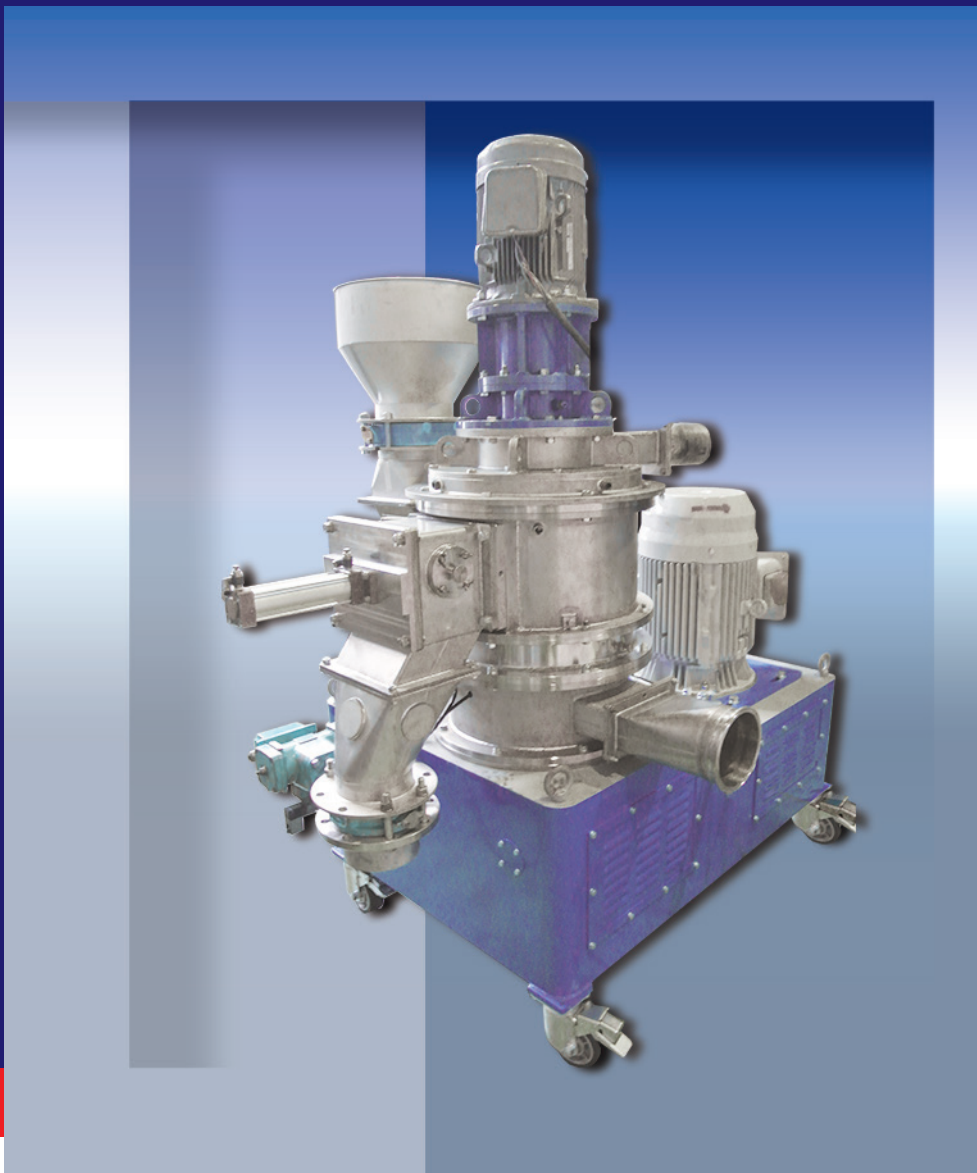


HOSOKAWA/MICRON FACULTY S series Particle Spheronization



Process Technologies for Tomorrow

HOSOKAWA MICRON CORPORATION

POWDER AND PARTICLE PROCESSING

Value Adding by spheronization of fine particles



Faculty S series : Renewal of Faculty, the machine of spheronization

Value adding on powder is realized by spheronization, densification, rejection low value particles. Typical application are toner and graphite. (anode for LIB)

Spheronization of toner has conventionally been conducted by thermal technology after dedusting process. This requires two stage processes (some piece of equipment) and gives thermal damage to toner. In the semi-batch operation of Faculty, the feed is dispersed and spheronized by unique designed rotor and dedusting by newly developed classifying wheel. These operations are repeated again and again in a cycle to need the required shape and size.

This process is also applied for graphite (anode of LIB). The graphite is processed as same as toner is conducted. The major purpose is the densification. As a result of spheronization, the bulk density of graphite is increased by 70%. Spheronization, densification and dedusting is carried out simultaneously.

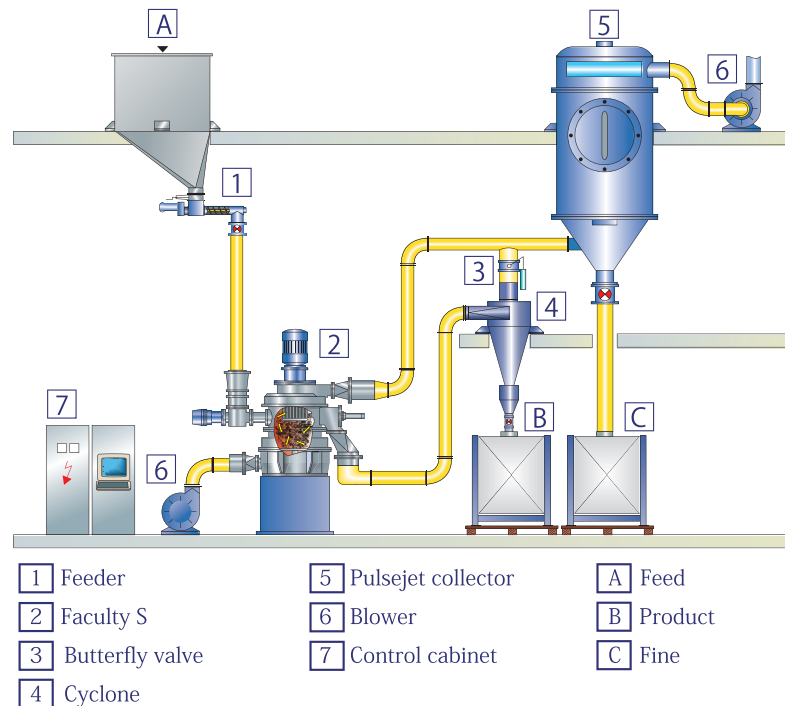
New "S" series provide 4 models and a ceramic version for a certain models.

Principle of Operation

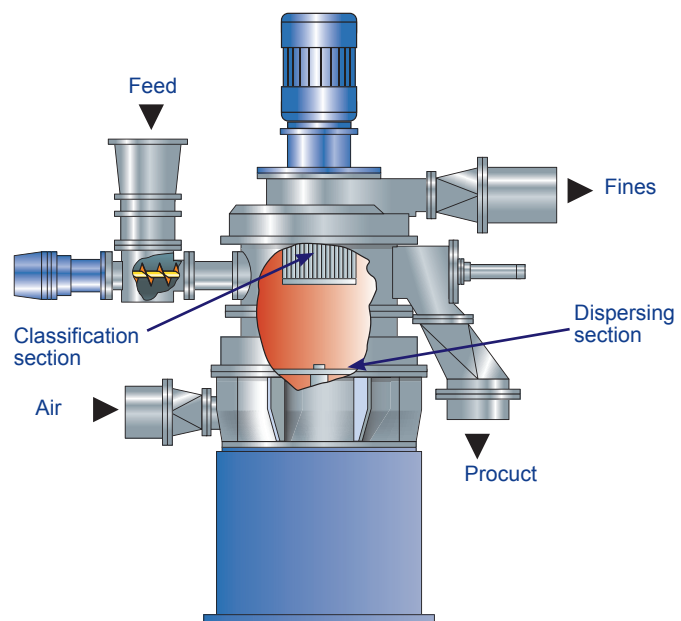
It consists of;

- the dispersion zone** where energy input to powder is controlled by the dispersing rotor speed,
- the classifying zone** where very fine particles are rejected by the forced vortex type classifier and
- the coarse product outlet** located at the side of the casing.

During the semi-batch of Faculty, the material receives necessary energy from dispersion rotor for the period of dozens seconds. At the same time, the particles are separated by the classifier. The spheronized product is discharged from the Faculty. Thus, a semi-batch cycle consists of the feeding, spheronization/dedusting and discharging.



Typical Flow Sheet

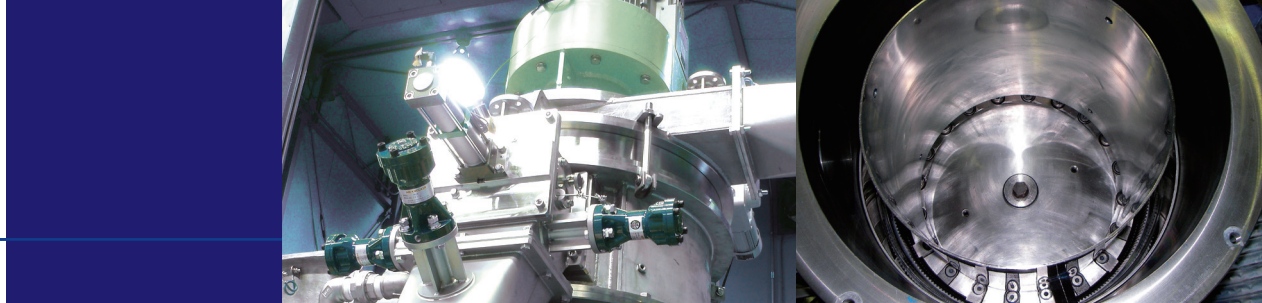


Schematic view

Top size is controlled by the classifying rotor speed. Casing can be provided with the jacket for cooling/heating media. Faculty "S" series provide pneumatic discharging mechanism which drastically improves the process capacity.

The plant consists of the feeder, Faculty,

pushing blower, cyclone, "Pulsjet collector" and an aspiration blower. (Please refer to the "Typical Flow Sheet" for details.)



Applications

Typical industrial applications are toner spheronization (dedusting) and graphite (LIB anode) densification.

■ Densification of graphite improves packing volume and overall LIB performance.

Densified graphite gives high energy density LIB.

Dedusting and surface treatment reduces the specific surface area which leads high performance LIB.

■ Spheronization of toner

Commercial toner spheronization (thermal process) requires the dedusting toner. Faculty requires the milled material as the feed, Mechanical spheronization and dedusting are simultaneously conducted.

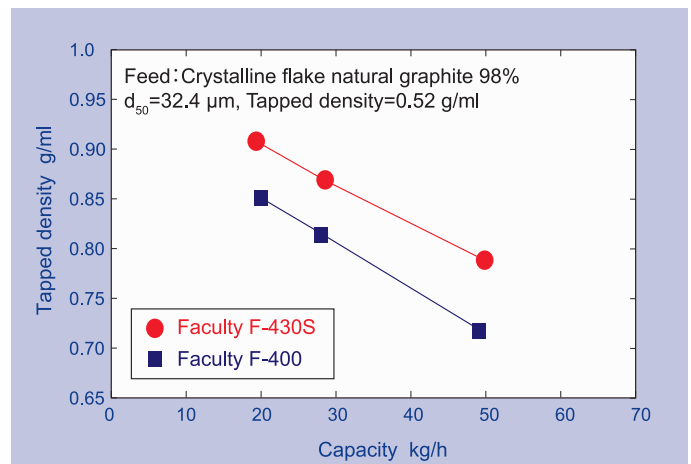
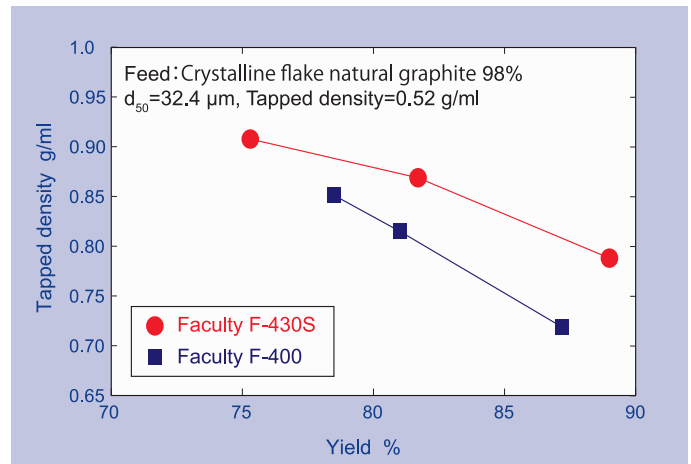
Features

■ Multi Functions

Dedusting, Surface treatment, Spheronization, Densification, Separating impurities

■ Possibility in simplifying process

■ Operator friendly equipment (easy adjustment of parameters)



Standard specification

Type	F-	430S	600S	800S	1200S	
Scaleup factor	(-)	1	2	4	8	
Power	Process	(kW)	30	75	132	250
	Classifier	(kW)	7.5	15	15	15
Classifier	CR-	260	370	370	370	
	Number	(-)	1	1	2	4
Capacity ^(*)		(kg/h)	85	170	340	680
Approx. dimension	Wide	(mm)	2200	2500	3500	4200
	Length	(mm)	1900	2400	3000	3200
	Hight	(mm)	2300	3200	3600	4000
Approx. weight ^{(*)2}		(kg)	2500 ^{*2}	5500 ^{*2}	8000	10000

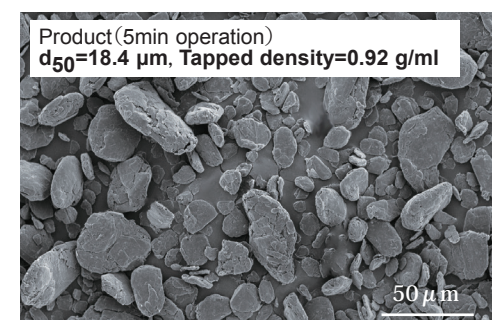
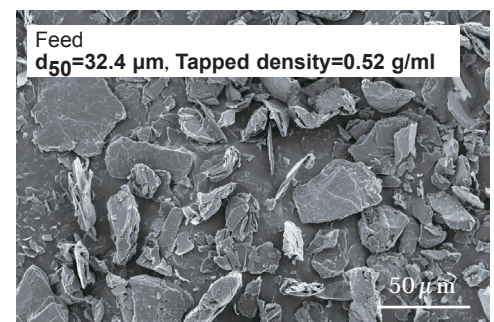
*1: Reference value for following conditions.

Feed : Natural graphite 98%, Tapped density 0.5g/ml

Product tapped density 0.85g/ml

Parameters : 5kg/batch. 3min. operation, input time=15s, discharging time=10s

*2: including the lifting device



Graphite particle



Process Technologies for Tomorrow

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