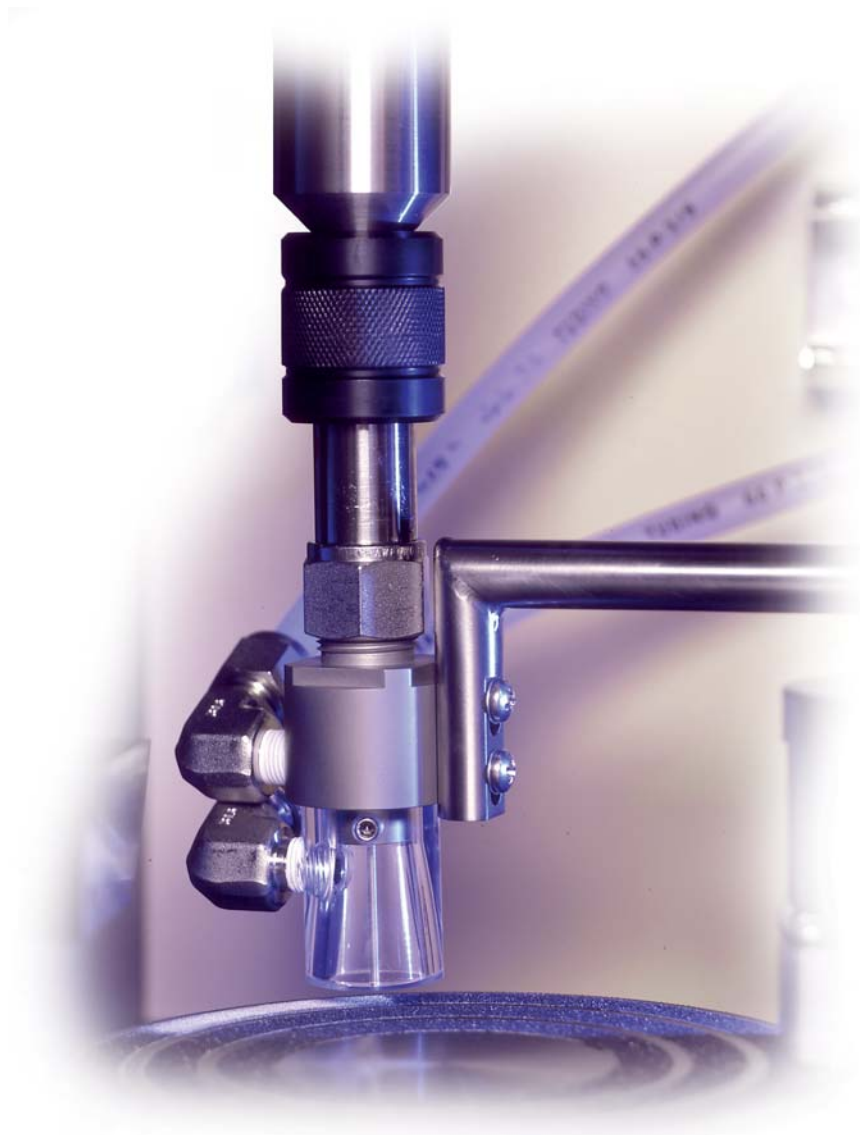


## Powder Dispersers

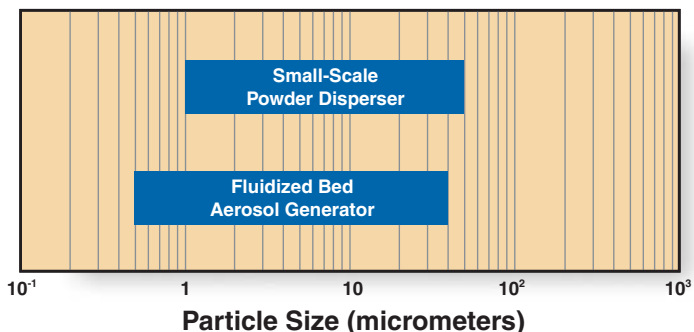
*Rugged, reliable instruments for powder  
deagglomeration and dispersion*



# TSI Powder Dispersers

*They effectively deagglomerate powders for dispersion over a wide range of concentrations.*

TSI offers two extremely rugged, highly reliable powder dispersers: the Model 3433 Small-Scale Powder Disperser and the Model 3400 Fluidized Bed Aerosol Generator. Both instruments provide exceptional deagglomeration characteristics at controlled feed rates and are capable of generating concentrations from 0.3 to 100 mg/m<sup>3</sup>. (See adjacent graph for individual ranges.)



## Model 3433 Small-Scale Powder Disperser



The Model 3433 Small-Scale Powder Disperser (SSPD) can be used for:

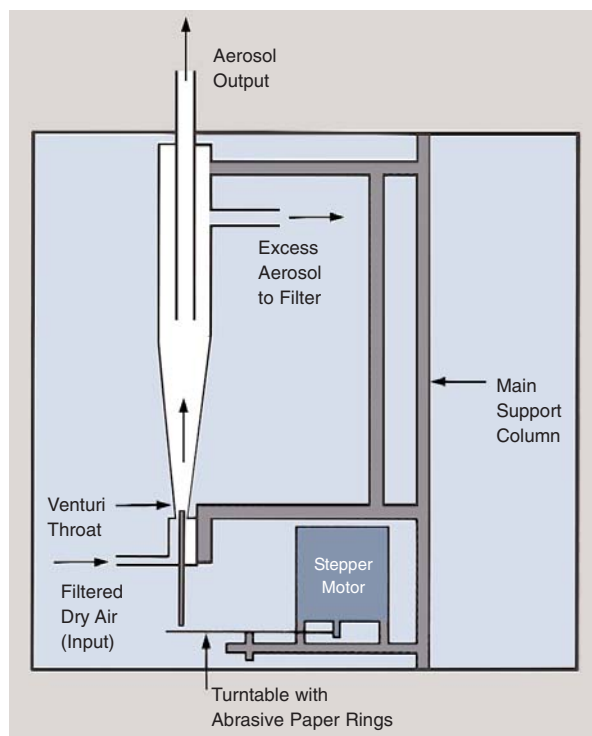
- Generating aerosol for introducing powder into particle sizing systems (such as the TSI Model 3321 Aerodynamic Particle Sizer<sup>®</sup> Spectrometer or Model PSD3603 Particle Size Distribution Analyzer)
- Dispersing dry polystyrene latex spheres (PSLs) for use in calibrating measurement instruments
- Redispersing airborne material collected on 25- and 37-mm-diameter membrane filters used in environmental monitoring
- Inhalation toxicology studies, particularly in the pharmaceutical industry

The standard SSPD is used mainly for powder sizing. The operator gently brushes the powder to be dispersed across one of three annular rings of abrasive paper glued to the top of a turntable. One end of a stainless steel capillary is positioned just above the turntable, the other in a venturi throat. A suction transmitted through the capillary tube removes the powder from the surface of the turntable. Because the air velocity in the venturi throat greatly exceeds that in the capillary tube, shear

forces are created where the two flows meet, causing the powder to deagglomerate. The powder then enters an expansion cone, from which it exhausts from the unit.

### Optional Accessories

- Alternate motor to provide 2.5 to 33.3 revolutions per hour (P/N 1030779)
- Additional turntable (127-mm diameter) with three concentric rings of abrasive paper (one is supplied with the instrument, P/N 1030737)
- Turntable with abrasive rings preloaded with a range (5, 7, 10, 15, 20, and 30  $\mu$ m) of monosized dry PSL spheres (P/N 1030770)
- Turntable with three concentric V-shaped grooves (P/N 1030772)
- Turntable with porous plastic membrane filter supports at 25- and 37-mm diameters (P/N 1030771)



## Specifications

### Model 3433 Small-Scale Powder Disperser

Output Concentration Range	0.3 to 4 mg/m <sup>3</sup> with standard motor; 3 to 40 mg/m <sup>3</sup> with alternate motor
Powder Feed Rate Range	3 to 90 mg/hr
Carrier Gas Flowrate Range	12 to 21 liters/min at 138 KPa (20 psi)
Particle Size Range	Related to size of powder to be dispersed. Maximum size is approximately 50- $\mu$ m aerodynamic diameter; particles smaller than 1 $\mu$ m do not deagglomerate efficiently.
Turntable Rotation	Clockwise or counterclockwise, between 0.25 and 3.3 rev/hour; 2.5 to 33.3 rev/hour with optional high-speed motor
Power Requirements	100, 120, 220, 240 VAC; 50 to 60 Hz; 20 W
Dimensions	(LWH) 386 × 432 × 343 mm (15.2 × 17 × 13.5 in.)
Weight	18 kg (39 lbs)



Supplied (lower right) and optional turntables.

## Model 3400A Fluidized Bed Aerosol Generator

The TSI Model 3400A Fluidized Bed Aerosol Generator (FBAG) is a general-purpose dry powder disperser that may be used for:

- Generating dust for inhalation and toxicology studies
- Evaluating performance and calibrating dust samplers and monitors
- Dust erosion in high-speed gas flows
- Generating particles for laser velocimeter applications

The instrument contains a fluidized bed chamber and a powder reservoir. The fluidized bed consists of 100- $\mu$ m bronze beads supported by a porous screen that allows clean, dry air to pass through, yet prevents the passage of any powder.

During operation, a bead chain meters powder into the fluidized bed. As air forces its way up through the screen and into the bed, it creates a boiling action, which deagglomerates the powder and causes it to be carried upward by the airflow through a vertical elutriator.

A cyclone at the top of the vertical elutriator prevents any particles that are not fully deagglomerated from being dispersed. With a flowrate of 9 liters/min, the cyclone allows only *respirable dust*\* to be generated. Separate flowmeters measure the bed flowrate and the bead purge flowrate.

The powder reservoir is equipped with a gear-driven rake that rocks back and forth, preventing the formation of a channel in the powder due to the movement of the bead chain through the powder reservoir. This assures a constant, even feed rate into the fluidized bed chamber. The airflow pattern through the porous screen further stabilizes the concentration of the output aerosol.



### Optional Accessories

- Model 3012/3012A Aerosol Neutralizer
- Bronze beads (P/N 1502574)

\*Respirable dust is defined by the American Conference of Governmental Industrial Hygienists. The flowrate through the 0.5-inch HASL cyclone is that which is recommended by the American Industrial Hygiene Association Aerosol Technology Committee.

## Specifications

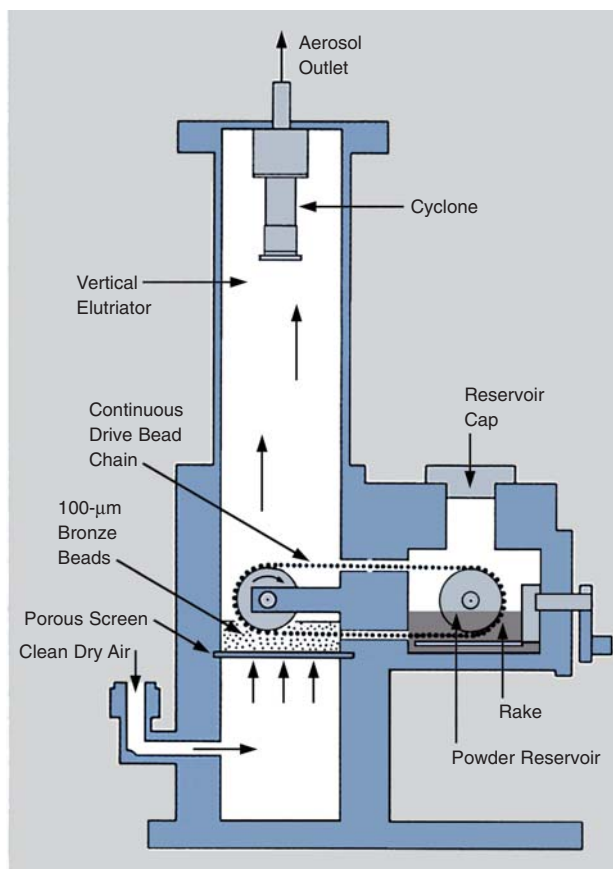
### Model 3400A Fluidized Bed Aerosol Generator

Output Concentration Range	10 to 100 mg/m <sup>3</sup>
Powder Feed Rate Range	3 to 30 mm <sup>3</sup> /min, adjustable (equates to a feed rate of 180 to 1800 mg/hour, assuming unit density)
Carrier Gas Flowrate Range	5 to 15 liters/min at 345 KPa (50 psi)
Particle Size Range	Related to size of powder to be dispersed. Maximum size is approximately 40- $\mu$ m aerodynamic diameter; particles smaller than 0.5 $\mu$ m do not deagglomerate efficiently.
Cyclone	Stainless steel, 0.5-in. diameter, classifies respirable dust at 9 liters/min
Power Requirements	115, 230 VAC; 50 to 60 Hz; 45 W
Dimensions	(LWH) 264 × 368 × 150 mm (10.4 × 14.5 × 5.9 in.); with elutriator, H = 483 mm (19 in.)
Weight	11 kg (24 lbs)

It is recommended that the powder dispersers described in this brochure be used with the TSI Model 3074B Air Supply System.

#### Warning:

Dispersed dusts may be toxic and hazardous. TSI assumes no responsibility for personal injury or property damage due to inappropriate use of these instruments.



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