Wet Grinding / Dispersing

# LABSTAR mini

A Single Common Frame for 3 Different Uses

Scale-up to Production Size

Corresponds to the Microbeads



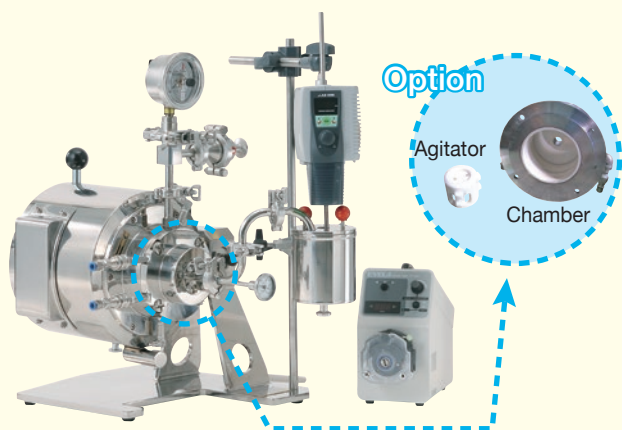Best for Nano Level Dispersing

Easy Handling

Circulation Type Batch Type

Particle technology for co-creation of new possibilities

**Ashizawa** Ashizawa Finetech Ltd.

# The Smallest Laboratory Size
（Minimum batch amount：100mL～）

## Option

Agitator

Chamber

## A Single Common Frame for 3 Different Uses

When you are facing problems related to micronization, Ashizawa offer you the best solution by deciding whether the material is grinded or dispersed.

Labstar Mini is a laboratory sized bead mill with changeable chambers and agitators according to type of micronizing (grinding or dispersing). It is also changeable to batch type which is best for sampling a small amount of slurry.

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## 1 For Grinding MGF015

**Features**

**①The Laboratory size MGF Mill**
MGF015 is excellent for grinding particles to sub-micron size.

**②For Strong Shear Grinding**
Particles are grinded in pieces from strong shear movement of the beads. Dispersing in high viscosity slurry needs strong shear power, which can be achieved using MGF015.

**③Centrifugal Separator with Screen**
Combination of Centrifugal separator and screen, high viscosity slurry can also be operated.
➡ **Microbeads can be used, and this enables finer grinding level**

**④High Energy Density Chamber**
Narrow grinding area and the projections on the agitator produces great energy within the chamber, and move the beads strongly.

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## 2 For Dispersing NANO GETTER DMS65

**Features**

**①The Laboratory size mill of NANO GETTER**
The smallest size of NANO GETTER which is excellent for nano dispersing.

**②Mild Dispersing**
"Rolling" power of beads can separate particles into pieces (see the right diagram). This "rolling" method reduces the particles' damage to the minimum.
➡ **Prevents re-agglomeration and contamination**

**③Screenless**
Our original centrifugal separating system now allows to operate without screen.
➡ **Easy handling of microbeads**
  **Eliminates the pre-grinding process**

**④Small L/D**
Homogeneous movement of beads leads to higher efficiency of energy.

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## 3 Batch Type For grinding and dispersing MAX NANO GETTER HFM02

**Features**

**①Ideal Beads Movement for Dispersing**
Straightening vane in the bead mill controls beads movement. This realizes "Mild Dispersing" maintaining high efficiency and high quality.
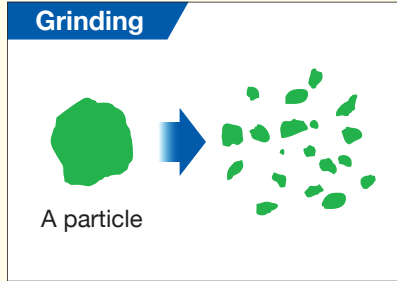The Laboratory size mill of MAX NANO GETTER

**②The Minimum Sampling from 100mL**
Batch type chamber doesn't require other equipments such as pumps, pipes, etc. HFM02 is ideal for tests using a small amount of slurry.

# LABSTAR mini

## Grinding
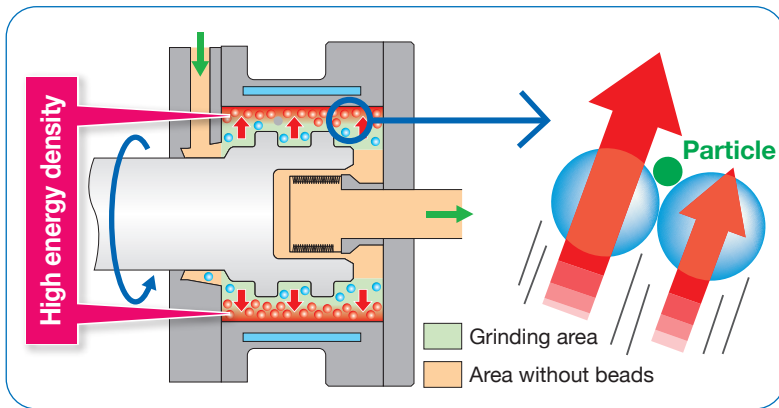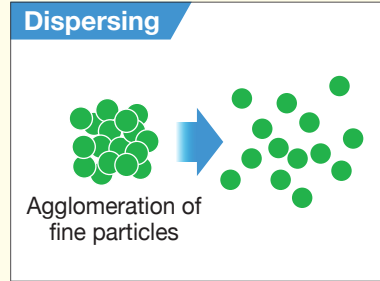### Break /shatter a particle

**Grinding**



A particle

## Dispersing
### Separating fine particles

**Dispersing**



Agglomeration of fine particles

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**High energy density**

**Particle**

- Grinding area
- Area without beads

Diagram of MGF015 and the movement of beads

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**Homogeneous movement of the beads**

**Particle**

**Beads**

- Grinding area
- Area without beads
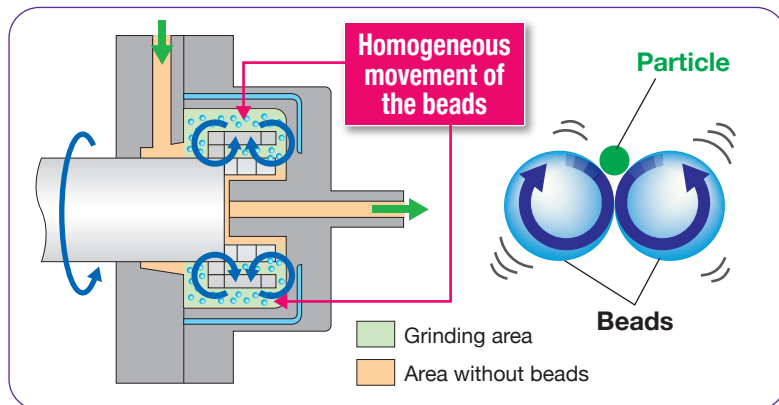
Diagram of DMS65 and the movement of beads

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Straightening vane

Movement of Slurry and Beads

**Spiral Laminar Flow**

Beads' movement

- Grinding·Dispersing area (Beads density : High)
- Grinding·Dispersing area (Beads density : Low)
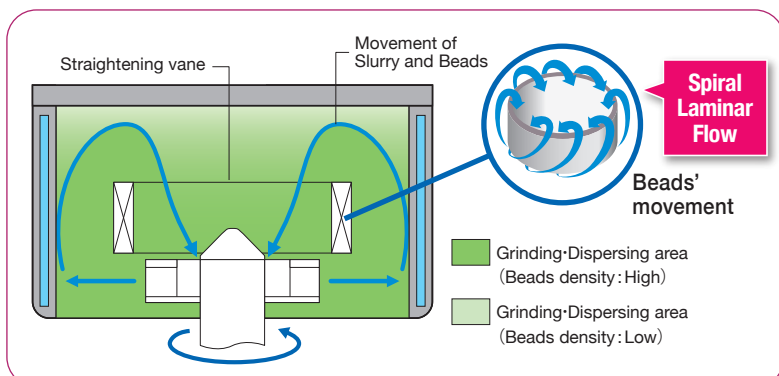
Diagram of HFM02 and the movement of beads

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*Swiveling chamber makes it easier to handle. Chamber angles can be adjusted for each process.*
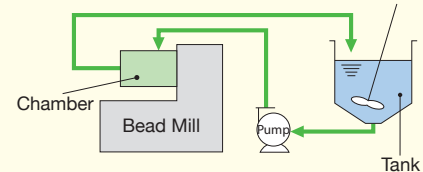


Beads Discharge Position



Operating Position



Beads Filling Position
※Operating Position (HFM02)

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## Difference between Re-circulation System and Batch System

### ● Re-circulation System

Slurry in tank is pumped to the chamber to be dispersed. The slurry is pushed back to the tank again. The slurry circulates through this system repeatedly.



Chamber

Bead Mill

Pump

Tank

### ● Batch Type System

Slurry stays only in the chamber and be dispersed, No pumps, pipes, and other components are needed.

### ■ Advantages and Disadvantages of Re-circulation system / Batch system

| | Advantages | Disadvantages |
|---|---|---|
| **Re-circulation system** | • Can manage large amount of slurry using small sized mill<br>• Amount of slurry can be changed | • Need pumps, pipes and other components. |
| **Batch system** | • Can run with small amount of slurry.<br>• No pumps, pipes, and other components needed. | • Unsuitable for mass production<br>• Amount of slurry is fixed. |

# What is Mild Dispersing?

Mild Dispersing is Ashizawa Finetech Ltd.' s original dispersing technology, which maintains size, shape, a crystal structure, and a surface condition of a primary particle.

## Conventional Dispersing
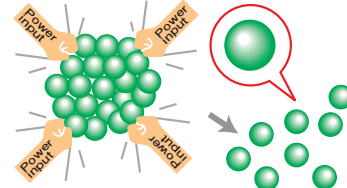### Concentrated power input
Particles are easily damaged thus causes re-agglomeration
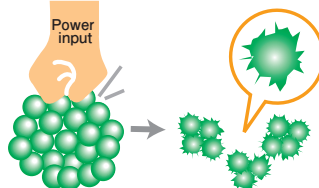


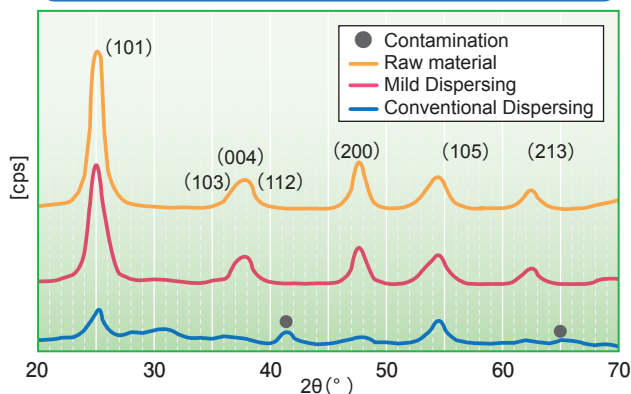## Mild Dispersing
### Distributed power input
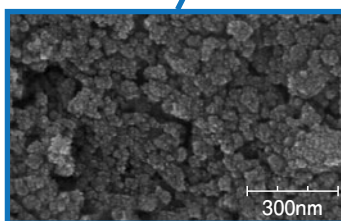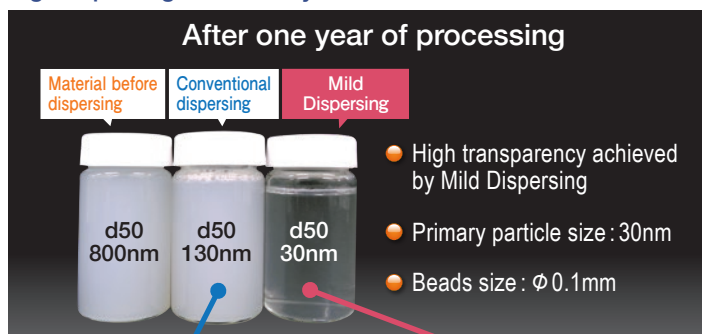Particles are not damaged, thus particles' attributes are kept



## Mild Dispersing can disperse particles…

- to primary particles without damaging their crystal structure
- without re-agglomeration by suppressing the surface activity
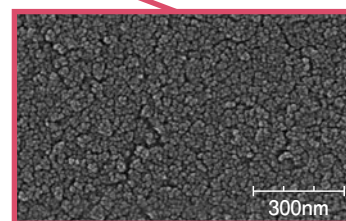- with little wear and contamination

### The result of X-ray diffraction (Processed Sample)



Legend:
- Contamination
- Raw material
- Mild Dispersing
- Conventional Dispersing

(101) (004) (103) (112) (200) (105) (213)

[cps]

2θ(°)

### e.g. Dispersing Photocatalyst (Titanium Oxide)

#### After one year of processing



Material before dispersing | Conventional dispersing | Mild Dispersing

d50 800nm | d50 130nm | d50 30nm

- High transparency achieved by Mild Dispersing
- Primary particle size : 30nm
- Beads size : Φ0.1mm


300nm
Conventional Dispersing


300nm
Mild Dispersing

## Specifications

| | LABSTAR mini | | |
|---|---|---|---|
| | MGF015 | DMS65 | HFM02 |
| Grinding Chamber Volume (L) | 0.17 | 0.12 | 0.2 |
| Batch Volume (L) | 0.3〜 | | 0.1 |
| Motor (kW) | 2.2 | | |
| Tip Speed (m/s) | 8–14 | 8–15 | 8–15 |
| Bead Diameter (mm) | 0.1–0.5 | 0.03–0.3 | 0.03–0.2 |
| Separation System | Centrifugal Separator with Screen | Centrifugal Separator without Screen | —— |
| Operating Method | Re-circulation | | Batch Type |
| The Shaft Seal | Double Mechanical Seal | | |
| Agitator/The Inner Surface of Grinding Chamber | Ceramics | | Ceramics and Nylon |
| Dimension, Weight (W×D×H) | Bead Mill：400×600×600mm・40kg ／ Whole Unit：1400×600×700mm・90kg | | |