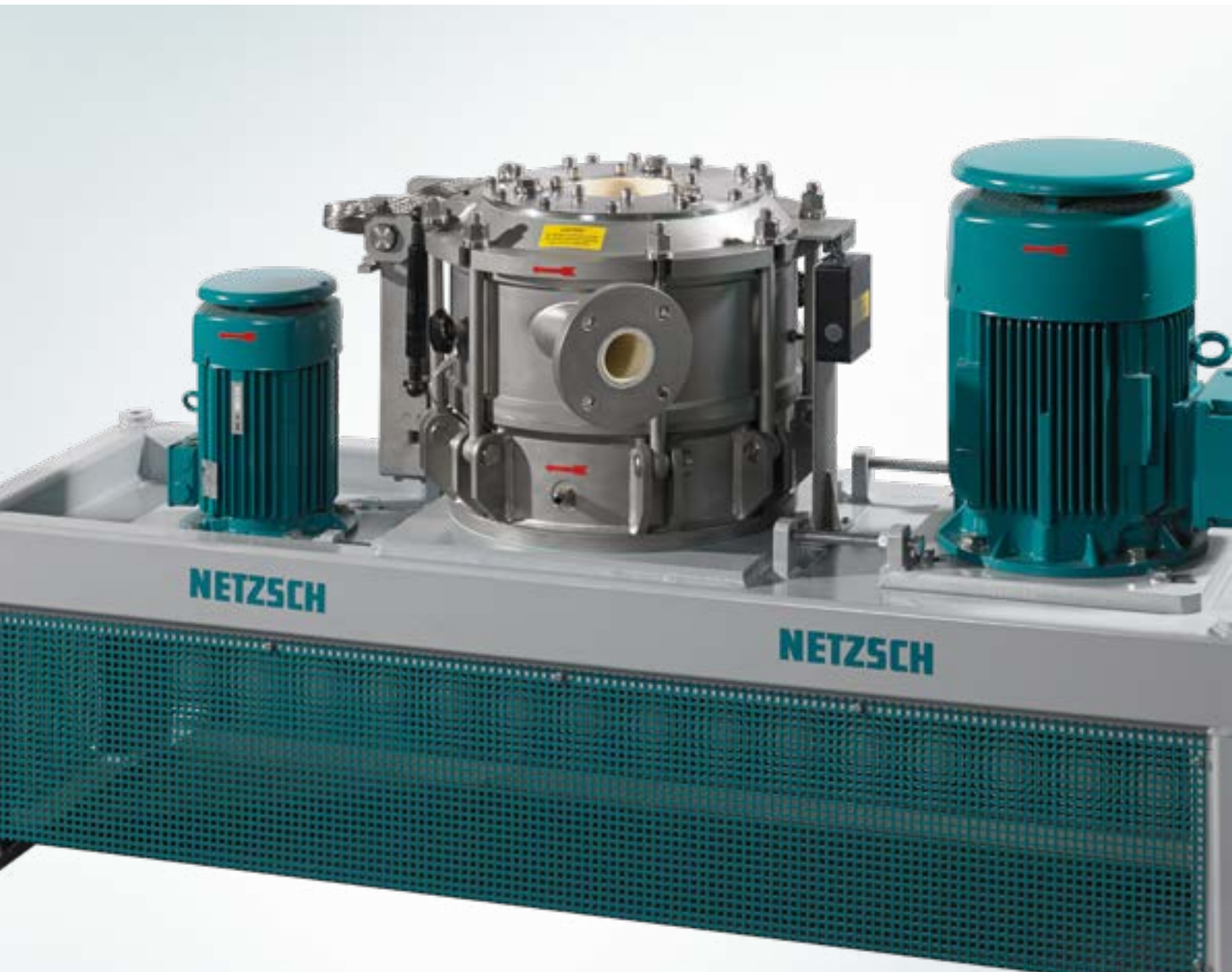


NETZSCH

Proven Excellence.



NETZSCH Classifier Mills CSM

Fine Impact Milling

Business Unit
GRINDING & DISPERSING

Classifier Mills for Fine Impact Milling

Single stage milling is often insufficient for the production of extremely fine particle size distributions of soft to medium hard materials (up to 3 Mohs). In such cases, conventional fine impact mills are often additionally equipped with screening machines or classifiers to classify the milled product. Undesirable coarse particles are returned to the mill to be ground again. This type of separate processing requires a considerable expenditure of machinery.

So-called classifier mills offer the possibility of having the same milling-classifying-effect in one system, with comparably little expense. The NETZSCH Classifier Mill CSM is a combination fine impact mill and deflector wheel classifier.

The integration of a mill and classifier in a single housing offers value-added benefits:

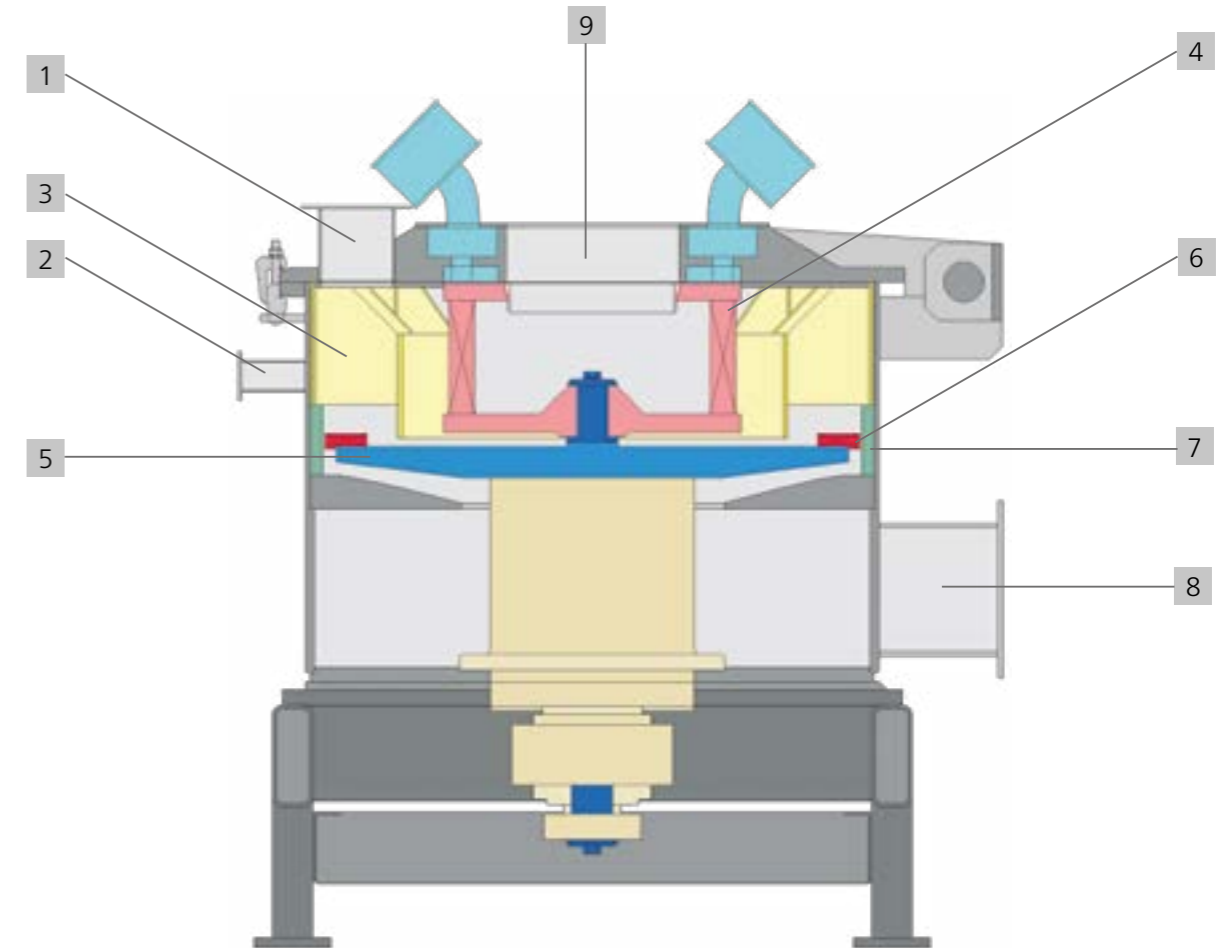
- Easy cleaning
- Simple construction
- Compact milling plant

Our CSM is a thoroughly developed classifier mill that offers a mechanical process engineering product with clear advantages over similar systems on the market. This classifier mill can be used to obtain finenesses from d_{97} 9 μm to 200 μm . This series of machines, offered in a full range of sizes, can be used on a lab scale as well as for the production of large product quantities with a throughput capacity of up to several tons per hour.



NETZSCH Classifier Mill CSM 560

Functional Description

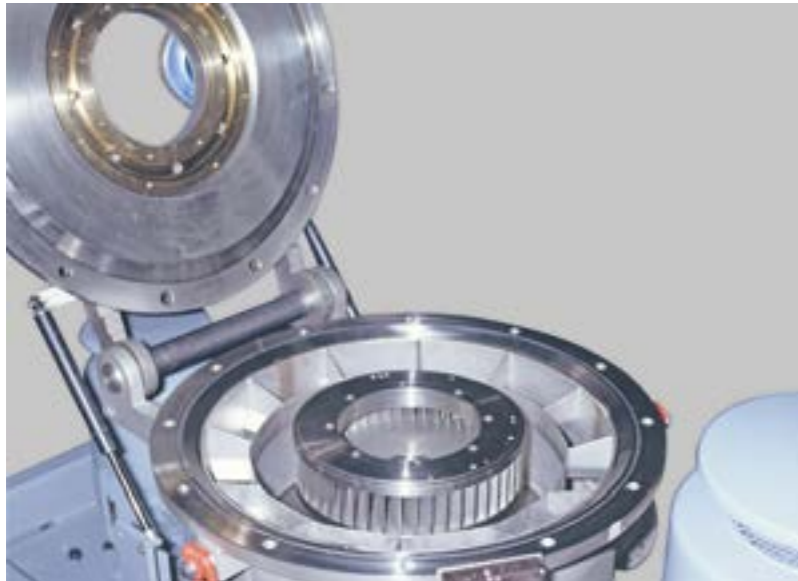


The milling product is fed either via gravity through a downpipe (1) or pneumatically through an injector on the housing (2). The milling product then moves along the inside of the guide ring (3), past the beater classifier wheel (4), which sifts out already present fines, to the beater rotor (5) whose beaters (6) accelerate and then propel it into the peripheral milling track (7). The optimum

angle and speed of impact of the milling particles are the result of the perfectly tuned geometries of the beaters and peripheral milling track. The peripheral milling track (7) can be either segmented or in a single piece to enable faster cleaning. The milling and classifying air enters the housing through the connection piece (8) and streams through the space between the beater rotor (5) and

peripheral milling track (7). As the impacted particles are streaming through this space they are presented to the air classifier (4) by the airflow through the guide ring. Coarse and fine particles are then returned to the beater rotor (5) where the fines, along with the milling and classifying air, leave the mill through the fines outlet (9).

Highly Efficient and Application Oriented



Your Advantage is Our Focus

- Highly efficient milling device with quick change beating elements and dual-use milling track, specially tuned to the needs of impact milling. Achieves a high range of particle size distributions and high throughput capacities with little rise in temperature.
- Large machines working with only one classifier wheel also produce high degrees of fineness. The classifier geometry makes ultra-fine cuts possible, even with high air through-puts. These are obtained by means of a new model in which the classification take place in a vane-free inner chamber of a classifier rotor.
- High precision classifier for exact limitation of the particle range in the milled product, free of oversized particles. A co-rotating immersion tube and optimum design produce the highest degrees of fineness.
- High precision classifier due to air purged gap, between rotating classifier wheel and stationary mill lid.
- Optimal and low vibration operation of the classifier mill is achieved with the extremely robust design of the complete machine construction, with its welded machine housing and the coaxial construction of grinding disc and classifier wheel.
- Application oriented product feed either through gravity via a down pipe or pneumatically via ground level conveyance through an injector or suction air.
- Easy access to the milling chamber and classifier allows for simple cleaning and maintenance. When the hinged mill lid is open, the milling elements and classifier wheel are immediately accessible. The machine can be opened as often as necessary without having to inspect or readjust the space in the classifier wheel.
- Remarkably robust, low-maintenance design of the bearing unit due to hollow shaft construction. This special bearing unit allows for higher rotations of the bearings at relatively low speeds.

Machine and Plant Design

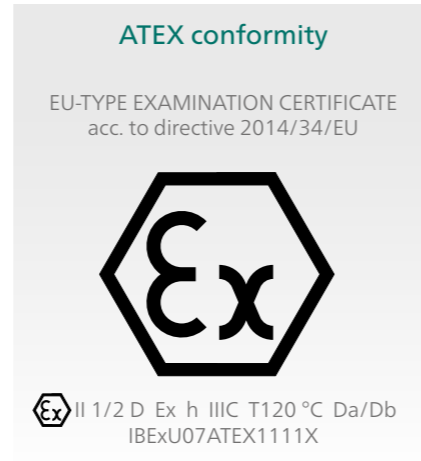
Our Know-How for your Requirements

A complete milling system is constructed in accordance with specific product requirements, taking into account your needs and our engineering expertise!

Components for dependable processing such as feeding system, high-performance cyclone or ultrafine dust filter are chosen to suit your product, as well as the machine size for the desired throughput capacity. Depending on the product and requirements, complete plants are designed in diverse configurations. Our general engineering standards

range from pressureless plants for the milling of inert substances to explosion proof systems. Various machines and plants for the milling of products subject to dust explosion can be delivered:

- Pressure shock resistant construction up to 10 bar (g) (see below)
- Pressure relief design up to 1.4 bar (absolute), as well as
- Closed loop inert gas systems



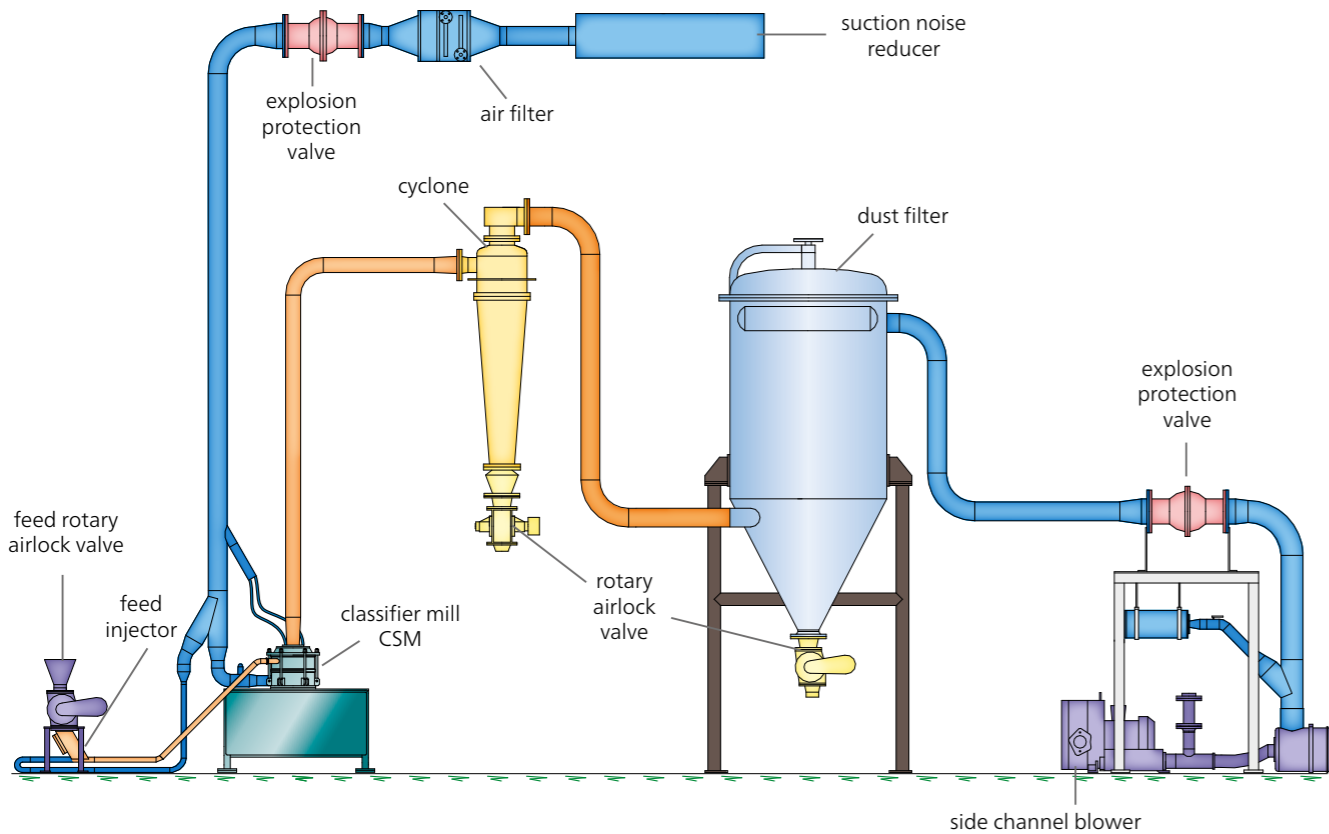
Adapted to Suit your Application

Of course the machine designs and materials of the NETZSCH Classifier Mill CSM are application oriented:

- Carbon steel or
- Rust- and acid-resistant materials are standards
- Special materials are also available upon request
- Designs in conformity with GMP standards with extremely low surface roughness
- Gas-tight construction
- Pressure shock resistant



NETZSCH Classifier Mill CSM 360



Pressure shock resistant milling plant

Extraction of Difficult to Mill Particles:

Often, but mainly during the milling of relatively "soft" minerals, a higher wear of milling elements occurs due to quartz content. This portion of the product is difficult to mill and accumulates in the internal milling-classifying-circuit. Ultimately, the machine can then no longer take up new product.

The use of an additional suction system, which is located directly on the machine housing, allows these accumulations to be removed at regular set intervals, which means that even these products can be processed without problems or significant wear.

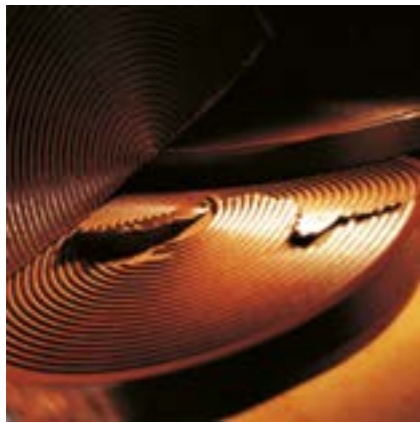


Examples of Applications

There are numerous application possibilities for the NETZSCH Classifier Mill CSM in many branches! Whether it is used in the chemical, plastics or paint- and varnish industry, there are many different products that can be processed and application problems that can be solved with

the Classifier Mill CSM. If the fineness-specifications for the end product should change, new fineness rates can be achieved quickly and without modification of the machine by simply adjusting the classifier wheel speed!

Of course, it is only possible for us to give some examples of the range of uses for our CSM-machine program. If your product is not mentioned, please explain your requirements to us. We are sure that we can find a suitable grinding system for your particular material.



Cocoa press cake



Sugar



Pigments



Powder coating



Talc



Dried peas

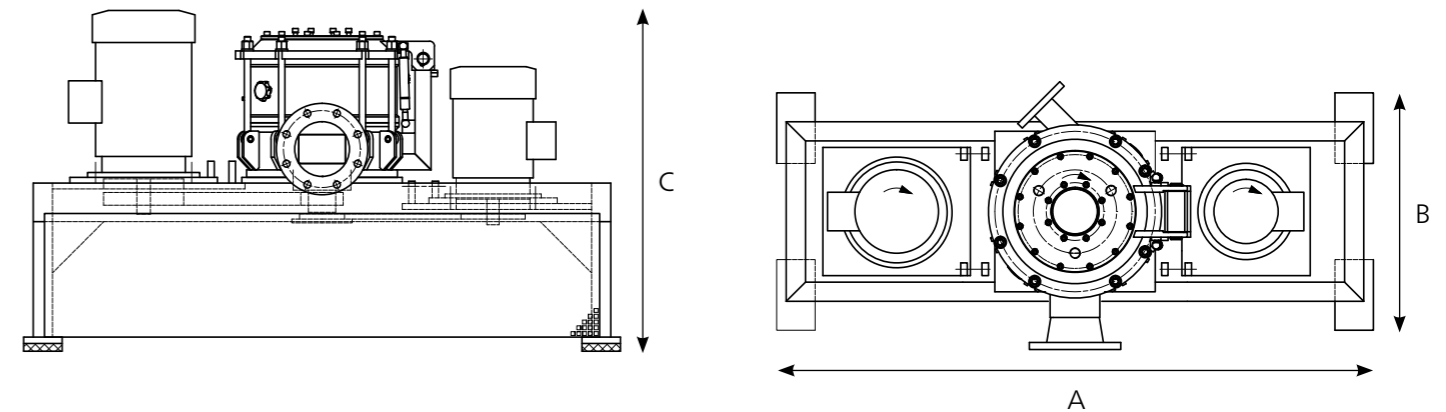
Examples of Products	Fineness	Size	Capacity kg h ⁻¹
Boron nitride	d ₉₉ 50 µm	CSM 165	60 - 100
Calcium citrate	d ₉₉ 20 µm	CSM 560	270
Cereals	d ₉₉ 20 µm	CSM 80	2 - 10
Charcoal	d _{99,9} 100 µm	CSM 80	30 - 40
Cobalt metal	d ₉₇ 10 µm	CSM 260	60
Cobalt oxide	d ₉₇ 7.6 µm	CSM 165	40
Cocoa press cake	d _{99,8} 75 µm	CSM 560	2 000 - 2 750
Dried peas	d ₉₀ 35 - 40 µm	CSM 900	5 000
Gelatine	d ₉₉ 100 µm	CSM 360	83
Iron powder	d ₉₅ 45 µm	CSM 360	600
Limestone	d ₉₇ 30 µm	CSM 260	300
Manganese(II) phosphate	d ₉₀ 7 µm	CSM 360	70 - 85
Nickel alloys	d ₉₀ 70 µm	CSM 165	230
Novolaks and hardeners	d ₉₉ 63 µm	CSM 260	500
Pentaerythritol	d ₉₇ 40 µm	CSM 360	625
Phenolic resin	d ₉₀ 30 µm	CSM 360	870
Pigments	d ₉₉ 15 µm	CSM 360	400
Pigments (copper)	d ₉₉ 18 µm	CSM 165	450
Pigments, red	d ₉₉ 15 µm	CSM 360	1 000
Plastic coatings	d ₉₉ 40 µm	CSM 260	20 - 100
Poly(methyl-methacrylate)	d ₉₉ 44.5 µm	CSM 360	300
Polyacrylamide	d _{99,9} 100 - 120 µm	CSM 360	17 - 35
Potato starch	d ₉₇ 100 µm	CSM 165	40
Powder coating	d _{99,5} 90 µm	CSM 360	600 - 1 000
Silica	d ₉₈ 32 µm	CSM 560	2 200
Silica gel	d _{99,9} 200 µm	CSM 165	180
Sodium bicarbonate	d ₉₀ 20 µm	CSM 720	400 - 2 360
Soy protein	d ₉₉ 92.8 µm	CSM 560	1 600
Sugar	d ₉₀ 6.3 - 6.7 µm	CSM 165	6 - 8
Sugar beet residue	d ₉₉ 121 µm	CSM 360	220
Sugar substitute	d ₉₀ 100 µm	CSM 560	3 000 - 3 500
Sugar-cocoa-mixture	d ₉₀ 21 µm	CSM 560	6 000
Talc	d ₉₉ 20 µm	CSM 560	1 000
Tartaric acid	d ₉₅ 63 µm	CSM 360	2 000
Tobacco	d ₉₅ 125 µm	CSM 360	500 - 800
Toner	d ₅₀ 25 µm	CSM 560	200
Vulkacit	d _{99,9} 63 µm	CSM 260	300
Wheat gluten	d ₉₉ 180 µm	CSM 900	5 000
Zinc stearate	d ₉₇ 20 µm	CSM 560	250

Technical Data

Technical Data		CSM 50	CSM 80	CSM 165	CSM 260	CSM 360	CSM 560	CSM 720	CSM 900
Power factor		-	-	0.3	0.5	1	2.5	4.4	7.5
Grinding disc diameter	mm	146	182	300	407	610	1044	1455	2000
Classifier wheel diameter	mm	80	120	170	260	360	560	720	950
Mill speed max.	min ⁻¹	15 000	12 000	7 500	5 400	3 650	2 100	1 485	1 100
Mill drive power max.	kW	1.5	2.2	5.5	15	30	75	132	250
Classifier speed max.	min ⁻¹	12 000	6 500	4 500	4 200	3 000	2 000	1 800	1 400
Classifier drive power max.	kW	0.55	1.5	2.2	4	7.5	15	30	45
Air volume flow max.	m ³ h ⁻¹	70	180	700	1 400	3 600	9 000	16 000	26 000
Fineness d ₉₇ *	µm	9 - 150	9 - 150	9 - 150	9 - 150	10 - 180	10 - 180	12 - 200	14 - 200

* based on limestone (density 2.7 kg/l)

Technical Data		CSM 50	CSM 80	CSM 165	CSM 260	CSM 360	CSM 560	CSM 720	CSM 900
Length (A)	mm	380	550	1 150	1 800	2 260	3 100	4 230	4 600
Width (B)	mm	350	690	620	560	840	1 250	1 800	2 500
Height (C)	mm	1 000	900	1 000	950	1 220	1 780	2 400	2 440
Weight (approx.)	kg	150	250	450	750	1 350	4 250	12 000	15 000



NETZSCH Classifier Mill CSM 260

Quality Management

Our company is certified according to DIN EN ISO 9001 and EN ISO/IEC 80079-34 (for manufacturing of explosion protected equipment) in order to ensure excellent product quality and trouble-free processing of your project!




Working Together to Ensure your Success!

Your milling plant can be designed during the project stage in close cooperation with you, the end-user! Our skilled engineering team can advise you on the various possibilities of our classifier mill plants.

www.netzsch-grinding.com

Details of your local contact person and current information can be found in our website.



The NETZSCH Group is an owner-managed, international technology company with headquarters in Germany. The Business Units Analyzing & Testing, Grinding & Dispersing and Pumps & Systems represent customized solutions at the highest level. More than 4 600 employees in 36 countries and a worldwide sales and service network ensure customer proximity and competent service.

Our performance standards are high. We promise our customers Proven Excellence – exceptional performance in everything we do, proven time and again since 1873.

Proven Excellence. ■

Business Unit Grinding & Dispersing – The World's Leading Grinding Technology

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