

Excelight

**UV Disinfection by
Waterite Technologies**
www.waterite.com

RESIDENTIAL UV WATER DISINFECTION SYSTEMS OWNER'S MANUAL[®]



For Excelight UV system model EL12AK



IMPORTANT!

**READ AND UNDERSTAND TERMS OF THE MANUFACTURER'S WARRANTY
ON PAGE 11 OF THIS MANUAL.**

Congratulations!

Your new Excelight UV disinfection system is made from the highest quality components available and is designed to provide many years of reliable service. Please take the time to read this manual completely so that you may provide the correct installation and maintenance, ensuring optimal system safety, performance and life.

WARNING!

WHERE MICROBIOLOGICALLY ACTIVE WATER IS KNOWN TO EXIST IT IS HIGHLY RECOMMENDED THAT AT LEAST ONE ADDITIONAL DISINFECTION BARRIER SUCH AS CHLORINATION OR ABSOLUTE FILTRATION IS USED TO TREAT DRINKING WATER, IN ADDITION TO UV TREATMENT. CAREFULLY MAINTAIN ALL WATER TREATMENT EQUIPMENT AND HAVE DRINKING WATER TESTED REGULARLY.



UV RADIATION HAZARD

NEVER OPERATE A UV LAMP OUTSIDE THE DISINFECTION CHAMBER. EXPOSURE TO UV LIGHT CAN RESULT IN SERIOUS INJURY AND EXTREME BURNING OF THE SKIN AND EYES



In order to optimize the disinfection performance, you must only use the unit with water that meets or exceeds the minimum standard and replace the UV lamp at recommended intervals. Failure to follow these guidelines will result in reduced disinfection performance.

SAFETY INSTRUCTIONS

1. Do not plug in unit if any of the external surfaces or electrical components are wet.
2. To avoid possible electric shock, special care should be taken since water may be present near electrical equipment. Unless referred to in these instructions, do not attempt repairs to the unit yourself. Contact the manufacture for service advice.
3. Do not operate this system if it has a damaged electrical cord or plug is malfunctioning, or has been dropped or damaged in any way.
4. Do not use this unit for anything other than its intended potable water application. The use of attachments not recommended, approved, or sold by the manufacturer/distributor may result in an unsafe condition.
5. Before doing any cleaning or maintenance, always unplug the unit.
6. Protect your unit from freezing. Drain all water from unit if freezing temperatures exist.

RAW WATER QUALITY

It is strongly recommended that you have your raw water professionally tested for dissolved mineral content, turbidity and microbiological activity. Your UV disinfection system requires clean, clear water for optimum performance. You should only operate your unit if the source water meets the following minimum standards:

Turbidity	<1 NTU
Suspended Solids	<10mg/L
Colour	None
Total Iron	<0.3mg/L
Manganese	<0.5 mg/L
Hydrogen Sulphide	<0.5 mg/L
Hardness	<7 gpg

Where raw water conditions do not meet these minimum standards, pre-treatment equipment such as an inline or automatic filter, ion exchange softener or an RO system must be installed. Consult with your local water treatment specialist for advice.

Where microbiological activity is indicated to be present in your water source, it is highly recommended that additional disinfection barriers be used in addition to your UV system. This could include water well chlorination using a pellet dispenser, inline chlorine injection using a dosing pump and a contact tank, <1-micron absolute filtration or ozone injection. The use of multiple barriers will assure safe drinking water in the event of the failure of any one of the disinfection methods.

INSTALLATION CAUTIONS



1. Connect your UV light to an approved receptacle (120V/60Hz) (**a GFI is highly recommended**).
2. Excelight UV disinfection devices are designed to be installed on the cold water line only.
3. Install the Excelight UV disinfection system indoors in a protected area where the temperature does not fall below 4°C (40°F) and the humidity level is low (to prevent condensation on the chamber). This unit functions optimally 9-29°C (49-85°F)
4. Use Teflon tape on all plumbing connections. **Do not use other sealants.**

INSTALLATION PROCEDURE

Your UV disinfection system should be located on the PE tube that connects the RO water storage tank or the carbon filter system to the sink faucet. Choose a location for the unit installation with easy access to a 120VAC electrical outlet. Refer to figure 1 for the typical installation diagram and ensure that you have all the fittings necessary for your installation.

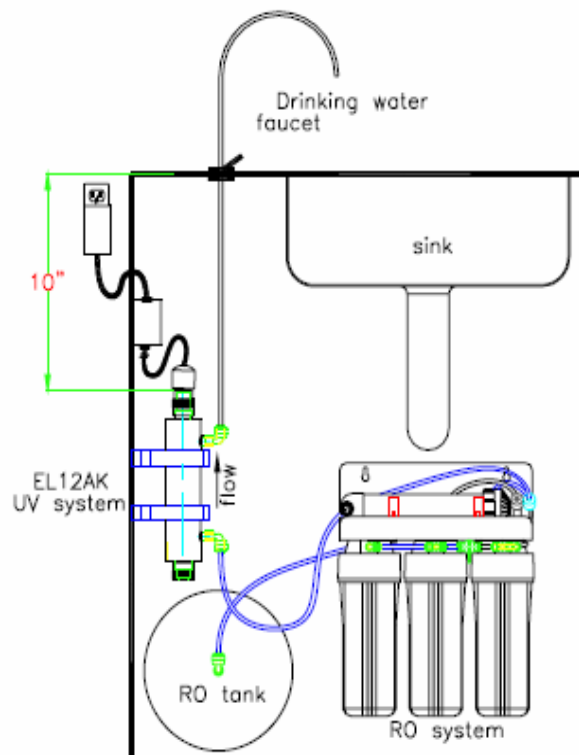


Figure 1.

A minimum distance of 28 cm clearance is necessary to remove the UV lamp from the reactor. If this is not practical the reactor can be removed from the mounting clips for maintenance. See figure 1.

1. Shut off the water supply valve to the under sink filter system or UV system. For RO systems, also shut off the water storage tank valve.
2. Mount the unit to the wall in the selected location using the brackets and screws provided.
3. Using the sticky pad on the back of the ballast body, mount the ballast beside or above the reactor vessel to assure that any leaks cannot migrate to the power source. Never mount the power supply below the reactor chamber. **DO NOT PLUG IN THE WALL ADAPTER AT THIS TIME.**
4. The unit must be installed so that the inlet and outlet ports are accessible. If mounted vertically the lamp connection must be at the highest point. This will assure that any dripping condensation or possible leaks will not migrate to the lamp harness or electrical connections. See figure 2.
5. If mounted vertically, the water inlet port must be the lowest port. This allows air to escape the housing, and ensures proper flow past the UV lamp. If the system mounted horizontally, either port can be used as the feed port. See figure 2.
6. Cut the existing tube that runs from the carbon filter or the RO water storage tank at a place convenient to the location of the UV system. Attach the tube from the tank or the carbon filter to the UV inlet and the tube from the faucet to the UV outlet. Insert the tube into the white compression fittings until it reaches the stop; tighten the compression nut hand tight, plus $\frac{1}{4}$ to $\frac{1}{2}$ turn until snug. **DO NOT OVERTIGHTEN.** Gently tug on the tube to assure a tight connection has been made. See Figure 1.

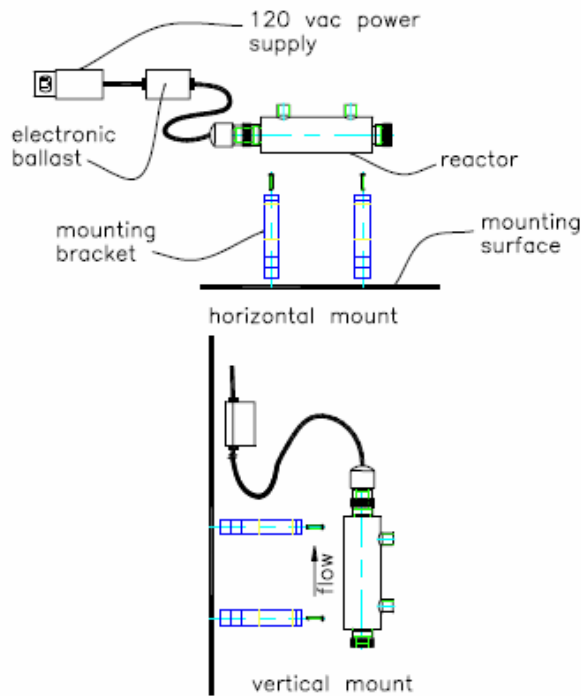


Figure 2.

7. Remove the electrical end cap. Note that the quartz sleeve has been factory installed.

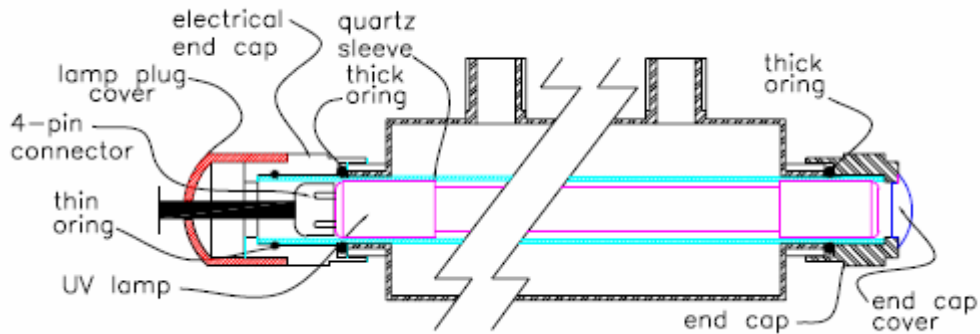


Figure 3.

8. Remove the lamp from its protective packaging. Clean lamp exterior with a clean cloth. Be careful not to leave fingerprints on the lamp. Connect the 4-pin electrical connector to the pins on the UV lamp. Insert the lamp through the opening at the end of the electrical end cap until the connector is inside the end cap. Thread on the electrical end cap until it is snug against the o-ring seal. Check that the other end cap is threaded into place and is snug against the o-ring seal as well.
9. Push the black rubber protective cover over the end of the electrical end cap.
10. Open the storage tank and valve slowly. If any leaks are present, close the valves and repair.
11. Connect UV power source to a 120v receptacle.
12. Your Excelight UV Disinfection System is now ready for use.

FILTER OR RO SYSTEM DISINFECTION PROCEDURE

During the UV disinfection process the only place disinfection takes place is within the reactor chamber. There is no residual disinfectant capacity. Therefore it is necessary to chemically disinfect the plumbing system prior to the initialization of the UV system.



PLEASE FOLLOW THE RECOMMENDED PROCEDURE FOR DISINFECTING YOUR FILTRATION SYSTEM THAT HAS BEEN PROVIDED BY THE FILTER MANUFACTURER, BEFORE UV USE.

If there is no available instruction set for this procedure, use the generic guide below to disinfect your system:

1. Turn the RO or filter system shut off valves to the closed position.
2. The disinfection of the plumbing system is most readily accomplished by removing the first pre-filter cartridge and adding 250-500ml (1-2 cups) of a standard 5% concentration of unscented household bleach, diluted 3:1 with water, into the empty filter housing and re-attach. Remove all other pre-filter cartridges from their housings and replace housing bowls.
3. Remove the membrane element from the membrane housing on the RO system, according to the manufacturer's instructions. Re-assemble the membrane housing and tubing. Rinse the membrane and set aside.
4. Turn the valves to the open position and let the water flow through the system.
5. Open the faucet and let water flow until you can easily smell chlorine. Close the faucet and let the system sit for 30-60 minutes. **Do not use or consume system water during this process.**
6. Close the water valves on the RO or filter system. Open the faucet to allow all water in the RO storage tank to empty. Close the faucet. Open the water valves and allow the storage tank to refill. Open the faucet again and flush the system, RO storage tank and lines thoroughly. Repeat until the chlorine smell is undetectable.
7. Close valves and faucet and re-install new cartridges and the membrane element. Open water valves. The water system is now ready for use.

UV SYSTEM OPERATION AND MAINTENANCE

Your Excelight UV System is "ON" continuously during normal operation. After periods of not using your water supply exceeding two to three days, it is recommended to open all faucets and flush your UV system for one to two minutes.

WARNING!

ULTRAVIOLET LAMP REPLACEMENT

THE ULTRAVIOLET LAMP INSIDE THE REACTOR CHAMBER WILL OPERATE EFFECTIVELY ROUND THE CLOCK, FOR APPROXIMATELY ONE YEAR OR 8000 HOURS. THE LAMP WILL LIGHT LONGER THAN THAT, HOWEVER, THE UV LIGHT PENETRATION MAY FALL BELOW THE PRESCRIBED SAFETY LEVEL. THEREFORE, ANNUAL LAMP REPLACEMENT IS NECESSARY REGARDLESS OF APPARENT LAMP CONDITION.

Replacing the UV Lamp And Cleaning The Quartz Sleeve:

1. Unplug the system from the electrical outlet and turn off the water supply to the unit.

2. Carefully extract the lamp connector from the electrical end cap assembly to just expose the top of the UV lamp. While holding the lamp base firmly, disconnect the lamp 4-pin connector. Lamp base can be very hot - be careful not to drop the lamp into the quartz as both are easily broken.
3. Carefully slide the lamp out of the quartz sleeve and discard.
4. Loosen and remove both end caps. Roll back the o-rings at both ends and remove. Carefully extract the quartz sleeve it from the reactor housing. **The quartz sleeve is very fragile and is easily chipped or broken - use extreme caution when installing or removing it from the reactor vessel.**

NOTE:

Do not touch the lamp or quartz sleeve with your fingers. Handle by the ends only or wear soft non-abrasive gloves.

5. Clean the quartz sleeve with vinegar or a readily available scale-removing product. (Lime Away, CLR)
6. Examine the quartz sleeve o-rings. If they look worn or cracked, replace. Re-install the quartz sleeve.
7. Install new lamp by reversing the procedure described in item #2 above.
8. Slowly open shutoff valves and purge the air from the system.
9. Ensure there are no leaks at the end caps before connecting the power to the system.

SYSTEM REPLACEMENT PARTS

EXCELIGHT System Replacement UV Lamp

Standard 4-pin, 8000 rated hours

Excelight EL12A UV Lamp, 14W/220mm

EL12L

EXCELIGHT Quartz Sleeves

DOE, silicone o-rings included

Excelight EL12A Quartz Sleeve, 245mm

EL12Q

EXCELIGHT Ballast and Wall Adapter with Certification



115V/60hz adapter, grounded plug.

Excelight Ballast, 24VDC, 110V/60hz

EL12B

Other EXCELIGHT Replacement Parts

Excelight Sleeve Cap

EL12C

Mounting Clip

WP-25

Sleeve o-ring kit

EL411RK

UV DOSAGE CHART FOR 3-LOG ORGANISM INACTIVATION

Approximate ultraviolet energy levels at 254-nanometer units wavelength required for 99.9% destruction of various microorganisms UV energy in mj/cm² :

BACTERIA		MOULD SPORE	
Agrobacterium tumefaciens	8,500	Aspergillus flavus (yellowish green)	99,000
Bacillus anthracis	8,700	Aspergillus glaucus (bluish green)	88,000
Bacillus mrgaterium (vegetative)	2,500	Aspergillus niger (black)	330,000
Bacillus mrgaterium (spore)	52,000	Mucor ramosissimus (white gray)	35,200
Bacillus subtilis (vegetative)	11,000	Penicillum digitatum (olive)	88,000
Bacillus subtilis (spore)	58,000	Penicillum expensum (olive)	22,000
Clostridium tetani	22,000	Penicillum roqueforti (green)	26,400
Corynebacterium diptheriae	6,500	Rhizopus nigricans (black)	220,000
Echerichia coli	7,000	-	-
Legionella bozimanii	3,500	-	-
Legionella dumoffii	5,500	-	-
Legionella gormanii	4,900	ALGAE	
Legionella micdadeli	3,100	Chlorella vulgaris (algae)	22,000
Legionella longbeachae	2,900	-	-
Legionella pneumophila	3,800	-	-
Legionella interrogans (infectious jaundice)	6,000	-	-
Mycobacterium tuberculosis	10,000	PROTOZOA	
Neisseria catarrhalis	8,500	Nematode eggs	92,000
Proteus vulgaris	6,600	Paramecium	200,000
Pseudomonas aeruginosa (laboratory strain)	3,900		

BACTERIA			
Pseudomonas aeruginosa (environmental strain)	10,500		
Salmonella enteritidis	7,600	VIRUS	
Salmonella paratyphi (Enteric fever)	6,100	Bacteriophage (E.coli)	6,600
Salmonella typhimurium	15,200	Hepatitis virus	8,000
Salmonella typhosa (Typhoid fever)	6,000	Influenza virus	6,600
Sarcina lutea	26,400	Poliovirus	21,000
Serratia marcescens	6,200	Rotavirus	24,000
Shigella dysenteriae (Dysentery)	4,200	Tobacco mosaic virus	440,000
Shigella flexneri (Dysentery)	3,400	Virus of Infectious Hepatitis	8,000
Staphylococcus aureus	7,000	YEAST	
Streptococcus faecalis	10,000	Baker's yeast	8,800
Streptococcus hemolyticus	5,500	Brewer's yeast	6,600
Streptococcus lactis	8,800	Common yeast cake	13,200
Streptococcus viridans	3,800	Saccharomyces ellipsoideus	13,200
Vibrio cholerae	6,500	Saccharomyces sp.	17,600

The approximate dosages / flow rate with clear water are:

EL12AK: 2 GPM@16mj/cm² 1GPM@30mj/ cm² 0.5GPM@40mj/ cm²

A 16mj/cm² dose is suitable for reducing non-pathogenic nuisance organisms only.

A 30mj/cm² Industry Standard Dose - This is the dosage produced by 2.5" diameter disinfection chambers when designed using the 1966 US Department of Health UV disinfection Policy Statement.

A 40mj/cm² dosage is now required in NSF/ANSI Standard 55.

WATERITE UV SYSTEM LIMITED WARRANTY

Waterite Excelight UV Disinfection Systems are warranted to free from defects of workmanship and provided with a material warranty for the period of one year. Warranty commences from date of purchase. Proof of purchase required.

Waterite Technologies will repair or replace, at its option, any defective parts covered by the warranty. Shipping and handling are not included in the warranty. They will be collected from you by your dealer. Replacement parts provided under warranty will be sent to your Waterite Technologies Dealer.

Parts repaired or replaced under this warranty will be covered under warranty until the end of the original warranty period. The warranty is also subject to the conditions and limitations outlined under the heading "General Conditions and Limitations" below.

Warranty For Replacement Lamps and Parts

Waterite Technologies warrants replacement lamps, purchased for annual routine maintenance and other parts purchase to repair product components that are no longer covered by the original warranty, to be free from defects in material and workmanship for a period of three months from the date of purchase. During this time, Waterite Technologies will repair, or replace at its option, a defective replacement lamp or part free of charge except for shipping and handling charges. The warranty period on replacement lamps and parts will be verified using date codes and/or purchase receipts, Your Waterite Excelight Dealer will advise you on whether the defective item needs to be returned to Waterite technologies for failure analysis.

General Conditions and Limitations

None of the above warranties cover damage by improper use or maintenance accidents, acts of God, or minor scratches or imperfections that do not materially impair the operation of the product. The warranties also do not cover products that are not installed as outlined in the applicable product owner's manual.

These limited warranties outline the exclusive remedy for all claims based on a failure or defect in any of these products. They are in lieu of all other warranties whether written, oral, implied or statutory.

Under no circumstances shall Waterite Technologies have any liability for liquidated damages for collateral, consequential, or special damages or for loss of profits, or for actual losses or for loss of production or progress of construction, regardless of the cause of such damages or losses. In any event, Waterite Technologies aggregate total liability shall not exceed the specified product purchase price. The purchaser agrees to indemnify and hold harmless Waterite Technologies from all claims by third parties in excess of these limitations.

Waterite Technologies does not assume any liability for personal injury or property damage caused by the use or misuse of its products. Waterite Technologies shall not in any event be liable for special, incidental, indirect or consequential damages. Waterite Technologies liability shall, in all instances, be limited to replacement of the defective product or part and this liability will terminate upon the expiration of the applicable warranty period.



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