Retsch®

MILLING SIEVING ASSISTING

GENERAL CATALOGUE

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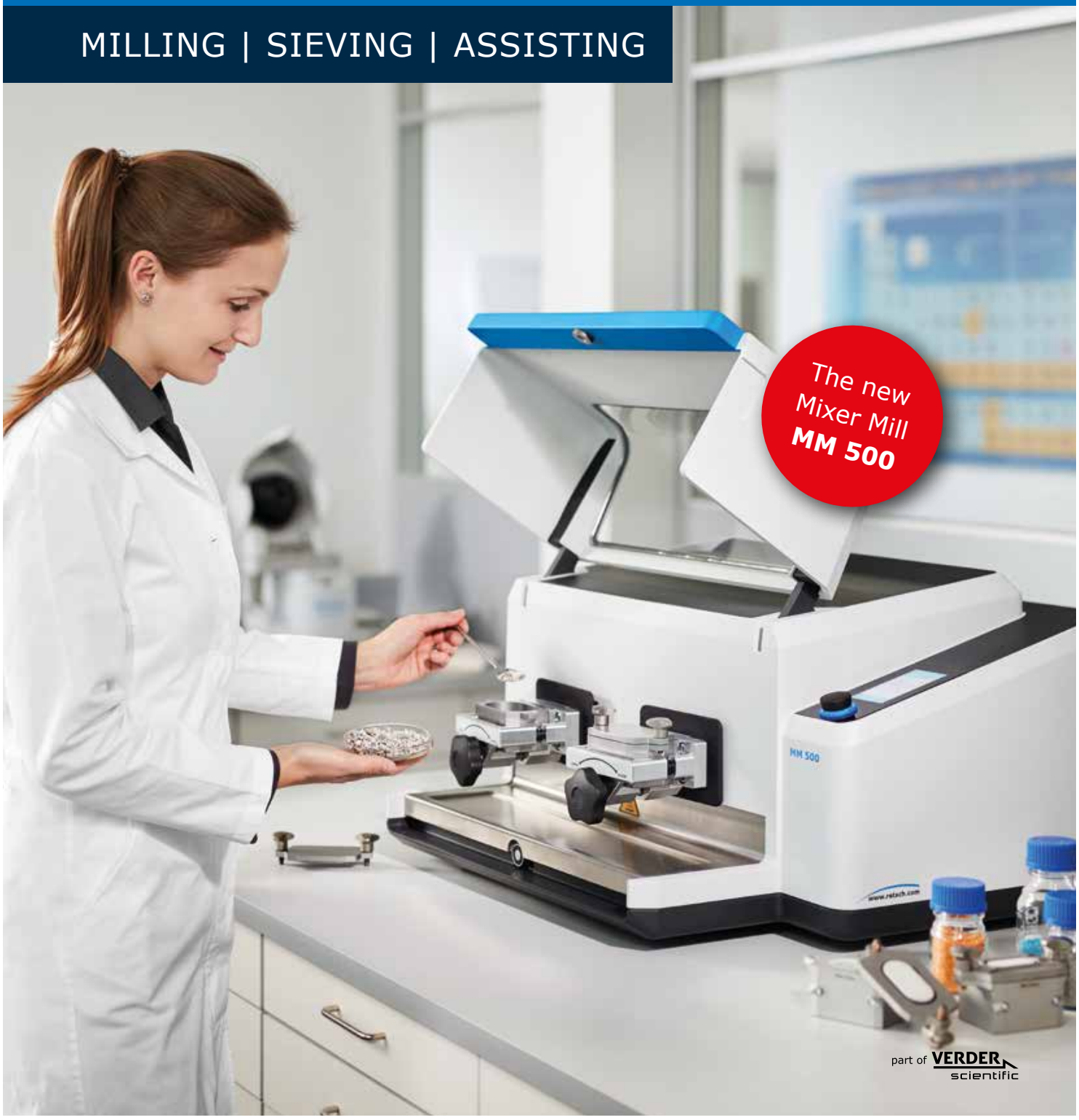

VERDER scientific

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

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, South Africa and Brazil 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

PREMIUM QUALITY

MADE IN GERMANY

Integrated Solutions

We see ourselves as solution providers. In addition to our extensive product program we offer competent application support and technical assistance.

Application Consulting

For us professional customer service is about offering individual and specific advice, by phone or on-site in our application laboratories worldwide. Our application experts process and measure your samples free-of-charge and provide a recommendation for the most suitable method and instrument. Finally, we offer free application consultations at your doorstep with our fully equipped laboratory bus.

Seminars, Webinars and Workshops

Alone or with renowned partners in the laboratory industry we regularly offer seminars and workshops about different aspects of sample preparation, particle measurement and analytics. Visit our website for current dates and online registration.

Customer Magazine "the sample"

RETSCH's popular customer magazine "the sample" provides readers with the latest information about products, applications, seminars and campaigns. Detailed articles provide insight into the particularities of sample preparation and particle analysis and provide valuable tips and tricks.

www.retsch.com

Our website www.retsch.com is the perfect tool to receive first-hand information on products, applications, contact persons, dates and events. The site is available in 19 languages.

Product Information

Each product is presented in great detail on the website www.retsch.com. In addition to features, technical data and order information, a whole range of useful documents and files can be downloaded. Moreover, it is possible to request a quote for each product and all the accessories listed on the website.

Application Database

Our application specialists process and characterize a large number of customer samples every day. The most interesting results are collected in an online database which currently contains more than 2,000 test reports. The application database is an excellent tool for a first impression as to which instrument may be suitable for a particular application or sample material.

1915
The company is founded by F. Kurt Retsch in Duesseldorf.

1923
F. Kurt Retsch develops and patents a mortar grinder which becomes known as the RETSCH Mill and is synonymous with the concept of easier and better laboratory work.

1952
Engineer Dirk Sijsling assumes management responsibility for F. Kurt Retsch KG. The production of laboratory equipment gains more and more importance.

1959
RETSCH extends the product line with sieve shakers, sample dividers and magnetic stirrers. More space is required for production, leading to the move of the company into larger premises in Haan.

1963
RETSCH intensifies its cooperation with universities and institutes to ensure their equipment is always up to the latest technological standards. By the end of the sixties, the export share has increased to 35%.

1976
The company moves to a new expanded location in Haan.

1989
RETSCH becomes part of the Dutch VERDER group and gradually manages the transition from a family business to an international company.

as of 1993
Subsidiaries in the US, China, Japan, India, France, Italy, Benelux, Russia, UK and Thailand ensure RETSCH's direct presence in the major economies of the world.

1998
Foundation of RETSCH TECHNOLOGY.

2012
RETSCH moves to new headquarters in Haan.

2014
Market launch of the revolutionary High Energy Ball Mill Emax.

2015
RETSCH celebrates its 100th anniversary.

2019
Market launch of the new MM 500, the perfect combination of Mixer Mill and Planetary Ball Mill.

At a glance

Product News

NEW This icon marks our product news

Milling

130 mm / 5 mm* Maximum feed size and final fineness

This mill is suitable for cryogenic grinding

Cyclone for improved material discharge and additional cooling

Sieving

25 mm / 20 µm Measuring range of sieve shakers / particle analyzers

Suitable for wet sieving / for measuring suspensions

Suitable for dry sieving / for measuring dry samples

This instrument can be used with the EasySieve software

CAL This instrument can be calibrated

General

CE This instrument is CE compliant

Milling

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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.

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Assisting

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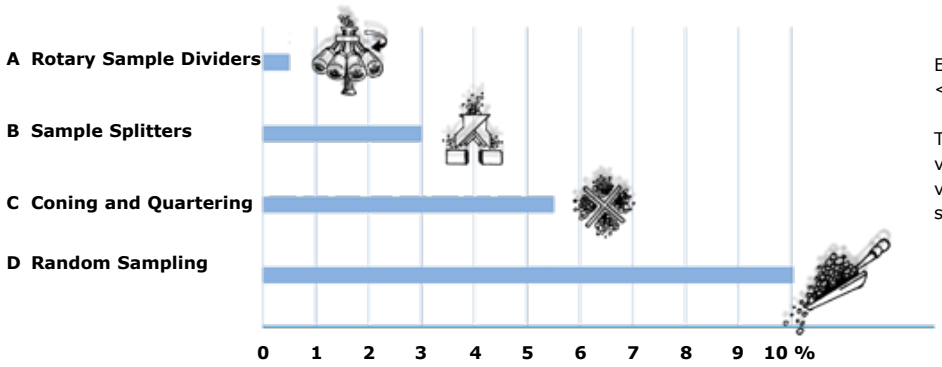
Assisting – The Key to Greater Efficiency in the Laboratory

From representative, reproducible sampling and sample division to uniform, continuous material feed; from efficient preparation of solid pellets for XRF analysis to rapid cleaning of grinding tools and test sieves to gentle sample drying: RETSCH offers a comprehensive range of useful assistants which enhance the performance of our mills and sieve shakers even further and ensure reliable analysis results.

Comparison of different sampling and sample division methods



Example: Bulk material, feed size < 5 mm

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

RETSCH sample dividers divide all pourable solids up to 10 mm so accurately that the characteristic composition of each fraction of the sample corresponds exactly to that of the original bulk sample.

Sample Divider PT 100

Working with the RETSCH Sample Divider PT 100 is easy and convenient. Material feed with the Feeder DR 100 is automatic and synchronized: this means representative sample division right from the start. The sample is divided under consistent operating conditions every time.

- Representative and reproducible division thanks to reliable method
- Compact, maintenance-free and easy to clean due to modular design
- Digital time setting
- Convenient quick-release clamping system for sample vessels
- Automatic material feed via synchronized feeder DR 100
- Constant rotation thanks to speed monitoring
- Low noise drive

Sample Divider PT 100

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Sample Divider PT 200

The RETSCH Rotating Tube Divider PT 200 is an indispensable tool for representative dust-free division and volume reduction of large bulk samples. It is suitable for powdered or granular bulk materials with particle sizes up to 10 mm. The rotating tube divider is available with bottom cones for 1, 2 or 3 samples. The slot width adjusts the ratio of the fractions and therefore the amount of the part sample.

- Exact dividing method ensures representative and reproducible results up to 30 l
- Compact, maintenance-free and easy to clean due to modular design
- Digital time setting and automatic material feed via synchronized feeder
- Constant rotation thanks to speed monitoring
- Low noise drive
- Extraction of 1 – 3 part samples
- Dividing process according to DIN 51701/T 4
- Batch and continuous operation possible

Sample Divider PT 200

The Sample Divider PT 100 is available with different dividing heads and sample vessels

Sample Divider PT 300 and PT 600

The Rotating Sample Dividers PT 300 and PT 600 are 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 thus the sample amount.

Operation of the PT 300 and PT 600 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 dividers PT 300 and PT 600 divide 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.

Sample Divider PT 300 / 600

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/pt

Typical Sample Materials

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

Accessories and options

Various dividing modules and collecting receptacles are available for the PT 300 and PT 600.

Module for 1 part sample with reject

Module for 8 part samples without reject

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Sample Dividers at a Glance

	Sample Dividers				
Model	PT 100	PT 200	PT 300	PT 600	RT 6.5–RT 100
Applications	sample division/ reduction	sample division/ reduction	sampling, sample division & reduction	sampling, sample division & reduction	sample division
Feed material	bulk materials	bulk materials	bulk materials	bulk materials	bulk materials
Feed size*	< 10 mm	< 10 mm	< 20 mm	< 20 mm	< 4–50 mm
Rotary speed	110 min^{-1}	50 min^{-1}	18–53 min^{-1}	18–53 min^{-1}	
Number of divisions, module without reject	6, 8 or 10	1, 2 or 3	6, 8 or 10	6, 8 or 10	2
Volume of segments, module without reject	30, 100, 250, 500 ml	250, 500 ml, 30 l	3,000 ml, 3,750 ml, 5,000 ml	6,000 ml, 7,500 ml, 10,000 ml	0.3 l, 1.5 l and 8 l
Number of divisions, module with reject	–	1, 2 or 3	1	1	–
Volume of segments, module with reject	–	30, 100, 250, 500 ml	3,000 ml	6,000 ml	–
Hopper volume	3.5 liter	3.5 liter	30 liter	60 liter	
W x H x D	580 x 910 x 420 mm	520 x 1,050 x 551 mm	1,180 x 1,510 x 750 mm	1,180 x 1,670 x 780 mm	
Net weight	33.5 kg	46 kg	209 kg	258 kg	
More information on	**www.retsch.com/pt100**	**www.retsch.com/pt200**	**www.retsch.com/pt300**	**www.retsch.com/pt600**	**www.retsch.com/rt**

*depending on feed material and instrument configuration

Sample Splitters RT 6.5–RT 100

RETSCH sample splitters are used for the simple division and reduction of bulk materials of all kinds. Sample splitters are ideal for on-site reduction of samples. They are easy to use and clean and do not need an electrical power supply.

- Accurate manual dividing process
- For use in the laboratory and on-site
- Robust; easy and quick cleaning
- Available in 7 sizes

Sample Splitters RT 6.5–RT 75

Vibratory Feeder DR 100

The RETSCH vibratory feeder is used for the uniform, continuous feeding and conveyance of pourable bulk materials and fine powders.

The DR 100 feeds RETSCH mills and sample dividers, as well as balances and particle measuring devices, and it is also suitable for filling and dosing. Their performance, adaptability and compact design make these devices suitable for a great variety of applications.

1 DR 100 with Sample Divider PT 100 and PT 200

2 DR 100 with Ultra Centrifugal Mill ZM 200

Vibratory Feeder DR 100

Vibratory Feeder at a Glance

Model	Vibratory Feeder DR 100
Applications	feeding, conveying
Feed material	bulk materials
Feed size*	up to 12 mm
Time setting	1–99 min digital, continuous operation
Volume flow*	max. 5 l/min, cont. adjustable (0–99 %)
More information on	**www.retsch.com/dr100**

*depending on feed material and instrument configuration

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Fluid Bed Dryer TG 200

The Fluid Bed Dryer TG 200 is used in quality control, sample preparation and Research & Development. It permits the gentle drying of organic, inorganic, chemical or pharmaceutical bulk materials without localized overheating.

The average drying time lies between 5 and 20 minutes which represents a substantial saving in time compared to other drying procedures. The TG 200 is suitable for drying a variety of materials such as coal, plastics, soil, pharmaceutical products or plants but also test sieves up to a diameter of 203 mm.

1 TG 200 for drying small volumes (3 x 0.3 l)

2 TG 200 for drying test sieves

Fluid Bed Dryer TG 200 (1 x 6 l)

Fluid Bed Dryer at a Glance

Model	Fluid Bed Dryer TG 200
Applications	drying
Feed material	bulk materials and solids, >63 µm
Temperature control	40 – 130 °C, continuously adjustable
Time setting	0 – 99 min digital, continuous operation
Container volume	1 x 6 l or 3 x 0.3 l
More information on	**www.retsch.com/tg200**

Pellet Presses PP 25, PP 35, PP 40

RETSCH offers three models of pellet presses for the preparation of solid samples for XRF analysis.

The automated Pellet Press PP 40 is a floor model which features an individual pressure force regulation up to 40 t. The pellets are pressed into steel rings with outer diameters of 40 mm or 51.5 mm. It is also possible to use aluminum cups or do free pressing.

The automated Pellet Press PP 35 is a compact benchtop model with a pressure force up to 35 t. The pellets are pressed into steel rings with outer diameter of 40 mm. It is also possible to use aluminum cups with diameters of 32 mm or 40 mm or do free pressing.

The manual hydraulic Pellet Press PP 25 is a compact benchtop unit with 32 mm and 40 mm dies. It is used to produce free pellets or in aluminum cups.

Pellet Press PP 40

Pellet Press PP 25

Pellet Press PP 35

Pellet Presses at a Glance

Model	Pellet Presses		
	PP 25	PP 35	PP 40
Applications	production of pellets for spectral analyses		
Feed material	minerals, slag, ores, cement, raw material etc.		
Max. pressure force	25 t	35 t	40 t
Pellet diameters	32 mm, 40 mm*	inside: 32 mm, 35 mm* outside: 40 mm*	inside: 32 mm, 35 mm* outside: 40 mm, 51.5 mm*
Standard Operating Procedures (SOP)	–	10	32
More information on	**www.retsch.com/pp25**	**www.retsch.com/pp35**	**www.retsch.com/pp40**

*depending on feed material and instrument configuration/settings

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Ultrasonic Baths UR 1, UR 2, UR 3

The RETSCH ultrasonic baths gently and intensively clean test sieves, glass and metal components and many other materials.

Further areas of application include the preparation of suspensions, e.g. for wet sieving, dispersion processes for chromatographic analyses and degassing of liquids.

Ultrasonic Baths UR 1, UR 2, UR 3

Ultrasonic Baths at a Glance

Model	Ultrasonic Baths		
	UR 1	UR 2	UR 3
Applications	cleaning, dispersion, degassing		
Feed material	sieves, glass and metal components, suspensions		
Volumes	6 l	42 l	45 l
for up to	1 sieve 200 x 50 mm/ 8" x 2"	1 sieve 450 x 100 mm	5 sieves 200 x 50 mm/ 8" x 2"
More information on	**www.retsch.com/ur**		

Bond Index Tester BT 100

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.

Bond Index Tester BT 100

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

Model	Bond Index Tester	
	BT 100 (Ball Mill Module)	BT 100 (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/bt100**	

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

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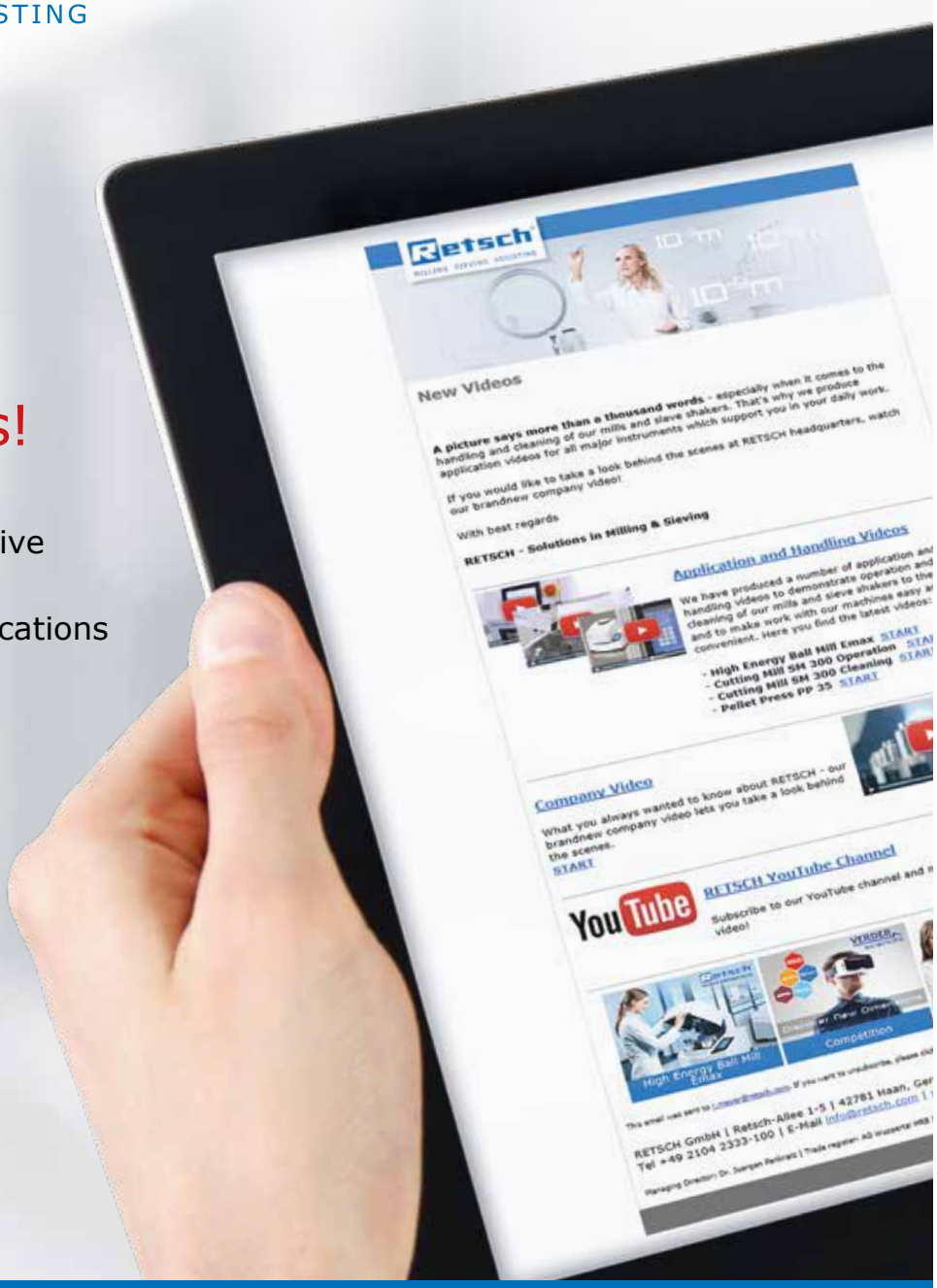

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