DYNO®-MILL ML

MULTI LAB
Laboratory agitator bead mill

Dispersion and wet grinding technology brought to perfection, ideal for research and development

Willy A. Bachofen AG Maschinenfabrik

WAB – your expert for wet ultrafine grinding and dispersion

For decades WAB has been the unchallenged specialist in dispersion and fine grinding technology with its world-famous **DYNO®-MILL.** The exacting requirements for the final product also place extreme demands on the quality and wear resistance of the mill components. WAB with its wide-ranging mill program provides you each time with exactly what you need for your product and your process.

Features of the DYNO®-MILL MULTI LAB

- Ideal for the smallest possible applications in research and development and for small-scale productions
- Continuous or discontinuous operation with a versatile laboratory mill attributable to different, easy-to-change grinding containers
- Two grinding principles in one mill with either the KD agitator discs or the patented DYNO® Accelerators
- The flexible grinding concept means that it is possible to scale up to all DYNO®-MILL production mills that are based on the same principle.
- The ideal equipment for every product with the choice of the widest possible range of materials for the components that come in contact with the product – from hardened steel, stainless steel, tungsten carbide, zirconium oxide, silicon carbide, polyurethane, polyamide, Teflon
- Guaranteed long service life and no metal contamination with the use of high-quality ceramic components (SiC, ZrO_2)
- Small process volume and ideal cooling properties permit the processing of temperature-sensitive products
- Easy handling – the MULTI LAB can be dismantled and changed to a different mill configuration in a few simple operations
- GMP-compliant design – very easy to clean with a minimum of cleaning fluid
- Mill is easy to operate thanks to well-designed control system – quantifying and monitoring operational data with the modern WAB VIEW process control system

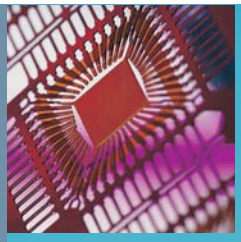
***DYNO®-MILL MULTI LAB** – with 1.4 litre grinding container, digital display showing product inlet pressure-, outlet temperature and the applied energy input (kWh)*

*The unique **agitator bead mill – the DYNO®-MILL MULTI LAB** – is used for the continuous dispersion and wet fine grinding of pumpable products with low to high viscosity in the micron to **nano range.***

Two grinding principles – one solution
unbeatable variability

The **DYNO®-MILL MULTI LAB** can be fitted with the traditional KD agitator discs as well as the patented DYNO®-Accelerators. The agitator discs or DYNO®-Accelerators which are mounted on the agitator shaft and easy to change, transfer the energy to the grinding beads in order to achieve the dispersion and grinding.

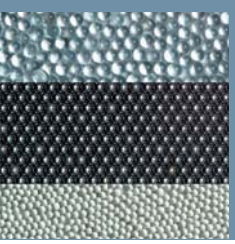
Nanotechnology – only the best for the smallest applications



Top quality comes from the use of high-grade materials

Maximum quality requirements (metal-free grinding/dispersion), high wear resistance and long service life mean that only the best materials are used in the DYNO®-MILL MULTI LAB. The choice of grinding bead quality is essential and affects the grinding and dispersion performance. With the DYNO®-MILL MULTI LAB you can use the finest grinding beads down to 0.1mm.

WAB tests and investigates in its own laboratory the various, commercially available grinding beads using DYNO®-MILLs. You do not simply buy a mill from WAB, you receive professional advice about the mill and about your product.



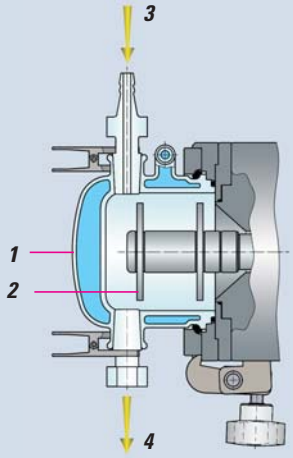
Discontinuous or continuous
the optimum production process for every product

Mode of operation
1 *Coolable grinding container in glass or stainless steel*
2 *DYNO® agitator disc in stainless steel, hardened steel, zirconium oxide, tungsten carbide, polyurethane, polyamide*
3 *Product inlet*
4 *Product outlet*

Discontinuous operation

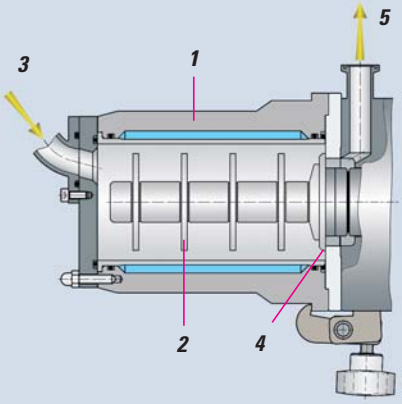
Grinding containers with volumes of 0.15l or 0.3l can be used for processing highly fluid suspensions in application sizes of 85ml or 170ml respectively. The product must be separated after grinding by sieving.

This grinding principle is used in particular for cell disruption in microbiology and for processing pharmaceutical active ingredients.

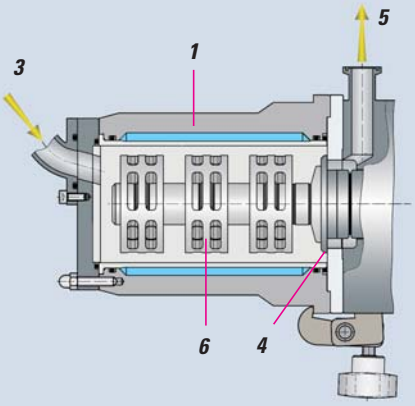


Continuous operation

Grinding containers with volumes of 0.15l, 0.3l, 0.6l and 1.4l can be used for processing highly fluid to viscous pumpable suspensions in amounts >500ml. A pump located next to the mill feeds the suspension into the DYNO®-MILL MULTI LAB. The grinding beads are retained in the grinding chamber using a dynamic gap separator, which makes it possible to use grinding beads with diameters from 0.1 to 2.0 mm.



For recirculation milling at high throughput rates, the ECM grinding principle with the DYNO®-Accelerators is used. This alternative may however also be used for the conventional passage process at lower flow rates. Only the 0.6 litre vessel may be used in this way.



Mode of operation
1 *Coolable grinding container with easy-to-change grinding cylinder in hardened or stainless steel, silicon carbide, zirconium oxide*
2 *DYNO® agitator disc in stainless steel, hardened steel, zirconium oxide, tungsten carbide, polyurethane, polyamide*
3 *Product inlet*
4 *Dynamic gap separator*
5 *Product outlet*
6 *DYNO®-Accelerators in hardened chrome alloy, polyethylene or zirconium oxide*

Reproducibility with optimum product quality with the WAB control and validation concept

WAB provides a comprehensive control system package. The DYNO®- MILL MULTI LABs can be equipped with manually operable to partially automatic to fully automatic control systems designed to be splash-water proof or explosion proof in accordance with 94/4/EU (ATEX).

WAB VIEW control system

In addition to the easily surveyed and simple operation of the mill, the WAB VIEW control system guarantees proper monitoring and recording of all process-relevant values . The design of the PLC control is modular and extensible:

- Data acquisition
- Process control via product temperature or kW input
- Visualisation systems with comprehensive management of formulations
- Communications system via modem
- Links to a PC or a control system are optionally included in our offer

GMP-compliant design – with WAB validation concept

The qualification documents **DQ, IQ, OQ** that are required for validation or certificates for the process-relevant machine components such as calibration and material certificates are available for all DYNO®-MILLs. Upon request we can also carry out the **F**actory **A**cceptance **T**est in our factory or the **S**ite **A**cceptance **T**est at your production location.

WAB also offers a complete laboratory solution for the development and production of cosmetic and pharmaceutical products.

Frequency control of the mill motor with digital display showing speed of the agitator shaft (rpm), product inlet pressure (bar) and product outlet temperature (°C)

ON / OFF button with ammeter and EMERGENCY switch, the speed of the agitator shaft can be easily changed by adjusting the position of the V-belt on the stepped drive pulleys

Modular construction – easy operation and servicing

With a minimum of manual operations the DYNO-MILL® MULTI LAB can be easily disassembled and cleaned and quickly converted to one of the many mill executions.

Quick servicing and cleaning

The assembly of the DYNO®-MILL MULTI LAB is well-designed and optimally adaptable to every process. Operating, cleaning and opening the mill for servicing is very simple. The cleaning is done with the minimum solvent/cleaning fluid, the loss of product is minimal and it is very easy to switch from one product to another.

Shaft seal

The shaft sealing is achieved with the single or double acting mechanical seal developed by WAB or with a special lip seal. The compact design of this unique mechanical seal permits easy and rapid change. The shaft seal rinse system employs a product-compatible rinsing liquid in a closed circuit containing feed pump and reservoir.

Before delivery the mechanical seals are always checked for leakage and quality which emphasizes the reliability of the WAB seals. In addition to simple maintenance, the mechanical seals can be sent to the factory for inspection. WAB will replace the functionally relevant components. After inspection, this seal undergoes the WAB standard quality test. In this way our customers obtain optimal benefit and reduce the maintenance costs considerably.

Scale-up from the laboratory to production

The ideal laboratory mill for all grinding and dispersion work in the field of research, development and small production.

The geometry of the grinding systems correspond to those of production mills which is why the dispersion/grinding performances achieved are easily transferable to the bigger mill types of **DYNO® MILL KD** and **ECM** (high-efficiency agitator bead mill).

DYNO®-MILL KD 60

DYNO®-MILL ECM Pro

Overview of the DYNO®-MILL MULTI LAB range

TYPE	GRINDING CHAMBER VOLUME l	MINIMUM BATCH VOLUME ml	GRINDING SYSTEM Ø mm	MILL DRIVE kW	COOLING WATER CONSUMPTION l/h	WEIGHT kg	DIMENSIONS L/W/H mm
Discontinuous	**0.15**	**85**	**KD agitator disc, 64**				
	0.3	**170**	**KD agitator disc, 64**				
				3.3–4.0	**250–400**	**95–125**	**680x740x580**
Continuous	**0.15**	**500**	**KD agitator disc, 64**				
	0.3	**600**	**KD agitator disc, 64**				
	0.6	**800**	**DYNO®-Accelerators, 64**				
	0.6	**800**	**KD agitator disc, 64**				
	1.4	**2000**	**KD agitator disc, 80**				

Subject to changes in design. The characteristics shown are indicative values and are dependent on the product to be processed

X-Ray, Basel

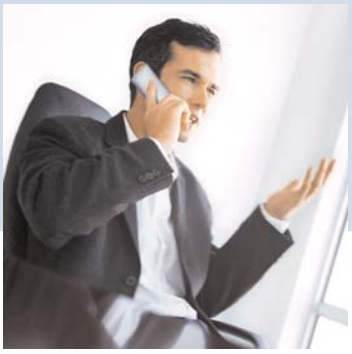
Highest product quality

most up-to-date grinding technology

- **for aqueous,**
- **solvent-containing,**
- **and for contamination-free products**

in research and development laboratories, university institutes and in production operations in countless branches of industry

- Paints and varnishes
- Printing inks
- Coatings
- Pigments and dyes
- Automobile paints
- Ink jet inks
- Ceramics
- Dental fillings
- Food industry
- Microelectronics, semiconducter
- Fillings
- Pharmaceuticals
- Cosmetics
- Agrochemicals
- Paper industry
- Life sciences
- Biotechnology
- Microbiology



Test the performance of the future

In our pilot plant you can experience the future live. Test the DYNO®-MILL MULTI LAB yourself and you will be convienced by its amazing performance potential. We will be pleased to arrange an appointment for you and also to provide you with advice and services in matters of process engineering.

WAB global: our service and sales network

With over 40 sales and service locations, our global network is ready to serve our customers with competent advice and efficient support and always guarantees a fast response and thus the shortest down times. In addition to the extensive stores at our headquarters, our subsidiaries as well as other sales and service locations keep in stock a wide range of spare parts.

WAB

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