

## Quick Guide

### AG-01 (Atomizer - 01)

The Model AG-01 generates submicron aerosols that can atomize most solutions or suspensions. The compressed supplied to the inlet expands through the inlet orifice forming a high-velocity jet. Liquid is supplied to the atomizing section through a vertical passage and is then atomized by the jet. Large droplets are removed by impaction on the wall opposite the jet and excess liquid is drained at the bottom of the atomizer section. The resulting fine spray leaves the atomizer through a fitting at the top.



#### Specification

Air Flow Rate : 4.5 L/min at 2.5 kg/cm<sup>3</sup>  
Particle Concentration : < 10<sup>6</sup> particles/cm<sup>3</sup>  
Geometric Standard Deviation : 1.3 ~2.0  
Pressure Source : Air compressor  
Number of Jets : 1  
Dimensions (height) : 130 mm (5.12 in)  
Weight : 0.5 kg (1.1 lbs)

#### Part Number

2601003	Orifice 0.3 mm
2601004	Orifice 0.5 mm

#### Setting up the Atomizer

##### Clean Air Requirements

AG-01 requires a source of clean, dry air at a flow rate of at least 5.0 -5.5 LPM at no more than 35 psig. If you use ordinary shop air, it must be properly dried, filtered, and regulated. AG-01 is designed to release aerosol to a system that is at

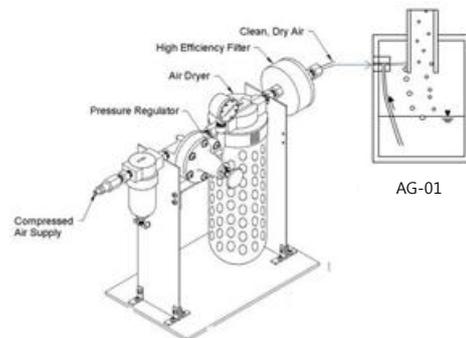
atmospheric pressure. Therefore, the pressure at the outlet of the Atomizer should be maintained close to atmospheric pressure.

##### Selecting and Preparing the Solution

Select a solute for generating the aerosol. Common solutes for solid particles are sodium chloride, uranine and methylene sucrose; for oil particles, DOP and olive oil. The recommended solvent for solid particles is fresh distilled water; for oil particles, use clean, reagent-grade alcohol. Usually 0.001 gram of solute per cubic centimeter of solvent is convenient for most applications; in case of a liquid, however, use 0.001 cubic centimeter of solute per cubic centimeter of solvent.

##### Setting Up the Model AG-01

Connect the 8 mm compressed air hose to your clean air supply. Fill the reservoir half-full with the selected liquid. Set the pressure regulator to 35 psig. To set up the atomizer, refer to blow Figure.



##### Operating the Atomizer

###### Make sure that the Atomizer is clean.

1. Fill the atomizer reservoir about half-full of solution.
2. Close the cover to the Atomizer.
3. Set the pressure to the Atomizer at or below 35 psig and connect the compressed air.

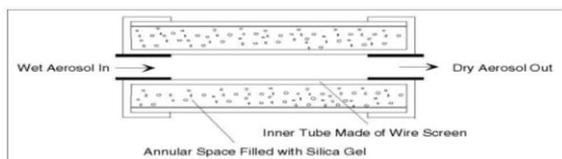
The Atomizer begins to operate as compressed air passes through the system.

*Note: If you are using Model AG-01, the most important factors for quality atomizing are (1) drying and neutralizing the aerosol; and (2) diluting the aerosol to the desired concentration. To change the particle size, you must empty the reservoir, clean*

the Atomizer's reservoir, fill the reservoir with new solution (having a different concentration), and start the Atomizer as before.

**Drying the Aerosol**

When generating aerosols from solid solute, the particles coming out of the Atomizer are still wet and must be dried. Usually, the aerosol is mixed with a large volume of clean dry dilution air. Another approach is to pass the aerosol through diffusion dryer. In the Diffusion Dryer, the aerosol passes through an inner tube, made of wire screen. The silica gel surrounding the inner tube maintains a dry atmosphere at the tube's outer wall while the porous wall absorbs the excess water vapor.



The diffusion Air must be completely dry. Routinely check the condition of the silica gel around the inner tube of the Atomizer. If the Silica Gel is 'blue' in color, it is still active and removing excess water vapor.

**Neutralizing the Aerosol**

The generated aerosol may have a high electrostatic charge resulting in some particle loss due to static charges in the system unless the particles are neutralized. Charged particles tend to deposit on the tube walls and other surfaces. An aerosol charge neutralizer (Soft X Ray Charger, HCT's Model XRC-05) can be used to neutralize the aerosol, to bring the aerosol to the Boltzmann charge distribution. A Neutralizer operates most effectively on dry particles.

**Atomizer Applications**

**Aerosol Output Flowrate**

Varying the inlet pressure to the Atomizer increases the output rate. The Atomizer can be operated between 5 and 55 psig. The table below shows the relationship between pressure and Aerosol output rate.

*[Relationship between input pressure & aerosol output rate]*

Pressure (Psi)	Aerosol Output (L/min)
14	2.4
22	3.6
29	4.4

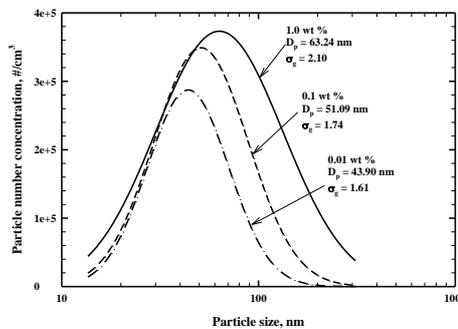
35	5.2
44	6.1
50	7.0
58	7.9

**Generating Water Droplets**

The diameter of the water droplets at the outlet depends on the pressure setting. The droplet diameter decreases with increased pressure. A setting of 35 psig will yield a number mean diameter of approximately 3.0 micrometers.

**Generating Salt Particles**

The Atomizer generates solid particles from water-soluble materials such as salt. Fill the Atomizer's reservoir with an aqueous solution of the desired material. The Atomizer will then generate droplets of that solution. Smaller diameter particles of the solute will result if sufficient time is allowed to evaporate the water from the droplets. The final particle size depends on the concentration of the solute in the solution. Below Figure shows the typical size distribution of NaCl aerosols generated by the Atomizer. The particle size distributions were measured with a SNPS system (HCT's Model SNPS-20N).



*[Size distribution of NaCl aerosols generated by the Atomizer]*

**Dispersing PSL Particles**

A common method of generating monodisperse aerosols is to atomize a hydrosol that contains monodisperse particles. For this application, add a drop of monodisperse particles to one liter of distilled water in the reservoir. Such a large dilution is necessary to ensure that each droplet contains only one PSL particle. The Atomizer output must be mixed with a large volume of dry air. When all the water from these droplets is evaporated the PSL particles of the original



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diameter are obtained.