

HIGH PURITY WATER SYSTEMS

SUPER - Q™ PLUS

and

STANDARD SUPER - Q SYSTEMS

115V

ZFSQ 115 03

ZFSQ 115 04

ZFSQ 115 P4

220V

ZFSQ 240 03

ZFSQ 240 04

ZFSQ 240 P4

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DECLARATION OF CONFORMITY **EUROPEAN UNION EC DIRECTIVES**

Directive 89/336/CEE Directive 73/23/CEE

Super-Q

- ◆ The system mentioned above is manufactured in Millipore S.A.S. - 67120 Molsheim - FRANCE - facilities whose quality management system is approved by an accredited registering body to the ISO9001 Quality System Standards.
- ◆ We certify that these Lab Water Systems are designed and manufactured in application of the following European Council directives :
 - 89/336/CEE relating to Electromagnetic compatibility
 - 73/23/CEE relating to electrical equipment designed for use within certain voltage limits
- ◆ Standards to which conformity is declared as applicable are the following :
 - EN 50082-1 Edition 1992 : Electromagnetic compatibility : generic immunity standard
 - EN 55022 Edition 1987: Limits and method of radio-disturbance characteristics of information technology equipments.
 - EN 61326-1 Edition 1997 / A1 Edition 1998: Electrical equipment for measurement, control and laboratory use - EMC requirements.
 - EN 61000-3-2 / A1 and A2 Edition 1998 / A14 Edition 2000 : Limits for harmonic current emissions (equipment input current up to and including 16A per phase)
 - EN 61010-1 : 1993 / A2 : 1995 : Safety requirements for electrical equipment for measurement, control and laboratory use.

Guy REYMANN



Quality Assurance Manager
Millipore S.A.S.

07th December 2004

INTRODUCTION

The Millipore Super-Q Water Systems are modular systems designed to provide the “final polish” to water that has been pre-treated by purification methods such as reverse osmosis (RO), deionization (DI) or distillation. Super-Q Systems can produce up to 12 L/min of high purity water; free of ionic contamination up to 18 megohm-cm resistivity level, and free from particulate and microbiological contamination to an absolute size level determined by the pore size of the Millipore filter element used. With the appropriate cartridges installed in the proper configuration, a level of down to 20 ppb TOC may be achieved for organic removal.

Super-Q Systems produce water that is pure enough for critical applications such as atomic absorption (AA) spectrophotometry, high performance liquid chromatography (HPLC), tissue culture media preparation, electronics rinse water, and total organic carbon (TOC) analysis. They are designed to produce water that exceeds C.A.P. (College of America Pathologists), A.S.T.M. (American Society for Testing and Materials), N.C.C.L.S. (National Committee for Clinical Laboratory Standards), and A.C.S. (American Chemical Society) standards for Type I Reagent Grade Water.

Super-Q product water is intended for immediate use because such high quality water deteriorates when stored, or exposed to the environment.

There are both Standard and Plus (Recirculating) Models. The recirculating Super-Q Plus System includes a pump and is recommended for single point-of-use applications with intermittent demands. The Standard, non-recirculating system, which requires additional accessories, is designed for multiple point-of-use applications.

The Standard System can also be used for applications requiring a continual supply of high quality water.

All Super-Q Systems consist of a series of three or four housings, each of which holds a disposable cartridge. Each cartridge provides a particular function such as prefiltration, organic adsorption, deionization and final Millipore membrane filtration to particle retention levels ranging to 0.22 μm . The full flow of feed water passes from the various cartridges through a temperature-compensated (25°C) resistivity sensor that monitors ionic purity over an effective range from 1.5 to 18.2 megohm-cm.

For Technical assistance with your system, please contact your local representative or Millipore Technical Service Department.

Super-Q Systems Specifications

<u>Component</u>	<u>Materials of Construction</u>
Support bracket	Stainless steel
Meg-O-Meter housing	Vacuum-formed plastic
PL housing and heads	Polypropylene, nylon
Hardware (Screws, nuts, washers)	Stainless steel
Sensor housing	White polypropylene

Connections

Inlet :	1/2" NPTF F&T fitting
Outlet :	1/2" NPTF F& T fitting

Dimensions

	<u>3 BOWLS</u>	<u>4 BOWLS</u>
Height :	800 mm (26.6 ft)	800 mm (26.6 ft)
Width :	945 mm (31.5 ft)	1 150 mm (38.3 ft)
Depth :	220 mm (7.3 ft)	220 mm (7.3 ft)

Electrical Requirements

The system must be electrically connected to an earth grounded power supply.

220V / 50Hz, 2A	Fuse : 2AT 250V 5 x 20mm
115V / 60Hz, 5 A	Fuse : 5AT 250V 5 x 20mm

Feed Water Requirements

Operating Temperature :	5°C - 40°C (41°F - 104°F)
Feed Water Pressure :	<u>Minimum</u> : 0.5 psi (0.03 bar). <u>Maximum</u> : Super-Q Plus Systems : 15 psi (1 bar). If greater, please use a pressure regulator. Standard Super-Q Systems : depends upon pump specifications, not to exceed maximum system pressure of 80 psi (5.5 bar).

Environmental conditions :

Ambient storage temperature :	10°C - 40°C (50°F - 104°F).
Humidity :	20% - 80% (below the dew point).

Typical System Performance

Resistivity	:	18.2 Megohms-cm at 25°C.
Organic	:	< 20 ppb (*).
Microorganisms	:	< 10 cfu/ml (**)

(*) When an Organex-Q™ cartridge is used and the system is fed with Reverse Osmosis water.

(**) With 0.22 µm final filtration immediately prior to the point-of-use.
Flow rate : Maximum 10-12 liters/min (2.6 - 3.0 US gpm).

Expendable

<u>Expendable*</u>	<u>Catalogue Nbrs</u>
Milligard® TP Prefilter cartridge, 20", 3/pk	CWSC02TP3
Super-C Carbon cartridge, 22", 3/pk	CDFC02203
Ion-Ex® Cartridge component, 22", 2/pk	CPMB02202
Durapore® TP 0.22µ Cartridge, 20", 1/pk	CVDI02TP1
Organex-Q Cartridge, 22", 1/pk	CPEX02201

* Cartridges are not shipped as part of the system and must be ordered separately.

NOTE : Effluent quality will rapidly degrade if stored outside of the Super-Q System. Such high quality water will be contaminated by the atmosphere and by contact with a storage vessel.

INSTALLATION

Unpacking

Super-Q Plus Systems are shipped with the support bracket and cartridge housings head manifold completely assembled in the same container with the housing bowls and other accessories. Each system requires cartridges, that are not provided with the preassembled hardware and must be ordered and shipped separately. Standard Super-Q Systems require additional components that must be ordered separately. Please consult the Ordering Information Section of this manual or Technical Service to choose the most appropriate cartridge configuration and accessories to meet the water quality requirements of your application(s).

Space Requirements

All systems require a clearance of 2 ft (60 cm) below the bowls for cartridge installation and replacement. The unit must be mounted on a surface and with bolts that can support an operating weight of at least 63 kg (140 lbs).

Electrical Requirements

All Super-Q Systems require one grounded electrical outlet, either 115V or 220V, depending upon your particular system. The systems have a power consumption capacity of 5A for 115V systems and 2A for 220V systems.

Feed Water Requirements

Most municipal tap water supplies contain a very high concentration of suspended particulate, colloids, dissolved organic and inorganic materials. These should be removed by the appropriate pre-treatment methods to prolong the useful life of cartridges, and enhance the product water purity. Reverse Osmosis (RO) or distillation treatment is ideal. If deionization of the water is preferred, this type of water should be prefiltered prior to feeding to the Super-Q Systems to remove some of the biological load.

A minimum feed water pressure of 0.5 psi (1 foot head) is required. The maximum feed water pressure to the Super-Q Plus Systems is 15 psi (1 bar). A pressure

regulator is required with these systems to maintain feed water pressure within these limits.

Feed water temperature should not exceed 40°C (104°F).

A shut-off valve on the feed water line is recommended to facilitate cartridge changing and system maintenance.

Mounting

Use the following procedure to level and secure the system to a suitable wall.

1. Mark a horizontal line on the mounting surface at least 1400 cm (55") above the floor. Using all four mounting bolt holes as a guide, mark locations for the bolts. Pre-drill the necessary holes.
2. Using fasteners (not supplied) that are strong enough to hold the Super-Q System when it is full of water (at least 63 kg - 140 lbs), secure the housing assembly to the mounting surface.

Pipe and Tube Connections

Complete any extra piping with polypropylene or polyethylene piping. Joints should be solvent cemented or sealed with Teflon-taped threads. Make threaded connections by wrapping the male thread with a double overlapping layer of Teflon thread-sealing tape to prevent leaks and facilitate removal.

DO NOT use pipe-thread compound. It will contaminate the water stream making it impossible to obtain the desired water quality.

Inlet Connections

The feed water source (Reverse Osmosis, deionized or distilled water supply) is connected to the inlet connector with 1/2" O.D. tubing on the Super-Q Plus.

Pressure Regulator Installation

If the feed water pressure to the Super-Q Plus Systems exceeds 15 psi (1 bar), install a pressure regulator (to be ordered separately) upstream of the Super-Q Plus inlet, maintaining the proper flow direction. The pressure regulator can have 1/2" NPTF inlet and outlet connections so you can install the regulator with a 1/2" NPTM to 1/2" O.D. tube fittings.

Adjust the regulator so that the inlet pressure is between 0.5 psi (0.03 bar) and 15 psi (1 bar).

Outlet Connections

On Super-Q Plus Systems, the outlet of the system has a 1/2" female tube fitting located on the production valve.

The Standard Super-Q Systems' outlet is 1/2" NPTF.

If an outlet delivery tube is required, use inert tubing to maintain the water quality.

Installation of Accessories to a Standard Super-Q System

If a recirculating system with multiple points-of-use is required, a customized unit to meet your high purity water needs can be installed using a Standard Super-Q System. Call Technician Service for assistance in sizing the proper components for your application because a properly designed system must meet the following specifications including maximum system pressure and flow rate while still providing proper delivery at all of the desired use points :

Operating Temperature :	5°C - 40°C (41°F - 104°)
Feed water Pressure :	<u>Minimum</u> : 055 psi (0.03 bar). <u>Maximum</u> : depends upon pump specifications.
Flow Rate :	Not to exceed 12 L/min.
Maximum System Pressure :	80 psi (5,5 bars).

NOTE : It is highly recommended to use Polypropylene or Polyethylene tubing throughout and wrap threaded connections with Teflon thread-sealing tape. Never use pipe-thread or silica compounds.

OPERATION

A. **Function of Components**

Head and Housing Assemblies

All cartridge housings are of identical modular design, consisting of a molded head with detachable cylindrical bowl. The heads and housings hold the various filter cartridges such that, when properly selected, combine to yield the highest quality product water available.

Use of an ultrafilter cartridge in the final bowl requires additional parts which are supplied in a separate kit, catalogue number ZWUFM0D01. (115V models only).

Pump (Super-Q Plus Systems) *

The Super-Q Plus Systems include a positive pressure gear-pump that directs the feed water, under pressure, through the system. This selected magnetic drive gear pump is used to eliminate problems of seal replacement, priming, and leakage. It produces a maximum flow of 12 L/min (3 gpm), at a maximum pressure of 55 psi (3.8 bar).

CAUTION : Although the pump is self-priming, **never** start the pump without ensuring that a proper water supply is connected and available to the pump.

The feed water pressure to the pump should not exceed 15 psi (1 bar). If necessary, a pressure regulator should be installed in the feed line, upstream of the pump, to control the feed water pressure.

* The Standard Super-Q System must have a pump (not included) that is properly sized for the application.

Pressure Regulator

Placed in the inlet feed water line, the pressure regulator controls the feed water pressure to the Super-Q Plus System. It should be set to a level between the minimum 0.5 psi (0.03 bar) pressure required, and the maximum permitted pressure of 15 psi (1 bar).

Meg-O-Meter Assembly

This water quality meter provides an accurate, in-line measurement of the Super-Q product water resistivity. The meter scale is graduated from 2 to 18 megohm-cm. The unit is internally temperature-compensated to normalize readings at 25°C (77°F) for water temperature between 5°C and 40°C (40°F to 104°F).

On Super-Q Plus Systems the assembly is equipped with an autorecirculation feature that allows water to recirculate when the Main Power Switch is in the ON-1 position, and the Pump Control Switch is in the “Standby” mode. This recirculation, caused by periodic operation (in the “Standby” mode) permits the user to draw water at a high purity level at all times.

Sensor

The sensor, located just after the last housing, is electrically connected to the Meg-O-Meter Assembly. In operation, the sensor continually measures the product water resistivity as it exits the last housing.

Main Power Switch (Super-Q Plus Systems)

This power switch, located on the right side of the Meg-O-Meter panel, has both ON-1, OFF-0 positions. The switch, when turned to the ON-1 position, operates the pump, and provides power to the circuit.

Main Power Light (Super-Q Plus Systems)

This green power light is located on the face of the Meg-O-Meter Assembly and is illuminated when the switch is in the ON-1 position.

Operation Control Switch (Super-Q Plus Systems)

This switch, located on the face of the Meg-O-Meter Assembly, controls the operation of the pump. To function, the Main Power Switch must be in the ON-1 position.

Operate position : In this position, the pump operates continually. Depending upon the position of the production valve, product water is sent either to the point-of-use, or is continually recirculated.

Standby position : In the standby position, the pump operates only during automatically timed flush cycles, once every one and a half hour for 4^{1/2} minutes.

Test Button

The Test Button is used to check if the Meg-O-Meter Assembly is functioning correctly. When the Test button is pushed, the Meg-O-Meter Assembly should read 10 megohm-cm. For Super-Q Plus Systems, perform the test when the Operation Control Switch is in the “Operate” position.

Production Valve (Super-Q Plus Systems)

This manually operated valve, located to the right of the sensor, directs the product water flow in either of two directions : to the point-of-use, or to the system’s recirculation loop. Standard Systems that require a recirculation loop must include a similar valve. The valve is open when the knob is turned anticlockwise to Product position, allowing water to flow to the final filter or point-of-use. The valve is closed when the knob is pointed up, to Recirculation position allowing water to recirculate through the system so that water quality is maintained at a high level.

NOTE: If, at anytime, the valve is disassembled, ensure that it is reassembled in the proper orientation.

Pressure Gauge

The pressure gauge is used to monitor pump discharge pressure. The maximum pressure limitation of the system is 80 psi (5.5 bar). Do not overtighten the pressure gauge into the housing head. To ensure a tight seal, the threads should be wrapped with on or two turns of Teflon tape.

Vent Valve

This manually-operated vent valve, located at the inlet side of the final housing head, is used to remove air from the housing bowls that might prevent total wetting of the membrane cartridge, thus limiting its efficiency.

B. Function of Expendables

Expendable cartridges are not provided with the preassembly hardware. The cartridges must be chosen based upon specific water quality requirements. Consult the Ordering Information Section of this manual, or Technical Service for the optimum combination required to meet your needs.

Milligard TP Cartridge

Milligard TP (thermoplastic) cartridges are high-retention-membrane-filter cartridge allowing to remove high particle loads from feed water. They are designed for clarification and prefiltration of fluids that require final filtering through 0.45 μm or 0.22 μm filters. The manufacturing process obviates the use of thermal sealing adhesives that could cause contamination of the product water. Flow through the Milligard-TP cartridge is from the exterior toward the central collecting tube. The arrow marked on the housing head should point to the right for correct flow through this cartridge.

Super-C Carbon Cartridge

Dissolved organic contaminants and residual chlorine are removed by activated carbon adsorption within the Super-C cartridge. The Super-C cartridge is always installed upstream of the deionizing (Ion-Ex Cartridge) elements to prevent organic-fouling of the ion-exchange resins. The possibility of dissolved minerals from the carbon entering the effluent stream and degrading final water quality will also be eliminated. Flow through the Super-C cartridge is from the exterior of the cartridge into the central collecting tube. The arrow marked on the housing head points to the right for proper flow through this cartridge.

Ion-Ex Cartridge

The disposable Ion-Ex Cartridge filter removes dissolved inorganic contaminants by ion-exchange in a highly efficient mixed bed of strong acid and strong base resins. This element is designed and constructed such as to prevent channelling through the resins. The cartridge is used to “polish” water to an 18 megohm-cm level of purity.

A series of two identical deionizing cartridge elements must always be located downstream of the Super-C Carbon cartridge and upstream of the final filter unit.

Organex-Q Cartridge (optional)

The Organex-Q cartridge is a unique mixture of ion-exchange resins and synthetic activated carbon for removal of trace organics. The Organex-Q cartridge is required when very low levels of organic in the water is desired. The cartridge is normally placed in the last housing bowl. This organic scavenging cartridge, composed of both mixed-bed resins and carbon, removes dissolved trace organic contaminants.

Durapore - TP 0.22 μ Cartridge

The Durapore-TP cartridge is designed specifically as a “final filter” for the removal of particles above 0.22 μ m and micro-organisms. The thermoplastic seal construction eliminates contamination from adhesive seals used in the construction of some cartridges. Flow through Durapore cartridges is from the exterior, through the membrane, and into the central collecting tube.

C. Standard Cartridge Installation

(Super-C, Ion-Ex, Milligard-TP and Durapore-TP cartridges)

1. Determine the proper cartridge configuration for your application.
2. Lightly lubricate the O-Ring on the first housing head with water.
3. Open the plastic wrapper of the Super-C cartridge and expose the cartridge-to-housing connection. Holding the cartridge by the wrapper, guide it into the housing head. Turn the cartridge about 1/4 turn and push firmly until the O-Rings are securely seated. Remove the plastic wrapper. The cartridge should be secured to the housing head.
4. Raise one of the housing bowls over the cartridge to the large O-Ring on the housing. With both hands, firmly grasp the bowl, push up and turn clockwise until the bowl is completely tightened and cannot be turned further.
5. Install and secure the V-clamp. Make sure that the knob is positioned to the side of the bowl so that it can be tightened completely without overtightening.
6. Secure the remaining bowls to the housing heads without installing cartridges. Ensure that they are tightly secured to the housings head assembly.
7. Plug the main power cord into the appropriate wall receptacle required, and open the feed water supply valve. Connect a length of flexible tubing to the outlet of the 3-way product valve and direct to drain.
8. Turn Pump Control switch to the “Operate” position, then turn main power switch to ON-1. Allow system to flush for 2 or 3 minutes to remove any superficial carbon fines from the Super-C cartridge.
9. Shut off main switch and turn the Pump Control switch to the “Standby” mode. Open bleed valve on head #4 to reduce pressure in system.
10. Remove, and empty, the last bowls and insert the other purification elements.
11. Repeat steps 3, 4, 5 and 8 of the installation procedure.

NOTE : If an Organex-Q cartridge is to be installed, please follow the installation procedure next page.

D. Organex-Q Cartridge Installation (into 4 bowls systems)

For applications requiring the use of the Organex-Q cartridge, this element is placed into the last bowl of Super-Q System.

1. Install the Organex-Q cartridge in the last housing bowl. (refer to steps 3 to 5 of the Standard Cartridge Installation Procedure).
2. Open the valve to the “Product” position (handle towards you), and return the Pump Control switch to “Operate”, and flush the system for fifteen minutes.
3. Flick the Pump Control switch to “Standby” ; turn off the Main Power switch ; and allow the system to stand idle for a minimum of at least one hour to hydrate the cartridge (better resistivity can be obtained if the system remains idle overnight).
4. The next morning (or after one hour), turn on the Main Power switch ; flick the Pump Control switch to “Operate” mode to start the pump, leaving the production valve in “Recirculation” position to allow water to recirculate.

The time required to reach high resistivity and organic-free water will vary, depending upon the condition of the cartridges, the pre-treated feed water characteristics, and the length of time the system has been inactive.

NOTE : To ensure the highest quality of water during operation, flush the system for five minutes after any recirculation period (as in standby) of over 12 hours.

It is advised to store non-used Ionex and Organex cartridges at 4°C and maximum 3 months.

MAINTENANCE

A Super-Q system can be kept in excellent operating condition with very little maintenance. Performance problems are, for the most part, due to improper cleaning and sanitization, or failure to replace exhausted cartridges.

A. Cartridge Replacement

The frequency with which cartridge elements require replacement depends essentially on the quality of the feed water to the system, the total and also relative amounts of particulate, organic, and ionic contaminants the system must remove. Since operating conditions vary so widely, no fixed general rule can be recommended. Practically speaking, the user should be guided by (a) the degree of plugging of the prefilter cartridge (if installed) and the final membrane cartridge ; (b) the level of resistivity obtained in the product water ; and (c) the level of organic removal achieved.

For optimum performance of the Super-Q System, and convenience, all cartridges should be replaced at the same time.

When ascertaining the degree of clogging of prefilter and membrane cartridges, it is necessary to record the pressure gauge readings (mounted on the top of the Super-Q heads) and the flow rate at the time all new cartridges are installed in the Super-Q System. Readings should be taken when the system is in the "Operate" mode. This is your baseline level and from pressure differential changes noted after operation, an evaluation of the need to change these filters can be made. It is important to note however that the Super-C, Ion-Ex cartridges and Organex-Q cartridges will be exhausted before they would be clogged. Therefore these elements are changed on the basis of their ionic, or organic removal performance only. The following guide should prove helpful for assessing the need to change cartridges.

The cartridges should be changed :

1. When the Meg-O-Meter scale indicator falls below 10 MΩ-cm or the desired resistivity level to a point unsatisfactory for your particular use. Purification media should not be left in the system for more than a year.
2. When the organic level in the product water exceeds that required for your particular use.
3. When a prefilter cartridge is installed in Bowl #1, and the pressure differential between the first and second gauges exceeds 10 psi (gauge #1 increases, gauge #2 remains the same). The prefilter is clogged.
4. With a membrane cartridge installed in Bowl #4, and the pressure differential between #3 exceeds 10 psi (gauge #1 and #2 will rise together while gauge #3 should remain the same).

NOTE 1 : When it is necessary to add a prefilter to the system, the cartridge may be installed in a separate holder (such as the Millipore PL Housing) or in the first bowl of your system, followed by a Super-C cartridge and Ion-Ex cartridge units, and a disposable membrane filter unit (such as a Millipak) connected to the outlet of your system. In the former case, install a pressure gauge on the upstream side of the housing, and read both this gauge and the next gauge of the system to ascertain the pressure differential across the prefilter. In the latter case, read gauge #1 and #2 as shown in 3 above.

NOTE 2: One pressure gauge is delivered with the system. Any other pressure gauge required should be ordered separately.

Cartridge Changing Procedure

Before proceeding, make sure the system is in “Standby” mode :

1. Turn off electrical power to the system.
2. To reduce the internal pressure, turn off the feed water flow and open the outlet valve, that has been diverted to drain.
3. Open the purge valve at the bottom of each housing to purge the system.
4. Remove the housing bowls by releasing the clamp, and twisting or rocking the bowl. Carefully lower the bowls from the cartridges.
5. Pull the cartridges straight down and discard them.
6. After cleaning the housing bowls (using the procedure that follows), replace the cartridges referring to the Cartridge Installation Procedure described in the Operation Section. Replace the elements in the proper sequence, flush the system, and resume operation.

B. Cleaning

When the cartridges are changed, examine the inside of the housing bowls for residues deposited on the walls. Clean the insides of the bowls with a non-abrasive detergent and a sponge or cloth. Thoroughly wash the inner surfaces of the bowls and the support structures. Rinse with clean water several times to completely remove all detergent residues before reassembling the system.

C. Sanitization

Sanitization should be done regularly to both the ultrafiltration cartridge (if used) and the system hardware (bowls and heads without cartridges).
Ion-Ex, Organex and Super-C cartridges CANNOT be sanitized.

The sanitization process includes :

1. Injection of a sanitant.
2. Soaking or recirculating the unit.
3. Flushing the residual chemicals.
4. Testing for complete removal of residual chemicals.
5. Recovery of water quality.

Super-Q Housing Sanitization

If slime deposits are detected inside the bowls and heads when cartridges are replaced, the entire system should be sanitized. This is especially important if a UF cartridge is used. It is also helpful to prevent premature microbial fouling of the cartridges.

To sanitize the bowls and heads :

1. Remove all bowls and cartridges.
2. Discard cartridges (except UF cartridge) and thoroughly clean all bowls and heads, following previous instructions in this manual.
3. Replace all bowls except one, without installing cartridges. Make sure all purge valves are closed.
4. Place 140 mL of household chlorine bleach (5,25% strength) in the remaining empty bowl, and secure this bowl to the final housing head.
5. Open the feed water supply valve and the production valve (if closed).
6. Start the pump.
7. When water begins to flow at the outlet, close the production valve and recirculate water for ten minutes.
8. Turn off the pump, close the feed water supply valve, and allow the system to stand idle for at least one hour. The water in the system should now have a chlorine level of about 200 ppm.
9. Purge all bowls.

10. Open the feed water and the production valve. When water begins to flow at the outlet, close the production valve and recirculate water through the system for two or three minutes.
11. Open the production valve and flush for approximately five minutes to remove residual bleach. Check the chlorine level of the water*.
12. When the chlorine level in the flush water is reduced to $< 0,1$ ppm (or the level of the feed water), shut off the system. Open the vent valve to allow the internal pressure to drop to zero. Purge and remove the bowls, install new cartridges, and proceed with normal system operation.

* High chlorine levels can be determined by using the DPD free-chlorine test kit, catalogue number : ZLCL000AH.

Low chlorine levels (0 - 3.5 ppm) can be determined by using the DPD free-chlorine test kit, catalogue number : ZLCL000AB.

ORDERING INFORMATION

Systems

<u>Description</u>	<u>Catalogue Number</u>
▲ <u>115V-60Hz</u>	
• 3-Bowl Super-Q System	ZFSQ 115 03
• 4-Bowl Super-Q System	ZFSQ 115 04
• 4-Bowl Super-Q Plus System (with Pump)	ZFSQ 115 P4
▲ <u>220V-50Hz</u>	
• 3-Bowl Super-Q System	ZFSQ 240 03
• 4-Bowl Super-Q System	ZFSQ 240 04
• 4-Bowl Super-Q Plus System (with Pump)	ZFSQ 240 P4

Expendables

<u>Description</u>	<u>Catalogue Number</u>
Milligard TP Cartridge, 3/pk	CWSC 02T P3
Super-C Carbon Cartridge, 3/pk	CDFC 022 03
Ion-Ex TP Cartridge, 2/pk	CPMB 022 02
Organex-Q TP Cartridge, 1/pk	CPEX 022 01
Durapore TP Cartridge, 1/pk	CVDI 02T PE
Pyrogard UF Cartridge, 1/pk	CDUF 022 01

Chlorine Test Kits

High levels of Chlorine DPD Free-Chlorine Test Kit	ZLCL 000 AH
Low levels of Chlorine (0-3.5 ppm) DPD Free Chlorine Test Kit	ZLCL 000 AB