

## **Universal Size-Distribution Aerosol Generator.**

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A variety of aerosol generators have been developed to produce aerosol particles with different size distribution. Most of these aerosol generators can only be modified to produce aerosol particles of different count median diameter with about the same geometric standard deviation. No generator is specifically developed to produce particles having the same count median diameter but with different geometric standard deviation, which may be critical to some aerosol characteristics, such as optical and filter loading properties. Two computer-controlled peristaltic pumps were used to carry sodium chloride solution and water into a 60 kHz ultrasonic aerosol atomizing nozzle. The total solution feed rate is fixed at 0.4 ml/min. By varying the rotation speed of these two pumps, NaCl solution of different concentrations, after being ultrasonically atomized, produced particles with different size distribution. The aerosol charges were neutralized by an air ionizer. An Aerodynamic Particle Sizer and an Aerosizer were used to measure the aerosol concentration and size distribution. The aerosol charge was monitored by an aerosol electrometer. The mass concentration increased linearly with increasing solution feed rate, if the drying process was complete. The count median diameter was found to decrease with increasing power input to the atomizer, that also resulted in higher number concentration, but the mass concentration remained the same. The GSD decreased with increasing solution concentration, reflecting the effect of surface tension. By adjusting the solution mixing volume (inside the atomizer) and the length of run-time of each concentration phase, the system was able to generate aerosol particles with GSD range from 1.2 to 1.8 or higher while CMD remained the same.