

Merlin

on-demand Reverse Osmosis

...a revolutionary
pure water system

from  *GE Osmonics*



Warranty



Most warranties will be found in the back pages in small print. The Merlin warranty, like the system itself, is innovative in terms of water treatment products. A GE warranty has true meaning, one can be confident GE will be in a position to honour this warranty in years to come and years is what is on offer. Three years with residential use and one year in a commercial application (defined as greater than 75 lpd).

Like the warranty, certification is not hollow, the Merlin has been tested according to NSF/ANSI 58 for reduction of substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58. The substances are: Arsenic, Barium, Cadmium, Chromium (Hexavalent), Chromium (Trivalent), Copper, Fluoride, Lead, Nitrate, Nitrite, Radium 226/228, Selenium and TDS.

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Merlin

on-demand Reverse Osmosis

innovative water-purifier
reliable smart
low maintenance
packaged ready-to-go

- Up to 4,000 litres per day of purified water.
- Requires no pump, no electricity.
- On-demand without the need for water storage.
- Up to 75% less waste water.
- Compact, simple design.



DRINKING WATER

VENDING MACHINE

SPOT-FREE RINSE

ICE MAKER

GLASS WASH

LABORATORY

AQUATICS

CAR WASH

BOTTLED WATER

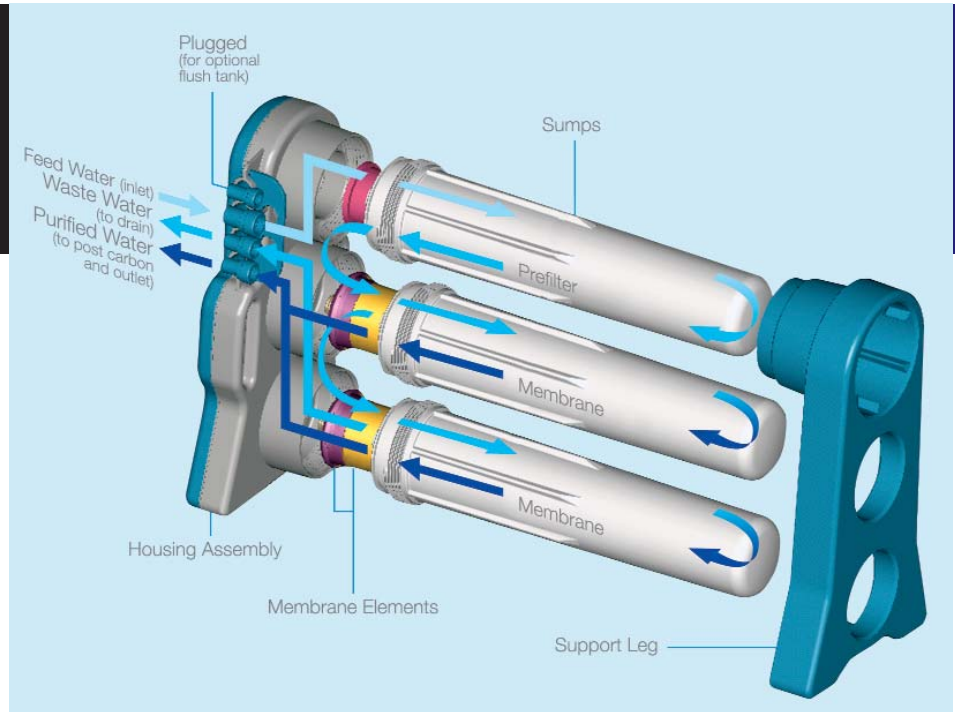


Merlin

on-demand Reverse Osmosis

In designing the Merlin, the complex assembly of conventional systems has been eliminated resulting in a simplistic leak-free unit. Membranes, cartridge and all componentry locate into a manifold that makes the Merlin less than two cubic feet in size, with just three simple push-fitting connections (even these are colour and symbol coded for absolute simplicity).

The Merlin system incorporates two, new-technology, high-flow membrane elements in series to produce an average of 1.9 lpm of purified water. With the concentrate from one element being channelled through the second, the waste water is reduced by approximately 75% compared to conventional systems.



up to
75% less
water waste



What is Reverse Osmosis?

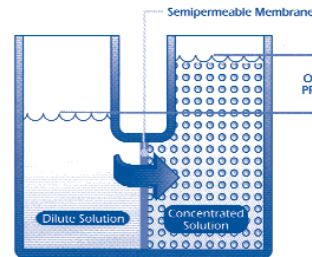


Arguably the most precious natural resource under threat today is water, more so safe, clean, consistently-reliable water. With the ever-growing demands of society today for, not only, human consumption but also numerous commercial and industrial applications our resource is “running dry”.

Purification goes beyond filtration removing minerals and impurities to create a water of a known quality to address the contamination issues of today.

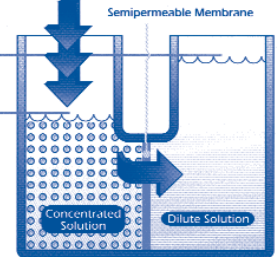
The Merlin Reverse Osmosis system is a truly innovative water treatment unit from GE Osmonics. It uses water pressure to reverse a natural physical process called osmosis. Water under pressure is forced through a semi-permeable membrane to separate out minerals and impurities from the pure water. In itself this technology is not new, GE Osmonics pioneered Reverse Osmosis 30 years ago, however, packaging Reverse Osmosis into a system of the Merlin size that can be used “on-demand” is new.

OSMOSIS
natural phenomenon



REVERSE OSMOSIS
with applied pressure

Applied Pressure to overcome osmotic pressure results in reverse osmosis.



“purification goes
beyond filtration”



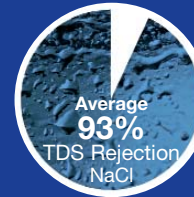
System performance

Carbon Contaminant Performance*	Average Reduction %
ALGAE	99.9
ATRAZINE	96
BENZENE	91
CHLORINE	95
EDBS	99
HERBICIDES / PESTICIDES	99
LINDANE	98
PCBS	99
PETROLEUM SOLVENTS	98
PARTICULATE	99.9
TANNINS	99
TASTE AND ODOUR	99+
THM'S	98

*When combined with membrane

Membrane Contaminant Performance	Average Reduction %
ARSENIC1 (pentavalent)	94.6
ALUMINIUM	98.5
AMMONIUM	92.2
BACTERIA	99.9+
BARIUM	98.3
CADMIUM	99.8
CALCIUM	97.3
CHLORIDE	93.5
CHROMIUM (VI)	97.9
CHROMIUM (III)	99.8
COPPER	97.8
CRYPTOSPORIDIUM CYSTS	99.9+
CYANIDE	91.7

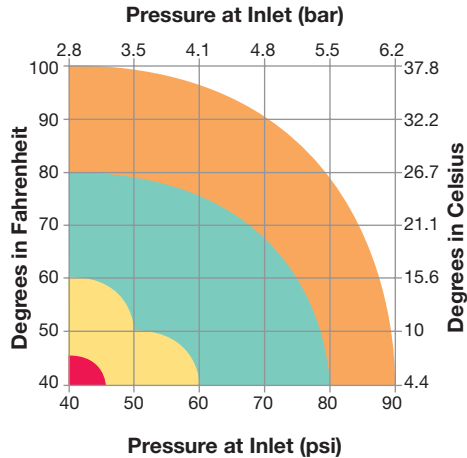
Membrane Contaminant Performance	Average Reduction %
FLUORIDE	93.7
IRON	97.8
GIARDIA CYSTS	99.9
LEAD	99.6
MAGNESIUM	98.2
MERCURY	97.9
NITRATE/NITRITE	78.4
PHOSPHATE	98.1
SELENIUM	97.8
SODIUM	94.4
SULPHATES	98.7
TOTAL DISSOLVED SOLIDS	89.7
ZINC	97.8



The Merlin Sweet Spot

Filter / Membrane Capacity

Filter type	Average Life
Carbon Prefilter	6 months (19,000 litres)
Membrane Element	2-4 years
Carbon Postfilter	6 months



The Merlin uses patented membrane technology to produce 5 times the flow of standard reverse osmosis systems. As with all reverse osmosis, pure-water production flow varies greatly depending on many factors. ☺ indicates optimum conditions.

- Red area** – will require a Merlin booster pump
- Yellow area** – low production, would benefit from a Merlin booster pump
- Green area** – optimum conditions for a balance of production quality and membrane life
- Orange area** – high production and quality, with a possibility of reduced membrane life

Minimum and Maximum Operating Conditions

Condition	Minimum	Maximum
Inlet Pressure	40 psi (2.76 bar)	80 psi (5.52 bar) ☺
Inlet Temperature	40°F (4.44°C)	100°F (37.78°C) ☺
Inlet TDS	50 mg/l ☺	2000 mg/l
Inlet Hardness	0 mg/l ☺	171 mg/l
Inlet Chlorine	0 mg/l ☺	1.0 mg/l
Inlet Iron	0 mg/l ☺	0.1 mg/l
Inlet Maganese	0 mg/l ☺	0.05 mg/l

Minimum
Permeate Flow Rate
0.33 gals/min
(1.25 Lpm)

Average
Permeate Flow Rate
0.50 gals/min
(1.89 Lpm)

Maximum
Permeate Flow Rate
0.75 gals/min
(2.84 Lpm)



Purified water - for drinking

Water is essential to the human body. While the body can last up to six weeks without food, it can last only a week without water. Water serves a variety of functions in the human body, including regulating body temperature, protecting and cushioning vital organs, removing waste and converting food into energy. Therefore, it is crucial to make sure that one drinks enough water so the body functions properly and productively.

Purified water helps these functions perform to the optimum without the added contamination that is present in most tap water.

- The brain is 75% water
- Water carries nutrients and oxygen to all cells in the body
- Muscles are 70-75% water
- Helps convert food into energy
- Protects and cushions vital organs
- Cushions joints
- Regulates body temperature
- Moistens oxygen for breathing



● Drinking

Pure, fresh-tasting, healthy water in a limitless supply for drinking, food preparation and cooking eliminates the need for expensive bottled water. The Merlin makes pure water viable on all occasions, for all to enjoy – kids, adults and pets too!



● Ice

Pure water creates a clearer ice cube, as the normal mineral salt contents that cause the cloudy effect are not present. Pure water also freezes quicker and on melting has no affect on taste or contamination of the liquid it is in.





Vending

Whether vending water from a cooler or using water in beverage vending equipment pure water is the essential ingredient. Taste and health reasons are key along with consistency, allowing the user a known expectation. Pure water also decreases maintenance requirements from scaling pipes and nozzle blockage, meaning less 'out of order' time and equipment that runs to temperature more accurately.



Table & Bottled Water

Restaurants and cafés can deliver pure water to tables at minimal cost.

Additionally, with minimal investment Merlin's water can be bottled and chilled to create a profitable revenue stream in catering establishments.



Tea & Coffee

98% of a cup of coffee or tea is water and a poor taste is more likely water quality than the bean or leaf. Bitter taste from heavy metals, taste and smell from chlorine and other chemicals are removed by the Merlin, as is the lime scale, to produce a clear scum-free beverage.



Salad & Vegetable Wash

Both commercially and in the home there are benefits in preparing and cooking vegetables and salads in pure water. Organic ranges especially, do not get contaminated at the last minute and boiling water that would normally concentrate impurities, no longer has detrimental effects on produce. Cryptosporidium is eliminated from water and foods for presentation are clearer with no lime scale deposits on the surface.

The Merlin's capacity to produce over 2.5 lpm of purified water makes it ideal for commercial water applications. In addition with a few simple push fittings, capacity can be increased to run Merlins in parallel, likewise multiple dispensing outlets can be created with a similar push fitting arrangement after the Merlin.

Post treatment with deionisation options enable consistent quality up to 18 megohm economically.

- Parallel Merlin connection for increased flow
- Deionisation treatment of up to 18 megohm quality
- Multiple dispensing locations
- Portable and mobile production
- Low TOC



• Car Wash

The hard work with a chamois is a thing of the past when rinsing a washed vehicle with spot free rinse water.

Unlike many cheap disposable units the Merlin provides continuous pure water normally requiring annual not weekly maintenance.



• Laboratory

Pure water systems in laboratories are essential but often expensive. Using the Merlin and post deionisation treatment, 18 megohm water can be achieved with low TOC, organic, bacteria and particulate counts – suitable as primary grade, deionised and general laboratory grade water.



• Spot-free

Normal water supply contains on average 300 ppm (parts per million) total dissolved solids (TDS), it is these mineral salts that cause spotting in many wash applications. As rinse water dries it evaporates into the atmosphere, anything that is not water remains deposited on the

surface thus creating a spot that impairs the finish on paint, glass, metals, etc.

By reducing TDS to below 50 ppm a spot-free rinse water is achieved. With the Merlin's average 93% TDS reduction an output of 20ppm is typical.



Ironing

The Merlin removes calcium, iron and rust from water. When used in an iron there is no scaling, improving the iron's efficiency. The result is no calcium, iron or rust deposits to damage and stain materials.

Battery Top-up

Deionised water is economically produced after the Merlin with post treatment. This final polishing stage can be a separate outlet whilst the standard reverse osmosis outlet continues to be used for other applications.



Renal

Renal dialysis equipment is fed with reverse osmosis quality water; within hospitals this is usually a large central system. To aid many patients today dialysis can be conducted from home where the Merlin is capable of delivering the required feed water quality without the bulk and cost of traditional water treatment systems.



Dentist

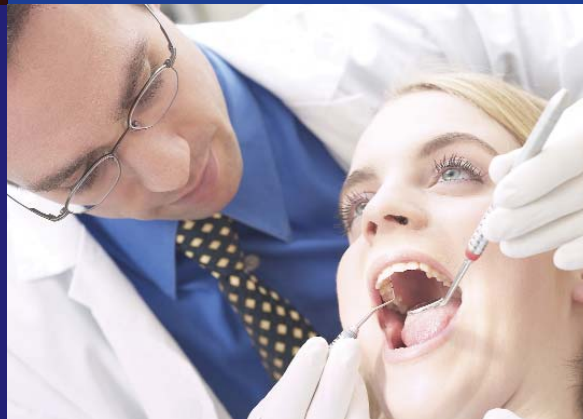
Contamination-free and bacteria-free water is produced by the Merlin making it ideal for dentistry rinse and instrument-fed requirements. Instrument autoclave is also economic with this multi-purpose pure water source.



Window wash

Recent health and safety regulations have encouraged 'pole-fed' window cleaning systems. Such equipment not only requires ultra-pure water as an aggressive cleaning agent but also high-grade spot-free rinse water.

This high-grade water eliminates the need for chemicals and the associated health and safety issues. The Merlin's high production and portability, along with the optional DI accessories, make it ideal for this growing application.





Glass/Metal Wash

The Merlin reduces TDS levels so mineral deposits are eliminated on product surfaces. Beneficial to glass manufacturers, commercial cutlery and drinking glass-washing businesses.



Plants

Like humans the consumption of contamination has detrimental effects on household plants. Many plants benefit from increased growth rate, durability and less wilt when using pure water. Yellow leaves, brown spots and dull leaves are also avoided with the removal of limescale.

Aquatic

Tap water commonly contains chlorine or chloramines as bacterial disinfectants, which even at low levels can be deadly to fish. Similarly tap water normally has excessive quantities of nutrients such as nitrate and phosphate, both algal nutrients that can cause major problems. Copper and lead traces from piping are harmful and deadly to invertebrates. Other heavy metals, pesticides, selenium and fluoride are all undesirable contamination for fish keepers. The Merlin addresses all these issues with the exception of the chloramines where an additional chloramine filter cartridge is required.





Merlin Booster Pump

For lower pressure and/or low temperature applications, a pressure activated booster pump, conforming to IP65, for the Merlin is available to improve system performance.

Installation is simple with 1/2" in-line, push-fitting connections. The pump will automatically turn on whenever the Merlin is producing water and off when not.

The Merlin booster pump is a variable speed pump designed to produce water pressure up to 80psi, regardless of the inlet pressure.



High Purity Flush System

For highly demanding applications that require an alternative method to lessen the effects of salt diffusion, a Merlin flush kit is available. This kit includes a small tank that connects to the 1/4" push-fitting on the Merlin. The kit forces permeate water from the membrane elements. By doing this, the system rests with low salt concentrations on both sides of the elements. Because low salt concentrations remain on each side of the membrane, salt diffusion is greatly reduced. The kit uses approximately 0.7 gallons (2.5 litres) of permeate water to flush the membrane elements each time it operates.



Pre Filtration

A pre-filter housing with 1/2" push-fitting connections is simply installed prior to the Merlin. In commercial and high turbidity applications a GE Osmonics 5 micron pre-filter is recommended (code ROSave 5-9 7/8"). This inexpensive cartridge will protect and prolong the life of the more expensive carbon filter and membranes.

Where reduction of chloramines is required the same filter housing can be used with a cartridge (code Chlorplus 10) designed for 45,000 litre reduction from 2ppm to 0.5ppm.

For commercial or well applications where there is a 0ppm chlorine feed the pre-carbon filter can be replaced with a 10 micron particulate cartridge.



Post De-Ionisation

The reverse osmosis element of the Merlin reduces TDS levels at an average rejection of 93%, typically outputting 20ppm. Deionisation is most cost effective at this level and there are many DI resins available in cartridge and cylinder format for varying degrees of treatment. In cartridge format, three sizes are available. All 3 kits come complete with 3/8" push-fitting housing, wall bracket, spanner and FDA compliant DI cartridge to produce 16 megohm water that has low TOC levels due to post production steps.

Post DI 10" capacity 17,500mg TDS as CaCO₃
 Post DI 20" capacity 38,800mg TDS as CaCO₃
 Post DI BB 20" capacity 120,000mg TDS as CaCO₃

Two cylinder sizes are available, all with 3/8" push-fitting connections. Cylinders offer higher capacities than cartridges at 18 megohm and more economic change-out, however cartridge change-out is more convenient and less time consuming.

DI Cylinder 8" x 17" capacity 300,000mg TDS as CaCO₃
 DI Cylinder 8" x 35" capacity 750,000mg TDS as CaCO₃





The Merlin is a complete system ready to install out of the box. The only extra fitting required will be a feed connection, typically a 15mm x 15mm x 1/2" tee with stop valve, although there are many variations dependent on pipe size, location and preference. Installation should comply with the local plumbing codes. For installation of extra taps, running Merlin in parallel and other custom installations a range of simple push fittings and tubing is available. Call the Merlin helpline or contact your installer for advice on the required fittings for customisation.



Push-fitting Connections

Sea Tech fittings connect multiple materials (copper, CPVC, PEX, CDPE, HDPE) without the need for special tools and can be simply made into manifolds.

Measure water quality

To measure water quality output a TDS meter is recommended.



Multi Location Extra Mini Tap (above)

With the high production rate of the Merlin and low pressure loss across the membranes the pure water outlet can be fed to multiple locations. Fit a 'T' piece (3/8 x 3/8 x 1/4) in-line and connect a mini tap that operates at the push of a lever. Mini tap comes complete with 1/4" tubing attached.

Inclusive Tap (pictured below)



Stainless Steel Button Tap (above)

For either visual or high purity reasons these two stainless steel taps are available. The Button Tap is a one-way pillar tap with push button operation, with the Lever Tap having a variable flow lever. Both have 1/4" connections and can also be used for multi location dispensing.

Stainless Steel Lever Tap (pictured below)





Tri Flow Dual Cross Tap



Tri Flow Mixer Tap



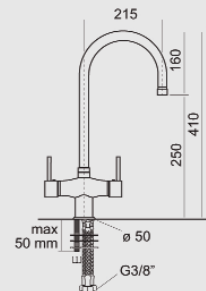
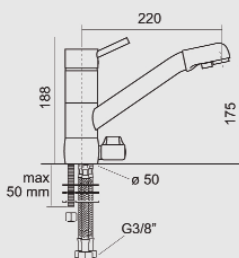
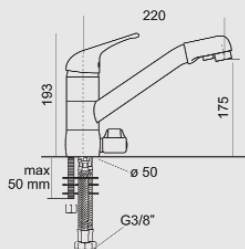
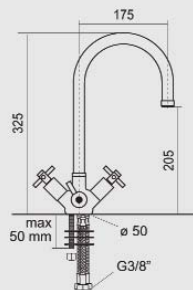
Tri Flow Mixer-Lever Tap



Tri Flow Dual-Lever Tap



As standard, the Merlin system is complete with a mini tap that is generally positioned on the side of a sink and operated by depressing a small lever to dispense water as required. One of four stylish 'Tri-flow' taps can be used to eliminate the need for the standard mini tap. The 'Tri-flow' range operates as a normal mixer tap but has a third handle to dispense pure water from the same spout. Even though pure water is dispensed from the same spout it is through a separate nozzle so as not to be contaminated by unpurified water. The standard 'Tri-flows' have a chrome finish with optional matt chrome and brushed nickel.



Contact details

Merlin Helpline Contacts

Tel: 0800 0133 853
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Web: www.merlin-ro.co.uk

Merlin Documents – available on-line or on request

Installation Guide
Application Guide
Flow Calculator
Performance Data
Warranty Documentation

Merlin distributor:

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