CUTTING MILL SM 300

The High-Performance Model with RES Technology

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Cutting mills are suitable for the grinding of soft, medium-hard, tough, elastic, fibrous, and heterogeneous mixes of products. Thanks to the powerful 3 kW drive with high torque and RES technology, the Cutting Mill SM 300 excels especially in the tough jobs where other cutting mills fail. This mill allows for perfect adaptation to application requirements by variable speed from 100 to 3,000 min^{-1}. A range of bottom sieves with aperture sizes from 0.25 - 20 mm is available, ensuring a defined final fineness.

Click to view video

"It is a very robust mill that allows us to homogenize samples with a very uniform particle size according to the sieve used and very easy to use. Since it is a very robust equipment, as it is made to last, definitely I would recommend."

Jonatan Racancoj

Cempro-Proverde

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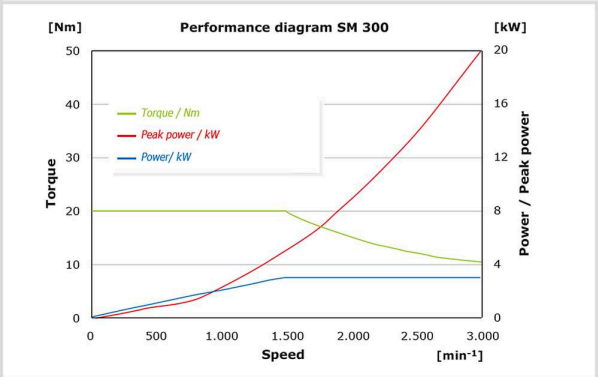
HIGH TORQUE & RES TECHNOLOGY

An additional flywheel mass accounts for a very high torque which enables the SM 300 to grind many materials to analytical fineness in only one working run (RES Technology, see graphic on the right). The extra peak power derived from the flywheel mass is used to overcome potential blockages, even when grinding particularly tough materials. Additionally, the RES technology enables quick sample feeding.

RES TECHNOLOGY - PEAK POWER OF UP TO 20 KW



The diagram shows the torque (green) and the power (blue) of the drive as well as the temporarily achievable peak power (red) against the speed. The peak power increases over the entire speed range. That means, the higher the speed, the more power is temporarily available for the cutting events.

CUTTING MILL SM 300

OUR MOST POWERFUL CUTTING MILL FOR A WIDE RANGE OF APPLICATIONS

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This video shows the amazing versatility of the SM 300 cutting mill, with a wide range of accessories including different hoppers, collection vessels and rotors to facilitate the feeding and collection of sample materials of different shapes, sizes and quantities. The variable speed allows the perfect cutting parameters to be selected, and the powerful 3 kW motor with RES technology gives the mill maximum pulling power.

Watch the video to see how the SM 300 handles these 8 applications with flying colours:

- Wood chips: Efficient size reduction of larger sample volumes
- PC boards: Pulverising solid PCBs with the 6-disc rotor for precious metal analysis
- Leather and table tennis balls: Comminution of textiles and rubber using the cyclone for rapid sample discharge from the grinding chamber
- Secondary fuels: Efficient comminution of highly heterogeneous materials for rapid calorific analysis
- Hay: Reproducible size reduction of fibrous, light and voluminous materials
- Injection moulding sprues: Grinding at low speeds to minimise fines (dust) content
- Toys: crushing of tough plastics by embrittling samples with liquid nitrogen

The SM 300 delivers perfect results even for the most demanding grinding tasks!

Click to view video

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CUTTING MILL SM 300

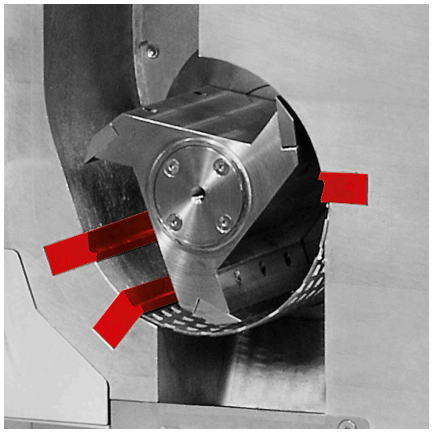
SUPERIORITY IN DETAIL

Ideal for light & heat-sensitive materials

Instead of the gravity outlet, an optionally available cyclone separator can be connected to the SM 300. The use of the cyclone is advantageous, for example, for light and heat-sensitive samples.

- Increased throughput
- Improved sample discharge from the grinding chamber
- Efficient cooling of sample and cutting tools
- Collecting vessels with 0.25 - 0.5 - 1 - 2 - 5 and 30 liters are available for the cyclone unit

DOUBLE ACTING CUTTING BARS



The SM 300 is equipped with double acting cutting bars which substantially increase the number and effectiveness of the cutting events. The parallel section rotor, for example, generates 18 cutting events per rotation.

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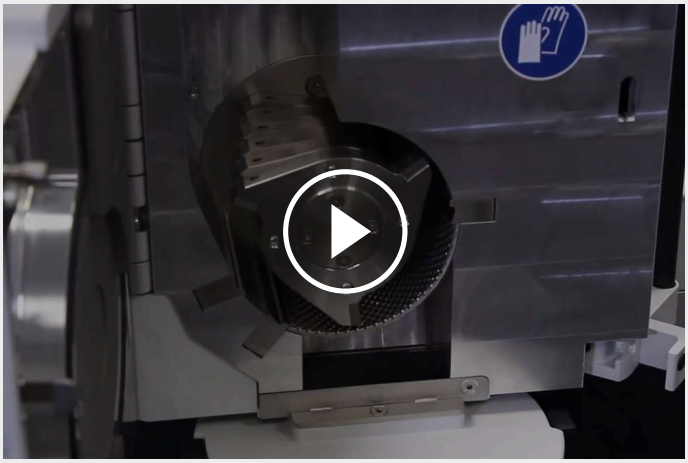
CUTTING MILL SM 300

EASY OPERATION & CLEANING

CONVENIENT OPERATION



Click to view video

Operation of the SM 300 is exceptionally simple and safe. The push-fit rotor and bottom sieves can be easily removed without tools. A safety switch prevents the mill from being started with the door open. An electronic safety check ensures that the door cannot be opened when the motor is running.

QUICK AND EASY CLEANING

Click to view video

The hopper can be folded back to get full access to the grinding chamber which, in combination with the smooth surfaces, greatly facilitates cleaning the mill. So does the design of the bottom sieves which reduces trapping of sample pieces to a minimum.

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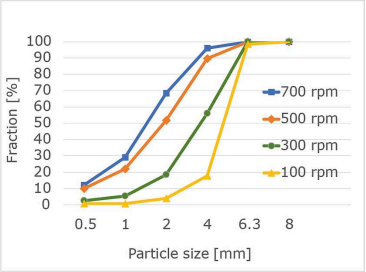
SPEED REDUCTION - LESS FINES, LESS TEMPERATURE RISE

Reduction of the speed leads to a decreased fine fraction of the sample and to more particles within the desired size range. Especially for this type of application, the lowest speed of the SM 300 was reduced to 100 min^{-1}. This is also beneficial for grinding heat-sensitive materials: reduced speed results in less energy input, preventing the sample from getting too warm during the process.



316L STAINLESS STEEL VERSION FOODGRADE

For applications like small scale production of food or cosmetics, the SM 300 is available in a stainless steel 316L foodGrade version which meets the guidelines of the food and pharma industry. It is equipped with a long-stock hopper for easy feeding of materials like cannabis plant parts. All parts in contact with the sample are made of 316L in this configuration. Optionally, the rotor blades and the cutting bars are made of a FDA-certified stainless steel which is less prone to wear under constant stress than 316L.

The unit can be equipped with an optional cyclone and a large 30 l receptacle (both stainless steel 316L) for collecting large sample amounts. Smooth surfaces lead to almost 100% sample recovery and easy cleaning.

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CUTTING MILL SM 300

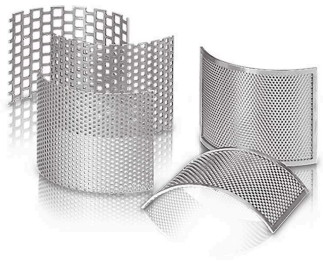
ACCESSORIES FOR SAFE AND EFFECTIVE GRINDING PROCESSES

ROTOR TYPES

A parallel section rotor, a 6-disc rotor and a V-rotor are available in stainless or heavy-metal-free steel for optimum adaptation to sample properties.

HOPPER TYPES

The SM 300 can be equipped either with the universal hopper, which is suitable for most samples, or the long-stock hopper which is specially designed for long samples.



BOTTOM SIEVES

The bottom sieves with trapezoid or square holes are made of stainless steel or heavy-metal-free steel.

CUTTING MILL SM 300

TYPICAL SAMPLE MATERIALS

RETSCH cutting mills are suitable for a vast range of applications. Typical materials include PET preforms, aluminium slag, animal feed, bones, cables, cardboard, electronic components, feed pellets, foils, food, leather, lignite, material mixtures, non-ferrous metals, paper, pharmaceutical products, plant materials, plastic toys, plastics, polymers, refuse derived fuels, resins, rubber, spices, straw, textiles, waste, wood, etc.

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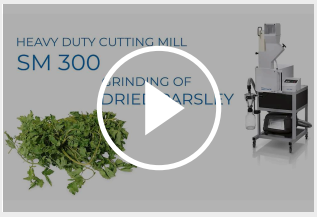
fish

wood

nuts

secondary fuels, biofuels



Click to view video

Parsley 1

Click to view video

Parsley 2

To find the best solution for your sample preparation task, visit our application database.

APPLICATION EXAMPLES

TORREFACTION & BIO-COAL

Torrefaction is a thermochemical process carried out in the absence of oxygen to cause the partial decomposition of biomass. Water and volatiles are released from the biomass to leave a solid, dry material known as bio-coal. For some applications, bio coal can be used to replace traditional fossil fuels, thus helping to reduce CO_2 emissions.

In this video, both RETSCH cutting mill SM 300 and the CARBOLITE rotating tube furnace TSR have been used as a part of a torrefaction process to create bio-coal fuel.

Click to view video

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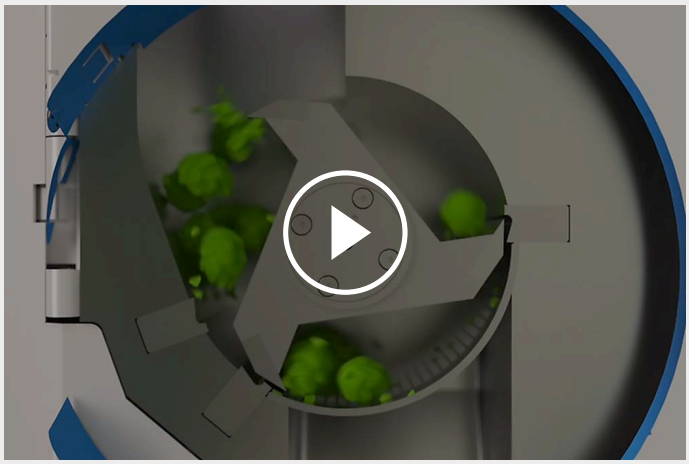
The Verder Scientific companies provide solutions to support your process every step of the way, from sample preparation and analysis, to heat treatment, and more.

CUTTING MILL SM 300

FUNCTIONAL PRINCIPLE

Size reduction in the Cutting Mill SM 300 takes place by **cutting and shearing forces**. The sample comes into contact with the rotor, and is comminuted between the blades and the stationary double acting cutting bars inserted in the housing.

In the **6-disc rotor**, spirally arranged reversible hard metal plates operate by cutting in sequence.
The knives of the **parallel section rotor** carry out comminution with a powerful cutting action. An additional flywheel mass (RES technology) on the drive shaft produces the exceptional performance of the SM 300. Thanks to the **variable speed** from 100 to 3,000 min^{-1}, the SM 300 can be easily adapted to different application requirements



Click to view video

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CUTTING MILL SM 300 - TECHNICAL DATA

Applications	size reduction by cutting
Field of application	agriculture, biology, chemistry / plastics, engineering / electronics, environment / recycling, food, medicine / pharmaceuticals
Feed material	soft, medium-hard, tough, elastic, fibrous
Size reduction principle	shearing, cutting
Material feed size*	< 60 x 80 mm
Final fineness*	0.25 - 20 mm
Speed at 50 Hz (60 Hz)	100 - 3000 min-1
Rotor peripheral speed	4.7 - 20.3 m/s
Rotor diameter	129.5 mm
Types of rotors	parallel section rotor / 6-disc rotor / V-rotor
Types of hoppers	universal, long stock
Material of grinding tools	stainless steel, steel for heavy-metal free grinding, tungsten carbide
Sieve sizes	trapezoid holes 0.25 / 0.50 / 0.75 / 1.00 / 1.50 mm square holes 2.00 / 4.00 / 6.00 / 8.00 / 10.00 / 20.00 mm
Collector systems / capacities	collecting receptacle 5 l / optional: 30 l collecting unit 0.25 / 0.5 l cyclone-suction combination (0.25 l - 30 l)
Drive	3-phase asynchronous motor with frequency converter
Drive power	3 kW with flywheel mass ~ 28.5 kg
Electrical supply data	different voltages
Power connection	1-phase
Engine brake	yes
Protection code	IP 20
W x H x D closed	576 (1080 opened) x 1677 x 750 mm (with base frame and universal hopper)
Net weight	~ 160 kg
Standards	CE

*depending on feed material and instrument configuration/settings

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ORDER DATA

CUTTING MILL SM 300

Cutting Mill SM 300 complete with collecting receptacle, 5 litres and base frame with wheels (please order rotor, hopper and bottom sieve separately)

20.729.0002		SM 300	220–230 V, 50/60 Hz, with frequency converter for variable speed
20.729.0008		SM 300	220–230 V, 50/60 Hz, with frequency converter for variable speed, housing of stainless steel
20.729.0005		SM 300	220–230 V, 50/60 Hz, with frequency converter for variable speed, for grinding without heavy-metal contamination

other electrical versions available for the same price

ROTORS SM 100, SM 200, SM 300

22.608.0022		6-disc rotor, stainless steel, with reversible cutting tips of tungsten carbide
22.608.0028		6-disc rotor, steel 1.0580, with reversible cutting tips of tungsten carbide, for grinding without heavy-metal contamination
22.608.0021		Parallel section rotor, stainless steel
22.608.0018		Parallel section rotor, steel 1.0580, for grinding without heavy-metal contamination
22.608.0034		V-rotor, stainless steel for SM 300

HOPPERS

22.785.0001		Universal hopper with plastic plunger for SM 200 / SM 300
22.408.0003		Long stock hopper with wooden plunger for SM 200 / SM 300

ADDITIONAL PLUNGERS FOR UNIVERSAL HOPPER

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22.725.0010		Plastic plunger
22.725.0011		Wooden plunger
22.725.0012		Aluminum plunger

BOTTOM SIEVES SM 100, SM 200, SM 300

BOTTOM SIEVES OF STAINLESS STEEL

03.647.0312		Trapezoid holes	0.25 mm
03.647.0313		Trapezoid holes	0.50 mm
03.647.0314		Trapezoid holes	0.75 mm
03.647.0315		Trapezoid holes	1.00 mm
03.647.0316		Trapezoid holes	1.50 mm
03.647.0318		Square holes	2.00 mm
03.647.0319		Square holes	3.00 mm
03.647.0320		Square holes	4.00 mm
03.647.0321		Square holes	6.00 mm
03.647.0322		Square holes	8.00 mm
03.647.0024		Square holes	10.00 mm
03.647.0062		Square holes	20.00 mm

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BOTTOM SIEVES OF STEEL 1.0353 FOR GRINDING WITHOUT HEAVY-METAL CONTAMINATION			
03.647.0325		Trapezoid holes	0.25 mm
03.647.0326		Trapezoid holes	0.50 mm
03.647.0327		Trapezoid holes	0.75 mm
03.647.0328		Trapezoid holes	1.00 mm
03.647.0329		Trapezoid holes	1.50 mm
03.647.0331		Square holes	2.00 mm
03.647.0332		Square holes	3.00 mm
03.647.0333		Square holes	4.00 mm
03.647.0334		Square holes	6.00 mm
03.647.0335		Square holes	8.00 mm
03.647.0359		Square holes	10.00 mm

ACCESSORIES SM 100, SM 200, SM 300

CYCLONE-SUCTION-COMBINATION FOR SM 200 / SM 300		
22.020.0004		Cyclone unit incl. 1 sample bottle 500 ml (to be used with industrial vacuum cleaner)
22.935.0024		Cyclone unit incl. collecting receptacle, 26 litre (to be used with industrial vacuum cleaner)
22.748.0005		Industrial vacuum cleaner for mills, 230 V, 50/60 Hz (other electrical versions and spare filter bags available upon request)
22.523.0002		Sample bottles, 500 ml, 10 pieces
22.001.0001		Holder for sample bottles 1 / 2 / 5 litre

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05.239.0011		Sample bottle, 1 litre, 1 piece, to be used with holder 22.001.0001
05.239.0010		Sample bottle, 2 litre, 1 piece, to be used with holder 22.001.0001
05.239.0009		Sample bottle, 5 litre, 1 piece, to be used with holder 22.001.0001
22.003.0014		Collecting receptacle, 5 litre, stainless steel, incl. adapter lid

COLLECTING RECEPTACLES

22.003.0008		Collecting unit 250 / 500 ml, incl. 2 sample bottles
22.523.0001		Sample bottles, 250 ml, 10 pieces
22.003.0007		Collecting receptacle, 5 litres, stainless steel
22.003.0010		Collecting receptacle, 26 litres, plastic, incl. adapter and filter hose
22.187.0006		Ring-type filter for collecting receptacle, 5 litres
22.748.0001		Dust filter clamping rings for ring-type filter, incl. 5 dust filters
05.742.0008		Dust filters for ring-type filter, 1 piece (please order amount multiple of 25 pcs.)
22.187.0007		Filter hose for collecting receptacle, 5 litres, incl. holder

ACCESSORIES FOR ROTORS

05.908.0001		Reversible cutting tips, tungsten carbide, for 6-disc rotor, 10 pieces
22.151.0004		Cutting plates, stainless steel, for parallel section rotor, 1 set (3 pieces)
22.151.0006		Cutting plates, steel 1.1740, for parallel section rotor, 1 set (3 pieces)for grinding without heavy-metal contamination for grinding without heavy-metal contamination

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STATIONARY CUTTING BARS		
22.152.0003		Double acting cutting bars, stainless steel, 1 set (3 pieces) for SM 200 / SM 300
22.152.0005		Double acting cutting bars, steel 1.1740, 1 set (3 pieces) for SM 200 / SM 300for grinding without heavy-metal contamination
22.608.0035		Adjustment aid for cutting bars

ADDITIONAL ITEMS SM 100, SM 200, SM 300		
22.225.0002		Replacement extraction tool for rotor
22.111.0003		Gasket for door SM 100 / SM 200 / SM 300, 1 piece

CUTTING MILL SM 300 316L, FOODGRADE

Cutting Mill SM 300 316L complete with collecting receptacle, 5 litres (316L) and base frame with wheels (please order rotor, hopper and bottom sieve separately)

20.729.0010		SM 300, 220–230 V, 50/60 Hz, with frequency converter for variable speed, housing and double acting cutting bars of steel 316L, foodGrade
20.729.0011		SM 300, 220–230 V, 50/60 Hz, with frequency converter for variable speed, housing of steel 316L, foodGrade, double acting cutting bars of FDA certified steel, foodGrade

other electrical versions available for the same price

ROTOR, STEEL 316L, FOODGRADE	
22.608.0037	Parallel section rotor, cutting plates of steel 316L, foodGrade
22.608.0038	Parallel section rotor, cutting plates of FDA certified steel, foodGrade

HOPPER	
22.408.0005	Long stock hopper (316L) with PTFE plunger for SM 300 316L, foodGrade
02.785.0044	PTFE plunger

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BOTTOM SIEVES SM 300 316L, FOODGRADE

BOTTOM SIEVES OF STEEL 316L, FOODGRADE	
03.647.0495	Square holes, 2.00 mm
03.647.0530	Square holes, 4.00 mm
03.647.0496	Square holes, 6.00 mm
03.647.0531	Square holes, 8.00 mm
03.647.0532	Square holes, 10.00 mm
03.647.0533	Square holes, 20.00 mm
03.647.0534	Slotted holes, 3.00 mm

ACCESSORIES SM 300 316L, FOODGRADE

CYCLONE-SUCTION-COMBINATION FOR SM 300 316L, FOODGRADE	
22.020.0006	Cyclone unit (316L) incl. 1 sample bottle 500 ml (to be used with industrial vacuum cleaner)
22.020.0009	Cyclone unit (316L) incl. collecting receptacle, 30 litres, steel 316L and carriage for collecting receptacle (to be used with industrial vacuum cleaner)

COLLECTING RECEPTACLES	
22.003.0016	Collecting receptacle, 5 litres, steel 316L, foodGrade
22.003.0017	Collecting receptacle, 30 litres, steel 316L, foodGrade
22.906.0002	Carriage for collecting receptacle 30 litres

ACCESSORIES FOR PARALLEL SECTION ROTOR	
22.151.0009	Cutting plates, steel 316L, for parallel section rotor, 1 set (3 pieces)
22.151.0008	Cutting plates, FDA certified steel, for parallel section rotor, 1 set (3 pieces)

STATIONARY CUTTING BARS	
22.152.0011	Double acting cutting bars, steel 316L, 1 set (3 pieces) for SM 300 316L, foodGrade
22.152.0010	Double acting cutting bars, FDA certified steel, 1 set (3 pieces) for SM 300 316L, foodGrade

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ADDITIONAL ITEMS SM 300 316L, FOODGRADE

99.200.0014 IQ/OQ Documentation for SM 300

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