

UltraPure Features

- UltraPure DI water fog
- High fog density
- Truly non-contaminating
- No measurable residue upon evaporation of water droplets
- Compact, easily transportable package with stream or fog rake output
- Model 2001 Portable, Ultrapure Cleanroom Fogger - A compact, ultrapure fogger with high fog density and 15cfm volume for about 50 - 90 minutes. Designed for Class 1, 10, 100, 1000, 10000, 100,000 Cleanrooms.
- Model 2010 Portable, Ultrapure Cleanroom Foggers - A compact ultrapure fogger with high fog density and 10cfm volume for about 24 - 60 minutes. Designed for Class 1, 10, 100, 1000, 10000, 100,000 Cleanrooms.
- Ultrapure, visualization of airflow turbulence in cleanrooms
- Exhaust and ventilation studies around process tools
- Air balance studies in Cleanrooms



Model 2001 and 2010 UltraPure Technical Benefits

- Volume of fog is desired as high as possible to visualize as much airflow turbulence as possible. Contaminants should be minimized to near zero so as not to affect the process and not require wipe downs after fogging
- Temperature output is desired as close to or slightly above room temperature as possible to ensure cold fog does not create its own turbulence. Droplet size is desired as small as possible and as uniformly sized as possible
- Fog density is desired as high as possible to increase visibility of airflow
- Fog time is desired as high as possible to increase time on site testing
- Fog distance is desired as far as possible to extend effects of fog in the airflow
- Fog output pressure is desired as low as possible so that pressurized fog does not create its own turbulence
- Electrolysis coating of metal components are desired so as to prevent metal contamination to the fog
- The Fog Tube should be flexible and made of material that does not add particulate contamination to the fog



* Fog distance measured at typical 40% humidity and air velocity of 90fpm. Fog distance decreases as humidity decreases or as airflow velocity increases.

** Electrolysis SS coatings prevents metal contact with fog, thus minimizes possibility of metal contamination to the fog output.



Model 2001 and 2010 Equipment Specifications
(Subject to change without notice)

	Model 2001 Cleanroom Fogger	Model 2010 Cleanroom Fogger
FOG Duration	60-120 minutes (w/ refills)	30-90 minutes (w/ refills)
FOG Volume	About 15cfm	About 10cfm
FOG Type	UltraPure	UltraPure
Class Room	Class 1 or higher	Class 1 or higher
Boiler capacity	3 liters (2.8 Qts)	2 liters (1.9 Qts)
Dewar capacity	9 liters (8.5 Qts)	3 liters (2.8 Qts)
LN2 Weight	6.4 kg (14 lb.) LN2	2.2 kg (4.8 lb.) LN2
Power	115 VAC, 60 Hz, 14A	115 VAC, 60 Hz, 10A
Optional	230 VAC, 50 Hz, 8A	230 VAC, 60 Hz, 6A
Dimensions	609 x 432 x 1142 cm	380 x 300 x 300 mm
(L x W x H)	21" x 15" x 16"	18" x 14" x 14"
Dry Weight	18.6 kg (41 lb.)	17.8 kg (40 lb.)
Full Weight	25 kg (55 lb.)	20 kg (45 lb.)

Which Fogger Is Best For My Applications

Model 2001, UltraPure Cleanroom Fogger*, 15cfm

When fog purity, persistence & max volume is required

When fogging larger cleanroom, ceiling to floor areas

When fog exit velocity must not create turbulence

When 50 minutes of high purity fog duration is useful

When fog visibility over 15-18 feet distance is required

When fogging \geq Class 1 in semiconductor or pharmaceutical

Model 2010, UltraPure Cleanroom Fogger*, 10cfm

When fog purity and persistence is needed, at lower cost

When fog purity is needed, but at lower budget

When 25 minutes of high purity fog duration is useful

When fog exit velocity must not create turbulence

When fog visibility over 15-18 feet distance is required

When fogging \geq Class 1 in semiconductor or pharmaceutical

* Use Gloves and Face Shield when filling LN2
Use 16M ohm DI water

Portable, Ultrasonic FOG-GUN, DiH2O Fogger, 3cfm

When fogger PORTABILITY is a must

When fog visibility for 3-4 feet distance is acceptable

When 40 minutes of fog duration is useful with quick turnaround

When fogging \geq Class 10 in semiconductor or pharmaceutical

When fogging "hard to get at" areas

CO2 Fogger, Vapor DiH2O Fogger, 3cfm

When Fogging Hazardous areas, No Electrical Permitted

When fog visibility for 3-4 feet distance is acceptable

When 15 minutes of fog duration is useful

When fogging small areas

When fogging \geq Class 10 in semiconductor or pharmaceutical

When fogging work benches

Utility Fogger, Ultrasonic DiH2O Fogger, 6cfm

When budget is tight, basic Fogger OK, output turbulence OK

When 60 minutes of fog duration is useful with quick turnaround

When fog visibility for 3-4 feet distance is acceptable

When fogging gray areas behind the cleanroom

When fogging \geq Class 10 in semiconductor or pharmaceutical

When fog exit velocity (turbulence) is of no concern

64 M ohm DI water preferred, but 16 M ohm acceptable
Do not permit DI Water to go stagnant in the chamber

** Use gloves when handling CO2 ice

Fogger Technology

The three types of foggers manufactured for use in the semiconductor and pharmaceutical industry are described below.

Ultrapure Fogger: This type of fogger produced by MSP provides the highest volume, density and purity of fog. Purity is created by bringing the water to a boil, creating a vapor, while simultaneously using gravity to remove the residual mass from the vapor. This process removes any bacterial agents and residual particulate matter from the vapor. The pure vapor is then passed over an LN2 bath, which naturally boils at room temperature. The water molecules quickly attach to the nitrogen molecules (quenching process), creating a nominal 3um fog droplet. The volume of water and nitrogen molecules that combine is extremely high in quantity, creating a dense, high volume, ultrapure fog output with exit temperatures of about 80 degrees F with an exit pressure of = 0.5 lbs, so as not to disturb the surrounding airflow. The fog is ultrapure leaving minimal, if any, trace particles behind. It evaporates to its gaseous hydrogen, oxygen and nitrogen components, which are natural to the Cleanroom environment. The high density of the fog increases the duration and travel distance of the fog. This fogger can be used in any class Cleanroom environment.

DI Water Fogger: This type of fogger has less fog density (less capability to visualize airflow) than the UltraPure Fogger described above, but more density than the CO2 fogger described below. The DI water fog is generated by atomizing DI water into water droplets, which are nominally 3-10um in size. The water droplets contain residual particulate matter from the DI water, and when the water droplet evaporates in the Cleanroom, the particulate matter remains as a "haze particle 10nm to 100nm in diameter" adrift in the air currents. If the facility manager operates a class 10000 (or worse) Cleanroom, the use of this fogger poses no problem. However, Cleanroom Engineers who manage facilities operating at Class 1 to Class 1000 performance should not use DI water fog, since the resulting Haze particles have a potential to affect the semiconductor yield or the pharmaceutical drug process. **Although some DI Water foggers are described as ultrapure, unless the DI water is vaporized to remove bacterial agents and residual particulate matter, the fog is not ultrapure.** The 3-5lb output pressure of a DI water fogger also distorts the airflow patterns, thus adding to the turbulence. The temperature output is typically less than the surrounding room temperature, thus a fog generated from the atomized water droplets will sink in a typical 70 degree room temperature.

CO2 Fogger: This type of fogger is designed for low volume, non-process critical applications such as bench airflow testing. The fog is created using CO2 ice as the fogging agent. The fog contains elements of the CO2 and the user must determine if the residual CO2 components are acceptable in a process environment operating Class 1 to Class 1,000. The 2-3lb output pressure of a CO2 fogger also distorts the airflow patterns, thus adding to the turbulence.