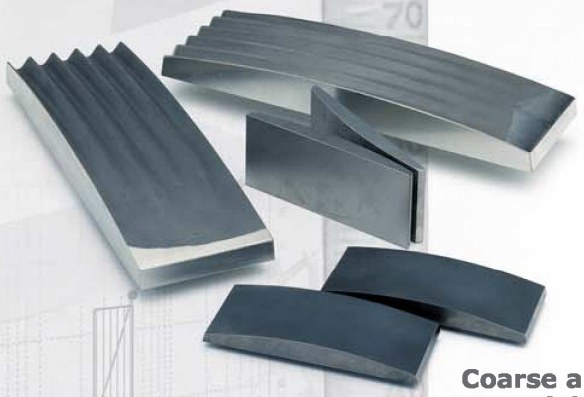
RETSCH Product Navigator

- **Milling**
  - Jaw Crushers
    - BB 51
    - BB 100
    - BB 200
    - BB 300
  - Rotor Mills
  - Cutting Mills
  - Mortar Grinders
  - Disc Mills
  - Ball Mills
- **Sieving**
- **Assisting**

Jaw crushers for primary size reduction



Coarse and initial size reduction of hard to brittle materials

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, such as heavy-metal free steel, their efficiency and safety make them ideal for sample preparation in laboratories and industrial plants.
The throughput and final fineness depend on the type of instrument, the gap width and the crushing properties of the sample. Jaw crushers are particularly suitable for the preparation of rocks, minerals, ores, glass, ceramics, construction materials, brittle metal alloys, slag, synthetic resins and many other hard, brittle substances.

Retsch®

Solutions in Milling & Sieving

The fine grinding of materials which have been pre-crushed in RETSCH jaw crushers can be carried out in the following RETSCH mills:

Ball Mills

RETSCH ball mills and mixer mills are particularly suitable for the ultra-fine grinding of hard and brittle materials with a maximum feed size between 6 and 10 mm. A final fineness down to 0.001 mm can be achieved.

Mortar Grinders

Soft, hard and brittle materials can be milled particularly well in RETSCH mortar grinders down to a final fineness of approx. 0.01 mm. Depending on the model, the maximum feed size is between 8 and 10 mm.

Disc Mills

RETSCH vibratory disc mills for medium-hard, brittle and tough materials with feed sizes up to 15 mm pulverize samples down to approx. 0.04 mm. This makes them ideal for applications such as sample preparation for spectral analysis. RETSCH disc mills achieve a final fineness of approx. 0.1 mm.

Superiority in detail – technology from RETSCH

With respect to the subsequent analysis, jaw crushers are always at the very front of the sample preparation chain. They are used for pre-crushing mainly hard and brittle materials. The fine grinding method depends on the analysis to follow and can be carried out with either

- **ball mills and mixer mills,**
- **mortar grinders, or**
- **disc mills and vibratory disc mills.**

Many unique details show that RETSCH jaw crushers are the ideal choice when the rapid and gentle crushing and pre-crushing of hard and brittle materials is to be accomplished.

Top performance in many areas

RETSCH jaw crushers are primarily used in laboratories and pilot plants under industrial conditions, but can also be used on-line for the quality assurance of raw materials. The jaw crushers are offered in four different models: **BB 51, BB 100, BB 200 and BB 300**. With a feed size between 35 and 150 mm, the jaw crushers can achieve a final fineness of down to 0.5 mm, depending on the model. The main fields of applications are:

- **Construction materials**
- **Mineralogy and metallurgy**
- **Ceramics and glass**
- **Materials research**
- **Environmental analysis**

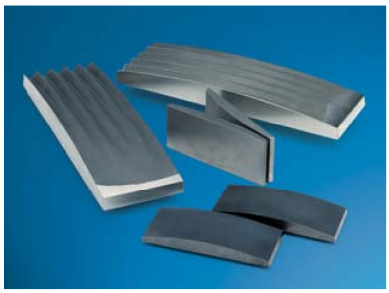
Their good final fineness and their high crushing ratio demonstrate the great efficiency of RETSCH jaw crushers.

BB 200 sample drawer with ground product

Versatile applications and long working life

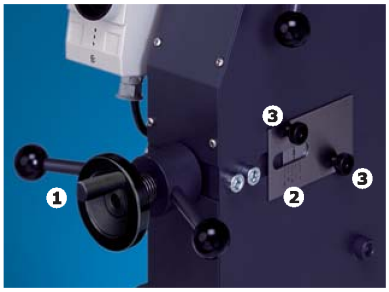
Breaking jaws for RETSCH jaw crushers are available in various materials and thus allow versatile applications and a long working life. They are available in:

- **Manganese steel**
- **Stainless steel**
- **Tungsten carbide**
- **Zirconium oxide, partially yttrium-stabilized**
- **Steel free from heavy metals**



No matter whether wear-resistance or heavy-metal-free size reduction is required – for every application there is a suitable grinding tool available.

BB 51



BB 100

Gap width setting ❶
Gap width display ❷
Zero-point setting ❸

Continuous gap width adjustment and display

The gap width is set by using an analog scale. The BB 51 has a digital display with a setting and read-off accuracy of 0.1 mm. This means that reproducible crushing processes are possible, particularly since it is possible to compensate for wear.

Zero-point adjustment to compensate for wear

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. With jaw crushers whose gap width can only be set in fixed steps, compensation for wear is not possible. This means that reproducibility can no longer be assured. In comparison, RETSCH jaw crushers can be continuously adjusted and therefore breaking jaw wear can be compensated. 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 51) or readjusting the scale (BB 100 to BB 300).

Increased user convenience combined with maximum working safety

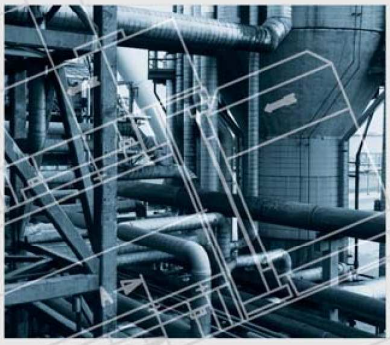
Safety is very important for RETSCH jaw crushers. The interior of the feed hopper cannot be accessed by hands and the baffles prevent the sample material from rebounding. Integral Belleville spring washer packages and a thermal overload protection switch protect the jaw crushers against overloading. The hopper is hinged for easy cleaning (BB 100 to BB 300) or can be easily removed. The jaw crushers run very smoothly and quietly. Due to their solid design, RETSCH jaw crushers are virtually maintenance-free.

The BB 200's hinged cover permits easy access to the grinding chamber.

BB 200 and BB 300 as process line versions

RETSCH type BB 200 and BB 300 jaw crushers are also available in versions which can be included in process lines. Their robust design means that they are not only suitable for batch-wise operation, but they are also particularly suitable for continuous size reduction in on-line operation.

The on-line versions of the RETSCH jaw crushers are supplied without the feed hopper and motor protection switch. The three-phase current version of the motor will be supplied as per customer's specifications.



Jaw Crusher BB 51

Laboratory scale pre-crushing

The BB 51 has been specially designed for sample preparation in the laboratory. The **space-saving, dust-tight instrument fits on any laboratory bench**. Small amounts of sample with large feed sizes are crushed gently and without loss.

The Jaw Crusher BB 51 rests on four rubber feet and has a closed housing whose interior cannot be accessed by hands. The on-off switch and gap width setting (0 – approx. 10 mm) with digital display are conveniently located on the front panel. Reproducible results are ensured by the zero-point adjustment of the gap width. This means that any breaking jaw wear can be compensated.

Benefits at a glance

- Compact, space-saving bench-top instrument
- Excellent performance and high final fineness (d_{90} <0.5 mm)
- Digital gap width display
- Zero-point adjustment for wear compensation
- Neutral-to-analysis size reduction thanks to breaking jaws made from 5 different materials
- Safe and user-friendly
- Escape-free hopper
- Dust-tight, maintenance-free
- Smooth and quiet operation
- 2-year warranty, CE-conforming

The feed hopper of the BB 51 can be easily dismantled for cleaning. Breaking jaws and wearing plates are available in five different materials. The choice of material depends on the sample and the analysis to be carried out. A new version for heavy-metal-free size reduction is now available. The breaking jaws and wearing plates are easily exchanged. This means that the jaw crusher can be converted to suit different applications.

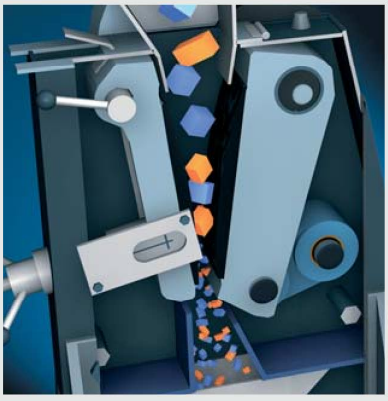
The BB 51 is driven by a powerful single-phase AC motor with 1100 W. A disc spring package and thermal overload protection device protect the jaw crusher against overloading. Due to permanently lubricated bearings and its solid design, the BB 51 is virtually maintenance-free.

Its compact size makes the BB 51 an ideal choice for use in mobile laboratories. Carrying handles for the jaw crusher are available on request

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.



Jaw Crushers BB 100, BB 200, 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
- Particularly economical
- 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
- Warranty period 2 years; CE-conforming

Conversion kit for central lubrication

Connection for dust extraction

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.

Neutral-to-analysis results are ensured by four different types of material for the breaking jaws and wearing plates.

The interior of the no-rebound feed hopper cannot be accessed by hands. It is hinged so that the crushing chamber is easily accessible for cleaning. Only a few steps are needed to exchange the breaking jaws and clean the jaw crusher.

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. Stainless steel and plastic sample collectors are available for the BB 300.

The grinding chamber is enclosed almost dust-tight. To remove any fine dust which could contaminate the surroundings, each crusher is equipped with a connection for dust extraction; this requires the use of an industrial vacuum cleaner.

Special conversion kits for the central lubrication of the lower movable crushing arm roller bearings are available for the BB 200 and BB 300. The is particularly advantageous if the jaw crushers are to be used continuously or, for example, if the jaw crusher is built into a processing line in such a way that the lubrication points are difficult to access manually.

A safety switch and brake motor ensure an immediate stop if the unit is opened or switched on incorrectly. 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.

Models BB 200 and BB 300 are also available as process line versions suitable for inclusion in preparation units.

The ideal jaw crusher to suit your needs

Selecting the jaw crusher

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 51** is often used in laboratories for pre-crushing small amounts of sample with a large feed size.

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.

BB 100 and **BB 200** are particularly suitable for standard size reductions, e.g. of minerals, ores and fossil fuels.

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

Performance data	BB 51	BB 100	BB 200	BB 300
Applications		coarse and pre-crushing		
Feed material		medium-hard, hard, brittle, tough		
Material feed size*	<35 mm	<50 mm	<90 mm	<150 mm
Final fineness	d_{90} <0.5 mm	d_{90} <4 mm	d_{90} <2 mm	d_{90} <5 mm
Collector capacity	1 liter	2 liters	5 liters	27.5 liters / 35.4 liters
Throughput*	1 liter/batch	200 kg/h	300 kg/h	up to 600 kg/h
Jaw width	40 x 40 mm	60 x 60 mm	100 x 100 mm	150 x 200 mm
Gap width setting	0 - 10 mm	0 - 20 mm	0 - 30 mm	1 - 40 mm
Gap width display	digital	analog	analog	analog
Zero point adjustment	yes	yes	yes	yes
Hinged hopper	–	yes	yes	yes
Connection for dust extraction	dust-tight	yes	yes	yes
Central lubrication	–	–	optional	optional
Process line version	–	–	available	available
Technical data				
Power consumption	1100 W	750 W	1500 W	3000 W
W x H x D	360 x 510 x 580 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)				
Emission value with regard to workplace	L_{pAeq} 83.7 dB(A)	L_{pAeq} 90 dB(A)	L_{pAeq} 84 dB(A)	L_{pAeq} 81.5 dB(A)
Measuring conditions:				
Feed material	broken quartz gravel	quartz gravel	marble gravel	marble gravel
Feed size	approx. 25 mm	40 - 50 mm	40 - 80 mm	<90 mm
Set gap width	2 mm	<1 mm	<1 mm	<1 mm
Final particle size	<5 mm	<5 mm	<5 mm	<14 mm

*depending on feed material and instrument configuration/settings

Tips for perfect results

- Material which is difficult to crush (e.g. iron alloys or ores) or materials with unknown crushing properties and large feed sizes should not be immediately crushed with the smallest gap width setting. It should first be pre-crushed with a larger gap width.
- Soft or medium-hard minerals tend to clump in the crushing chamber as a result of the crushing mechanism.
- Bituminous construction materials can be crushed without any problems if they are first **embrittled with liquid nitrogen**.

The suitable material for your requirements

Selecting the breaking jaw material

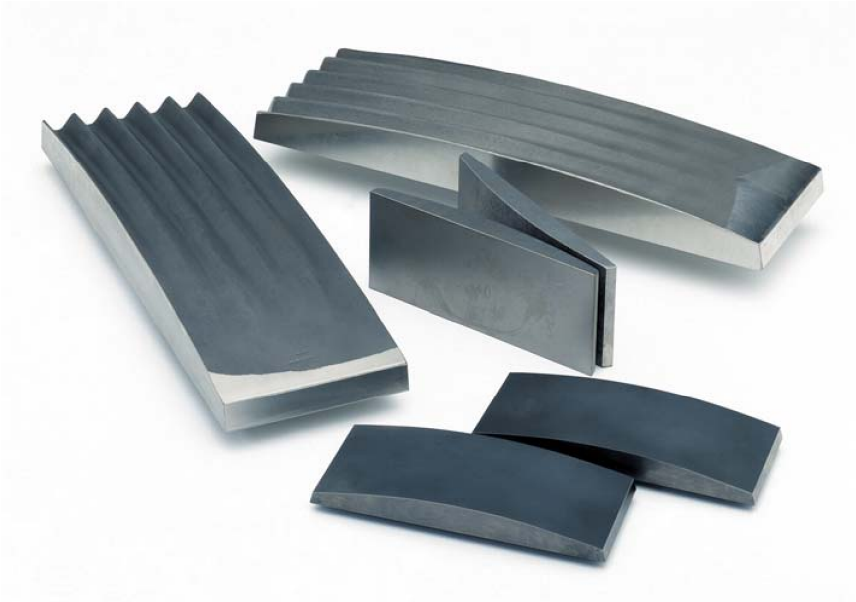
Breaking jaws made from different materials are available for different applications:

■ **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 (only available for BB 51).



Surface structure of the breaking jaws

Material	BB 51	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

■ **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 and road surfacing.

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.

Guide to choosing breaking jaws

Material composition guidelines

Breaking jaws	Material reference	BB 51	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 (92), Co (8)
Zirconium oxide*		■	–	–	–	8.5 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	■	■	■	■	58 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						Item No.
Breaking jaws	Wearing plates	Version*	BB 51	BB 100	BB 200	BB 300**
Manganese steel	BB 51-BB 300: stainless steel	3/N~400 V, 50 Hz	–	20.052.0001	20.053.0001	20.054.1001
		230 V, 50 Hz	20.056.0006	20.052.0003	20.053.0007	–
		110 V, 60 Hz	20.056.0010	20.052.0017	–	–
Stainless steel	BB 51-BB 300: stainless steel	3/N~400 V, 50 Hz	–	20.052.0004	20.053.0002	20.054.1003
		230 V, 50 Hz	20.056.0002	20.052.0006	20.053.0008	–
		110 V, 60 Hz	20.056.0008	20.052.0010	–	–
Tungsten carbide	BB 51: tungsten carbide	3/N~400 V, 50 Hz	–	20.052.0007	20.053.0003	20.054.1013
	BB 100-BB 300: stainless steel	230 V, 50 Hz	20.056.0003	20.052.0009	20.053.0009	–
		110 V, 60 Hz	20.056.0005	20.052.0015	–	–
Zirconium oxide	BB 51: Zirconium oxide	3/N~400 V, 50 Hz	–	–	–	–
	BB 100-BB 300: stainless steel	230 V, 50 Hz	20.056.0004	–	–	–
		110 V, 60 Hz	20.056.0009	–	–	–
For heavy-metal-free size reduction						
steel 1.1750	BB 51, BB 100: steel St 1203	3/N~400 V, 50 Hz	–	20.052.0027	20.053.0018	20.054.1006
	BB 200: steel 1.0038	230 V, 50 Hz	20.056.0013	20.052.0028	20.053.0019	–
	BB 300: steel St 1203	110 V, 60 Hz	20.056.0014	20.052.0029	–	–
Jaw crushers for inclusion into process units with manufacturer's declaration according to EU Directive on Machines						
with 3-phase motor (voltage versions on request), without hopper and motor protection switch						
Manganese steel	BB 200, BB 300: stainless steel	on request	–	–	20.058.1001	20.057.1001
Stainless steel	BB 200, BB 300: stainless steel	on request	–	–	20.058.1002	20.057.1002
Tungsten carbide	BB 200, BB 300: stainless steel	on request	–	–	20.058.1003	–

* other voltage versions available on request ** please order collector separately, see Other Accessories

Spare breaking jaws and wearing plates				Item No.
Spare breaking jaws, 1 pair	BB 51	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	on request
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 51	BB 100	BB 200	BB 300
Spare wearing plates, stainless steel	22.711.0009	22.711.0002	22.711.0003	22.711.0004
Spare wearing plates, tungsten carbide	22.711.0008	22.711.0005	22.711.0010	on request
Spare wearing plates, zirconium oxide	22.711.0007	–	–	–
Spare wearing plates, steel St 1203	22.711.0011	22.711.0012	–	22.711.0013
Spare wearing plates, steel 1.0038	–	–	22.711.0006	–

Other accessories / Spare parts				Item No.
	BB 51	BB 100	BB 200	BB 300
Carrying handles, 1 pair	32.825.0001	–	–	–
Spare V-belt, 1 pce	05.242.0028	–	–	–
Spare V-belt, 1 set (3 pcs)	–	22.351.0002	22.351.0003	–
Spare V-belt, 1 set (4 pcs)	–	–	–	22.351.0004
Set of castors (4 pcs)	–	22.609.0002	–	–
Conversion kit for central lubrication	–	–	22.481.0023	22.481.0024
Lubricant feeder	–	–	05.664.0001	05.664.0001
Collector wagon	–	–	–	22.906.0001
Collector, zinc-plated steel, nominal capacity 27.5 liters	–	–	–	05.045.0048
Collector, plastic, nominal capacity 35.4 liters	–	–	–	05.045.0049

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