

# Mixing & Milling Technology

Equipment for the  
Pharmaceutical Industry

Proven performance in the  
field of dispersion, ultra  
fine wet grinding, nano wet  
grinding, and dry mixing



# WAB – Your expert in Wet Milling

*DYNO®-MILL RESEARCH LAB*



For over 50 years, WAB has been a leader in the field of wet micromedia milling with thousands of the famous DYNO®-MILL agitator bead mills installed worldwide.

Wet milling by agitated small beads (media) allows for the efficient grinding of suspended particles to the low micrometre range – even the low nanometre range – with narrow particle size distribution. With its extensive experience and complete range of GMP compliant agitator bead mills, WAB delivers perfect wet milling results for a broad range of user requirements.

## **DYNO®-MILL RESEARCH LAB**

The compact sized DYNO®-MILL RESEARCH LAB is a high-efficiency bead mill that enables users to effectively achieve particles sizes below 100 nanometres.

The DYNO®-MILL RESEARCH LAB is the perfect device for wet-milling feasibility studies, especially when only a limited amount of Active Pharmaceutical Ingredient (API) is available for testing. Batch starting from 100 ml only need a few grams of solids to be processed in circulation mode.

After use, the milling chamber of the DYNO®-MILL RESEARCH LAB is quickly disassembled from the drive for easy cleaning. All product contacted parts can be sterilized.

## **DYNO®-MILL MULTI LAB**

The DYNO®-MILL MULTI LAB's flexibility is uniquely suited for development work. Just about any milling task can be accomplished with this multitasking machine. Whether milling products in continuous, batch or recycle mode; standard or high-energy input configurations; with glass, steel, Nylon or ceramic parts... the DYNO®-MILL MULTI LAB will accommodate all your needs.

## **DYNO®-MILL ECM-AP 05**

This latest addition to the WAB range of agitator bead mills now offers more to the user by employing the novel DYNO®-Accelerator design.

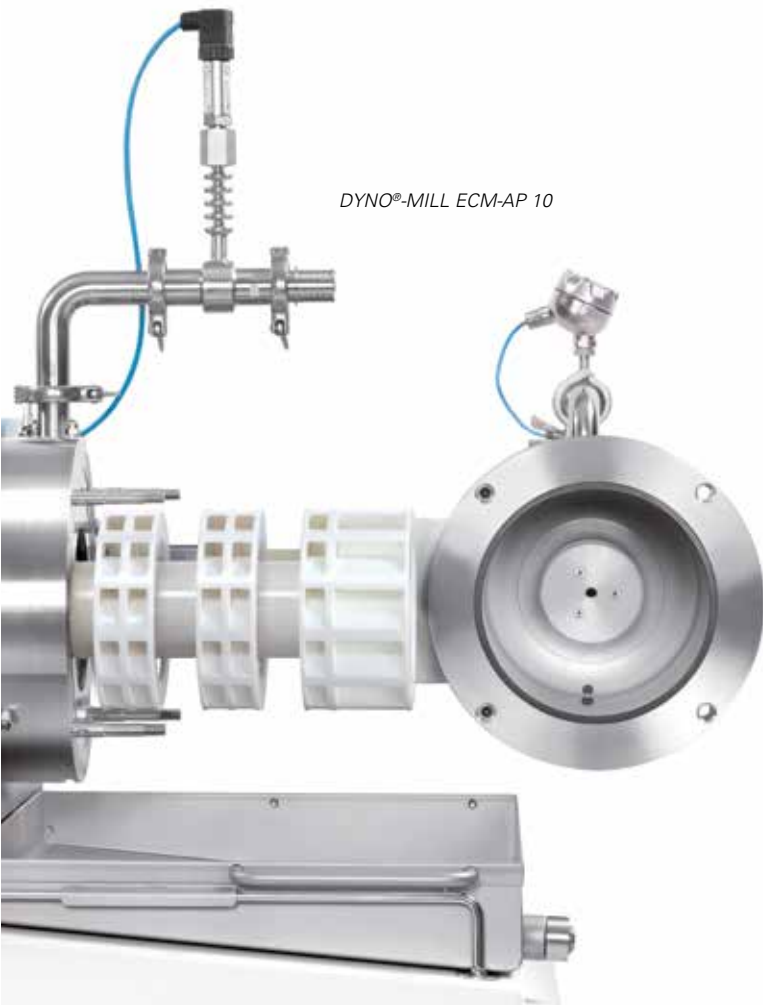
The DYNO®-MILL ECM-AP 05 is both a laboratory and pilot plant mill. This mill allows working with bigger batch sizes due to its high throughput.

If your product is sensitive to heat, is high in viscosity, or has a tendency to foam – the DYNO®-MILL ECM-AP 05 high-efficiency mill will achieve the desired results in a short run.

*DYNO®-MILL ECM-AP 05*



# WAB – Your expert in **Wet Milling**



*DYNO®-MILL ECM-AP 10*

The hydraulic movement of the DYNO®-Accelerators support excellent grinding and dispersing conditions of the product suspension in the milling chamber. The efficient cooling/heating system allows running the process under optimal temperature conditions.

The compact milling chambers of the DYNO®-MILL ECM-AP series in combination with the hydraulic effect of the DYNO®-Accelerators provide a superior Cleaning In Place. Easy disassembling facilitates the final cleaning and sterilization process.

All WAB Pharma-Mills are designed and manufactured according to highest quality standards to meet the stringent requirements of the pharmaceutical industry. Materials and material surface finishes ensure best wear resistance and therefore lowest product contaminations. Metal-free zirconium oxide ceramic wetted parts are standard with all WAB Pharma-Mills.

The WAB VIEW Programmable Logic Controller guarantees the reproducibility of the process and ensures the registration of all process parameters.

The innovative DYNO®-MILL ECM-AP series of agitator bead mills offers unique API wet milling advantages. These mills are designed for running in single/multi pass or circulation with constant efficiency in both modes and provide the flexibility to choose the best possible process mode for each ingredient.

The ability to change the process parameters in a wide range enables to fine-tune the process for a broad spectrum of products to achieve narrowest particle size distributions and full reproducibility.



*DYNO®-MILL ECM-AP 10*



<b>WAB DYNO®-MILL Pharma-Mills</b>	<b>Milling Chamber (l)</b>	<b>Smallest Bead Ø (mm)</b>	<b>Mill Drive (kW)</b>	<b>Batch Size (l)</b>
DYNO®-MILL RESEARCH LAB	0.08	0.05	1.1	0.1 – 1
DYNO®-MILL MULTI LAB	0.15 to 1.4	0.1	3.3 – 4.3	0.08 - 10
DYNO®-MILL ECM-AP 05	0.5	0.1	4.0	1 – 20
DYNO®-MILL ECM-AP 2	1.9	0.1	11	> 10
DYNO®-MILL ECM-AP 10	9	0.1	30 – 37	> 50
DYNO®-MILL ECM-AP 20	21	0.1	44 – 58	> 100
DYNO®-MILL KD 6	6	0.5	10 – 15	> 20
DYNO®-MILL KD 20 B	17	0.5	17.5 – 24	> 40

*Subject to changes in design. The data shown are indicative values and are dependent on the machine execution and on the products to be processed.*



### **GMP-compliant equipment – with WAB qualification concept**

The WAB qualification concept ensures a GMP compliant equipment qualification according to international standards (EU, USA, WHO, PIC/S). The documents of the qualification phases DQ, IQ, OQ and PQ-support with calibration and material certificates of process- and GMP-critical machine parts are available for all DYNO®-MILL units. FAT and SAT are integrated parts of the qualification concepts and are available on request for non-GMP applications as well.

# WAB – Your expert in Dry Mixing

TURBULA® T2F

The wide range of WAB mixing equipment has been developed to satisfy most demanding user requirements in the pharmaceutical industry.

WAB excels in tumble batch mixing technology offering full containment by change can design. All mixers from WAB create 3-D mixing movements to achieve mixes of high homogeneity. The TURBULA® and dyna-MIX® Shaker Mixers are used for the mixing of powdery substances, different wet components, or a combination of wet and dry components.

## The advantages of the WAB mixing technologies

- Achieving most homogenous batch qualities
- Excellent reproducibility
- Most gentle blending of dry components
- Homogeneously mix dry powders with different specific weights and particle sizes
- Change-can design, no cross contamination
- Short mixing time needed
- Reliable Scale-Up

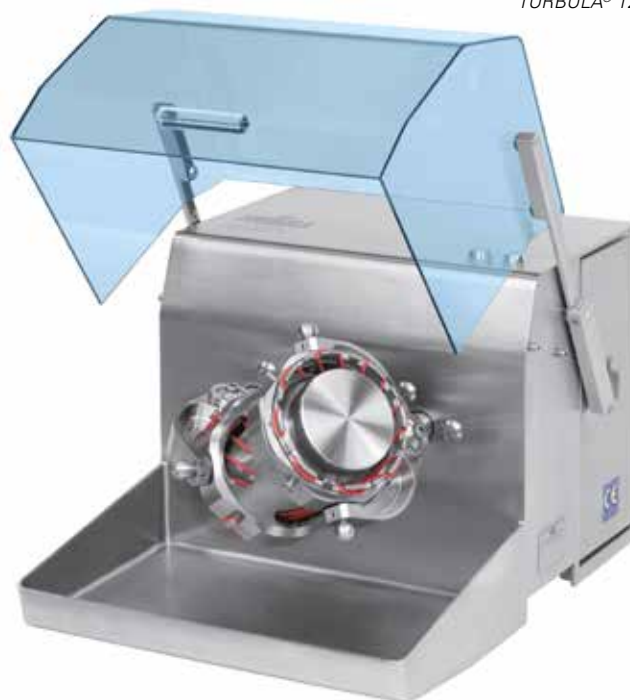
The product can be mixed in standard or client specific containers. The production process is hygienic, dust-free, and needs little cleaning.

## TURBULA® Shaker Mixer

The exceptional efficiency of the TURBULA® Shaker Mixer comes from the use of rotation, translation, and inversion according to the Schatz geometry.

The worldwide proven TURBULA® Shaker Mixers mixing results fulfill the highest requirements in a minimum of time without product re-segregation (unmixing) even after extended runs.

Due to their reliability, the TURBULA® mixers have been used for decades in demanding industries like the pharmaceutical industry, the cosmetic industry, the food industry, and analytical laboratories. The TURBULA® mixing container volume ranges from 0.1 to 55 litres.



## dyna-MIX®

The principle of the dyna-MIX® Shaker Mixer is based on its independently controlled movement of two rotational axes which create the three-dimensional mixing movements for gentle, constant, and reproducible mixing results.

The dyna-MIX® product line with its PLC control unit allows adjusting the mixing motion to suit a wide range of products. The control unit can save up to eight different mixing programs (each with up to nine different mixing sequences) to cover all kind of mixing requirements. The PLC control satisfies the pharmaceutical industries demand for reproducible results.

The dyna-MIX® equipment is designed for middle to large scale production with container volumes from 40 to 1200 litres.

dyna-MIX® CM 100



# Wet Milling in containment

## The Innovative Concept Mill by WAB

GMP compliant concept that allows the milling of consecutive batches in containment and grinding beads replacement – without the need to open the system.



### The new WAB Concept: **Wet milling in containment**

WAB developed an innovative concept for wet milling which fulfils the stringent pharmaceutical industry requirements. This new GMP compliant concept allows the milling of consecutive batches in containment. If required, it's even possible to exchange the milling beads between two batches, without the need to open the system.

Designed for running in circulation under containment mode, the WAB Concept Mill perfectly integrates a product preparation vessel with cooling/heating jacket, a peristaltic product pump, the necessary components to control and reproduce the grinding process as well as the Cleaning In Place. This advanced concept offers new possibilities in the field of high Active Pharmaceutical Ingredients (API) wet milling.



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