NETZSCH
Proven Excellence.

NETZSCH Process Technology for Food Applications

Advanced Processing powered by Dry and Wet Grinding for next level efficiency

Business Unit
GRINDING & DISPERSING

NETZSCH – Technology that fits every Food Application

From spices and coffee to cocoa, proteins and confectionery, modern food production relies on precise and efficient processing technologies. Grinding, classifying and dispersing are essential steps that significantly influence product characteristics such as texture, taste, functionality and stability across a wide range of applications.

With extensive expertise in both dry and wet processing, NETZSCH offers a broad portfolio of technologies tailored to the diverse requirements of the food industry. Our solutions cover applications including spices, special flours, hydrocolloids, sweeteners, cocoa, chocolate, compounds and fillings, as well as emerging areas such as alternative proteins, cell disruption and insect-based products.

From initial product development and laboratory testing to process optimization and industrial scale-up, NETZSCH supports you at every stage. The result is efficient, reliable production and consistently high product quality aligned with your specific requirements.

Everything at a Glance

From Idea to Industrial Scale
Food Testing Expertise at NETZSCH

The NETZSCH application laboratories in Hanau and Selb are a key part of our comprehensive service offering. Equipped with state of the art technology, they provide the ideal environment to turn your ideas into scalable solutions. Once technical details are clarified, you are free to focus on your recipe development, supported by our experienced teams who ensure that every test is carried out to achieve reliable and meaningful results.

In Selb, our dedicated *WhiteLab* offers a specialized space for testing confectionery and cocoa applications. Designed specifically for the food industry, this facility delivers results that serve as the foundation for the design and engineering of production plants used by customers worldwide.

At our site in Hanau, the *FoodLab* focuses on dry processing trials under strict food grade conditions. Two modern test rooms allow live observation through large glass panels from the meeting area, ensuring full transparency. Access is managed via hygiene sluices, maintaining the highest standards for both visitors and staff.

Together, these facilities enable precise, application oriented testing and help you move confidently from product idea to full scale production.

NETZSCH Service

- Product development
- Process support
- Scale-up to your production requirements
- Project planning and -management, commissioning, customer service, local service
- Training at NETZSCH and locally

NETZSCH Trockenmahltechnik GmbH and NETZSCH-Feinmahltechnik GmbH are company members of EHEDG

Find out more about our strategic partnerships here:

Trusted Partnerships
Realizing Visions Together

At NETZSCH, the value of trusted strategic partnerships cannot be overstated. Working hand in hand with our partners, we dedicate ourselves to enhancing both processes and product quality. This collaboration becomes particularly vital as we confront global challenges, venture into new markets, and present comprehensive projects as “integrated solutions.”

In our strategic partnerships, we focus on the development and implementation of future technologies, including functional coatings, innovative materials, advanced pharmaceutical active ingredients, alternative foods, and high-performance battery technologies.

Spices

Gentle Grinding to Preserve the Characteristic Properties

Spices are dried plant parts, for example seeds, fruits, roots, bark, berries, peel, stems or leaves. These are used in nutritionally insignificant amounts as food additives for flavor and color or as preservatives.

NETZSCH Flavor Protection Grinding

When processing herbs and spices the highest priority is to preserve their characteristic properties as flavor-, aroma- or color carriers. Some spices already have their characteristic properties when they are freshly-harvested. In this case the natural flavors are completely enclosed by cell walls and to a large extent protected. Other spices develop their characteristic properties after they have been dried and some are processed with the aim of enhancing their desired properties. Essential oils and so-called hot and spicy substances are the main flavor enhancers in spices. They consist of a multitude of different flavors which are generally volatile. With the NETZSCH flavor-protection grinding process these flavors can be preserved to a large extent.

Product	Fineness [%] < 500 µm	CONDUX® 300 [kg/h]	CONDUX® 1250 [kg/h]
Aniseed	87	295	3 245
Caraway seeds	72	81	891
Chilli	99	90	990
Chilli	95	150	1 650
Cinnamon	97	231	2 541
Cloves	96	143	1 573
Coriander	92	250	2 750
Ginger	96	370	4 070
Nutmeg	98	270	2 970
Paprika	98	625	6 875
Pepper	96	577	6 347

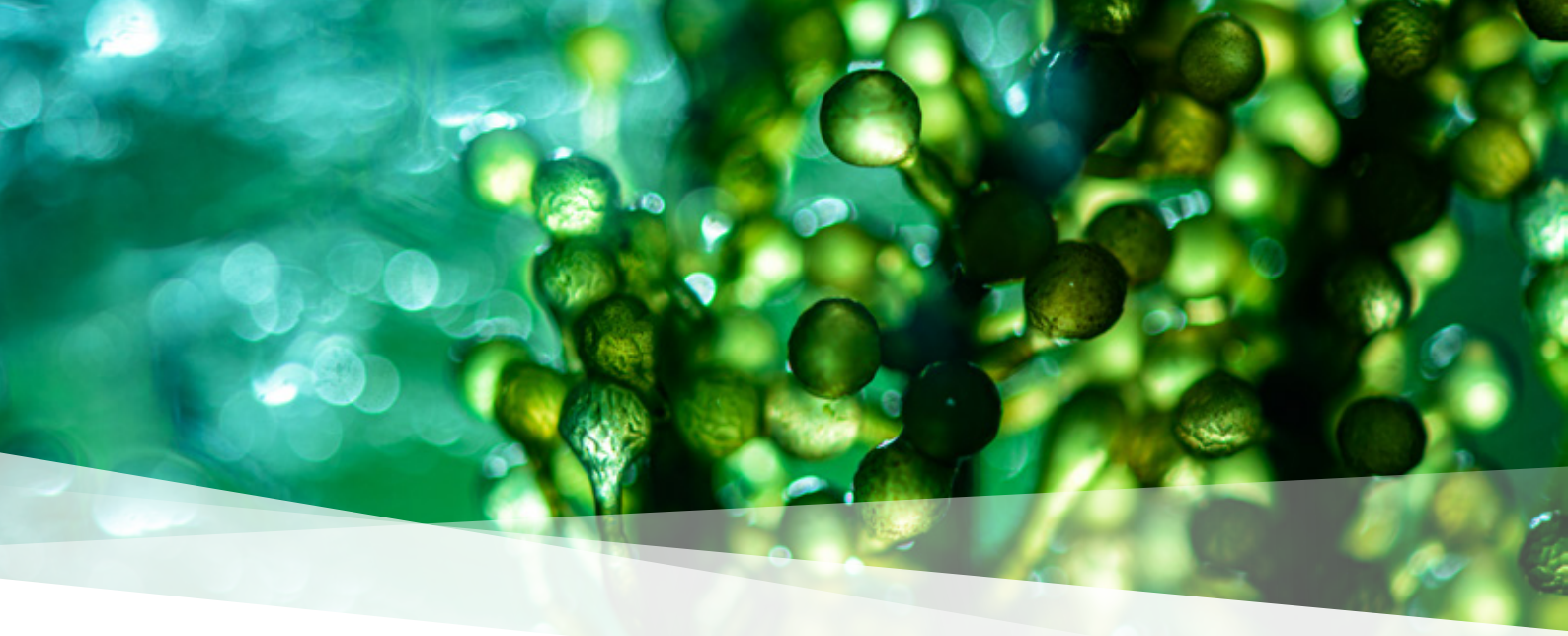
Chilli

Pepper

Focus on Your Advantages

- Low grinding temperatures reduce diffusion processes
- Adjustable grinding fineness avoids unnecessary breaking up of cell structures
- Short dwell times in the mill keep heat transfer into the grinding product to a minimum
- Crush-free grinding protects the cell structures within the particles
- The essential oils are preserved to a great extent as the final fineness is obtained in a single grinding step without product return and without intermediate screening
- Cryogenic grinding with liquid nitrogen
- Conditioned grinding air for products with high oil- and fat contents

Fine Impact Mill *Condux*® 680



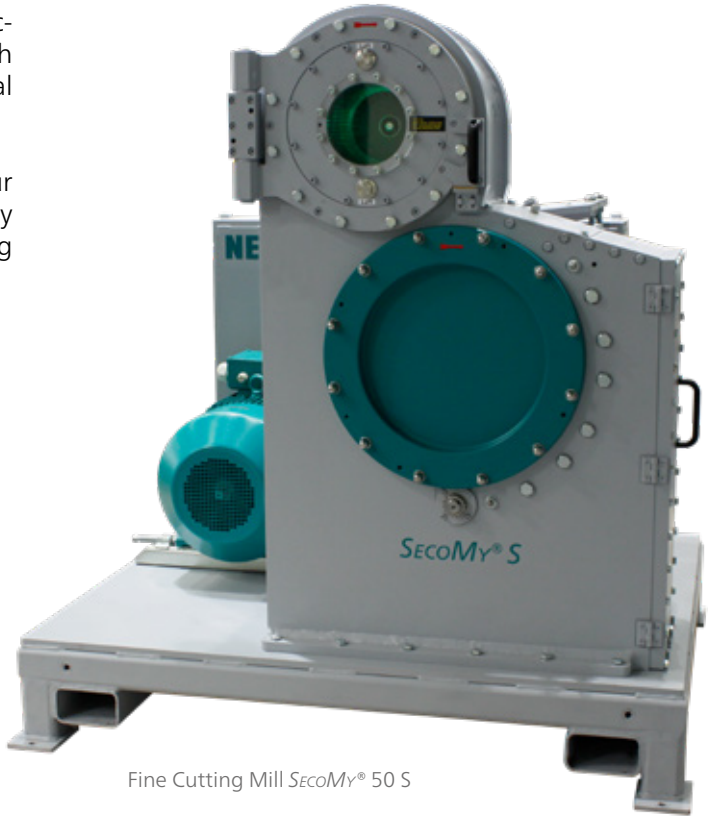
Hydrocolloids

Food Additives and Food Supplements with many different Properties

A large group of polysaccharides and proteins which have a high capacity for gelling are known as hydrocolloids. A large number of these originate from nature most of them from the plant world. However, hydrocolloids can also be obtained from algae, bacteria and animal sources. The extraction of hydrocolloids is carried out using several very different processes and often the products obtained are further modified in order to regulate certain properties.

Hydrocolloids are used in the food industry as gelling- and thickening agents, stabilizers, humectants etc. Furthermore, their properties give each particular food its appearance and the usual (texture) mouth feel.

We can offer you the optimum solution for your requirements with NETZSCH´s proven technology including impact-, classifier-, jet- and fine-grinding mills.



Fine Cutting Mill *SecoMy®* 50 S

Application Example: Gelatine

Gelatine is a natural foodstuff. It is transparent has neither nor taste and is used for many applications. Gelatine consists up to 80 % - 90 % of protein. The remaining components are water and mineral salts. Gelatine is produced from collagen in a multistage manufacturing process. In the final step the pulverization of extrudates is necessary. The throughputs obtained in this step depend greatly on the viscosity of the feed product.

Product	Machine	Throughput [kg/h]	Final Fineness [µm]
Gelatine	CSM 360	83	100 (d_{99})
Gelatine	*Condux*® 450	130	250 (d_{99})
Gelatine	*Condux*® 680	480	630 (d_{97})

Application Example Algae

Algae not only have a high content of minerals and trace elements, but are also rich in carbohydrates, unsaturated fatty acids and/or beta-carotenes. For this reason algae are interesting as a food – so far predominantly in South East Asia.

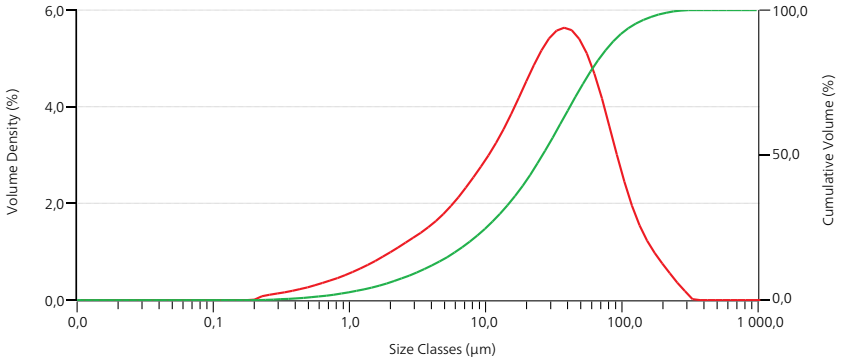
For special applications the individual ingredients are used or the degradability of algae is exploited and the products obtained through degradability used.

Product	Machine	Throughput [kg/h]	Final Fineness [µm]
Chlorella-Algae	*ConJet*® 32	19	7.5 (d_{50})

Application Example: Pectin

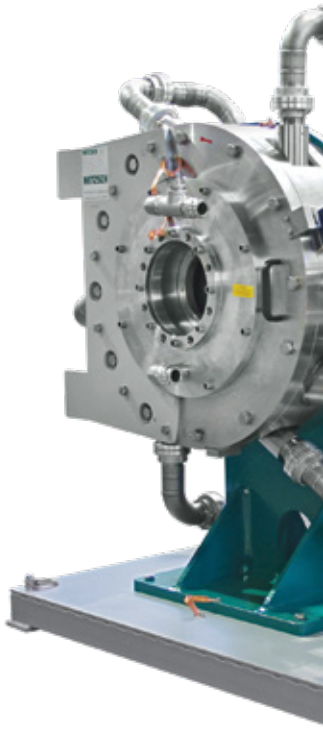
Pectins are plant-based polysaccharides which can be found in all hard plant parts, for example stems, flowers or leaves. Seen from a nutritional point of view pectins provide dietary fiber for humans, although they are used chiefly as gelling agents in the food industry.

Pectins are essential ingredients of many products in the food- and pharma industries or are used in the manufacture of cosmetics.



Product	Machine	Throughput [kg/h]	Final Fineness [µm]
Pectin	*SecoMy*® 50 *S*	11	90 (d_{90})
Pectin	CSM 720	700 - 800	179 (d_{90})

Pectin



High Density Bed Jet Mill *ConJet*® 71

Application Example: Cellulose and Cellulose Derivatives

Before cellulose and cellulose derivatives can be used in pharmaceutical products, a multistage processing is necessary. With their precise and high number of cuts and the use of a screen insert and/or with a rotating classifier wheel to determine the final size, the fine cutting mills CS-Z, *SecoMy*® and *SecoMy*® *S* by NETZSCH are an ideal solution for the first processing step. The cellulose powder obtained with these machines can be added straight away to the product (food) as a filler or an additive.

The powder obtained in this way can also be modified and by introducing various functional groups can give a multitude of cellulose derivatives which are characterized by certain particular properties such as solubility, viscosity, gelling power and -temperature or surface activity. With the NETZSCH impact mill the cellulose derivative can be ground down to various finenesses to suit your requirements exactly.

Product	Machine	Throughput [kg/h]	Final Fineness [µm]
Wood cellulose	*SecoMy*® 50 *S*	45	63 (d_{97})
CMC	*Condux*® 1250	1 800 - 2 100	250 (d_{99})
HPMC	*Condux*® 300	66	150 (d_{50})
HPC	CGS 50	100	53 (d_{50})
Microcrystalline cellulose	CGS 71	150	150 (d_{50})

Further Product Examples

Product	Machine	Throughput [kg/h]	Final Fineness [µm]
Milk calcium	*ConJet*® 50	200 - 250	10 (d_{99})
Tricalcium citrate	*ConJet*® 50	200	10 (d_{98})
Beta carotene	*ConJet*® 50	60	5 (d_{97})
Carob flour	*SecoMy*® 50 *S*	57	55 (d_{99})

Coffee
Finest Grinding for Greater Enjoyment!

Coffee is one of the most important internationally traded products as well as one of the most frequently consumed drinks. Its name is derived from the Arabic word “Kahwe” or “Qahwa” which means vitality or strength. The stimulating effect of coffee has been well-known for a long time and thanks to constantly improving methods of analysis over 1000 different ingredients such as flavors, vitamins, minerals or antioxidants have been determined.

In order to release these ingredients and flavors, the coffee must be ground after roasting. The finer the coffee is ground the greater the amount of ingredients released, thus influencing the flavor positively. New products require very fine-grinding. The fluidized bed jet mill range by NETZSCH is predestined for this application.

Example of Product

Fine-grinding of a coffee mixture consisting of 50% roasted coffee and 50% instant coffee.

Coffee

Fluidized Bed Jet Mill	CGS 100
Feed size d_{97}	500 µm
Grinding air pressure	3 bar(g), cold gas 20 °C
Throughput capacity	240 kg/h
Fineness d_{90}	37.6 µm
Fineness d_{97}	47.3 µm
Fineness d_{99}	100 µm

Fluidized Bed Jet Mill CGS 50

Sweeteners
Safe Operation and Effective Dry-Grinding

Sugar, Artificial Sweeteners and Sugar Substitutes

Although the word „sugar" is commonly only used when referring to monosaccharides such as fructose and glucose, it actually encompasses disaccharides, such as sucrose, lactose and/or maltose. The most important disaccharide in economic terms is sucrose (crystal- or household sugar) which is obtained from sugar cane and sugar beet in an industrial process. Sugars are grouped under the term sweeteners together with natural and synthetic sugar substitutes.

Compared to sugar, artificial sweeteners either have no or a negligible amount of calories. They are manufactured synthetically or consist of natural compounds, which are considerably sweeter than sugar. As artificial sweeteners are considered to be food additives, they are subject to statutory authorization.

Sugar substitutes such as Sorbitol, Isomalt, Mannitol or Xylite are carbohydrates which taste like sugar but which have only around 40 % - 70 % of their sweetening power.

NETZSCH Technology – Custom-Designed and Efficient

For the dry-grinding of all these products first class equipment is just one part of a proven production process. NETZSCH also determines the optimum process parameters for each material. Fineness, temperature and throughput are perfectly coordinated to guarantee an economical process which gives a high-quality product.

Focus on Your Advantages

- Grinding after crystallization and drying as a downstream process step for adjustment of the particle size
- Cold grinding and classifying with proven NETZSCH Technology
- Target finenesses of between 10 µm and 150 µm can be set easily
- Hygienic design

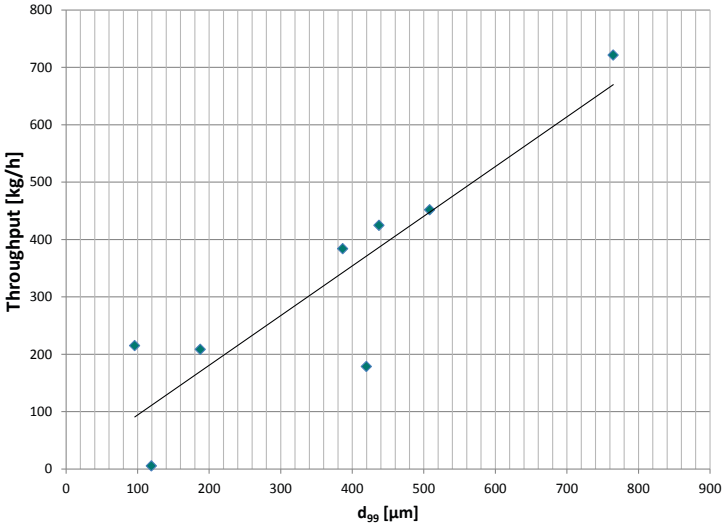
Application Example: Lactose

Lactose is a crystalline, colorless substance with between 25 % and 60 % of the sweetening power of sucrose (household sugar), depending on its concentration. As it has favorable properties for the production process as a carrier substance or emulsifier, lactose is often used in medicinal drugs for example as a pharmaceutical excipient.

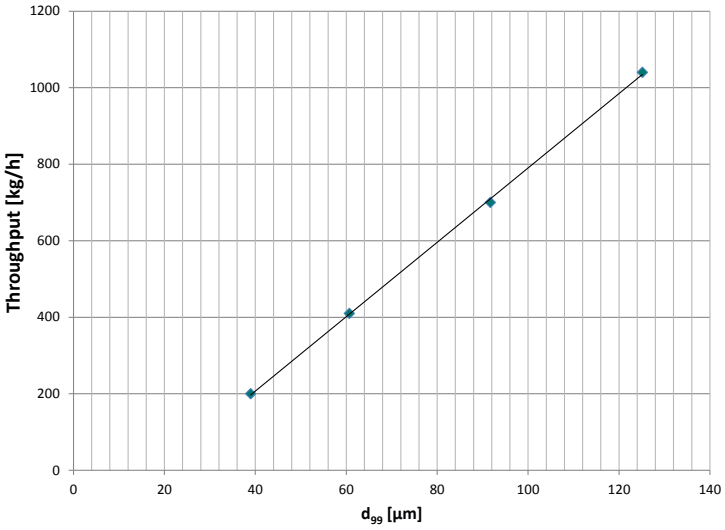
All market standard qualities can be manufactured with the Fine Impact Mill *Condux*®, the Classifier Mill CSM or the High Density Bed Jet Mill *ConJet*®.

Machine	Throughput [kg/h]	Final Fineness
ConJet® 16	10	45 (d_{90})

High Density Bed Jet Mill *ConJet*® 16



Lactose grinding with the Fine Impact Mill *Condux*® 300



Lactose grinding with the Classifier Mill CSM 360

Sweeteners
Processing Technologies for Sugar

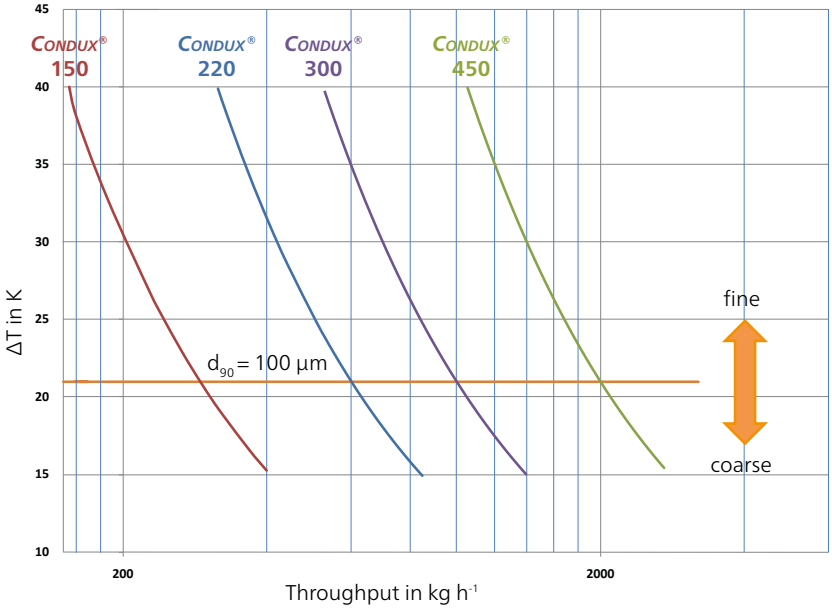
Sugar is a material with manifold uses such as in chocolates, jams, jellies, ice cream, drinks and baked goods such as cookies. Depending on the intended use various different particle sizes are required. Sugar is finely ground for numerous application uses as this guarantees the rapid solubility in the subsequent process or it is then used to decorate delicious desserts.

With the Fine Impact Mill *Condux*® various grinding finenesses can be easily produced using the infinitely variable speed setting on the blower rotor as well as various screen inserts.

Condux® *Compact* Plant

- Suitable for applications in which the confectioner´s sugar undergoes further processing directly after grinding
- ATEX-compliant plant design: Complete grinding system designed for an explosion overpressure of up to 10 bar (g)
- A mini-aspiration filter prevents the unwanted escape of dust at the product feed inlet and discharge valve
- The thermal energy created during grinding is dissipated via the product being ground
- Low space requirement; compact construction
- Dust-free filling; easy and rapid cleaning as well as straightforward operation
- Low investment- and maintenance costs

Fine Impact Mill *Condux*® 220 *Compact*

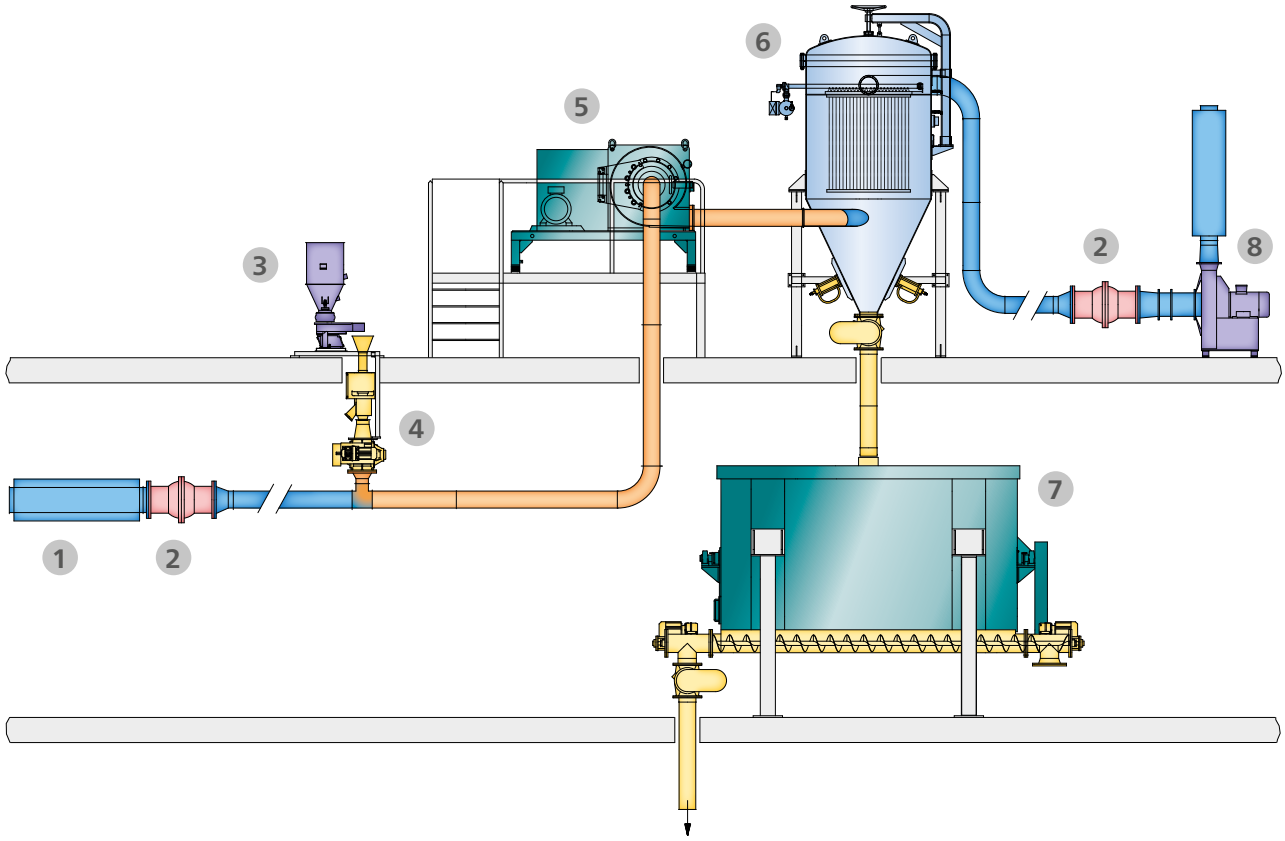


Sugar-grinding with Fine Impact Mill *Condux*® *Compact*

Focus on Your Advantages

- Optimum adjusting of fineness, temperature and throughput
- Excellent product qualities produced in an economical process
- The design of the Fine Impact Mill *Condux*® with a blast rotor guarantees a low temperature level
- Dust explosion protected plants designed according to national directives in the country of the purchasing company are available

Standard Plant for the Fine-Grinding of Sugar with Pneumatic Conveying System and Explosion Protection



1 Intake silencer
2 Explosion protection valve
3 Vibration feeder
4 Rotary airlock valve
5 Fine Impact Mill *Condux*®
6 Dust filter
7 Intermediate tank
8 Radial ventilator

	Condux®	150	220	300	450	680	900	1250
Power factor		0.3	0.6	1	2	4	6	11
Throughput approx.	[kg/h]*	300 - 530	480 - 840	800 - 1 400	1 600 - 2 800	3 200 - 5 600	5 200 - 9 100	9 800 - 15 400
Drive power (max.)	[kW]	4	11	18.5	37	75	132	250

* d_{97} = 75 µm - 200 µm

Food Colorants

Finest Grinding & Dispersing for Brilliant Color Performance

Food colorants play a crucial role in the visual appearance and quality perception of food products. Whether natural or synthetic, solid or liquid – the processing of pigments requires precise control of particle size, temperature and dispersion quality to ensure maximum color strength, stability and yield.

NETZSCH offers advanced solutions for both dry and wet processing of food colorants, enabling finest particle sizes and gentle processing conditions tailored to sensitive pigments.

Focus on Your Advantages

- Finest particle sizes for maximum color intensity and yield
- No temperature increase during dry grinding
- Steep particle size distribution through integrated classification
- Gentle processing of temperature-sensitive pigments
- Hygienic design with easy and fast cleaning
- Residue-free product discharge
- Scalable solutions for both dry and wet processes

Typical Applications

- Curcumin / Turmeric
- Carmine
- Phycocyanin (algae-based pigments)
- Carotenoids
- Annatto / Urucum
- Carbon-based pigments

Dry Processing of Food Colorants

Jet Milling for Ultra-Fine Powders

For powder pigments, the market demands finest particle sizes with narrow distributions and no thermal impact during processing.

Typical requirements:

- Fineness levels between 1 µm and 20 µm (d_{90})
- No temperature increase during grinding
- High color strength and yield

With the *ConJet*® High Density Bed Jet Mill, NETZSCH combines a spiral jet mill with an integrated classifier wheel. This enables the production of ultra-fine powders with a defined upper particle size limit – independent of feed rate or product load.

High Density Bed Jet Mill *ConJet*®

Wet Processing of Food Colorants

Bead Milling for Maximum Color Intensity

Liquid colorants and pigment suspensions require ultra-fine grinding and stable dispersion to achieve optimal chroma values and application performance.

Typical requirements:

- Fineness levels from 0.1 µm to 10 µm (d_{90})
- Excellent dispersibility and color strength
- Gentle processing of sensitive pigments (e.g. from algae or yeast)

NETZSCH Agitator Bead Mills provide efficient wet grinding in the micron and submicron range. The use of smallest grinding media ensures effective particle size reduction and uniform dispersions.

Agitator Bead Mill *Zeta*®

Nuts & Oilseeds
Unbounded Flexibility

Pre-Cutting System *MasterCream*

The *MasterCream* enables flexible and efficient refining of nuts and rework, either as a stand-alone machine, integrated into existing lines or combined with NETZSCH *Rumba*® or *Salsa*® systems.

It continuously processes whole or granulated nuts into a fine paste below 100 µm. A pre-cutting unit combined with a horizontal agitator bead mill ensures efficient grinding and the production of high-quality nut creams or rework pastes, which can be directly transferred for further processing.

The optimized, closed design allows low processing temperatures of 40°C to 50°C, preserving flavor and extending shelf life. Adjustable speed and tool settings enable processing of various nut types, depending on fat content and temperature limits.

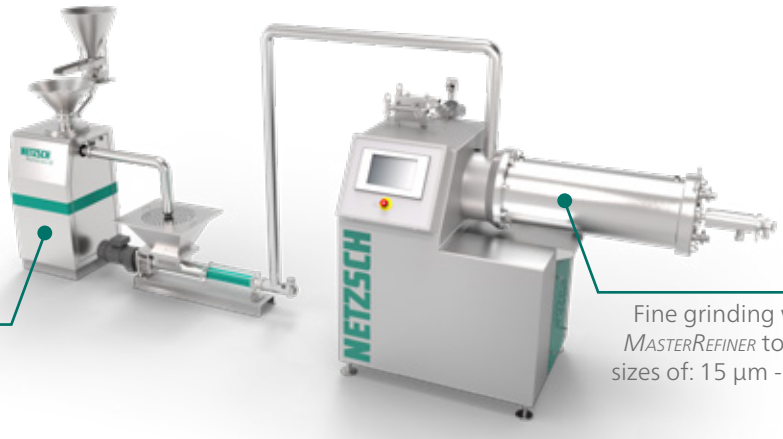
Product	Machine	Power [kW]	Throughput capacity [kg/h]
whole Hazelnuts	*MasterCream* 10	17	200 - 750
	MasterCream 20	30	500 - 1 500
	MasterCream 40	55	1 000 - 4 000

Pre-Cutting System *MasterCream* 10

Zumba Line: The perfect solution for processing roasted nuts and oilseeds – For 100% nut products

Using the combination of the proven advanced technologies of the *MasterCream* and the *MasterRefiner*, our *Zumba* line is the perfect solution to process pure roasted nuts and oilseeds. This compact system reaches the highest product quality with regards to the taste, appearance, and rheological parameters.

- Start with roasted nuts or oilseeds
- Moisture content ≤ 2 %
- Low processing temperatures, ≤ 45°C according to the product
- Fineness down to 20 µm in one pass operation, e.g. nut milk



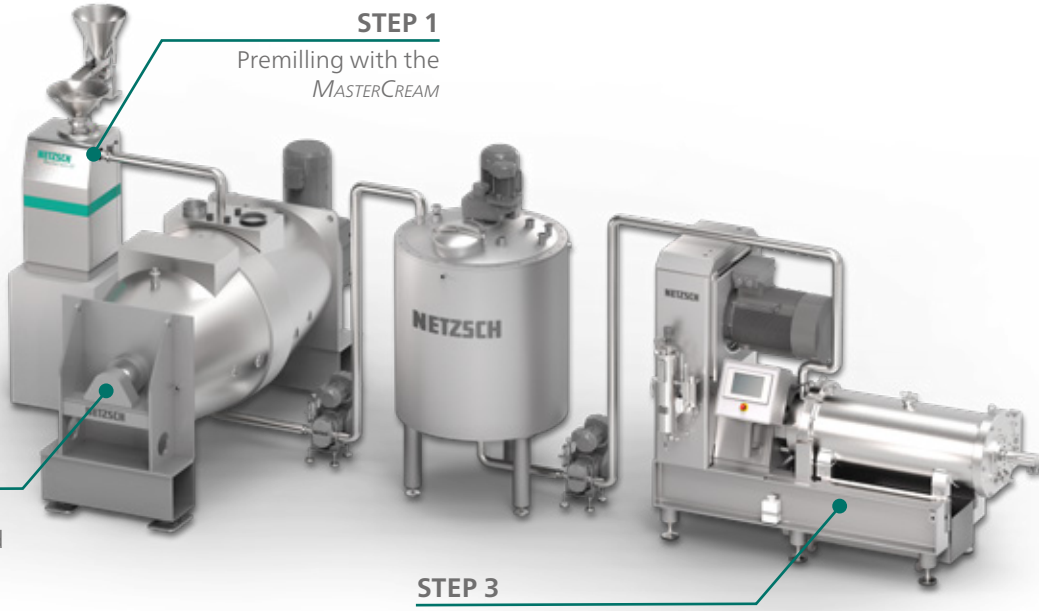
STEP 1
Pre-grinding with the *MasterCream* to particle sizes of: 40 µm - 300 µm

STEP 2
Fine grinding with the *MasterRefiner* to particle sizes of: 15 µm - 100 µm

ZumbaPlus Line: For products with higher moisture content

Our *ZumbaPlus* is an upgraded version of the *Zumba* line, with one additional drying step between the pre-grinding and fine-grinding, it is possible to start from unroasted nuts and oilseeds and obtain a product without the color and taste changes during the roasting process. The integration of the *MasterConch* into the *Zumba* line results in an energy saving process when roasting is not required, and an industrial solution for an unroasted nut butter of the highest quality.

- Start with up to 8 % moisture
- Final product with a moisture of 0.5 %, higher shelf life
- No roasting flavors, no color change
- Product temperature < 80°C
- Controlled drying process
- Fineness down to 20 µm in one pass operation, e.g. nut milk



STEP 1
Premilling with the *MasterCream*

STEP 2
Drying: The drying step is carried out with an integrated *MasterConch*

STEP 3
Fine grinding with *MasterRefiner*

Cocoa
Grinding & Pulverizing

Pre-Grinding of Cocoa Nibs
Beater Blade Mill *MasterNibs*

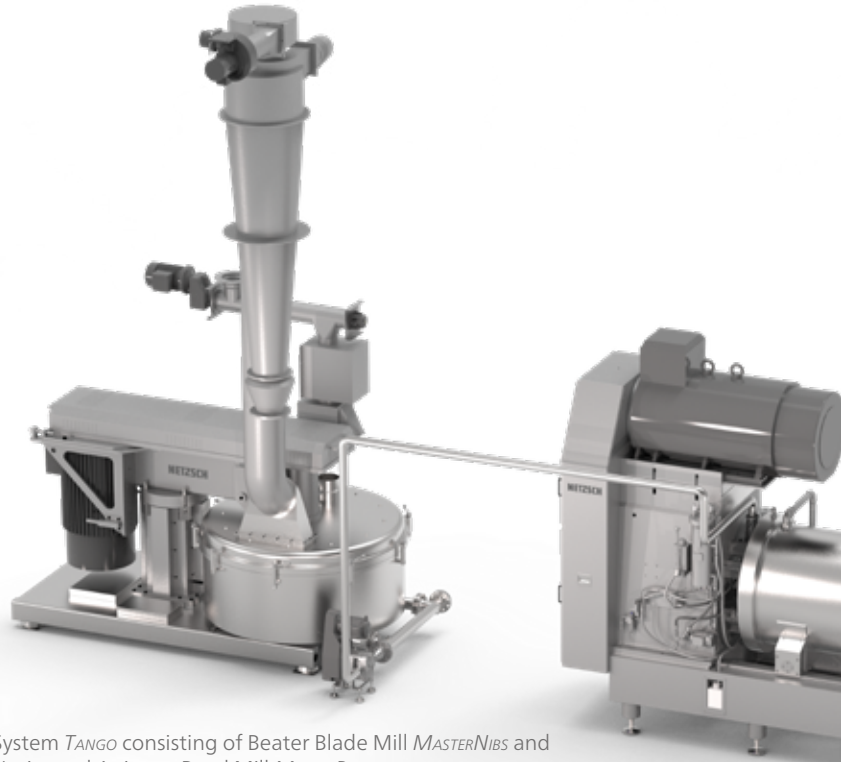
- The top-mounted drive allows better access to the tools and tank.
- The arrangement of the bearing facilitates better/more efficient cooling of the grinding chamber and lower process temperature.
- Quick exchange of beaters outside the grinding chamber
- Quick and easy cleaning of tank, grinding tools and screen.
- Easy removal of screen and exchange of grinding tools.

Plant	Consisting of	Throughput [kg/h]
Tango® 1000	*MasterNibs* 1000 + *MasterRefiner* 200	750 - 1 000
Tango® 2000	*MasterNibs* 2000 + *MasterRefiner* 500	1 500 - 2 000
Tango® 4000	*MasterNibs* 4000 + *MasterRefiner* 1000	3 000 - 4 000

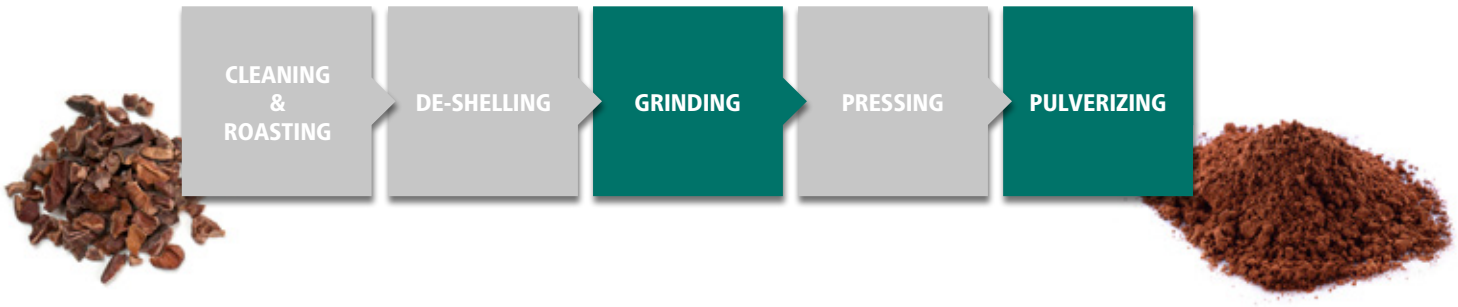
Throughput is influenced by the type of bean, shell content and desired fineness.

Fine-Grinding of Cocoa Liquor
Horizontal Agitator Bead Mill *MasterRefiner*

- Efficient single pass operation
- High throughput
- Small footprint
- Low energy consumption
- Use of smaller grinding beads achieves a finer product



System *Tango* consisting of Beater Blade Mill *MasterNibs* and Horizontal Agitator Bead Mill *MasterRefiner*



Pulverization of Cocoa Press Cake

The finely ground cocoa mass is separated into liquid cocoa butter and solid cocoa press cake in a chamber filter press. The cocoa butter is then filtered and either bottled in liquid form or poured into molds, while the compacted cocoa press cakes are broken up in roller crushers after which they are finely ground using dry-grinding to give cocoa powder. NETZSCH can offer various machine types for pulverizing the pre-crushed low fat or high fat cocoa press cakes depending on their fat content, feed temperature and desired final fineness.

Classifier Mill CSM

- High specific throughput capacities with low fat qualities (up to 12% fat content)
- Cooling of the intake air
- Final products with a defined upper particle size limit thanks to integrated air classifier.

Fluidized Bed Jet Mill CGS

- Reliable processing of high fat qualities (22% fat content) in low pressure operation
- Low wear
- Well-suited for products containing a large amount of cocoa shells

Fine Impact Mill *Condux*®

- Equipped with two counter-rotating pin discs as grinding tools
- Relative peripheral speeds of up to 250 ms^{-1}

Deagglomeration of Cocoa Press Cakes

Machine	Final Fineness d_{99}	Throughput [kg/h]
CSM 360	< 75 µm	1 000
CSM 560	< 75 µm	2 500
CSM 720	< 75 µm	4 400

Classifier Mill CSM 560

Compounds & Fillings
Compact & High-Efficient Plants

Dip coatings, icings, and fillings differ from chocolate primarily due to their higher fat content. The vegetable fats used play a key role in defining their properties: depending on temperature, they significantly influence taste, viscosity, texture, mouthfeel, aroma, and melting behavior

This higher fat content, combined with the use of alternative vegetable fats, results in a softer consistency, making both production and processing easier compared to chocolate. Processes such as selective tempering are no longer required, and thanks to the lower viscosity, time-consuming and cost-intensive dry and wet conching steps can be eliminated.

Our modular plant design allows each system to be precisely tailored to your specific requirements and easily adapted as needed. In addition to standard filling creams, spreads, and compounds, a wide range of specialty products can also be processed – including diet masses or chocolate variants with different types of sugar and additives.

All standard confectionery masses can be produced under full temperature control, ensuring consistent, reproducible product quality.

NETZSCH System *Salsa*®

Compound production at the highest level with System *Salsa*®

The *Salsa*® system offers a highly efficient and flexible solution for the production of fine confectionery masses. Compared to conventional systems, it stands out with significantly lower requirements for power, cooling water, and installation space, while also enabling shorter processing times.

At the core of the *Salsa*® line concept is a well-structured process: individual components are first homogenized in a mixing tank using a rapidly rotating dispersion tool that ensures continuous product circulation. The premix is then transferred to a heatable process tank before undergoing final fine grinding in *MasterRefiner* agitator bead mills.

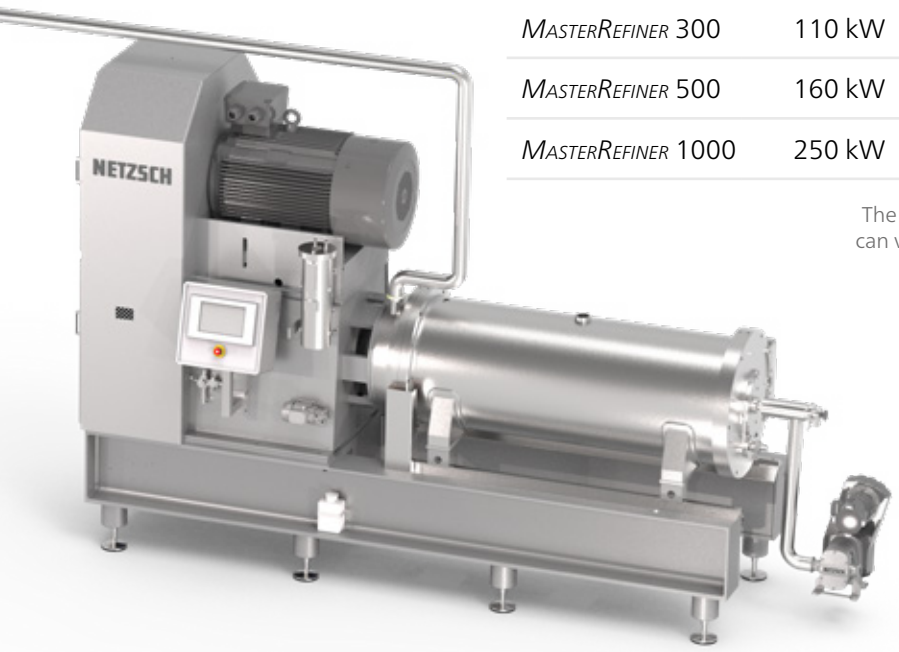
Thanks to its modular design, each plant can be precisely tailored to your specific production requirements and can be easily expanded at a later stage. Optional components, such as a feed station or a fat-melting system, can be seamlessly integrated into the process.

With the *Salsa*® system, you benefit from excellent reproducibility within a defined semi- or fully automated process. The intuitive, menu-guided control system – including precise temperature control – allows you to reliably achieve your desired product quality, with final fineness levels of less than 15 µm.

The production capacity of a plant depends on the size of the Agitator Bead Mill *MasterRefiner*. It also depends heavily on the initial fineness of the sugar used.

Mill type	Motor Power	Typical Throughput	Grinding Chamber Capacity
MasterRefiner 6	7.5 kW	20 - 60 kg/h	7 l
MasterRefiner 30	22 kW	100 - 300 kg/h	26 l
MasterRefiner 60	45 kW	200 - 600 kg/h	55 l
MasterRefiner 150	55 kW	300 - 1 000 kg/h	125 l
MasterRefiner 200	75 kW	500 - 1 500 kg/h	200 l
MasterRefiner 300	110 kW	700 - 2 100 kg/h	300 l
MasterRefiner 500	160 kW	1 000 - 3 000 kg/h	500 l
MasterRefiner 1000	250 kW	2 000 - 5 000 kg/h	1 000 l

The information stated here serves only as a guideline and can vary for technical reasons or due to product properties



Chocolate
Unbounded Flexibility

This modern, fully enclosed production concept enables all main equipment to operate simultaneously, reducing downtime, product losses and adjustment efforts when changing products. The innovative dry conching process with very low fat content allows faster flavor and rheology development while lowering energy consumption. During this step, unwanted acids are efficiently removed, resulting in a mild chocolate flavor.

Controlled aeration and precise temperature management ensure effective moisture reduction and optimal interaction of cocoa, sugar and milk components.

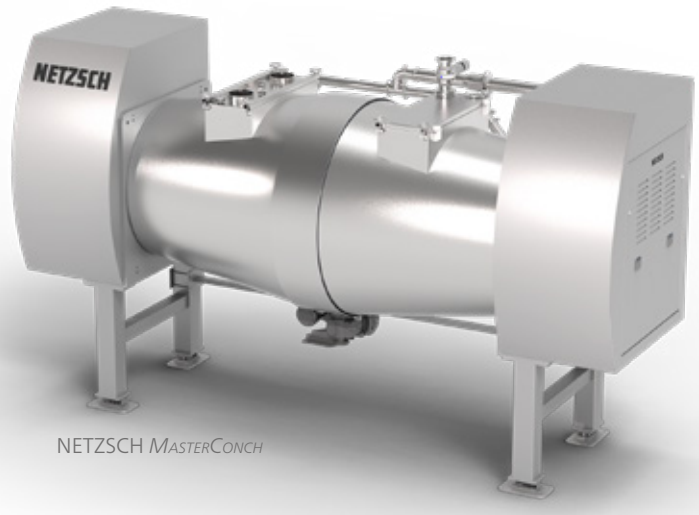
Overall, the process delivers consistent product quality without complex adjustments or energy-intensive mixing.

Improve the Efficiency of your Chocolate Production with *MasterConch*

NETZSCH *MasterConch* allows higher fill levels and improved mixing performance, resulting in more efficient chocolate processing. It can be almost completely emptied and cleaned in place, with an optimized air inlet design ensuring excellent cleanability and flexibility. Suitable for chocolate, compounds, fillings, spreads and coatings, it also handles rework drying. As a CIP-capable conch, it enables product changes in around 30 minutes with minimal loss and reduced cross-contamination.

Focus on Your Advantages

- High degree of product safety
- Completely closed system
- CIP capable
- High level of flexibility
- Space-saving
- Short processing times
- Low energy requirement
- Highest quality



NETZSCH *MasterConch*

Highly Efficient Chocolate Production with System *Rumba*®

NETZSCH System *Rumba*®

The *Rumba*® plant concept from NETZSCH-Feinmahltechnik GmbH is a complete process for the production of high-quality chocolate. From the basic ingredients cocoa mass, cocoa butter, sugar and perhaps milk powder, you can produce your own dark, milk or white chocolate. With very easy operation of the compact, closed *Rumba*® plant and batch sizes from 150 kg to 6000 kg per batch, you can develop recipes according to individual needs.

Compared to other systems for the production of chocolate- and confectionery masses, the system *Rumba*® is characterized by reduced requirements for energy, cooling water and space as well as considerably shortened processing times (dry conching within 3 - 4 hours), since the grinding and liquid-conching processes run simultaneously. The system *Rumba*® also allows you to save on cocoa butter/fats and/or lecithin.

Focus on Your Advantages

- Completely closed system
- Easy Cleaning
- Low energy consumption
- Short processing times
- Highest quality
- Space-saving
- Great flexibility

Rework
Efficient Processing of Rework

Pre-Cutting System *MasterCream*

The NETZSCH *MasterCream* is a versatile solution for efficient rework applications in the confectionery and bakery industry. Designed for both stand-alone operation and seamless integration into existing production lines, the machine enables manufacturers to reprocess off-spec products directly within their production environment.

Whether used as a single machine or as part of a continuous process, *MasterCream* ensures reliable, hygienic, and reproducible rework results. Its flexible configuration allows adaptation to different capacities, product types, and process requirements, helping to reduce waste, recover valuable ingredients, and maintain consistent product quality.

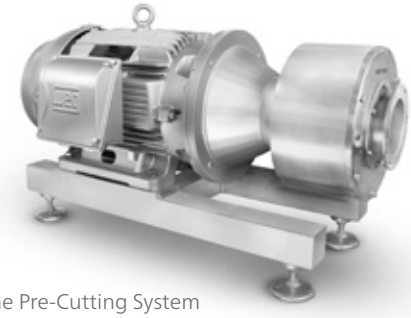
Rework of

- Chocolate products
- Pralines
- Chocolate bars
- Filled wafers
- Wafers
- Cookies
- Dragées

Product	Machine	Fineness [µm]
Rework of sugar-coated candies or pralines to paste	*MasterCream*	50 - 250

Rework products with a maximum size of up to 30 mm, such as pralines, bars, filled wafers, or sugar-coated candies with nuts, can be processed into a homogeneous, flowable paste.

In addition, wafer products and wafer rework can be finely ground to granules smaller than 1 mm, allowing for flexible reuse in downstream production steps.



Inline Pre-Cutting System *MasterCream* 20

Food Applications
Universal Machinery for flexible Food Production

Pre-Cutting System *MasterCream*

The *MasterCream* offers maximum flexibility in food production: it can be operated as a stand-alone machine or seamlessly integrated into existing production lines.

Pre-ground products are transported directly into a process tank for further processing. For short distances, no additional pump is required, simplifying plant design and reducing investment costs.

An integrated circulation cleaning system enables efficient self-cleaning using flushing liquids. This allows fast product changes and ensures high flexibility in daily production.

The combination of a pre-cutting unit with a horizontal agitator bead mill ensures efficient fine grinding and enables the production of high-quality, premium food products. Thanks to its compact, closed design and optimized grinding technology, the *MasterCream* achieves low processing temperatures while maintaining high throughput rates.

Pre-Cutting System *MasterCream* 10

Application Options

- Roasted Soybeans
- Meat for Sausage
- Pet food
- Sauces
- Spice pastes
- Vegetable pastes
- Baby food
- Beverages

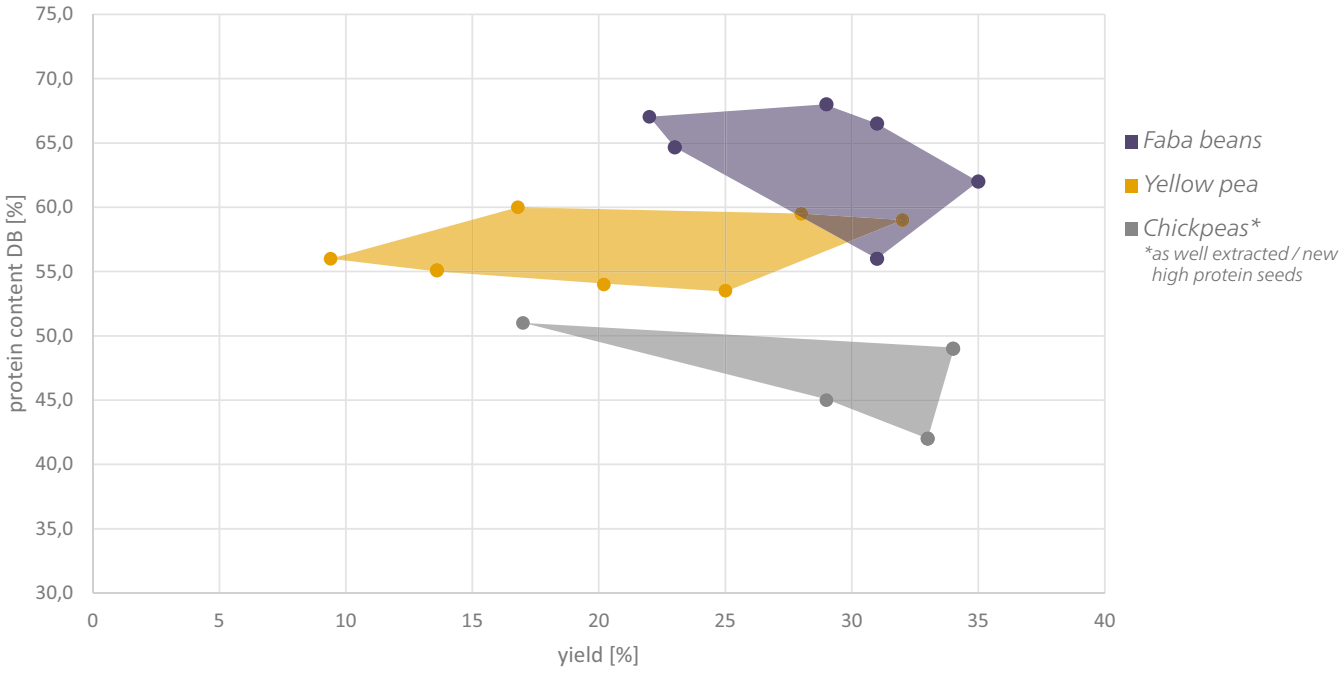
Processing example: frozen fruit and vegetable pieces, mustard garlic

Protein Shifting
via Dry Grinding & Classifying

Application for Legumes & Derivatives*
*e.g. from press or extraction processes

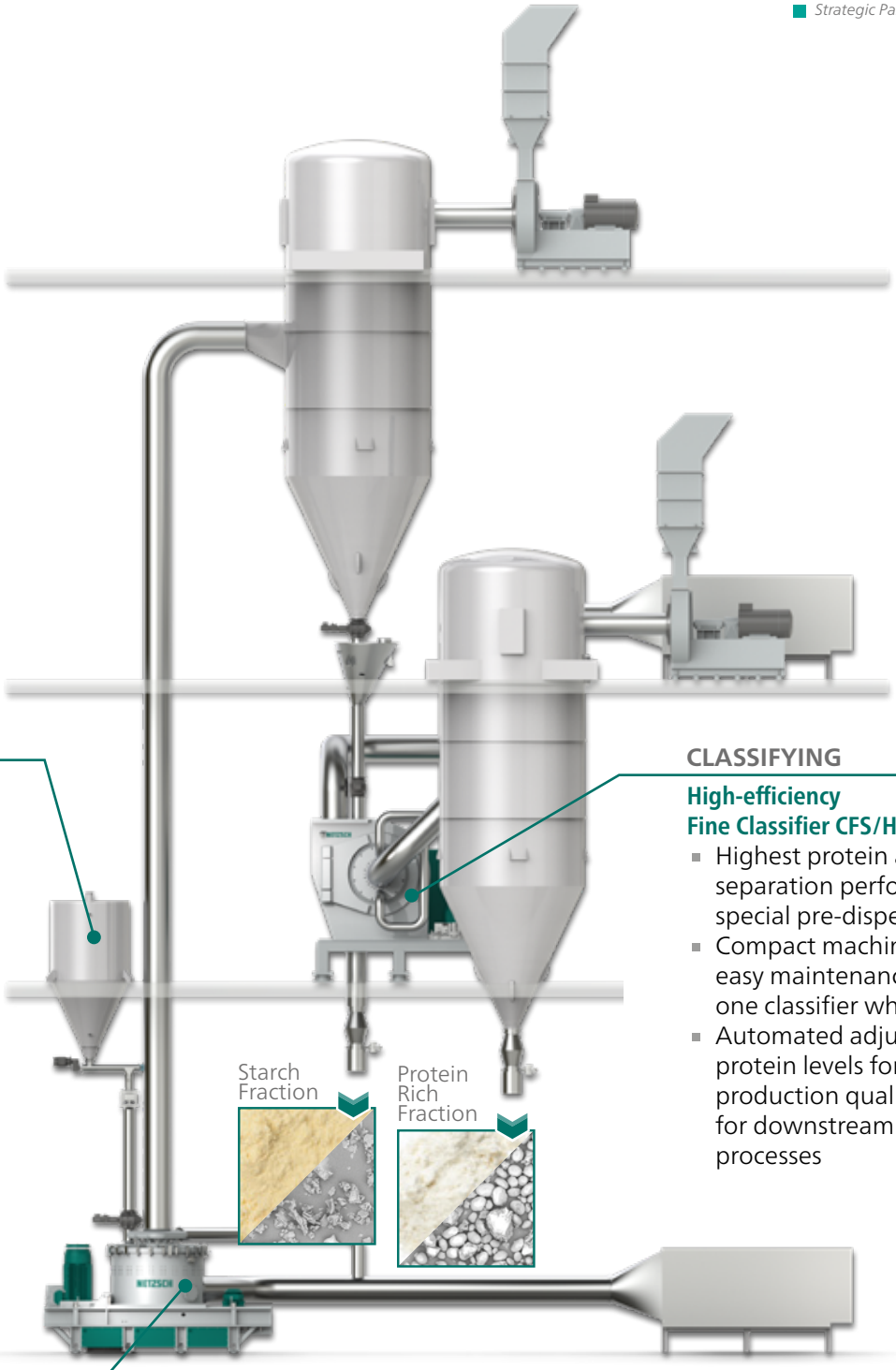
- Yield of protein fraction between 25 % - 50 %
- Protein concentration in 50 % - 75 %*
- Throughput up to 5 t/h

* Dependent on the feed product parameters
(i.e. moisture content, initial protein content, legume variety, etc.)



CLEANING | DEHULLING | FINE MILLING | CLASSIFYING | FLAVOR DEVELOPMENT | EXTRUSION

NETZSCH Equipment
Strategic Partnership



FEEDING

Dehulled Legumes

CLASSIFYING

High-efficiency Fine Classifier CFS/HD-S

- Highest protein and starch separation performance, with special pre-dispersion unit
- Compact machine design and easy maintenance with only one classifier wheel
- Automated adjustment of protein levels for constant production quality, e.g. for downstream extrusion processes

FINE MILLING

Fine Flour

Classifier Mill CSM

- Axial orientation of classifier wheel and grinding disc allows equal and efficient milling properties
- Automated hull release applicable for wear-reduced running operation

Special Flours
Grinding and Classifying with Higher Throughput Capacity

Special flours differ from normal flour, which consists solely of wheat, either due to their composition or their intended use. Powdery products with a special character are also included in the area of bakery products.

These can be either
- Micronized flours,
- Flours with particular finenesses with a steep particle size distribution,
- Specially dried flours and/or powders with a reduction of the residual moisture in the product to below 5 %,
- Flours or powders with an improved microbiological stability or
- Flours with modified protein structures.

Example of an Application: Protein Shifting in Wheat Flour

As well as dietary fiber, minerals and digestible carbohydrates, plant-based materials used for feeding humans or animals also contain proteins. The aim of the process of protein shifting is to gain a protein-rich fraction in which the amount of protein is considerably higher than in the original product by grinding and separating.

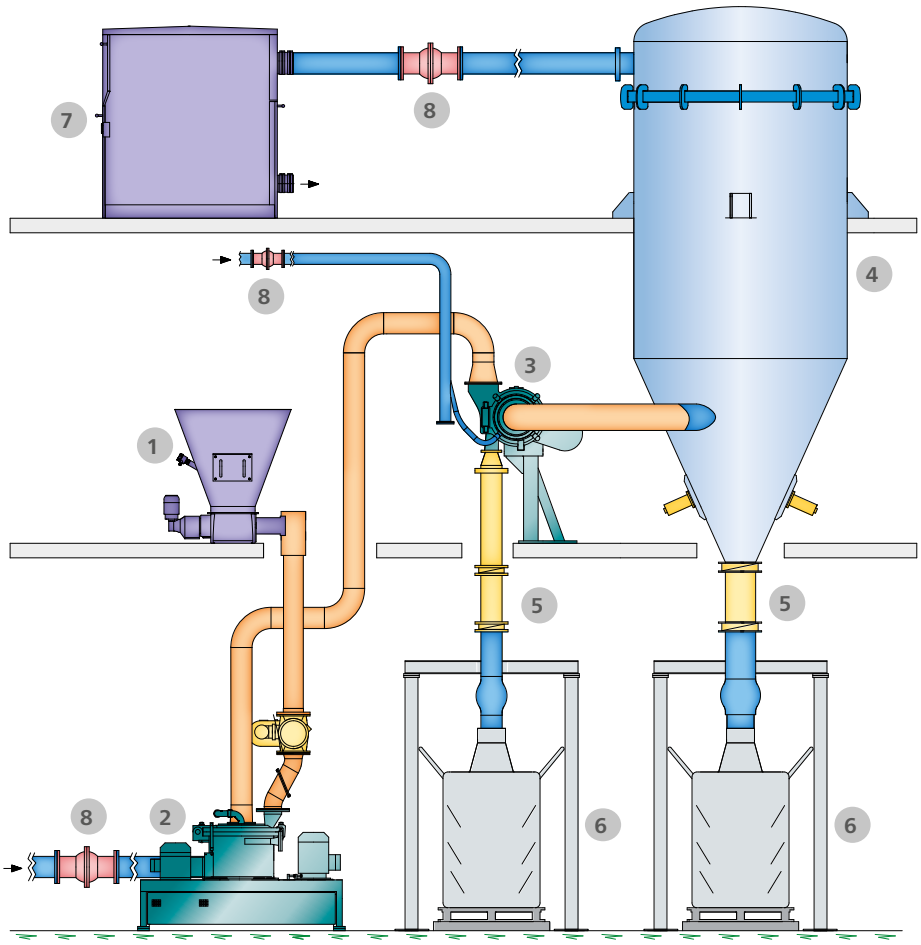
In this process the large difference between the size of the protein- and starch particles (starch: 30 µm to 40 µm, protein < 17 µm) is exploited, as well as the fact that starch can only be ground by means of dry impact grinding with a high energy input.

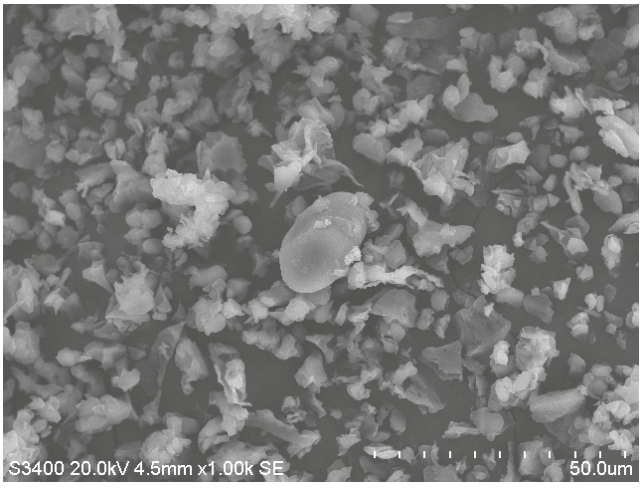
Using the NETZSCH Classifier Mill type CSM to fine-grind commercial wheat flour, protein- and starch particles in the flour are separated to a large degree. As the starch particles are difficult to grind due to their flexible structure, the protein particles are ground significantly more finely. By subsequent classifying with the NETZSCH Fine Classifier CFS or the NETZSCH High-efficiency Fine Classifier CFS/HD-S or the *InlineStar*, fractions with different protein- and starch contents can be obtained.

Focus on Your Advantages

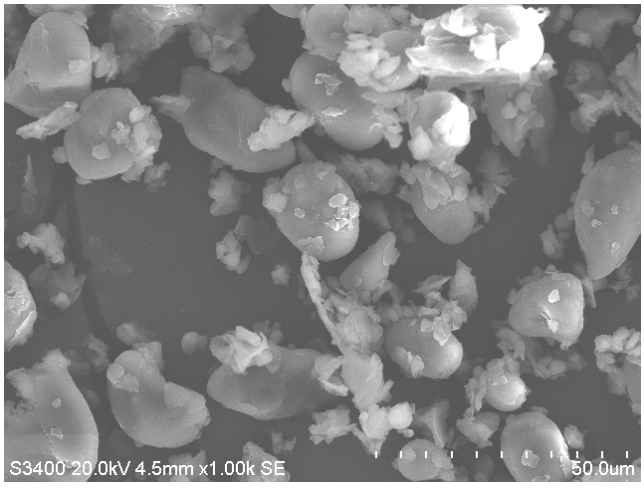
- High throughput capacities
- Gentle grinding with low heating of the product
- Grinding with conditioned air possible
- Higher amount of protein-rich fraction

1. Dosing unit
2. Classifier Mill CSM
3. High-performance Fine Classifier *InlineStar*
4. Dust filter
5. Double flap valve
6. Big-Bag
7. Blower
8. Explosion protection valve

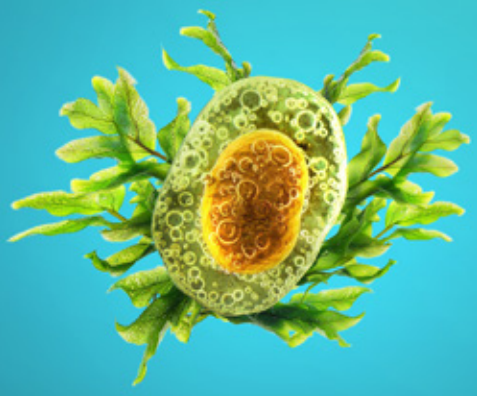




Fine fraction with high protein content



Coarse fraction with high amount of starch



Cell Disruption

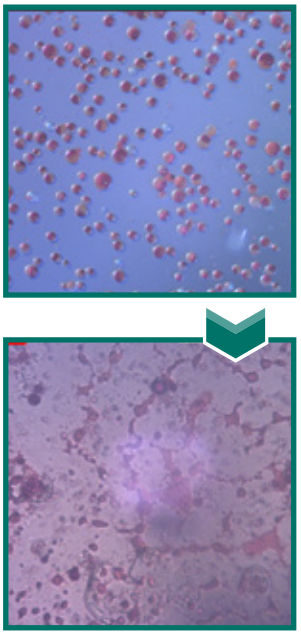
Product & Process Solutions for Algea & Yeast Cells

Cell disruption is a key process step in the production of food ingredients derived from algae, yeast and other microorganisms. The objective is to release valuable intracellular components such as proteins, pigments or lipids while maintaining their functional properties.

NETZSCH offers both wet and dry processing solutions tailored to the specific requirements of cell disruption, from gentle wet grinding to efficient dry micronization.

NETZSCH Advantages in Cell Disruption Process

- No product damage or denaturation
- High degree of cell wall disruption / protein release, but allowing good separation conditions in following processes
- Scalability for high throughout rates > 10 000 l/h
- Cleanability (compromise of wear-resistant materials and hygienic design)
- Efficiency
- Low processing temperatures preserves the proteins



Wet Processing for Cell Disruption

Maximum Cell Opening with Agitator Bead Mills

In wet processing, the disruption of cell structures is achieved by mechanical forces generated within a liquid suspension. This method enables efficient release of intracellular components while preserving sensitive substances.

Typical requirements:

- High degree of cell disruption and product release
- Gentle processing to avoid protein denaturation
- Controlled temperature conditions
- High throughput and scalability

With the *MasterRefiner* agitator bead mill, NETZSCH provides an efficient solution for cell disruption. The grinding energy is transferred via fine grinding media, ensuring intensive but controlled mechanical stress on the cells.

Agitator Bead Mill *MasterRefiner*

Dry Processing after Cell Disruption

Fine Grinding for Defined Particle Sizes with *ConJet*® High Density Bed Jet Mill

After drying, further processing often requires precise micronization to achieve defined particle sizes and improve product handling or functionality.

Typical requirements:

- Defined and reproducible particle size distribution
- Gentle grinding to preserve product quality
- Efficient processing of dried biomass

The *ConJet*® High Ddensity Bed Jet Mill enables ultra-fine grinding without mechanical stress and with minimal temperature increase. The integrated classifier wheel ensures a sharp upper particle size limit and consistent product quality.

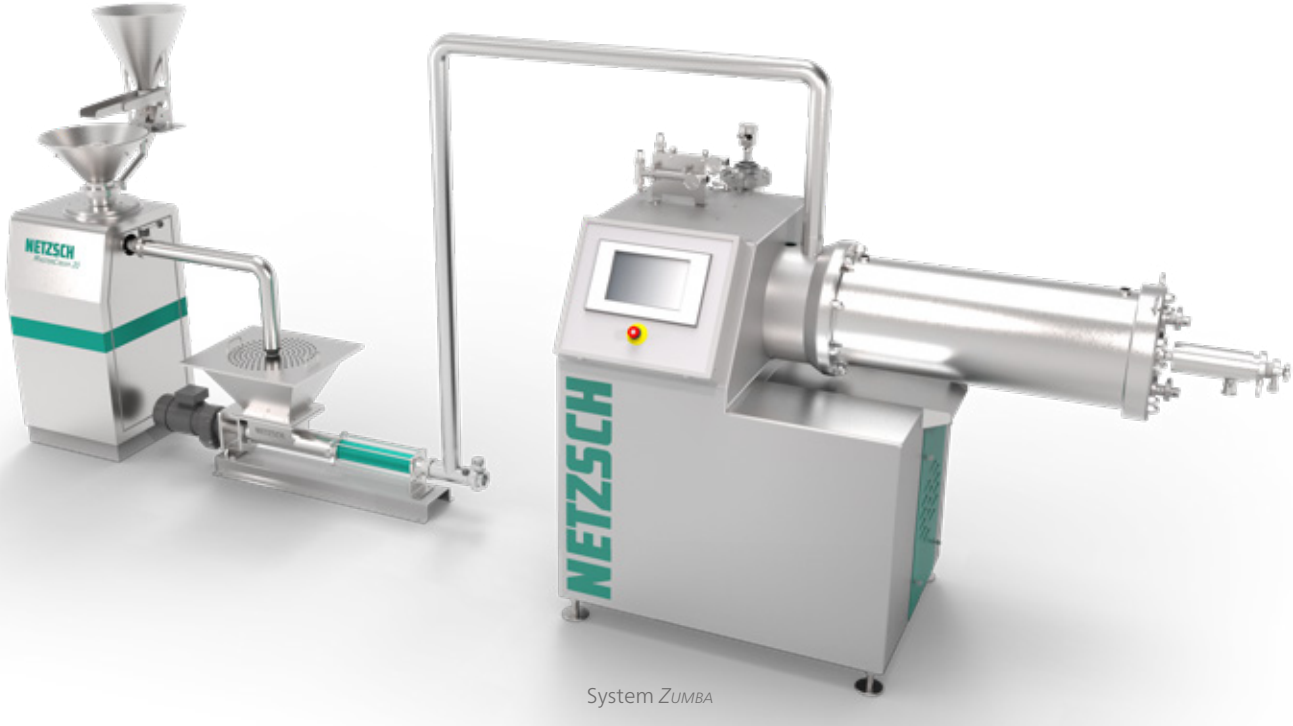
High Density Bed Jet Mill *ConJet*®

Insect Proteins

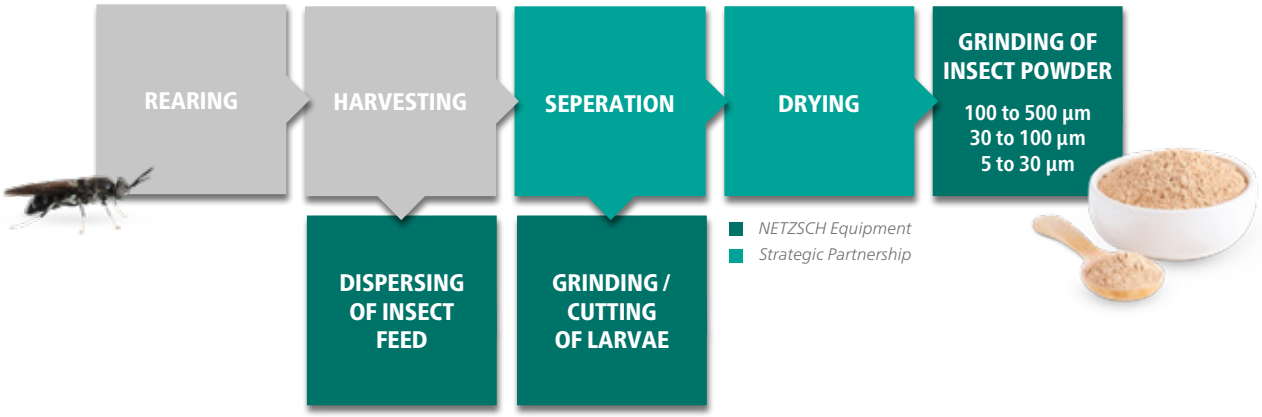
Product & Process Solutions for your Production

Wet Grinding Process with System *ZUMBA*

- Start with blanched or frozen larvae
- Feeding of whole insects or insect frass
- Low processing temperature below 40°C
- High throughput rates up to 8 t/h



System *ZUMBA*



Dry Grinding Process with Fine Impact Mill *Condux® Compact*

- Starting from insect powder
- Inlet fineness between 1 mm - 5 mm
- Moisture content up to 10 %
- Fineness between 10 µm - 500 µm possible

Fine Impact Mill *Condux®* 150 *Compact*

The owner-managed NETZSCH Group is a leading global technology company specializing in mechanical, plant and instrument engineering.

Under the management of Erich NETZSCH B.V. & Co. Holding KG, the company consists of the three business units Analyzing & Testing, Grinding & Dispersing and Pumps & Systems, which are geared towards specific industries and products. A worldwide sales and service network has guaranteed customer proximity and competent service since 1873.

Proven Excellence.

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

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NETZSCH Vakumix | Germany
NETZSCH Lohnmahltechnik | Germany
NETZSCH Feinmahltechnik Polska | Poland
NETZSCH Mastermix | Great Britain
NETZSCH Broyage | France
NETZSCH Macinazione & Dispersione | Italy
NETZSCH España | Spain
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NETZSCH India Grinding & Dispersing | India
NETZSCH Tula | Russia
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customer portal

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