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Fine type swirling airflow-driven air classifier

Aerofine Classifier

Realizing high-accuracy classification ranging from single microns to submicrons

AC

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Aerofine Classifier
22203

Nisshin Engineering Inc.

Realizing high-accuracy classification ranging from single microns to submicrons.

Important role of Aerofine Classifier

- Classification at nano and submicron level, which was not previously possible with dry process
- Complete removal (scalping) of coarse particles that do not appear in particle size distribution
- Adjusting metal powder particle size (particle size reduction)
- Classification of highly cohesive and highly adhesive powders
- Classification of highly abrasive powders such as ceramic powders
- Adjusting particle size of products resistant to metal contamination (with ceramic lining for main powder contact area)
- Adjusting particle size of products to prevent moisture absorption and oxidation

Overview

The Equipment has been developed as a structure capable of maximally extracting three elements, “uniforming and accelerating a vortex flow”, “dispersion of raw material powder into primary particles” and “repetitive classification,” which are essential to fine dry classification regions.
It allows high-accuracy classification ranging from single microns to submicrons, which has not been realized by conventional dry air classification. A simple structure with no moving parts allows easy disassembly and high washability, facilitating treatment of adhesive powder and abrasive powder.

Structure and features

High-accuracy classification by the use of a twin air system

The Equipment uses the twin air system based on the “main air” taken in through the guide vanes and the “secondary air” blown into the upper and lower parts of the classification zone. Stable high-accuracy classification has been realized in a submicron region as well by uniforming and accelerating a swirling flow generated by the main air, by means of the secondary air.

Effects of secondary air introduction

- Adjustment of a cut point

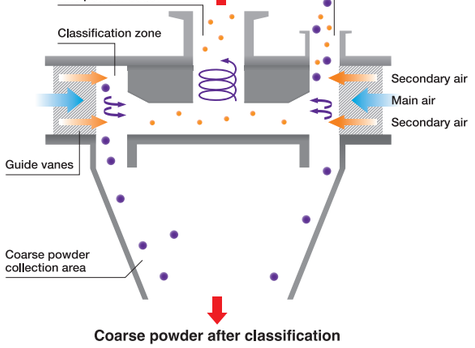
  To make big adjustment, change the installation angle of the guide vanes. To make small slight adjustment, increase/decrease a flow rate of the secondary air to be shot. The cut point can be adjusted while maintaining high classification accuracy.
- Dispersion of the raw material

  The upper secondary air in the classification zone promotes dispersion of the raw material powder, feeding it into a classification field in the state close to single particles.
- Reclassification

  The lower secondary air in the classification zone promotes reclassification. Particularly, a collection rate of 2 to 3 μm or smaller fine powder has been considerably improved.

Nano classification and submicron classification	Abrasion resistance achieved with ceramics (without metal contamination)
High precision and efficiency	Rotorless (metal contamination-free, easy to clean)
High dispersibility	Treatment in inert gas atmosphere
Easy disassembly and cleaning	

Structural cross section



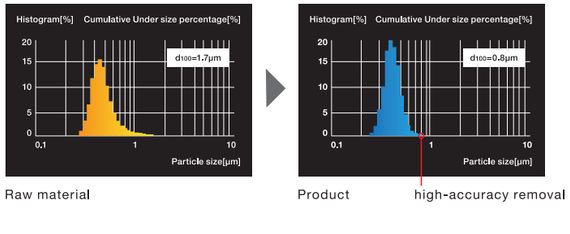
Equipment Photos

AC-20

Model AC-20 (lab unit)

Examples of classification

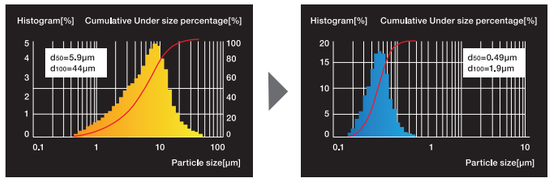
Barium titanate



Raw material　　Product　　high-accuracy removal

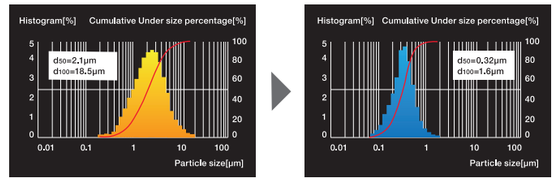
Single-micron particles contained in minute quantities in submicron particles can be removed with high accuracy.
Aerofine Classifier technology is widely used in multilayer materials such as multilayer ceramic capacitors, which are becoming thinner and more multi-layered in order to achieve higher performance and smaller size.

Silica particles



Raw material　　Product

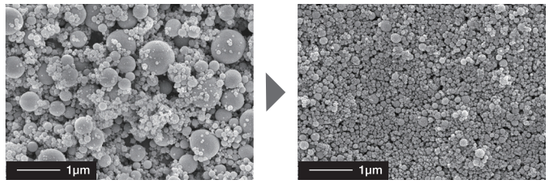
Copper powder



Raw material　　Product

Metallic silicon powder

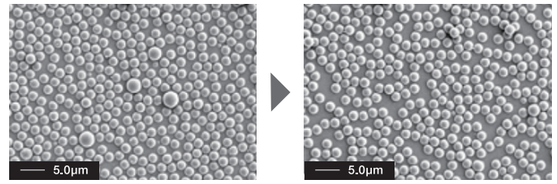
Classification is possible at the nano level, which was not previously possible with dry process.



Raw material BET:92nm　　Product BET:75nm

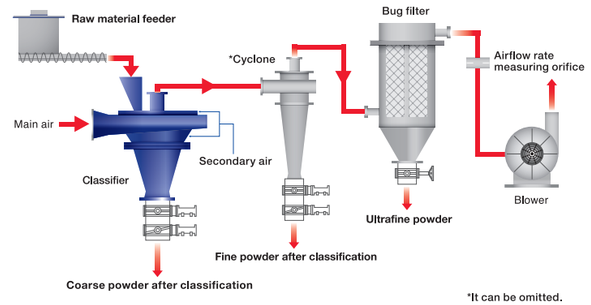
Spherical resin powder

Capable of coarse particle removal classification in ppm order.



Raw material　　Product

System Flow



*It can be omitted.

Lineup

Lineup	Cut point[μm]	Feed rate [kg/h]	Suction air flow rate [m³/min]	Compressed air flow rate @ 0.8MPa [m³/min]	Demensions D×H[mm]	Weight [kg]
AC-20	0.3 ~ 20	1 ~ 20	1.5 ~ 3.0	~ 0.5	Φ300 × H400	50
AC-30	0.5 ~ 25	2 ~ 40	3.0 ~ 6.0	~ 1.0	Φ400 × H600	100
AC-40	1.0 ~ 30	4 ~ 80	8 ~ 12	~ 1.5	Φ500 × H800	200
AC-60	1.0 ~ 30	8 ~ 160	20 ~ 30	~ 4.0	Φ800 × H1,100	400
AC-80	1.5 ~ 30	16 ~ 320	32 ~ 48	~ 8	Φ1,000 × H1,200	500