

# XL

# Retsch®

MILLING SIEVING ASSISTING

## Milling | Assisting | Testing

for large sample volumes

**NEW**  
**RS 300 XL**

Vibratory Disc Mill  
for high capacity  
grinding!

part of **VERDER**  
scientific



## Science for Solids

Materialography  
Hardness Testing  
Heat Treatment  
Elemental Analysis  
Milling & Sieving  
Particle Analysis

As part of the VERDER Group, the business division VERDER SCIENTIFIC sets standards in the development, manufacture and sales of laboratory and analytical equipment. The instruments are used in the areas of quality control, research and development for sample preparation and analysis of solids.

[www.verder-scientific.com](http://www.verder-scientific.com)

## RETSCH – More than 100 Years of Innovation

**Global market leader in the preparation and characterization of solids – quality “made in Germany”.**

The company was founded in 1915 by F. Kurt Retsch. A few years later he registered his first patent in grinding technology: a mortar grinder that became famous worldwide as the “RETSCH Mill”. This innovation replaced tiresome manual grinding with hand mortars which was the standard in laboratories at the time and earned RETSCH an excellent reputation in the international science and research community.

Today RETSCH is the leading solution provider for size reduction and particle sizing technology with subsidiaries in the US, China, Japan, India, France, Italy, Benelux, Russia, UK and Thailand and an export share of 80%.

RETSCH’s philosophy is based on customer orientation and leading edge technology. This is reflected in instruments whose high-quality components are designed for perfect interaction. RETSCH products not only guarantee representative and reproducible results for grinding and particle analysis but also allow for easy and comfortable operation.

With RETSCH you get:

- **First class product quality thanks to advanced manufacturing methods**
- **Comprehensive application support including free test grindings and product trainings**
- **Excellent sales and service network throughout the world**

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## RETSCH Goes Big: New Product Line of Big Crushers and Grinders

RETSCH GmbH – world-leading supplier of laboratory equipment for sample homogenization and sieve analysis – have enhanced their product range with a complete line of instruments for applications with large feed sizes and high throughput rates. The new product range has been integrated into the existing product line under the label “XL”.

Now RETSCH can offer, for example, a series of jaw crushers with feed sizes from 40 mm to 350x170 mm. The new XL models of ball mills, vibratory disc mills and sample dividers provide a substantially higher throughput than the laboratory-scale equipment. The new portfolio also includes a range of

testing equipment to determine the Bond Grinding Indices.

RETSCH’s XL items are ideally suited for the coal, steel and mining industries which until now could only be served with laboratory instruments for small sample volumes.

**RETSCH is now the only supplier worldwide offering a portfolio that ranges from ball mills for nano grinding to jaw crushers with a throughput of 3500 kg per hour, thus covering the entire field of size reduction from research applications to the semi-industrial field.**



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### Disclaimer

As RETSCH has a policy of continuous product development, improvements and changes will be made during the lifetime of this catalogue. RETSCH reserves the right to amend the specifications at any time and in any particular way without prior notice. If the dimensions or technical specification of a product in this catalogue are critical, it is important that RETSCH is contacted to confirm the details prior to order placement. Images in this catalogue may differ from the original and may contain accessories and optional equipment which are not part of the standard scope of delivery.

## Selection Guide for Size Reduction Tools

The following selection guide provides an initial overview of the application areas of RETSCH mills and crushers. The selection of a suitable mill depends on the individual application.

**Contact us to find the optimum solution for your application!**

- suitable
- ◐ suitable to a limited extent
- not suitable

Applications											
Construction materials	Soil	Chemical products	Electronic waste	Glass, ceramics	Wood, bones, paper	Coal, coke	Food	Minerals, ores, rocks	Pharmaceutical products	Plants, hay, straw	Secondary fuels

Jaw Crushers	Model	Feed size* approx.	Final fineness* approx.	Page
Jaw Crusher	BB 250 XL	120x90 mm	2 mm	6
Jaw Crusher	BB 400 XL	220x90 mm	2 mm	6
Jaw Crusher	BB 500 XL	<110 mm	500 µm	7
Jaw Crusher	BB 600 XL	350x170 mm	6 mm	8

●	●	◐	-	●	-	●	-	●	-	-	-
●	●	◐	-	●	-	●	-	●	-	-	-
●	●	◐	-	●	-	●	-	●	-	-	-
●	●	◐	-	●	-	●	-	●	-	-	-

### Vibratory Disc Mill

Vibratory Disc Mill	RS 300 XL	20 mm	20 µm	10
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### Drum Mills

Ball Mill	TM 300 XL	20 mm	20 µm	12
Rod Mill	TM 300 XL	20 mm	150 µm	12

●	●	●	◐	●	◐	●	◐	●	◐	●	◐
●	●	●	◐	●	◐	●	◐	●	◐	●	◐

### Cutting Mill

<b>NEW: Cutting Mill</b>	SM 400 XL	<170x220 mm	1-20 mm	19
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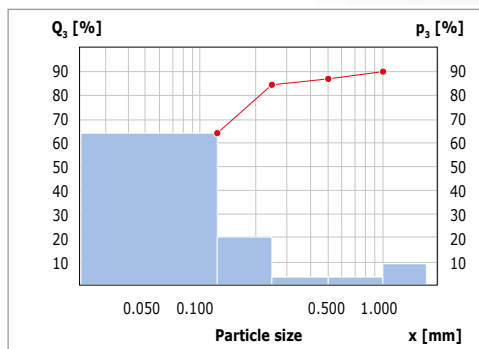
**i** Please note:

The feed size and final fineness depend on the sample material and on instrument configurations/settings.

## Application Example: Crushing of Powder Metallurgical Components

Powder metallurgical components (PM components) are characterized by high shape accuracy, a wide and differentiated variety of alloys as well as a density range from highly porous to extremely dense.

In a trial, 4 kg of pre-sintered PM components (50-100 mm feed size) were crushed in a BB 500 XL, achieving a final fineness of 84% < 250 microns and 90% < 500 microns. This particle size enables components to be re-used in the production process **without the need for a secondary grinding run.**



## Jaw Crushers XL – Safe and Convenient Powerhouses

The Jaw Crusher models BB 250 XL and BB 400 XL are used for the **rapid, effective crushing and pre-crushing of medium-hard, hard, brittle and tough materials**. The variety of materials offered, including heavy-metal free steel, their efficiency and safety makes these jaw crushers ideal for sample preparation in laboratories and industrial plants.

For small amounts of sample these crushers are used **batch-wise**; for larger amounts they can be operated **continuously**. Control of the gap width and zero point adjustment allow for reproducible results.

Thanks to the modular concept of the housing and frame these jaw crushers are suitable for a wide range of applications.

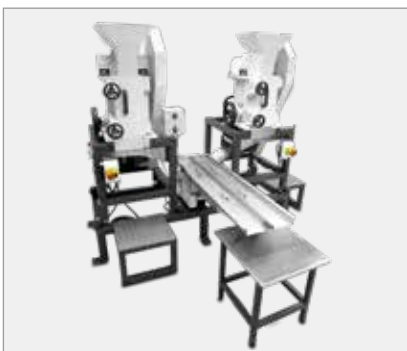
### Benefits XL Jaw Crushers

- Continuous gap width setting
- Overload protection
- Wide range of materials for contamination free grinding
- Removable no-rebound feed hopper
- Sample collector with safety switch
- Collecting receptacle with outlet for continuous operation
- Connector for dust extraction
- Optional central lubrication
- Suitable for integration in automatic installations
- Special version with automated sorting of undersize (3 fractions) and oversize (1 fraction)

[www.retsch.com/bb](http://www.retsch.com/bb)

### BB 250 XL and BB 400 XL

**These models have a front door which allows direct access to the crushing chamber for cleaning.** The feed hopper can be removed quickly and easily.



Special version:  
2 x BB 250 XL with automated sorting



BB 250 XL

BB 400 XL

## BB 500 XL – Fine Grinding in One Working Run

The BB 500 XL is a robust and powerful force-fed crusher characterized by its **excellent crushing ratio**. Thanks to the steep crushing chamber design and the highly effective crushing kinematics it is possible to process **samples with a feed size of up to 110 mm to a final fineness of 90% <0.5 mm in one working run.**

The feed material passes through the no-rebound hopper and enters the crushing chamber. Size reduction takes place in the wedge-shaped area between the fixed crushing arm and one oscillating arm with high frequency (780 min<sup>-1</sup>). This motion ensures a **consistent gap width** in the stroke cycle so that the sample is crushed to the set fineness in one working step. Two massive flywheels transmit **high impulse forces** to the crushing jaws. The innovative design permits dual usage by rotation and therefore provides for an extended service life.

As soon as the sample is smaller than the discharge gap width, it falls into a removable collector. The **continuous gap width setting with scale** ensures optimum size reduction in accordance with the set gap width.

110 mm  
500 µm\*



## Superiority in Detail



BB 250 XL and BB 400 XL:  
Removable hopper



BB 250 XL and BB 400 XL:  
Connector for dust extraction



BB 500 XL:  
Continuous gap width adjustment

## BB 600 XL – For High Sample Throughput

The Jaw Crusher BB 600 XL is used for **rapid, effective, crushing and pre-crushing of brittle, medium-hard, hard and tough materials.**

Due to the low installation height of 1 meter the BB 600 XL is **ideally suited for continuous operation** in automatic installations and sampling stations. Thanks to the compact design of the BB 600 XL it may replace a jaw crusher in existing installations. It achieves a throughput of up to 3500 kg per hour.

Small sample volumes with large particle sizes can be crushed **batch-wise** in the Jaw Crusher BB 600 XL.



BB 600 XL

## Breaking Jaws for Jaw Crushers XL

Breaking jaws are made from three different materials allowing adaptation to different sample properties (e.g. hardness) or heavy-metal-free crushing.

- Manganese steel** has a structure which becomes compressed under pressure and hardens with time (cold hardening).
- Tungsten carbide** is the most abrasion-resistant and pure material. It ensures a longer working life of the jaws even if materials with a hardness of up to 7-8 on Mohs' scale are regularly processed.
- heavy-metal-free steel** is ideally suited for heavy-metal-free grinding of samples which are not extremely abrasive (such as construction waste, soil, road pavings).

### Available breaking jaws

Model	Manganese steel	Tungsten carbide	heavy-metal-free steel	NiHard 4	Dimensions [w x l]
BB 250 XL	✓	✓	✓	-	125 x 323 mm
BB 400 XL	✓	✓	✓	-	225 x 323 mm
BB 500 XL	✓	-	-	✓	250 x 355 mm
BB 600 XL	✓	-	-	-	400 x 600 mm





  

Surface structure of breaking jaws	grooved	smooth	grooved





## Jaw Crushers at a Glance

	Jaw Crushers			
				
Model	BB 250 XL	BB 400 XL	BB 500 XL	BB 600 XL

<b>Applications</b>	coarse and pre-crushing
<b>Fields of application</b>	chemistry / plastics, construction materials, engineering / electronics, environment / recycling, geology / metallurgy, glass / ceramics
<b>Feed material</b>	medium-hard, hard, brittle, tough

### Performance data

	BB 250 XL	BB 400 XL	BB 500 XL	BB 600 XL
<b>Material feed size*</b>	< 120 x 90 mm	< 220 x 90 mm	< 110 mm	< 350 x 170 mm
<b>Final fineness*</b>	d <sub>90</sub> < 2 mm	d <sub>90</sub> < 2 mm	d <sub>90</sub> < 0.5 mm	d <sub>90</sub> < 6 mm
<b>Collector capacity</b>	10 liters	10 liters	15 liters	30 liters
<b>Collecting funnel with outlet for continuous crushing</b>	optional	optional	-	-
<b>Max. throughput*</b>	300 kg/h	400 kg/h	500 kg/h	3500 kg/h
<b>Gap width setting</b>	0–30 mm	0–30 mm	0–11 mm	6–60 mm
<b>Gap width display</b>	analog	analog	analog	-
<b>Zero point adjustment</b>	✓	✓	✓	-
<b>Removable hopper</b>	✓	✓	✓	✓
<b>Connection for dust extraction</b>	✓	✓	✓	✓
<b>Process line version available</b>	-	-	optional	optional

### Technical Data

<b>Drive power</b>	3,000 W	5,500 W	7,500 W	15,000 W
<b>W x H x D</b>	695 x 1,365 x 719 mm	695 x 1,365 x 719 mm	930 x 1,400 x 1,080 mm	925 x 1,600 x 1,370 mm
<b>Net weight</b>	approx. 325 kg	approx. 400 kg	approx. 1,050 kg	approx. 1,350 kg
<b>More information on</b>	<a href="http://www.retsch.com/bb250xl">www.retsch.com/bb250xl</a>	<a href="http://www.retsch.com/bb400xl">www.retsch.com/bb400xl</a>	<a href="http://www.retsch.com/bb500xl">www.retsch.com/bb500xl</a>	<a href="http://www.retsch.com/bb600xl">www.retsch.com/bb600xl</a>

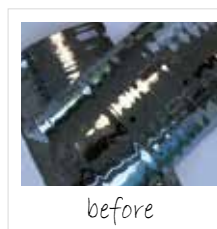
\*depending on feed material and instrument configuration



BB 250 XL with optional collecting funnel with outlet and 30 liter collector

## Typical Sample Materials

RETSCH's powerful jaw crushers are ideally suited for preliminary crushing of construction materials, ores, granite, oxide ceramics, quartz, slag, silicon, coal, tungsten alloys, cement clinker etc.



Application example: Silicon

## RS 300 XL – Fine Grinding of Large Sample Volumes

The Vibratory Disc Mill RS 300 XL is suitable for the extremely quick, loss-free and reproducible grinding of medium-hard, brittle and fibrous materials to analytical fineness. **Up to 4 samples may be processed simultaneously.** Thanks to the robust universal drive shaft, which sets the grinding jar into a 3-D motion, this mill accepts **grinding set weights of up to 30 kg**. The closed grinding system guarantees complete processing of the sample.

Just like the RS 200, the RS 300 XL with its **robust design** has proven to be ideal for applications in geology, mineralogy, metallurgy, as well as in the building materials sector (cement) and in power plants.

Due to the **high end fineness** and speed the RETSCH Vibratory Disc Mills are the perfect choice when it comes to **preparing samples for spectral analysis.**



RS 300 XL

### Vibratory Disc Mill Technology:

The vibratory disc mill comminutes by impact and friction. The grinding set is firmly attached to the vibration plate with a pneumatic quick clamping device. The plate with the grinding set is subjected to 3-D vibrations. The sample is crushed by **extreme pressure, impact and friction** generated by centrifugal forces acting on the grinding elements in the dish.



### Benefits

- Reproducible results and homogeneous samples thanks to universal drive shaft (3D vibration of grinding sets)
- Short grinding times
- Auto-reverse function (left/right rotation)
- Programmable interval function (start/ stop automatic)
- Easy operation via function keys
- Wide range of materials for contamination-free grinding
- Grinding jar volumes from 100 ml up to 2,000 ml
- Pneumatic grinding-jar clamping (with air-pressure) for convenient and safe handling
- Additional safety feature: mill only starts when the pneumatic pressure is correct
- Optional AutoLifter for ergonomic lifting of heavy grinding sets

[www.retsch.com/rs300xl](http://www.retsch.com/rs300xl)

## Grinding Sets

The grinding sets of the RS 300 are available in five different materials and four sizes (100 ml – 800 ml – 1000 ml – 2000 ml) which makes the mill easily adaptable to a wide range of applications and ensures uncontaminated analyses.

The **100 ml** grinding set consists of a grinding jar with lid, a grinding ring and a grinding disc. The **800, 1000 and 2000 ml** grinding sets consist of a grinding jar with lid and a grinding disc with opening which supports perfect mixing of large sample quantities.



### Guidelines for sample volumes

In addition to the instrument settings, the filling level of the grinding set is also of crucial importance for a successful grinding process in a vibratory disc mill. The table provides some guide values for the recommended sample volume for each jar size.

Grinding set nominal value	Sample volume	Max. feed size
<b>100 ml</b>	35-100 ml	< 10 mm
<b>800 ml</b>	280-800 ml	< 15 mm
<b>1000 ml</b>	350-1000 ml	< 15 mm
<b>2000 ml</b>	700-2000 ml	< 20 mm

## AutoLifter

For ergonomic removal of the heavy grinding sets (800 ml, 1000 ml and 2000 ml) we recommend the use of the pneumatic AutoLifter.



## RS 300 XL at a Glance

### Vibratory Disc Mill



Model

RS 300 XL

<b>Application</b>	size reduction, mixing, trituration
<b>Fields of application</b>	construction materials, environment / recycling, geology / metallurgy, glass / ceramics
<b>Feed material</b>	medium-hard, hard, brittle, fibrous

### Performance data

<b>Material feed size*</b>	< 20 mm
<b>Final fineness*</b>	$d_{90} < 20 \mu\text{m}$
<b>Batch size / feed quantity*</b>	35 – 2000 ml
<b>Speed</b>	912 min <sup>-1</sup>
<b>Digital setting of grinding time</b>	✓

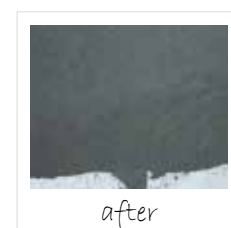
### Technical data

<b>Drive power</b>	2,200 W
<b>W x H x D (closed)</b>	1,150 x 1,400 x 810 mm
<b>W x H x D (open)</b>	1,150 x 2,100 x 810 mm
<b>Net weight</b>	approx. 400 kg
<b>More information on</b>	<a href="http://www.retsch.com/rs300xl">www.retsch.com/rs300xl</a>

\*depending on feed material and instrument configuration

## Typical Sample Materials

RETSCH's Vibratory Disc Mill RS 300 XL rapidly pulverizes materials such as cement, cement clinker, ceramics, coal, coke, concrete, corundum, glass, metal oxides, minerals, ores, silicate, slag, soil etc.



Application example:  
Slag

## TM 300 XL – Grinding and Mixing of Large Sample Volumes

The **TM 300 XL Drum Mill** is used for the preparation of granules and powders. The grinding process is performed either in dry or wet conditions. The drum mill can be operated either as a ball or rod mill by using the corresponding module.

A sufficient number of balls or rods is required for an effective grinding process. Typically, a **final fineness below 150 microns** is achieved.

The mill consists of a gear motor mounted on a solid steel frame complete with outlet funnel and a set of separation screens plus sample collector. In the TM 300 XL, access to the sample is easy: the housing is opened conveniently with a yoke and locking mechanism and the drum features a quick-release cover.

### Adjustment of grinding parameters:

Parameters like grinding time or start and stop are easily selected and stored via the display. The following factors have an influence on the final particle size: Sample characteristics, maximum feed size and capacity. We will gladly support you in working out the most suitable configuration for your specific application.



Drum Mill TM 300 XL

Modular 2-in-1 Mill

## Benefits

- Suitable for dry and wet grinding
- Variable speed, reproducible results
- Suitable for long-term operations
- Ball mill and rod mill modules available
- Easy tilt to empty the grinding drum
- Removable sample collector
- Easy parameter setting via display
- Standard sizes of grinding drums from 5 to 43.4 l
- Separation grid to separate sample from grinding balls (for ball mill only)
- Guide rail allows for ergonomic removal of drum
- Grinding drum with gasket for lossfree operation
- Solid noise-protection hood

[www.retsch.com/tm300xl](http://www.retsch.com/tm300xl)



### Drum Mill Technology:

In a drum mill the sample (usually pre-crushed material) is placed inside the drum with the grinding balls or rods and subjected to external forces. The ball mill and rod mill modules are used for fine grinding of solid matter by impact and friction, in wet or dry condition. The drum, which contains the sample and grinding balls or rods, rotates around a horizontal axis. Whereas particles break more easily when larger grinding ball or rod diameters are used, smaller diameters lead to a substantially higher final fineness. The motor incorporates a solid-state controller with internal overload protection which is used to set and accurately control **different drum speeds**.

\*depending on feed material and instrument configuration

## Accessories and Options

The volumes of the steel grinding drums for TM 300 XL range from 5 to 43.4 liters.

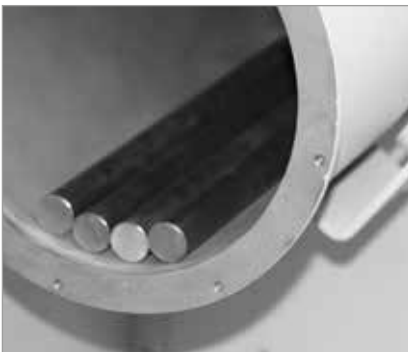
Drum volume and ball or rod fillings depend on sample type and quantity.

### Grinding Drums, steel

- 5 liters
- 10 liters
- 21.7 liters
- 43.4 liters

### Grinding Media, steel

- Grinding balls 20 kg with 20 mm diameter
- Grinding rods 8 pieces with 30 mm diameter (only valid for 43.4 liter drum)



## Drum Mills at a Glance

Drum Mills			
			
Model	<table border="1"> <tr> <td>TM 300 XL Ball Mill</td> <td>TM 300 XL Rod Mill</td> </tr> </table>	TM 300 XL Ball Mill	TM 300 XL Rod Mill
TM 300 XL Ball Mill	TM 300 XL Rod Mill		

<b>Applications</b>	pulverizing, mixing	
<b>Fields of application</b>	agriculture, biology, Chemistry, construction materials, engineering / electronics, environment / recycling, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals	
<b>Feed material</b>	soft, hard, brittle, fibrous - dry or wet	

### Performance data

<b>Material feed size*</b>	< 20 mm	< 20 mm
<b>Final fineness*</b>	< 20 µm	< 150 µm
<b>Max. batch size / feed quantity*</b>	approx. 10 liters	approx. 20 liters
<b>Typical grinding time</b>	30–60 min	30–60 min
<b>Possible applications</b>		
Dry grinding	✓	✓
Wet grinding	✓	✓
Mixing	✓	-
<b>Grinding drums</b>	5 / 10 / 21.7 liters	43.4 liters
<b>Grinding media</b>	grinding balls	grinding rods
<b>No. of grinding stations</b>	1	1
<b>Digital pre-selection of speed</b>	0–80 min <sup>-1</sup>	0–80 min <sup>-1</sup>
<b>Digital pre-selection of time</b>	✓	✓

### Technical Data

<b>Drive power</b>	750 W	750 W
<b>W x H x D</b>	1,500 x 1,260 x 765 mm	1,500 x 1,260 x 765 mm
<b>Net weight</b>	295 kg	295 kg
<b>More information on</b>	<a href="http://www.retsch.com/tm300xl">www.retsch.com/tm300xl</a>	

\*depending on feed material and instrument configuration

## Typical Sample Materials

RETSCH Drum Mills are ideally suited for the size reduction of minerals, ores, glass, ceramics, coal, cement, pharmaceutical products, food etc.



Application example:  
Ore

## Sample Divider PT 600 XL

The rotating sample divider PT 600 XL is specially designed for representative, dust-free division and volume reduction of large amounts of powdered or granular bulk materials. The selection of different dividing modules determines the dividing ratio and the sample amount.

Operation of the PT 600 XL is easy and convenient. The vibratory feeder ensures automatic and synchronized sample feeding which means **representative division right from the start**. The sample material is always divided under consistent conditions.

- Representative and reproducible results thanks to reliable dividing method
- Compact, maintenance-free and easy to clean due to the modular design
- Digital time and speed setting
- Quick and easy handling of dividing segments
- Constant rotation
- Low-noise drive

The RETSCH sample divider PT 600 XL divides all pourable solids up to 20 mm so accurately that the characteristic composition of each fraction of the sample corresponds exactly to that of the original bulk sample.

## Typical Sample Materials

Soil, construction materials, fertilizer, filler materials, grain, coffee, flour, metal powder, minerals, nuts, seeds, sand, washing powder, cement clinker etc.



PT 600 XL

## Benefits

- Exact dividing, also of larger quantities
- Modular design
- Variable speed
- Extraction of 6 - 10 samples for batch processing
- Extraction of 1 sample for continuous processing with reject
- Vibratory feeder with push-fit feed chute for easy cleaning

[www.retsch.com/pt600xl](http://www.retsch.com/pt600xl)

## Superiority in Detail



Easy cleaning: foldback hopper



Continuous processing: 1 part sample up to 6 liters and 70 liters of reject



Reject collector with transport casters

## Accessories and Options

A variety of dividing modules and sample vessels is available for the Sample Divider PT 600 XL.



Module for 1 part sample with reject



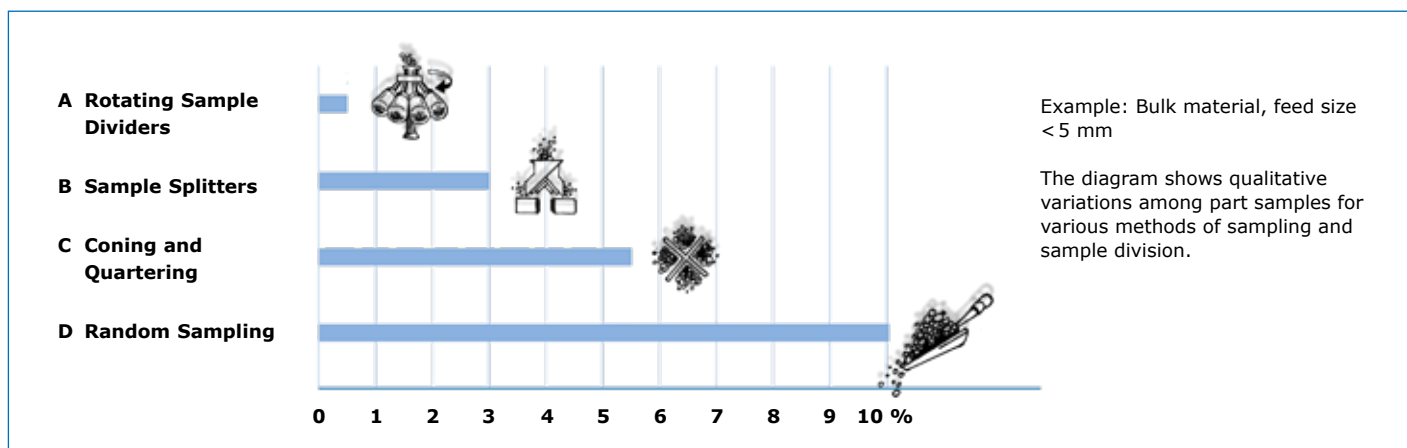
Module for 8 part samples without reject

## Rotating Sample Dividers at a Glance

Model	Rotating Sample Divider PT 600 XL	
	PT 600 XL (module for continuous processing)	PT 600 XL (module for batch processing)
<b>Applications</b>	sampling, sample division, sample reduction	sampling, sample division, sample reduction
<b>Feed material</b>	bulk materials	bulk materials
<b>Speed</b>	18–53 min <sup>-1</sup>	18–53 min <sup>-1</sup>
<b>Number of division segments</b>	1	6 / 8 / 10
<b>Volume of segments</b>	6,000 ml	6,000 ml / 7,500 ml / 10,000 ml
<b>Volume of hopper</b>	60 liters	60 liters
<b>W x H x D</b>	1,180 x 1,670 x 780 mm	1,180 x 1,670 x 780 mm
<b>Net weight</b>	258 kg	239 kg
<b>More information on</b>	<a href="http://www.retsch.com/pt600xl">www.retsch.com/pt600xl</a>	

## Comparison of different sampling and sample division methods

A faultless and comparable analysis is closely linked to accurate sample handling. Only a sample representative of the initial material can provide meaningful analysis results. Rotating sample dividers ensure the representativeness of a sample and thus the reproducibility of the analysis.



## Bond Index Tester BT 100 XL

**By determining the Bond Work Index it is possible to calculate the crushing/abrasion behavior of mineral samples. This knowledge is essential to define the required ball mill layout and production capacity.**

The **Ball Mill Work Index (BWI)** is used for particle size determination in a size range from 3.35 mm down to 150 µm whereas the **Rod Mill Work Index (RWI)** is used for the size range from 12.5 mm down to 1.4 mm.

At least 15 to 20 kg sample material is required to simulate a closed grinding circuit in a ball or rod mill.

A successful Bond Index test begins with pre-crushing the sample material (e. g. minerals, drilling cores, concrete) in a jaw crusher. The material is then divided representatively and the required fractions (< 3.35 mm BWI or < 12.5 mm RWI) are obtained by sieve analysis.



### Ball Mill Module

The grinding drum of the Bond Index Ball Mill measures 12" x 12" and has well-rounded corners. The fixed speed is 70 min<sup>-1</sup>; the number of rotations is freely adjustable.

The Bond Index conforming ball charge consists of:

- 43 x 1.45" balls
- 67 x 1.17" balls
- 10 x 1" balls
- 71 x 0.75" balls
- 94 x 0.61" balls

### Rod Mill Module

The grinding drum for the Bond Index Rod Mill is 12" x 24" in size and has a wave-shaped design. The fixed speed is 46 min<sup>-1</sup>; the number of rotations is freely adjustable.

The Bond Index conforming rod charge consists of:

- 6 rods of 1.25" diameter and 21" length
- 2 rods of 1.75" diameter and 21" length

## Bond Index Tester at a Glance

Model	Bond Index Tester	
	BT 100 XL (Ball Mill Module)	BT 100 XL (Rod Mill Module)
<b>Applications</b>	quantification of grindability of ores and minerals	
<b>Feed Material</b>	<3.35 mm	<12.50 mm
<b>Speed*</b>	70 min <sup>-1</sup>	46 min <sup>-1</sup>
<b>Number of rotations</b>	freely adjustable	freely adjustable
<b>Drum volume</b>	21.7 liters	43.4 liters
<b>W x H x D</b>	1,500 x 1,260 x 765 mm	1,500 x 1,260 x 765 mm
<b>Net weight</b>	295 kg	295 kg
<b>More information on</b>	<a href="http://www.retsch.com/bt100xl">www.retsch.com/bt100xl</a>	

\*For grinding processes the speed can be adjusted from 1 to 80 rpm



## Impact Tester IT 100 XL

A clear definition of the desired **throughput capacity and product quality** can be obtained in the planning phase of a crushing plant with the help of **Bond Index Testing**.

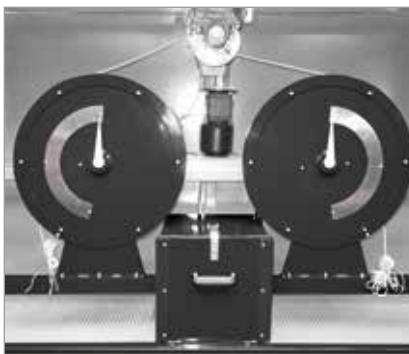
**The Bond Impact Tester IT 100 XL has two hammers mounted on a pendulum and is used for the determination of the Crushing Work Index (CWI).** This index describes the competency of ores at larger particle sizes and serves to calculate the energy actually required for the crushing process.

At least 10 samples, preferably 20, should be tested. Each broken stone has to pass a 3 inch square mesh and falls on a 2 inch square mesh.

The IT 100 XL Bond Impact Tester is available in a manual or automatic version and complies with the requirements defined by F. C. Bond.



IT 100 XL, manual version



IT 100 XL, automatic version



Scale for crushing angle



Exchangeable hammers

## Impact Tester at a Glance

Model	Impact Tester	
	IT 100 XL, automatic version	IT 100 XL, manual version
<b>Applications</b>	quantification of the breaking characteristics of ores and minerals	
<b>Feed Material</b>	brittle, medium-hard, hard, tough	
<b>Crushing angle</b>	adjustable from 10° up to 150° in steps by 5°	adjustable from 10° up to 150° in steps by 5°
<b>Processing time</b>	automatic	manual
<b>Feed quantity</b>	variable	variable
<b>More information on</b>	<a href="http://www.retsch.com/it100xl">www.retsch.com/it100xl</a>	

## Abrasion Tester AT 100 XL

The **Bond Abrasion Index (AI)**, devised by F.C. Bond in the 1940's, quantifies the abrasivity of ores and minerals. The index serves to calculate metal wear rates in crushers and ball consumption rates in ball mills.

**The AT 100 XL consists of a rotating insert into which dry ore samples with a defined particle size are placed.** An impact paddle mounted on a centre shaft, rotating at a higher speed than the insert, grinds the sample over a defined period of time.

Both insert and paddle rotate in the same direction. The paddle is made from standard alloy steel hardened to 500 Brinell. **The Abrasion Index is calculated from the weight loss of the paddle under standard operating conditions.**



Standard-compliant determination of AI

AT 100 XL



360° insert



Closing the filled grinding chamber



Hardened impact paddle

## Abrasion Tester at a Glance

	Abrasion Tester
Model	AT 100 XL
<b>Applications</b>	quantification of the abrasivity of ores and minerals
<b>Feed Material</b>	brittle, medium-hard, hard, tough
<b>Batch size / feed quantity*</b>	4 x 400 g (according to standard)
<b>Speed setting</b>	paddle: fixed, 632 min <sup>-1</sup> insert: fixed, 70 min <sup>-1</sup>
<b>Time setting</b>	fixed, 15 minutes
<b>W x H x D (closed)</b>	720 x 1,240 x 910 mm
<b>W x H x D (open)</b>	720 x 1,800 x 910 mm
<b>Net weight</b>	260 kg
<b>More information on</b>	<a href="http://www.retsch.com/at100xl">www.retsch.com/at100xl</a>

## Cutting Mill SM 400 XL

The new Cutting Mill SM 400 XL is ideally suited for pre-cutting of large sample pieces but, depending on the application, may also achieve the required fineness in one step.

The high torque of the 3 kW drive allows for an exceptionally effective preliminary size reduction of heterogeneous mixtures, such as waste or electronic components.

The cutting mill is used successfully for a great variety of materials. The sample is only moderately warmed up during the grinding process so that the mill is perfectly suitable for grinding temperature-sensitive materials. Due to the large open surface of the 240 mm x 240 mm bottom sieve, it is possible to grind large sample quantities and to increase the throughput.

When operated with the optional cyclone-suction-combination, the SM 400 XL is also suitable for grinding light sample materials. In combination with the wide choice of bottom sieves, hoppers and collecting vessels, the mill can be easily adapted to varying application requirements.

### SM 400 XL at a Glance

Model	Cutting Mill
	SM 400 XL
<b>Applications</b>	size reduction by cutting
<b>Feed Material</b>	soft, medium-hard, tough, elastic, fibrous
<b>Material feed size*</b>	< 170 x 220 mm
<b>Final fineness*</b>	1 - 20 mm
<b>Speed</b>	280 min <sup>-1</sup>
<b>W x H x D (closed)</b>	695 x 1399 x 719 mm
<b>Net weight</b>	~ 180 kg
<b>More information on</b>	<a href="http://www.retsch.com/sm400xl">www.retsch.com/sm400xl</a>

\*depending on feed material and instrument configuration

NEW



Powerful size reduction – also of heterogeneous material mixes

SM 400 XL

### Benefits

- Powerful size reduction thanks to 3 kW drive
- Optimum cutting effects
- Accepts large feed sizes up to 170 mm x 220 mm
- Quick and easy cleaning due to fold-back hopper, smooth surfaces
- Defined final fineness due to bottom sieves with aperture sizes from 1 - 20 mm

[www.retsch.com/sm400xl](http://www.retsch.com/sm400xl)



## RETSCH General Catalog

RETSCH's general catalog comprises the complete product range for sample preparation by size reduction and homogenization and for particle size analysis by sieving. It also contains an overview of the most important applications as well as key facts on milling and sieving.

[www.retsch.com/downloads](http://www.retsch.com/downloads)

# RETSCH PRODUCT RANGE

Visit us at [www.retsch.com](http://www.retsch.com) and you will find further information such as news, product info, brochures, videos for download, search for applications and much more.

Milling



Jaw Crushers  
BB 50/BB 100/BB 200/BB 300



Ultra Centrifugal Mill  
ZM 200



Rotor Beater Mill  
SR 300



Cross Beater Mill  
SK 300



Cyclone Mill  
TWISTER



Knife Mills  
GRINDOMIX GM 200/GM 300



Cutting Mills  
SM 100/SM 200/SM 300



Mortar Grinder  
RM 200



Disc Mills  
DM 200/DM 400



Vibratory Disc Mill  
RS 200



XRD-Mill  
Mccrone



CryoMill



Mixer Mills  
MM 200/MM 400



Planetary Ball Mills  
PM 100 CM/PM 100/PM 200/PM 400



High Energy Ball Mill  
Emax

Sieving



Vibratory Sieve Shakers  
AS 200/AS 300/AS 400/AS 450



Tap Sieve Shaker  
AS 200 tap



Air Jet Sieving Machine  
AS 200 jet



Test Sieves  
Evaluation Software EasySieve®



Optical Particle Analyzers  
CAMSIZER® P4/CAMSIZER® X2

Assisting



Sample Dividers  
PT 100/PT 200



Vibratory Feeder  
DR 100



Fluid Bed Dryer  
TG 200



Ultrasonic Baths  
UR 1/UR 2/UR 3



Pellet Presses  
PP 25/PP 35/PP 40

Retsch XL



Jaw Crushers  
BB 250/BB 400/BB 500/BB 600 XL



Vibratory Disc Mill  
RS 300 XL



Cutting Mill  
SM 400 XL



Drum Mill  
TM 300 XL



Sample Divider  
PT 600 XL



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