

ULTRA CENTRIFUGAL MILL ZM 300



Rotor mills are used for high-speed size reduction of soft to medium-hard as well as temperature-sensitive or fibrous materials.

The powerful Ultra Centrifugal Mill ZM 300 provides maximum grinding performance combined with ease of use. The variable speed from 6,000 to 23,000 rpm allows for gentle, neutral-to-analysis sample preparation in a very short time.

Thanks to an integrated temperature monitoring system, reproducibility is guaranteed even for long grinding processes or pulverization of large sample volumes.

The wide selection of rotors, ring sieves and cassettes makes the ZM 300 a true allrounder which meets the requirements of a great variety of size reduction tasks.



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THE STANDARD FOR FOOD & FEED

- | Gentle high-speed pulverization due to pre- and fine grinding in one working run
- | Optimum process control and reproducibility based on monitoring of the cassette temperature
- | Patented cassette system for maximum sample recovery and easy cleaning
- | Optional cassette for sample volumes up to 600 ml
- | Wide speed range from 6,000 to 23,000 rpm
- | Defined final fineness due to ring sieves with aperture sizes from 0.08 – 10 mm
- | Collecting vessels for sample volumes from 250 ml to 4.5 l
- | Automated vibratory feeder and various cyclone systems available



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INCREASED REPRODUCIBILITY THROUGH TEMPERATURE MONITORING

The speed range from 6000 to 23000 rpm allows for optimum adaptation of the grinding process to the sample requirements by keeping the grinding time as short as possible and the temperature increase as moderate as possible. Too much heat may have a negative effect on the grinding results, for example, if moisture or volatile components escape.

The ZM 300 is equipped with an integrated temperature sensor which measures the temperature of the cassette lid near the ring sieve. The measured temperature is constantly shown in the mill's display, allowing the user to optimize the grinding process and improve reproducibility.



ULTRA CENTRIFUGAL MILL ZM 300

MAXIMUM SPEED FOR HIGH FINAL FINENESS AND INCREASED THROUGHPUT

The maximum speed of classic centrifugal mills, like the widely used ZM 200, is usually limited to 18,000 rpm (rotor peripheral speed 98 m/s). The ZM 300 achieves a maximum speed of 23,000 rpm (rotor peripheral speed 118 m/s) and produces particles which are 15 to 20 % finer in comparison, depending on the material.

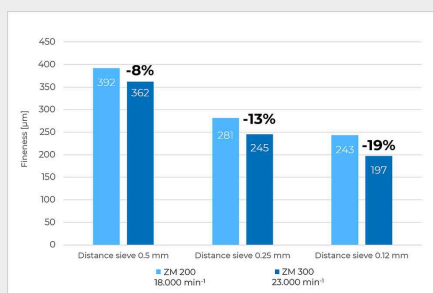
The higher speed has a particularly positive impact on the grind sizes of polymer samples which are pulverized cryogenically, or of fibrous materials like hay. Compared to models with a maximum speed of 18,000 rpm, the throughput may be increased by 10 to 15 %.

APPLICATION EXAMPLES

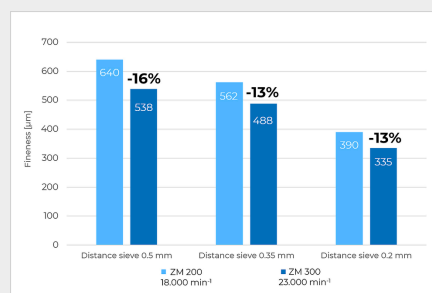
Grind sizes of plastic materials (POM or PP) after grinding with different sieves and speeds. The speed of 23,000 rpm results in a higher fineness for all sieves compared to grinding at 18,000 rpm. For example, a 19 % reduction in fineness can be achieved when POM is ground with a 0.12 mm distance sieve at 23,000 rpm.

The maximum sample throughput, e.g. when crushing chicken feed with a 0.5 mm ring sieve, could be increased by 16% when crushing at maximum speed of 23,000 min⁻¹ instead of 18,000 min⁻¹.

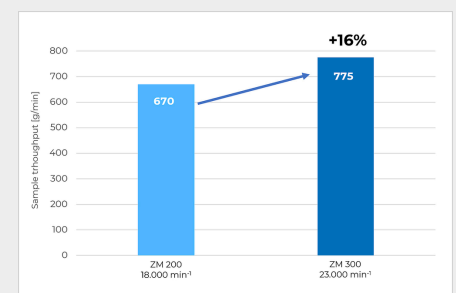
POLYMER POM



POLYMER PP



GRINDING ANIMAL FEED



ULTRA CENTRIFUGAL MILL ZM 300

REDUCING THE FINE FRACTION

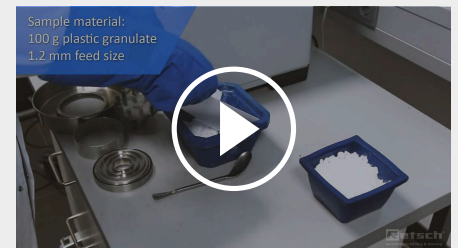
The fines content in a pulverized sample can be controlled by speed reduction. If, for example, the grains of an animal feed sample are to be coarsely ground to avoid dust formation, a reduction to 6,000 - 10,000 rpm will provide the desired result.

Thanks to the variable speed, the ZM 300 can be flexibly adapted to all requirements in the food and feed industry, chemical industry, and in agriculture.

CRYOGENIC GRINDING

Cryogenic or cold grinding is the ideal solution for pulverizing samples that cannot be reduced to the required fineness at room temperature. This procedure involves the use of grinding aids such as liquid nitrogen (-196 °C, embrittlement of the sample outside the mill) or dry ice (-78 °C, sample/dry ice mixture) to embrittle the sample material by cooling, and thus improve the breaking behavior.

In addition, highly volatile components are better preserved in the sample by cooling. Cryogenic grinding is easy to perform with the ZM 300 and is recommended especially for plastics or very temperature-sensitive samples. The video shows the process with the predecessor model ZM 200, which is identical in the ZM 300.



[Click to view video](#)

This video shows dryice grinding of plastic granules with the ZM 200 which also applies to the ZM 300.

ULTRA CENTRIFUGAL MILL ZM 300

IDEAL FOR LIGHT & HEAT-SENSITIVE MATERIALS

When operated with the optional cyclone-suction-combination, the ZM 300 is also suitable for grinding low-density or heat-sensitive sample materials.

- | Efficient cooling of sample and grinding tools
- | Improved sample discharge from the grinding chamber
- | Particularly suitable for large volumes
- | The cyclone accommodates sample bottles of 0.25, 3 and 5 liters
- | Ideal for cryogenic grinding



ACCESSORIES FOR ZM 300



RING SIEVES

For the ZM 300 ring sieves with reinforced rim are used which are equipped with four grooves for secure locking. Distance sieves, also secured and fixed by four grooves, have a gap between the sieve mesh and the rotor, which reduces shearing effects and thereby heat generation.



ROTORS

Rotors are available with either 6, 12 or 24 teeth. The standard rotor with 12 teeth is suitable for almost any material and requirement. For fibrous samples, such as straw, the rotor with 6 teeth is typically used, while for fine samples the rotor with 24 teeth is best suited.



HEAVY-METAL-FREE GRINDING

For neutral-to-analysis work, or for pulverizing abrasive samples, grinding tools in various materials are available: titanium (titanium-niobium coating), steel 1.4404, tungsten carbide coating.



COLLECTING VESSELS

In the standard collecting vessel with 900 ml nominal volume, up to 300 ml of sample can be ground in one working step. With the large-volume cassette, the useful volume can be doubled to 600 ml. When utilizing a cassette with cyclone, various collecting vessels up to 4,500 ml useful volume are available.



VIBRATORY FEEDER DR 100

The Vibratory Feeder DR 100 is controlled via an interface and conveys material in a load-dependent manner to the hopper of the ZM 300. This procedure ensures uniform grinding with maximum sample feed. The use of a feeder is particularly advantageous for large sample quantities.

ULTRA CENTRIFUGAL MILL ZM 300

CONVENIENT OPERATION AND EASY CLEANING

The ZM 300 is easy and safe to operate. The large touch display with rotary knob permits convenient entry of the grinding parameters. It shows the current cassette temperature and load during grinding which helps to prevent overloads by feeding the sample too quickly.

A push-fit system without screws and the patented cassette principle allow for easy insertion and removal without tools.

As a result, cleaning rotors and ring sieves is particularly quick and easy. All parts in contact with the sample can be cleaned under running water or in the dishwasher.



ULTRA CENTRIFUGAL MILL ZM 300

TYPICAL SAMPLE MATERIALS

The versatile Ultra Centrifugal Mill ZM 300 processes materials such as bones, cereals, chemical products, coal, coffee beans, collagen, corn, dried fruit and vegetables, dried larvae, drugs, electronic components, feed pellets, fertilizers, food, grain, graphite, minerals, paper, pharmaceutical materials, plant materials, polymers, powder coatings, rice, rubber, seeds, spices, straw, sweets, textiles, tobacco, waste, wood



powder coatings



coffee beans



PET flakes



herbs

ULTRA CENTRIFUGAL MILL ZM 300

TECHNICAL DATA

Applications	fine grinding
Field of application	agriculture, biology, chemistry / plastics, construction materials, engineering / electronics, environment / recycling, food, geology / metallurgy, medicine / pharmaceuticals
Feed material	soft, medium-hard, brittle, fibrous
Size reduction principle	impact, shearing
Material feed size*	< 10 mm
Final fineness*	< 40 µm
Batch size / feed quantity*	300 ml with standard cassette 600 ml with volume cassette 4500 ml / 2500 ml / 450 ml / 230 ml with cyclone
Speed at 50 Hz (60 Hz)	6,000 - 23,000 min ⁻¹ , free selectable
Rotor peripheral speed	31 - 119 m/s
Rotor diameter	99 mm
Types of rotors	6-tooth rotor / 12-tooth rotor / 24-tooth rotor
Material of grinding tools	stainless steel, titanium, stainless steel with wear-resistant coating
Sieve sizes	trapezoid holes 0.08 / 0.12 / 0.20 / 0.25 / 0.50 / 0.75 / 1.00 / 1.50 / 2.00 mm round holes 3.00 / 4.00 / 5.00 / 6.00 / 10.00 mm
Setting of grinding time	no
Collector capacity	900 ml with standard cassette 1200 ml with volume cassette 5000 ml / 3000 ml / 500 ml / 250 ml with cyclone
Drive	3-phase asynchronous motor with frequency converter
Power connection	1-phase
Protection code	IP 20
Power consumption	1750 VA ((200..240V), 1400 VA (110..120V))
W x H x D closed	452 x 431 x 426 mm
Net weight	~ 38 kg
Standards	CE

*depending on feed material and instrument configuration/settings

ULTRA CENTRIFUGAL MILL ZM 300

FUNCTIONAL PRINCIPLE

In the Ultra Centrifugal Mill ZM 300 size reduction takes place by impact and shearing effects between the rotor and the fixed ring sieve. The feed material passes through the hopper (with splash-back protection) onto the rotor. Centrifugal acceleration throws it outward with great energy and it is pre-crushed on impact with the wedge-shaped rotor teeth moving at a high speed. It is then finely ground between the rotor and the ring sieve.

This 2-step grinding ensures particularly gentle but fast processing. The feed material only remains in the grinding chamber for a very short time, which means that the characteristic features of the sample to be determined are not altered. The ground sample is collected in the collecting cassette surrounding the grinding chamber or in the downstream cyclone or paper filter bag.



[Click to view video](#)

www.retsch.com/zm300

ORDER DATA

ULTRA CENTRIFUGAL MILL ZM 300




Ultra Centrifugal Mill ZM 300 with 900 ml cassette
(please order push-fit rotor and ring sieve separately)

20.824.0001	ZM 300	230 V, 50/60 Hz
20.824.0002	ZM 300	110-120 V, 50/60 Hz

other electrical versions available for the same price

ACCESSORIES ZM 300 STANDARD

PUSH-FIT ROTORS OF STAINLESS STEEL

02.608.0040		Push-fit rotor	6 teeth
02.608.0041		Push-fit rotor	12 teeth
02.608.0042		Push-fit rotor	24 teeth

RING SIEVES OF STAINLESS STEEL, WITH REINFORCED RIM

03.647.0465	Trapezoid holes	0.08 mm
03.647.0466	Trapezoid holes	0.12 mm
03.647.0467	Trapezoid holes	0.20 mm
03.647.0468	Trapezoid holes	0.25 mm
03.647.0469	Trapezoid holes	0.35 mm
03.647.0470	Trapezoid holes	0.50 mm
03.647.0471	Trapezoid holes	0.75 mm
03.647.0472	Trapezoid holes	1.00 mm
03.647.0473	Trapezoid holes	1.50 mm
03.647.0474	Trapezoid holes	2.00 mm
03.647.0475	Round holes	3.00 mm
03.647.0476	Round holes	4.00 mm




03.647.0477	Round holes	5.00 mm
03.647.0478	Round holes	6.00 mm

DISTANCE SIEVES OF STAINLESS STEEL,
RECOMMENDED FOR TEMPERATURE-SENSITIVE AND FATTY MATERIALS

03.647.0441	Trapezoid holes	0.08 mm	
03.647.0442	Trapezoid holes	0.12 mm	
03.647.0443	Trapezoid holes	0.20 mm	
03.647.0444	Trapezoid holes	0.25 mm	
03.647.0445	Trapezoid holes	0.35 mm	
03.647.0446	Trapezoid holes	0.50 mm	
03.647.0447	Trapezoid holes	0.75 mm	
03.647.0448	Trapezoid holes	1.00 mm	
03.647.0449	Trapezoid holes	1.50 mm	
03.647.0450	Trapezoid holes	2.00 mm	
03.647.0451	Round holes	3.00 mm	
03.647.0452	Round holes	4.00 mm	
03.647.0453	Round holes	5.00 mm	
03.647.0454	Round holes	6.0 mm	
03.647.0455	Square holes	10.00 mm	for pre-grinding

ACCESSORIES ZM 300 FOR ABRASIVE PRODUCTS

PUSH-FIT ROTORS OF STAINLESS STEEL, WITH WEAR RESISTANT COATING

02.608.0043		Push-fit rotor	6 teeth
02.608.0044		Push-fit rotor	12 teeth
02.608.0045		Push-fit rotor	24 teeth

RING SIEVES OF STAINLESS STEEL, WITH REINFORCED RIM, WITH WEAR RESISTANT COATING

03.647.0456	Trapezoid holes	0.20 mm
03.647.0457	Trapezoid holes	0.25 mm
03.647.0458	Trapezoid holes	0.35 mm
03.647.0459	Trapezoid holes	0.50 mm
03.647.0460	Trapezoid holes	0.75 mm
03.647.0461	Trapezoid holes	1.00 mm
03.647.0462	Trapezoid holes	1.50 mm
03.647.0463	Trapezoid holes	2.00 mm
03.647.0464	Round holes	3.00 mm

ACCESSORIES ZM 300 FOR GRINDING WITHOUT HEAVY-METAL CONTAMINATION

PUSH-FIT ROTOR AND CASSETTE

02.608.0047  Push-fit rotor, 12 teeth of pure titanium

22.355.0012 Cassette complete, titanium-niobium coating, incl. pan 900 ml, lid with gasket

RING SIEVES OF PURE TITANIUM, WITH REINFORCED RIM


TRAPEZOID HOLES, 0.08 MM

03.647.0480	Trapezoid holes	0.12 mm
03.647.0481	Trapezoid holes	0.20 mm
03.647.0482	Trapezoid holes	0.25 mm
03.647.0483	Trapezoid holes	0.35 mm
03.647.0484	Trapezoid holes	0.50 mm
03.647.0485	Trapezoid holes	0.75 mm
03.647.0486	Trapezoid holes	1.00 mm
03.647.0487	Trapezoid holes	1.50 mm
03.647.0488	Round holes	2.00 mm

DISTANCE SIEVES OF PURE TITANIUM			
03.647.0493	Trapezoid holes	0.08 mm	
03.647.0550	Trapezoid holes	0.12 mm	
03.647.0551	Trapezoid holes	0.20 mm	
03.647.0552	Trapezoid holes	0.25 mm	
03.647.0553	Trapezoid holes	0.35 mm	
03.647.0489	Trapezoid holes	0.50 mm	
03.647.0554	Trapezoid holes	0.75 mm	
03.647.0490	Trapezoid holes	1.00 mm	
03.647.0555	Trapezoid holes	1.50 mm	
03.647.0556	Trapezoid holes	2.00 mm	
03.647.0557	Round holes	3.00 mm	
03.647.0561	Round holes	4.00 mm	
03.647.0558	Round holes	5.00 mm	
03.647.0559	Round holes	6.0 mm	
03.647.0560	Square holes	10.00 mm	for pre-grinding

CYCLONES ZM 300

CYCLONE INCL. CASSETTE PAN WITH OUTLET AND SUPPORT

22.935.0030		Cyclone with filter bag, with sample bottles 0.25 and 0.5 litres
22.935.0028		Cyclone with filter bag, with collecting receptacle 3 litres
22.935.0027		Cyclone with filter bag, with collecting receptacle 5 litres
22.935.0029		Cyclone with connection for vacuum cleaner, with sample bottles 0.25 and 0.5 litres
22.935.0026		Cyclone with connection for vacuum cleaner, with collecting receptacle 3 litres
22.935.0025		Cyclone with connection for vacuum cleaner, with collecting receptacle 5 litres
22.748.0005		Industrial vacuum cleaner for mills, 230 V, 50/60 Hz (other electrical versions and spare filter bags available upon request)

PAPER FILTER BAGS ZM 300









22.261.0005 Paper filter bags (12 pieces) incl. cassette pan with outlet and filter holder


VIBRATORY FEEDER DR 100 FOR AUTOMATIC MATERIAL FEED

DR 100 complete unit, incl. feeding kit (push-fit feed chute 75/40 mm, length 250 mm, holder for push-fit feed chute, hopper 3.5 litres and fixture for hopper), stand with data cable

22.936.1013	DR 100	220–240 V, 50 Hz
22.936.1014	DR 100	110–120 V, 60 Hz

ADDITIONAL ITEMS ZM 300

22.355.0018		Cassette complete, stainless steel, incl. pan 900 ml, lid with gasket
22.355.0021		Cassette complete, stainless steel, incl. pan 1200 ml, lid with gasket
22.355.0020		Cassette complete, stainless steel, incl. pan with outlet, lid with gasket
22.355.0012		Cassette complete, titanium-niobium coating, incl. pan 900 ml, lid with gasket
03.010.0058		Cassette pan 900 ml, stainless steel
03.010.0059		Cassette pan 1200 ml, stainless steel
02.010.0060		Cassette pan with outlet, stainless steel
03.010.0062		Cassette pan 900 ml, titanium-niobium coating
22.355.0015		Cassette lid, stainless steel, with gasket
22.355.0011		Cassette lid, titanium-niobium coating, with gasket
03.111.0400		Gasket for cassette lid
22.936.0009		Set of gaskets for cassette lid, 5 pieces
02.011.0078		Collecting receptacle for cyclone, 5 litres, stainless steel
02.011.0031		Collecting receptacle for cyclone, 3 litres, stainless steel
02.107.0634		Lid for collecting receptacle, 5 litres
02.107.0493		Lid for collecting receptacle, 3 litres
02.186.0010		Filter bag of nylon, for cyclone

22.524.0001		Paper filter bags, 12 pieces
03.241.0109		Gasket for paper filter holder, 1 piece
01.706.0318		Labyrinth disc
03.114.0092		Gasket for labyrinth disc, 1 piece
22.524.0006		Protective grating with dust filter for fan
22.524.0007		Dust filter for fan, 10 pieces
99.200.0033		IQ/OQ Documentation for ZM 300