Ashizawa

Dispersing Machine for Mass Producing Nano Particle

MAX NANO GETTER® HFM

MAX NANO GETTER®

Finezation the materials

Can disperse particles, with high quality and precision, down to nanometer sizes.

- Realizing Mild Dispersing by Ideal Bead Movement
- Mass Production for High-quality and High-precision Nano Particles
- Reliable Beads Separation and Stable Use of Microbeads
- A significant increase in operating parameters by selecting an appropriate type

HFM4

Explore the future with invisible things.

Ashizawa Finetech Ltd.

MAX NANO GETTER® HFM

Achieved high-quality dispersion! We will handle wide-ranging cases.

We will meet your advanced requests with the Mild Dispersion® !

The dispersion process is intended to disperse aggregates to primary particles. However, applying excess energy causes them to break into the primary particles.
This activates the new surfaces of the milled particles, increasing interaction between particles on the activated surfaces, which results in reaggregation.
By controlling energy during particle dispersion helps prevent over-dispersion. This particular method, known as 'Mild Dispersion,' is exclusive to the 'MAX Nano Getter.' It achieves a balanced 'rolling force' of the beads in both circumferential and axial directions, effectively managing the shear forces of particles and beads. The 'MAX Nano Getter' is a specialized bead mill designed to meet these conditions. The 'MAX Nano Getter' can now disperse particles down to nano sizes while controlling over-dispersion without damaging them.

What is Mild Dispersing®?

Mild Dispersion is Ashizawa Finetech Ltd.'s original dispersing technology, which maintains sizes, shapes, crystal structures, and surface conditions of primary particles.

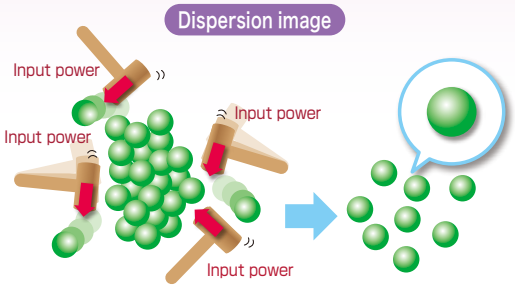
Your Benefits

- KEEP particle properties
- NO re-agglomeration
- REDUCE additives amount

Mild Dispersion®

Controls over-dispersion, and micronizes particles with high quality and precision without damaging them.

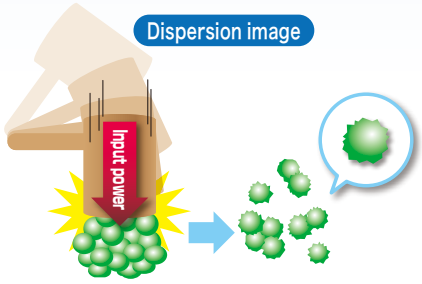
Dispersion image



Conventional dispersion

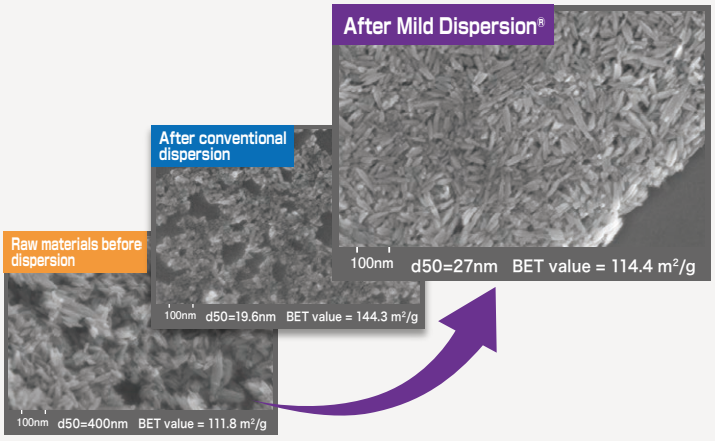
Over-dispersion is likely to increase particle damage and promote aggregation.
Product characteristics are also likely to be compromised.

Dispersion image



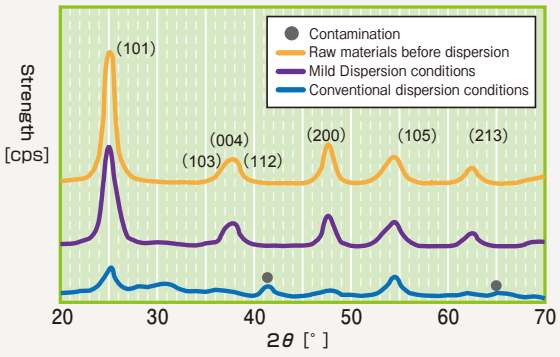
"Mild Dispersion®" is the registered trademark no. 4891867 of Ashizawa.

Case of dispersion while maintaining needle-like shapes: Target: Titanium oxide



Maintain particle characteristics

< results of X-ray diffraction >

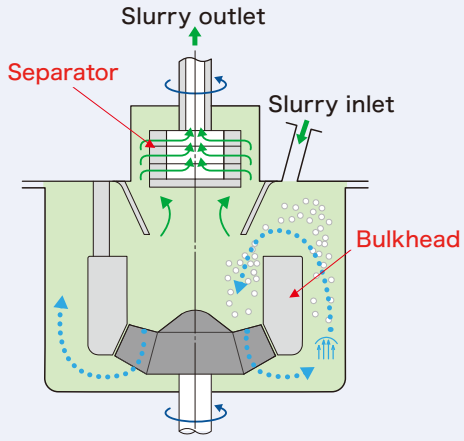


MAX NANO GETTER® HFM Introducing our p

HFM

Two drive shafts

Independently driven centrifugal separator



⇒Ideal bead flow (spiral laminar flow) enables **Mild Dispersing.**

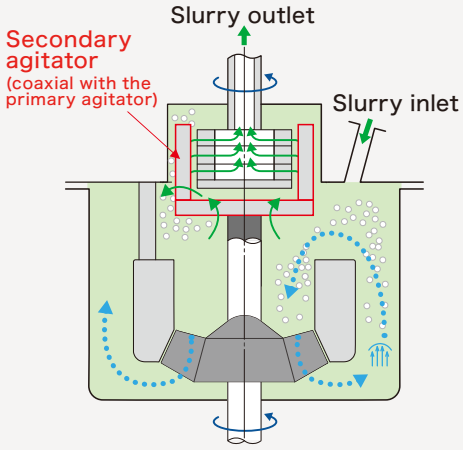
- Enables high-quality and high-precision dispersion down to nano sizes.
- Two-axis centrifugation mechanism enables reliable bead separation.
- Easy to scale up from laboratory equipment to large-scale production.

Enhance operating parameters with a new type based on proven track results!

- The seco
- The use

HFM-E Enhanced centrifugation type

Two drive shafts



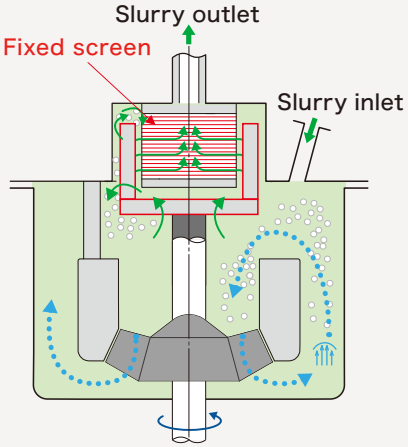
Addition of a secondary agitator

⇒Increased bead separation capability enables high flow rate operation.Reduce bead segregation near the separator.

- Enhanced the scope of operating conditions. (High flow rate and low tip speed operations are possible)
- An ideal bead distribution allows for the use of beads ranging from ϕ 0.015 to 0.5 mm.

HFM-S Slotted pipe type

One drive shafts



Addition of slotted pipe

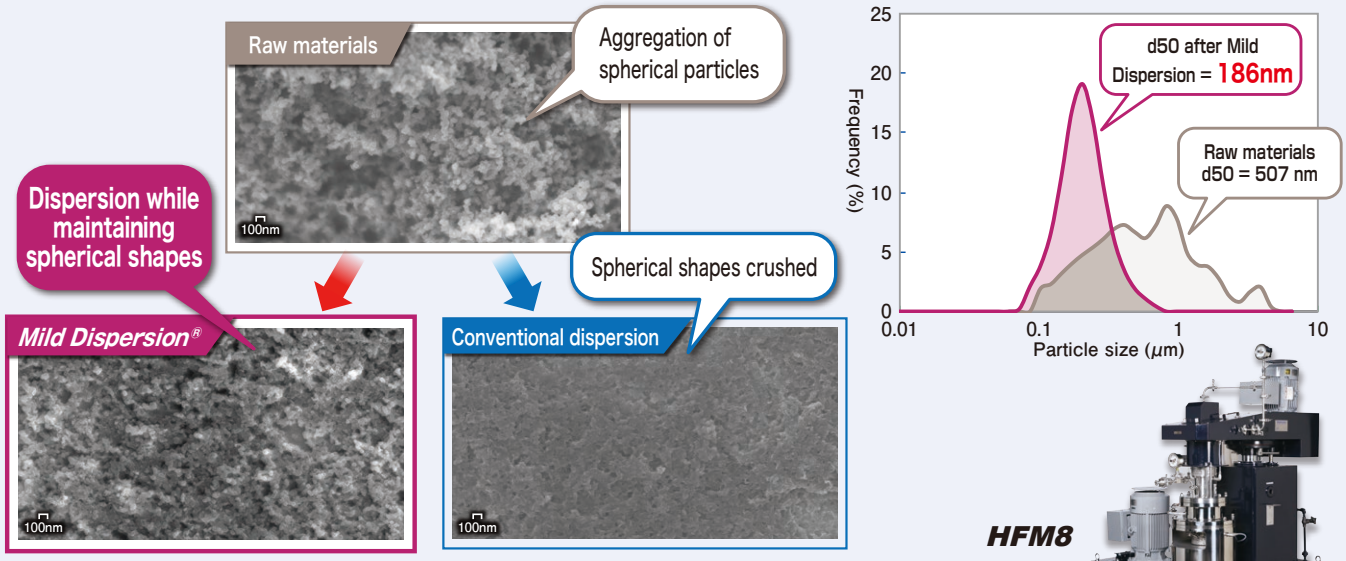
⇒This enables handling of high-viscosity slurry while maintaining an ideal bead flow (spiral laminar flow).

- Has fewer parts than the enhanced centrifugal type and is inexpensive.
- Can handle a wider range of viscosity than the enhanced centrifugation type centrifugal type (up to 300 mPa·s).
- ϕ 0.1 to 0.5 mm beads are usable.

roduct lineup (Production machine scales)

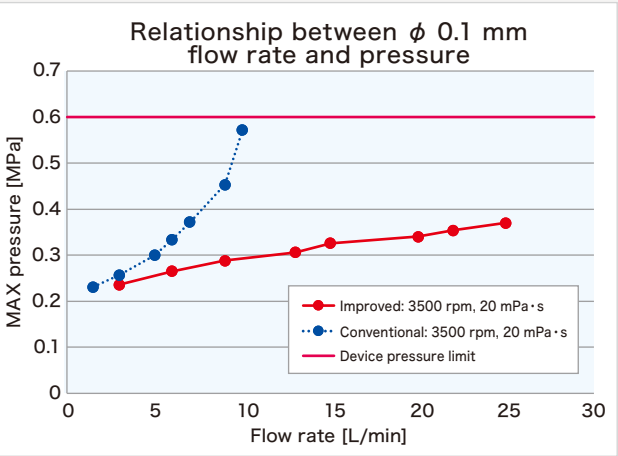
Examples of dispersion of fragile materials

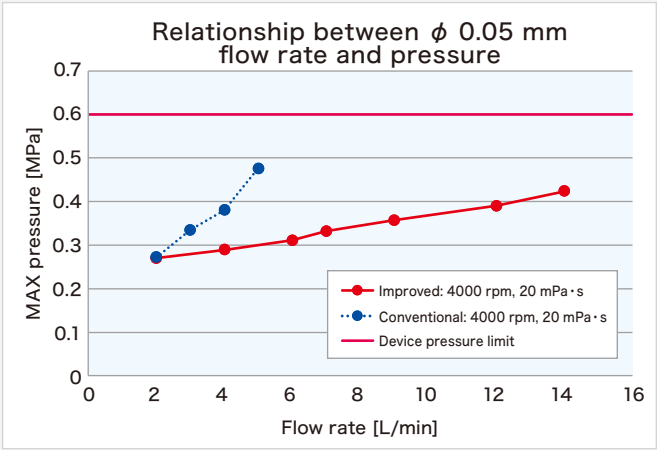
Target: Carbon application: Conductive additive for batteries



HFM8

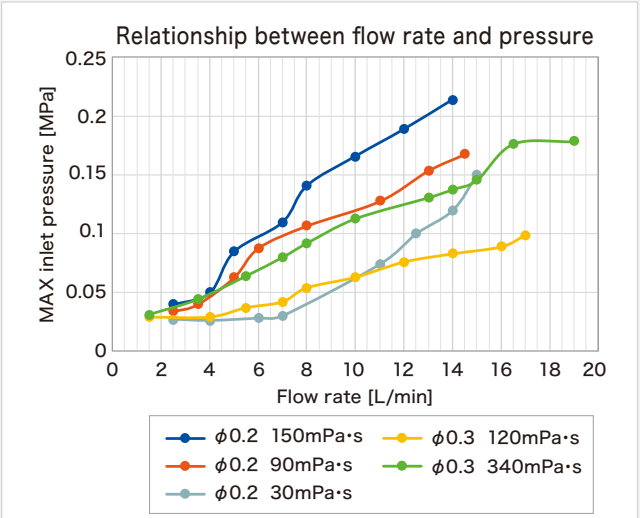
ondary agitator has further expanded the scope of our dispersion tests!
of a slotted pipe has enabled the processing of slurry, which was difficult to handle.

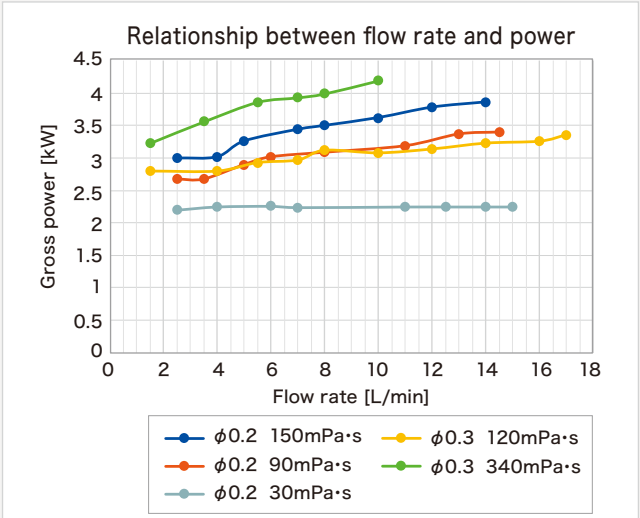




Bead diameter used: ϕ 0.05, 0.1 mm PSZ
Agitator tip speed: 8 m/s
Wheel rotation speed: Up to 4000 rpm

product: CMC aqueous solution
Slurry viscosity: 20 [mPa·s] @ 1000 [1/s], 25 [°C]





The 'spiral laminar flow,' which considers balance between circumferential and axial directions, generates an ideal bead movement, resulting in damage-less, high-quality dispersion.

Achieve an ideal bead movement.

What is the ideal bead movement?

- Beads stay uniformly in the griding chamber.
- Beads are not over-dispersed.
  (Efficiently contacts particles without applying strong shear forces.)

Control of contamination

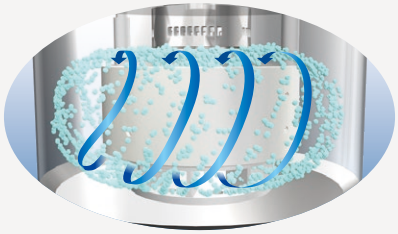
Regarding to wear and contamination, it is very important to select a mill which doesn't use too much energy.
By the ideal beads movement, NANO GETTER and MAX NANO GETTER have great characteristics f high energy efficiency and they don't give excess energy which leads to contamination.

Bead movement in MAX Nano Getter®

The 'rolling force' of beads disperses particles.

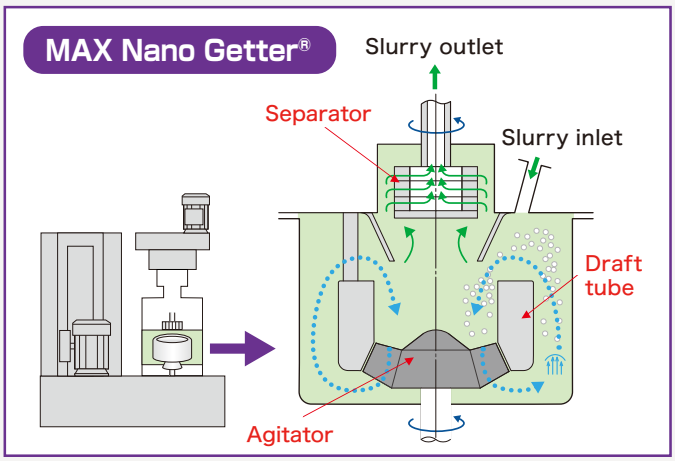
Controls over-dispersion, and micronizes particles with high quality and precision, without damaging them.

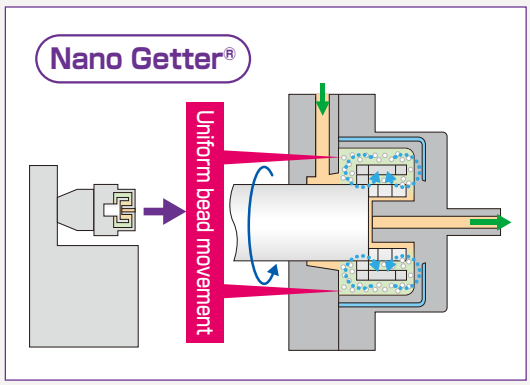
■ Achieve an ideal bead movement.
"Spiral laminar flow"



Movement of beads in the milling room

■ Optimal shape for "dispersion" with uniform energy in the griding camber





Realize with MAX Nano Getter®/Nano Getter® !

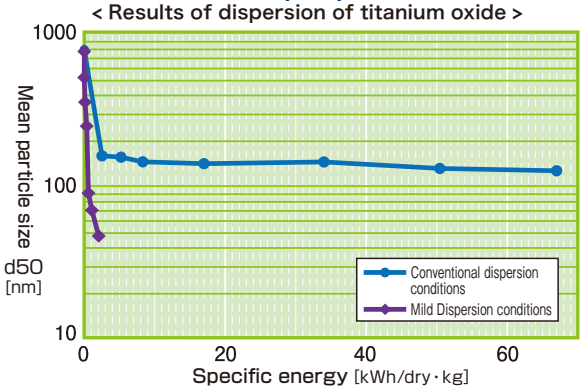
Example of Mild Dispersion® of photocatalyst (titanium oxide) that requires transparency

Concentration: Same for all, primary particle size = 30 nm

* Photographed one year after micronizing

Reduction in input power

< Results of dispersion of titanium oxide >



MAX NANO GETTER® HFM

Various lineup from lab machines to large machines

Birth of a small machine

Circulation-type small machine for nanoparticle production

MAX NANO GETTER® HFM06

- Sample volume required for circulation type: 3.0 L
- Bead diameters available for screen-less machines: ϕ 0.015 to 0.5 mm
- Easy to scale up to production machines.

Specifications

	MAX NANO GETTER® HFM model						
	HFM02 (Batch type)	HFM06	HFM4/8		HFM20	HFM50	HFM8
							HFM-E / HFM-S
Griding chamber volume (L)	0.2	0.63	3.1	6.9	17	50	5.61
Drive power agitator (kW)	2.2	3.7	11		30	30～55	15
Drive power for separator (kW)	–	2.2	3.7		11	15	5.5 / –
Dimensions (mm) [W × D × maximum total height H]	400×550×600	700×900×1500	1200×1200 ×2300		2500×2000 ×2800	3000×2500 ×3400	1200×1200 ×2300 / 1200×600 ×2300
Weight (kg)	40	500	1300		2500	3200	1300 / 1100
bead size (mm)	ϕ0.015～0.2	ϕ0.015～0.5					ϕ0.015～0.5 / ϕ0.1～0.5
Bead separation system	–	Independently Driven Centrifugal Separator					Enhanced centrifugation / Slotted pipe
Material of wetted part	Ceramics, resin	Ceramics, SUS, abrasion resistant steel, resin					Ceramics/resin

* Values are representative and specifications may be subject to change without notice.

Dispersing machine for Nano particle

NANO GETTER®

- The slotted pipe is installable optionally.
- A simple structure enables unparalleled cleanability.
- Easy maintenance

Specifications

	NANO GETTER® DMR Series		
	DMS65	DMR/S110	DMR/S180
Griding chamber volume (L)	0.12	0.45	2.1
Drive power agitator (kW)	2.2	3.7	11
Drive power for separator (kW)	–	–	–
Dimensions (mm) [W × D × maximum total height H]	400×550 ×600	1000×1000 ×1000	1100×1300 ×1900
Weight (kg)	40	350	800
bead size (mm)	ϕ0.03～0.3	ϕ0.03～0.5	
Bead separation system	Centrifuge separator *		
Material of wetted part	Ceramics	Ceramics, SUS, abrasion resistant steel, resin	

* Screen installation is optional.
Values are representative and specifications may be subject to change without notice.

Applications

Optical material/film ● Pigment ● Cosmetics ● Dyes ● Optical catalysts ● Polishing agent for semiconductors ● Magnetic recording material ● Liquid crystal color resist ● Battery material ● Other nanoparticles in general

Explore the future with invisible things.

Ashizawa Finetech Ltd.

Headquarter 1-4-2 Akanehama, Narashino city, Chiba Japan, 275-8572 TEL 047-453-8111 FAX 047-453-8378

Osaka Branch 4-15-13 Katayama-cho, Suita city, Osaka Japan, 564-0082 TEL 06-6389-7700 FAX 06-6389-7710

To Web

https://www.ashizawa.com E-mail sal@ashizawa.com

2401C10 GII-1