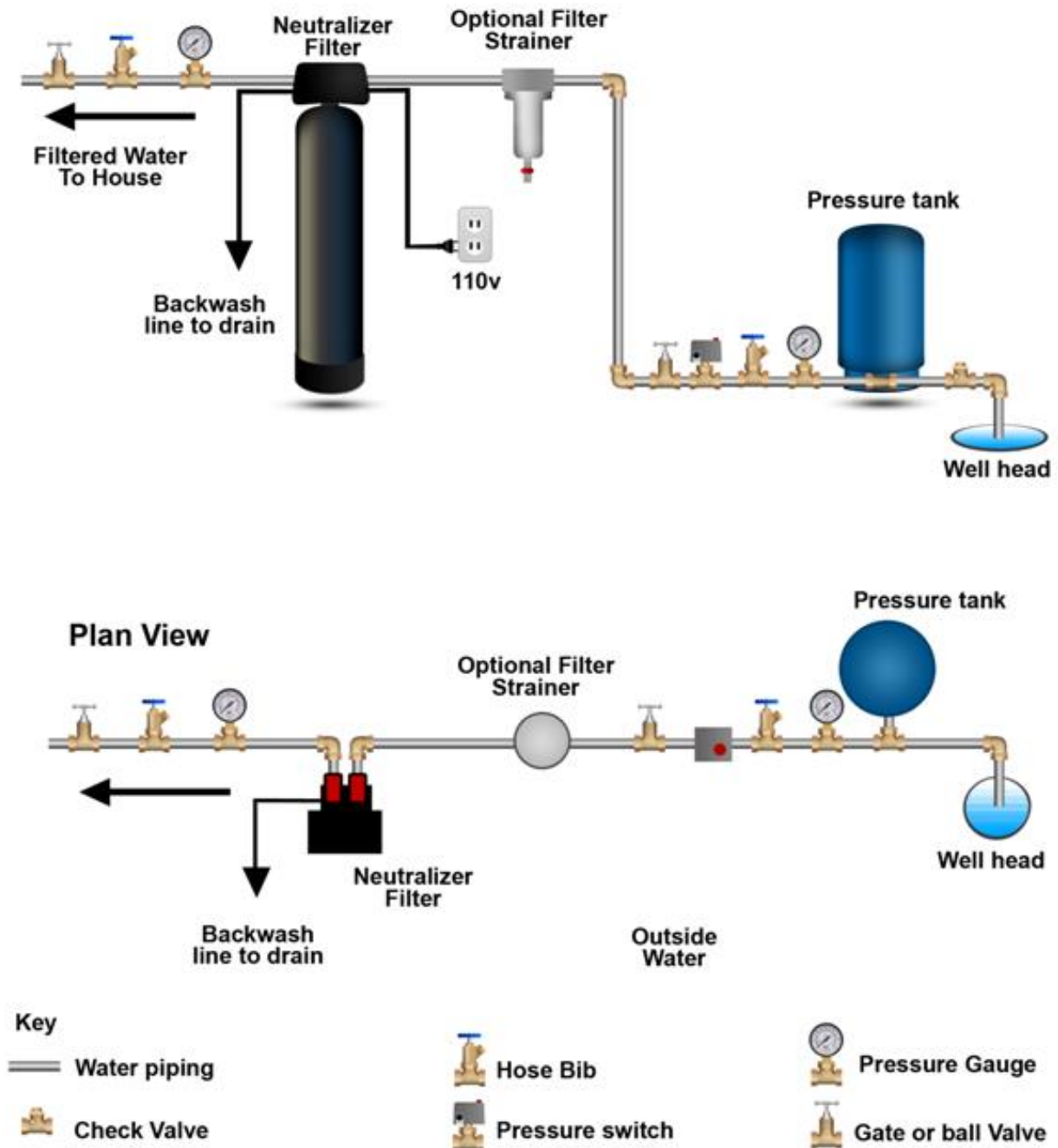
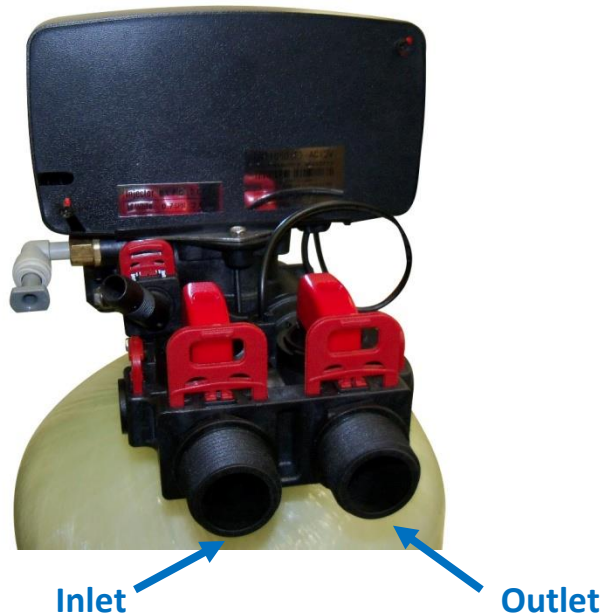


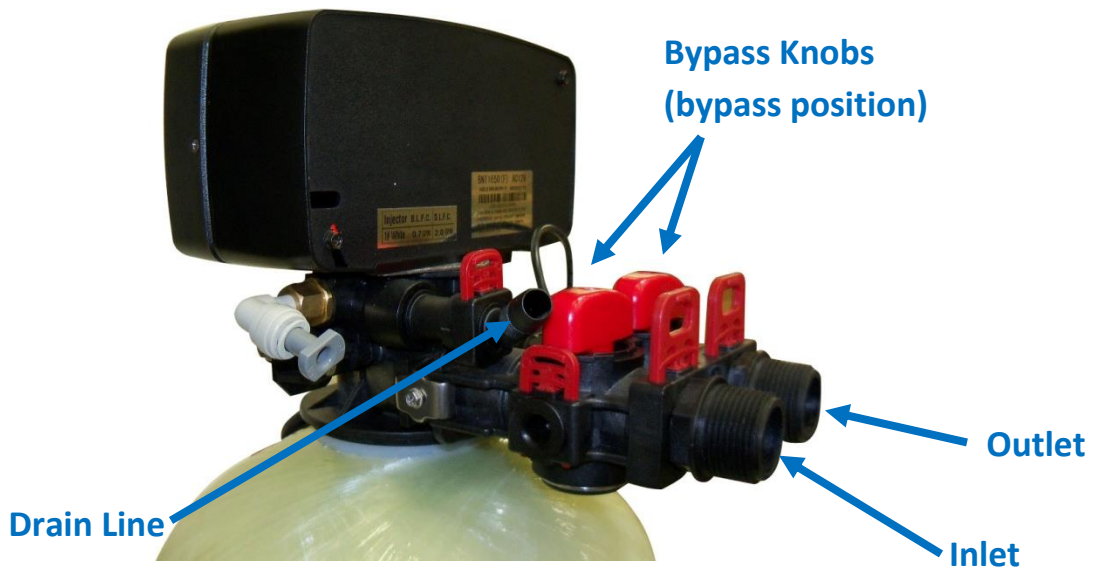
Fig 2 - Typical Neutralizer CWS Plus piping installation with ball valve and hose bib after the filter



**Fig 3: CWS Plus 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 Plus side view**



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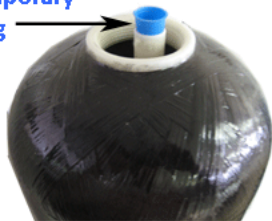
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## Assembly and Installation Instructions

1. By hand, unscrew the entire CWS Plus 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 Plus 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.





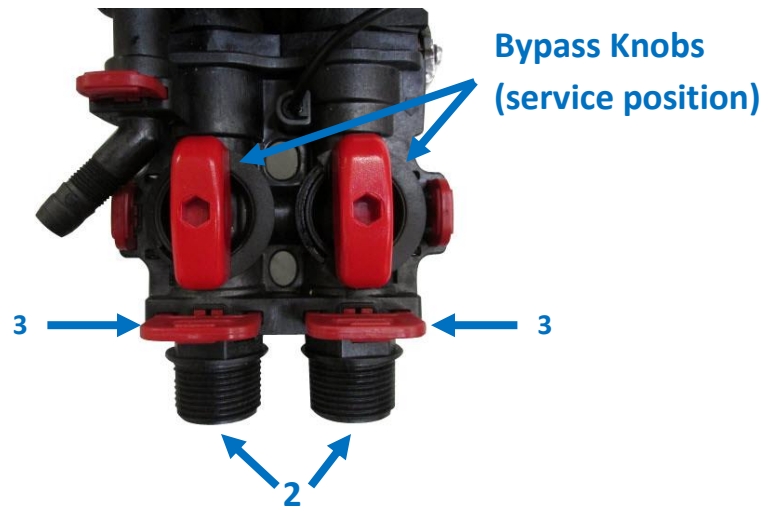
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7. Add a small amount of silicone grease or vegetable cooking oil to the tank threads and screw on CWS Plus control valve carefully. Do not use pipe-joint compound, Teflon tape, or Vaseline or other petroleum greases to lubricate tank threads.
8. See how the 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 Plus is usually shipped in the by-pass position, as in Figure 4.**

**Fig 5 CWS Plus 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 Plus control by sliding the bypass valve firmly into the body of the CWS Plus. 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 Plus 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 Plus 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 Plus 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 Plus 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 ¾" 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.
15. Plug your CWS Plus control valve into an outlet. After being plugged in, the screen may display "WAITING PLEASE" while it finds the service position. By default, the control valve will be set to work like a Water Softener, but that's not correct for this application. So, next you will need to program the system to work as a Neutralizer Filter. There are a few settings that must be changed before the system can be put into service.
16. PROGRAMMING:
  - a. First, press the menu button labeled  once. If it says "SCREEN LOCKED," you may have to press and hold the upper left button labeled  about 3 seconds until a beep sounds to unlock the display screen.
  - b. NOTE: Use the up and down arrows to cycle through the various program settings. To change any setting, press . When the display flashes, the value may be changed. Press either the up or down arrow to change the value. Press  once more to accept the value, and the display should stop flashing to indicate that the setting has been saved.
  - c. Step 1: REGIONAL US GAL (this stands for US gallons format, if it is different, change it to US GAL). When it is set, press the down button to proceed to the next step.
  - d. Step 2: The display should be set to: "CALENDAR CLOCK". By default, the system is most likely set to "METER IMMEDIATE" or "METER DELAYED." We recommend CALENDAR CLOCK for the operation of your Neutralizer Filter, to backwash a set number of days. Change the setting, then press the down arrow to proceed to the next step.
  - e. Step 3: TIME- set the time of day. Press the down button to proceed.
  - f. Step 4: REG. TIME - Set to 2:00 AM generally or sometime when no water is being used, and no other filter or softener is likely to be in a regeneration cycle. Then press the down button.
  - g. Step 5: REG. DAYS - This tells the Neutralizer filter how often to regenerate in days. It can be set for any setting from 1 to 10, with 7 being the recommended common setting. If you are having some problems with bleed-through of chlorine (or whatever else it is

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that is being filtered out) after the Neutralizer filter has been online for a few days, you may want to change it to 2 or 3 days.

- h. Step 6: BACKWASH - Stands for Backwash length in minutes. It should be set to 10 MIN which means 10 minutes of backwash. If your water is extremely high in iron you can change this setting to 12 or 14 minutes to allow some extra backwash time, but 10 minutes is a good setting. Press the down button one time.
  - i. Step 7: BRINE – This stands for Brine Draw. This doesn't really apply to your Neutralizer filter, so lower it to the absolute minimum value, which is 3. This cycle is 3 minutes long and should display: 3 MIN. Then, press the down button one time.
  - j. Step 8: RINSE - This is the Rapid Rinse cycle and should display: 10 MIN. Press the down button one more time.
  - k. Step 9: REFILL - This step does not really apply to your Neutralizer filter. Lower it all the way to 00.0. When it is set properly, it should display: 00.0 MIN. Press the down button one time.
  - l. Programming is finished- to exit, press the upper menu button  one more time to return to Service mode.
17. Now you can start the initial manual backwash. Turn the manual knob clockwise to “BA. WA” and a manual backwash will begin.
18. 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.
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. Once the water is clear, press any button to advance to the “Rinse” position. Once again, allow the water to flow for about five minutes or until the water is clear.
22. Press any button to advance to the “Service” position. Next, open the outlet on the bypass valve and then open the nearest treated water faucet to the unit and allow the water to run until it is

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clear. We advise using a bathtub, laundry sink, or other fixture that does not have an aerator screen as any remaining residue may get caught in the screen.

23. Refer to your CWS Plus service manual for more information about how your control valve is programmed if desired.

### How to Add Calcite Media to the CWS Plus Neutralizer Filter

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

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.
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

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- 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

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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.