Aquafine Corporation®

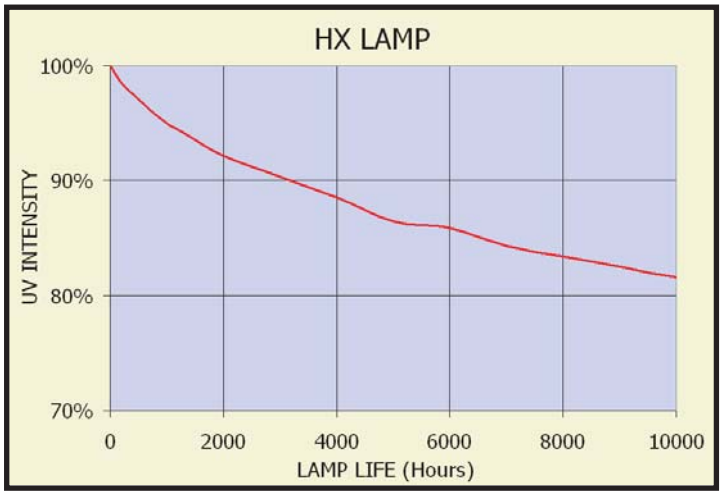
OPTIMA IEX®

DISINFECTION

For over five decades, Aquafine has set the standard as the primary source in ultraviolet technology. Now Aquafine is introducing the latest in ultraviolet lamp technology, coupled with new computer reactor mapping technology for accurate UV fluence (UV dosage) modeling in fluid flow. The Optima HX series represents leading edge UV technology and provides the lowest installed capital and life cycle cost of any UV product on the market.

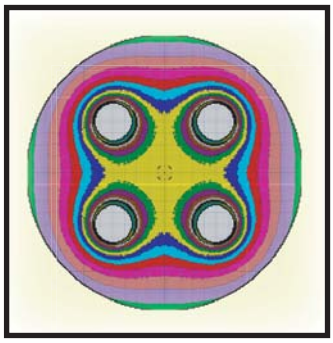
The Optima HX series lamp is a low-pressure mercury vapor lamp that allows predominantly 254 nm wavelength radiation to be released.

The key characteristic of the Optima HX lamp series other than the enhanced amount of UVC output, is the decay curve. Most mercury vapor lamps have a steep decay curve that drops to 60% of the original new lamp intensity (after the stabilization burn in period), which is approximately 8000 hours. The Optima HX series lamps feature technology improvements that have a reduced decay rate, resulting in greater than 80% intensity after 9000 hours of continued operation. This allows for more UV intensity over a longer period of time and drastically alters the process of sizing a UV system, resulting in increased performance and reduced capital and operating costs for the customer. In determining the amount of average UV fluence required at a given flow rate, accurate computer modeling is required to calculate the fluence rate (UV intensity) at any given point in a UV chamber. Aquafine uses a state-of-the-art computerized mathematical fluence rate model that is based on calculations of fluence rates using Multiple-Point-Source Summation (MPSS) approximation. It is the only mathematical fluence rate model that has been experimentally verified by biological and chemical support applications. Computational Fluid Dynamics (CFD) models are used to calculate flow patterns and these are supported by physical hydraulic tests on the units.

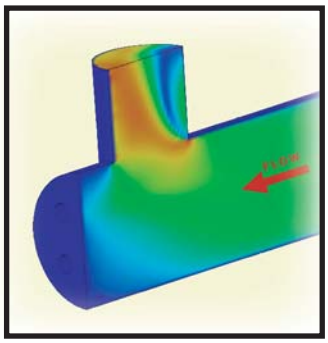


Disinfection Applications

The Optima HX Disinfection system uses 254 nm radiation to alter the genetic material (DNA) of bacteria, viruses, and other microorganisms. With their DNA altered, they are unable to reproduce and soon die. The system UV fluence



UV fluence rate distribution across an Optima HX reactor cross section



Velocity distribution across an Optima HX reactor

UV Fluence (mJ/cm^2) Required for 3-Log (99.9%) Inactivation of Microorganisms in Water*

Bacteria	
Aeromonas Hydrophilia	3.9
Campylobacter Jejuni	4
Legionella Pneumophila	6.9
Salmonella Anatum	15
Samonella Enteritidis	9
Salmonella Typhi	6.4
Salmonella Typhimurium	5
Shigella Dysenteriae	2
Shigella Sonnei	6.5
Staphylococcus Aureus	6.5
Vibrio Cholerae	2.2
Yersinia Enterocolitica	3.7
Escherichia Coli	3.5-7.3
Streptococcus Faecalis	8-9.9

Spores	
Bacillus Subtilis Spores	51 - 61

Virus	
Adenovirus Type 40	90
Adenovirus Type 41	80
Coxsackievirus B5	21
Hepatitis A	15
Hepatitis A HM175	12-22
Poliovirus Type 1	14-23
Rotavirus SA11	23-26

Phage	
MS-2	38-61
ΦX174	6.4-12
PRD-1	24
B-40	23

Protozoa	
Cryptosporidium Parvum	12
Giadia Lamblia	11

* Ref: EPA815-D-03-007

can be designed to meet applicable government regulations. Most industrial applications require a minimum UV fluence of 30 mJ/cm^2, which is usually more than sufficient to kill the common organisms in most water systems. The Optima HX disinfection models are available in configurations specific to applications.

Common applications include Pharmaceutical, Beverage, Food Processing, Municipal Water, Cosmetics, and Industrial Water.

Aquafine Corporation designs UV systems for every application including Ozone, TOC, Chlorine, and Chloramine reduction. Please refer to other specification sheets for details for each specific application.

Please contact Aquafine for additional information.

Optima HX Disinfection Series Product Specifications

OPTIMA HX MODEL	HX02ADS[5]	HX02BDS	HX02BDL	HX02DDS	HX02CDL	HX02DDL	HX04CDL	HX06CDL
OPTIMA HX-U[4] MODEL	N/A	HX02BDSU	HX02BDLU	HX02DDSU	HX02CDLU	HX02DDLU	HX04CDLU	HX06CDLU
Clear Fresh Water [1] GPM (m^3/hr) UV Fluence [2]: 30 mJ/cm^2 @ 94% UVT	40 (9)	40 (9)	78 (18)	90 (20)	130 (30)	175 (40)	251 (57)	335 (76)
Distilled/DI/RO Water [1] GPM (m^3/hr) UV Fluence [2]: 30 mJ/cm^2 @ 99% UVT	45 (10)	45 (10)	90 (20)	115 (26)	150 (34)	220 (50)	300 (68)	405 (92)
Clear Fresh Water [1] GPM (m^3/hr) UV Fluence [2]: 40 mJ/cm^2 @ 94% UVT	30 (7)	30 (7)	59 (13)	68 (15)	98 (22)	131 (30)	188 (43)	251 (57)
Distilled/DI/RO Water [1] GPM (m^3/hr) UV Fluence [2]: 40 mJ/cm^2 @ 99% UVT	34 (8)	34 (8)	68 (15)	86 (20)	113 (26)	165 (37)	225 (51)	304 (69)
Number of UV Lamps	2	2	2	2	2	2	4	6
Total Current (Amps) @ 240 VAC	1.7	1.7	2.3	1.7	2.3	2.3	3.7	5.1
Total Power (Watts) @ 240 VAC	408	408	552	408	552	552	888	1224
Inlet/Outlet Size (R.F. Flange [3]) (inch)	2	2	2	3	3	3	4	4
HX Dimensions (L x W x H) (inch)	38 x 7 x 21	40 x 12 x 15	68 x 12 x 15	40 x 16 x 22	68 x 11 x 22	68 x 11 x 24	68 x 11 x 22	68 x 11 x 22
HX-U Electrical Cabinet Dimensions (H x W x D) (inch)	N/A	17 x 13 x 6	17 x 13 x 6	17 x 13 x 6	17 x 13 x 6	17 x 13 x 6	18 x 20 x 14	18 x 20 x 14

(1) For water temperatures from 40 ºF (4.4 ºC) to 80 ºF (26.7 ºC), (2) After 9000 hours of operation at 254 nm, (3) ANSI Class 150 lb flange, (4) U: Remote electrical cabinet
(5) Wall mounted unit

OPTIMA HX MODEL	HX05DDL	HX06DDL	HX08DDL	HX08EDL	HX08FDL	HX08GDL	HX10GDL	HX12GDL
OPTIMA HX-U[4] MODEL	HX05DDLU	HX06DDLU	HX08DDLU	HX08EDLU	HX08FDLU	HX08GDLU	HX10GDLU	HX12GDLU
Clear Fresh Water [1] GPM (m^3/hr) UV Fluence [2]: 30 mJ/cm^2 @ 94% UVT	415 (94)	500 (114)	550 (125)	670 (152)	800 (182)	925 (210)	1100 (250)	1300 (295)
Distilled/DI/RO Water [1] GPM (m^3/hr) UV Fluence [2]: 30 mJ/cm^2 @ 99% UVT	520 (118)	625 (142)	700 (159)	850 (193)	1070 (243)	1200 (273)	1400 (318)	1800* (409)
Clear Fresh Water [1] GPM (m^3/hr) UV Fluence [2]: 40 mJ/cm^2 @ 94% UVT	311 (71)	375 (85)	413 (94)	503 (114)	600 (136)	694 (158)	825 (187)	975 (221)
Distilled/DI/RO Water [1] GPM (m^3/hr) UV Fluence [2]: 40 mJ/cm^2 @ 99% UVT	390 (89)	469 (106)	525 (119)	638 (145)	803 (182)	900 (204)	1050 (238)	1350 (307)
Number of UV Lamps	5	6	8	8	8	8	10	12
Total Current (Amps) @ 240 VAC	4.5	5.1	6.6	6.6	6.6	6.6	8.0	9.4
Total Power (Watts) @ 240 VAC	1080	1224	1584	1584	1584	1584	1920	2256
Inlet/Outlet Size (R.F. Flange [3]) (inch)	6	6	6	6	8	8	8	8 - 10*
HX Dimensions (L x W x H) (inch)	68 x 11 x 24	68 x 11 x 24	68 x 12 x 27	68 x 15 x 34	68 x 17 x 36	68 x 19 x 38	68 x 19 x 44	68 x 19 x 44
HX-U Electrical Cabinet Dimensions (H x W x D) (inch)	18 x 20 x 14	18 x 20 x 14	18 x 20 x 14	18 x 20 x 14	18 x 20 x 14	18 x 20 x 14	24 x 20 x 14	24 x 20 x 14

STANDARD EQUIPMENT:

- OPTIMA HX cabinet housing material:
  - Stainless steel for HX02ADS to HX08DDL models
  - Painted carbon steel for HX08EDL to HX12GDL models
- OPTIMA HX-U cabinet housing material:
  - Painted carbon steel for all models
- Treatment chamber material: 316L S.S.
- Running Time Meter
- EPDM gaskets and O-rings
- SE Lamps / High Purity Quartz
- 240 V / 50 or 60 Hz
- Lamp Status Indication
- OPTIMA HX-U Series are NEMA 4 (IP 66) modified rated
- 150 psig (10 barg) Standard Operating Pressure
- All models are CE®. OPTIMA HX-U models will be UL® listed
- HX-U standard conduit length is 9 ft

OPTIONS:

- Lamp Out Alert (LOA)
- Viton gaskets and O-rings
- UV and Temperature Monitoring System with standard or NIST traceable UV sensor
- Aqualogic Monitoring System (Optima HX-U models only)
- RA 15 finish for all units except OPTIMA HX BDS, BDSU, BDL and BDLU models
- Stainless steel compression nuts
- Sanitary fittings
- Sample ports
- OPTIMA HX cabinet housing material:
  - Stainless steel for HX08EDL to HX12GDL models
- OPTIMA HX-U cabinet housing material:
  - Stainless steel with NEMA 4X modified rating, for all models
- Validated lamps
- Additional voltages are available

NOTE: All specifications are subject to change without notice

Optional UV and Temperature Monitoring System™

Aquafine Corporation's integrated UV and Temperature Monitoring System™ will accurately monitor UV intensity and process water temperature of your HX UV treatment equipment. The system includes a NIST traceable option for ISO certified and other critical processes. One of the key benefits is improved liability protection. The new design surpasses the performance and reliability of competing systems. The state-of-the-art detector employs a Gallium Nitride (GaN) photodiode and a semiconductor temperature sensor in a single package, along with its on-board electronics for remote and local operation. The monitoring system features:

Monitoring Station™

- **Absolute (µW/cm²) and relative (%) UV measurement**
- **Temperature measurement in °C or °F**
- **Low UV and high water temperature alarms**

Detector

- **UV and temperature sensors in a single housing**
- **Optional NIST-traceable UV sensor calibration with certificate**
- **10 times larger photodiode sensitive area**
- **No optical filters, no degradation**
- **No diffuser, therefore no UV solarization**
- **Withstands non-operating temperatures of 250 °F (121 °C) for steam sterilization at a maximum pressure of 250 psig (17.2 barg)**
- **Complete on-board electronics for UV and temperature**
- **Scratch-resistant sapphire window**
- **Water-resistant axial connector and cabling**

The largest manufacturing facility in the world for low-pressure UV products was designed to assist our customers in advancing their performance.

Our Mission

To Strategically Supply Environmentally-Safe Products Through the Manufacture and Marketing of Ultraviolet Water Treatment Equipment, World Class in Quality, Technology, Delivery and Cost, With Maximum Value to Our Customers, While Enhancing the Safety and Development of Our Employees

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ISO 9001 Certified