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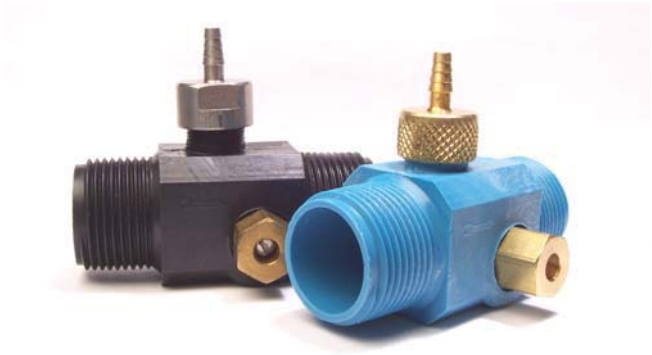
Paterson



Featuring the Micronizer air injection valve

*Advanced Iron Removal System**

OWNER'S MANUAL

FOR ALL WATERITE PATERSON IRON REMOVALSYSTEMS

THIS MANUAL IS TO BE LEFT WITH THE OWNER OF THE EQUIPMENT FOR REFERENCE PURPOSES AND TECHNICAL GUIDANCE. IT IS STRONGLY RECOMMENDED THAT QUALIFIED DEALER SERVICE PERSONNEL BE CONTACTED IN THE EVENT OF AN UNKNOWN INTERRUPTION OF SERVICE OR APPARENT PRODUCT MALFUNCTION. AN ANNUAL PREVENTATIVE MAINTENANCE INSPECTION BY A WATER PROFESSIONAL IS RECOMMENDED TO ENSURE TROUBLE-FREE AND CONTINUOUS OPERATION.

Waterite

www.waterite.com

Waterite Technologies, Inc. ■ 1-885 Keewatin Street, Winnipeg, MB Canada ■ R2X 2S7

Canadian Patent #1,154,884

Congratulations!

You have purchased the finest residential iron removal system available for your home. It will provide you years of reliable service if properly installed, operated and maintained. Please read this entire manual before attempting installation and operation.

Section 1. Frequently Asked Questions

Before getting started, take the time to familiarize yourself with your new Waterite system by reading some FAQs listed below. Call us or ask your dealer if you have any other questions about your system's operation.

Q: How does the Paterson Iron Removal System differ from an ordinary water filter?
Ordinary water filters use a screen to separate only particles of dirt and sediment from the raw water source. Other iron removal systems may use a combination of filtration and oxidation, by using a specialized oxidizing media that requires regeneration with a chemical called potassium permanganate. The Paterson Iron Remover uses atmospheric air to oxidize the iron in your water and then remove it in a filter bed designed to capture iron oxide. Its operation is completely chemical-free.

Q: What kind of iron is in my water?
Iron is a naturally occurring mineral, commonly found in well water and other ground water sources. "Clear water iron" is iron that is in solution in its *ferrous* form. This is the way it usually stays while in the underground aquifer, since most underground water is anaerobic (lacking in oxygen) and the ferrous iron has no way of oxidizing. Once pumped to the surface and exposed to air (in an open holding tank or a water heater or once run from a fixture), the iron in solution combines with oxygen to form *ferric* or "red water iron". This is the form of iron that you would commonly refer to as rust. When suspended in water, it is in the form of tiny particles of iron oxide that can bind to pipes and fixtures.

Q: Is iron harmful?
Iron is an essential element to good nutritional balance. Fortunately, we receive all of the iron that we need in a properly balanced diet. Health and water authorities consider iron in water as an aesthetic problem and not a health related risk. Ferric iron in your household water however, can permanently stain plumbing fixtures and tiles, clog water lines, cause damaging build-ups in water heaters and heater elements or cause an unpleasant metallic taste in your drinking water. Permanent damage can result to dishwashers, coffee makers and icemakers. Iron-laden water, when used for watering, will also clog irrigation nozzles and leave ugly rust stains on concrete walks and driveways.

Q: How does the Paterson Iron Remover work?
The Paterson Iron Remover is a complete system for iron removal that is intended for use on private wells that contain levels of iron in excess of .3 ppm to as high as 15 ppm. It may also be adapted for use with a municipal water supply.

The first operation is the injection of air into the water line by the Micronizer valve, a unique valve with a built-in, adjustable venturi. The injected air then oxidizes the soluble iron in the raw water after an appropriate contact time, usually in a contact tank plumbed in-line. The fine particles of oxidized iron are then filtered out of the water in the filter tank by a bed of specially formulated media. This media is periodically backwashed to waste by the automatic filter valve that the Paterson system is equipped with. This backwashing process rinses the iron that has been collected in the bed to your drain line.

Q: Can my present bladder type pressure tank be used as the contact tank as well?
This is not recommended. A bladder style pressure tank cannot be fitted with an air volume control valve and will gradually fill with excess air and lose water storage capacity. Further, most are too small to be effective in a normal contact tank application. If there is a bladder tank presently on your water system, it should be installed upstream from the Micronizer valve and a separate contact tank and AVC valve should be purchased.

If a glass-lined galvanized tank with an AVC is presently used on your water system it may be used if it is of sufficient size to allow for adequate contact time. Consult your dealer.

Q: Should the Paterson system be installed before or after my softener?
Always install the Paterson Iron Remover upstream from a softener. This will reduce iron fouling in the softener resin and valve, thereby significantly lengthening its life.

Q: In what pH range will the Paterson Iron Remover work?
We recommend that the raw water pH range be 6.5 to 10.0. Oxidation is retarded as the pH of the water is reduced – pH correction will be required should it fall below 6.5. Water in excess of 10.0 pH is extremely scale forming and should be avoided. Most well water pH will easily fall into the recommended range.

Q: At what iron levels will the Paterson Iron Remover be effective?
Iron in household water will begin staining and will leave deposits at levels as low as .3 ppm. The Paterson system will be effective in removing iron to 15 ppm, though special attention should be given to proper contact tank sizing and backwash frequency at iron levels in excess of 6 ppm.

Q: Is the Paterson system effective in reducing high manganese levels?
Typically, no. Manganese is a naturally occurring mineral that is very difficult to oxidize with air at normal pH levels. At the high end of the recommended pH range (>9.5) manganese may be somewhat reduced by the Paterson system. Manganese can cause black staining on laundry and leave stains on fixtures, similar to iron. The only effective method for household manganese reduction is with the use of a manganese greensand filter.

Q: What is the filter media that is used in the Paterson filter vessel?
Waterite specially formulates a natural pumice-like material for use as a Paterson filter bed. It is screened to ensure the exact size to capture iron particles produced in the oxidation process. **DO NOT** substitute any material for genuine Waterite Paterson Iron Remover media, or system failure may result.

Section 1. Preparing for Installation

Start with a Water Sample

Every successful installation starts with a complete water analysis, conducted by a water professional. A good basic analysis will be sufficient – the important measurements are total iron, pH, hardness and manganese. Make sure that the pH ranges from 6.5 to 10.0 and that the total iron does not exceed 15 ppm.

The following chart provides some guidance as to how to properly size your Paterson system, depending on your particular water analysis:

Paterson Iron Remover Performance Specifications

Model	Capacity (Grains)	Media CF	B/W Rate GPM	Service Flow GPM	Height	Weight (kg.)	Autotrol Valve
P1054A	42,000	1.5	5.0	5.0	62"	38	263
P1248A	65,000	2.0	7.0	6.0	56"	50	263
P1354A	84,000	2.5	10.0	8.0	62"	63	263

Calculate the System Pump Capacity

1. Using a stopwatch or the second hand of your wristwatch, record the time that it takes for the pump to go through a complete pumping cycle – that is the time from when the pump starts at the low pressure setting (usually 20 or 30 psi) to when it shuts off at the high pressure setting (usually 40 or 50 psi).

2. Using a bucket or container, open a tap and collect the water until the tank pressure falls to the low pressure setting and the pump starts. By dividing the number of gallons collected by the time measured in (1) above, the capacity of the pump to deliver water to the pressure tank is obtained. A MINIMUM OF 5 GPM (gallons per minute) IS REQUIRED FOR THE PATERSON IRON REMOVER TO FUNCTION PROPERLY AND DRAW ENOUGH AIR THROUGH THE MICRONIZER VALVE. This usually requires a minimum of a ½ HP jet pump or a 1/3 HP submersible pump. To maximize flow rates on pumps at the low end of the necessary capacity, use a 20-40 psi pressure switch.

To ensure an adequate flow for backwashing the filter media, please ensure the following: 10” tank, 5GPM; 12” tank, 7 GPM; 13” tank, 10GPM. If inadequate backwash flow rates are used, the filter media will not be flushed properly and will eventually become plugged with iron and fail.

3. The pumping cycle should be at least 20 seconds. In some cases, the existing pressure tank may need to be replaced if it has too little capacity to allow this. Remember, the pressure tank used on a Paterson Iron Remover must be fitted with a air volume control to regulate air volume in the tank.

4. If the water supply originates from a municipal or community supply and a household pump is not used to deliver water to your home, the Paterson Iron Remover requires a special installation. See Section 5.

Section 2. Important Installation Planning Tips

1. All installation procedures must comply with local plumbing codes

2. Connections to outside faucets for irrigation should be made before the iron remover and softener. If you wish to provide iron free or softened water to our outside taps, be certain that this additional water usage is included when sizing the required equipment.

3. Iron filter and softener drains must NEVER be connected to sewer lines with a solid connection. Always use an air gap of at least 2" at the end of the filter drain line and the sewer. This will eliminate the possibility of back-siphonage of sewage into the water system.

4. Always protect the iron remover and other plumbing components from freezing.

5. If the plumbing system is used as the ground leg of the electric supply, continuity must be maintained by installing ground straps around any non-conductive plastic piping used in the installation of the water conditioning devices. It is recommended that where the plumbing system is used as an electrical ground, insulated connectors should be used to isolate any electrical control valves (such as a filter or softener valve) from stray currents that may interfere with or damage the control's circuit boards. These insulators may be purchased from a plumbing shop.

Section 4. Installations on Private Well Systems

1. Turn off the power to the pump (see Figure 1). Drain the pressure tank and the water system.

2. Since the hot water tank may contain rust deposits it is a good practice to completely flush the tank and to drain it at this time.

3. If sand is known to be present in the system, it is recommended that a strainer or pre-filter be installed after the pump but before the water conditioning systems or the Micronizer valve.

4. Cut the supply line and install the Micronizer valve between the pump and the pressure tank, using the necessary fittings. Use a minimum 12" nipple on either side of the Micronizer valve when connecting to the pump and pressure tank.

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Make sure that the water flow direction through the Micronizer conforms to the directional arrow on the Micronizer body.

5. It is recommended that pipe unions be used in this connection to facilitate removal of the Micronizer valve for periodic cleaning. Micronizers contain an internal venturi nozzle that may become plugged with scale or foreign debris over time.

6. Cut the main service line downstream of the pressure tank to insert the filter vessel. It is recommended that a factory bypass valve be installed which will act as a filter tank by-pass in the event of filter servicing. Install a ball or gate valve upstream to the filter tank inlet (valve 'D' in Figures 1 and 2). Using a tee, install a pressure tank drain cock if one is not presently in service (valve 'E' on Figures 1 and 2).

7. Copper, CPVC or PEX plumbing pipe may be used, in accordance with local plumbing codes. Minimum sizing is ¾". While connecting, do not apply heat to any fitting connected to the filter control valve as damage may result to internal parts. Make sure that the direction of flow through the control valve on the filter conforms to "inlet" and "outlet" markings on the valve. It is recommended to install a water sampling cock using a tee between the iron filter vessel outlet and the water softener inlet (valve 'F' on Figure 1 and 2). This will allow sampling of iron-free water free of any residual iron that may be present in the softener or water heater that may give false high readings.

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Always install a 2" air gap on all backwash or drain lines to prevent sewage back siphonage.

8. Attach a backwash drain line to the backwash fitting on the control valve using at least a ½" hose or pipe. Position the drain line over the drain and secure it in place. Do not elevate the backwash line over 10 feet from the floor. If connection to a sewer line is necessary, check the local code or a plumbing professional for guidance and the required parts. Usually a trap with a 2" air gap will suffice.

9. If you have a jet pump, the pressure switch (located on the side of the pump motor at the electrical connection) is activated by water pressure in a tube attached to the pump head. To avoid the pressure drop caused by the flow restriction in the Micronizer, it will be necessary to sense the system pressure after the Micronizer. Disconnect this tube from the pump head and reattach the tube to the water line downstream from the Micronizer valve. You will need to cut in a tee or similar fitting to make this connection. You may need to lengthen the pressure tube – good quality poly tube or copper tubing may be used for this purpose.

Section 5. Installations on a Municipal Water Supply

1. For the Micronizer to draw the required air into the system used in oxidation of the iron, the water system must produce a flow rate past the Micronizer of at least 5 GPM in each pump-up cycle. Municipal systems provide a constant pressure to the home – hence there is no pump-up cycle to operate the Micronizer. The draw from the household plumbing system at any time may range from a fully open tap to mere trickle. In order to assure that an air draw is present for all water passing the Micronizer, the household system must be configured to produce a pump-up cycle similar to a private well system. See Figure 2.

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If your home is equipped with a constant pressure, variable speed submersible pump, the operation of the water system may be very similar to a municipal supply. You may need to make plumbing changes described in this section to produce a pump-up cycle to ensure proper Micronizer operation.

2. Close the water supply to the home. You may use the valve at the water meter or the service valve located at the street. Directly after the meter and inside shut-off valve, cut the main service line and install an approved, normally closed, 110V solonoid valve.

3. Leaving at least a 12" run, next install the Micronizer valve, ensuring the direction of flow conforms to the directional arrow on the valve body.

4. Leaving another 12" run, install an approved pressure switch (30-50 range recommended) with a tee. Connect the solonoid valve to the pressure switch so that it is activated at the low-pressure setting and deactivated at the high-pressure setting. As the pressure switch must be connected to a 110V power supply, make sure a licensed electrician makes the installation and the job is inspected by the necessary local authorities.

5. Install a properly sized (consult your plumber – a 20 gallon tank is usually sufficient) pressure/contact tank, equipped with an AVC, downstream from the pressure switch.

6. Refer to instructions at Section 4 (5) through (8). Your system is now configured to operate with a pump-up cycle similar to a private well system.

Section 6. System Start-Up Procedure

1. Close valves D, E and F. Turn on power to pump or open municipal supply valve. The pressure tank is now filling and the system will turn off once the high-pressure setting is reached. Check for leaks.

2. Consult the control valve operating manual. Place the valve in the backwash position by hand rotating the camshaft while pressing the cam release button on the face of the valve.

3. Make sure the filter vessel by-pass is closed (normal operating position). Slowly open valve 'D', allowing water to slowly fill the filter tank and orient the filter media. When water begins to flow through the backwash line, gradually open valve 'D' to the fully open position. When the backwash water runs clear and free of air, turn the camshaft to the "Service" position.

4. Open the Micronizer adjusting screw to the fully open position (fully counter-clockwise).

5. Use a tap in the house to test cycle the system. If necessary, adjust the pressure switch to ensure a 20 psi differential between pump cut-in and cut-out (such as 20-40).

6. Inspect all plumbing and fittings for leaks and repair if necessary.

Section 7. Adjusting the Micronizer Valve

1. When properly adjusted, the Micronizer will oxidize and suspend the iron so that it can be captured by the filter bed. It is important to ensure that this adjustment be made and maintained over time.

2. Close valve ‘D’. Turn down the Micronizer adjusting screw three (3) turns by rotating it clockwise.

3. Open valve ‘D’ and open a tap in the house – you can now control the system flow by operating valve ‘D’. Allow the water to drain completely from the pressure tank until the pump starts (or the solonoid opens) then immediately close valve ‘D’. Using your wristwatch or a stopwatch, time the length of the pump-up cycle until the pump stops.

4. Re-open valve ‘D’ until the pump starts, then immediately shut valve ‘D’. Again using the watch, determine the time of the air draw at the suction nozzle of the Micronizer valve. Optimally, this air-draw time should be 30% of the total pump-up cycle. For example, if the pump-up time was 100 seconds, the air-draw time should be 30 seconds. If the air-draw time is greater than 30%, turn the Micronizer adjusting screw counter-clockwise slightly. If the air-draw time is less than 30%, turn the screw slightly clockwise. Repeat these steps with each adjustment until the proper balance is established.

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If after a four-week period all of the iron is not being removed from your water, increase the air-draw time to 35% of the total pump-up time.

Section 7. Sampling Your Water for Iron

The water should be sampled for iron removal directly after the filter tank (valve F). Sampling the water at other points in the system may offer a false high iron reading due to residuals in the water heater, piping or softener.

In most cases the iron content will show a significant drop within 24 hours, in some waters it may take up to four weeks for the filter bed to load sufficiently and the iron reduction to reach its maximum level.

Section 8. Setting the Backwash Frequency

Your Paterson Iron Remover is equipped with an Autotrol Model 263 Automatic Filter Valve, among the finest valve of its type available. It will provide years of trouble-free service if maintained and operated according to its manufacturer’s instructions. Carefully read all manuals and notices in your literature kit that relate to valve operation.

When a Paterson Iron Remover has been correctly sized for an installation, with consideration to the volume of water consumed and the concentration of iron in the water, the filter media will require backwashing twice monthly. Like most filters, they are more effective as the bed begins to load with iron, to a point. Hence, backwashing too frequently will reduce the effectiveness of the unit and not backwashing frequently enough will cause the bed to become clogged.

It is normal to expect to change the filter media every five years, sooner if iron concentrations are in excess of 10 ppm. Always insist on Paterson Iron Remover media to assure proper grading and optimal performance from your iron remover.

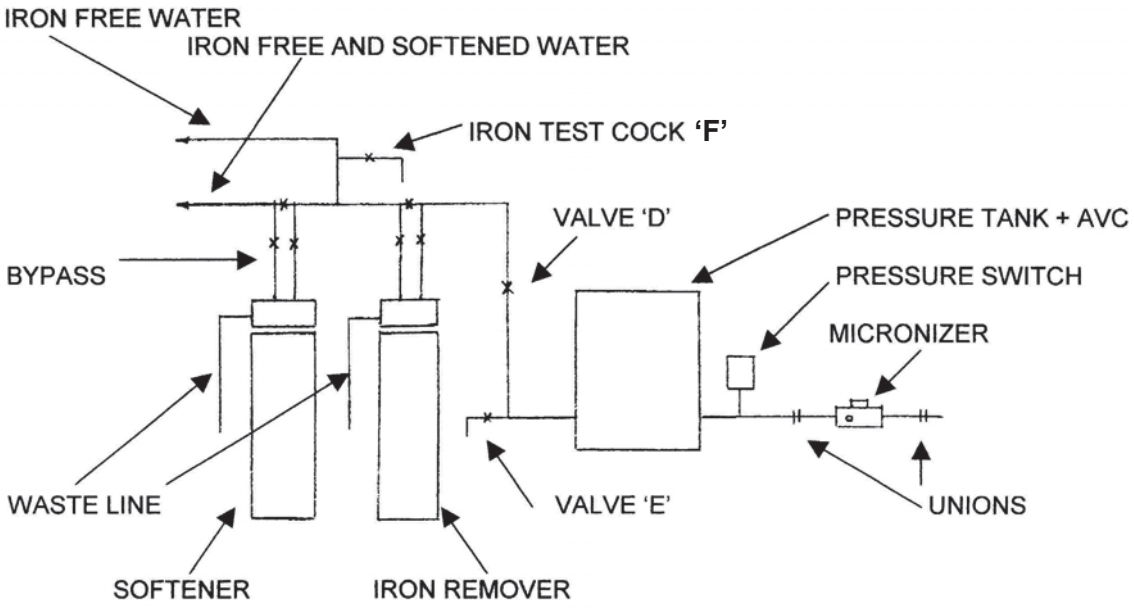

FIGURE 1

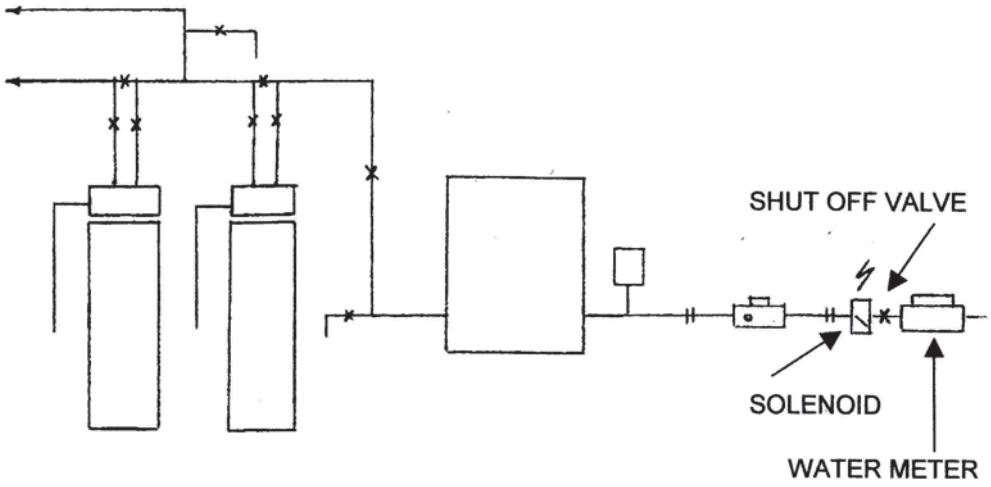

FIGURE 2

CLEAN WATER STORE

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Waterite

Waterite Technologies, Inc.
1-885 Keewatin Street
Winnipeg, Manitoba
Canada R2X 2S7
(204) 786-1604
(204) 783-1599 fax
waterite@waterite.com
http://www.waterite.com