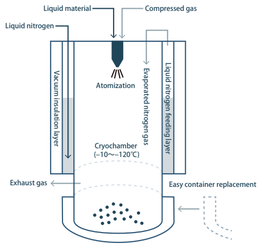
Production-scale freeze granulator (Dry cooling method)

Cryochamber – CS30

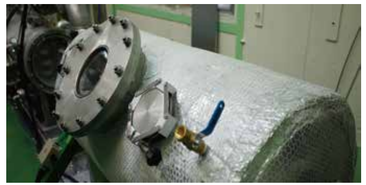
The chamber has a three-layer structure consisting of a liquid nitrogen-filled layer and a vacuum insulation layer. The barrel freeze-drying unit (TFD-10) can be replaced during operation thanks to the use of vaporized nitrogen gas instead of liquid nitrogen. It also saves energy consumption compared to using liquid nitrogen directly.

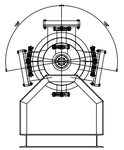


Feed capacity (kg/h)	Up to 15
Atomization mode	Two-fluid nozzle
Cryochamber diameter (mm)	Φ300
Cooling temperature (℃)	-10 up to -120
Cooling method	Dry cooling with liquid nitrogen
Major material	Stainless steel

Barrel freeze-drying unit – TFD-10

By connecting to the Cryochamber (CS30), frozen granules can be collected continuously. The process achieves zero contamination by seamlessly connecting the granulation and drying processes. The swinging movement of the barrel allows the flowing granules to be evenly mixed and promotes drying efficiency.





Full capacity (L)	85
Trapping capacity (kg)	10
Trapping temperature (℃)	-40
Major material	Stainless steel

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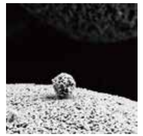
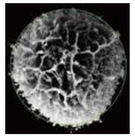
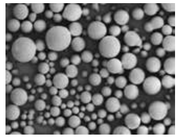
Freeze Granulator







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Freeze Granulator

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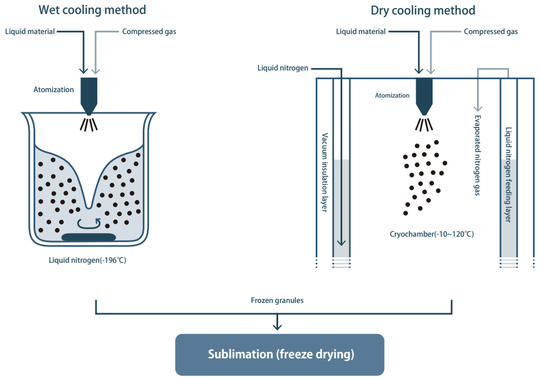
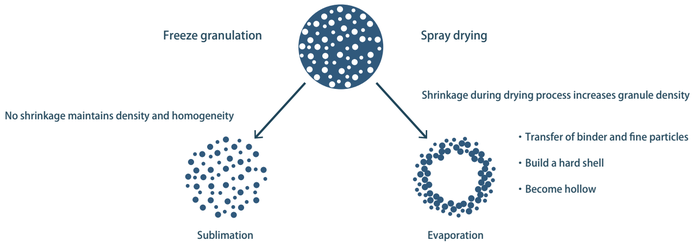
Freeze granulation

Freeze granulation is an industrial process of producing spherical granules with excellent fluidity by spraying a liquid material under ultra-low temperature environment. The sprayed raw material instantaneously gets frozen and dried granules are obtained after sublimation (freeze drying) process. Granules produced by freeze granulation are spherical and have excellent fluidity and can maintain high homogeneity.



Freeze granulator VS Spray dryer

Granules produced by freeze granulation process neither shrink nor transfer fine particles compared to the spray drying method, so granules are hardly hollow in shape, and high-dispersion, low-density and homogeneous spherical granules can be obtained. The particle size distribution (PSD) of the granules is wider (10-700μm) than spray drying, and tap density equal to or higher than spray drying can be obtained. Also, unlike high temperature hot air drying processes, it is possible to minimize the oxidation of the raw material during the production process.

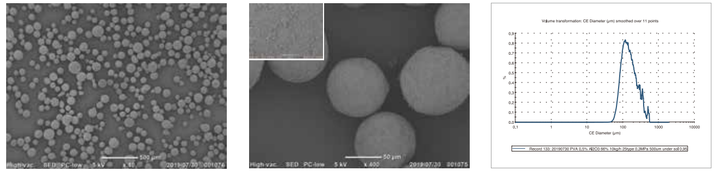


Characteristic

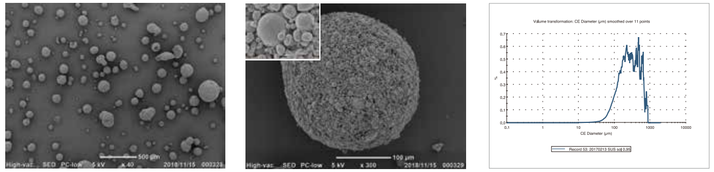
- Particle size range is about 10-700μm
- Spherical granules with excellent fluidity
- Less deformation of granules
- No transfer of fine particles and binder
- Low density and soft granules
- Uniformly dispersed granules without becoming hollow
- Less oxidizable than high temperature drying process
- Density control is possible by adjusting the solid concentration
- Less material loss and high yield
- Low possibility of contamination
- Possible to process from small volume (50-100ml) to large volume
- Easy cleaning

Reference

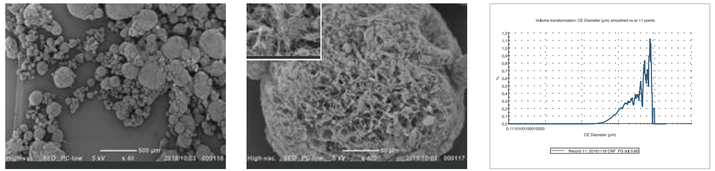
Al203 66wt% Slurry　Process type：CS30　Dv50：140μm



SUS316 88wt% Slurry　Process type：LS-6nms　Dv50：150μm



Cellulose nanofiber 2wt% Slurry　Process type：LS-6　Dv50：400μm

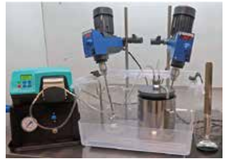


Applicable fields

- Fine ceramics and metal composites
- MIM and Extruded powder filling
- Material synthesis
- Redispersion processing of nano powder and CNT
- Carrier particles in catalysts
- LED material
- Thermal spray material
- Pharmaceuticals and biomaterials

Lab-scale freeze granulator (Wet cooling method)

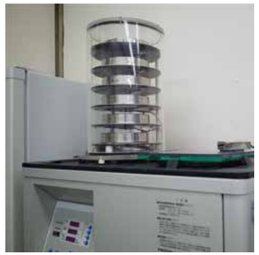
LS-6 Series (PowderPro)


Feed capacity (kg/h)	Up to 6
Atomization mode	Two-fluid nozzle
Cryochamber diameter (mm)	Φ120
Cooling temperature (℃)	-196℃
Cooling method	Wet cooling with liquid nitrogen

Small batch type freeze dryer - FDU-2110





Capacity	300g × 6 trays
Trapping capacity (L)	3
Trapping temperature (℃)	-80