XL

Retsch®

Solutions in Milling & Sieving

Milling | Assisting | Testing

for large sample volumes

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VERDER scientific

Science for Solids

Materialography
Furnaces & Ovens
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

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**

www.retsch.com

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.

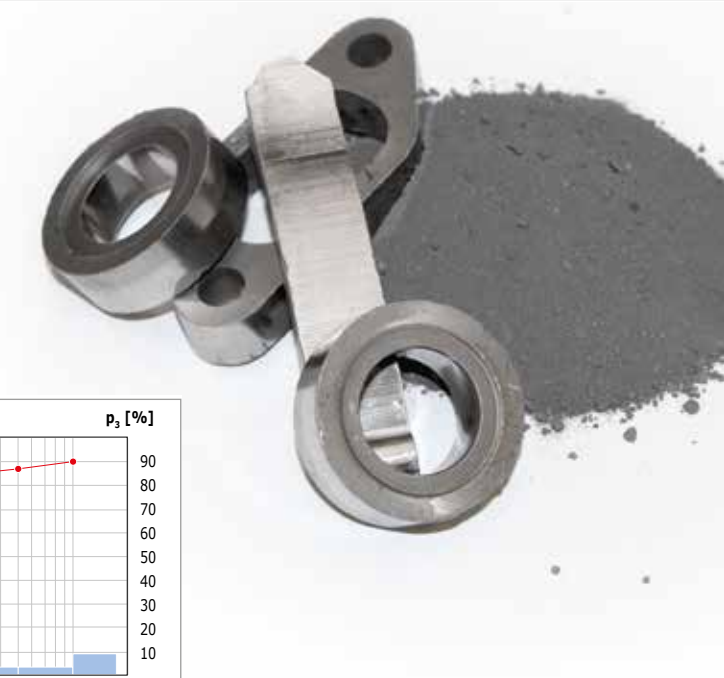
Selection Guide for Size Reduction Tools

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

Jaw Crushers	Model	Feed size* approx.	Final fineness* approx	Page	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
					Applications											
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	●	●	◒	◒	●	●	●	◒	●	◒	●	◒
Drum Mills																
Ball Mill	**TM 300 XL**	20 mm	20 µm	12	●	●	●	◒	●	◒	●	◒	●	◒	●	◒
Rod Mill	**TM 300 XL**	20 mm	150 µm	12	●	●	●	◒	●	◒	●	◒	●	◒	●	◒

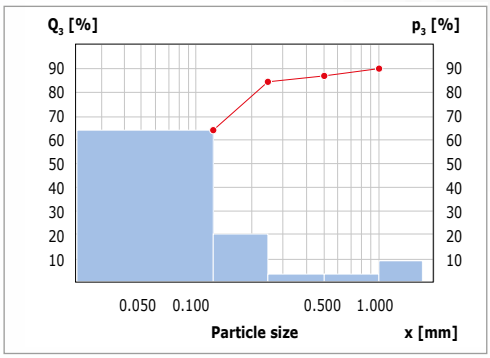
Please note:
The feed size and final fineness depend on the sample material and on instrument configurations/settings.



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

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

*depending on feed material and instrument configuration

110 mm
500 µm*

NEW

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^{-1}). 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.

BB 500 XL

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

*depending on feed material and instrument configuration

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		

*depending on feed material and instrument configuration
**other materials on request

Jaw Crushers at a Glance

	Jaw Crushers			
				
Model	BB 250 XL	BB 400 XL	BB 500 XL	BB 600 XL
Applications	coarse and pre-crushing			
Fields of application	chemistry / plastics, construction materials, engineering / electronics, environment / recycling, geology / metallurgy, glass / ceramics			
Feed material	medium-hard, hard, brittle, tough			

Performance data

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

Technical Data

Drive power	3,000 W	5,500 W	7,500 W	15,000 W
W x H x D	695 x 1,365x 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
Net weight	approx. 325 kg	approx. 400 kg	approx. 1,050 kg	approx. 1,350 kg
More information on	**www.retsch.com/ bb250xl**	**www.retsch.com/ bb400xl**	**www.retsch.com/ bb500xl**	**www.retsch.com/ bb600xl**

*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.

before

after

Application example: Silicon

Solutions in Milling & Sieving

10 Vibratory Disc Mill

RS 300 XL – Fine Grinding of Large Sample Volumes

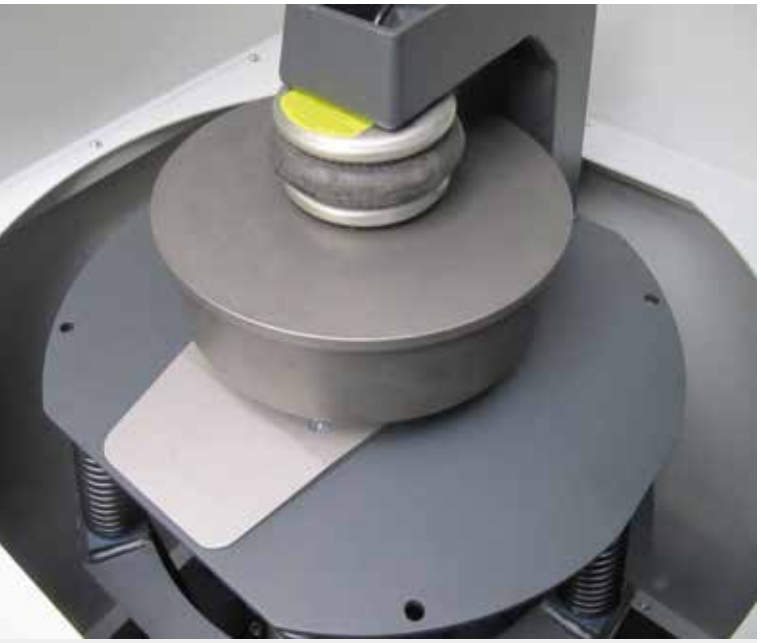
The Vibratory Disc Mill RS 300 XL is suitable for the extremely quick, loss-free and reproducible grinding of medium-hard, brittle and fibrous materials to analytical fineness. **Up to 4 samples may be processed simultaneously.** Thanks to the robust universal drive shaft, which sets the grinding jar 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

*depending on feed material and instrument configuration

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
100 ml	35-100 ml	< 10 mm
800 ml	280-800 ml	< 15 mm
1000 ml	350-1000 ml	< 15 mm
2000 ml	700-2000 ml	< 20 mm

RS 300 XL at a Glance

Model	Vibratory Disc Mill
	
	RS 300 XL

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

Performance data

Material feed size*	< 20 mm
Final fineness*	d_{90} < 20 µm
Batch size / feed quantity*	35 – 2000 ml
Speed	912 min^{-1}
Digital setting of grinding time	✓

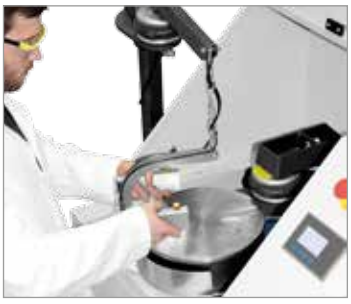
Technical data

Drive power	2,200 W
W x H x D (closed)	1,150 x 1,400 x 810 mm
W x H x D (open)	1,150 x 2,100 x 810 mm
Net weight	approx. 400 kg
More information on	**www.retsch.com/rs300xl**

*depending on feed material and instrument configuration

AutoLifter

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



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.


before


after

Application example: Slag

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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

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

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.

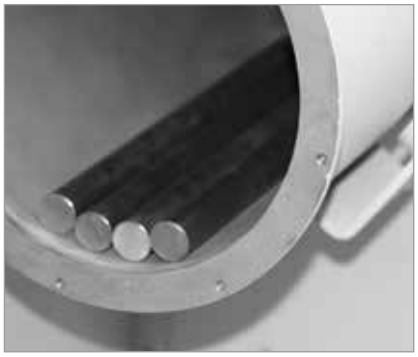
Drum volume and ball or rod fillings depend on sample type and quantity.

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	TM 300 XL Ball Mill	TM 300 XL Rod Mill
Applications	pulverizing, mixing	
Fields of application	agriculture, biology, Chemistry, construction materials, engineering / electronics, environment / recycling, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals	
Feed material	soft, hard, brittle, fibrous - dry or wet	
Performance data		
Material feed size*	< 20 mm	< 20 mm
Final fineness*	< 20 µm	< 150 µm
Max. batch size / feed quantity*	approx. 10 liters	approx. 20 liters
Typical grinding time	30 – 60 min	30 – 60 min
Possible applications		
Dry grinding	✓	✓
Wet grinding	✓	✓
Mixing	✓	–
Grinding drums	5 / 10 / 21.7 liters	43.4 liters
Grinding media	grinding balls	grinding rods
No. of grinding stations	1	1
Digital pre-selection of speed	0 – 80 min^{-1}	0 – 80 min^{-1}
Digital pre-selection of time	✓	✓
Technical Data		
Drive power	750 W	750 W
W x H x D	1,500 x 1,260 x 765 mm	1,500 x 1,260 x 765 mm
Net weight	295 kg	295 kg
More information on	**www.retsch.com/tm300xl**	

*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.


before


after

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

PT 600 XL

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.

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

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

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

Comparison of different sampling and sample division methods

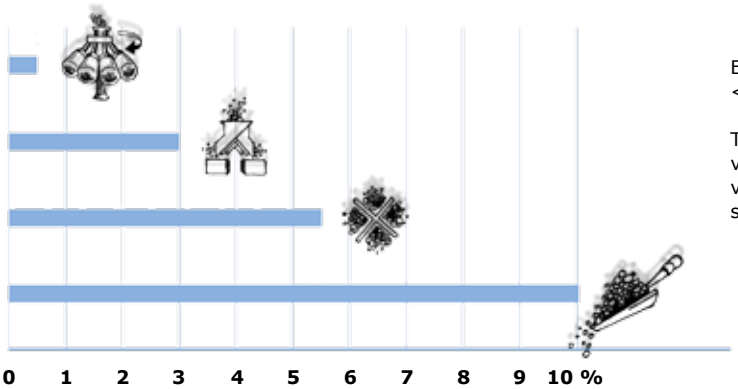
A faultless and comparable analysis is closely linked to accurate sample handling. Only a sample representative of the initial material can provide meaningful analysis results. Rotating sample dividers ensure the representativeness of a sample and thus the reproducibility of the analysis.

A Rotating Sample Dividers

B Sample Splitters

C Coning and Quartering

D Random Sampling



Example: Bulk material, feed size < 5 mm

The diagram shows qualitative variations among part samples for various methods of sampling and sample division.

Bond Index Tester

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.

BT 100 XL

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^{-1}; 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^{-1}; 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

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

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

Impact Tester IT 100 XL

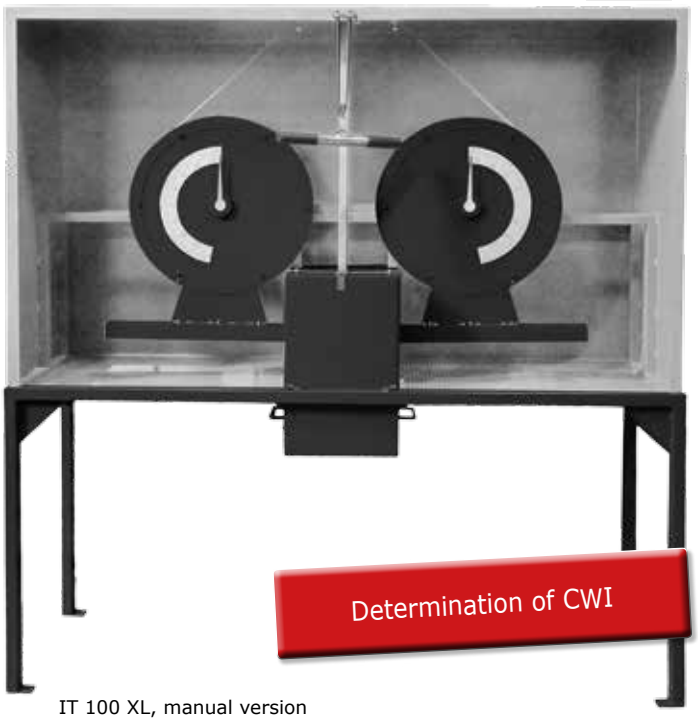
NEW

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**.

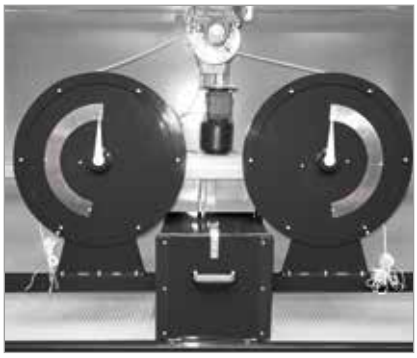
The Bond Impact Tester IT 100 XL has two hammers mounted on a pendulum and is used for the determination of the Crushing Work Index (CWI). This index describes the competency of ores at larger particle sizes and serves to calculate the energy actually required for the crushing process.

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
Applications	quantification of the breaking characteristics of ores and minerals	
Feed Material	brittle, medium-hard, hard, tough	brittle, medium-hard, hard, tough
Crushing angle	adjustable from 10° up to 150° in steps by 5°	adjustable from 10° up to 150° in steps by 5°
Processing time	automatic	manual
Feed quantity	variable	variable
More information on	**www.retsch.com/it100xl**	

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.**

AT 100 XL

360° insert

Closing the filled grinding chamber

Hardened impact paddle

Abrasion Tester at a Glance

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

Flotation Tester FT 100 XL

Flotation is used in gold, copper, lead, zinc, and coal mining to recover fine mineral particles from ore slurry. The slurry is added to a frothing solution to separate the minerals. Hydrophobic particles stick to the rising air bubbles and can thus be extracted with the froth whereas fragments which still contain large amounts of ore (so-called "tailings") sink to the bottom of the tank.

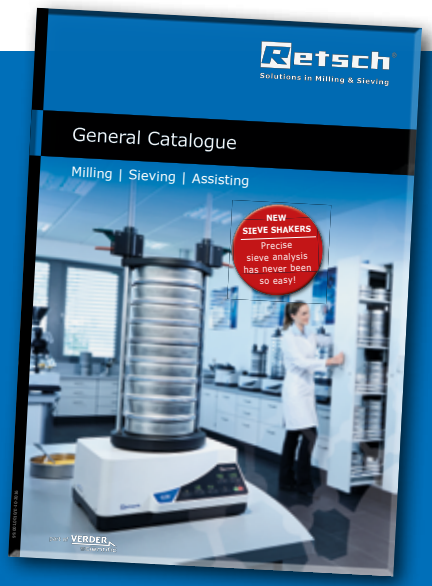
The laboratory flotation tester FT 100 XL is used to determine the percentages of the reagents required in a production flotation cell and for metallurgical sampling. A variety of flotation cells is available for use with the FT 100 XL. The tank and agitator are made of stainless steel. The device is designed for a material fineness of 500 to 750 microns.

The FT 100 XL is a precise and reliable tool to obtain reproducible test results to ascertain the operational capability of flotation plants.

FT 100 XL

Flotation Tester at a Glance

Model	Flotation Tester FT 100 XL
Applications	separation of different materials, particularly minerals, by agitating a pulverized mixture of solids in liquids
Feed Material	slurries <800 µm
Speed setting	adjustable 200 – 1,200 min^{-1}
Time setting	0 – 99 Min. digital
Batch size / feed quantity*	flotation cell up to 5,000 ml
W x H x D	560 x 755 x 600 mm
Net weight	74 kg
More information on	**www.retsch.com/ft100xl**



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

RETSCH PRODUCT RANGE

Visit us at 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

Drum Mill
TM 300 XL

Sample Divider
PT 600 XL

Flotation Tester
FT 100 XL

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