

Wet bead mill

Mugen Flow[®] MGF

High quality fine grinding and dispersion achieved by higher-grade refinement technology

Proven record of
30,000 mPa·s

High viscosity slurry compatible

10x higher than
conventional mills

High flow rate operation possible

Minimum bead
diameter :
0.1 mm

Small beads compatible

KEY POINT

Well-polished, superb
bead-separation
performance



MGF2

Mugen Flow[®] MGF is a high-performance bead mill that provides dramatically improved grinding capacity compared with conventional mills. This technology is compatible with extremely high-viscosity and high-concentration slurry, and has thus revolutionized the field of slurry blending. This mill is capable of fine grinding to a nanometer level or submicron level.

Feature I

High flow rate operation possible

Can be configured to operate at 10 times the flow rate of conventional mills.

*Comparison with our conventional mills

<Example>

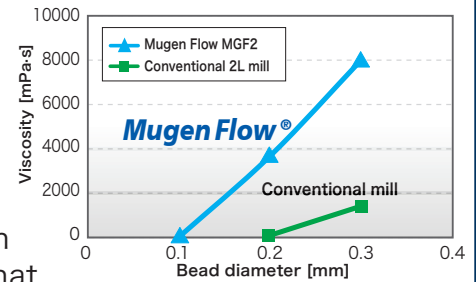
In case of MGF10 (10L mill), can operate at approx. 100 L/min.

Feature II

Small beads compatible

Usable bead diameter of 0.1 to 1.0mm

Provides stable operation even with use of small beads that are difficult to control



Material: CMC Filling level: 85%
Tip speed: 12 m/s Flow rate: 2L/min

Feature III

Compatibility with high-viscosity, high-concentration slurry

Proven record of processing non-Newtonian fluid with viscosity of 30,000 mPa·s

<<Process example>>

Material: Calcium carbonate solid content: 75 wt%

Model: MGF2

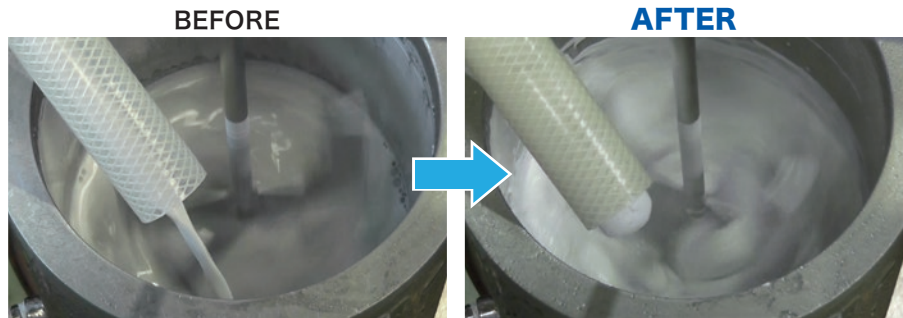
Tip speed: 8 m/s

Bead diameter: PSZ 0.5 mm

<<Viscosity after grinding>>

Type E: 621 mPa·s (25°C, 200 s-1)

Type BM: 100,000 mPa·s or more



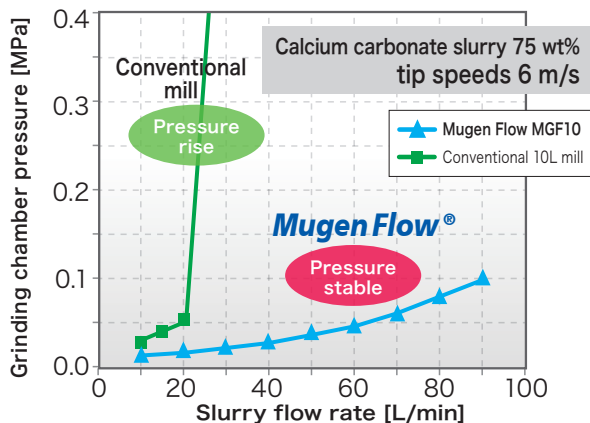
Thickening as miniaturization progresses

Feature IV

Low tip-speed operation

Can carry out stable operation without raising pressure even at low tip speeds

▶ Temperature rises also suppressed

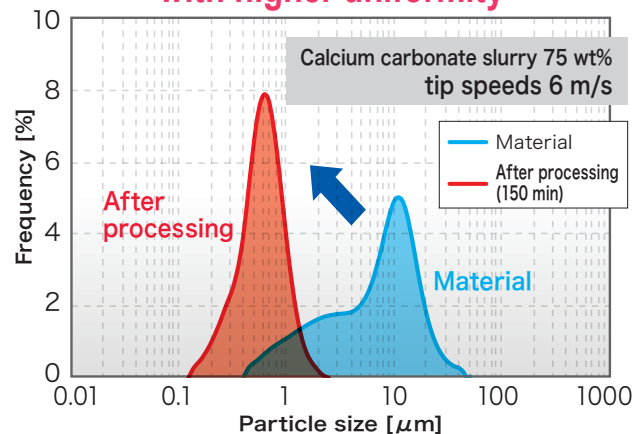


Feature V

High grinding performance

Features pin rotor-type grinding system

▶ Ensures particle size distribution with higher uniformity



POINT

Based on **high-flow circulation** and **superb bead-sep**
fine grinding of even high-viscosity, high-c
or submicron level with efficiency

newly-enhanced

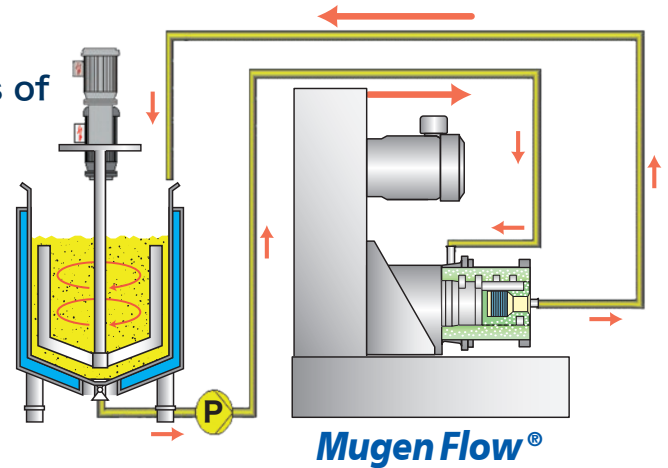
Mechanisms and benefits of high-flow circulation

What is high-flow circulation?

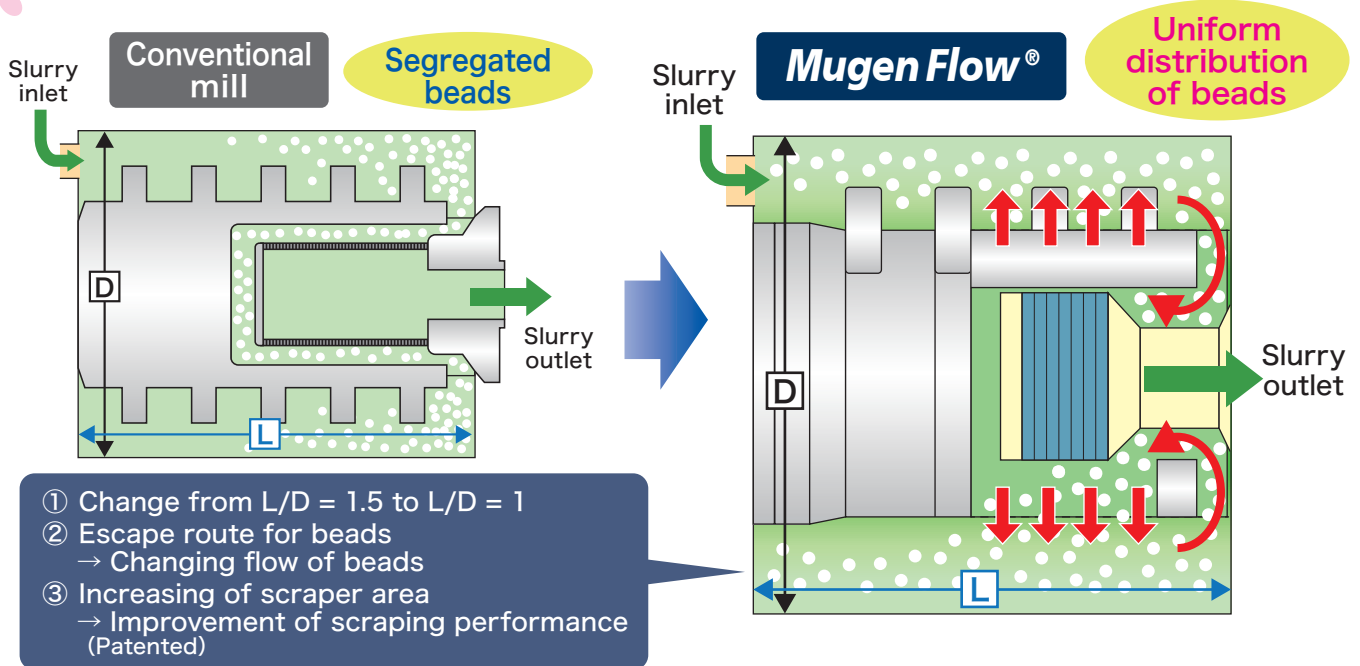
This is a multi-pass system in which circulation between the tank and bead mill is carried out at a high flow rate, and several dozen passes are performed.



Motions and mechanisms of high-flow circulation



Benefits of superb bead-separation performance



[Image of inside of grinding chamber during high-flow circulation]

Bead flow conditions ideal for bead mills to fulfill their potential

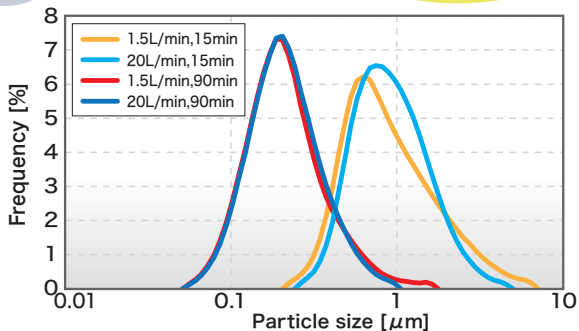
Segregation of beads prevented, ensuring **uniform distribution** in grinding chamber

Mugen Flow provides operation that had not been possible with conventional mills. Please feel free to consult us about this product.

Dispersion performance, concentration slurry to nanometer level

Benefits of high-flow circulation

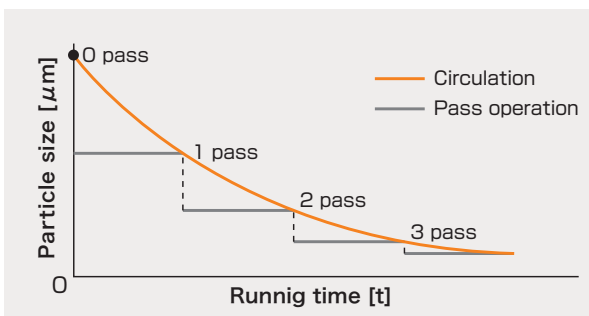
Sharp particle-size distribution



Differences in the flow rate can make the particle-size distribution sharp, even with the same average particle size.

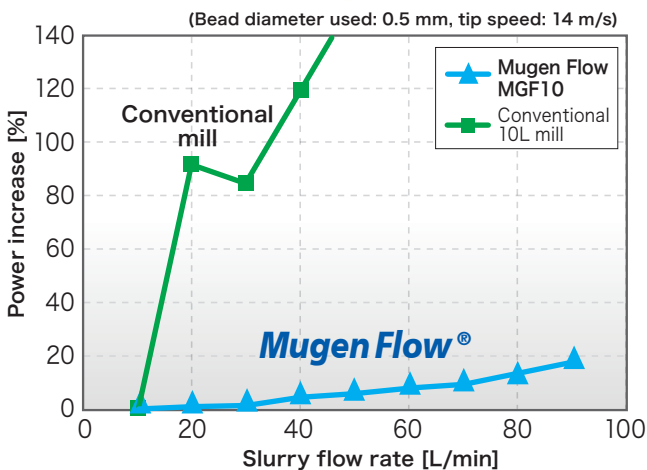
[Particle size distribution, and flow rate comparison]

Continuous dispersion



Dispersion is carried out continuously over time, so the target particle size for the product can be achieved with pinpoint accuracy.

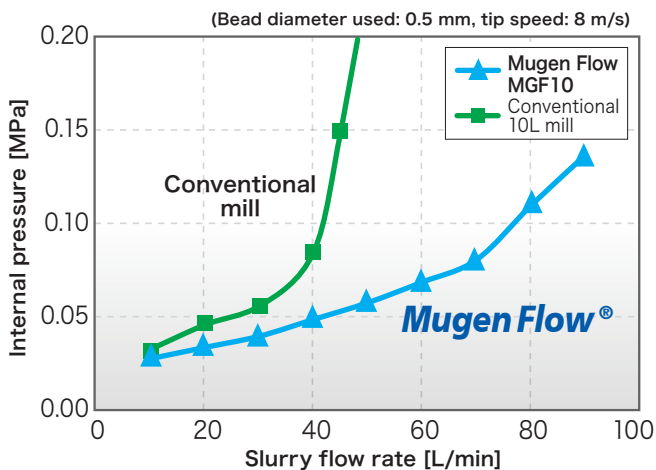
Suppressing of increase in electric power



Power increase rate is an indicator for the uneven distribution of beads inside the device. The larger the value is, the more unevenly the beads are distributed. The Mugen Flow restrains power increase rates in comparison with conventional mills.

[Comparison of increase in electric power]

Suppressing of pressure in grinding chamber



The internal pressure is mainly increased when the slurry flow rate is raised or a high-viscosity slurry is used. Mugen Flow increases it only slowly, which means the mill can operate at a higher slurry flow rate that cannot be reached by conventional mills.

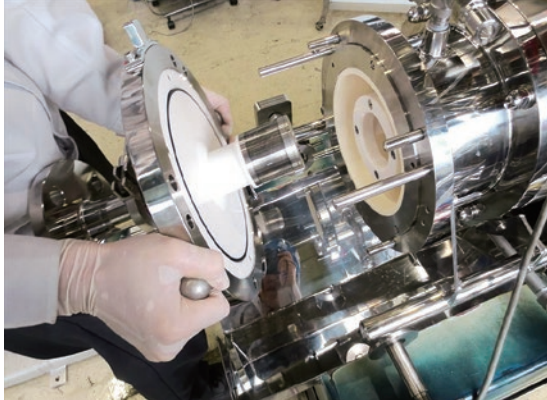
[Comparison of pressure in grinding chamber]

The setting range for operating conditions, such as flow rate, viscosity, concentration, tip speed, and bead diameter, is greatly expanded in comparison with conventional bead mills, and as a result, **the high-flow circulation of high-viscosity slurry is achieved!**

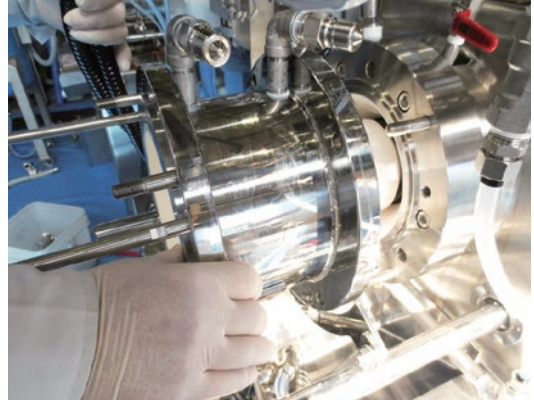
Feature

Extra

Simple maintenance (disassembly and assembly)



The outlet flange is removed to discharge the beads into the bead receptacle.



Disassembly can easily be carried out with a vessel drawer rail, and cleaning of the agitator can be performed.

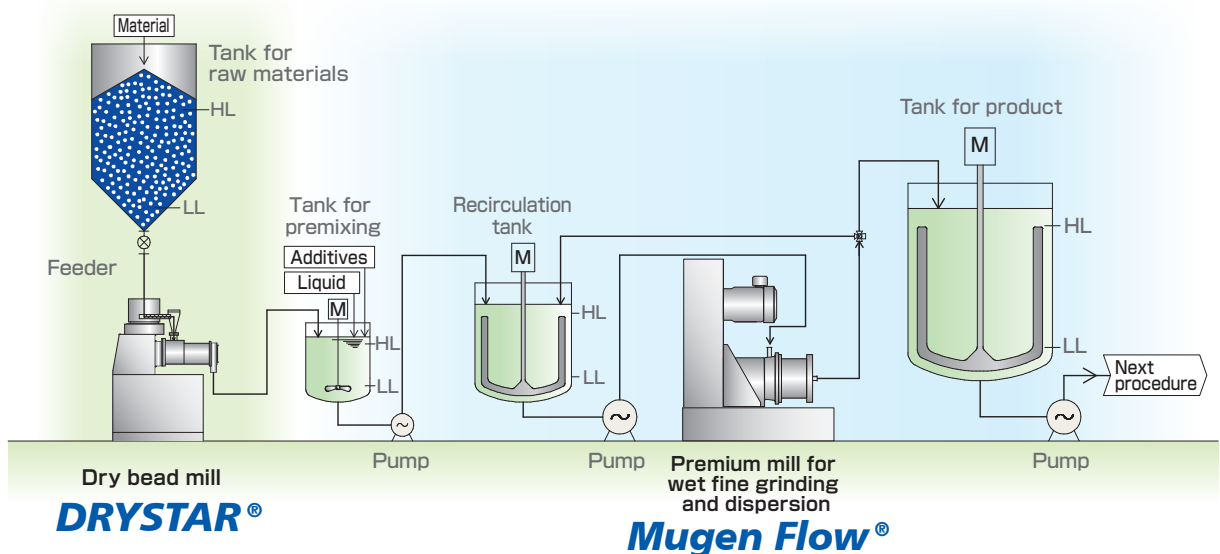
Proposal example

Eco-Grinding™ with **DRYSTAR®** + **Mugen Flow®**
(Model: SDA) (Model: MGF)

“Eco-Grinding” is a new system that saves energy during grinding.

This is achieved by combining a **dry bead mill (DRYSTAR® SDA)** with a **wet bead mill (Mugen Flow® MGF)**, which dramatically increases energy efficiency.

Example of unit

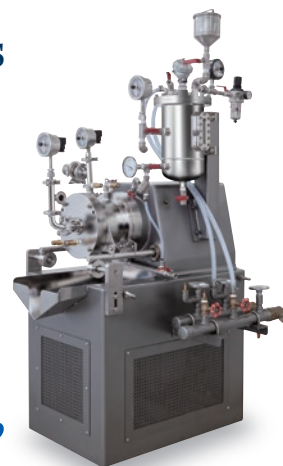


Rich lineup from laboratory models to large production models

We offer a lineup that ranges from table-top laboratory models for the production of small-lot, high-mix varieties for R&D purposes, to large-scale models suited for mass production. We have adopted a similar structure for all of the models, and this makes it possible to scale up with accuracy.



MGF25



MGF2

Applications



Electronic devices



Printing ink



Cosmetics



Food



Battery materials



Catalysts



Papermaking



Other

Materials

Ferrite, Carbon black, CNT, Zeolite, Alumina, Zirconia, Titanium oxide, Calcium carbonate, Pigment (Cyan, Magenta, Yellow), etc.

Specifications

Model	MGF015	MGF04	MGF2	MGF10	MGF25
Grinding chamber volume (L)	0.17	0.4	1.7	9.5	25.0
Motor (kW)	2.2	5.5	15.0	45.0	55.0
Size: W x D x H (mm)	400x600x600	900x1,000x750	900x950x1,950	1,400x1,500x2,000	1,300x2,700x2,350
Weight (kg)	40	250	500	1,500	3,000
Liquid contact member	Ceramics	Ceramics and Metals			

*The values are representative examples, and the specifications are subject to change without notice.

Particle technology for co-creation of new possibilities

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