

NETZSCH

Proven Excellence.



NETZSCH Laboratory Plants

Ultra-fine Grinding and Ultra-fine Classifying on a Laboratory Scale

Business Unit
GRINDING & DISPERSING

Ultra-fine Grinding and Ultra-fine Classifying on a Laboratory Scale



Fine mills and ultra-fine classifiers made by NETZSCH are synonymous with highest finenesses and an optimum degree of efficiency.

With corresponding laboratory machines, the proven technology can also be used to produce small quantities of product on a laboratory scale.

The Smallest, Complete Grinding Plant

Fine-Impact Mill *CONDUX*[®] 60

The laboratory plant *CONDUX*[®] 60 is the smallest, complete grinding plant by NETZSCH which includes control unit, feeding, ventilation and product drum. During its conception phase particular emphasis was placed on ergonomic design, good access and easy cleanability. Moreover, the plant is equipped with castors to render it mobile and can fit through any door thanks to its compact dimensions.

With the *CONDUX*[®] fine impact mill many different products with a Mohs hardness between 3 and 3.5 can be processed.

Depending on the characteristics of the product to be ground, the laboratory mill can be equipped with various grinding tools (pin discs, blast rotor, wing beater) and stators. This machine is suitable for a wide range of applications and is the ideal solution for initial feasibility studies and for the manufacturer of small amounts of product.

Your Advantages at a Glance

- Compact, mobile base frame with integrated switch cabinet
- Product can be fed into the machine by hand as the mill is installed at a comfortable working height
- Grinding tools can be changed rapidly avoiding long stoppages and providing greater flexibility
- Adjustable disc for easy removal of collecting drum
- Optimum cleanability for easy product change
- Operating voltage 230 V



Technical Data	<i>CONDUX</i> [®] 60 Grinding Plant
Air volume flow	15 - 120 m ³ h ⁻¹
Drive power	1.1 kW
Max. speed	30 000 min ⁻¹
Fineness d ₉₇ *	30 - 800 μm

*) based on limestone (density 2.7 kg/l)

LABCOMPACTPLUS

The Module Plant

The *LABCOMPACTPLUS* was especially designed for use in laboratories. The technology of production-size plants which has been channeled into the design of this product guarantees a stable and reproducible processing method.

Naturally the daily conditions of laboratory operation were taken into consideration during the plant construction. In addition to the actual machine, the plant comprises a very compact operating module including feeding, cyclone, filter, blower and electrical control unit which enables our customers to install this plant in a very small room.

The product is fed directly into the machine via a feeding screw and then processed. The fine product is separated out in a downstream high-efficiency cyclone and then collected in a product barrel. A downstream fully automatic dust filter then cleans the processing air.

The complete plant is mounted on one single base frame and is delivered completely installed. This means that commissioning can be carried out straight after delivery in the customer's lab!

The NETZSCH *LABCOMPACTPLUS* is available with the following machines, which can be easily exchanged:

- Fluidized Bed Jet Mill
CGS 10
- High-Density Bed Jet Mill
CONJET® 10
- Classifier Mill
CSM 50
- Ultra-Fine Classifier
CFS 5
- High-Efficiency Classifier
CFS 5 HD-S

Each machine is taken up by a swivel arm on the machine base and can be exchanged very easily using an individual connecting kit for each machine type.

Your Advantages at a Glance

- Quick and easy cleaning
- Optimum accessibility
- Efficient product separation
- Dust-free filling
- Compact installation, optimized machine base
- Low feed height
- Maximum individual weight of each component for cleaning and maintenance is < 5 kg
- Simple clear operation
- Setting of all process parameters via integrated operator panel
- Machine can easily be exchanged thanks to individual connecting set for each machine type (electricity and compressed air)
- *COMPACTPLUS CART* for easy exchange of machines (optional)

be creative



NETZSCH LABCOMPACTPLUS with Fluidized Bed Jet Mill CGS 10

LABPILOTPLANT

A Versatile System

The *LABPILOTPLANT* is particularly suitable for flexible use in a laboratory and/or for producing small quantities of sample material.

The compact plant comprises an operating module with feeding, cyclone, filter, blower and electrical control unit as well as several function modules for finest-grinding and classifying. The installation of this type of basis-operating module makes operating of a large variety of function modules and thus various types of machine possible. It is also possible to install two different machine modules together which can then be operated alternately.

There are no limits to your flexibility!

NETZSCH *SMARTREMOVAL*

The filter of the *LABPILOTPLANT* is equipped with the *SMARTREMOVAL* (patent-pending) filter hose exchange system newly developed by NETZSCH.

With this system, the same low residual dust content as that obtained with Top Removal filters can be achieved without their disadvantage, i.e. no additional installation height is required with *SMARTREMOVAL*.

NETZSCH *SMARTREMOVAL* requires the same amount of space as standard Side Removal systems. With this system, no tools are required for exchanging the filter hoses and their mounting is significantly quicker and very easy. For you this means that filter hose exchange times are reduced by up to 80 %!

With only one installation, the plant can be quickly adapted and adjusted via the individual process gas volume so that all the following machine modules can be used:

- Fluidized Bed Jet Mill
CGS 10
- High-Density Bed Jet Mill
CONJET® 10
- Classifier Mill
CSM 50
- Ultra-Fine Classifier
CFS 5
- High-Efficiency Classifier
CFS 5 HD-S

Your Advantages at a Glance

- Flexible use
- Very little time required for modification
- Optimum accessibility
- Easy and quick cleaning
- Efficient product separation
- Can be used with a cyclone
- Generously dimensioned filter door for comfortable access to raw gas chamber
- Filter hose exchange can be carried out quickly without the use of tools thanks to NETZSCH *SMARTREMOVAL* system
- Dust-free product filling process
- Easy and clear operation via operating panel in separate swivel arm
- Delivery with various machine modules
- Optional delivery also possible with wear protection

be flexible



NETZSCH *LabPilotPlant* with Fluidized Bed Jet Mill CGS 10 and High-Efficiency Classifier CFS 5 HD-S (as additional module)

PILOTPLANT

For the Production of Small Quantities

The NETZSCH *PILOTPLANT* is predestined for the production of small quantities. It can also be delivered in pressure shock resistant, gas-tight and wear protected execution in order to give more flexibility for meeting product requirements.

In contrast to the *LABPILOTPLANT*, with the NETZSCH *PILOTPLANT* various feeding units can be used – these can be optimally designed to suit the characteristics of the particular product.

The basic module of the *PILOTPLANT*, consisting of filter, cyclone, blower and switching plant, can be operated with the following machines:

- Fluidized Bed Jet Mill
CGS 16
- High-Density Bed Jet Mill
CONJET® 16
- Classifier Mill
CSM 80
- Ultra-Fine Classifier
CFS 8
- High-Efficiency Classifier
CFS 8 HD-S

NETZSCH *SMARTREMOVAL*

The filter in the *PILOTPLANT* is also equipped with the *SMARTREMOVAL* filter hose exchange system newly developed by NETZSCH:

You can find further information under
www.netzsch.com/smartremoval



Your Advantages at a Glance

- Flexible use
- Optimum accessibility
- Quick and easy cleaning
- Efficient product separation
- Can be used with a cyclone
- Generously dimensioned filter door for comfortable access to raw gas chamber
- Filter hose exchange can be carried out quickly without the use of tools thanks to NETZSCH *SMARTREMOVAL* system
- Dust-free product filling process
- Easy and clear operation via operating panel in separate swivel arm
- Delivery with various machine modules
- Module retrofitting can be carried out at a later date
- Various feeding units can be used
- Optional delivery also possible in pressure shock resistant, gas-tight and/or wear protected executions

be productive



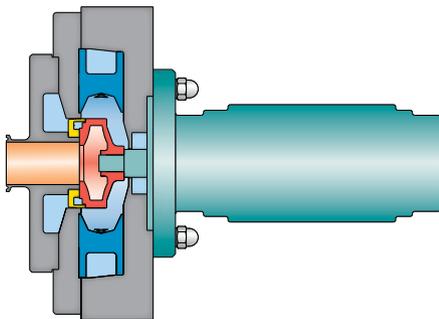
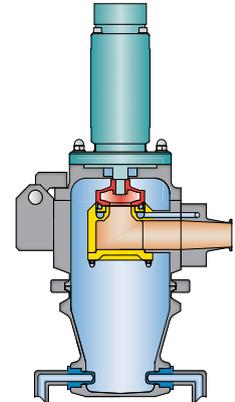
NETZSCH *PilotPlant* with Fluidized Bed Jet Mill CGS 16

The Machines

Custom-made to Suit Your Particular Application

Fluidized Bed Jet Mills CGS 10 and CGS 16

A jet mill with integrated dynamic air classifier for grinding even the hardest substances (up to a hardness of 10 according to Mohs). To give the desired final fineness the speed is set using the infinitely variable speed adjustment of the classifier wheel and by varying the amount of grinding gas.

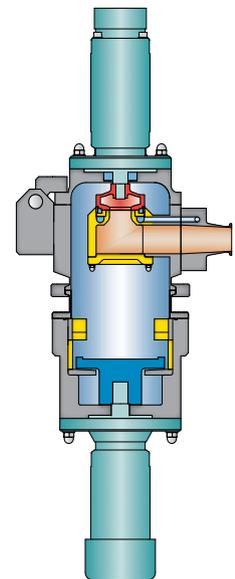


High-Density Bed Jet Mills CONJET® 10 and CONJET® 16

The CONJET® is the only laboratory-size spiral jet mill with integrated classifier. This mill combines the advantages of a classic spiral jet mill with a dynamic classifier wheel. Final products free of oversized particles and with a steep particle size distribution are produced using a fineness adjustment which is independent of the product load. Grinding is carried out without the build-up of product deposits which ensures very easy cleaning.

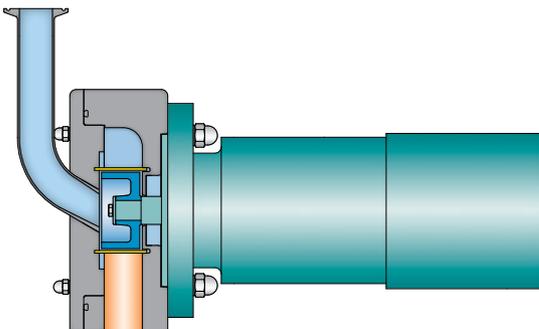
Classifier Mills CSM 50 and CSM 80

Impact grinding with integrated classifying: Grinding takes place between a peripheral grinding track and the beaters. The impacted product particles are transported into the upper part of the machine by the conveyed classifying air and offered to the speed regulated classifier wheel. This then allows only those fine particles through which correspond to the conditions set (classifier speed, air volume).



Fine Impact Mill CONDUX® 60

During the new development of the CONDUX® 60 impact mill a great deal of emphasis was placed on a high degree of cleanability. The mill can be fitted with blower rotor, wing beater, pin discs, grinding- and screen baskets respectively depending on requirements. Thus, it covers a very wide range for the grinding of a large number of different products with a Mohs hardness of up to 3 - 3.5.



Machines for the *LABCOMPACTPLUS* and *LABPILOTPLANT*

Technical Data		CGS 10	CONJET® 10	CSM 50	CFS 5	CFS 5 HD-S
Air volume flow	m ³ h ⁻¹	50 - 75*	50 - 75*	50 - 70	50 - 70	50 - 70
Drive power	kW	0.55	0.55	0.55 + 1.5	0.55	0.55
Max. speed	min ⁻¹	18 000	18 000	18 000/15 000	18 000	18 000
Fineness d ₉₇ **	µm	2.5 - 120	2.5 - 120	30 - 800	20 - 150	2.5 - 100

Machines for the *PILOTPLANT*

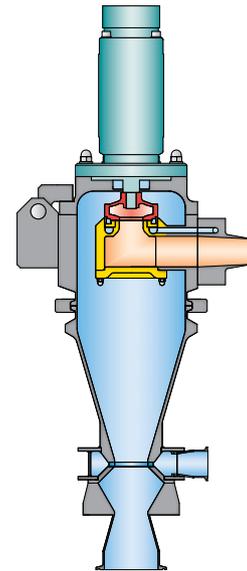
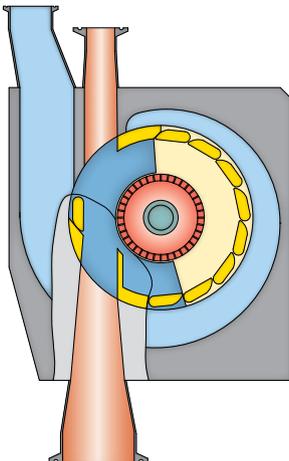
Technical Data		CGS 16	CONJET® 16	CSM 80	CFS 8	CFS 8 HD-S
Air volume flow	m ³ h ⁻¹	90 - 135*	90 - 135*	120 - 180	80 - 105	80 - 105
Drive power	kW	1.5	1.5	1.5 + 2.2	1.5	1.5
Max. speed	min ⁻¹	12 000	12 000	12 000/12 000	12 000	12 000
Fineness d ₉₇ **	µm	2.5 - 120	2.5 - 120	30 - 800	20 - 150	2.5 - 100

*) 7 bar (abs.) and 20°C

**) based on limestone (density 2.7 kg/l)

Ultra-fine Classifiers CFS 5 and CFS 8

This is an air classifier for classifying fine powders in a medium fineness range. The product separation into two fractions (fine- and coarse product) is carried out by a carrier gas and a rotating classifier wheel. The setting of the desired separation limits is carried out via the infinitely variable speed adjustment of the classifier. Good accessibility for cleaning purposes is guaranteed.



High-Efficiency Fine Classifiers CFS 5 HD-S and CFS 8 HD-S

This classifier is used when the required separation limits are extremely fine. Such fine separation cuts are made possible by the optimum dispersing of the feed product via the integrated guide vane basket. CFS/HD-S high-efficiency fine classifiers are characterized by an extremely high degree of separation and with this an improved fines extraction.

Laboratory-Steam Jet Mill *s-JET*® 25

Ultra-fine Dry-grinding down to the Submicron



NETZSCH Laboratory-Steam Jet Mill *s-JET*® 25 – complete plant including steam generation unit

Examples of Products	Feed fineness d_{99} [μm]	Final fineness d_{50} [μm]
Al_2O_3	16	0.57
LiFePO_4	2	0.43
Precipitated silica	2.5	0.22

be innovative

micron Range

The *s-JET*[®] 25 is the smallest laboratory unit of the *s-JET*[®] Steam Jet Mill series.

The *s-JET*[®] process, which was developed and patented by NETZSCH to produce nanoscale particles using superheated and thus absolutely dry steam as a grinding medium, has already proved itself successfully and is still opening up new and interesting fields of application for this technology. With the *s-JET*[®] 25 compact plant it is possible to produce submicron particles on a laboratory scale by dry-grinding.

During the development phase of the *s-JET*[®] 25 particular emphasis was placed on obtaining a system for the production of smallest quantities and product samples. Ergonomic design, easy cleaning as well as the condensation of the exhaust steam vapor generated during the process make a flexible installation of the system possible.

The laboratory plant constructed as a Skid-system includes all the necessary components such as feeding, mill, product separation, control unit, fittings as well as steam generator mounted together on one base frame. The space required for the installation of the complete steam grinding plant is only 3 m² with a maximum required height of 2450 mm. All product-contacted parts as well as the assembly table are made of stainless steel.

The plant is delivered completely mounted and ready for operation. Central connection points for compressed air and electricity as well as water in- and outlets mean that the time required for installation- and commissioning is very short.

Technical Data	<i>s-JET</i> [®] 25
Steam mass flow*	25 kg/h
Steam pressure	up to 10 bar (g)
Temperature	300°C
Fineness d ₅₀ **	0.1 µm - 50 µm

* based on a steam pressure of 11 bar

** based on aluminum oxide

Your Advantages at a Glance

- Grinding finenesses < 130 nm (d₅₀)
- Development of new products and applications
- Deposit-building products can be processed
- Steep particle size distributions
- Small specimen quantities possible
- Installation possibilities are varied
- Ergonomic design
- Easy cleaning
- Product feeding via gravimetric feeding and injector system
- Compact system installed on a skid
- Integrated control unit for automatic operating mode guarantees a high degree of safety and reproducibility

Control System

Easy and Comfortable

When the control unit for the NETZSCH laboratory plants was being designed, care was taken to ensure that its operation would be simple and clear. Thanks to the display, monitoring and regulating of all important process parameters, the control unit is highly flexible and therefore the safety of the process is guaranteed. All the important plant parameters such as grinding gas pressure, gap rinsing air, process gas volumes and speeds are automatically monitored and regulated by set-point setting.

This guarantees the reproducibility of the grinding- and classifier results!

NETZSCH-*CONNECT*

Monitoring and Remote Service System

The linkage of the laboratory plant to the NETZSCH-*CONNECT* system makes it possible to record and store various process data. These are recorded continuously, pre-processed and encrypted via a VPN-network as an XML-file and then transferred to a central server, which is installed on an external provider. The data can be viewed, analyzed and exported via a web application using the corresponding access rights. In this way, the NETZSCH-*CONNECT* user can conveniently compare and analyze various series of tests.



Technical Data

	<i>CONDUX® 60 Grinding Plant</i>	<i>LABCOMPACTPLUS</i>
Machine Operation	<i>CONDUX®</i>	CGS, <i>CONJET®</i> , CSM, CFS, CFS/HD-S
	Only one machine	Only one machine, easily exchangeable
Control system Siemens S7-300	Without	
Operating panel	Danfoss operating unit	7" widescreen
NETZSCH-CONNECT	---	optional
Feeding	Vibration channel	Double screw
Storage tank	3,5 l	4,5 l
Cyclone separator	---	Hand flap and collecting drum 10 l
Bypass	---	Yes
Filter	Aspiration filter	Cartridge filter
Filter change	---	Top Removal
Filter area	---	1,6 m ²
Product discharge	Collecting drum 5 l	Hand flap and collecting drum 10 l
Barrel change filter	In standstill	During operation
Piping		
Material	Stainless steel	Stainless steel
Other		
Mode of operation	Laboratory operation	Laboratory operation
Amount of material	Small sample quantities	Small sample quantities
Size and weight		
Width (A) [mm]	745	1 270 - 1 400*
Height (B) [mm]	1 775	1 775
Depth [mm]	860	900
Weight (approx.) [kg]	250	600

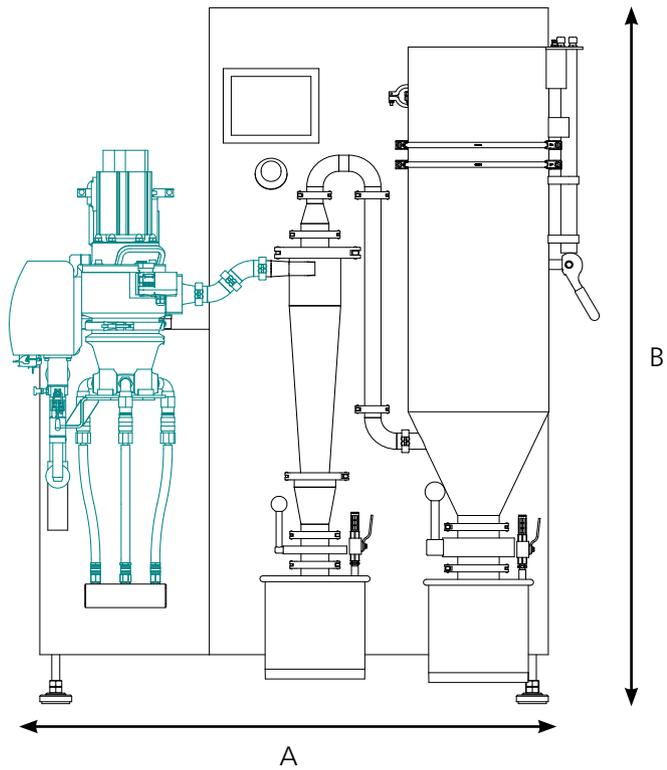
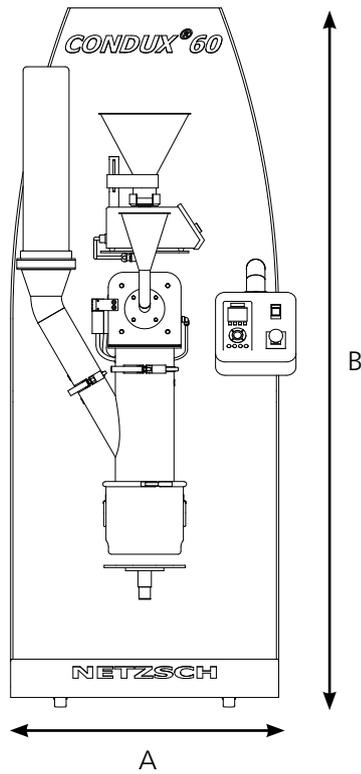
* depending on type of machine; ** with additional module

<i>LABPILOTPLANT</i>	<i>PILOTPLANT</i>	<i>s-JET® 25</i>
CGS, <i>CONJET®</i> , CSM, CFS, CFS/HD-S	CGS, <i>CONJET®</i> , CSM, CFS, CFS/HD-S	<i>s-JET®</i>
Optional with a second machine module for alternate operation	Optional with a second machine module for alternate operation	Only one machine
7" widescreen optional	9" widescreen optional	15" widescreen Yes
Double screw 10 l	Single screw 50 l	Double screw 4,5 l
Hand flap and collecting drum 20 l	Hand flap and collecting drum 50 l	---
Yes	Yes	---
Hose filter	Hose filter	Hose filter
NETZSCH <i>SMARTREMOVAL</i> 2 m ²	NETZSCH <i>SMARTREMOVAL</i> 3 m ²	Top Removal 2 m ²
Hand flap and collecting drum 25 l	Hand flap and collecting drum 50 l	Hand flap and collecting drum 10 l
During operation	During operation	During operation
PU (flexible) / Stainless steel / Ceramic	PU (flexible) / Stainless steel / Ceramic	Stainless steel / Ceramic
Continuous operation	Continuous operation	Continuous operation
Small test specimen quantities	Small production quantities	Small production quantities
1 700 - 2 500**	2 500 - 3 600**	3 000
2 150	2 100 - 2 600 (According to execution)	2 000
800	1 200	1 100
900 - 1 000	1 400 - 1 700	1 900

CONDUX® 60 Grinding Plant

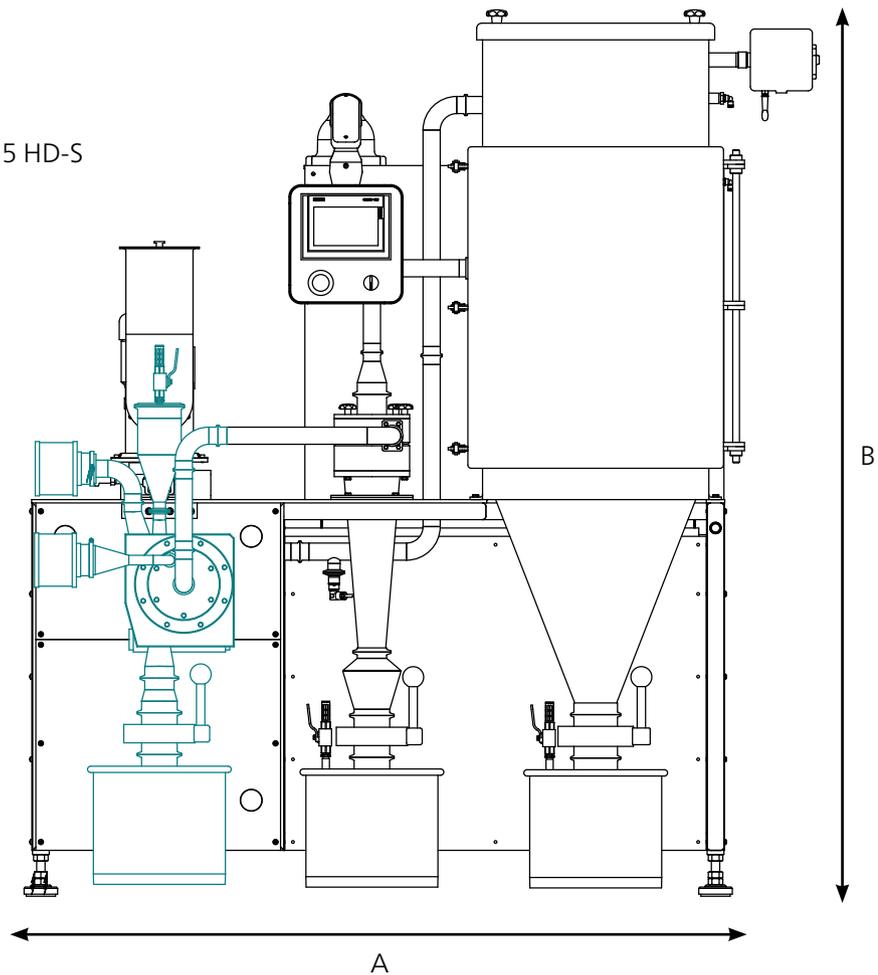
LABCOMPACTPLUS

Execution with Fluidized Bed Jet Mill CGS 10



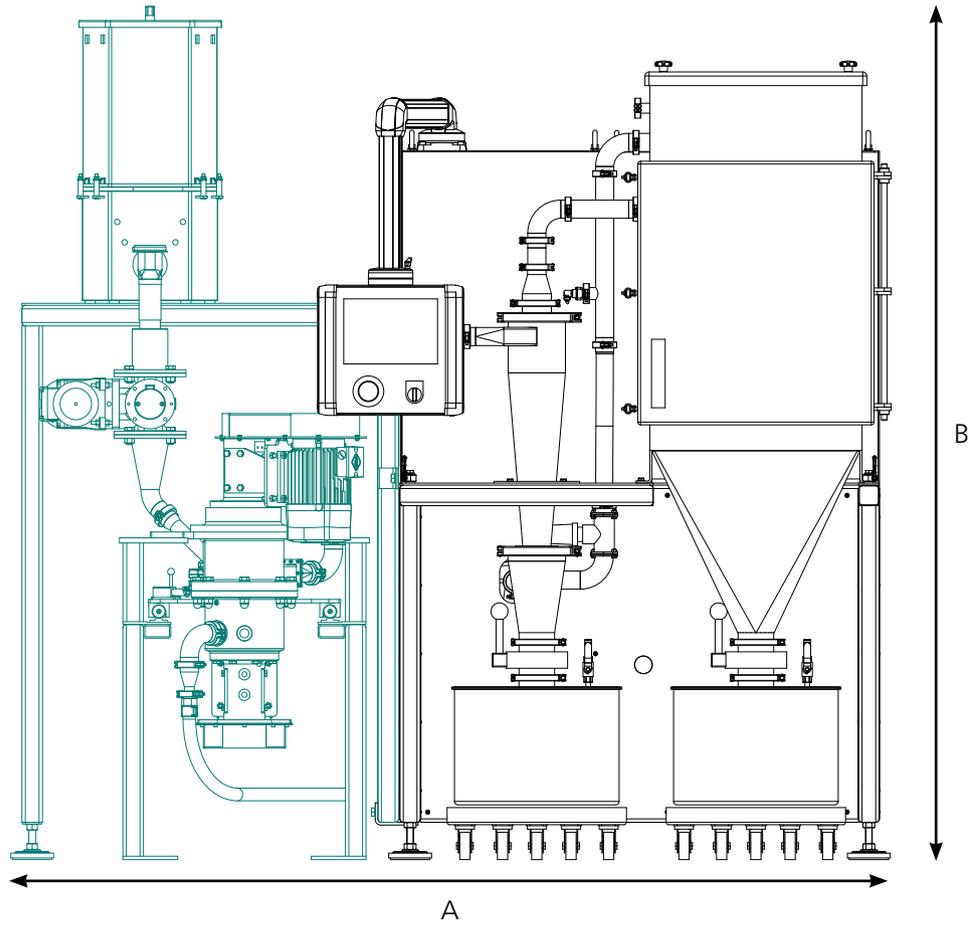
LABPILOTPLANT

Execution with High-Efficiency Classifier CFS 5 HD-S

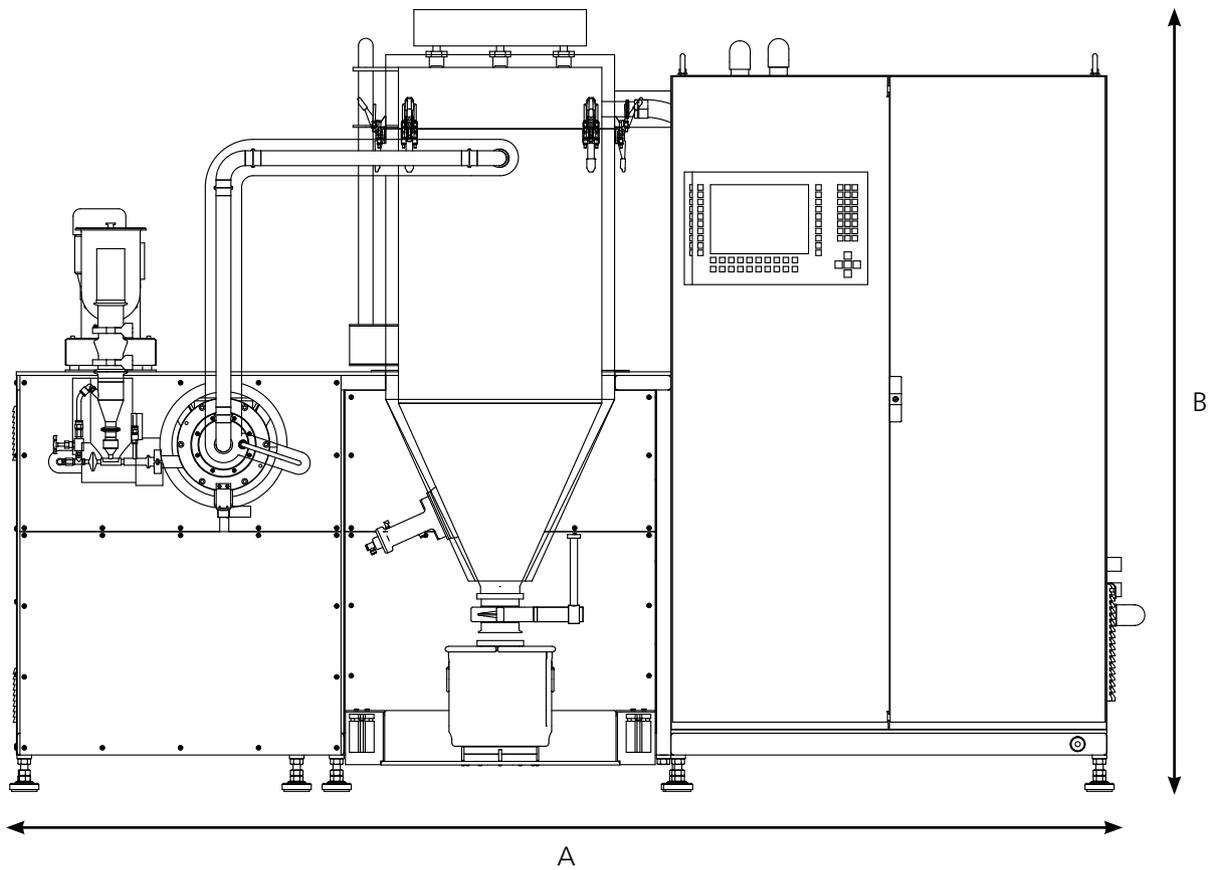


PILOTPLANT

Execution with
Classifier Mill CSM 80



Laboratory-Steam Jet Mill *s-JET*® 25



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

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Selb, Germany

NETZSCH Trockenmahltechnik GmbH
Hanau, Germany

NETZSCH Vakumix GmbH
Weyhe-Dreye, Germany

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The NETZSCH Group is a mid-sized, family-owned German company engaging in the manufacture of machinery and instrumentation with worldwide production, sales, and service branches.

The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 3,500 employees at 210 sales and production centers in 35 countries across the globe guarantee that expert service is never far from our customers.

NETZSCH Trockenmahltechnik GmbH
Rodenbacher Chaussee 1
63457 Hanau
Germany
Tel.: +49 6181 506 01
Fax: +49 6181 571 270
info.ntt@netsch.com

NETZSCH®

www.netsch.com