
Novaclean IF Chemical Free Iron Filters



Operation Manual

*Page 11 of this manual contains important maintenance procedures for the continued proper operation of your unit. These **MUST** be performed regularly for your guarantee to remain valid.*

Novaclean IF - Specifications

Model Description	"M" Model Description	Media Cu Ft	Iron Removal Capacity - ppm	Flow Rates USGPM			Installation Space Inches - W x D x H	Fiberglass Tank Size - Inches	Shipping Weight - Lbs
				Service	Peak	Backwash			
NCF75	NCF75M	.75	22,500	2	4	3.5	10 x 10 x 57	8 x 47	110
NCF10	NCF10M	1.0	30,000	3	6	4	11 x 11 x 58	9 x 48	145
NCF15	NCF15M	1.5	60,000	4	10	5	12 x 12 x 64	10 x 54	250
NCF20	NCF20M	2.0	90,000	5	15	7	14 x 14 x 62	12 x 52	365

- Models ending in 'M' are required when raw water has up to 1.0 mg/l of manganese or when pH is below 7.0. Over a period of time, it may become necessary to add more media to the unit. Adding media is necessary only when water has low pH or manganese is present.
- Peak flow rates intended for intermittent use only (10 minutes or less) and are for residential applications only. Do not use peak flow rate for commercial applications or for a continuous rate when treated water supplies are geothermal heat pump, swimming pool, etc.
- At the stated service flow rates, the pressure drop through these devices will not exceed 15 psig.
- For satisfactory operation, the pumping rate of the well system must equal or exceed indicated backwash flow rate.
- The manufacturer reserves the right to make product improvements which may deviate from the specifications and descriptions stated herein, without obligation to change previously manufactured products or to note the change.
- Maximum Water Temperature = 110°F (43°C)
- Maximum Operating Pressure = 100 PSIG (689 kPa)
- Pipe Size = 3/4"
- Voltage = 110V standard

General Information

Read this manual carefully and follow the installation steps in order.

How Your Chemical Free Iron Filter Works

The chemical free iron filter consists of two major components which are:

1. A hydrocharger, located between the well head and the pressure tank, adds a small amount of air to the iron-laden water whenever the well pump runs. Refer to Figs. 1, 2 or 3 on Page 4 for its location.

Note: If your pump system is a constant pressure or variable frequency drive (VFD) the hydrocharger supplied with this filter will not operate properly. The system will require the addition of an air pump and vent tank to introduce the needed air into the water system. Refer to page 4 for more information.

2. A backwashing type filter containing special media that causes the iron in the "hydrocharged" water to precipitate throughout the filter bed (rather than on the surface as in chemical oxidizing filters). This process produces an iron removal capacity of up to 30,000 ppm. The media requires no chemical regenerant for oxygen enrichment.

Your filter automatically adjusts the pH to neutral or higher on acid water without an acid neutralizer. The ability to raise pH when it is below neutral (7.0 or less) greatly enhances the filter's ability to remove iron efficiently.

The clean, filtered water then flows into your household water line. Depending on water use and the concentration of iron in your water, periodic backwashing is required to flush the entrapped iron from the system. The filter control can be programmed to backwash once every two, three, four, six or twelve days as required (instructions for calculating backwash frequency and setting the controls are on Pages 9 and 10).

NOTE: Replenishment of the media that raises pH will be required periodically, depending on how low the raw water pH is, the amount of manganese (Mn) present in the water and the water usage rate.

Before Installation

Inspecting and Handling Your Chemical Free Iron Filter

Inspect the equipment for any shipping damage. If damaged, notify the transportation company and request a damage inspection. Damage to cartons should also be noted.

Handle the filter unit with care. Damage can result if it is dropped or set on sharp, uneven projections on the floor. Do not turn the filter unit upside down.

NOTE: If a severe loss in water pressure is observed when the filter unit is initially placed in service, the filter tank may have been laid on its side during transit. If this occurs, backwash the filter to "reclassify" the media. (see Page 5, Step 7).

Iron (Fe)

Iron concentrations as low as 0.3 ppm will cause staining. The iron concentration, together with the flow rate demand and the consumption rate of the water, determines the basic size of the filter system. The higher these factors are, the larger the required system. The filter system is capable of filtering out the three main types of iron found in water supplies: soluble iron (also known as “clear water” or ferrous iron), precipitated iron (also known as “red water” or ferric iron) and bacterial iron (also known as iron bacteria). There is no apparent upper limit of iron concentration for the filter but special care must be taken when selecting a filter model if your water has a combination of high iron, very low pH and/or manganese.

Manganese (Mn)

The presence of manganese can be bothersome, even for a chemical free iron filter. As little as 0.05 ppm of manganese can produce a brownish or black stain. The ability of the filter to remove manganese depends on its concentration and the pH of the water.

Manganese tends to “coat” the filter media, rendering it incapable of increasing the pH and, therefore, ineffective in removing either the iron or the manganese. Manganese, however, will precipitate in the filter bed when the pH is increased. To accomplish this, a special “M” type media that contains additional quantities of the pH raising component (“MpH adder”) can be provided. The use of “M” type media is for applications where the manganese is not more than 1.5 ppm, and the pH is 6.0 or higher. When the pH is below 6.0, consult your dealer.

pH

The pH of water measures its acidity or its alkalinity. Water with a pH of less than 7.0 is acidic, above 7.0 is alkaline, and 7.0 is neutral. The lower the pH value is below 7.0, the greater the acidity and the higher the pH value is above 7.0, the more alkaline. Acidic water (pH less than 7.0) is corrosive to pipes, appliances, etc. A pH of 7.0 or higher facilitates iron removal – which is why the filter is designed to increase the pH when it is less than 7.0.

The pH increasing component of the media is “sacrificial”. That is, it slowly dissolves during the process of increasing pH. The rate at which this occurs is proportional to the pH increase and the water consumption rate (i.e. the greater the pH increase and the water consumption, the greater the sacrificial rate). Thus, when the pH is increased to 8.2 or more as is necessary when manganese is present, the sacrificial rate is even greater. Under the most severe conditions, the MpH component of the media may have to be replenished two to four times per year. On the other hand, if the raw water pH is 7.0 or above and no manganese is present, the sacrificial rate is very slight.

Tannins (Humic Acid)

Tannins (also known as humic acid), which are present in some supplies, are the result of decaying vegetable matter. If the tannin concentration is above approximately 0.5 ppm, it will form a sticky coating on the media, thus rendering it incapable of filtering the iron. A chemical free iron filter is not recommended for this situation. If the tannin concentration is less than 0.5 ppm, a chemical free iron filter may be installed.

Hydrogen Sulfide (H₂S)

Hydrogen sulfide (often referred to as “sulfur”), is easily detectable by its objectionable “rotten egg” odor. Sulfur corrodes iron, brass, copper and silver. A chemical free iron filter is not recommended when hydrogen sulfide is the only water problem, although it is capable of removing sulfur in concentrations of up to 2 to 3 ppm. Whenever hydrogen sulfide is present, backwashing must be performed at more frequent intervals and the pumping system **MUST** include a standard air-to-water pressure tank with an air relief valve.

Check Your Water Pressure and Pumping Rate

Two water system conditions must be checked carefully to avoid unsatisfactory operation or equipment damage:

1. Minimum water pressure required at the filter tank inlet is 20 psi. If pressure is over 50 psi, a pressure reducing valve must be installed in the water supply line ahead of the hydrocharger (Fig. 1, 2 or 3, Page 4).
2. The pumping rate of your well pump must be at least 5 gallons per minute (gpm) for satisfactory operation of the hydrocharger. In addition, the pumping rate must equal the required backwash flow rate of your model (see Specifications on Page 1 for backwash flow rates). To measure the pumping rate of your pump, follow these instructions:
 - a. Make certain no water is being drawn. Open spigot nearest pressure tank. When pump starts, close spigot and measure time (in seconds) to refill pressure tank (when pump shuts off). This figure represents cycle time.

b. With the pressure tank full, draw water into a container of known volume and measure the number of gallons drawn until the pump starts again. This is draw-down. Divide this figure by cycle time and multiply the result by 60 to arrive at the pumping rate in gallons per minute (gpm). To aid in your calculation, insert the data in the following formula:

$$\text{DRAWDOWN} \frac{\text{_____}}{\text{(gals)}} \div \text{CYCLE TIME} \frac{\text{_____}}{\text{(seconds)}} \times 60 \\ = \text{PUMPING RATE} \frac{\text{_____}}{\text{(gpm)}}$$

EXAMPLE: DRAWDOWN is 6 gals; CYCLE TIME is 53 secs; then, PUMPING RATE equals:

$$6 \text{ gals} \div 53 \text{ secs} \times 60 = 6.8 \text{ gpm}$$

See Specifications on Page 1 for minimum flow rates.

NOTE: If your pumping rate is inadequate, do not install your filter until the problem is solved.

Locate Water Conditioning Equipment Correctly

Select the location of your filter tank with care. Various conditions which contribute to proper location are as follows:

1. Locate as close as possible to the water supply source.
2. Locate as close as possible to a floor or laundry tub drain.
3. Locate in correct relationship to other water conditioning equipment (see Fig. 1, 2 or 3, Page 4).
4. Filters and softeners should be located in the supply line before the water heater. Temperatures above 120°F damage filters and softeners and will void the factory warranty.
5. Do not install a filter or softener in a location where freezing temperatures occur. Freezing may cause permanent damage to this type of equipment and will void the factory warranty.
6. Allow sufficient space around the unit for easy servicing.
7. If your water source is a community water supply, a public water supply or you wish to bypass water used for a geothermal heat pump, lawn sprinkling, out-buildings or other high demand applications, refer to Fig. 2 or 3 on Page 4 for additional equipment required. Also, refer to the NOTE following Step 10 on Page 5.

The Importance of Your Pressure Tank

The pressure tank found on private well systems becomes an integral part of the filter system by providing necessary mixing and “contact time” to the “hydrocharged” water. While the iron filter will perform better on a standard air-to-water pressure tank, it will perform satisfactorily on a captive air (bladder) pressure tank. The bladder tank requires more careful adjustment of the hydrocharger and careful location of the air relief valve. (see Fig. 6 and 7, Page 6).

If cycle time on pumping system is less than 30 seconds and severe operating conditions exist (low pH, high iron, manganese, and small concentrations of sulfur), a standard air-to-water pressure tank with an air-relief valve must be used (if a bladder tank is already in place — do not remove it — install the air-to-water pressure tank between the hydrocharger and the bladder tank).

NOTE: If your pressure tank (or any part of your water system) is not functioning properly, corrective action must be taken before installation of your iron filter.

Facts to Remember When Planning Your Installation

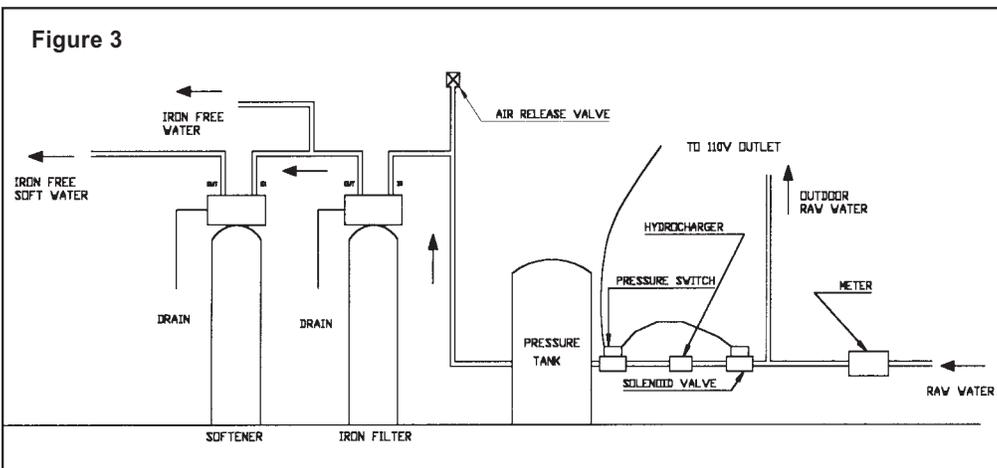
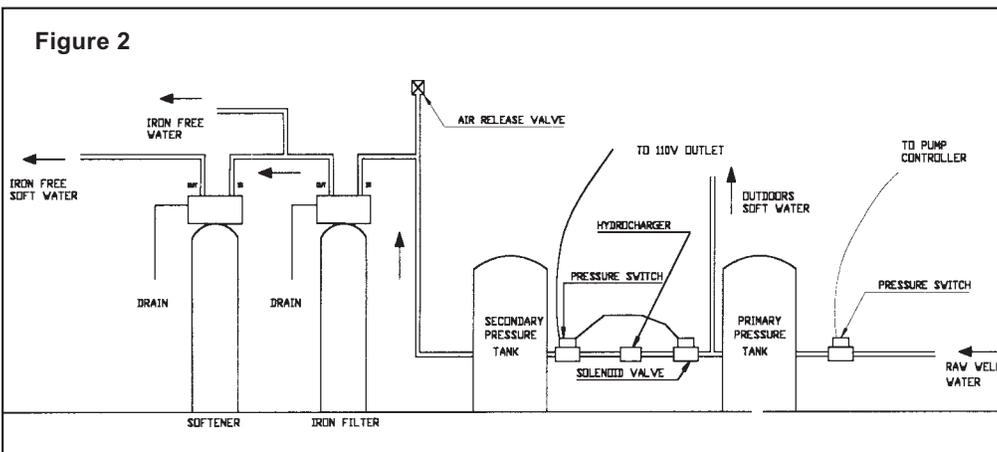
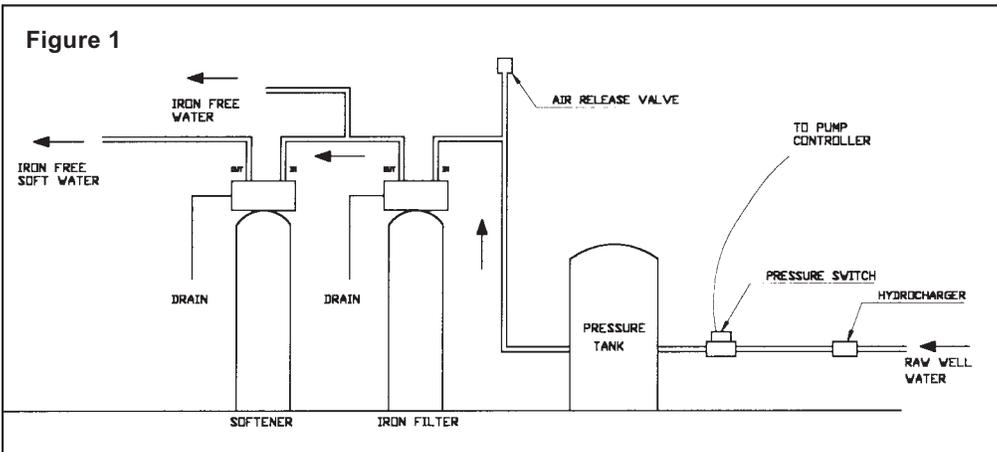
1. All installation procedures must conform to local and state plumbing codes.
2. All water must pass through the hydrocharger, pressure tank and the filter, or refer to the special instructions for a split-stream installation on Page 6. (System may malfunction if these instructions are ignored.)
3. If lawn sprinkling, a swimming pool, geothermal heating/cooling or water for other devices/activities is to be treated by the filter, a larger model filter must be selected to accommodate the higher flow rate demands of these items. The pumping rate of the well pump must be sufficient to accommodate these items plus the backwash requirement of the filter. Consult your dealer for alternative instructions if the pumping rate is insufficient.
4. Remember that the filter inlet is attached to the pipe that supplies water (i.e., runs to the pump) and the outlet is the line that runs toward the water heater.
5. Before commencing installation, it is advisable to study the existing piping system and determine the size, number and type of fittings required. Typical system schematics shown in these instructions (Fig. 1, 2, or 3, Page 4), will be of assistance.
NOTE: If the plumbing system is used as the ground leg of the electric supply, continuity should be maintained by installing ground straps around any nonconductive plastic piping used in installation.
6. When utilizing a constant pressure or VFD pump system you will require the addition of an air pump and vent tank kit #978003 for 115 volt or 978004 for 230 volt systems. A flow switch #79980 will also be required to run the air pump, see Figure 4 for installation diagram.

Installation

Proper installation sequence of water conditioning equipment is very important. Refer to the diagrams following for your particular water supply.

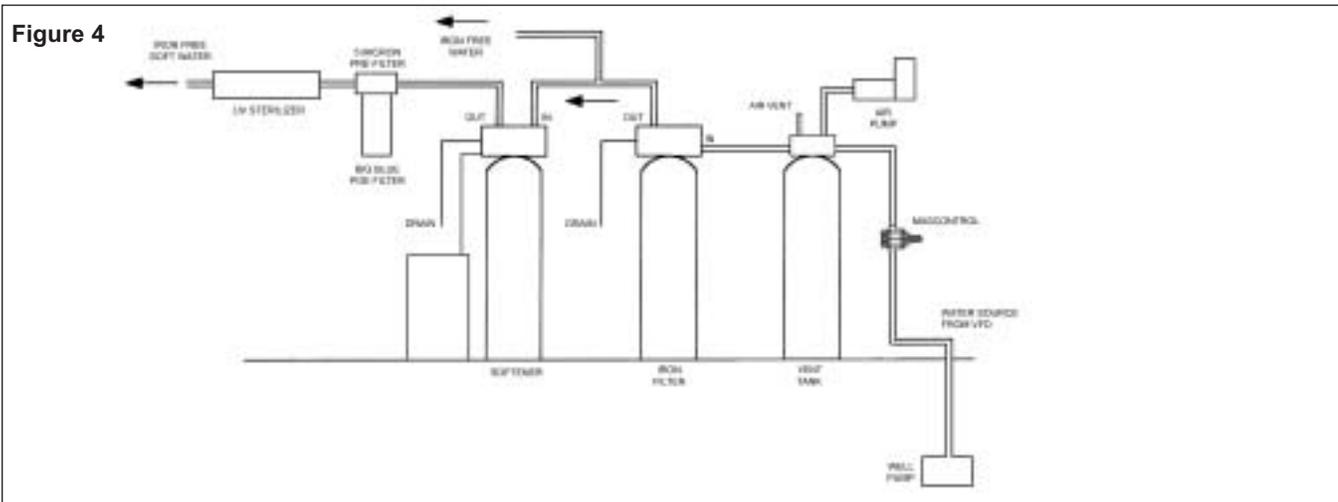
NOTE: The Braukman air vent is not approved for use in the State of Wisconsin. An approved air to water tank and/or air vent should be used with this application in the State of Wisconsin.

NOTE: Before starting installation, read Page 7, Plumbing System Clean-Up, for instructions on some procedures that may need to be performed first.



Installation of the Air Pump with Flow Control Switch (Mascontrol) as Power Source

1. Used when pressure switch and air pump are in alternate locations. Also used on constant pressure or variable speed pump systems.
2. Mascontrol acts as a flow control detecting flow.
3. Connect the air pump to the Mascontrol receptacle. See Mascontrol manual for wiring diagram.
4. All government codes and regulations governing the installation of these devices must be observed. Check your local electrical codes or contact a qualified electrician.



Installation Instructions

1. Shut off all water at main supply. On a private well system turn off power to pump and drain pressure tank. Make certain pressure is relieved from complete system by opening nearest faucet to drain system. Shut off fuel supply to water heater.

Media Installation (When Necessary)

- Remove the valve from the mineral tank.
 - Temporarily plug the open end of the riser tube to ensure that no resin or gravel falls down into the distribution.
 - Fill mineral tank one quarter full of water to protect distribution during gravel installation.
 - Slowly and carefully add the gravel support bed and the softener or filtration media leveling each layer as it is placed into the tank.
 - Unplug the riser tube, carefully position the valve over it and turn the valve into the threads in the fiberglass tank, tightening securely into tank. Note: Ensure that the internal O-ring in the valve fits securely over the riser tube. Silicone grease (#13691) or other food grade lubricant may be applied to the O-ring to ease installation of the riser tube. DO NOT use petroleum based lubricants as they will cause swelling of O-ring seals.
 - The softener or filter is now charged with softening resin.
 - It is recommended that the softener or filter tank now be completely filled with water (SLOWLY) to soak the resin or filtration media before startup. This will allow the media to absorb water as well as help displace any trapped air. This will reduce the chance of backwashing resin or filter media out of the tank during the initial backwash on startup.
2. Cut main supply line as required to fit hydrocharger in plumbing between well pump and pressure tank (hydrocharger may be installed in a vertical or horizontal position). Allow a minimum of 6 inches straight run of pipe on each side of hydrocharger, excluding fittings. Be certain direction of flow arrow on hydrocharger points toward pressure tank, and pressure control switch is located on pressure tank side of the hydrocharger as in Fig. 1, 2 or 3, (rapid cycling of pump may occur if pressure switch is located on well side. If check valves are used, they should be installed before the hydrocharger – not between the hydrocharger and pressure tank).

NOTE: It is advisable to install the hydrocharger with the unions at both ends to facilitate removal and inspection. If heat is applied near hydrocharger, remove rubber check valve to prevent damaging it. On badly scaled, older pumping systems, it may be advantageous to install an optional “Y”-strainer ahead of hydrocharger to prevent plugging hydrocharger nozzle with scale.

3. Cut main supply line as required to fit plumbing to control valve and attach the bypass valve.

Installation Instructions Cont'd

4. Solder or solvent weld plumbing. Do not apply heat to any fitting connected to control valve as damage may result to internal parts. Check to be certain water supply pipe is connected to control valve inlet fitting, and pipe connected to control valve outlet fitting is in direction of house service (see Fig. 5).

NOTE: If the installation is to be split-streamed prior to the filter tank (Fig. 2) or is a public water supply type installation (Fig. 3), refer to special instructions on Page 7.

5. Loosen set screw and pull out drain line flow control assembly from valve body. Unscrew drain line fitting elbow from drain line flow control. Apply pipe dope or teflon tape to threads. Reassemble to valve body, making certain drain line flow control assembly is fully inserted into valve body before tightening set screw. Attach 1/2 inch ID drain line to drain elbow. **CAUTION:** Set-screw requires only finger pressure to hold plastic flow control in place. Overtightening set-screw may crack fitting.

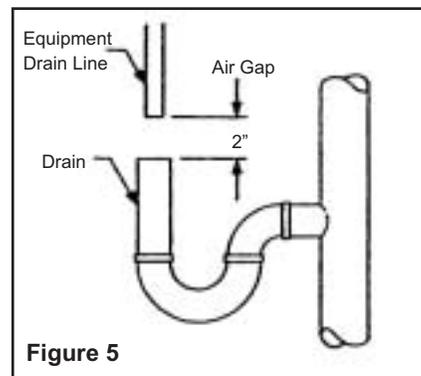


Figure 5

6. Position drain hose over drain and secure firmly. To prevent back-siphoning of sewer water, provide an air gap to code or equivalent. (Fig. 5) Do not raise drain hose more than 10 ft. above floor.

7. Loosen the two screws on the timer cover to remove it from the timer. **CAUTION:** This timer's programs will be out of sync if you turn the knob too far or do not allow the drive motor to stop completely before continuing to the next step. If this happens while doing any procedure, rotate the knob clockwise until the white dot lines up with the time of day arrow and the unit will return to the service position. You can then start again.

8. Turn on power to well pump. The Novaclean IF Filter is supplied from the factory in the backwash position ready for start up. Turn the water supply on to the unit. Open the supply line slowly and allow the air to escape from the filter before turning the supply water on all the way. Allow the unit to backwash until all the air and media fines are no longer showing at the drain. This procedure may take several minutes so do not supply power to the timer until this procedure is complete. During initial backwashings, a small amount of fine white media may be observed in the drain water. This is normal. Now supply power to timer and allow the unit to finish the cycle on its own.

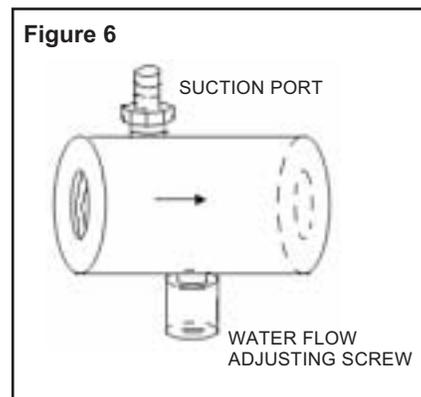


Figure 6

9. Set hydrocharger by following these steps:

- A. Open nearest faucet until pump starts, then close faucet.

- B. Place a finger over suction port (Fig. 6) A slight suction should be detected for a minimum of 20 seconds or for approximately one-third of pumping cycle whichever is greater.

- C. If suction duration is too short, increase by turning water flow adjusting screw (Fig. 6) clockwise. To decrease duration, turn counterclockwise.

- D. Repeat Steps A through C until proper setting is obtained. When the duration of the suction is too long, cold water may have a "milky" appearance caused by excess air in system. Correct this condition by reducing the duration of suction. This condition is one commonly associated with bladder-type pressure tanks. In extreme cases excess air prevents the system from performing satisfactorily, consequently it is essential to install an air relief valve (such as a Braukman) in the proper location.

10. Make certain bypass is closed and inlet and outlet valves are fully opened. Check for leaks.

11. Set time-of-day and backwash frequency (see Page 10, Programming Backwash Controls).

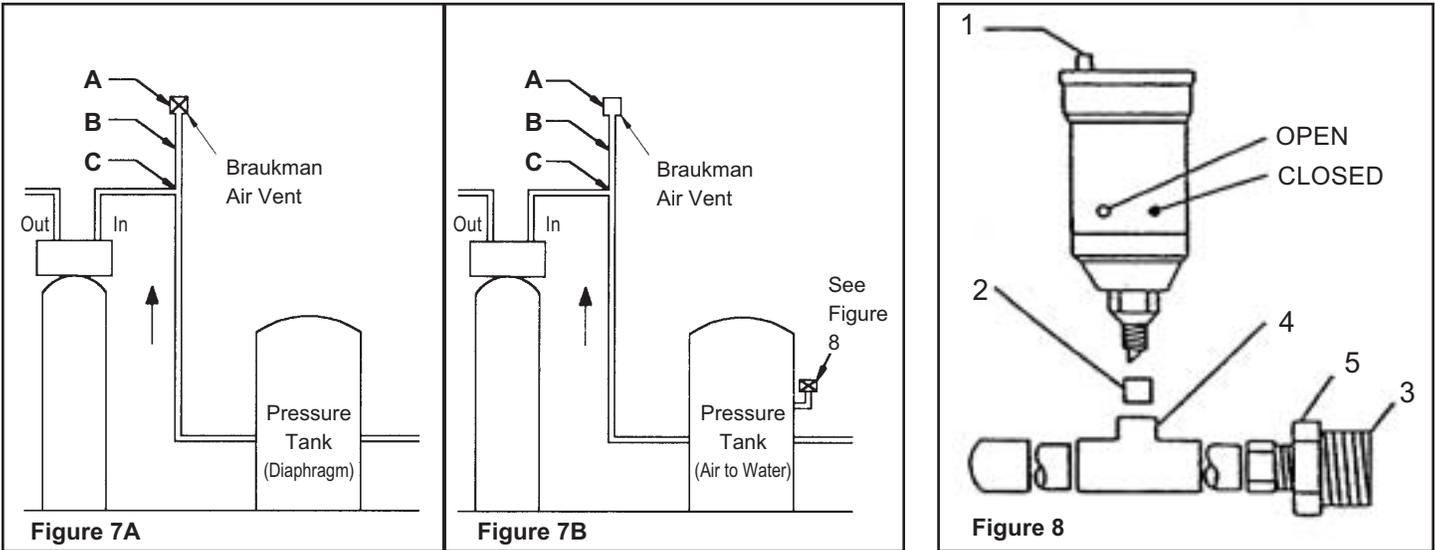
NOTE: After start-up, this filter may take several days to completely remove the iron. This is normal because of the nature of the media.

Braukman Air Vent Installation

NOTE: The Braukman air vent is not approved for use in the State of Wisconsin. An approved air to water tank and/or air vent should be used with this application in the State of Wisconsin.

The Braukman Air Vent must be installed at the highest point of the plumbing, between the pressure tank and filter (see Fig. 7). Please note that the Braukman Air Vent (A) is mounted on a four to six inch pipe extension (B) at the elbow (C) of the highest point. This enables the vent to better collect any excess air created by the hydrocharger.

To use the Braukman Air Vent on an air-to-water pressure tank, install it approximately halfway up the side of the tank, as shown in the detailed drawing below.



1. Air Release Cap must be loose or removed to allow air to escape from vent.
2. Vent Bushing 1/2" x 1/8"
3. To opening on side of retention tank (approximately 1/2 way up, from bottom of tank)
4. 3/4" x 3/4" x 1/2" copper tee
5. 3/4" adapter with bushing to tank

Special Instructions for Split-Stream and Public Water Supply Type Installations:

For a split-stream installation, a secondary pressure tank must be installed as in Fig. 2. On a public water supply installation, a pressure tank must be installed as in Fig. 3, Page 4

1. Install pressure tank (secondary pressure tank in Fig. 2, Page 4) as indicated by appropriate diagram.
2. Install normally-closed solenoid valve after water meter and after a line split for untreated water (if there is one).
3. On both types of installation, install the hydrocharger between pressure tank (secondary pressure tank on split-stream type installations) and normally-closed solenoid valve.
4. Install a pressure switch after the hydrocharger and wire it to the solenoid valve (secondary pressure switch on split-stream). Set high pressure on pressure switch (which controls opening and closing of solenoid valve) to 3 psi lower than low pressure on primary pressure switch. Example: if primary pressure switch is set at 40 to 60 psi, set secondary pressure switch high at 37 to 38 psi.

For public water supply installations, contact your local water department or plant operator and ask what the normal low system pressure is. Set high pressure on pressure switch 2 to 3 psi lower than this figure.

NOTE: Failure to set the pressure switch as described above will not allow proper closing of the solenoid valve during periods of low system pressure.

Plumbing System Clean-Up

The following procedures are guidelines only but have proven successful in most instances. Under no circumstances should any procedure outlined below be followed if contrary to the appliance manufacturer's instructions. Should there be any questions concerning the advisability of performing a procedure, it is strongly recommended the manufacturer's authorized service outlet be consulted prior to performing the procedure.

The plumbing system and water using appliances that have been exposed, even for a short time, to iron-fouled water need to be cleaned of the precipitated iron that has collected in them or iron bleed (staining) will continue to be a problem.

Depending on the amount of iron in the water and the length of time the water system has been exposed to iron fouling, select from the following procedures those that apply to the type of system and appliances that need to be cleaned to assure iron-free water at the point of use.

Softener

It isn't uncommon that a softener was installed in an effort to remove ferrous ("clear water") iron from the water supply. Typically, a softener will remove some ferrous iron until the resin bed becomes fouled to the extent that it will lose both hardness removal capacity and the limited capacity for iron removal. This is the condition to expect a softener to be in when planning a system clean-up.

Prior to closing main supply valve or turning power off to a private well system and preparatory to installing the filter system, do the following:

1. Disconnect brine draw line from the brine cabinet and place the loose end into a five gallon plastic pail filled with a solution of warm water and 4 oz. of resin mineral cleaner.
2. Manually advance control timer to brine draw position (refer to instructions provided with your softener). Allow all the warm mineral cleaner solution to be drawn into mineral bed. Then immediately:
3. Close main water supply valve or turn power off to pump and proceed with filter installation. During time required to install filter system, iron-fouled softener resin will be chemically cleaned.
4. After filter installation is completed and final adjustments are made with the water turned on and brine draw tube reconnected, manually reposition timer on softener to backwash position. Allow timer to perform an automatic regeneration cycle. During backwash of softener, all iron cleaned from the resin will be washed down the drain. It is advisable, after chemically cleaning softener, to regenerate system twice to fully restore capacity lost due to iron fouling.

Operating Instructions

Water Heater

If the water heater has been exposed to both iron and hardness for a long period of time, replacement of the heater tank may be the only practical solution to prevent continued staining originating from this source.

After completing the installation of the chemical free iron filter system, clean the water heater by following these instructions:

1. Shut off energy supply to water heater and close heater inlet water valve.
2. Drain hot water tank completely. Open inlet water valve allowing heater tank to be refilled with iron-free water. Continue flushing until water runs clear to drain.
3. If, after approximately 30 minutes flushing, water does NOT clear, terminate flushing operation. Refill hot water heater with water and pour approximately 1/2 gallon of household bleach into top of heater tank. Allow bleach solution to stand in tank for 20 to 30 minutes. Flush tank again until water is clear at drain. Turn energy supply on.

NOTE: If water does not clear in approximately 10 minutes, water heater should probably be replaced.

Dishwasher

Consult owners' handbook and follow manufacturer's instructions.

Toilet Flush Tanks

Prior to commencing installation of the filter system, pour 4 to 6 ounces of resin mineral cleaner Pro-Rust Out or inhibited muriatic acid into flush tanks and bowls and let stand. When installation is completed, flush toilets several times with iron-free water. If iron deposits or stains remain, repeat procedure until clear.

Water Pressure

Your chemical free iron filter system is designed to operate under normal water pressures from 20 psi to 50 psi.

Backwashing and Automatic Bypass

Your filter is factory set to backwash at 1:00 a.m. during a period of little or no water use. The backwash cycle lasts approximately 15 minutes, after which filtered water service is restored. While backwashing is taking place, raw water automatically bypasses the filter if required. If possible, avoid using water during backwashing to prevent iron-laden water entering your household plumbing system.

New Sounds

You will notice new sounds, such as the hum of the timer, as your filter operates. During backwashing, it will not be uncommon to hear water running to the drain.

Manual Bypass

In case of an emergency, you can isolate your water filter from the water supply using the bypass valve located at the back of the control.

Noryl Bypass (Figure 9A)

In normal operation the bypass is open with the on/off knobs in line with the inlet and outlet pipes. To isolate the filter, simply rotate the knobs clockwise (as indicated by the word BYPASS and arrow) until they lock.

To resume filtered water service, open the bypass valve by reversing the rotation of the knobs.

Stainless Steel Bypass (Figure 9B)

In normal operation the bypass lever is aligned with the inlet/outlet with the pointer on SERVICE. To isolate the filter, rotate lever counter clockwise until it stops and pointer indicates unit is in bypass.

You can use your water related fixtures and appliances as the water supply is bypassing the filter. However, the water you use will be unfiltered.

To resume filtered water service, open the bypass valve by reversing the rotation of the lever.

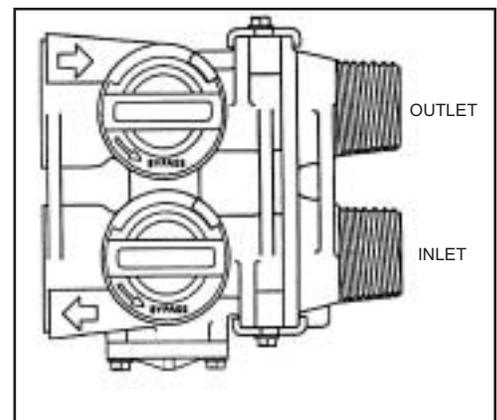


Figure 9A

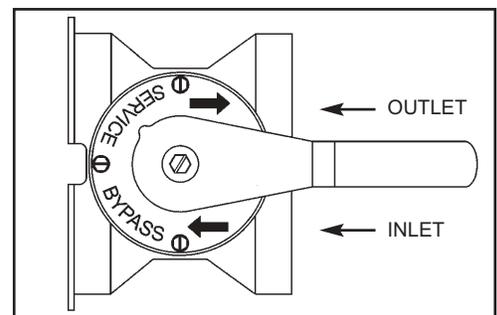


Figure 9B

Backwashing Instructions

To Calculate Backwash Frequency - Normal Applications

Backwash frequency for households with average water use can be determined using the following guide. The guide cannot be used if the filtered water supplies a swimming pool, geothermal pump, outside spigots or other high water demand devices or activities. If your application includes any of the foregoing refer to the paragraph on "Special Applications" below.

People in Family	Iron Content (ppm)									
	2	4	6	8	10	12	14	16	18	20
1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	2	2	2	2	2
3	1	1	1	2	2	2	3	3	3	3
4	1	1	2	2	2	3	3	4	4	4
5	1	1	2	2	3	3	4	4	6	6
6	1	2	2	3	3	4	6	6	6	6

1. Locate the box intersected by the number of people in your family and the parts per million (ppm) of iron in your water (if your ppm is between two numbers on the guide, use the higher number).
2. The number in the box represents how many times your filter has to backwash in a twelve day schedule.

Example: You have four in the family and 8 ppm of iron. Refer to the guide and locate the box intersected by four in the family and 8 ppm of iron. The figure supplied is 2. This means your filter control should be programmed to backwash twice in twelve days – that is every sixth day. If the figure had been 3 it would mean 3 backwashes in twelve days or every fourth day.

To Calculate Backwash Frequency - Special Applications

To ensure adequate reserve capacity and prevent loss of water pressure between backwashes the figure of 15,000 (not the full 30,000 ppm capacity) is used to calculate backwash frequency. Determine your backwash frequency as follows:

1. Estimate daily iron removal requirements using the following calculation:

$$\begin{aligned}
 &\text{No. of people in family} \\
 &\times 75 \text{ gallons of water per person} \\
 &+ \text{No. of gallons of water for special use} \\
 &= \text{No. of gallons of water required per day} \\
 &\times \text{Iron concentration (ppm)} \\
 &= \text{Daily iron removal requirements (ppm)}
 \end{aligned}$$

2. Establish backwash frequency using daily iron removal requirements to complete the following calculation:

$$\begin{aligned}
 &15,000 \text{ iron removal capacity (ppm)} \\
 &\div \text{Daily iron removal requirements (ppm)} \\
 &= \text{No. of backwashes required in 12 day schedule}
 \end{aligned}$$

Example: You have four in the family, 8 ppm of iron and a swimming pool requiring 46 gallons of water per day.

$$\begin{array}{r}
 4 \text{ People in the family} \\
 \times 75 \text{ Gallons of water per person} \\
 \hline
 300 \text{ Gallons of water for family} \\
 + 46 \text{ Gallons of water for the pool} \\
 \hline
 346 \text{ Gallons of water required per day} \\
 \times 8 \text{ Iron concentration} \\
 \hline
 2,768 \text{ Daily iron removal requirements (ppm)} \\
 \\
 15,000 \text{ Iron removal capacity (ppm)} \\
 \div 2,768 \text{ Daily iron removal requirements (ppm)} \\
 \hline
 5.4 \text{ Backwash frequency (days)}
 \end{array}$$

The calculation indicates the need to backwash every 5.4 days. The control can only be programmed to backwash at intervals of two, three, four, six and twelve days. The control would be programmed to the closest more frequent setting i.e. every four days.

Programming Backwash Controls

Setting The 24-Hour Timer

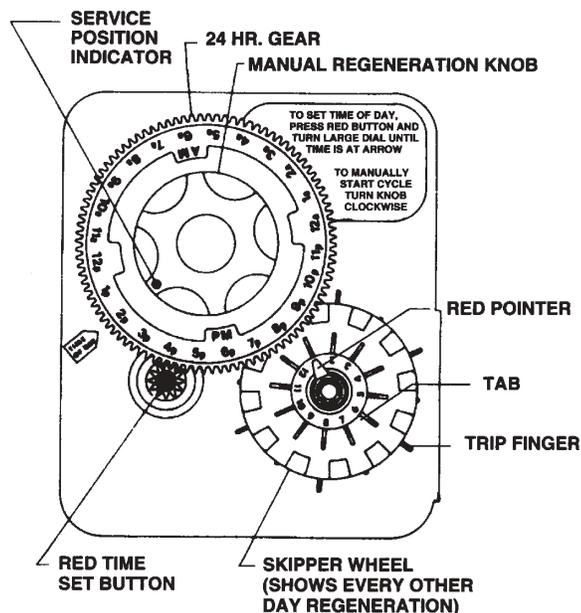
Press and hold the red button in to disengage the drive gear. Turn the large dial until the actual time of day is opposite the time of day pointer. Release the red button to re-engage the drive gear.

Setting The Backwash Frequency

The filter control features a skipper wheel with twelve numbered tabs and trip fingers. Each represents one day of a twelve day schedule. By adjusting the skipper wheel tabs, the control can be programmed to backwash every second, third, fourth, sixth or twelfth day, according to your requirements.

The control is shipped with all the skipper wheel tabs pushed outwards. You must push the tabs in toward the center of the wheel (retracting the trip finger) for each day that backwashing is not required.

Rotate the skipper wheel until number "1" is at the pointer, leave this tab out. Moving clockwise round the skipper wheel adjust the remaining tabs using the following table as a guide.



Manual Regeneration

Turn the manual regeneration knob clockwise. This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration process. The back center knob will make one revolution in approximately three hours and stop in the position shown in the drawing. Actual backwash time is 14 minutes. In any event, iron-free water may be drawn after rinse water stops flowing from the filter's drain line.

No. of backwashes required in 12 days	Skipper Wheel Tab Settings											
	1	2	3	4	5	6	7	8	9	10	11	12
1	Out	In	In	In	In	In	In	In	In	In	In	In
2	Out	In	In	In	In	In	In	In	In	In	In	In
3	Out	In	In	In	Out	In	In	In	Out	In	In	In
4	Out	In	In	Out	In	In	Out	In	In	Out	In	In
6	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In

Maintenance

Your chem free iron filter requires some minor maintenance to ensure optimum performance and years of trouble-free clean water. The following steps should be performed once or twice a year (more often under harsh conditions):

1. Verify the pumping rate of the system - **do not refer to a pumping curve for this data**. Follow the instructions found on Page 3. If the measured pumping rate is less than the backwash rate of the filter, see Page 12, Trouble Shooting.
2. Have your water tested - for pH, iron and manganese on both the treated and raw water to ensure your water conditions haven't changed.
3. Inspect the hydrocharger and the piping between the iron filter and the pressure tank to ensure they are not plugged with raw iron. If the line becomes plugged, the flow of water to the home will be reduced. This will result in a reduction of water available for backwashing the unit which will inhibit operation of the system.
4. Air-to-water pressure tank - periodically drain and flush your tank to prevent a build-up of precipitated iron from forming in the bottom of the tank.
5. Bladder tank - periodically check that the bladder air pressure remains at 2 psi lower than the cut-in pressure of your pump.
6. Check the hydrocharger - to ensure it is drawing air properly and for the correct amount of time (1/3 of the pump cycle time or 20 seconds, whichever is greater).
7. For applications with low pH, manganese or hydrogen sulfide, consult your local dealer for specific instructions to maintain the efficiency and operation of your filter.
8. Periodic cleaning of the air vent assembly with mild acid or vinegar will ensure that it continues to vent excess air properly.
9. The filter tank can be cleaned with a mild soap solution.
10. Never subject the unit to freezing.

Trouble Shooting

1. WATER IS CLEAR WHEN DRAWN, TURNS RED UPON STANDING (STAIN PRODUCING)

Insufficient air drawn by hydrocharger - Check hydrocharger adjustment. If unable to adjust for long enough draw, check pumping rate.

Bypass open or leaking - Close bypass valve and/or repair as necessary.

Filter bed backwashed at improper intervals - Refer to backwash frequency chart in operation manual to ensure unit is set correctly. Do not increase the backwash frequency unless required to based on the chart, since the media needs to be some what iron-fouled for best performance (in more severe iron-fouling cases, filter bed may need chemical cleaning – contact dealer).

Presence of manganese or tannins - Recheck water analysis.

Flow rate excessive for model - Reread Sec. 2: Facts To Remember When Planning Your Installation, Page 3.

Check-valve located between hydro-charger and pressure tank, disrupting water flow - Relocate check-valve.

Pumping cycle too short. pH of treated water too low (should be 7.0 or higher; with manganese, pH must be 8.2) - Lengthen pump cycle time. Replenish MpH component in media (contact dealer).

2. WATER IS RED WHEN DRAWN FROM TAP

Filter bed overloaded with precipitated iron due to insufficient backwash flow rate - a) Recheck well pumping rate and repair or replace as required. (b) Check for obstructions or kink in drain line, or (c) for improper drain line flow controller (see specs). Upon correction of this problem, if manually backwashing does not clear bed of iron, filter bed may need chemical cleaning

Filter bed backwashed at improper intervals - Refer to backwash frequency chart in operation manual to ensure unit is set correctly. Do not increase the backwash frequency unless required to based on the chart, since the media needs to be some what iron-fouled for best performance (in more severe iron-fouling cases, filter bed may need chemical cleaning – contact dealer)

Solenoid valve malfunction or inadequate supply system pressure/flow rate - Solenoid valve malfunction or inadequate supply system pressure/flow rate

3. EXCESSIVE PRESSURE LOSS THROUGH FILTER

Filter bed overloaded with precipitated iron - Refer to Section 2 above.

Control inlet/outlet valve(s) not fully open - open valves

Sand, silt or mud collecting in filter media - check well for these conditions

Filter bed not properly “classified” - Manually backwash to reclassify.

“Cementing” or “channelling” of filter media - Prod (stir) filter bed to break up hardened layer, backwash frequency to prevent recurrence.increase

4. “MILKY” OR “BUBBLY” WATER (APPEARS TO CONTAIN SMALL BUBBLES)

Excess hydrocharger air-draw - Check adjustment for duration of draw in excess of one-third pumping cycle (see Step 9, Page 6).

Excess gases in water (carbon dioxide, hydrogen sulfide, methane) - May require cleaning or installation or air-relief control (contact dealer).

System Check List

More than 90% of problems affecting the efficiency of a chemical iron free filter system can be identified in 9 minutes or less by following this diagnostic schedule. Start with Step 1, then follow each step in sequence to ensure proper diagnostic procedures.

1. Check for Proper Installation

- a. Is the hydrocharger installed between well pump and pressure tank with arrow pointing toward pressure tank?
- b. Is there a minimum of 6 inches on the hydrocharger inlet and 6 inches on the outlet of the straight pipe, free of pipe fittings?
- c. Is the check valve (if used) correctly located between the pump and the hydrocharger?
- d. Is the pipe from the pressure tank to the filter unit attached to the inlet port of the control valve?
Is the pipe from the filter unit to the water heater attached to the outlet port of the control valve?
- e. Is the drain line of adequate diameter? Drain line must be sized to prevent back pressure from reducing backwash flow rate below minimum for the model installed. Typical examples of minimum drain line diameters are:
 - i) 1/2" ID when drain is up to 15 ft from unit and backwash discharge point is lower than the control valve
 - ii) 5/8" ID when drain is up to 15 ft from unit and backwash water discharge point is slightly higher than the control valve
 - iii) 3/4" ID when drain is 25 ft away and/or drain is installed overhead
- f. Has the drain line been "kinked"? A kinked drain line must be replaced.
- g. Is the drain line installed in a way that it will freeze in cold weather?
- h. If the system incorporates a standard air-to-water pressure tank, does it have the required deep well air volume control (air release valve) and is it functioning? (Proper installation of this type of pressure tank should have inlet from pump higher than outlet to service.)

2. Check pH, Iron and Manganese Content of Treated Water

Is the treated water pH reading less than 6.7 (8.2 when manganese is present)? If yes, replenish the media with MpH adder and check the bed for "channelling".

3. Check Pumping Rate

Do not refer to a pumping rate curve for this data. Follow the instructions found on Page 3. Is the measured pumping rate less than the backwash rate of the filter? If yes, increase the pumping rate by first reducing the system operating pressure. If the pumping rate is still too low, replace the pump.

4. Check Hydrocharger for Proper Air Draw

Does air suction continue for 1/3 of the time the pump runs (do not confuse with 1/3 of the pressure range)? Turn the water flow adjusting screw clockwise to increase the draw time and counter-clockwise to decrease the draw time.

5. Manually Stage Filter Control to Backwash Cycle

Does a "rush" of air precede the backwash water out of the drain line? (If no, proceed to Step 6). If yes, the system is "air-logged". Disconnect power from the pump and allow the system pressure to drop to zero through the filter drain line. Restore power and rebuild system pressure. Continue backwashing unit until the pump has completed two or three pressure cycles. Stage control valve to the service position and check the hydrocharger draw time. Adjust draw for 1/3 of pump cycle time.

6. Determine Other Uses of Water in Addition to Normal Domestic Purposes

(e.g. geothermal heating or cooling, swimming pool fill, lawn irrigation, farm animal watering, etc.) Have any high demand water uses been added subsequent to the installation of the filter system or overlooked when originally sizing the system? (If a high demand situation exists, resize the system using continuous service flow rate data.)

Guarantee

Novatek guarantees that your new water conditioner is built of quality material and workmanship. When properly installed and maintained, it will give years of trouble free service.

Seven Year Complete Parts Guarantee:

Novatek will replace any part which fails within 84 months from date of manufacture, as indicated by the serial number provided the failure is due to a defect in material or workmanship. The only exception shall be when proof of purchase or installation is provided and then the warranty period shall be from the date thereof.

Lifetime Guarantee on Mineral Tanks and Brine Tanks:

Novatek will provide a replacement mineral tank or brine tank to any original equipment purchaser in possession of a tank that fails within his/her lifetime, provided that the water conditioner is at all times operated in accordance with specifications and not subject to freezing.

General Provisions:

Novatek assumes no responsibility for consequential damage, labor or expense incurred as a result of a defect or for failure to meet the terms of these guarantees because of circumstances beyond its control.

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