NETZSCH

Proven Excellence.

NETZSCH Laboratory Plants

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

Business Unit
GRINDING & DISPERSING

ULTRA-FINE GRINDING & 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.

Fine-Impact Mill *Condux*® 60

The Smallest, Complete Grinding Plant

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	*Condux*® 60 Grinding Plant
Air volume flow	15 - 120 m^3h^{-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 and *m-Jet* 10
- Classifier Mill CSM 50
- Ultra-Fine Classifier CFS 5
- High-Efficiency Fine Classifier CFS 5/HD-S and *m-Class* 5

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)

NETZSCH *LabCompactPlus* with Fluidized Bed Jet Mill CGS 10

LabCompactPlus

Safe – compact – pressure shock-resistant

With the new LabCompactPlus in pressure shock-resistant design, NETZSCH offers a laboratory system that meets the highest safety requirements – without compromising on ease of use and flexibility.

This version is designed for products with a maximum explosion pressure of 10 bar and is certified as a unit with an integrated protection system by a notified body. This enables the ultra-fine grinding of organic, potentially explosive products without inerting with nitrogen. Perfect for R&D laboratories, pilot plants, and anyone who wants to combine safety and efficiency.

The proven advantages of the LabCompactPlus remain unchanged: compact design, easy cleaning, intuitive operation, and quick machine changeover via the modular plug-in system. Whether CGS, ConJet®, CSM, or CFS/HD-S – in just a few simple steps, the LabCompactPlus becomes the perfect system for your application.

Your Advantages at a Glance

- Pressure shock resistant up to 10 bar
- No nitrogen required: safe operation even with explosive dusts and low operating costs
- Compact pilot plant with proven concept
- Flexible and easy machine changeover for a wide range of applications
- Ideal for new challenges in food, chemical, additive manufacturing, and many other applications

The following machines are available for NETZSCH LabCompactPlus in pressure shock-resistant design:

- Fluidized Bed Jet Mill CGS 10
- High-Density Bed Jet Mill ConJet® 10 and m-Jet 10
- Classifier Mill CSM 50
- High-Efficiency Fine Classifier CFS 5/HD-S and m-Class 5

Typical areas of application for LabCompactPlus in pressure shock-resistant design:

- Alternative proteins (protein shifting of e.g. beans, peas, lentils, etc.)
- Food additives
- Food colorants
- Organic pigments
- Carbon black
- Polymers for 3D printing
- Pesticides
- ...

NETZSCH *LabCompactPlus* in pressure shock-resistant design with
High-Efficiency Fine Classifier CFS 5/HD-S

LabPilot
A Versatile System

The *LabPilot* 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!

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 and *m-Jet* 10
- Classifier Mill CSM 50
- Ultra-Fine Classifier CFS 5
- High-Efficiency Fine Classifier CFS 5/HD-S and *m-Class* 5

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
- 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

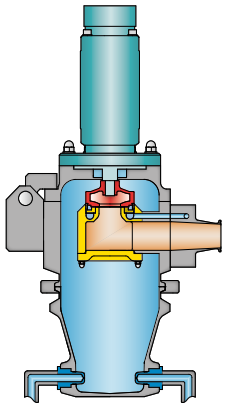
NETZSCH *LabPilot* with Fluidized Bed Jet Mill CGS 10

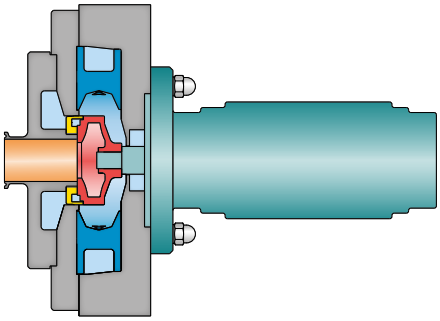
NETZSCH *LabPilot* with High-Density Bed Jet Mill *ConJet*® 10 and High-Efficiency Fine Classifier CFS 5/HD-S

Custom-made to Suit Your Particular Application

Fluidized Bed Jet Mill CGS 10

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.



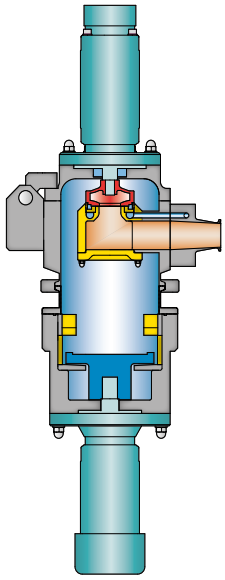


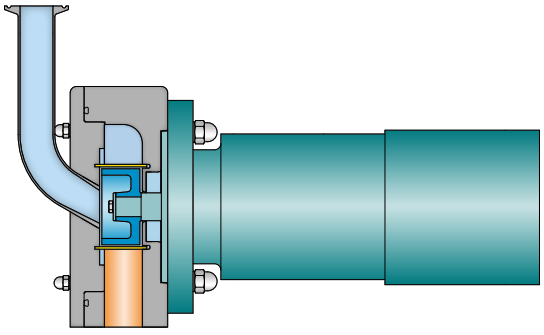
High-Density Bed Jet Mill *ConJet*® 10

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 Mill CSM 50

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).



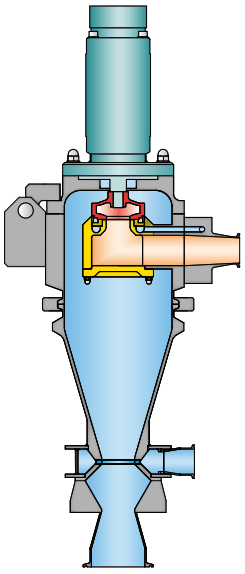


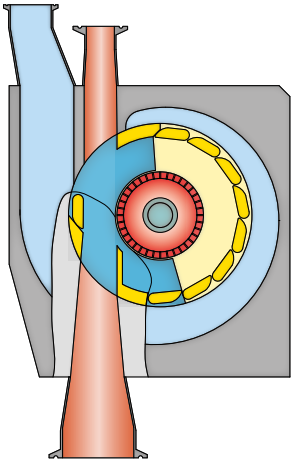
Fine Impact Mill *Condux*® 60

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.

Ultra-fine Classifier CFS 5

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 Classifier CFS 5/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.

Machines for *LabCompactPlus* and *LabPilot*

Technical Data		CGS 10	*ConJet*® 10 & *m-Jet* 10	CSM 50	CFS 5	CFS 5/HD-S & *m-Class* 5
Air volume flow	m^3h^{-1}	50 - 75*	50 - 75*	50 - 70	25 - 65	25 - 65
Drive power	kW	0.55	0.55	0.55 + 1.5	0.55	0.55
Max. speed	min^{-1}	18000	18000	18000 / 15000	18000	18000
Fineness d_{97}**	µm	2.5 - 120	2.5 - 120	30 - 800	3.5 - 200	2.5 - 100

*) under laboratory conditions: 1.01325 bar and 20°C (= normal conditions)
**) based on limestone (density 2.7 kg/l)

Laboratory-Steam Jet Mill *s-Jet*® 25

Ultra-fine Dry-grinding down to the Submicron Range

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

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 and easy cleaning 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 m^2 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	***s-Jet*® 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

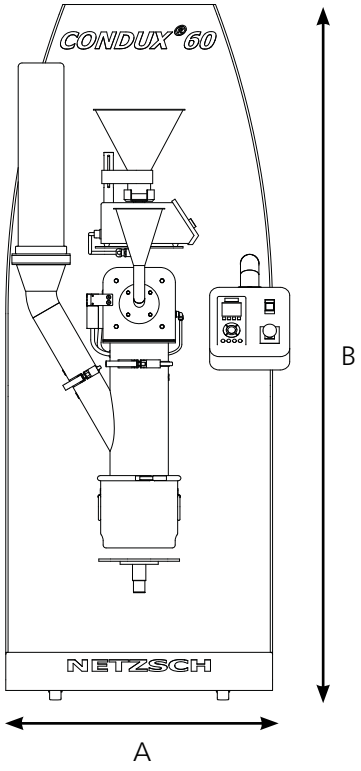
- Grinding finenesses < 130 nm (d_{50})
- Development of new products and applications
- Deposit-building products can be processed
- Steep particle size distributions
- Small specimen quantities possible
- Installation possibilities are varied
- Ergonomic design
- Easy cleaning
- Product feeding via 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

Technical Data at a Glance

	CONDUX® 60 Grinding Plant	LABCOMPACTPLUS	S-JET® 25
Machine Operation	CONDUX®	CGS, CONJET®, M-JET, CSM, CFS, CFS/HD-S, M-CLASS	S-JET®
	Only one machine	Only one machine, easily exchangeable	Only one machine
Control system Siemens S7-1500	Without		
Operating panel	Danfoss operating unit	10'' widescreen	15'' widescreen
Feeding	Vibration channel	Double screw	Double screw
Storage tank	3.5 l	4.5 l / 6 l / 11 l / 26 l	4.5 l
Cyclone separator	---	Hand flap and collecting drum 10 l	---
Bypass	---	Yes	---
Filter	Aspiration filter	Cartridge filter	Hose filter
Filter change	---	Top Removal	Top Removal
Filter area	---	1.6 m^2	2 m^2
Product discharge	Collecting drum 5 l	Hand flap and 5 l funnel can for nitrogen and 10 l collecting drum for air	Hand flap and collecting drum 10 l
Barrel change filter	In standstill	During operation	During operation
Piping			
Material	Stainless steel	Stainless steel	Stainless steel / Ceramic
Other			
Mode of operation	Laboratory operation	Laboratory operation	Continuous operation
Amount of material	Small sample quantities	Small sample quantities	Small production quantities
Size and weight			
Width (A) [mm]	745	1 270 - 1 400*	3 000
Height (B) [mm]	1 775	1 775	2 000
Depth [mm]	860	900	1 100
Weight (approx.) [kg]	250	600	1 900

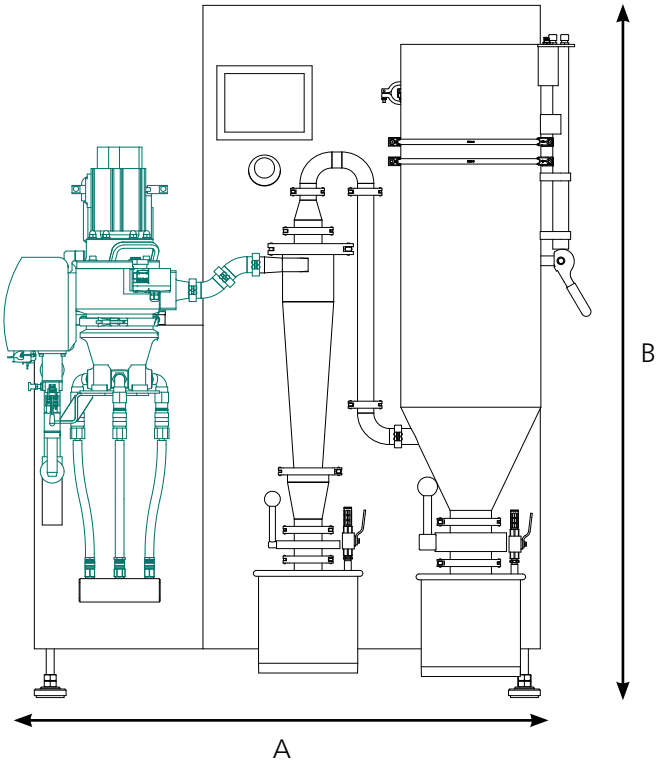
* depending on type of machine

CONDUX® 60 Grinding Plant

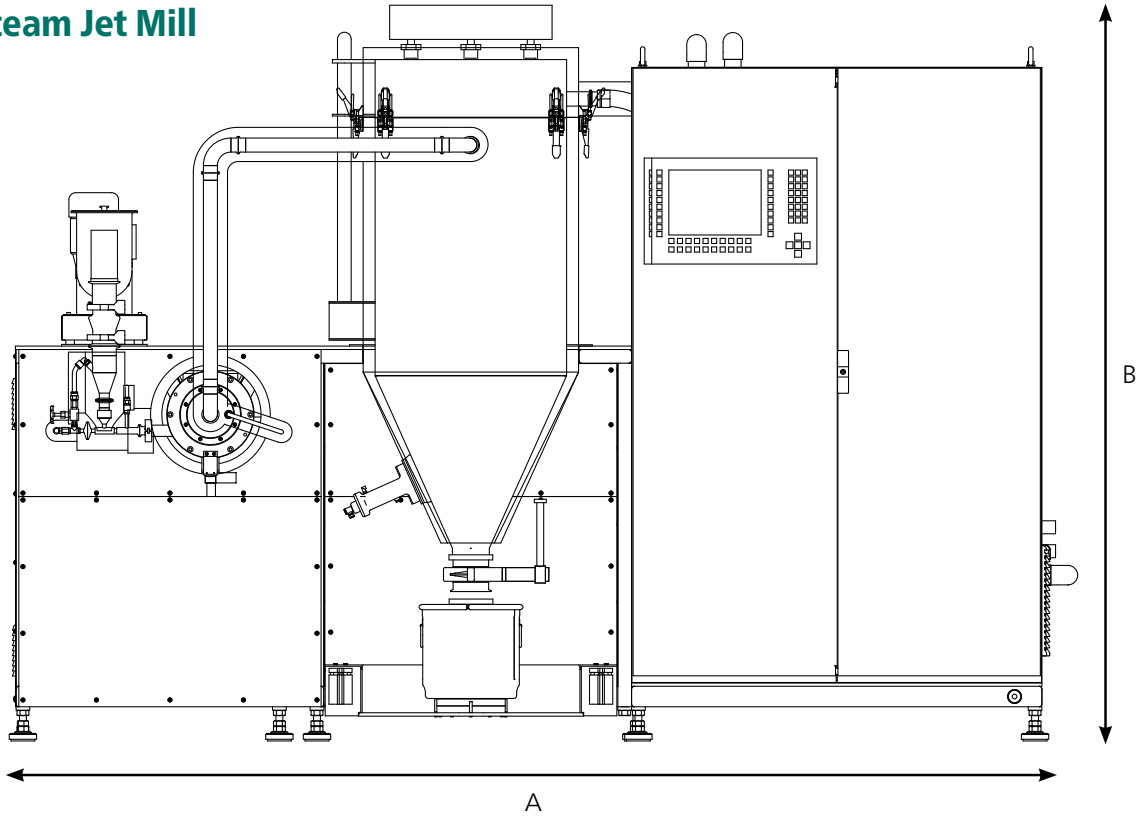


LABCOMPACTPLUS

Execution with Fluidized Bed Jet Mill CGS 10



Laboratory-Steam Jet Mill S-JET® 25



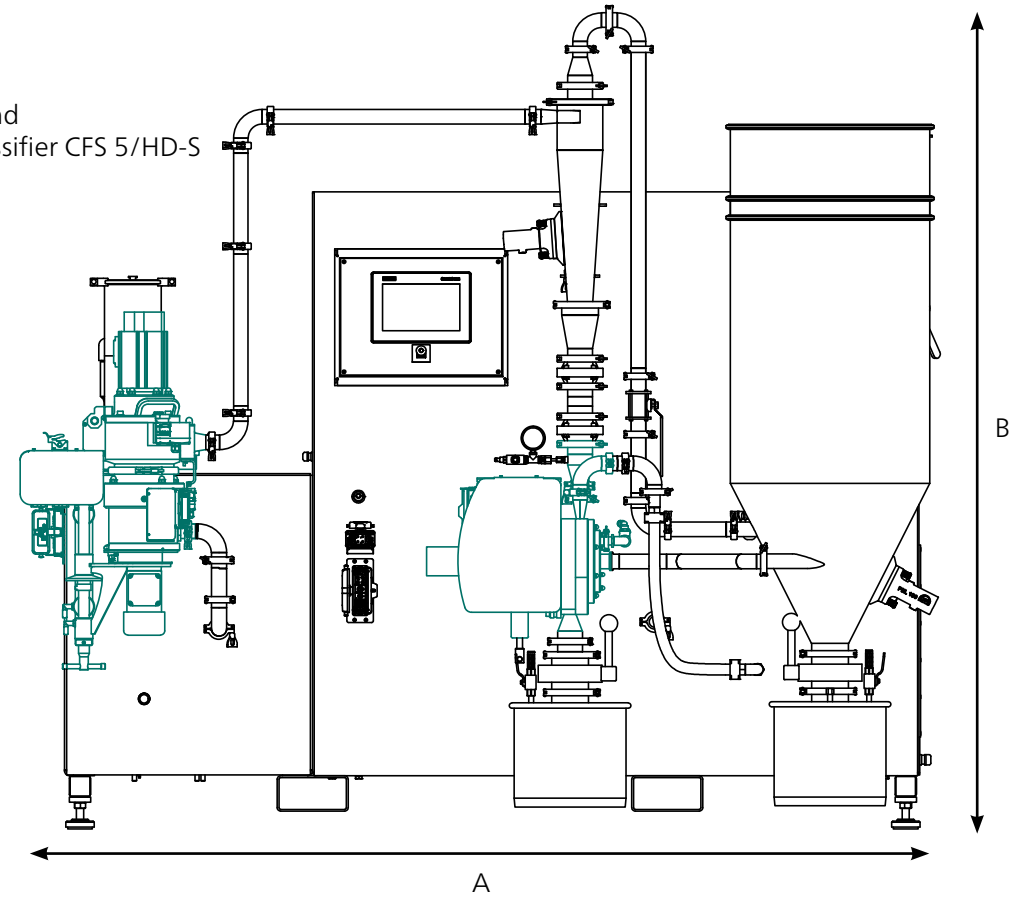
Technical Data at a Glance

	LabPilot
Machine Operation	CGS, ConJet®, m-Jet, CSM, CFS, CFS/HD-S, m-Class
	Optional with a second machine module for alternate operation
Control system Siemens S7-1500	
Operating panel	10'' widescreen
Feeding	Double screw
Storage tank	4.5 l / 6 l / 11 l / 26 l
Cyclone separator	Hand flap and collecting drum 20 l
Bypass	Yes
Filter	Cartridge and hose filter
Filter change	Top Removal
Filter area	1.8 m^2
Product discharge	Hand flap and 5 l funnel can for nitrogen and 20 l collecting drum for air
Barrel change filter	During operation
Piping	
Material	PU (flexible) / Stainless steel
Other	
Mode of operation	Continuous operation
Amount of material	Small test specimen quantities
Size and weight	
Width (A) [mm]	1 700 - 2 500*
Height (B) [mm]	2 150
Depth [mm]	800
Weight (approx.) [kg]	900 - 1 000

* with additional module

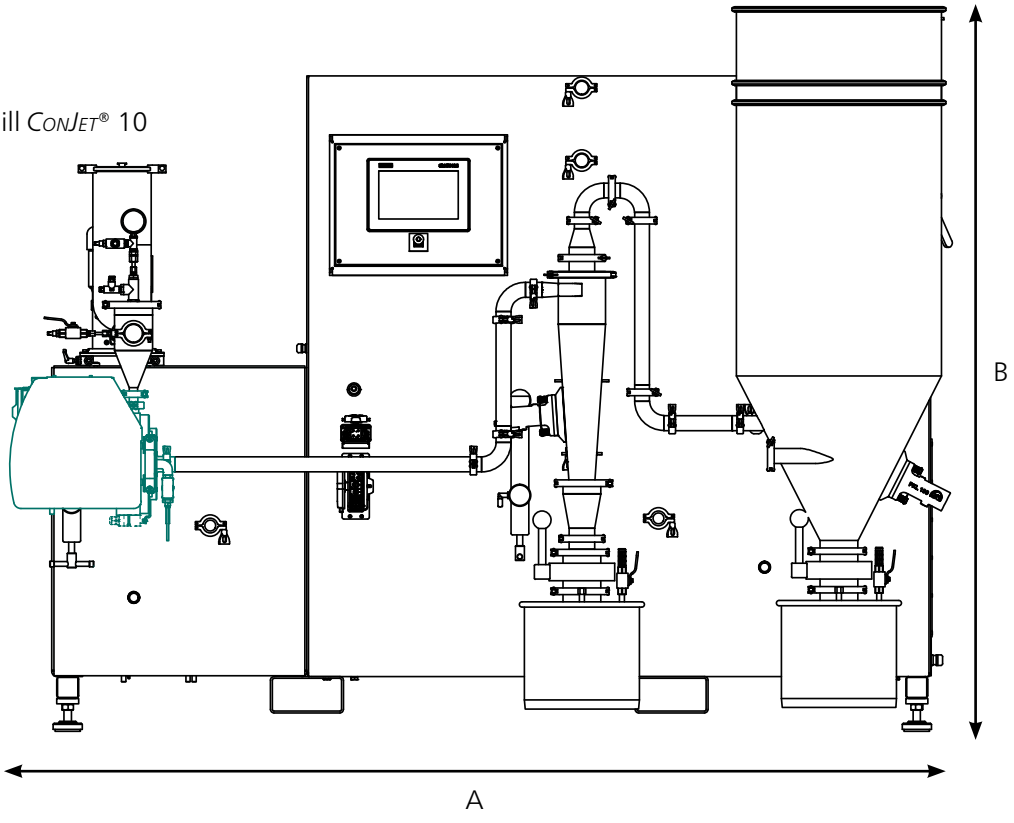
LabPilot

Execution with
Classifier Mill CSM 50 and
High-Efficiency Fine Classifier CFS 5/HD-S



LabPilot

Execution with
High-Density Bed Jet Mill ConJet® 10



Modular Laboratory Plant

Flexible solution on a pilot plant scale

The NETZSCH Modular Laboratory Plant is the ideal choice when it comes to processing small quantities of product. It was specially designed for use on a pilot plant and laboratory scale and offers significantly more flexibility and variety than classic laboratory systems such as *LabCompactPlus* or *LabPilot*.

At its heart is a central core module consisting of a filter, cyclone, blower, and switchgear. This module can be combined with various grinding units, including the Fluidized Bed Jet Mill CGS 16, the High-Density Bed Jet Mill *ConJet*® 16, the Classifier Mill CSM 80, and the Fine Classifier CFS 8 and CFS 8/HD-S. The result is an extremely versatile system that can be optimally adapted to different products and processes.

The Modular Laboratory Plant offers a wide range of options that go beyond what is possible with other laboratory systems. Depending on requirements, it can be equipped with various dosing devices to cater to specific product properties. In addition, variants with direct drive or separate bearings are available. The switchgear can also be positioned flexibly – integrated in the core module or as a separate element.

Additional versions are available for special applications: for example, a gas-tight or pressure-shock-resistant version in accordance with ATEX guidelines, a non-ferrous metal-free variant for processing battery materials, or systems that can be operated with hot or cold gas. Depending on the target market, the electrical design can be made UL- or EN-compliant.

With this variety of possible combinations, the NETZSCH Modular Laboratory Plant is more than just a laboratory device – it is a scalable platform for research, development, and small-batch production that grows flexibly with your requirements.

Your Advantages at a Glance

Flexible and future-proof use

- Modular system concept with interchangeable machine modules, which also makes it easy to retrofit additional modules at a later date
- Various dosing devices can be used, depending on the respective product
- Design with direct drive or separate bearing
- UL or EN-compliant electrical design depending on the target market
- Non-ferrous metal-free version for sensitive applications, e.g., in battery material processing
- Optional versions for hot or cold gas Operation

Safety and system availability

- Optional pressure shock-resistant and gas-tight versions in accordance with ATEX guidelines
- Wear-protected versions for abrasive products
- Optional cyclone operation for specific product separation requirements
- Efficient and dust-free product filling

Easy handling and cleaning – convenient operation

- Generously dimensioned filter door for convenient access to the raw gas chamber for quick, tool-free filter bag replacement with NETZSCH *SmartRemoval*
- Optimal accessibility of all maintenance-relevant components as well as simple and quick cleaning thanks to well-thought-out system design
- Clear operation via separate control panel on the swivel arm
- Integrated or separate switchgear module – depending on space requirements and customer preferences

NETZSCH Modular Laboratory Plant with Fluidized Bed Jet Mill CGS 16

Technical Data at a Glance

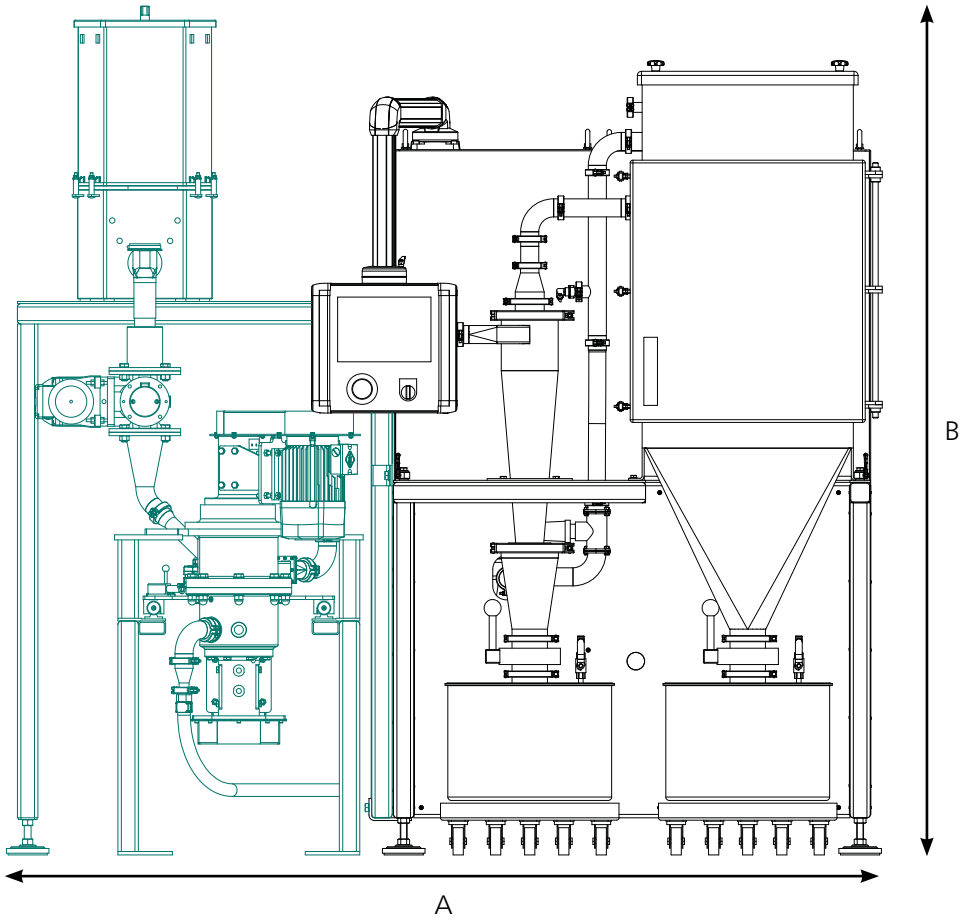
Machines for *PilotPlant*

Technical Data		CGS 16	*ConJet*® 16	CSM 80	CFS 8	CFS 8/HD-S
Air volume flow	m^3h^{-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

*) under laboratory conditions: 1.01325 bar and 20°C (= normal conditions)
**) based on limestone (density 2.7 kg/l)

PilotPlant

Execution with
Classifier Mill CSM 80



	PilotPlant
Machine Operation	CGS, ConJet®, CSM, CFS, CFS/HD-S
	Optional with a second machine module for alternate operation
Control system Siemens S7-1500	
Operating panel	10'' widescreen, larger displays are available as an option
Feeding	Single screw
Storage tank	50 l
Cyclone separator	Hand flap and collecting drum 50 l
Bypass	Yes
Filter	Hose filter
Filter change	NETZSCH SmartRemoval
Filter area	3 m^2
Product discharge	Hand flap and collecting drum 50 l
Barrel change filter	During operation
Piping	
Material	PU (flexible) / Stainless steel / Ceramic
Other	
Mode of operation	Continuous operation
Amount of material	Small production quantities
Size and weight	
Width (A) [mm]	2 500 - 3 600*
Height (B) [mm]	2 100 - 2 600 (According to execution)
Depth [mm]	1 200
Weight (approx.) [kg]	1 400 - 1 700

* with additional module

IRIS – Digital Ecosystem

The seamless integration of machines, systems and intelligent applications on one platform – and the integration into existing system landscapes – not only increases the efficiency of production processes, but also enables you to react flexibly to market changes. Regular updates and innovative new features also ensure that the system is always up to date.

Automation Systems

- Simple and intuitive operation via a multi-touch display or physical push-buttons
- Interfaces to customer systems and peripheral devices for seamless integration
- Individually configurable dashboards for a customized user experience

Intelligent Applications

- Optimized production performance by avoiding unplanned downtimes
- Acquisition, analysis, and provision of machine and process data for targeted optimization of the production process
- Higher process efficiency and quality assurance through automated batch records

Plant & Systems Control Centers

- Seamless integration through interfaces to existing customer systems and peripheral devices
- Flexible customization options by combining basic functions with individually tailored solutions
- Efficient production processes ensure smooth operations and consistently reproducible product quality

Interfaces & Connectivity

- Easy integration through support of common standard interfaces such as OPC UA, S7 communication, Profinet, Ethernet IP, TCP/IP, MQTT, and Modbus
- Connection to higher-level systems such as SCADA, ERP, MES, or cloud platforms
- Smooth integration into existing system landscapes for maximum compatibility

With the *IRIS* - Digital Ecosystem, NETZSCH Grinding & Dispersing offers you a constantly growing portfolio of control systems and Industry 4.0 solutions.

Our Application Laboratories

NETZSCH's application laboratories which are equipped with the latest technology are part of a comprehensive service offer. A test lab for dry-grinding and classifying of products from the chemistry and food industries is located at NETZSCH Trocken-mahltechnik in Hanau, Germany.

In this laboratory NETZSCH processes and/or grinds products which are supplied by customers and analyzes their behavior to achieve higher efficiency and the best possible grinding result. Grinding tests can be run on both laboratory scale and production sized machines. For this purpose, the complete NETZSCH mill and classifier portfolio for dry-processing is available.

In the NETZSCH *FoodLab* tests are carried out under food-grade conditions in two testing rooms, which can both be seen from a meeting room through a large viewing window and which are separated from the visitor- and employee areas by a hygiene sluice.

NETZSCH is pleased to welcome customers and invite them to take part in testing. This facilitates closer cooperation to achieve the best possible test results taking both the customer-specific product expertise and our process-engineering recommendations into consideration.

After tests have been carried out, the processed product is returned to the customer and they receive a comprehensive test report with the results of the tests.

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

NETZSCH-Feinmahltechnik | Germany
NETZSCH Trockenmahltechnik | Germany
NETZSCH Vakumix | Germany
NETZSCH Lohnmahltechnik | Germany
NETZSCH Feinmahltechnik Polska | Poland
NETZSCH Mastermix | Great Britain
NETZSCH Broyage | France
NETZSCH Macinazione & Dispersione | Italy
NETZSCH España | Spain
NETZSCH Machinery and Instruments | China
NETZSCH India Grinding & Dispersing | India
NETZSCH Tula | Russia
NETZSCH Makine Sanayi ve Ticaret | Turkey
NETZSCH Premier Technologies | USA
NETZSCH Equipamentos de Moagem | Brazil

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