

Sieving for perfect quality control



Retsch[®]
Solutions in Milling & Sieving

The widest range of sieving equipment in the world!

RETSCH's line of sieving machines not only covers a wide measuring range. Thanks to various sieving motions and sieve sizes it is possible to select the ideal instrument for practically any bulk material. The instruments produce exact and reproducible results and comply with the requirements for the test materials monitoring according to DIN EN ISO 9000 ff.



Product videos at
www.retsch.com/videos

Milling
Sieving
 Assisting

Analytical Sieving Machines

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The perfect solution for each measuring range

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Sieve analysis				
AS 200		20 µm (dry) to 25 mm (wet)		4
AS 300		20 µm (dry) to 40 mm (wet)		6
AS 450		25 µm (dry) to 125 mm (wet)		7
AS 400		45 µm (dry) to 63 mm (wet)		10
AS 200 tap		20 µm (dry) to 25 mm (wet)		12
AS 200 jet		10 µm (dry) to 4 mm (wet)		14
Dynamic Image Analysis				
CAMSIZER XT	1 µm (dry)	3 mm (wet)		
CAMSIZER®		30 µm (dry)	30 mm (wet)	

■ dry measurement
 ■ wet measurement

Why particle size analysis?

The knowledge of particle size and distribution in disperse systems is very important for research and development, production and quality assurance.

The following list shows product properties that depend on the particle size distribution:

- mechanical properties of bulk goods
- surface reaction
- insulating and absorbing properties
- flavor
- mixability
- wear resistance
- filtration ability
- stress and breaking behavior
- agglomeration due to adhesive forces
- conductivity
- extinction



Innovative technology that sets standards worldwide!

RETSCH analytical vibratory sieve shakers are used in research & development, quality control of raw materials, interim and finished products as well as in production monitoring. The **three-stage series AS 200** provides a suitable instrument for every requirement and budget.

The **AS 300 control** is designed for larger feed quantities up to 6 kg whereas the **AS 450 control** is the ideal sieve shaker for even higher loads up to 25 kg.

All of them are suitable for dry and wet sieving. The patented electromagnetic drive of these sieve shakers produces a 3-D throwing motion which ensures optimum use of the open sieve area and lets the sample move equally over the whole sieving surface. The "control" instruments feature digital amplitude adjustment which allows for sharp fractionizing of the sample even after very short sieving times. **These models can be used as measuring instruments according to DIN EN ISO 9000 ff.**

Vibratory Sieve Shakers AS 200 basic / digit



AS 200 basic with clamping device "economy" and sieve stack

AS 200 basic



The **economical alternative** of the series with familiar RETSCH quality and reliability. With analog adjustment of vibration height and sieving time.



AS 200 digit with clamping device "standard" and sieve stack

AS 200 digit



The standard model of the AS 200 series is recommended whenever **digital time display, interval operation** and analog adjustment along with optical monitoring of the vibration height are required.

Vibratory Sieve Shaker

AS 200 control



AS 200 control with clamping device "comfort" and sieve stack

Three dimensional sieving motion

AS 200 control



The AS 200 control complies with the highest requirements in quality assurance. One particular characteristic makes this RETSCH product stand out from others: Instead of the vibration height, the **sieve acceleration**, which is **independent of the power frequency**, can be set. Thus, the AS 200 control ensures **comparable and reproducible sieving results worldwide**. It can be calibrated to ensure 100% reproducibility of sieving

results, not only in one device, but among all AS 200 control units! Thus, the requirement for the **test materials monitoring according to DIN EN ISO 9000 ff** is met. Its microprocessor-controlled **measuring and control unit** ensures a constant vibration height. Operation of the AS 200 control is convenient and easy. All sieving parameters – vibration height, time, interval – are set, displayed and monitored digitally. Up to **9 parame-**

ter combinations (SOPs) can be stored for routine analyses. Through the **integrated interface** the instrument can be connected to a PC and controlled with the evaluation software EasySieve®. This program enables the user to control the whole sieving process and the subsequent documentation with convenience and accuracy.

All RETSCH Sieve Shakers can be combined with various sieve clamping units. For frequent sieving processes, we recommend the user-friendly quick clamping unit "comfort".

Benefits at a glance

- Sieving with 3-D effect
- For sieves up to 203 mm (8") Ø
- Measuring range 20 µm to 25 mm
- Suitable for dry and wet sieving
- Available in 3 versions
- Easy operation, ergonomic design
- Low noise and maintenance-free

Technology of AS 200, AS 300, AS 450

All Sieve Shakers of the series AS 200, AS 300 and AS 450 work with an electromagnetic drive that is patented by RETSCH (EP 0642844). This drive produces a 3-D throwing motion that moves the product to be sieved equally over the whole sieving surface. The advantage:

high load capacity, extremely smooth operation and short sieving times with high separation efficiency.

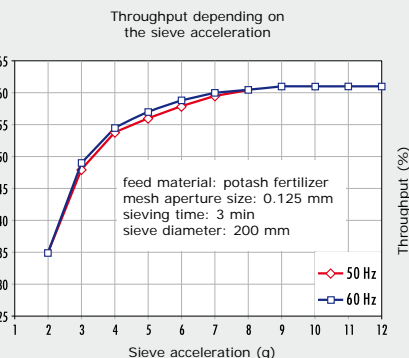
Furthermore, this patented RETSCH drive runs without wear and does not require maintenance.



The worldwide unique **RETSCH** technology: sieving with controlled acceleration!

The Sieve Shakers **AS 200 control** and **AS 300 control** are activated in their natural frequency. This means, the sieving frequency changes with the load of the instrument. It depends on the weight of the sieve stack and the quantity of the loaded product to be sieved. In order to ensure the reproducibility of the results even in short-time sieving procedures, the default setting of the vibration height can be switched to **sieve acceleration** (sieving with equal acceleration). The Sieve Shaker **AS 450 control** works at a specially aligned stabilized frequency. Thus, these instruments work completely **independent of** operational parameters such as **power frequency, loading, age, or condition** of the unit.

Therefore, the RETSCH Sieve Shakers AS 200 control, AS 300 control and AS 450 control are the only sieve shakers to feature the possibility of eliminating influences of error by different sieving frequencies via automatic adjustment of the amplitude (**patents D 19 522 987, USA 5,791,494**). An amplitude of up to 3 mm can be achieved under all nominal load conditions, and the sieve acceleration achieved can be as high as 21 g ($1 \text{ g} = 9.81 \text{ m/s}^2$).



The chart makes it clear: even with large differences in the frequency, sieving processes with equal acceleration always achieve fully matching results, independent of the sieving time. This is because the sieve acceleration is the decisive factor for the quick passage of the particles through the sieve.

Vibratory Sieve Shaker AS 300 control



Three dimensional sieving motion

AS 300 control with clamping device "comfort" and sieve stack

AS 300 control



The AS 300 control is specifically designed for test sieves with a diameter of 305 mm (12")/315 mm. Compared to sieves with a diameter of 200 mm, a 2.25 times larger sieving surface is thus available. Therefore, the average sieving times can be greatly reduced with the AS 300 control. Another advantage is the **large feed quantity** (up to 6 kg) that can be separated in one working run. Repetitive operations can be greatly simplified with the possibility to **store up to 9 parameter combinations** directly in the sieving instrument. For perfectly reproducible sieving results, the AS 300 control can be programmed with **sieve acceleration independent of the power frequency** instead of vibration height. All sieving parameters are set, displayed and monitored digitally. The microprocessor-controlled **measuring device** monitors and automatically readjusts the vibration height in case of changes of the load or the voltage.

The AS 300 control **can be calibrated**, and is thus suitable for test materials monitoring according to DIN EN ISO 9000 ff. Like all instruments of the series "control", the AS 300 has an **integrated interface**. Using the evaluation software EasySieve®, the instrument can be controlled and adjusted. With EasySieve®, all sieving parameters are displayed on screen before and during the sieving process.

- ### Benefits at a glance
- Sieving with 3-D effect
 - For sieves up to 315 mm Ø
 - Measuring range 20 µm to 40 mm
 - Suitable for dry and wet sieving
 - 9 SOPs can be stored
 - Short sieving times with large sieving surface and effective movement of the product to be sieved
 - Low noise and maintenance-free

Vibratory Sieve Shaker

AS 450 control

Without the need
for re-sieving!

AS 450 control



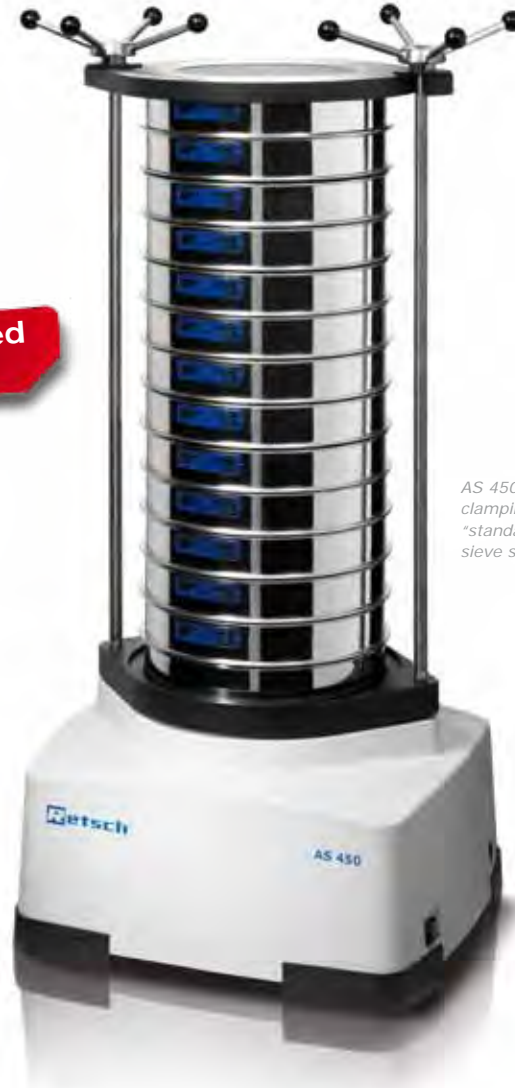
Remote operation panel
(e.g. wall-mounted)

With the Vibratory Sieve Shaker AS 450 control RETSCH has designed its first sieve for 400 mm and 450 mm sieves which operates with a three-dimensional sieving motion. It can be used for dry and wet sieving of **sample amounts of up to 25 kg** in one working run. With the AS 450 control RETSCH has now combined the benefits of electromagnetic sieving – controlled amplitude with highest reproducibility – with the powerful drive based on the **CET technology** (Continuous Energy Transformation). The continuous and controlled energy input allows for **constant amplitudes of up to 2.2 mm** which results in a high separation efficiency, even with high loads, so that manual re-sieving becomes obsolete. The AS 450 control is particularly suitable for materials such as **minerals, ores, construction materials, coal**

or soils. Like all instruments of the "control" series, the AS 450 can be controlled with the evaluation software EasySieve®.

When it comes to operating comfort, the AS 450 control meets all the requirements of a modern laboratory. All parameters such as amplitude, time and interval are digitally set, displayed and controlled via a remote operation panel. It is possible to store up to **9 parameter combinations** for routine tasks.

AS 450 control with
clamping device
"standard" and
sieve stack



Benefits at a glance

- Sieving with 3-D effect
- For sieves up to 450 mm Ø
- Measuring range 25 µm to 125 mm
- Suitable for dry and wet sieving
- 9 SOPs can be stored
- High sieve loads (up to 25 kg)
- Excellent separation efficiency even with short sieving times
- With remote operation panel

AS 450 basic

With the AS 450 basic, RETSCH offers a budget-priced alternative to the AS 450 control sieve shaker. The sieve shaker covers a size range from 25 µm to 125 mm and accepts loads of up to 15 kg. Time and amplitude are digitally set which ensures reproducibility of the sieving process.

The AS 450 basic is suitable for dry sieving. It is the economic solution for users who need to sieve larger quantities of dry material with reliable results.



AS 450 basic,
sieve stack 400 mm Ø, remote operation panel

AS 450 basic,
sieve stack 450 mm Ø, remote operation panel

Selection guide for Vibratory Sieve Shakers

Performance data	AS 200 basic	AS 200 digit	AS 200 control	AS 300 control	AS 450 basic	AS 450 control
	www.retsch.com/as200		www.retsch.com/as300		www.retsch.com/as450	
Applications	separation, fractioning, particle size determination					
Feed material	powders, bulk materials, suspensions					
Measuring range*	20 µm - 25 mm	20 µm - 25 mm	20 µm - 25 mm	20 µm - 40 mm	25 µm - 125 mm	25 µm - 125 mm
Max. batch / feed capacity*	3 kg	3 kg	3 kg	6 kg	15 kg	25 kg
Max. number of fractions**	9 / 17	9 / 17	9 / 17	9 / 17	11 / 8	13 / 9
Max. mass of sieve stack	4 kg	4 kg	6 kg	10 kg	50 kg	50 kg
Adjustment of sieving parameters						
Amplitude	analog	analog	digital	digital	digital	digital
	0 - 3 mm	0 - 3 mm	0.2 - 3 mm	0.2 - >2 mm	0 - >2 mm	0.2 - >2.2 mm
Sieve acceleration	–	–	1.0 - >15.1 g	1.0 - >10.0 g	–	0.6 - >7.1 g
Time	analog	digital	digital	digital	digital	digital
	1 - 60 min	1 - 99 min	1 - 99 min	1 - 99 min	1 - 99.9 min	1 - 99 min
Interval operation	–	10 s (fixed)	10 - 99 s	10 - 99 s	1 - 99 s	10 - 99 s
Storable SOPs	–	–	9	9	1	9
Motion of product to be sieved	throwing motion with angular momentum					
Suitable for sieving of wet products	yes	yes	yes	yes	no	yes
Serial interface	–	–	yes	yes	no	yes
Including test certificate / can be calibrated	–	–	yes	yes	no	yes
*depending on feed material and used sieve set **depending on the used sieve sizes						
Technical data						
Suitable sieve diameters	100 mm to 200 mm / 8"		100 mm to 315 mm		400 mm and 450 mm	
Height of sieve stack	up to 450 mm		up to 450 mm		up to 830 mm	
W x H x D	400 x 230 x 350 mm		400 x 235 x 400 mm		680 x 280 x 680 mm	
Net weight	approx. 30 kg		approx. 35 kg		approx. 140 kg	
Noise values (noise measurement according to DIN 45635-31-01-KL3)						
Measuring conditions: 5 test sieves; vibration height 1.5 mm (AS 200/AS 300), 1.1 mm (AS 450); feed material quartz sand; particle size <1 mm						
Emission value with regard to workplace	L _{pAeq} 63 dB(A)		L _{pAeq} 59 dB(A)		L _{pAeq} 69.6 dB(A)	

Wet sieving with Vibratory Sieve Shakers

There are many applications for which wet sieving is the best solution, e.g. when the material to be tested is a suspension or when a very fine sample (< 45 µm) that tends to agglomerate has to be sieved.

All Vibratory Sieve Shakers – AS 200, AS 300 and AS 450 control – can be used for wet sieving. There are special accessories like clamping lids with spray nozzle and collecting pans with outlet available. By placing RETSCH's venting rings between the sieves, air cushions can expand without letting liquid or sample material escape.



Order data

Vibratory Sieve Shaker AS 200 basic, AS 200 digit, AS 200 control				Item No.
AS 200 (not including clamping device, test sieves and collecting pan)		basic	digit	control
AS 200	100-240 V, 50/60 Hz, incl. test report acc. to EN 10204 2.2	–	–	30.018.0001
AS 200	230 V, 50 Hz	30.016.0001	30.015.0001	–
AS 200	120 V, 60 Hz	30.016.0005	30.015.0005	–
Clamping devices, complete for AS 200				dry sieving
economy	for test sieves 100/150/200/203 mm (8") Ø			32.662.0003
standard	for test sieves 200/203 mm (8") Ø			32.662.0002
comfort	for test sieves 200/203 mm (8") Ø			32.662.0001
Universal clamping devices, complete for AS 200			wet sieving	dry sieving
standard	for test sieves 100/150/200/203 mm (8") Ø		32.662.0007	32.662.0005
comfort	for test sieves 100/150/200/203 mm (8") Ø		32.662.0006	32.662.0004
Accessories for AS 200				
Sieve stack consisting of 8 test sieves (ISO 3310-1), 200 mm Ø, 50 mm height (45 µm, 63 µm, 125 µm, 250 µm, 500 µm, 1 mm, 2 mm, 4 mm) and collecting pan				60.131.000999
Sieve stack consisting of 8 test sieves (ASTM E11), 203 mm (8") Ø, 50 mm height (325 mesh, 230 mesh, 120 mesh, 60 mesh, 35 mesh, 18 mesh, 10 mesh, 5 mesh) and collecting pan				60.150.000999
Test sieve rack for 10 test sieves 200/203 mm (8") Ø				32.012.0001
IQ/OQ documentation for AS 200 control				99.200.0001

Vibratory Sieve Shaker AS 300 control				Item No.
AS 300 (not including clamping device, test sieves and collecting pan)				control
AS 300	100-240 V, 50/60 Hz, incl. test report acc. to EN 10204 2.2			30.021.0001
Clamping devices, complete for AS 300			wet sieving	dry sieving
standard	for test sieves 305 mm (12")/315 mm Ø		32.662.0012	32.662.0008
comfort	for test sieves 305 mm (12")/315 mm Ø		32.662.0014	32.662.0009
All clamping devices of AS 200 are also suitable for AS 300				
Accessories for AS 300				
Sieve stack consisting of 7 test sieves (ISO 3310-1), 305 mm (12") Ø, 40 mm height (0.63 mm, 1.25 mm, 2.5 mm, 5 mm, 10 mm, 20 mm, 31.5 mm) and collecting pan				60.158.000999
Sieve stack consisting of 7 test sieves (ASTM E11), 305 mm (12") Ø, 40 mm height (30 mesh, 16 mesh, 8 mesh, 4 mesh, 3/8", 3/4", 1 1/4") and collecting pan				60.159.000999
IQ/OQ documentation for AS 300 control				99.200.0002

Vibratory Sieve Shaker AS 450 basic, AS 450 control				Item No.
AS 450 (not including clamping device (AS 450 control), test sieves and collecting pan)				
AS 450 basic	230 V, 50 Hz, incl. clamping device "standard"			30.028.1001
AS 450 control	230 V, 50/60 Hz without clamping device			30.026.0001
Clamping devices AS 450 control			wet sieving	dry sieving
standard	for test sieves 400/450 mm Ø		32.662.0017	32.662.0015
comfort	for test sieves 400/450 mm Ø		32.662.0018	32.662.0016
Accessories for AS 450				
Sieve stack consisting of 10 test sieves (ISO 3310-1), 400 mm Ø, 65 mm height (63 µm, 125 µm, 250 µm, 500 µm, 1 mm, 2 mm, 4 mm, 8 mm, 16 mm, 31.5 mm) and collecting pan				60.166.000998
Sieve stack consisting of 7 test sieves (ISO 3310-1), 450 mm Ø, 100 mm height (63 µm, 125 µm, 250 µm, 500 µm, 1 mm, 2 mm, 4 mm) and collecting pan				60.168.000999
Sieve stack consisting of 10 test sieves (ASTM E11), 400 mm Ø, 65 mm height, (230 mesh, 120 mesh, 60 mesh, 35 mesh, 18 mesh, 10 mesh, 5 mesh, 5/16", 5/8", 1.1/4") and collecting pann				60.167.000998
Sieve stack consisting of 7 test sieves (ASTM E11), 450 mm Ø, 100 mm height (230 mesh, 120 mesh, 60 mesh, 35 mesh, 18 mesh, 10 mesh, 5 mesh) and collecting pan				60.169.000999

For additional accessories such as evaluation software, test sieves, sieve lids, collecting pans, sieving aids etc. please refer to our website www.retsch.com



Sieve clamping device
"comfort"



Sieve clamping device
"standard"



Sieve clamping device
"economy"



Universal wet sieve
clamping device "comfort"



Universal sieve clamping
device "standard"

Horizontal Sieve Shaker

AS 400 control



AS 400 control with clamping device "comfort" and sieve stack

AS 400 control



The AS 400 control can be used as test instrument for the quality control according to DIN EN ISO 9000 ff. Due to the **controlled drive** the AS 400 control yields reproducible results worldwide. The desired number of revolutions / sieve acceleration and sieving time are set, displayed and monitored digitally. The instrument is supplied with a test certificate and can be **recalibrated**. If desired, the rotation direction can be set to alternate in the interval. Up to

9 sieving programs can be directly stored for routine analyses. An integrated counter mass **ensures stability** even with a high mass of the sieve stack. It is possible to secure the instrument to the laboratory bench if desired. The base plate can take **very high loads** due to 4 eccentric guides. The AS 400 control has an **integrated interface** for controlling all sieving parameters via the EasySieve® software.

Technology of the AS 400

The base plate performs horizontal circular motions with a radius of 15 mm (according to DIN 53477). The speed of 50 to 300 rpm is electronically controlled. It is continuously adjustable to meet the requirements of the product to be

sieved. The actual value of the number of revolutions is digitally displayed. The base plate is driven by a robust, maintenance-free drive motor with a power of 125 Watt. The power is transmitted via an eccentric.

Horizontal circular sieving motion

Sieving on one level

The RETSCH AS 400 control is used for the sieving of dry goods with test sieves of a diameter up to 400 mm. The horizontal circular sieving motion is preferably used for long or fibrous, needle-shaped flat materials. The horizontal orientation of the particles allows for better reproducibility of the sieving results. Fine and coarse-grained goods as found **in the areas of milling, brewing, chemical industry, quarries, soil testing, woodworking and plastics industry**, can be exactly separated with the AS 400 control. For the testing of plastics (grainy moulding materials), the DIN 53 477 even requires the circular sieving motion.

Benefits at a glance

- Circular sieving motion according to DIN 53477
- For sieves up to 400 mm Ø
- Measuring range 45 µm to 63 mm
- Easy operation, ergonomic design
- Low noise and maintenance-free



The AS 400 control is a robust device, which meets highest requirements due to its superior technology. With the option to install clamping devices for sieves with diameters from 100 mm to 400 mm (4" to 16") the AS 400 is **particularly versatile** and suitable for a wide range of applications. With the proven clamping device "comfort" the sieve stack can be fastened conveniently with two simple steps. For occasional sieving processes we recommend the inexpensive clamp "standard".

All clamping devices of AS 200 and AS 300 are also suitable for AS 400.

Performance data	AS 400 control
	www.retsch.com/as400
Applications	separation, fractioning, particle size determination
Feed material	powders, bulk materials
Measuring range*	45 µm to 63 mm
Max. batch / feed capacity*	5 kg
Max. number of fractions**	7 / 9 / 17
Max. mass of sieve stack	15 kg
Adjustment of sieving parameters	
Speed	digital, 50 - 300 rpm
Sieve acceleration	0.04 - 1.51 g
Time	digital, 1 - 99 min
Interval operation	1 - 10 min
Storable SOPs	9
Motion of product to be sieved	horizontal circular motion
Suitable for sieving of wet products	-
Serial interface	yes
Including test certificate / can be calibrated	yes
*depending on feed material and used sieve set	**depending on the used sieve sizes
Technical data	
Suitable sieve diameters	100 mm to 400 mm
Height of sieve stack	up to 450 mm
W x H x D	540 x 260 x 507 mm
Net weight	approx. 70 kg
Noise values (noise measurement according to DIN 45635-31-01-KL3)	
Measuring conditions:	
5 test sieves; speed 150 rpm; feed material quartz sand; particle size <1 mm	
Emission value with regard to workplace	L _{pAeq} 58.4 dB(A)

Order data

Horizontal Sieve Shaker AS 400	Item No.
AS 400 (not including clamping device, test sieves and collecting pan)	control
AS 400 100-240 V, 50/60 Hz incl. test report acc. to EN 10204 2.2	30.022.0001
Clamping devices, complete for AS 400	
standard for test sieves 400 mm Ø	dry sieving
comfort for test sieves 400 mm Ø	32.662.0010
comfort for test sieves 400 mm Ø	32.662.0011
All clamping devices of AS 200 and AS 300 are also suitable for AS 400	
Accessories for AS 400	
Sieve stack consisting of 6 test sieves (ISO 3310-1), 400 mm Ø, 65 mm height (0.5 mm, 1 mm, 2 mm, 5 mm, 10 mm, 20 mm) and collecting pan	60.166.000999
Sieve stack consisting of 6 test sieves (ASTM E11), 400 mm Ø, 65 mm height (35 mesh, 18 mesh, 10 mesh, 4 mesh, 3/8", 3/4") and collecting pan	60.167.000999

For additional accessories such as evaluation software, test sieves, sieve lids, collecting pans, sieving aids etc. please refer to our website www.retsch.com

Recalibration of Sieve Shakers

As reliable sieving results do not just depend on the sieve but are also influenced by the sieving time and sieve movements, it is extremely advisable to recalibrate the sieve shaker used within the framework of test agent monitoring. Reproducible sieving pa-

rameters are an essential precondition for assigning variations in the analysis results unambiguously to the sample and showing that they are not caused, for example, by inaccurate sieve shaker settings. During calibration within the context of quality assur-

ance as per ISO 9000, all the relevant parameters of the control sieve shakers are checked and, if necessary, adjusted. Its proper condition is confirmed by an **inspection certificate** as per EN 10204 3.1B.



Tap Sieve Shaker

AS 200 tap



AS 200 tap with sieve stack

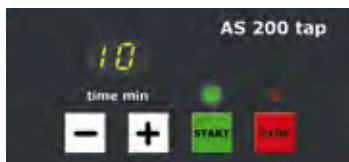
Horizontal circular sieving motion with taps

Mechanizing hand sieving

The RETSCH AS 200 tap is suitable for dry sieving with test sieves of 200 mm or 8" diameter. The combination of horizontal, circular sieving motions with vertical taps reproduces the principle of hand sieving. The uniform mechanical action ensures reliable and reproducible measurement results.

This special type of sieving motion used by the AS 200 tap is specified in various standards for particle size analysis of materials such as **activated carbon, diamonds, spices, metal powders, abrasives or cement.**

AS 200 tap



Operating the AS 200 tap is **exceptionally easy and safe**. The integrated clamping device allows for sieve stacks with up to 12 sieves plus pan, depending on the height of the sieve frame. The sieving time is set from 1 to 99 minutes via a digital display. The number of rotations and taps is fixed and cannot be adjusted. The tapping motion can be deactivated, if required. A safety switch and an anti-trap protection **provide maximum safety**

when working with the AS 200 tap.

Thanks to an **integrated interface**, the AS 200 tap can be controlled with the evaluation software EasySieve®. This program enables the user to control the whole sieving process and the subsequent documentation with convenience and accuracy.

No clamping device is required for the Sieve Shaker AS 200 tap.

Benefits at a glance

- Sieving with circular motion and vertical taps
- For 200 mm / 8" sieves
- Measuring range 20 µm to 25 mm
- Safe and easy operation
- Robust and maintenance-free
- Sound-enclosure cabinet with CE mark

AS 200 tap technology

The AS 200 tap is equipped with a powerful single-phase a.c. motor. The sieve plate performs horizontal circular motions with a radius of 14 mm.

The mechanical gear keeps the number of oscillations (280 min⁻¹) as well as the number of taps (150 min⁻¹) constant, even with high loads.



The AS 200 tap is a robust sieve shaker which requires hardly any maintenance. The compact sound-enclosure cabinet helps to substantially reduce noise emission and **ensures CE conformity**.

AS 200 tap with sound-enclosure cabinet and sieve stack



Performance data		AS 200 tap	
		www.retsch.com/as200tap	
Applications	separation, fractioning, particle size determination		
Feed material	powders, bulk materials		
Measuring range*	20 µm to 25 mm		
Max. batch / feed capacity*	3 kg		
Max. number of fractions**	7 / 13		
Max. mass of sieve stack	6 kg		
Adjustment of sieving parameters			
Speed	fixed, 280 min ⁻¹ , 150 taps		
Sieve acceleration	-		
Time	digital, 1 - 99 min		
Interval operation	-		
Storable SOPs	-		
Motion of product to be sieved	horizontal circular motion with taps		
Suitable for sieving of wet products	-		
Serial interface	yes		
Including test certificate / can be calibrated	-		
*depending on feed material and used sieve set **depending on the used sieve sizes			
Technical data		without sound-enclosure cabinet	with sound-enclosure cabinet
Suitable sieve diameters	200 mm / 8"		
Height of sieve stack	up to 350 mm		
W x H x D	700 x 650 x 450 mm	715 x 760 x 520 mm	
Net weight	approx. 68 kg	approx. 92 kg	
Noise values (noise measurement according to DIN 45635-31-01-KL3)			
Measuring conditions:			
5 test sieves; vibration height 1.5 mm; feed material quartz sand; particle size <1 mm			
Emission value with regard to workplace	L _{pAeq} 82 dB(A)	L _{pAeq} 65 dB(A)	

Order data

Tap Sieve Shaker AS 200 tap	Item No.
AS 200 tap (incl. sieve lid for test sieves up to 203 mm / 8" Ø, not including test sieves and collecting pan)	
AS 200 tap 230 V, 50 Hz, incl. sound-enclosure cabinet, conforms with CE standards	30.025.1001
AS 200 tap 120 V, 60 Hz, incl. sound-enclosure cabinet, conforms with CE standards	30.025.1002
AS 200 tap 230 V, 50 Hz	30.025.0001
AS 200 tap 120 V, 60 Hz	30.025.0002
Accessories for AS 200 tap	
Sieve stack consisting of 6 test sieves (ISO 3310-1), 200 mm Ø, 50 mm height (63 µm, 125 µm, 250 µm, 500 µm, 1 mm, 2 mm) and collecting pan	60.131.000998
Sieve stack consisting of 6 test sieves (ASTM E11), 203 mm (8") Ø, 50 mm height (230 mesh, 120 mesh, 60 mesh, 35 mesh, 18 mesh, 10 mesh) and collecting pan	60.150.000998
Test sieve rack for 10 test sieves 200/203 mm (8") Ø	32.012.0001
Ball-pan hardness test kit	22.783.0001

For additional accessories such as evaluation software, test sieves, sieve lids, collecting pans, sieving aids etc. please refer to our website www.retsch.com.

Sieving aids

For materials that are difficult to separate we recommend the additional use of sieving aids in the individual sieve fractions. Which sieving aid is best suited depends on the mesh size of the sieve and the preselected oscillation intensity. RETSCH offers

- chain rings,
- balls of agate, rubber, hard porcelain or steatite,
- brushes and
- Vulkollan® cubes.

These mechanical sieving aids destroy agglomerates and dislodge wedged particles from the sieve mesh.



Air Jet Sieving Machine

AS 200 jet

Air jet for dispersion and deagglomeration



AS 200 jet with test sieve and cyclone

Quick and gentle quality control of fine powders

The Air Jet Sieving Machine AS 200 jet is particularly suitable for **low density materials with particle sizes in the lower micron range which tend to agglomerate**. It is used with sieves of **10 microns mesh size or more**. The procedure is very gentle on the material as no mechanical sieving aids are required. The average sieving time is 2-3 minutes.

Typical applications include **construction materials, flour, spices, plastics and pharmaceuticals**.

AS 200 jet



The AS 200 jet is specifically designed for test sieves with a diameter of 200 mm/203 mm (8"). The air jet generated by an industrial vacuum can be adjusted by using the manual vacuum regulation. The sieving machine can be optionally equipped with an **automatic vacuum regulation** which constantly monitors and main-

tains the air flow thus increasing the reproducibility of the sieving process.

The **Open Mesh Function**, a procedure which greatly reduces the number of near-mesh particles, provides optimum separation efficiency and excellent reproducibility.

Sieving time and nozzle speed are conveniently set with a single button, the settings are shown in the **graphic display**. The **Quick Start Mode** allows to start the sieving process under standard conditions without entering parameters.

The RETSCH software EasySieve® can be used for **automated evaluation and documentation**.

Benefits at a glance

- Sieving using air jet technology for dispersion and deagglomeration
- Wide measuring range from 10 µm to 4 mm
- Gentle sieving with short sieving times
- Reproducible results due to Open Mesh Function
- Quick Start Mode for easy operation
- Suitable for RETSCH standard sieves Ø 200 mm/203 mm (8")

AS 200 jet technology

A vacuum cleaner which is connected to the sieving machine generates a vacuum inside the sieving chamber and sucks in fresh air through a sound absorber. When passing the narrow slit of the nozzle, the air stream is accelerated and blown against the

sieve mesh. Above the mesh, the air jet is distributed over the complete sieve surface and is sucked in with low speed through the sieve mesh. Thus the finer particles are transported through the mesh openings into the vacuum cleaner or, optionally, into a cyclone.



The AS 200 jet is preferably used with sieves of 25 mm height. When the particles are dispersed by the jet of air, they hit the perspex lid and deagglomerate – the shorter the distance, the better the deagglomeration. 50 mm sieves are only used for very sensitive materials.

The delivery scope of the AS 200 jet includes a manual vacuum regulation (1), two sieve lids (2), a sound absorber (3) and a rubber mallet.

RETSCH offers a special vacuum cleaner to be used with the AS 200 jet. It is powered by the siev-



Order data

Air Jet Sieving Machine AS 200 jet		Item No.
AS 200 jet for test sieves 203 mm (8") Ø, with manual vacuum regulation, incl. lids for test sieves 1" and 2" height and rubber mallet (Please order test sieve and vacuum cleaner separately)		
AS 200 jet 100–240 V, 50/60 Hz, incl. test report acc. to EN 10204 2.2		30.027.0001
Accessories AS 200 jet		
Cyclone with holder and collecting receptacle (250 ml and 500 ml sample bottle)		32.935.0008
Industrial vacuum cleaner GM 80, 230 V, 50/60 Hz (other electrical versions available)		32.748.0004
Automatic vacuum regulation		32.100.0002
Adapter and lids for test sieves 200 mm Ø x 50 mm and 200 mm Ø x 25 mm		02.025.0070
Test sieve with electroformed sheet (ISO 3310-3), 203 mm Ø, 25 mm height,	10 µm: 60.142.000010	16 µm: 60.142.000016
IQ/OQ Documentation for AS 200 jet		99.200.0003

For test sieves please refer to our website www.retsch.com/sieves

Recommended material quantities

The maximum batch a sieving machine can process depends on various factors such as number and aperture size of the sieves, maximum grain size and width of distribution of the sample. The standard **DIN 66165** provides more details, e.g. the

maximum amount of oversize grain which should remain on a square decimeter of sieve bottom.

Examples for the maximum batch and permitted sieve oversize for 200 mm Ø sieves:

Overloaded sieves prevent reproducible results!

Mesh size	Max. batch	Max. sieve oversize
25 µm	14 cm ³	7 cm ³
45 µm	20 cm ³	10 cm ³
63 µm	26 cm ³	13 cm ³
125 µm	38 cm ³	19 cm ³
250 µm	58 cm ³	29 cm ³
500 µm	88 cm ³	44 cm ³
1 mm	126 cm ³	63 cm ³

Performance data

AS 200 jet	
	www.retsch.com/as200jet
Applications	separation, fractioning, particle size determination
Feed material	powders, bulk materials
Measuring range*	10 µm to 4 mm
Max. batch / feed capacity*	approx. 100 g
Max. number of fractions	1 (2 with cyclone)
Adjustment of sieving parameters	
Nozzle speed	digital, 5 - 55 rpm
Time	digital, 00:00 - 99:59 min
Open Mesh Function	10 min ⁻¹ (fixed), +20°, -10°
Vacuum**	2000 - 9999 Pa / 20 - 100 mbar
Storable SOPs	9
Motion of product to be sieved	dispersion by air jet
Serial interface	yes
Including test certificate / can be calibrated	yes
*depending on feed material and used sieve	
**using the automatic vacuum regulation	

Technical data

Suitable sieve diameters	RETSCH standard test sieves Ø 200 mm/203 mm (8")
Height of sieve stack	1 sieve 25/50 mm (1"/2")
W x H x D	460 x 288 x 305 mm
Net weight	approx. 14 kg

Noise values

The AS 200 jet is constructed in a manner that prevents any significant development of noise.

ing machine and is automatically switched on when the sieving process is started. The AS 200 jet can also be equipped with any other industrial vacuum cleaner (<1200 W) with an IEC connector and a suction tube with an outer diameter of 32 mm.

To extend the service life of the filters in the vacuum cleaner and for recovery of the sample fraction passing the sieve, we recommend the use of the optional **cyclone**. The separation degree and limiting particle size respectively depend on the sample characteristics.

RETSCH Test Sieves

With Ø of 200 / 203 mm (8")



To ensure that the quality of our test sieves meets the requirements of modern particle size analysis, RETSCH uses a unique manufacturing process which guarantees unrivaled quality and consistency in sieve production. In addition, the logistic system of this process allows for full traceability of each and every material used.

The sieves can be combined with most other sieve brands without any problems. Each sieve that leaves our company includes a test report or, at your request, a special inspection certificate in conformity with ISO 3310-1. RETSCH's calibration certificates ensure an even higher statistical reliability.

RETSCH test sieves are available in the four sizes most widely used in laboratory analytics:

200 x 50 mm · 200 x 25 mm
203 x 50 mm (8"x 2") · 203 x 25 mm (8"x 1").

Production process: 1.

1. Data entry

2. Welding

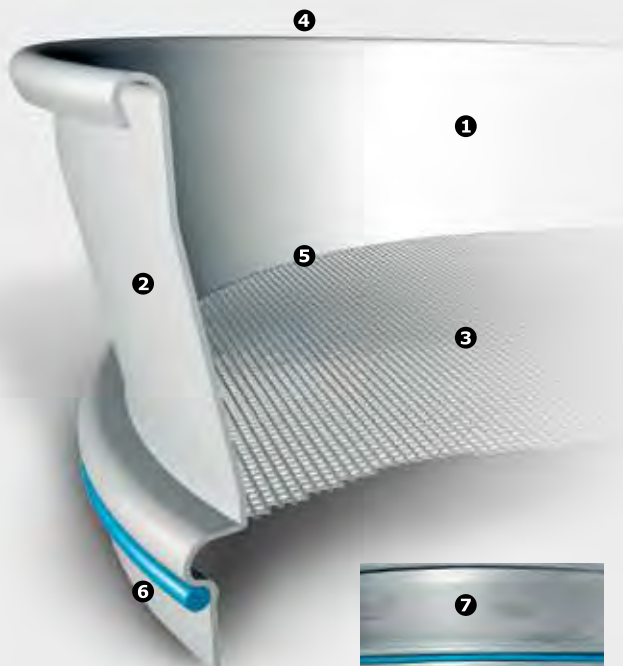
3. Lasering

4. 100% optical inspection



Seven Unique Benefits

Our unique manufacturing process ensures an optimum design for each sieve. Experience yourself the increased quality of your analyses as well as improved handling and service life of the sieves.



1. One piece construction and fabric-transition without any grooves to prevent cross contamination (no solder*, no epoxy, no residues, etc.)
2. A high degree of corrosion resistance and ease of cleaning due to high-alloy stainless steel (specification: 316)
3. 15% lighter than traditional sieves while at the same time increasing the free sieve area
4. Previously unattained product quality due to fully automatic production and extensive optical inspection with optimum design
5. Innovative resistance welding technology guarantees permanently tight sieve fabric
6. Maximum stability and optimum sealing when used in sieve stacks
7. Clear and precise labeling of the sieves with full traceability based on individualized laser engraving

*for sieves up to 5.6 mm (#3.1/2).
As from 6.3 mm lead-free silver solder is used.

Comparison Chart for European and American Sieve Standards

ISO	ASTM	ISO	ASTM
[µm]	[#]	[mm]	[#]
20	635	1.00	18
25	500	1.12	
32	450	1.18	16
36		1.25	
38	400	1.40	14
40		1.60	
45	325	1.70	12
50		1.80	
53	270	2.00	10
56		2.24	
63	230	2.36	8
71		2.50	
75	200	2.80	7
80		3.15	
90	170	3.35	6
100		3.55	
106	140	4.00	5
112		4.50	
125	120	4.75	4
140		5.00	
150	100	5.60	3.1/2
160		6.30	1/4 in.*
180	80	6.70	0.265 in.
200		7.10	
212	70	8.00	5/16 in.
224		9.00	
250	60	9.50	3/8 in.
280		10.00	
300	50	11.20	7/16 in.
315		12.50	1/2 in.*
355	45	13.20	0.530 in.
400		14.00	
425	40	16.00	5/8 in.
450			
500	35		
560			
600	30		
630			
710	25		
800			* ASTM supplementary values
850	20		
900			

With Ø of 100 / 150 / 305 (12") / 400 / 450 mm

- Sieve meshes, frames and labeling comply with standards
- Tested 5 times, with test report
- According to ISO, ASTM, BS
- Individual inspection certificate for test materials monitoring according to ISO 9000 ff available on request
- Stainless steel wire sieve mesh, 20 µm to 125 mm
- Also available with perforated plate, round or square



Sieve accessories



For the various test sieves, matching (A) collecting pans (B) collecting pans with outlet (C) intermediate pans (D) intermediate rings (E) venting rings and (F) sieve lids are available. Sieving aids and sieve racks complete the range of accessories. Please refer to our website www.retsch.com/sieves for order data of the test sieves and the available accessories.

Tested quality – with certificates

Every RETSCH high-quality sieve receives a **test report** before it is delivered.

On request, an **inspection certificate** according to DIN ISO 3310-1 is available, too, which documents the measuring results in tabular and graphical form. The **calibration certificate** provides even more statistical details.



As a special service RETSCH offers **recalibration** of the test sieves. After the standard measuring process of the sieves, all relevant data are recorded and confirmed in the certificate.

Control, evaluation, documentation with EasySieve®



Simple, fast, and reliable

EasySieve®, the software for particle size analyses, exceeds manual evaluation in many aspects. The software is able to automatically control the necessary measurement and weighing procedures – from the registration of the weight of the sieve to the evaluation of the data.

Due to the logical design of the software the user can easily get started with the program and is lead through the process step by step. Moreover, the abundance of evaluation possibilities allows for absolute flexibility with regard to adjustment to individual tasks.

An example of a particle size analysis using EasySieve®

1. Parameter entry

All available parameters (such as sieve stack configuration, dead weight of the sieve, sieve shaker settings) as well as the characteristics, which may have to be calculated, can be entered by clicking with the mouse in the corresponding fields. Routine parameters can be entered, edited, saved and recalled at a later time. Product specific settings of the measurement parameters are saved and ensure a productive workflow.

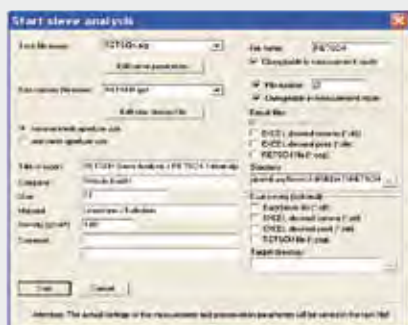
2. Sieve analysis

The program accepts automatic and manual data entries from both scale and sieve system. All RETSCH sieve shakers of the series "control" can be automatically controlled with EasySieve®.

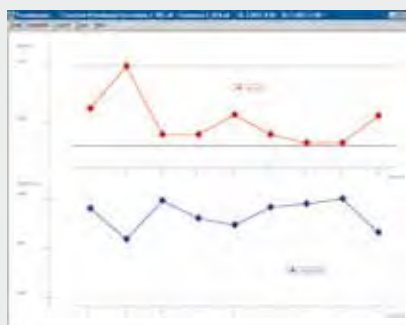
After the sieve analysis is completed, the loaded sieves are reweighed. By determining the weight difference, the program automatically detects the mass proportions and assigns them accordingly to the corresponding fractions. All data are immediately available for further processing.

3. Evaluation

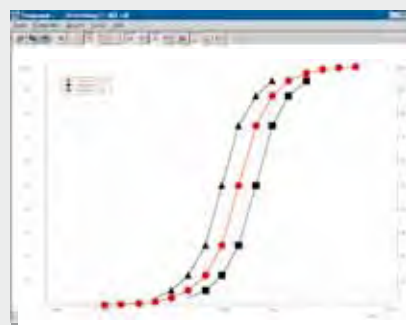
The EasySieve® software calculates all common particle distributions as well as the characteristic values of the particle size, thus making it possible to present the results in standard presentation forms, such as tables and charts. Cumulative throughput or residual values, distribution density and histograms can be included in the standard particle size distributions. In addition to this, the program allows for a trend analysis of production procedures, averaging and much more. Last but not least, fineness and distribution characteristics as well as standard parameters can be selected.



Parameter entry



Trend analysis of production procedures



Comparison with specification limits

Benefits at a glance

- Automatic registration, evaluation and administration of measurement data
- Logical design, self-explanatory
- Measurement protocol in accordance with standards
- Complex presentation of the results in charts and tables
- Easy selection and configuration of common analytical scales
- Comprehensive data export
- Manual on CD-ROM
- English and German

4. Data export

All measured data can be printed, saved and exported as tables and charts. Furthermore, the data can be processed using other software applications such as Excel, Word, PowerPoint and Acrobat Reader, or can be exported as ASCII files. Automatic transfer into the LIMS system is also possible with EasySieve®. Data import and export for modern optical particle size analyzers such as the CAMSIZER® from Retsch Technology is quick and easy.

System requirements

- Pentium PC
 - for automatic control:
 - PC with free serial interfaces/USB interfaces
 - sieve shaker with serial interface (e.g. AS 200 control, AS 300 control, AS 450 control, AS 400 control, AS 200 tap, AS 200 jet)
 - scale with serial interface
- A RS 232-USB Adapter is part of the delivery scope.

Features	EasySieve®
General information	www.retsch.com/easysieve
Windows®, interface	Windows® 2000/XP/Vista (others on request)
ASTM and Tyler Mesh	x
Password protection for sieve analysis	x
Serial no. for sieves	x
Sieve analysis with	
• nominal mesh size	x
• actual mesh size	x
Automatic simultaneous data transfer	x
Administration of measurement data	unlimited
Data import and export	x
PDF manual on CD-ROM	x
Measurement protocol (according to DIN 66165)	x
Language selection English/German	x
Tables	
Throughput values Q3 (x)	x
Residual values (1-Q3(x))	x
Fraction p3	x
Fraction Δm (proportional masses)	x
Distribution density q3(x)	x
log. distribution density q3*(x)	x
Actual mesh size	x
Diagram	
Combined representation of several analyses	x
Curve representation	x
Graphic presentation	
• x-axis	lin, log
• y-axis	lin, log, RRSB
Windowing (Zoom)	x
Cumulative curve (throughput) Q3 (x)	x
Residual curve (1-Q3 (x))	x
Fraction p3/histogram	x
Lin. Division density q3(x)	x
Log. Division density q3*(x)	x
Trend analysis	x
Limit value graph with specifications limits	x
2 representation possibilities (including right y-axis)	x
Reference particles (registration of external particle size division)	x
Parameters	
Fineness parameters, 3 values Q3 (x)	x
Quantile particle size, 3 values x (Q3)	x
RRSB parameters	x
Sauter mean diameter X St	x
Splinter value	x
Specific surface	
• volume related Sv	x
• mass related Sm	x
Unequal grade of granularity	x
AFS particle fineness No.	x

Solutions for more efficient sieve analyses

RETSCH products are used in the quality control of solids for a reason. From representative sample division to precise particle size analysis to professional maintenance of the test sieves – RETSCH offers a complete equipment range for perfect results:



Sample Dividers PT 100, PT 200, RT 6.5 - RT 75

Sample dividers are essential for the exact and **representative division** of pourable bulk goods in the laboratory. The Rotary Divider PT 100 uses the most exact division method which produces the smallest qualitative variations. In addition to the PT 200, which divides larger amounts up to 30 l per run, RETSCH offers the sample splitter RT for manual division.



Fluid Bed Dryer TG 200

The Fluid Bed Dryer TG 200 is used in the laboratory for the gentle drying of bulk materials without localized overheating. The average drying time lies between 5 to 20 minutes which represents a substantial saving in time compared to other drying methods. Typical materials include coal, plastics, soils, pharmaceutical products or plant materials. The TG 200 can also be used for **drying test sieves**.



Ultrasonic Baths UR 1, UR 2, UR 3

RETSCH ultrasonic baths are used for the gentle and efficient **cleaning of test sieves**, glass and metal parts, metallographic and geological samples and many others. Further areas of application are sample preparation of suspensions (e.g. for wet sieving), dispersions in chromatography or the degassing of solutions.

For more details on our sample dividers, rapid dryers and ultrasonic cleaning baths see our "Assisting" brochure.

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A VERDER COMPANY

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.