

# DYNO<sup>®</sup>-MILL ML

MULTI LAB

Laboratory agitator bead mill

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



# WAB – your expert for wet ultrafine grinding and dispersion

With its world famous **DYNO®-MILL**, WAB is the undisputed specialist in dispersion and grinding technology. The agitator bead mills fulfil the most stringent requirements with regard to the quality and abrasion resistance of the mill components. With our comprehensive range of mills, you can be sure to find the right model 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 DYNO®-ACCELERATOR
- 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<sub>2</sub>)
- 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

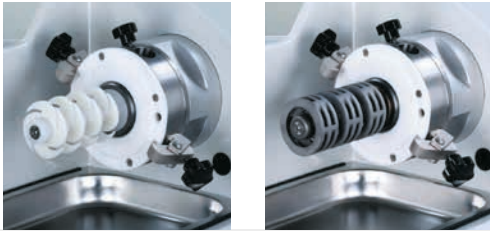


**DYNO®-MILL MULTI LAB** –  
with 0.6 litre grinding container, WAB VIEW control system

*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 DYNO®-ACCELERATOR. The agitator discs or DYNO®-ACCELERATOR 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.

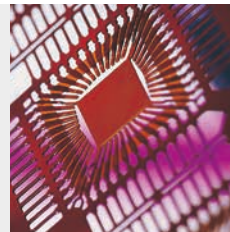


## Nanotechnology – only the best for the smallest applications

### 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®-MILL. 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

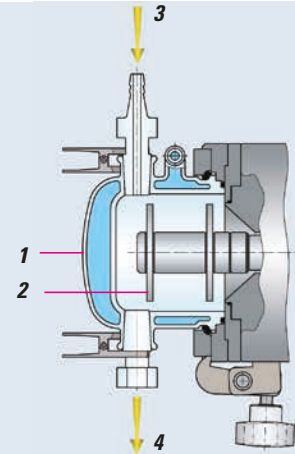
- 1 Coolable grinding container in glass or stainless steel
- 2 DYNO® agitator disc in stainless steel, hardened steel, zirconium oxide, tungsten carbide, polyurethane, polyamide
- 3 Product inlet
- 4 Product outlet



### 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.

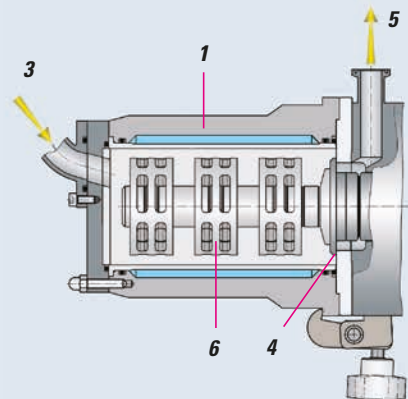
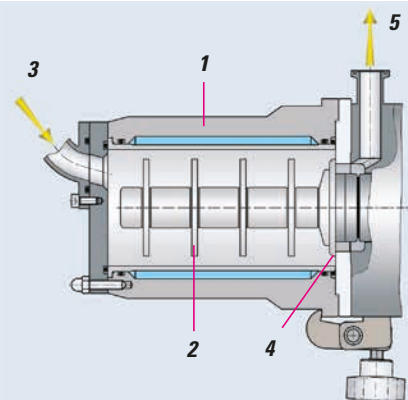
This grinding principle is used in particular for cell disruption in microbiology and for processing pharmaceutical active ingredients.



### 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 2.5 mm.

For recirculation milling at high throughput rates, the ECM grinding principle with the DYNO®-ACCELERATOR 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®-ACCELERATOR in hardened chrome alloy, polyethylene or zirconium oxide



# Reproducibility and top product quality with WAB control systems and validation concept

## WAB control systems

The three control systems **WAB BASIC**, **WAB CONTROL** and **WAB VIEW**

enable manual, semi-automated or fully automated control of the DYN0®-MILL agitator bead mills.



### WAB BASIC

The economical, tried-and-trusted machine control system for harsh production environments.

### WAB CONTROL

WAB CONTROL (IP 65-compliant) not only allows the operation of the mill, but also enables the monitoring, acquisition and logging of all relevant process-related parameters.

- Tip Speed (agitator shaft speed (rpm) for laboratory mills)
- Product temperature
- Product pressure
- Energy input
- Active power (torque for laboratory mills)
- Current consumption
- Operating time
- Error message



### WAB VIEW

In addition to the straightforward and simple operation of the mill, WAB VIEW also enables the monitoring and logging of all the relevant process-related parameters.

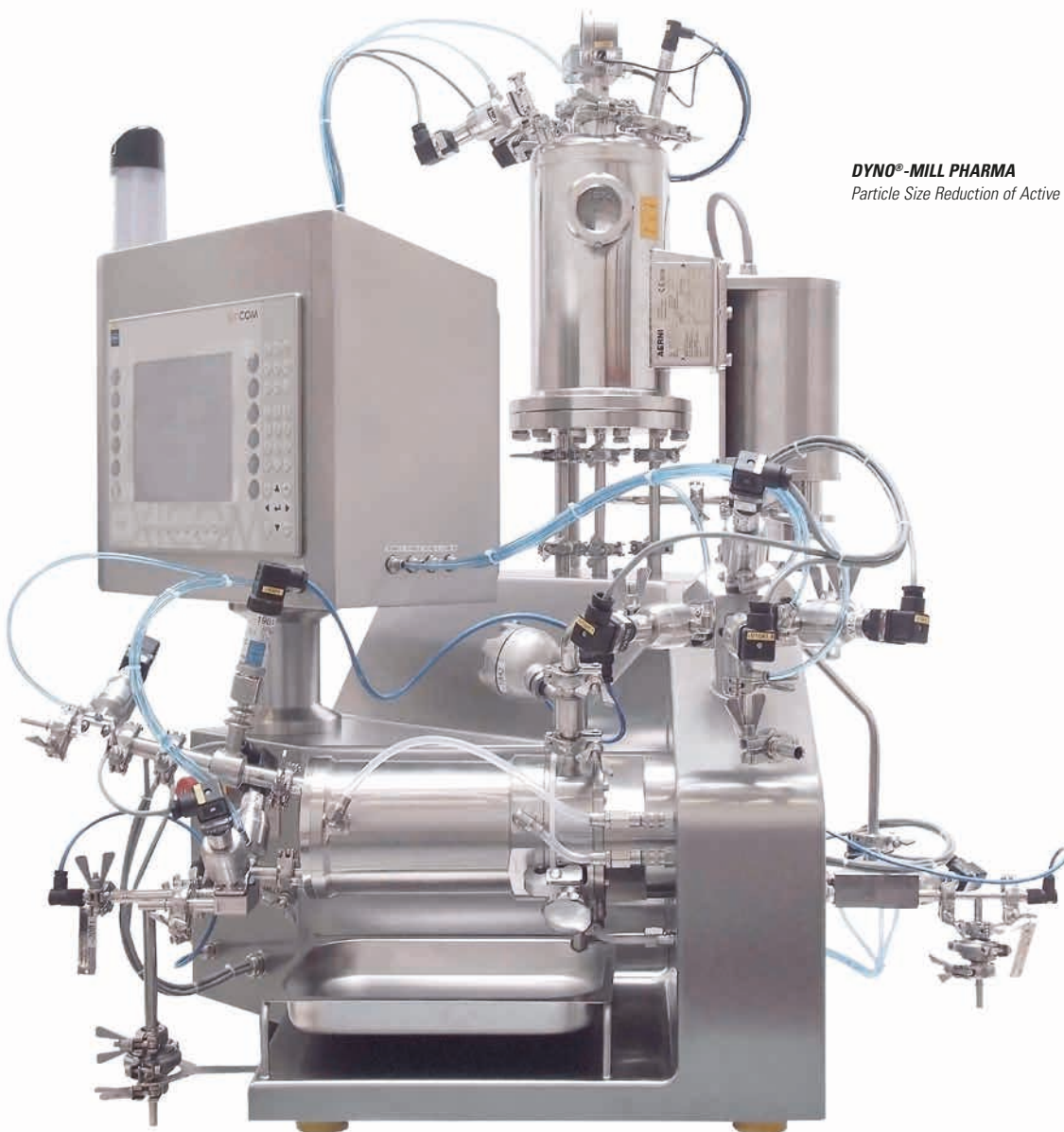
- Data collection
- Process control by means of product temperature or energy input
- Visualisation systems with comprehensive recipe management



### WAB validation concept

The **FDS**, **DQ**, **IQ** and **OQ** qualification documents required for validation plus the certificates for process-relevant machine components such as calibration and material certificates are available for all **DYNO®-MILL** types. On request, we will also conduct the **Factory Acceptance Tests** at WAB or the **Site Acceptance Tests** together with you on your premises.

# DYNO®-MILL PHARMA – wet milling equipment | for the Pharmaceutical Industry



## DYNO®-MILL PHARMA

Particle Size Reduction of Active Pharmaceutical Ingredients (API)



The wet milling technology of WAB allows for effectively reducing the particle size of API and excipients. With the DYNO®-MILL PHARMA equipment, coarse particles are wet-milled to establish the particle size distribution required by our customers for their drug formulations.

Beside the bioavailability, the finer particle size distributions may improve the processability or solubility of the API.

The DYNO®-MILL PHARMA equipment line is capable of mechanical Micronization and Nanosization at current Good Manufacturing Practice (cGMP) level protocols through semi-automatic or fully automatic control units,

and the 21 CFR part 11 compliant WAB SCADA-System. In addition, select DYNO®-MILL PHARMA units are available with Cleaning-In-Place (CIP) and Sterilization-In-Place (SIP) functionality.

WAB supports its customers from the definition of the User Requirement Specification (URS) until the IQ/OQ. All WAB offerings are complemented with an unbeatable After-Sales-Service.

# 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.



DYNO®-MILL MULTI LAB



DYNO®-MILL KD 280 A with Food Grade Paint

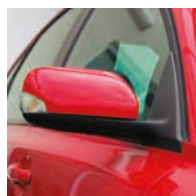
## Overview of the DYNO®-MILL MULTI LAB range

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
<b>Discontinuous</b>	<b>0.15</b>	<b>85</b>	<b>KD agitator disc, 64</b>	<b>3.3–4.0</b>	<b>250–400</b>	<b>95–125</b>	<b>680x740x580</b>
	<b>0.3</b>	<b>170</b>	<b>KD agitator disc, 64</b>				
<b>Continuous</b>	<b>0.15</b>	<b>500</b>	<b>KD agitator disc, 64</b>				
	<b>0.3</b>	<b>600</b>	<b>KD agitator disc, 64</b>				
	<b>0.6</b>	<b>800</b>	<b>DYNO®-ACCELERATOR, 64</b>				
	<b>0.6</b>	<b>800</b>	<b>KD agitator disc, 64</b>				
	<b>1.4</b>	<b>2000</b>	<b>KD agitator disc, 80</b>				

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

# The Highest Performance for your Products |

## The Best in its Class



- Paints and varnishes
- Printing inks
- Coatings
- Pigments and dyes
- Automobile coatings
- Food industry
- Filling
- Agrochemicals
- Paper industry
- Life sciences
- Biotechnology
- Cell disruption

### Services offered by WAB

WAB AG has its own test facility in a thoroughly modern building including all the latest analytical testing equipment, with various mills in different sizes, ranging from laboratory up to full production scale. The partnership with our customers is one of the main aspects for WAB. Therefore, we offer our customers the possibilities to do experiments in this facility with their own products. With the results, one can check whether the machine fulfils the requirements before making any decisions. At WAB, you would not only purchase a mill, but you would also get professional advice concerning the mill and your product together with a full after sales service.

■ WAB-GROUP

WAB

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