Calmag
Calming troubled waters

Celebrating 10 years of quality water at quality prices
Calmag Calming troubled waters

COMMERCIAL/INDUSTRIAL

Ultra Violet Disinfection...

...Water Filters and Reverse Osmosis

UNIQUE IN DESIGN
UNIQUE IN OPERATION

Calmag GUARANTEE

Where to use Ultra Violet units

1. Private Water Supplies

In general terms a private water supply is any water supply which is not provided by a water company. It is not a "mains" supply. About 1% of the population of England and Wales have private water supplies to their homes.

Most private supplies are situated in the more remote, rural parts of the country. The source of the supply may be a well, borehole, spring, stream, river, lake or pond. The supply may serve just one property or several properties through a network of pipes.

UK Water Supplies

Most homes in the UK receive their water from a public (mains) water supply. In England and Wales the water is supplied by the privatised water companies, and in Scotland by three public authorities and in Northern Ireland, by the Department of the Environment.

Approximately one percent of the population of England and Wales are served by some 100,000 private water supplies. In Scotland there are about 38,000 private supplies. In most cases the water is drawn from a well, spring, river or lake.

Many of these private water supplies will not have received prior treatment at a water works which means that the water is unlikely to meet the standards set by the Private Water Supplies Regulators. In such cases, water disinfection by Ultra Violet light is the easiest and most cost effective option open to those responsible for the supply.

New Private Water Supply Regulations*

Regulations on private water supplies in England and Wales were introduced in 1991 and were replaced by new Regulations introduced early in 2010. The new Regulations apply to all who own or use a private water supply. The new Regulations have been introduced to ensure that water from private supplies is wholesome, so that people who drink water or consume food or drinks made from private supplies may do so without risk to their health.

Local authorities are responsible for regulating private water supplies used for domestic purposes (such as drinking, cooking, and washing) in both domestic and commercial premises.

Where a private water supply is used:

- For more than one house
- For commercial purposes in premises including, food businesses, Bed and Breakfast, dairy farms, holiday rentals, a workplace (where you employ other people)
- In a public building

A professional from your local authority will visit to inspect the supply and take water samples, generally from your kitchen tap. They can make a charge for this.

If the house you and your family live in is the only property supplied by a water source, and only your family drink the water, the local authority will only take a sample if you ask them to. They can charge for this service. If you are a tenant on a private water supply, you can also ask your local authority to investigate your supply if you think there could be a problem.

What sort of things can affect the water quality?

Even if water looks clear, untreated water can contain microorganisms (from animal droppings or human sewage) or chemical contamination which may not be detectable by taste or smell.

Some microorganisms, such as coliforms, just indicate that contamination may be present. Others, such as Cryptosporidium, Giardia, Camplyobacter and E.coli O157 can cause vomiting and diarrhoea or more severe illness in some cases.

The effects of chemicals depend on the type and amount of chemical present. One common concern relates to lead, which is dissolved from lead pipework, and can impair childhood development. Children with higher levels of lead in their bodies tend to have difficulties with learning and behaviour.

Who could be affected?

You, your family and visitors to your home or business all have a right to expect clean, safe drinking water.

Many private water supplies meet the regulatory requirements in England and Wales. However, there are a number of groups who may be at risk from microbiological contamination in a private water supply, such as visitors and employees who normally drink mains water at home and people with a weakened immune system.

What can the local authority do to help?

Local authority staff will implement the Regulations, do the testing and give you the results. The changes in the Regulations mean that these staff also need to carry out a risk assessment of your private water supply, from the source to the tap. This risk assessment looks at the source of the supply and the surrounding area to see if contamination is possible. It also involves checks of the storage tanks, any treatment systems and the pipework. The risk assessment identifies actual and potential hazards that may affect the health of those drinking the water, so that you can take action to make sure your water supply is safe to drink. Where the water is found to be unsafe, the local authority must ensure that the supply is improved by the owners or people who control the supply.

Ultra Violet Disinfection

Where to use Ultra Violet units, cont...

What sorts of improvements might be needed?

Improvements might be required at the source itself, or to the pipes or fittings inside your home, for example;

- Repairing the system to prevent dirty water, animals or their droppings entering the water e.g. by sealing the roof slabs on collection chambers, fencing around the source and digging a drainage ditch to stop surface water or water just below the surface entering the supply,
- Installing an appropriate water treatment system to ensure satisfactory microbiological quality and where required, water filters (to remove iron, nitrates, manganese etc).
- Replacing lead pipes throughout the property is the only completely effective way to reduce the lead levels in your drinking water supply. If the pipe underneath your kitchen sink is dull-grey and is easy to scratch leaving shiny marks then it is likely to be lead. Lead pipes can also be found in the pipe leading up to your house. Ensure that lead solder and fittings are not used in any plumbing work.

What you can do.

Make sure you know where your water comes from and how it reaches your tap. Knowing this can help you understand what could cause a problem.

- Clarify who is responsible for maintenance of the supply. Contact the owners of the land where the source is, and discuss your supply with them, and where the source, tank/s and pipework are.
- Clarify who is responsible for the whole supply system including water treatment equipment and that it is maintained according to manufacturer's instructions.

Where you can get help.

From your local authority and the following links to web sites www.privatewatersupplies.gov.uk and www.dwi.gov.uk or alternatively call Calmag on 01535 210320 and we will endeavour to answer your questions.

Please also visit www.calmagltd.com for further information on our range of products.

* Taken from published information

Ultra Violet Disinfection

2. In commercial outlets - ACOP guidance

Essential information for providers of accommodation.

The revised Approved Code of Practice (ACOP) and guidance to Legionnaire's disease has some important changes that could affect you as a provider of residential accommodation.

A wide range of organisations, groups or self-employed individuals who provide residential accommodation will be responsible for the water system in their premises, and include:-

Local Authorities;
Universities;
Housing associations, including housing companies;
Charities;
Hostels;
Landlords in the private renting sector;
Managing agents;
Hoteliers, B&B, guest house and holiday camp owners;
Caravan and camping site owners, including fixed caravan sites.

All providers should be aware of their responsibilities to ensure that the risk from exposure to legionella in your premises are controlled correctly.

Legionella and Legionnaire's disease

Legionella are bacteria that are common in natural (rivers and lakes, etc) and artificial water systems, eg, hot and cold water systems (storage tanks, pipework, taps and showers).

We usually associate legionella with larger water systems, eg, in factories, hotels, hospitals and cooling towers, but they can also live in smaller water supply systems used in homes and other residential accommodation.

Other potential sources of legionella include:-

Spa and whirlpool baths,
Humidifiers (in factories)
Fire-fighting systems (sprinklers and hose reels).

Legionella can survive in low temperatures, but thrive at temperatures between 20°C and 45°C. High temperatures of 60°C and over will kill them, but water at higher temperatures can also lead to problems of scalding in, for example care homes.

Legionnaires' disease is a potentially fatal form of pneumonia caused by the legionella bacteria. It can affect anybody, but some people are at higher risk including those over 45, smokers and heavy drinkers, those suffering from chronic respiratory or kidney disease, and people whose immune system is impaired.

Legionellosis is the collective name given to the pneumonia-like illnesses caused by legionella bacteria, including the most serious and well-known Legionnaires' disease, and also the similar but less serious conditions of Pontiac fever and Lochgoilhead fever.

Where to use Ultra Violet units, cont...

It should be possible to assess the risk, either individually or through advice via a Consultant, but considerations must include the following:-

- Are conditions right for the bacteria to multiply, eg, is the water temperature between 20°C and 45°C?
- Are there areas where stagnant water occurs (deadlegs), eg, pipes to a washing machine that is no longer used?
- Are there infrequently used outlets, eg, showers, taps?
- Is there debris in the system, such as rust, sludge or scale (often a problem in old metal cisterns), that could provide food for growing legionella?
- Are there thermostatic mixing valves that set a favourable outlet temperature for legionella growth?
- Are any of your employees, residents, visitors, etc, vulnerable to infection, eg, older people, those already ill?

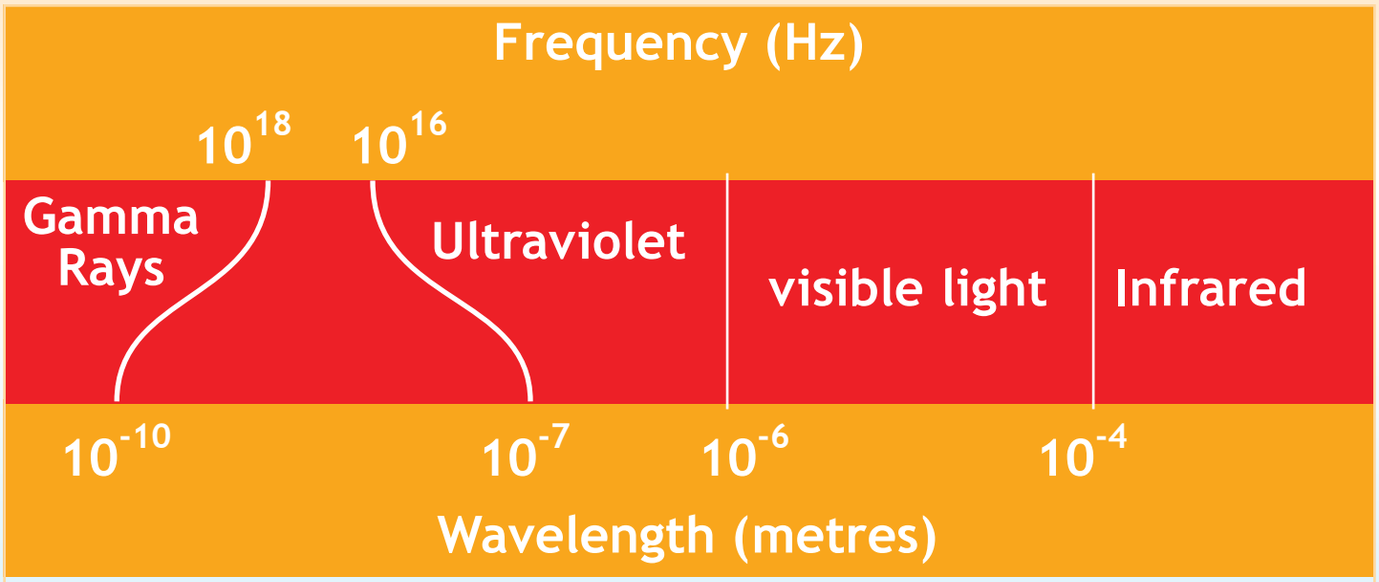
Answering 'yes' to any of these questions suggests there is an increased risk of your residents being exposed to legionella and falling ill.

Recommended Maximum Concentration Levels

Before Ultra Violet for Standard Applications

Turbidity	< 1NTU
Suspended	< 10 ppm
Colour	None
Iron	< 0.3 ppm
Manganese	< 0.05 ppm
pH	6.5 - 9.5
Hardness	< 120 ppm
Hydrogen Sulphate	< 0.05 ppm
Tannins	< 0.1 ppm

Electromagnetic Spectrum



Ultra Violet light is the region of the electromagnetic spectrum that lies between visible light and x-rays. It is invisible to the naked eye.

1. 350-400 Nm.....U VA - higher/long wave (tanning lamps)
2. 280-315 Nm.....U VB - medium
3. 240-280 Nm.....U VC - short wave
4. 185 Nm.....Vacuum UV - specialised, ie. oxidation

Water born organisms

EXPOSURE UWSEC/CM² REQUIRED FOR 99% DESTRUCTION OF MICRO ORGANISMS

BACTERIA	KILL RATE
Bacillus Anthracis	8700
Corynebacterium Diptheriae	6500
Dysentery Bacilli	4200
Escherichia Coli	7000
Legionella Bozemanii	3500
Legionella Dumoffi	5500
Legionella Gormanii	4900
Legionella Micdadei	3100
Legionella Longbeachae	2900
Legionella Pnemophila (Legionnaires Disease)	12300
Mycobacterium Tuberulosis	10000
Pseudomonas Aeruginosa (Laboratory strain)	3900
Pseudomonas Aeruginosa (Environmental strain)	10500
Salmonella (Food poisoning)	10000
Salmonella Typhosa (Typhoid fever)	7000
Shigella Cysentariae (Dysentery)	4200
Shigella Flexneri (Dysentery)	3400
Staphylococcus Epidermidis	5800
Staphylococcus Faecalis	10000
Viridans Stretococci	3800
Vibro Comma (Cholera)	6500

VIRUSES	KILL RATE
Bacteriophage (E-coli)	6600
Hepititis	8000
Influenza	6600
Poliomyelitis (Polio virus)	7000

ALGAE	
Chlorella Vulgaris	22000

Once identified, Ultra Violet Disinfection provides the ultimate method to sterilising a contaminated water supply.

Note: All Calmag units are sized at an output of 30,000 µW/cm²

Ultra Violet Disinfection

CalUltra

UNIQUE IN DESIGN
UNIQUE IN OPERATION

CalUltra 12 - CalUltra 79

DOMESTIC AND LIGHT COMMERCIAL UNITS

CONTROL YOUR OWN WATER QUALITY!

If you are unsure of the microbiological quality of your source water or if you are looking for additional security from your water source, then Calmag has the solution in the CalUltra series of domestic and light commercial UV systems.

UV technology is proven to control microbiological (bacteria & virus) issues in water including E.coli, Cryptosporidium and Giardia lamblia.

Truly modular in design, the CalUltra allows easy upgradeability in the future. Want to wait to install a UV monitor? - no problem with the CalUltra systems. Flexibility plus a colour user interface with a multitude of screens displaying diagnostics, status, warnings and even QR codes for a link back to Calmag's website, the CalUltra systems introduce a technology never before seen in a UV system!

PRODUCT FEATURES

- Colour user interface with full diagnostics and warnings including QR codes
- "Future-proof" expandability port for future upgrades and options
- Single ended, 304 stainless steel, polished reactors. Systems include an intergral sensor port to allow for sensor upgradability in the future
- Designed & manufactured to ASME pressure vessel standards
- Flow rates stated at 95% UVT at a dose of 30mJ/cm^2
- User friendly bayonet style lamp connector (quick ¼ turn removal with no extra tools needed)
- Reliable, industry proven low pressure (LP) coated UV lamps with ceramic bases for durability and a 9000 hour life (1 year)
- Constant current electronic controller (one controller for all systems) in a splash-proof case

SAMPLE SCREEN SHOTS

Home Screen Lamp Life Remaining Screen

Lamp Expiration Screen

Unsafe Water Screen

QR Code Screen

Domestic & Light Commercial

CalUltra Specifications

	CALMAG YORKSHIRE LIMITED EQUIPMENT SPECIFICATIONS			
	CalUltra domestic ultra violet systems			
MODEL	**CalUltra 12**	**CalUltra 22**	**CalUltra 41**	**CalUltra 79**
Flow Rate (@16 mJ/cm²)	6 GPM 23 lpm 1.4 m³/hr.	11.0 GPM 42 lpm 2.5 m³/hr.	20 GPM 77 lpm 4.6 m³/hr.	39.2 GPM 150 lpm 8.9 m³/hr.
Flow Rate (@30 mJ/cm²)	3 GPM 12 lpm 0.7 m³/hr.	5.8 GPM 22 lpm 1.3 m³/hr.	11 GPM 41 lpm 2.5 m³/hr.	21 GPM 79 lpm 3.6 m³/hr.
Flow Rate (@40 mJ/cm²)	2.4 GPM 9.1 lpm 0.7 m³/hr.	4.4 GPM 17 lpm 1.0 m³/hr.	8.2 GPM 31 lpm 1.9 m³/hr.	16 GPM 59 lpm 3.6 m³/hr.
Port Size	½“ MNPT	¾“ MNPT	¾“ MNPT	1“ MNPT
Electrical	230-240V./50-60Hz			
Plug Type	British Standard, BS1363			
Lamp Watts	15	22	39	42
Power (watts)	20	30	49	51
Replacement Lamp	BULB-B12	BULB-B22	BULB-B41	BULB-B79
Replacement Sleeve	SLEEVE-QS12	SLEEVE-QS22	SLEEVE-QS41	SLEEVE-QS79
Unit Dimensions	2.5 x 13.5” (6.4 x 34.2 cm)	2.5 x 20.5” (6.4 x 52.2 cm)	2.5 x 34.3” (6.4 x 87.2 cm)	2.5 x 36.1” (6.4 x 91.7 cm)
Chamber Material	Polished 304 Stainless Steel, A249 Pressure Rated Tubing			
Controller Dimension	6.8 x 3.6 x 3” (171.5 x 92.1 x 76.2mm)			
Maximum Operating Pressure	8.6 Bar (125 psi)			
Optimum Water Temperature	2-40° C (36-104° F)			
UV Monitor Port (upgradeability)	No	Yes		
Solenoid Output	Yes, but requires optional solenoid module			
4-20 mA Output	Yes, but requires optional 4-20 mA module			
Lamp Change Reminder (audible & visual)	Yes			
Lamp-Out Indicator (audible & visual)	Yes			
Board Mounted	Yes	Yes	No	No
Pre-filter Included	Yes	Yes	No (Recommended)	No (Recommended)
Cartridge Included	Yes 5 micron House S	Yes 5 micron Max S	No	No

* Note: Larger Systems available upto 2360l/m

CalUltra Specification

CalUltra

UNIQUE IN DESIGN
UNIQUE IN OPERATION

CalUltra 132 - CalUltra 662
COMMERCIAL UNITS

If microbiological protection is required for your commercial/industrial application then Calmag has the solution in the CalUltra series of ultraviolet disinfection systems.

Unsure about needing a UV sensor or if regulations require you to add a sensor? There is no need to replace the entire system - simply add a UV sensor module to the CalUltra as it comes with an integral sensor port built-in! Plug the optional UV sensor into the pre-wired controller and the UV intensity will be displayed on the LED output.

Constructed with highly polished 316L stainless reactors and industrial grade enclosures, the CalUltra uses proven low pressure amalgam (LP-AM) offering stable output in both hot and cold water applications. Whether you are looking to control microbiological (bacteria & virus) issues in both hot or cold water with UVT levels as low as 50% or to reduce TOC in industrial grade waters, Calmag has it covered.

Covering a wide variety of applications in both regulated and unregulated markets, CalUltra offers environmentally friendly disinfection at lower capital and operating costs than traditional disinfection solutions.

PRODUCT FEATURES

- Modular control panel with LED display for remaining lamp life, total running hours, audible & visual lamp failure, remote on and solenoid ready
- 316L stainless steel, polished reactors with integral sensor port to allow for sensor upgradeability in the future (comes standard with visual glow plug)
- Designed & manufactured to ASME pressure vessel standards
- Flexible vertical or horizontal installation
- Uniform lamp output in both hot or cold applications
- Reliable, industry proven low pressure amalgam (LP-AM) coated UV lamps with ceramic bases for durability, 12,000 hour lamp life
- User friendly bayonet style lamp connector (quick ¼ turn removal with no extra tools needed)
- True gland seal retaining nut (no o-ring deformation as in competitive systems)
- Constant current electronic ballasts in a splash-proof (IP-54) case with audible and visual lamp failure indicators
- Splash proof ABS control box with constant current electronic ballast

FLEXIBLE APPLICATIONS

DISINFECTION

Choose your required dose for application that include restaurants, nursing homes, campgrounds, agricultural, food service, schools, marine, etc.

HOT WATER

For use in hot water applications including recirculation loops, showers, cooling towers, etc., designed for the reduction of legionella

LOW UVT

For applications where water quality may approach 70% or less, choose the LOW UVT systems to increase the operational performance and reduce nuisance alarms.

TOC

For the reduction of TOC (total organic carbon) using UV lamps at 185 nm output

Light Commercial

CONTROL FEATURES

Lamp Connector - Troublesome lamp changes and broken sleeves no longer with CalUltra's lamp connector. Lamp changes with an effortless 1/4 turn of the connector - no fumbling with metal clips as in competitive systems.

Expandability Port (Included) - IEP "infinite expandability port" allows for system upgrades and "future-proofing". New options and expansion modules can communicate with main circuit board through this port.

Remote Monitoring (Dry Contacts) Output (capability only) (Included)
Allows for the dry contact signal (on/off) provided by the CalUltra controller to be sent to a remote location. Can be used for remote-on, solenoid connection, PLC connection, remote alarm, remote visual, or many other options.

Remote Monitoring Cable (Optional)
Connector and 10 m (33') of cable to remotely control the CalUltra dry contact signal.

UV Sensor Port (Included)
All CalUltra 132-662 units include an integral UV sensor port for future upgradeability.

UV Sensor Module (Optional)
Allows for the 254nm UV wavelength to be measured and displayed via the controller. Sensor plugs directly into the controller and is mounted in the integral sensor port located on all units.

Case Study

SOLUTIONS FOR BUSINESS USING THE CALULTRA VIOLET UNIT

ULTRA VIOLET DISINFECTION FOR BOREHOLE WATER

Customer
EPS Plumbing Services Private Residence in Grassington, North Yorkshire

Installation
CalUltra 66 Ultra Violet Disinfection, pH Correction Unit and Water Filters

Application
8 bedrooms & 5 bathroom converted country barn house on private water source.

Problem
Due to the property having a borehole water supply a suitable water treatment system was required to provide clean, safe water free of contaminants such as E-coli, a major contributor to the caused of Legionella.

Resolution
Calmag worked very closely with the contractor conducting water tests to determine water quality and thus diagnose the most cost effective solution.

CalUltra Ultra Violet Water Disinfection and Water Filters solved the risk.

CalUltra 132 - CalUltra 662 cont..

COMMERCIAL UNITS

CalUltra Specifications

	CALMAG YORKSHIRE LIMITED EQUIPMENT SPECIFICATIONS					
	CalUltra commercial ultra violet systems					
MODEL	**CalUltra 132**	**CalUltra 220**	**CalUltra 322**	**CalUltra 416**	**CalUltra 530**	**CalUltra 662**
Flow Rate (@30 mJ/cm²) @ 95% UVT	35 GPM 132 lpm 8.0 m³/hr.	58 GPM 220 lpm 13.2 m³/hr.	85 GPM 322 lpm 19.3 m³/hr.	110 GPM 416 lpm 25.0 m³/hr.	140 GPM 530 lpm 31.8 m³/hr.	175 GPM 662 lpm 39.7 m³/hr.
Flow Rate (@16 mJ/cm²) @ 95% UVT	66 GPM (250 lpm) (15.0 m3/hr.)	109 GPM (413 lpm) (24.8 m3/hr.)	167 GPM (632 lpm) (37.9 m3/hr.)	207 GPM (784 lpm) (47.0 m3/hr.)	263 GPM (995 lpm) (59.7 m3/hr.)	327 GPM (1240 lpm) (74.3 m3/hr.)
Flow Rate (@40 mJ/cm²) @ 95% UVT	27 GPM (102 lpm) (6.1 m3/hr.)	44 GPM (167 lpm) (10.0 m3/hr.)	67 GPM (252 lpm) (15.1 m3/hr.)	84 GPM (318 lpm) (19.1 m3/hr.)	106 GPM (401 lpm) (24.1 m3/hr.)	131 GPM (496 lpm) (29.8 m3/hr.)
Port Size	1½”	2”	2”	2½”	3”	4”
Electrical	230-240V / 50-60Hz			230-240V / 50-60Hz		
Plug Type	British Standard, BS1363			British Standard, BS1363		
Lamp Watts	104	152	207	304	344	414
Power (watts)	120	170	220	320	360	430
Replacement Lamp	Bulb-B132	Bulb-B220	Bulb-B322	Bulb-B416 2 Required	Bulb-B530 2 Required	Bulb-B662 2 Required
Replacement Sleeve	Sleeve-QS132	Sleeve-QS220	Sleeve-QS322	Sleeve-QS416 2 Required	Sleeve-QS530 2 Required	Sleeve-QS662 2 Required
Chamber Material	316L Stainless Steel, A249 Pressure Rated Tubing, Polished & Passivated					
Controller Dimension	11.8 x 7.9 x 6.3” (30.0 x 20.1 x 16.0 cm)					
Maximum Operating Pressure	10.3 Bar (150 psi)					
Optimum Water Temperature	2-40° C (36-104° F)					
UV Monitor	Upgradeable, includes visual glow plug					
Remote-On	Yes					
Dry Contacts (Solenoid)	Optional					
4-20 mA Output	Optional					
Lamp Age Counter	Yes					
Lamp Out Indicator	Yes					

* Note: Calmag strongly recommends that a pre-filter is installed prior to any ultra violet unit.
Please call for details and recommendations.

CalUltra Specification

CalUltra

UNIQUE IN DESIGN
UNIQUE IN OPERATION

CalUltra 1500 - 2400

HEAVY COMMERCIAL/INDUSTRIAL UNITS

Calmag's line of disinfection systems are specifically designed and built to handle the challenging environments of process and manufacturing industries as well as pool and leisure applications.

Unsure about needing a UV sensor or if regulations require you to add a sensor? There is no need to replace the entire system - simply add a UV sensor module as it comes with an integral sensor port built in! Plug the optional UV sensor into the pre-wired controller and the UV intensity will be displayed on the LCD output.

Constructed with highly polished 316L stainless steel reactors and stainless steel enclosures, the CalUltra uses proven low pressure amalgam (LP-AM) lamp technology for maximum power density and efficiency all in a small footprint.

Controlling microbiological (bacteria & virus) issues in water (or other viscous fluids), including E.coli , Cryptosporidium and Giardia lamblia is safe and simple with Calmag's UV systems. UV does not affect the aesthetic quality of the fluid and the process does not add anything to the fluid, nor create any disinfection by-products.

Covering a wide variety of applications in both regulated and unregulated markets, CalUltra offers environmentally friendly disinfection at lower capital and operating costs than traditional disinfection solutions.

APPLICATIONS INCLUDE:

- Food and Beverage
- Pharmaceutical
- Swimming Pool
- Water recycling
- Agricultural
- Ultrapure

PRODUCT FEATURES

- Modular 304 stainless steel control panel with LCD display for remaining lamp life, total running hours, audible & visual lamp failure, remote-on and dry contacts
- 316L stainless steel, polished reactors with flanged end-plate
- Designed & manufactured to ASME pressure vessel standards
- Flow rates stated at 95% UVT at a dose of 30 mJ/cm2
- User friendly bayonet style lamp connectors (quick ¼ turn removal with no extra tools needed)
- True gland seal retaining nuts with positive stop
- Reliable, industry proven low pressure amalgam (LP-AM) coated UV lamps with ceramic bases for durability and a 12,000 hour lamp life
- Constant current electronic ballasts

CONTROL FEATURES

- Individual lamp status indicators (visual & audible failure indicators)
- Lamp age monitor (visual & audible failure indicators)
- Lamp cycle counter (tracks total on-off lamp cycles)
- Service time monitor (tracks total system running time)
- Chamber temperature monitor (monitors high temperatures and no flow conditions)
- Panel temperature monitor (protects electronic circuits from extreme temperatures)
- Remote on/off feature (allows reactor to be controlled remotely and timed with other system components)
- Automatic reactor shut-down (user configurable)
- Dry contact ouputs
  - Minor alarm (NO/NC)
  - Major alarm (NO/NC)
  - Reactor ready (valve control feature)(NO/NC)
- Major alarm output (audible & visual)
- Minor alarm output (audible & visual)

Heavy Commercial / Industrial

CalUltra 1500 - 2400 cont...

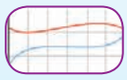
HEAVY COMMERCIAL/INDUSTRIAL UNITS

SYSTEM FEATURES

UV Sensor Port - Included
All units include integral UV sensor ports for future upgradeability. Simply remove the plug and affix the optional UV sensors!

UV Sensor Module - Optional
Allows the 254nm UV wavelength to be measured and displayed via the contoller. The sensors plug directly into the contoller and are mounted in the sensor ports located on all units.

Remote Monitoring (Dry Contacts) Output
Allows for the dry contact signal (on/off) provided by the controller to be sent to a remote location. Can be used for remote on, solenoid connection, PLC connection, remote alarm, remote visual, or many other options.



Expandibility Port - Included
Integral communication port allows for system expandability and “future-proofing”. New options and expansion modules can communicate with main circuit board through this port.

Case Study

SOLUTIONS FOR BUSINESS USING THE CALULTRA VIOLET UNIT

ULTRA VIOLET DISINFECTION AT COUNTRY HOTEL

Customer
Flodigarry Maintenance Team
Flodigarry Country House Hotel, Isle of Sky

Installation
CalUltra 100 Ultra Violet Disinfection Unit

Application
5 star country hotel in remote Scottish island location.

Problem
Removal risk of Legionella within the hotel’s private water supply

Resolution
Calmag provide diagnosis of the relevant solution, product and installation assistance to ensure compliance with local water regulations.

The installation of CalUltra Ultra Violet Water Disinfection solved the risk.

Heavy Commercial / Industrial

CalUltra 1500 - 2400

HEAVY COMMERCIAL/INDUSTRIAL UNITS

CalUltra Specifications

	CALMAG YORKSHIRE LIMITED EQUIPMENT SPECIFICATIONS	
	CalUltra commercial ultra violet systems	
MODEL	**CalUltra 1500**	**CalUltra 2400**
Flow Rate (@16 mJ/cm²)	758 GPM 2870 lpm 172 m³/hr.	1170 GPM 4420 lpm 265 m³/hr.
Flow Rate (@30 mJ/cm²)	404 GPM (1500 lpm) (91.8 m3/hr.)	623 GPM (2400 lpm) (141 m3/hr.)
Flow Rate (@40 mJ/cm²)	302 GPM (1150 lpm) (68.8 m3/hr.)	467 GPM (1770 lpm) (106 m3/hr.)
Port Size	4” Flange	6” Flange
Electrical	230-240V / 50-60Hz direct wire	
Lamp Watts	828	1242
Power (watts)	900	1340
Replacement Lamp	Bulb-B1500 (4 Required)	Bulb-B2400 (6 Required)
Replacement Sleeve	Quartz-QS1500 (4 Required)	Quartz-QS2400 (4 Required)
Chamber Material	316L Stainless Steel, A249 Pressure Rated Tubing, Polished & Passivated	
Reactor Dimensions	Contact Calmag for further information	
Controller Dimension	Contact Calmag for further information	
Controller Enclosure	Modified NEMA 4X - 304 Stainless Steel	
Maximum Operating Temp	10.3 bar (150psi)	
Operating Temp Range	2-40° C (36-104° F)	
254mm UV Intensity Mon.	Optional	
UVT Monitoring	Optional	
Dose Calculations	Optional	
Flow Monitoring	Optional	
Internal Falt History	Yes	
Remote-on	Yes	
Dry Contacts Solenoid	Optional	
4-20 mA Output	Optional	
Drain Ports	3/8”	½”
Lamp Age Counter	Yes	
Sample Ports	No	Yes
Visual Lamp-Out Ind.	Yes	
Audible Lamp-Out Alarm	Yes	

* Note: Calmag strongly recommends that a pre-filter is installed prior to any ultra violet unit.

Please call for details and recommendations.

CalUltra Specification

Commercial Water Filters

Stainless Steel Range - up to 60l/min

- Heavy Duty Construction
- Temperature: 135°C
- Pressure: 17.2 Bar

Calmag stainless steel filter housings, from 1 round 10” up to a multi 52 round 40” housing, all represent a tried and tested system that is easy to install, operate and maintain.

Constructed from 316L stainless steel across the range, the Calmag housings are supplied with a universal cartridge adaptor as standard in all multi-round housings. All vessels in the range will accept cartridges with adjustable cartridge sealing, meaning variable length cartridges can be installed into the housings easily and securely.

Whilst all stainless steel housings come with Buna-N FDA grade gaskets as standard, material upgrades are available where compatibility is required. All housings have a standard finish of polycoat over stainless steel to give a smooth, clean look to your housing.

Customisation

If the standard configuration does not suit the application a total customisation is available on short lead times. Upgrade by adding fast action swing-bolt closures for additional security. The following customisations are common:-

- Ports
- Sanitary connections
- Cartridge configuration 226
- Flanges
- Gauge port assembly
- High pressure versions
- Gasket / O-ring material – EPDM, Silicone, Viton and Teflon
- Swing-bolt closures on vessels up to 12 round, standard on 22 round vessels and above

FLOW RATES

Flow data is based on 15 lpm per 10” length with a 20 micron pleated cartridge at 0.14 bar clean and a viscosity of 1 cps. Flow rates are for guidelines only. Actual flow rates are based on fluid, viscosity, cartridge type, micron ratings and other factors.

PRODUCT FEATURES

The CalFilter Steel below is an entry level housing into the heavy-duty industrial and commercial stainless steel housings range, equipped with ½”, ¾” and 1” BSP ports in all 316L stainless steel construction with a polycoat finish.

Housings accept 10” cartridges with radial flow and secure with a tie rod through the centre of the head, tightening by head nut. Cartridge replacements are made easy with a base drain to reduce spillage and the housing requiring just 60mm ground clearance.

SPECIFICATION INFORMATION

CalFilter Steel	Cartridge (")	Inlet/Outlet (")	Max Flow* (lpm)
20	1 x 10	½, ¾, 1	20
40	1 x 20	½, ¾, 1	40
60	1 x 30	½, ¾, 1	60

*flow rate based on 20 micron pleated cartridge

Commercial Water Filters

Commercial Water Filters

Stainless Steel Range - up to 960l/min

- Most popular choice
- Temperature: 145°C
- Pressure: 10 bar

The Calmag range of filter housings starts with the smaller housing, available in 316L stainless steel with 2” male BSP ports, 2 x 1/2” drain ports and 1/4” vent in the cover now come complete with universal cartridge adaptors, capable of accepting cartridges. Drain ports allow for quick and easy cartridge replacements and can also be used as gauge ports - one upstream and one downstream.

The larger round vessels come with mounting legs to aid installation, with the CalFilter Steel 720 & 960 with 3” ports, all other specifications remaining the same.

A swing-bolt closure is available as an option on all housings.

Adjustable Top Plate

Universal cartridge adaptor

SPECIFICATION INFORMATION

CalFilter Steel	Cartridge Configuration	Inlet/Outlet	Max Flow* (lpm)
100	5 x 10”	2” BSP	100
200	5 x 20”	2” BSP	200
300	5 x 30”	2” BSP	300
400	5 x 40”	2” BSP	400
280	7 x 20”	2” BSP	280
420	7 x 30”	2” BSP	420
560	7 x 40”	2” BSP	560
720	12 x 30”	3” DN80	720
960	12 x 40”	3” DN80	960

*flow rate based on 20 micron pleated cartridge

Commercial Water Filters

Commercial Water Filters

Stainless Steel Range - up to 4160l/min

- Durable high flow
- Temperature: 149°C
- Pressure: 10 bar

Taking flow capacities over 4,100 lpm with 6” piping relies on equipment that is not only durable, but designed to aid ease of use. The three larger Calmag versions come as standard with:- heavy-duty mounting legs for housing security, a swing bolt and davit arm configuration for quick, easy and safe cartridge replacement.

4” DN100 PN16 flanges are used as standard to accommodate, with minimal pressure loss, flows of up to 4100 lpm. The top plate has 4 tie rod threads to evenly spread compression over the 12 spring seals. This arrangement allows up to a 1” cartridge length variation and makes replacing cartridges easy.

PN16 BS EN1092-1 flanges are standard. Drains are ½” and ¾” on the units accept cartridges with an Outer Diameter (OD) of up to $2^{5}/_{8}$”.

Adjustable Top Plate

Universal cartridge adaptor

SPECIFICATION INFORMATION

CalFilter Steel	Cartridge Configuration	Flange size	Max Flow* (lpm)
1320	22 x 30”	4”	1320
1760	22 x 40”	4”	1760
2160	36 x 30”	6”	2160
2880	36 x 40”	6”	2880
3120	52 x 30”	6”	3120
4160	52 x 40”	6”	4160

*flow rate based on 20 micron pleated cartridge

Commercial Water Filters

CalRo

UNIQUE IN DESIGN
UNIQUE IN OPERATION

Reverse Osmosis

Technology & Specification

APPLICATIONS

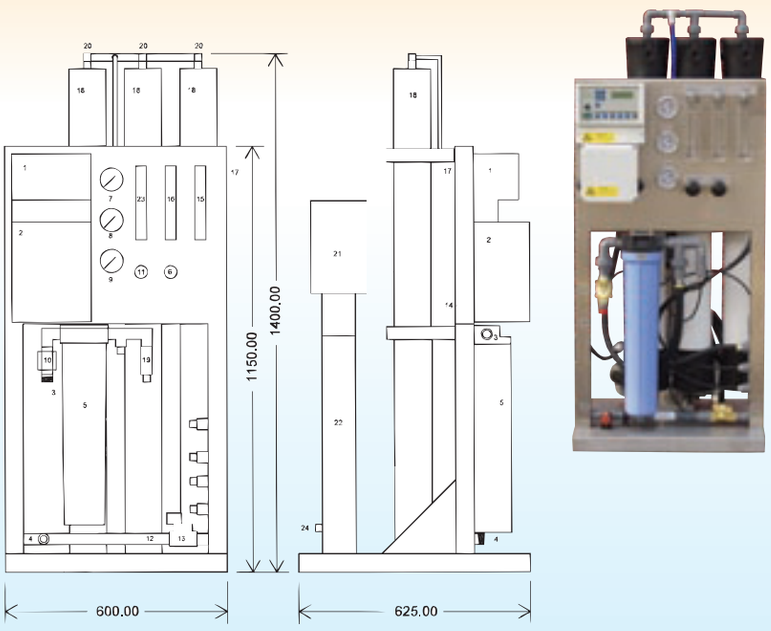
- Drinking water
- Waste water
- Food industry
- Car Wash
- Aquatic industy
- Desalination
- Hospitals
- Commercial / Industrial premises
- Boiler fed water

BENEFITS

- Safe and more purified water
- Removal of potentially harmful contaminants
- Popular due to the depletion of drinking water
- Pre-treatment for boiler solids removal

Reverse Osmosis

The Basics



1. Controller
2. Transformer/relay
3. Inlet 3/4” BSPM
4. Drain Outlet 3/4” BSPM
5. GAC Filter
6. Pressure control
7. Low pressure gauge
8. Pump pressure gauge
9. Back pressure gauge
10. Inlet solenoid
11. Recirculation flow control
12. Flush flow control
13. Flush solenoid
14. Conductivity probe
15. Permeate flow meter
16. Concentrate flow meter
17. Permeate outlet 1/2”
18. Membrane
19. Low pressure switch
20. Membrane connections
21. Pump motor
22. Pump
23. High pressure switch
24. Recirculation flow meter

Reverse Osmosis is a process that is used to remove a wide range of salts to give water of a high purity - Osmosis is a natural process involving fluid flow across a semi-permeable membrane barrier. It is the process by which nutrients feed the cells in our bodies and how water gets to the leaves at the top of trees.

If you separate a solution of salts from pure water using a basic thin semi-permeable membrane like a sausage skin, the pure water passes through the membrane and tries to dilute the salt solution. If the salt solution is connected to a vertical pipe then the progressively diluted solution will fill the pipe until the ‘osmotic pressure’ drawing the pure water though the membrane is the same as the head pressure of the diluted solution.

This process can be reversed - hence ‘Reverse Osmosis’ - by applying a higher pressure to the salt solution. Pure water will then pass the other way through the membrane in a process that is easy to visualise as ‘filtration’ where the filter will only let through the small water molecules and retain almost all of the other molecules. This means that water containing a high level of natural salts can be purified without the need for chemical regenerants such as the acid and caustic used in demin plants.

Reverse Osmosis is therefore considered a much safer route of producing pure water for many commercial and industrial applications, and additionally the plant does not need to be taken out of service for regeneration as a Demin plant does.

Rejection rates of salts from water is generally in the region of 95-99.5% dependent upon the membrane type used and the raw water feed quality. RO systems can be designed to utilise the wide range of membranes available, which will give different permeate water qualities. Standard designed RO’s are manufactured utilising the Low Energy Membranes which will give a permeate water quality of approximately 10 microsiemens from an input water of between 500-700 microsiemens.

The Basics

RO System Management

Reverse Osmosis systems, in their basic form, consist of a pressure pump, housing and the membrane. Water is forced into the housing under pressure and the pure water (or permeate) is collected and passed to service.

Reject water is collected from another outlet and routed to drain, with a portion of the water recycled back to the inlet of the pump. This means that the portion of water sent to drain is kept to a minimum allowing a recovery ratio of approximately 75% to be achieved without significant fouling of the membrane. The recirculation allows ahigher flow of water through the pump reducing the load on its bearings and keeping the pump running cooler. The recirculation on all units is adjustable.

The controller used on the RO system constantly monitors the quality of the permeate water and is also linked with safety controls on the system, to ensure the unit cuts out on low & high pressure, high & low conductivity and full permeate tank signal. It will also run various pre & post flush cycles to maximise the life time of the membrane. The constant monitoring is automatic and the programming is all preset to ensure protection of the system at all times and to maximise the quality of the pure water.

RO plants must be supplied with softened, de-chlorinated or de-chlorinated anti scalent dosed water. A duplex softener is recommended for continuous operation. Utilising softened water for the feed to the RO will reduce the scaling potential on the membrane and therefore lengthen its working life. De-chlorination of the feed will reduce oxidation damage to the surface of the membrane. High output reverse osmosis plant offers considerable advantages over traditional deionisation systems, with no acid/caustic consumables nor problems with COSHH compliance. If softened service water is needed elsewhere on the same installation site, concentrate water can be returned to a softened water holding tank, eliminating water wastage.

NOMINAL MEMBRANE PERFORMANCE - ESPA

Element Type	Minimum Salt Rejection, %	Permeate Flow, GPD	(m^3/d)
ESPA1	99.0	12,000	45.4
ESPA2	99.6 (avg.)	9,000	34.1
ESPA3	98.0	14,000	53.0
ESPA4	99.2	12,000	45.4
ESPA1-4040	99.0	4,000	15.1
ESPA2-4040	99.4	3,000	11.4
ESPA3-4040	98.0	4,500	17.0
ESPA4-4040	99.2 (avg.)	2,500	9.46

RO System Management

Calmag GUARANTEE

Specifying and Sizing

RO Dimensions	Width mm	Depth mm	Height mm
Calmag C1000-C8000	600	625	1450
Calmag Pro4 to Pro 4-38	1120	725	1525
Calmag Pro 8-75 & 8-150	4100	1100	1750
Calmag Pro 8-50 & 8-100	3000	1100	1750
Calmag Pro 8-200 & 8-300	4900	1100	1750
Calmag Pro 8-400	5900	1100	1750

The size of the RO and choice of membrane will be determined by the permeate quantity required, feed water salinity and permeate quality expected. Low energy membranes allow the units to run at pressures around 150-200psi, and as such the pressure booster pumps required to generate the pure water are smaller, and the power consumption is reduced significantly.

These membranes will produce water quality of approximately 10 microsiemens from an input water of between 500-700 microsiemens. If higher permeate quality is required a different range of membranes with higher pressure pumps can be used.

RO units are normally built and used as single units producing the quantity required during the working day. If circumstances demand, the RO units can be duplexed with a central control panel being used to allow manual or automatic switching of the RO plant in service, and will also allow the units to run in parallel when the demand for water is higher, thus doubling the permeate production.

Also for very high purity waters the RO can be manufactured in “double pass mode” - This means the permeate water from the first unit is fed as raw water into the second pass of the RO. This already high quality water will then be improved and a very pure water is produced, typically less than 1 microsiemen.

When sizing the pre-treatment system the quantity of water available on the raw water feed side needs to be checked carefully as the RO system needs a higher feed flow than it’s permeate output, as the recovery of the units is approximately 75% for the pure water. The 25% concentrate that is rejected by the RO can be used for any application where soft water is required such as wash water, grey water for toilet flushing or in some cases cooling tower make-up. The use of this water minimises any waste from the feed supply.

RO System Management

Calmag RO Technical Specification

Calmag COMPACT	C2000	C4000	C6000	C8000
Output (litres per hour)	300	600	900	1,200
Input litres/hour - 75% Recovery	400	800	1,200	1,600
Membrane (4040)	1 x ESPA	2 x ESPA	3 x ESPA	4 x ESPA
Pump Power (KW)	0.75	1.1	1.1	2.2 (3 phase)

Calmag RO PRO MODEL	4-26	4-32	4-38
Output (litres per hour)	1,600	1,900	2,200
Input litres/hour - 75% Recovery	2,150	2,550	2,950
Membranes (4040)	ESPA1		
No Membranes	4	5	6
Pump Pressure (bar)	12.7	13.0	13.5
Pump Power (KW)	2.2	3.0	3.0

Calmag RO PRO MODEL	8-50	8-75	8-100	8-150	8-200	8-300	8-400
Output (litres per hour)	2,500	3,750	5,000	7,500	10,000	15,000	20,000
Input litres/hour - 75% Recovery	3,300	5,000	6,667	10,000	13,333	20,000	26,667
Membranes (8040)	ESPA1						
No Membranes	2	3	4	6	8	12	15
Pump Pressure (bar)	12.4	12.7	12.7	13.1	13.7	14.1	14.5
Pump Power (KW)	5.5	5.5	5.5	11	11	15	18.5

All flow rates quoted are on softened towns mains water @ ambient temperature and running at 75% recovery - Actual flow rates will depend on a number of factors including feedwater temperature, quality, feed pressure, pre-treatment and age of RO plant.

C1000 to C6000 systems are built with 230V 50Hz single-phase pumps as standard - 400 v 50Hz three phase pumps are optional. All other systems are built with 400V 50Hz three phase pumps.

Softener and carbon Filter sizing - Softeners are all based on Duplex valves and capacities quoted are per vessel. Please call if you require further clarification or assistance on the RO plant pretreatment sizing.

CALDUPLEX WATER SOFTENERS

Softener Size (litres of resin)	10	14	20	25	30	40	50	60	75	80	100	120	140	190	250	350	500
Flow Rate Information																	
Flow Rate Information	1.67	2.34	3.34	4.18	5.01	6.68	8.35	10.02	12.53	13.36	16.70	20.04	23.38	31.73	41.75	58.45	83.50
Flow Rate Information	0.40	0.56	0.80	1.00	1.20	1.60	2.00	2.40	3.00	3.20	4.00	4.80	5.60	7.60	10.00	14.00	20.00
Valve Specification																	
Connections: 1" BSP inlet & outlet. 1/2" hose barb drain	Maximum flow rated at 4m³/hr																
Connections: 1" BSP inlet & outlet. 1/2" hose barb drain	Maximum flow rated at 4.7m³/hr																
Connections: 1.5" BSP inlet & outlet. 1/2" hose barb drain	Maximum flow rated at 9.6m³/hr																
Connections: 2" BSP inlet & outlet. 1" BSP drain	Maximum flow rated at 23m³/hr																

PLEASE NOTE: When sizing softeners, please ensure that the valve being used is able to handle the flow rate required by the system.

ACTIVATED CARBON FILTERS - CalCarb

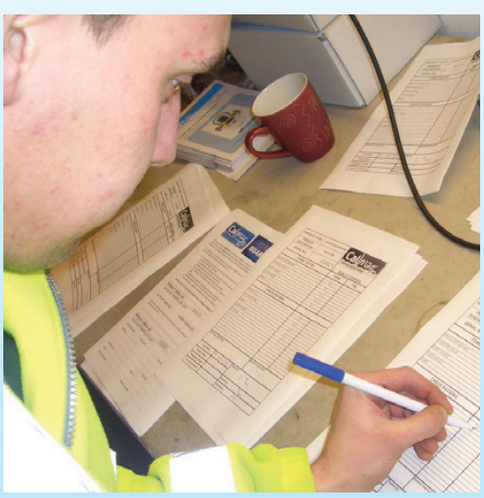
Softener Size (litres of resin)	17	21	29	42	58	79	92	100	183	300	333	383
Flow Rate Information m³/hour	1	1.25	1.75	2.5	3.5	4.75	5.5	6	11	18	20	23
BW Rate m³/hour	0.5	0.9	1	1.2	1.5	2.2	2.6	3.4	5.3	7.7	10.5	13.7
Connections Inlet/Outlet	1" BSP	1" BSP	1" BSP	1" BSP	1" BSP	1" BSP	1" BSP	1" BSP	1.5" BSP	2" BSP	2" BSP	2" BSP

Flow rates advised are for de-chlorination of the feed water only. If organic reduction is required please call for sizing assistance.

Specifying and Sizing

Confidence in water quality

Celebrating 10 years of quality water at quality prices
Calmag Calming troubled waters



Calmag's fresh, innovative approach to water quality has led to the development of the most extensive and effective range of water treatment solutions within the UK water treatment industry - our products are designed with the needs of our customers in mind - the merchant, installer and consumer.

Calmag's philosophy is based on providing products and services to meet the real needs of all our customers - we don't simply produce what we think you should buy - Calmag have the unique design and production capabilities to produce what you want - when you want it!

CALMAG QUALITY ASSURED Tested

For more information regarding all Calmag products and services please go to www.Calmagltd.com

Calmag
Calming troubled waters

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* All figures are taken from various published figures.

DWTA Domestic Water Treatment Association
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UKWTA ASSOCIATE MEMBER
ISOQAR Certificate No. 5791

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