Retsch®

Solutions in Milling & Sieving

Primary size reduction with jaw crushers

BB 50 | BB 100 | BB 200 | BB 300

RETSCH

Very high throughput up to 600 kg/h

BB 300

BB 50

BB 300

part of VERDER scientific

Retsch®
Solutions in Milling & Sieving

RETSCH Sets Standards

100 years of experience in the preparation and characterization of solids have made RETSCH the world-market leader in milling and sieving technology.

With RETSCH you get

- **First-class product quality**
- **Comprehensive application support including free test grindings**
- **Excellent sales and service network throughout the world**

Primary size reduction with jaw crushers

RETSCH jaw crushers are used for the rapid, gentle crushing and pre-crushing of medium-hard, hard, brittle and tough materials. Many unique details ensure safe and convenient operation and guarantee representative sample preparation every time.

Product videos at www.retsch.com/videos

Jaw crushers

RETSCH offers a range of suitable mills for the pulverization of medium-hard, hard, brittle and tough sample materials:

Ball mills

RETSCH ball mills and mixer mills are particularly suitable for pulverizing hard and brittle materials with a maximum feed size of 6 to 10 mm. They can achieve grind sizes down to 0.001 mm.

Mortar grinders

RETSCH mortar grinders are used to grind soft, hard and brittle materials to a fineness of approx. 0.01 mm. The maximum feed size is 8 mm.

Vibratory disc mills

RETSCH vibratory disc mills for medium-hard, brittle and hard-tough materials with feed sizes up to 15 mm achieve grind sizes down to 0.04 mm. This makes them ideally suited for sample preparation to spectral analyses.
RETSCH disc mills achieve grind sizes of approx. 0.1 mm.

Applications

BB 50 | BB 100 | BB 200 | BB 300

The main areas of application for jaw crushers are:

- **Ceramics and glass**
  glass, oxide ceramics
- **Construction materials**
  basalt, bricks, cement clinker, chamotte
- **Environmental analysis**
  construction waste, soil
- **Materials research**
- **Mineralogy and metallurgy**
  alloys, coal, coke, feldspar, granite, ores, quartz, rocks, silicon, slag

and many more...

RETSCH jaw crushers are used for the rapid, gentle crushing and pre-crushing of medium-hard, hard, brittle and tough materials. The variety of materials offered, their efficiency and safety make them ideal for sample preparation in laboratories and industrial plants. Typical sample materials include rocks, minerals, ores, glass, ceramics, construction materials, brittle metal alloys, slag, resins and many other hard and brittle substances.

Free test grinding

For RETSCH, professional customer service includes offering our customers the individual advice they need to find the best possible solution for their sample preparation task. To achieve this our application laboratories process and measure samples free-of-charge and provide a recommendation for the most suitable method and instrument.

For more information please visit our website www.retsch.com/testgrinding.

Application examples

Application	Model	Breaking jaws	Gap width	Feed size	Sample amount	Grinding time	Final fineness
Asphalt	BB 300	Manganese steel	1 mm	130 mm	3,000 g	1 min	4 mm
Concrete	BB 200	Stainless steel	1 mm	70 mm	900 g	1 min	2 mm
Drilling cores	BB 300	Manganese steel	1 mm	Ø 120 mm x 250 mm	7,000 g	2 min	2 mm
Enamel	BB 200	Stainless steel	1 mm	90 mm	4,000 g	2 min	2 mm
Ferro Alloys	BB 300	Stainless steel	touching	70 mm	300 g	1 min	5 mm
Glass	BB 50	Zirconium oxide	0.1 mm	30 mm	250 g	2 min	0.5 mm
Pig iron pellets	BB 200	Tungsten carbide	5 mm	Ø 40 mm	one pellet	5 min	5 mm
Shale	BB 200	Stainless steel	4 mm	Ø 50 mm x 200 mm	16,500 g	6 min	10 mm
Slag	BB 50	Tungsten carbide	1.5 mm	30 mm	280 g	20 sec	2 mm
Silicon	BB 200	Tungsten carbide	4 mm	90 mm	3,000 g	2 min	7 mm
Stones	BB 100	Stainless steel	2 mm	40 mm	500 g	2 min	4 mm

This chart serves only for orientation purposes.

RETSCH's application database contains more than 1,000 application reports. Please visit www.retsch.com/applicationdatabase.

Powerful crushing and pre-crushing

A suitable jaw crusher for any application

BB 50

BB 100

BB 200

BB 300

Jaw crushers are always at the very front of the sample preparation chain, pre-crushing all hard and brittle materials. RETSCH jaw crushers are primarily used in laboratories and pilot plants under rough conditions but are also suitable for on-line quality control of raw materials. The jaw crushers are available in 4 different sizes: **BB 50, BB 100, BB 200 and BB 300**. Throughput and final fineness depend on the crusher type, selected gap width and breaking properties of the sample material.

Feed sizes range from 40 mm to 130 mm, depending on the model.

The main fields of application of jaw crushers are construction materials, mineralogy and metallurgy, ceramics and glass, materials research and environmental analysis.

RETSCH jaw crushers are characterized by many unique details allowing for convenient and safe sample processing.

Benefits at a glance

- High throughput, high degree of size reduction
- High final fineness (down to d_{90} <0.5 mm)
- Zero point adjustment for wear compensation
- Breaking jaws made of different materials
- No-rebound feed hopper
- Easy-to-clean crushing chamber
- Belleville spring washer provides overload protection

Jaw crusher technology

RETSCH jaw crushers are robust and powerful forced-feed crushers. 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 moved by an eccentric drive shaft. The elliptical motion crushes the sample which then falls under gravity.

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 resp. digital display ensure optimal size reduction in accordance with the set gap width value. Integral Belleville spring washer packages and a thermal overload protection switch protect the jaw crushers against overloading.

Jaw crusher

BB 50

BB 50

BB 50 – Powerful and compact benchtop model

Laboratory scale pre-crushing

The BB 50 is the smallest model of the RETSCH jaw crusher series and has been specially designed for sample preparation in the laboratory. **The space-saving instrument fits on any laboratory bench.** Small amounts of sample with large feed sizes are crushed gently and without loss. The jaw crusher BB 50 possesses a **robust metal housing which cannot be accessed by hand**. Reproducible results are ensured by the zero-point adjustment of the gap width. This means that any breaking jaw wear can be compensated by simply pressing a button.

Benefits at a glance

- Compact, space-saving benchtop instrument
- High final fineness (d_{90} <0.5 mm)
- Variable speed from 550 to 950 min^{-1}
- Digital gap width and speed display
- Direction reversal
- Zero-point adjustment for wear compensation
- Breaking jaws in 5 different materials
- No-rebound feed hopper
- Maintenance-free

Breaking jaws and wearing plates are available in five different materials to be selected depending on the sample and the analysis to be carried out. The range of options includes a version for heavy-metal-free size reduction.

The BB 50 is driven by a powerful three-phase asynchronous motor with 1100 Watt. Due to a frequency converter the motor starts with enough power to achieve the maximum speed in a very short time. A Belleville spring washer and intelligent monitoring electronics protect the jaw crusher against overloading.
Due to permanently lubricated bearings and its solid design, the BB 50 is virtually maintenance-free.

See page 10 for technical data.

Easy operation and cleaning

Working with the BB 50 jaw crusher is easy and safe. The large, clearly structured operating panel allows for digital display of parameters such as gap width and speed. The sample material is conveniently fed to the crusher via the large hopper equipped with splash-back protection.

For easy cleaning the fold-back hopper and crusher arm can be removed without using tools. The user can also exchange the breaking jaws if the crusher needs to be converted for different applications.

Easy removal of the crusher arm without tools

The BB 50 is designed for a very efficient and convenient size reduction process. The **variable speed** can be set between **550 and 950 min^{-1}** to adapt the crushing process to sample requirements. The possibility to **reverse the rotating direction** is helpful if too much sample material has been fed to the crusher causing it to block. The simple push of a button restarts the process. There is no need to empty the crushing chamber manually.

Another advantage of the BB 50 is the so-called **zero point adjustment**. Sooner or later, the breaking jaws will show signs of wear which will affect the reproducibility of the size reduction process. This effect can be compensated by adjusting the zero point. A **sign in the display** indicates if the jaws need to be replaced altogether, thus helping to avoid damages to the crusher.

Accessories

The optional accessories of the BB 50 make its use versatile and flexible. The jaws are available in **5 different materials**. For the processing of materials such as, for example, medical ceramics, jaws of **zirconium oxide** are ideally suited. See page 11 for the complete list of available materials.

If a variety of sample materials is processed on a regular basis, the **optional lid** for the collecting receptacle ensures that the fine residues from previous applications fall on the lid and not into the receptacle. Thus it is possible to avoid cross contaminations.

Its compact size makes the BB 50 an ideal choice for use in mobile laboratories. Carrying handles for the jaw crusher are available on request.

Superiority in detail

Fold-back hopper can be removed for easy access

Setting the gap width to determine the final fineness

Digital speed setting and display of gap width

Large collecting receptacle (3 liters) with optional lid to avoid cross contaminations

BB 100, BB 200, BB 300 – Robust and versatile floor models

BB 100

BB 300

Benefits at a glance

- High throughput, high degree of size reduction
- High final fineness (down to d_{90} <2 mm)
- Continuous gap width setting
- Scale for gap width display
- Zero point adjustment for wear compensation
- Central lubrication (BB 200, BB 300)
- Breaking jaws made of 4 different materials
- No-rebound feed hopper with quick-release clamp
- Brake motor with safety switch
- Easy-to-clean crushing chamber
- Process line versions of BB 200 and BB 300 available

Convenient and safe power packages

Robust design, simple handling and cleaning are the features of the BB 100, BB 200 and BB 300 models. For small amounts of sample the jaw crushers can be used batch-wise; for larger amounts they can be operated continuously.

The crushed sample is collected in a removable collector. For larger amounts or continuous crushing operations, the sample collector can be replaced by customer-specific solutions (e.g. a belt conveyor). Stainless steel and plastic sample collectors are available for the BB 300.

A Belleville spring washer integrated in the spindle adjustment provides additional overload protection. The eccentric spindle which moves the crushing arm is driven by a robust brake motor via V-belts. The largest belt pulley also acts as the flywheel to ensure uniform and smooth operation.

BB 200 and BB 300 feature central lubrication of the lower movable crushing arm roller bearings.

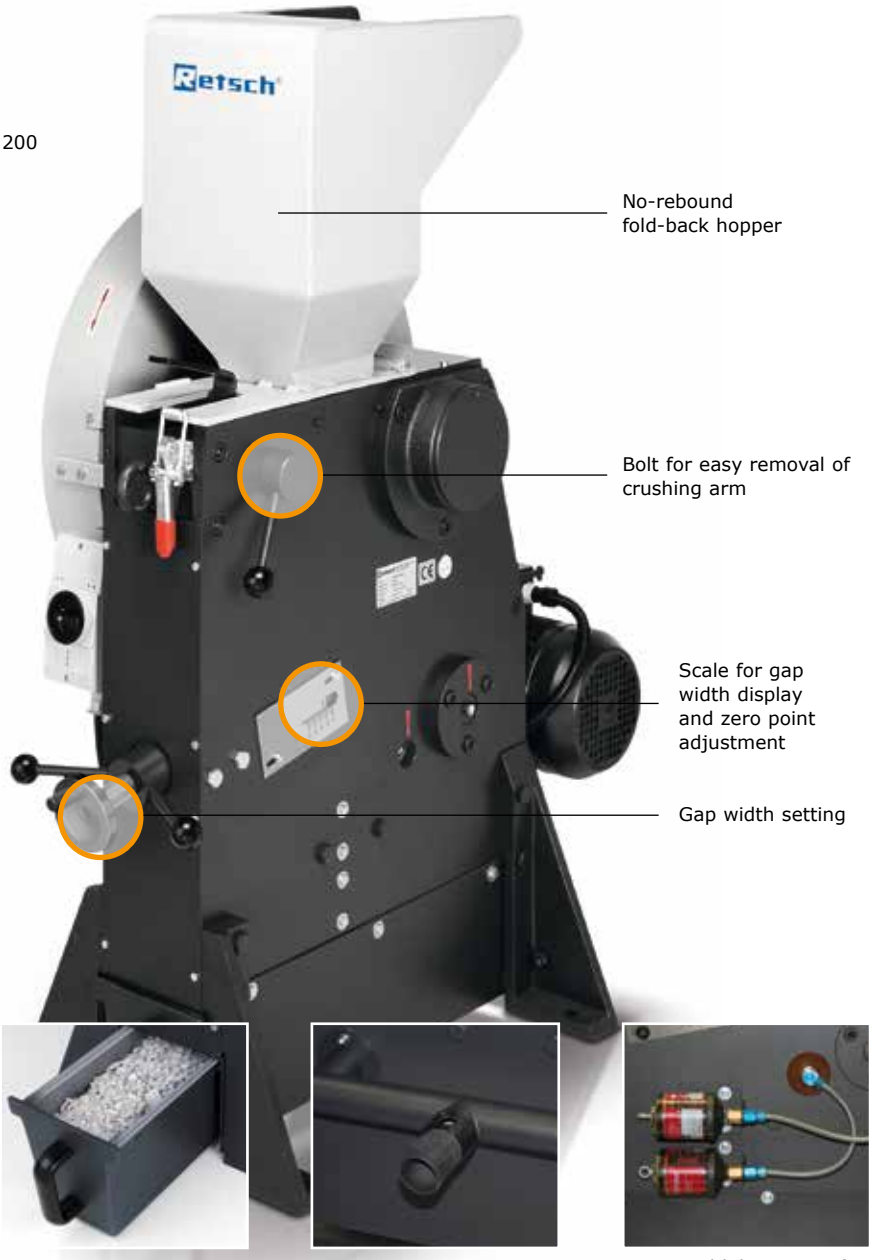
Increased user convenience combined with maximum working safety

The hinged hopper permits easy access to the grinding chamber

Safety is a top priority with RETSCH jaw crushers. The feed hopper with splash-back protection cannot be accessed by hand. A safety switch and the brake motor ensure an immediate stop if the unit is opened or switched on incorrectly.

For easy cleaning of the crushing chamber, the hinged hopper can be removed in a few simple steps. The jaw crushers run very smoothly and quietly and are virtually maintenance-free.

BB 200



Receptacle with 5 l volume

Connection for dust extraction

Central lubrication of the lower movable crushing arm roller bearings.

Heavy-metal-free crushing

All jaw crushers are available in a heavy-metal-free version. The BB 200 and BB 300 can also be supplied in a special **version suitable for crushing semiconductor materials**. This includes plastic lining of feed hopper and receptacle as well as breaking jaws and wear plates of tungsten carbide. Thus, the sample does not come into contact with metal materials at any point and **no abrasion of the grinding tools** impairs the purity of the sample material.

Jaw crushers for special requirements

Apart from the four standard models, RETSCH jaw crushers are also available as special versions adapted to particular application requirements.

Continuous pre- and fine grinding

For the rapid, continuous grinding of large quantities of coarse material to analytical fineness, the combination of the RETSCH jaw crusher BB 200 and the RETSCH Disc Mill DM 200 is the perfect solution. The crusher is mounted above the disc mill on a frame and both instruments are connected by a chute. With this construction, samples of up to 90 mm feed size can be ground down to 100 microns in one single step.

Process-line versions

The BB 200 and BB 300 jaw crushers are also available in versions which are suitable for continuous size reduction in online operation, e. g. for quality control during the production process. These are supplied without feed hopper and motor protection switch. The voltage of the three-phase AC motor will be selected in accordance with the customer's requirements.

Selection guide for jaw crushers

The choice of jaw crusher depends primarily on the feed material size and the amount to be crushed.

With its compact space-saving design, model **BB 50** is often used in laboratories for pre-crushing small amounts of sample.

Series **BB 100, BB 200** and **BB 300** jaw crushers are mainly used for pre-crushing hard, brittle products with a degree of hardness >3 on the Mohs' scale.

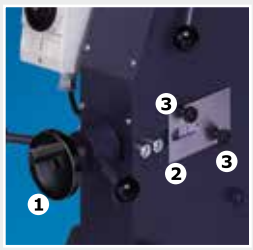
Models **BB 200** and **BB 300** are also suitable for size reduction in process plants, e.g. when included in a sampling station.

Performance Data	**BB 50**	**BB 100**	**BB 200**	**BB 300**
	www.retsch.com/bb50	www.retsch.com/bb100	www.retsch.com/bb200	www.retsch.com/bb300
Applications		coarse and pre-crushing		
Feed material		medium-hard, hard, brittle, tough		
Material feed size*	< 40 mm	< 50 mm	< 90 mm	< 130 mm
Final fineness*	d_{90} <0.5 mm	d_{90} <4 mm	d_{90} <2 mm	d_{90} <5 mm
Collector capacity	3 liters	2 liters	5 liters	27.5 liters / 35.4 liters
Throughput*	3 liters/batch	200 kg/h	300 kg/h	up to 600 kg/h
Gap width setting	0 – 11 mm	0 – 20 mm	0 – 30 mm	1 – 40 mm
Speed (at 50 Hz)	550 – 950 min^{-1}	275 min^{-1}	275 min^{-1}	253 min^{-1}
Gap width display	digital	analog	analog	analog
Zero point adjustment	yes	yes	yes	yes
Hinged hopper	yes	yes	yes	yes
Connection for dust extraction	–	yes	yes	yes
Central lubrication	greased for life	–	yes	yes
Process line version available	–	–	yes	yes
Wearout warning notice	yes	–	–	–
Technical data	**BB 50**	**BB 100**	**BB 200**	**BB 300**
Power consumption	1100 W	750 W	1500 W	3000 W
W x H x D	420 x 460 x 560 mm	320 x 960 x 800 mm	450 x 1160 x 900 mm	670 x 1450 x 1600 mm
Net weight	approx. 79 kg	approx. 137 kg	approx. 300 kg	approx. 700 kg
Noise values (Noise measurement according to DIN 45635-31-01-KL3)	**BB 50**	**BB 100**	**BB 200**	**BB 300**
Emission value with regard to workplace **	L_{pAeq} 71.1 dB(A)	L_{pAeq} 90 dB(A)	L_{pAeq} 84 dB(A)	L_{pAeq} 81.5 dB(A)

*depending on feed material and instrument configuration/settings
**Measuring conditions on request

BB 50

(1) Gap width setting
(2) Gap width display
(3) Zero-point setting



BB 100 to BB 300

(1) Gap width setting
(2) Gap width display
(3) Zero-point setting

Wear compensation by zero-point adjustment

Depending on the material and the throughput, sooner or later the breaking jaws will start to show signs of wear. This means that the set breaking jaw distance or the crushing gap will increase with time. In order to still be able to obtain reproducible crushing results this wear must be compensated. RETSCH jaw crushers can be continuously adjusted, allowing for compensation of breaking jaw wear. This is done by slowly altering the gap width setting with the motor running until the breaking jaws are heard to come into contact. The new zero point thus obtained is saved by pressing the reset key (BB 50) or readjusting the scale (BB 100 to BB 300).

With jaw crushers of other manufacturers whose gap width can only be set in fixed steps, compensation for wear is not possible.

The suitable material for your requirements

5 different materials available

Selecting the breaking jaw material

Breaking jaws made from different materials are available for different applications:

- **Manganese steel**
  is a material whose structure becomes compressed under pressure and becomes harder with time (cold hardening).
- **Stainless steel**
  is recommended if the expected feed material is not too hard and could cause corrosion.
- **Tungsten carbide**
  is the most abrasion-resistant and pure material. It provides an increased working life even with materials up to 7-8 on Mohs' scale.
- **Zirconium oxide,**
  partially yttrium-stabilized,is used as a ceramic material for metal-free preparation, e.g. for dental or clinical ceramics, optical glasses. A further advantage is that no color changes as a result of abrasion are observed
- **Heavy-metal-free steel**
  is optimal for the sample preparation of materials which will be submitted for analysis on heavy metals and which are not too abrasive, such as construction waste, soil samples, road surfacing or materials to be analyzed for hazardous substances as specified in the RoHS directive.

Surface structure of the breaking jaws

Material	BB 50	BB 100	BB 200	BB 300
Manganese steel	smooth	smooth	grooved	grooved
Stainless steel	smooth	smooth	grooved	grooved
Tungsten carbide	smooth	smooth	smooth	on request
Zirconium oxide	smooth	–	–	–
Heavy-metal-free steel	smooth	smooth	grooved	grooved

Apart from giving guideline information about their analytical compositions, the table below provides an overview of which breaking jaw materials are available for which jaw crusher models.

Material composition guidelines

Breaking jaws	Material reference	BB 50	BB 100	BB 200	BB 300	Hardness approx.	Analysis (%)
Manganese steel	1.3401	■	■	■	■	34-35 HRC	C (1.3), Si (0.5), P (0.1), Mn (13), S (0.04), Cr (1.5), Fe (83.56)
Stainless steel	1.4027	■	–	–	–	37-40 HRC	C (0.25), Si (1), P (0.05), Mn (1), S (0.05), Cr (14.5), Fe (83.17)
	1.4312	–	■	■	■	150-200 HB	C (0.12), Si (2), P (0.045), Mn (1.5), S (0.03), Cr (19.5), Ni (10), Fe (66.805)
Tungsten carbide		■	■	■	■	1180-1280 HV 30	WC (90), Co (10)
Zirconium oxide*		■	–	–	–	7.5 Mohs	ZrO_2 (94.5), Y_2O_3 (5.2), SiO_2 / MgO / CaO / Fe_2O_3 / Na_2O / K_2O (<0.3)
Heavy-metal-free steel	1.1750	■	■	■	■	52-60 HRC	C (0.82), Si (0.4), P (0.035), S (0.035), Mn (0.8), Fe (97.91)
Wearing plates							
Stainless steel	1.4301	■	■	■	■	**	C (0.07), Si (1), P (0.045), Mn (2), S (0.03), Cr (19.5), Ni (10.5), N (0.11), Fe (66.805)
Tungsten carbide		■	■	■	■	1180-1280 HV 30	WC (90), Co (10)
Zirconium oxide*		■	–	–	–	7.5 Mohs	ZrO_2 (94.5), Y_2O_3 (5.2), SiO_2 / MgO / CaO / Fe_2O_3 / Na_2O / K_2O (<0.3)
Heavy-metal-free steel	1.0344	■	■	■	■	**	C (0.1), Cu (0.35), P (0.05), S (0.05), N (0.008), Mn (0.45), Fe (98.992)

The percentages given above for the analytical values are averages. We reserve the right to make alterations.
* partially yttrium-stabilized, ** no information available

Order data jaw crushers

Jaw crushers						Item No.
Breaking jaws	Wearing plates	Version[1]	BB 50	BB 100	BB 200	BB 300[2]
Manganese steel	stainless steel	3/N~ 400 V, 50 Hz	–	20.052.0001	20.053.0001	20.054.1001
		230 V, 50 Hz	–	20.052.0003	20.053.0007	–
		200–240 V, 50/60 Hz	20.062.0001	–	–	–
Stainless steel	stainless steel	3/N~ 400 V, 50 Hz	–	20.052.0004	20.053.0002	20.054.1003
		230 V, 50 Hz	–	20.052.0006	20.053.0008	–
		200–240 V, 50/60 Hz	20.062.0002	–	–	–
Tungsten carbide	stainless steel	3/N~ 400 V, 50 Hz	–	20.052.0007	20.053.0003	20.054.1013
		230 V, 50 Hz	–	20.052.0009	20.053.0009	–
Tungsten carbide	tungsten carbide	3/N~ 400 V, 50 Hz	–	20.052.0037	20.053.0043	–
		200–240 V, 50/60 Hz	20.062.0003	–	–	–
Zirconium oxide	zirconium oxide	200–240 V, 50/60 Hz	20.062.0004	–	–	–
For grinding without heavy-metal contamination						
Steel 1.1750	Steel 1.0344	3/N~ 400 V, 50 Hz	–	20.052.0027	20.053.0018	20.054.1006
		230 V, 50 Hz	–	20.052.0028	20.053.0019	–
		200–240 V, 50/60 Hz	20.062.0005	–	–	–
For grinding of semi-conductor materials (all parts coming into contact with the sample are heavy-metal-free)						
Tungsten carbide	Tungsten carbide	3~ 400 V, 50 Hz	–	–	20.059.0001	20.061.0001
For integration into a system at the customer's location, with manufacturer's declaration according to EC machine directive, with three-phase motor (voltages on request) and central lubrication, without hopper and protective motor switch						
Manganese steel	stainless steel	on request	–	–	20.058.1001	20.057.1001
Stainless steel	stainless steel	on request	–	–	20.058.1002	20.057.1002
Tungsten carbide	stainless steel	on request	–	–	20.058.1003	–

[1]other electrical versions available on request [2]please order receptacle separately

Spare breaking jaws and wearing plates				Item No.
Spare breaking jaws, 1 pair	BB 50	BB 100	BB 200	BB 300
Spare breaking jaws, manganese steel	22.048.0014	22.048.0001	22.048.0004	22.048.0007
Spare breaking jaws, stainless steel	22.048.0012	22.048.0002	22.048.0005	22.048.0008
Spare breaking jaws, tungsten carbide	22.048.0010	22.048.0003	22.048.0006	22.048.0021
Spare breaking jaws, zirconium oxide	22.048.0011	–	–	–
Spare breaking jaws, steel 1.1750	22.048.0016	22.048.0017	22.048.0018	22.048.0019
Spare wearing plates, 1 pair	BB 50	BB 100	BB 200	BB 300
Spare wearing plates, stainless steel	22.711.0015	22.711.0002	22.711.0003	22.711.0004
Spare wearing plates, tungsten carbide	22.711.0016	22.711.0005	22.711.0010	on request
Spare wearing plates, zirconium oxide	22.711.0017	–	–	–
Spare wearing plates, steel 1.0344	22.711.0018	22.711.0012	22.711.0006	22.711.0013

Other accessories / spare parts				
	BB 50	BB 100	BB 200	BB 300
Carry handles, 1 pair	22.825.0005	–	–	–
V-belt, 1 piece	05.242.0038	–	–	–
V-belt, 1 set (3 pieces)	–	22.351.0002	22.351.0003	–
V-belt, 1 set (4 pieces)	–	–	–	22.351.0004
Set of wheels (4 pieces)	–	22.609.0002	–	–
Lubricator	–	–	22.664.0001	22.664.0001
Frame for combination with Disc Mill DM 200	–	–	02.824.0054	–
Lid for collecting receptacle	03.050.0437	–	–	–
Carriage for receptacle, capacity up to 150 kg	–	–	–	22.906.0001
Receptacle, galvanized steel, 27.5 litres	–	–	–	05.045.0048
Receptacle, plastic, 35.4 liters	–	–	–	05.045.0049

Retsch GmbH
Retsch-Allee 1-5
42781 Haan, Germany

Telephone +49 2104/2333-100
Telefax +49 2104/2333-199

E-Mail info@retsch.com
Internet www.retsch.com

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RETSCH – Your specialist for sample preparation offers you a comprehensive range of equipment. Please request information on our crushers, mills, sieve shakers, sample dividers, feeders as well as cleaning and drying machines.

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