

GRINDING

CENTRIFUGAL BALL MILL S 100



GRINDING

RETSCH centrifugal ball mills have proved their worth in grinding for analysis in thousands of applications. Featuring high performance, easy control and safe use, they can be used with equal success for both experimental and routine sample preparation in the most diverse fields.

MIXING

The RETSCH centrifugal ball mills can also be used to blend, homogenize and emulsify samples.

ADVANTAGES

- Great ultimate fineness, down into the micron range
- Fast no loss grinding, dry and wet
- Preparation of one or two samples simultaneously
- Time and speed displayed digitally
- Memory keys for 3 working programs
- Automatic direction reversal is standard
- Re-set lock to secure the parameters selected
- Universal application with a wide range of accessories
- Enhanced safety with the grinding compartment integrated into the unit and stable grinding jar mount
- Stable and smooth operation with adjustable balancing masses
- High reproducibility due to speed control (continuous adjustment of actual value to set value)

FEATURES

application	size reduction, mixing, homogenizing, dry or wet
feed stock	soft, medium hard, hard, brittle
feed size	< 10 mm
final fineness	< 1 µm
sample volume	1 x up to 250 ml or 2 x up to 20 ml

Retsch[®]

CENTRIFUGAL BALL MILL S 100



The RETSCH centrifugal ball mills will grind and mix soft, medium-hard, hard and brittle materials. Dry and wet grinding in suspension is possible. The S 100 will prepare chemicals, minerals, glass, ceramics, enamels, pigments, slag, soils, drugs, tablets, plant material, cellulose, compost, sewage sludge, and many other materials simply and without loss of product. Centrifugal ball mills are used in the fields of analytical chemistry, pharmacy, biology, mineralogy, geology, paints and enamels, ceramics, nuclear research, environmental protection, etc. A multitude of accessories makes for ideal matching to the most diverse applications, be they in research, development or quality control. The S 100 centrifugal ball mill is distinguished by simple operation, high performance and unequalled safety.



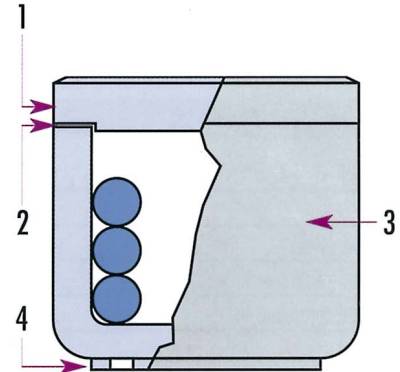
Further advantages are the ergonomic, touch-pad control panel, 1 to 300 minute digital timer, continuous speed regulation (rated speeds from 100 to 580 rpm), the compact housing with hinged Plexiglas protective cover and the rugged, low-maintenance drive.

Quality is guaranteed by the DIN ISO 9001/EN 29001 standards, safety by CE conformity. The unit carries up to a two-year warranty.

COMPACT, SAFE, VERSATILE

FEATURES OF THE TYPE "S" GRINDING JARS

1. Cover (optional: aeration cover with hose nipples)
2. Rubber/Teflon sealing gasket
3. Choice of eight different materials
4. Centering



GRINDING JARS AND BALLS

Fineness, purity, grinding time and homogeneity are greatly dependent on the choice of grinding balls and grinding jars. Jar volume will be matched to the size of the sample; the ball charge set according to the jar volume and the nature of the product being processed. The adjacent tables will help in selecting the appropriate grinding combination. The higher the density of the balls, the greater the reduction energy. The jar and balls should be made from the same material and are chosen so that any dust will not interfere with the analysis.



Wherever particular importance is attached to quick, simple and safe handling, the comfort grinding jars Type „C“ (please refer to Planetary Ball Mills) can be used.

refer to Planetary Ball Mills) can be used.

UNIVERSAL ADAPTER

The adapter required for the 50 ml jar can also be used to mount a stack of two non-ceramic, type „S“ jars.

GRINDING JARS AND BALL CHARGES

jars type „S“ rated volume	effective vol. (material and balls)	max. feed particle size	recommended ball charge			
			Ø 40mm	Ø 30mm	Ø 20 mm	Ø 10mm
50 ml	5 - 30 ml	< 3 mm	-	-	3 pcs.	10 pcs.
250 ml	25 - 150 ml	< 5 mm	-	5 pcs.	12 pcs.	50 pcs.
500 ml	75 - 300 ml	< 8 mm	4 pcs.	8 pcs.	20 pcs.	100 pcs.

MATERIAL ANALYSES

Grinding set	Composition (approx.)	Degree of Hardness	Density
Agate	99.9% SiO ₂	7.0 Mohs	app. 2 600 kg/m ³
Hard porcelain	71.0% SiO ₂ , 24.0% Al ₂ O ₃	7.0 Mohs	app. 2 400 kg/m ³
Sintered corundum I	99.7% Al ₂ O ₃	9.0 Mohs	app. 3 900 kg/m ³
Sintered corundum II	92.0% Al ₂ O ₃	9.0 Mohs	app. 3 600 kg/m ³
Zirconia	94.5% ZrO ₂ , 5.2% Y ₂ O ₃	8.5 Mohs	app. 5 700 kg/m ³
Stainless steel	84.5% Fe, 13.0% Cr	53 HRC ≅ app. HV = 5.7 GPA	app. 7 700 kg/m ³
Chrome steel 2	86.0% Fe, 11.5% Cr	60 HRC ≅ app. HV = 7 GPA	app. 7 700 kg/m ³
Chrome steel 4	84.0% Fe, 13.5% Cr	53 HRC ≅ app. HV = 5.7 GPA	app. 7 700 kg/m ³
Tungsten carbide	94.0% WC, 6.0% Co	HV = 1150 kg/mm ² ≅ 11.2 GPA	app. 14 400 kg/m ³

ATTEMPERATION JACKET

For indirect altemperation of the sample, the grinding jars type „S“ can be mounted in a double-walled aluminum jacket. During the grinding process, an attemperation fluid can be circulated through connecting hoses.

AERATION COVER

Available for the 250 ml, „S“ style jar are covers with two hose nipples through which an inert gas can be injected. This configuration is called for especially where the ground product can be expected to react during the grinding cycle. Fine-grained products exhibit greater surface activity and can react with ambient oxygen.

REFERENCES

CENTRIFUGAL BALL MILL S 100	Article-No.
Type S 100, 220 - 240 V, 50 Hz, with reversing mechanism	20.189.0001
Type S 100, 100 - 115 V, 60 Hz, with reversing mechanism	20.189.0002

Grinding jars Type „S“	Article-No.		
Material	500 ml	250 ml	50 ml
Agate	01.462.0054	01.462.0053	02.462.0027
Hard porcelain	–	02.462.0020	–
Sintered corundum I	02.462.0094	02.462.0078	02.462.0096
Sintered corundum II	02.462.0023	02.462.0022	02.462.0097
Zirconia	02.462.0048	02.462.0047	02.462.0191
Stainless steel	02.462.0025	02.462.0024	02.462.0100
Chrome steel 2	02.462.0108	02.462.0092	02.462.0102
Tungsten carbide	–	02.462.0041	02.462.0042

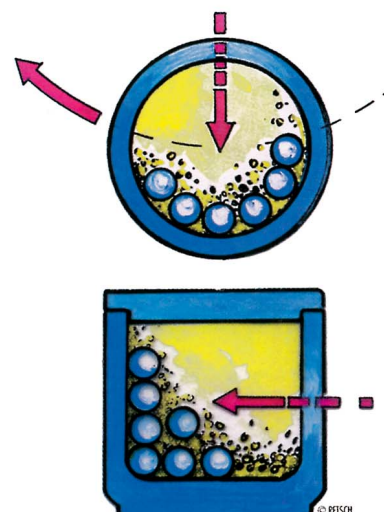
Grinding jars type „C“, refer to Planetary Ball Mills or upon request

Grinding balls	Article-No.			
Material	40 mm Ø	30 mm Ø	20 mm Ø	10 mm Ø
Agate	05.368.0064	05.368.0065	05.368.0028	05.368.0067
Hard porcelain	05.368.0048	05.368.0049	05.368.0050	05.368.0051
Sintered corundum I	05.368.0052	05.368.0053	05.368.0054	05.368.0021
Zirconia	05.368.0091	05.368.0092	05.368.0093	05.368.0094
Stainless steel	05.368.0060	05.368.0061	05.368.0062	05.368.0063
Chrome steel 4	05.368.0056	05.368.0057	05.368.0033	05.368.0059
Tungsten carbide	05.368.0068	05.368.0069	05.368.0070	05.368.0071

Accessories	Article-No.
Universal Adapter for grinding jars type „S“, 50 ml 1. for reducing/centering, 2. for stacking of non ceramic grinding jars	22.001.0008
Sleeve for reducing/centering grinding jars Type „C“, 50 ml on S 100	02.112.0059
Attemperation jacket for grinding jars Type „S“, 50 ml	02.362.0005
Safe-lock fixture for hazardous materials for grinding jars Type „S“ and „C“, 250 ml, 125 ml and 50 ml	82.654.0001
Aeration covers with hose nipples for grinding jars Type „S“, 250 ml	
of agate	02.107.0041
of stainless steel	02.107.0087
of aluminium (for sintered c.)	02.107.0085
of chrome steel 2	02.107.0091
of zirconia	02.107.0131
of tungsten carbide	02.107.0086

F. Kurt RETSCH GmbH & Co. KG
 Rheinische Strasse 36 · D - 42781 Haan
 POB 15 54 · D - 42759 Haan
 Tel.: +49 (0) 21 29 / 55 61-0
 Fax.: +49 (0) 21 29 / 87 02
 E-Mail: info@retsch.de
 Internet: <http://www.retsch.de>

Retsch®



S 100 MECHANICS

The grinding jars in the centrifugal ball mills move in a horizontal plane. Speed is continuously adjustable from 100 to 580 rpm. During the entire grinding process, an electronic speed control compares the actual speed to the preset value and keeps it constant. The centrifugal forces which are generated propel the balls against the inside wall of the jar, where they roll over the product. Grinding is effected primarily by way of impact and friction. The grinding and mixing time can be reliably set via a digital quartz timer for between 1 to 300 minutes. All settings are stored for use in subsequent cycles. To counter any agglomeration effects and enhance homogenization quality, the device is fitted with an automatic reversal system.

The S 100 is powered by a high-performance, 100-watt brake motor which will bring the unit to a full stop in less than 1 second after the prescribed time elapses or after the safety cover has been opened.

WEIGHTS AND MEASURES

W x H x D	350 x 420 x 510 mm
Weight	approx. 42 kg

RETSCH offers a comprehensive programme of equipment for sample preparation of solids. Just ask for information on our crushers, mills, sample dividers, sieve shakers, feeders and cleaning and drying units. You will receive complete literature free of charge and without obligation.

Technical modifications reserved
 copyright RETSCH

99.189.0001/E
 Made in Germany 06/98