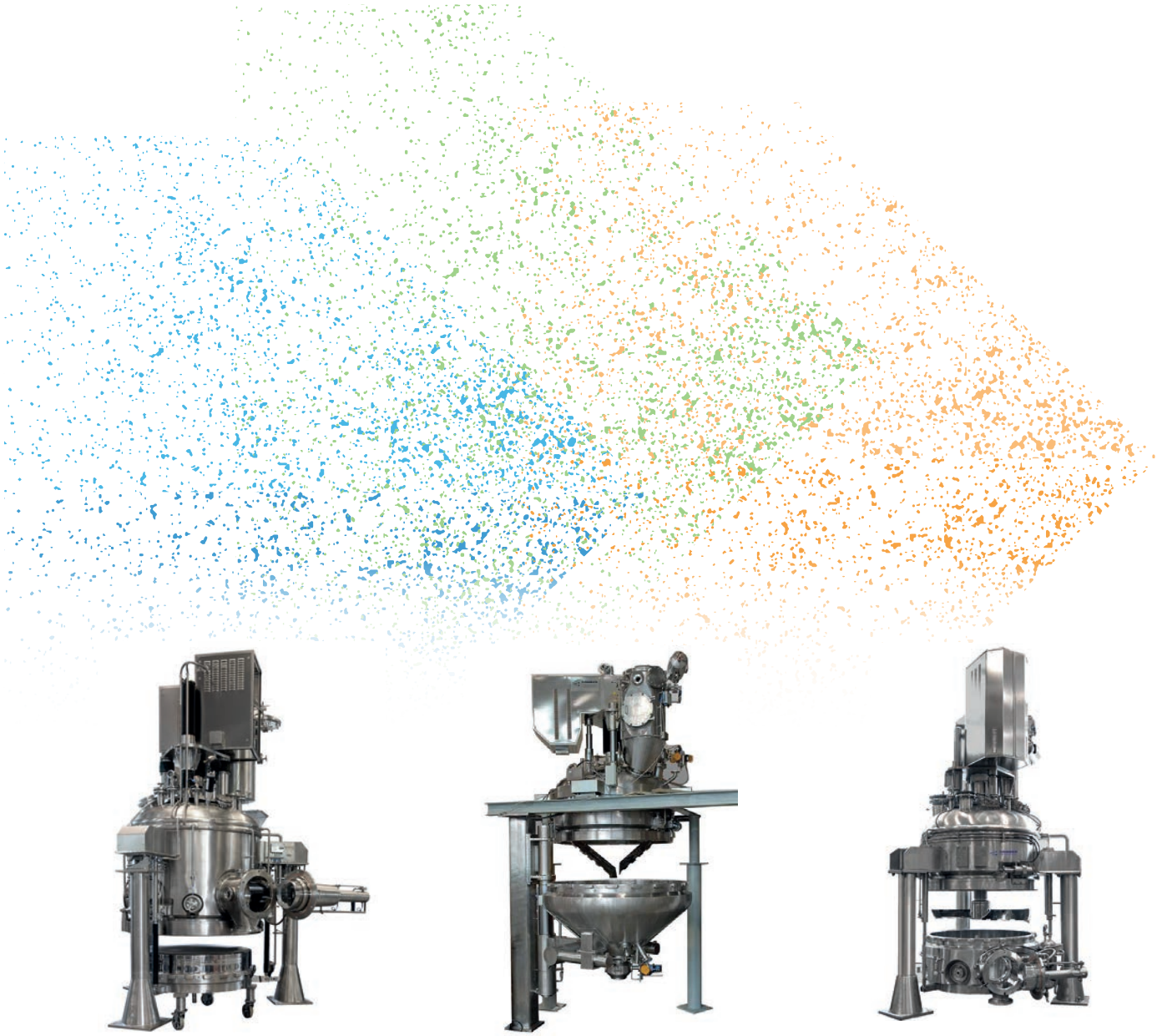
Member of HEINKEL Drying and Separation Group

COMBER
Drying and Filtration Technology



PRODUCT OVERVIEW
FILTER DRYERS & DRYERS

working for future *technology*

Welcome to the HEINKEL Drying and Separation Group

The HEINKEL Drying and Separation Group is one of the few suppliers of complete system solutions for processes in solid-liquid separation. More than 2.000 customers all over the world benefit from our solutions for over 5.000 applications in the chemical, fine chemical, pharmaceutical and food industries. The history of the HEINKEL Drying and Separation Group started back in 1884 with the foundation of the Grotz Maschinenfabrik in Bietigheim near Stuttgart, Germany. Since then we have continuously extended our knowledge and expertise, and considerably influenced innovations in the process industry.

The brands COMBER, BOLZ-SUMMIX, HEINKEL and JONGIA provide expertise in filtration, centrifugation, mixing, agitating and drying. The knowledge transfer between the members of the corporate group enables us to develop well-thought-out and turn-key solutions for our customers. The solutions are the basis of your innovative power – the basis for the development of significant future technologies.

Our philosophy means we do not just deliver machines but also offer our customers a reliable 360° service. We accompany and support you from the test phase in our lab centers through commissioning and launching the system to production. With comprehensive after sales service, we ensure the constant, sustained high availability and reliability of your production facility. For a continuously optimal product quality. For your success.

The Brands of the HEINKEL Drying and Separation Group

COMBER Drying and Filtration Technology

BOLZ summix®

HEINKEL

jongia mixing technology

COMBER Pressofiltro®
Series PF 100 – PF 10000

COMBER Pressofiltro nutsche filters or filter dryers are versatile units designed for multipurpose production facilities. To meet the demanding requirements for filters used in the manufacture of pharmaceutical ingredients, the filters are designed to meet stringent cGMP and FDA guidelines.

Pharma Design

- Excellent cleanability using CIP systems, simple validation
- Openable filter base provides for good access to the filter internals for cleaning and inspection
- Easily interchangeable filter plates, with flat, homogeneous filter surfaces for good cleanability and inspection
- Multilayer and/or conventional filter materials
- Good drying performance with special agitator design, large heat exchange areas
- Double mechanical seals, externally interchangeable, dry running contacting or non-contacting lift-off type seals as well as liquid lubricated seals

COMBER Pressofiltro®
Series PF 2000 – PF 16000

Chemical Design

- Available as closed units with manhole access or with an openable filter base
- Multilayer and/ or conventional filter materials
- Good emptying characteristics due to narrow agitator to wall/ bottom clearances and a unique agitator blade design
- Shaft seal with externally accessible stuffing box

Filterdryer with Containment COMBER Pressofiltro®
Series PF 50 – PF 2000

Pressofiltro agitated Nutsche filters or filter dryers with containment systems provide protection of the operators against hazardous materials and equally provide product or process safety against possible contamination from external particles.

- Containment systems (glove boxes) are designed to allow contamination free sampling, product discharge, heel removal and product pack-off into suitable containers
- Containment systems are available as passive, active, single chamber, two chamber and multiple chamber designs, all in compliance with cGMP and FDA guidelines
- Active isolator units are equipped with air handling systems and HEPA inlet and exhaust filters for containment levels down to 10 ng/m^3 TWA
- The isolator design permits sampling, product discharge, pack-off, heel removal and filter cloth disposal in a single unit
- Sample and small items transfer using optional RTP's (Rapid Transfer Ports/alpha-beta ports), split butterfly valves, bag-in/ bag-out port

Sterilizable Units COMBER Pressofiltro®
Series PF 50 – PF 6000

COMBER Pressofiltro steam sterilizable agitated Nutsche filter dryers are designed to maintain full sterility during the entire process, from inerting through slurry feeding and filtration, washing and drying to discharge of the dry product. CIP and SIP provide a very effective, safe and convenient form of sterilization, easy to automate and validate.

- With Cleaning-In-Place (CIP) and Sterilization-In-Place (SIP) systems designed for the automatic cleaning and disinfecting of the equipment
- Steam sterilizable filter dryer design assures steam reaches all parts of the filter dryer in contact with the product and air is not trapped in the unit during sterilization
- In compliance with cGMP and FDA guidelines, with vessel interior and all associated piping designed to prevent product adherence and to facilitate cleanability, fully drainable for clearance of condensate during the heating process, with aseptic design for flanges, seals, valves etc.
- Double mechanical seals, externally interchangeable, dry running with debris well, steam sterilizable

Vacuum Pan Dryer COMBER Turbodry®
Series TD 0.8 / 1.1 – TD 40 / 60

The Turbodry agitated vacuum pan dryer has proven to be excellent for the drying of sensitive, pasty and other "difficult" products that pass through a highly viscous stage during the drying process. The dryers have proven to be particularly suited for the drying of heat sensitive products as well as products with fragile crystal structure and thus sensitive to shear forces. Excellent product discharge and shortest cycle times.

- In compliance with cGMP and FDA guidelines, also in aseptic/ steam sterilizable versions
- Shortest possible drying times, suitable for the drying of sensitive, pasty, sticky and other "difficult" products such as those turning highly viscous during the drying process
- Simultaneous axial and radial agitator movements permit uniform mixing of the entire product mass, without the formation of lumps or balls
- Double mechanical seal, dry running contacting or non-contacting lift-off or liquid lubricated, externally interchangeable
- Agitator supported by the top head, with the seal in contact with the vapors only

Vertical Vacuum Dryer COMBER Condry®
Series TDC 25 – TDC 15000

The Condry conical bottom agitated vacuum dryer was developed to process a wide variety of products. The machines have proven to be particularly suited for the drying of heat sensitive products as well as products with fragile crystal structure and thus sensitive to shear forces. The conical bottom allows for full product discharge characteristics.

- In compliance with cGMP and FDA guidelines, also in aseptic/ steam sterilizable versions
- Excellent product discharge performance with negligible product hold-up due to the conical vessel bottom, very close agitator to wall/bottom clearances and a unique agitator design
- The agitator permits uniform mixing of the entire product mass, without the formation of lumps or balls
- The surface area for heat transfer is maximized for optimum performance and cycle times
- Agitator supported by the top head, with the seal in contact with the vapors only
- Entirely welded agitator design, without any bolts, without pockets and with all edges rounded for good cleanability

Horizontal Vacuum Dryer COMBER Pharmadry®
Series PH 50 – PH 4000

The Pharmadry vacuum paddle dryer with short drying times is well suited for the drying of freely flowing, sensitive pharmaceutical ingredients and fine chemicals. Designed to meet stringent cGMP and FDA guidelines.

- In compliance with cGMP and FDA guidelines, also in aseptic/ steam sterilizable versions
- Agitator supported at the rear, with externally exchangeable mechanical seal
- Entirely welded agitator design, without any bolts, without pockets and with all edges rounded for good cleanability
- Minimal build depth, thus very good accessibility for inspection and cleaning purposes
- Excellent cleanability using CIP systems, simple validation
- Available with separating wall between process and mechanical areas
- Double mechanical seal, externally interchangeable, dry running contacting or non-contacting lift-off type seals as well as liquid lubricated seals

Horizontal Vacuum Dryer/ Reactor COMBER Termomix®
Series TM 1000 – TM 40000

The Termomix vacuum paddle dryer/reactor is intended for monoproduction applications or bulk production facilities as mixer, reactor, precipitator and dryer.

- Economic, robust multipurpose machine for heavy industrial applications
- The agitator is supported on both ends providing excellent mixing characteristics, with externally interchangeable stuffing boxes or mechanical seals
- Large heating area resulting in an outstanding heat transfer rate by heating the vessel walls, the vessel ends as well as the agitator shaft and arms

Pilot Units COMBER Pressofiltro®
Series PF 5 – PF 100

Pressofiltro pilot units are multipurpose tools for pilot plant or laboratory applications as well as for small scale production facilities. Versatile use of the equipment, cGMP compliant design, containment, efficient and complete cleanability, complete dischargeability, highest drying efficiency, process safety and monitoring, ease of validation and a compact design are important requirements.

- In compliance with cGMP and FDA guidelines, also available in steam sterilizable and/ or aseptic designs
- Small pilot units are skid mounted including all drives, the required instrumentation and the hydraulics
- For easy access larger pilot units are mounted on a support column or post; the vessel base is mounted on a separate column to lower the base and displace it to the side
- Vessel base can be designed interchangeable for conversion to a conical bottom dryer or a Nutsche filter dryer respectively

Heating and Cooling Skids

The heating and cooling skids are used for heating or cooling the jackets of agitated vacuum dryers, agitated Nutsche filters and filter dryers with heat transfer fluid 15 - 300 kW heat transfer capacity 4 –150 m^3/h flow rate.

- Supplied skid mounted as fully functional unit
- Units with several independent heating-/cooling circuits

Used Machines / Rebuilts / Retrofits

The HEINKEL Group offers economic solutions for its customers providing a large and constantly changing range of used machines which are available quickly at an attractive price, including warranty. The machines are being completely disassembled, comprehensively checked and reassembled according to customer requirements. Damaged parts are replaced by original spare parts of the latest design. Documentation is updated to match the as-rebuilt status.

Additional equipment for used machines, upgrades and retrofits can be fitted and integrated into the control system. Subsequent optimizations, also for third-party manufacturers, make it possible to adjust the customer's systems to changed process requirements as well as safety and validation standards.

Technical Data

Valid data for all machine types

Product wetted materials	Stainless steels, Nickel based alloys such as Hastelloy C 22 or Alloy 59, Titanium, etc.,
Sealing materials	PTFE gaskets, O-Rings in FFKM or FEP encapsulated
Area classification	EU-Type Examination Certificate INERIS the 2014/34/EU Directive, or with electrical components UL approved for operation in a Class 1, Division 1 or 2, Groups C&D environment
Controls	Control cabinet with PLC, HMI with touch screen, MCC, interface for DCS
Guidelines	Calculation, design and manufacture in accordance with the Pressure Equipment Directive (PED) 2014/68/EU and /or the ASME pressure vessel code, Section VIII, with U-Stamp.

Typical design parameters for Pressofiltro® agitated Nutsche filters / filter dryers (Pharma)

Filter area	0.20 to 10 m^2
Slurry volume	100 - 10000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +4 barg (FV to 60 psig) or per requirements
Heated areas	All product wetted components, including agitator
Accessories	Dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Typical design parameters for Pressofiltro® agitated Nutsche filters / filter dryers (Chemical)

Filter area	2.0 to 16 m^2
Slurry volume	2000 - 40000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +4 barg (FV to 60 psig) or per requirements
Accessories	Heated vessel and agitator, openable filter bottom, dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Typical design parameters for Pressofiltro® agitated Nutsche filters / filter dryers (Containment)

Filter area	0.13 to 2 m^2
Slurry volume	55 - 2000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +4 barg (FV to 60 psig) or per requirements
Heated areas	All product wetted components, including agitator
Accessories	Dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Typical design parameters for Pressofiltro® steam sterilizable Nutsche filter dryers

Filter area	0.13 to 6 m^2
Slurry volume	55 - 6000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +4 barg (FV to 60 psig) or per requirements
Heated areas	All product wetted components, including agitator
Accessories	CIP / SIP system, dust filter with automatic back cleaning, sampling valve, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc..

Typical design parameters for Turbodry® agitated vacuum pan dryers

Usable volume	100 - 6000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +0.45 barg (FV to 6.5 psig), -1 to +6 barg (FV to 90 psig) in pressure proof version or per requirements
Heated areas	All product wetted components, including agitator shaft, arms and blades
Accessories	Dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Typical design parameters for Condry® agitated vacuum dryers

Usable volume	25 - 13500 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +0.45 barg (FV to 6.5 psig), -1 to +6 barg (FV to 90 psig) in pressure proof version or per requirements
Heated areas	All product wetted components, including agitator shaft, arms and blades
Accessories	Dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Typical design parameters for Pharmadry® vacuum paddle dryers

Usable volume	50 - 4000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +0.45 barg (FV to 6.5 psig), -1 to +6 barg (FV to 90 psig) in pressure proof version or per requirements
Heated areas	All product wetted components, including agitator shaft, arms and blades
Accessories	Dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Typical design parameters for Termomix® vacuum paddle dryers / reactors

Usable volume	1000 - 40000 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +0.45 barg (FV to 6.5 psig) or per requirements
Heated areas	All product wetted components, including agitator shaft, arms and blades
Accessories	Dust filter with automatic back cleaning, sampling valve, choppers, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

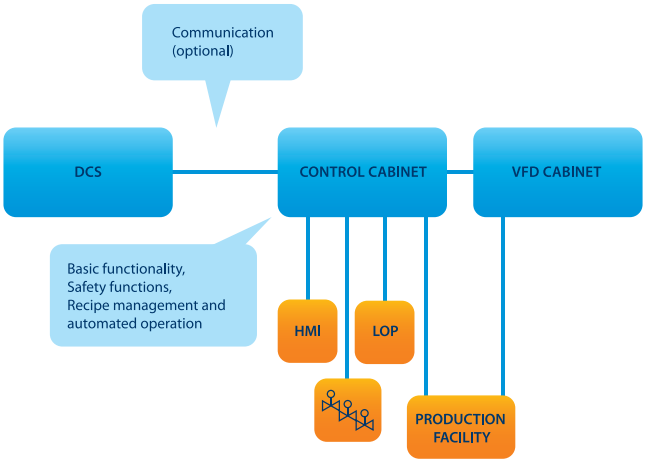
Typical design parameters for Pressofiltro® agitated Nutsche filters / filter dryers (Pilots)

Filter area	0.03 to 0.20 m^2
Slurry volume	8 - 100 liters
Design temperature	-10 to 150°C (14 to 302°F) or per requirements
Design pressure	-1 to +4 barg (FV to 60 psig) or per requirements
Heated areas	All product wetted components, including agitator
Accessories	Dust filter with automatic back cleaning, sampling valve, CIP system, sight glass with vessel light, vacuum system with condenser, heating and cooling unit etc.

Automation

Tailor-made software for each application

With decades of experience and expertise, the HEINKEL Group offers tailor-made system components and software upgrades – individually set-up and optimized for the customer´s application.



Upgrade from Siemens S5 to S7/ TIA

The migration of the control system Siemens SIMATIC S5 to Version S7/ TIA makes it possible to use the latest functions of process control technology and increases the productivity of the system.

The upgrade ensures the continuity of control investments made to date, increases the effciency of the machines and provides a cost effcient extension of the life cycle of the machine.

The modern technology reduces the risk of machine downtime and reveals optimization potential. The HEINKEL Groups carries out the upgrades and thus increases the reliability of the production process of their customers.

Service

The HEINKEL Group does everything to ensure success – anytime, anywhere.

For decades now, the HEINKEL Drying and Separation Group has been committed to precision and reliability in filtration, centrifugation, mixing and drying technology. With know-how and innovative power, the group develops components and complete system solutions for specific applications of solid-liquid separation in the pharmaceutical, fine chemical, chemical, cosmetic and food industries.

The HEINKEL Group offers integral service - from the development of the perfect solution through commissioning and training to maintenance, spare part service and 24/7 support.

Tailor-made pilot units for new developments ensure the competitive capacity of the customers. The basis of common success is cooperative collaboration. It results in top performance that finds acclaim all over the world.

The constant striving for quality and perfection is part of the corporate culture. Something the HEINKEL Group works for in all areas at full strength day in, day out. Regular training sessions and further education measures ensure the achievement of the high procedural and legal requirements of the pharmaceutical, chemical and food industries.

HEINKEL®
DRYING AND SEPARATION GROUP

SALES & SERVICES WORLDWIDE

FILTRATION CENTRIFUGATION MIXING DRYING

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