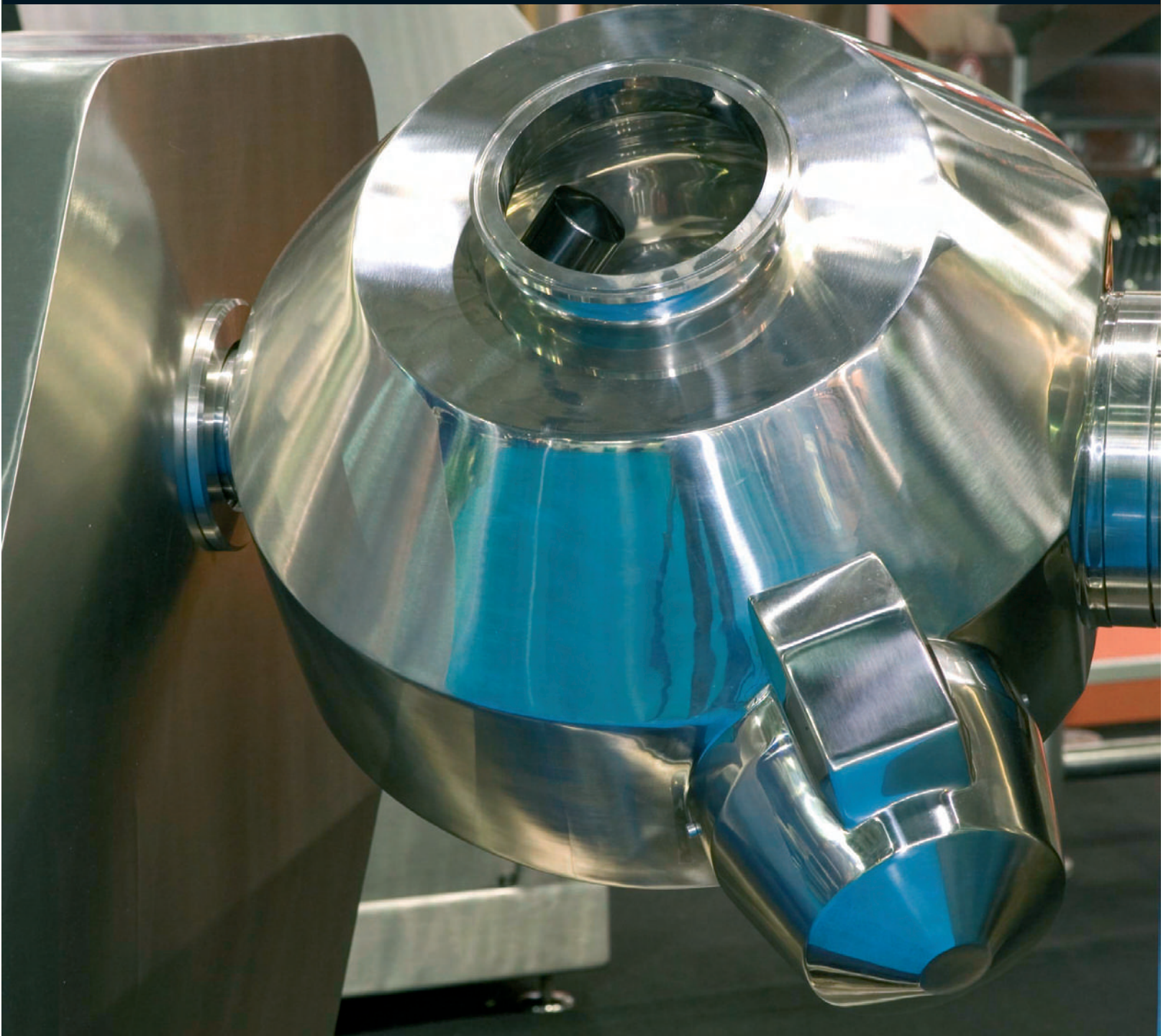


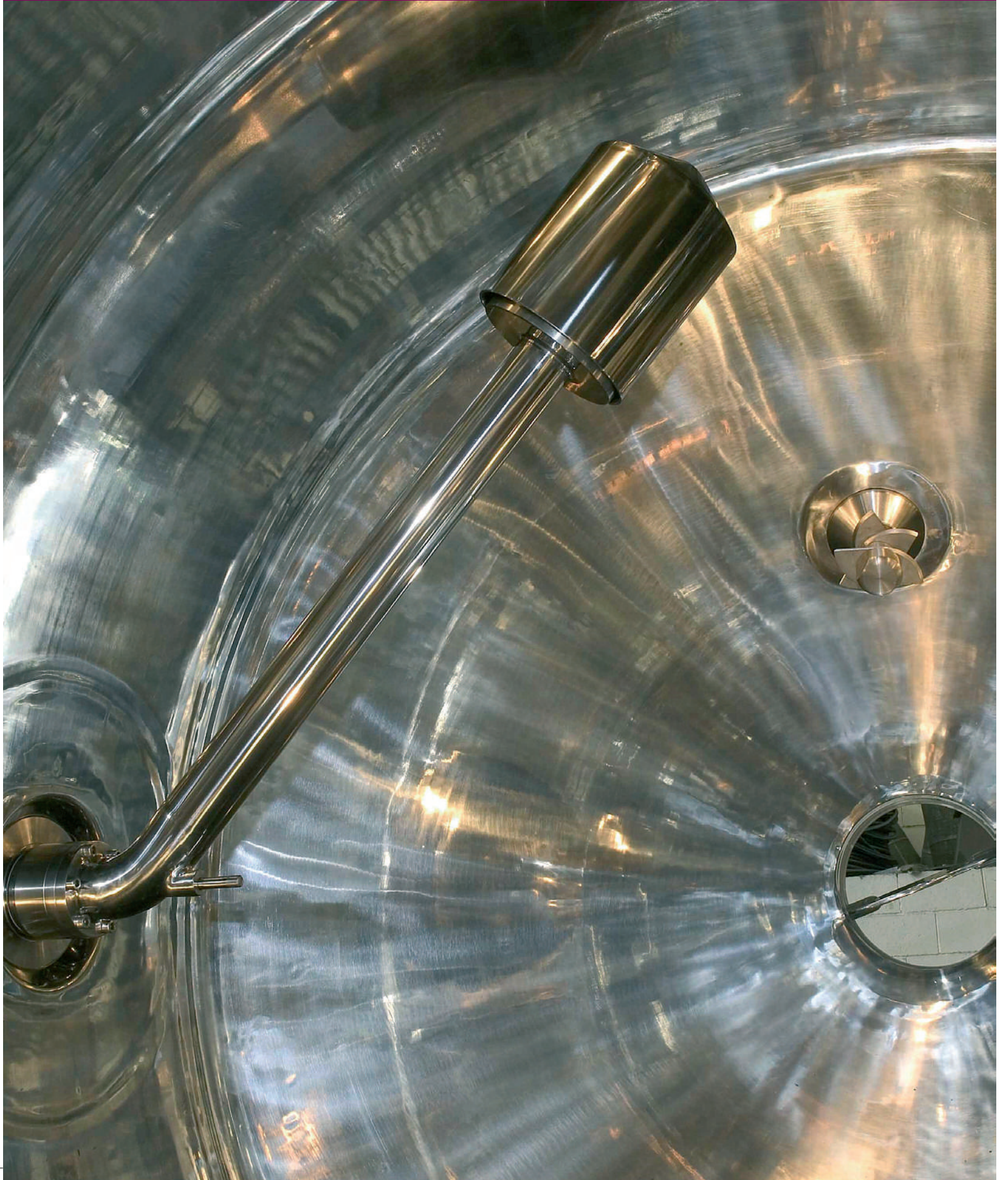
Biconical vacuum dryer MBC-S

**BICUUM DRYER**



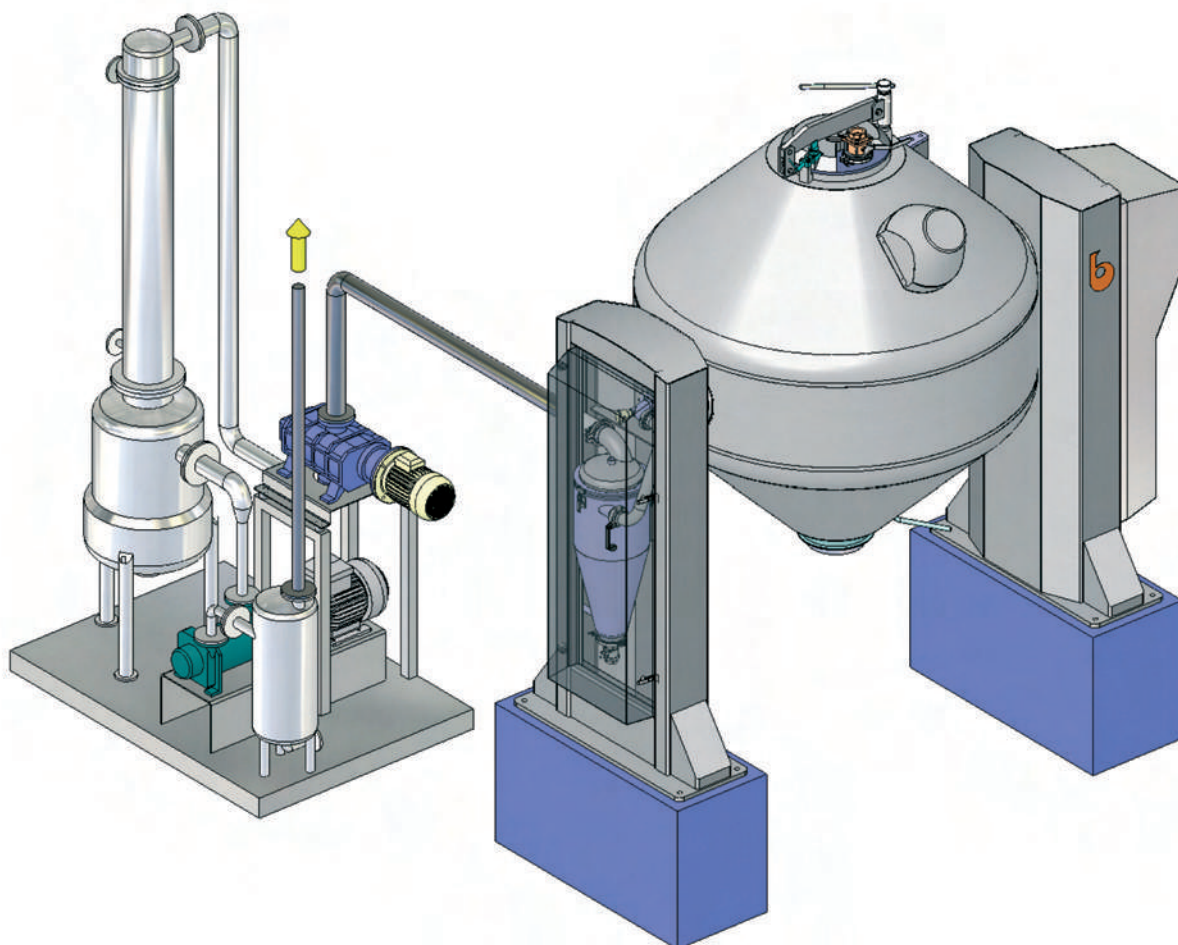
**BACHILLER**

Mixing and drying technology



# BICUUM

## Biconical vacuum dryer MBC-S



### The ultra high vacuum drying process advantages

The main advantage of high vacuum or ultra high vacuum drying is that, by reducing the boiling point for the product to be dried, the drying process takes place at a low temperature in comparison with other industrial drying processes. Vacuum drying is ideal for treating heat-sensitive or heat-labile products which properties might be affected change while exposed to moderate or high temperatures.

Furthermore, with high vacuum drying, the product inside the container is isolated from the outside, preventing contamination from air-driven external agents and / or oxidation.

Also, the same high vacuum conditions prevent accidental product leaks. The complete absence of oxygen during the drying process results in a non-explosive atmosphere, guaranteeing safety for the operator, unlike other industrial drying processes.

At BACHILLER, we have developed a wide range of vacuum dryers with different configurations and technologies to provide a solution for every typical application in the chemistry, fine chemicals, pharmaceutical, cosmetics and food industries.



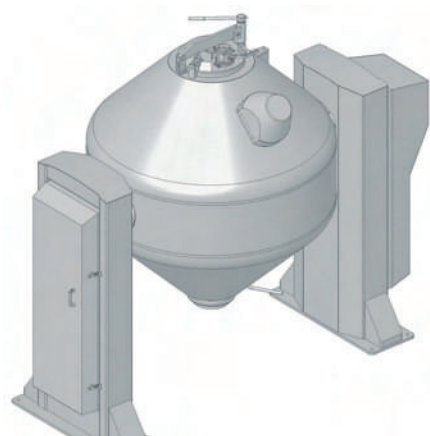
## **BICUUM Biconical vacuum dryer MBC-S**

Our **BICUUM** dryer is specially designed for the fine chemicals and pharmaceutical industries to operate under high degree of vacuum and ultra high vacuum in clean room environments. It is also suitable for sterile processes.

One of the main features of the **BICUUM** dryer is that it treats the product very gently, due to its low rotation speed, under 0.5 m/s. This, combined with maximising the heating surface, makes the machine highly efficient for drying crystalline and/or amorphous products, with a low tendency to form accumulations and lumps during the drying process.

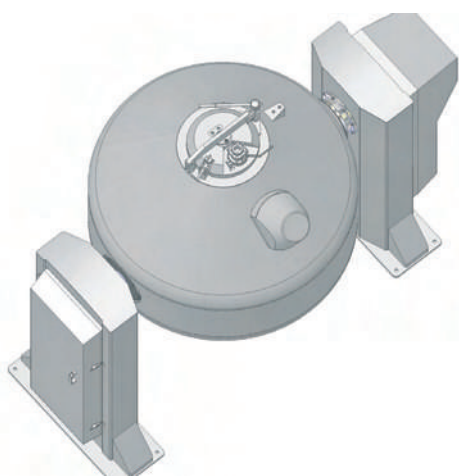
# BICUUM

## Biconical vacuum dryer MBC-S



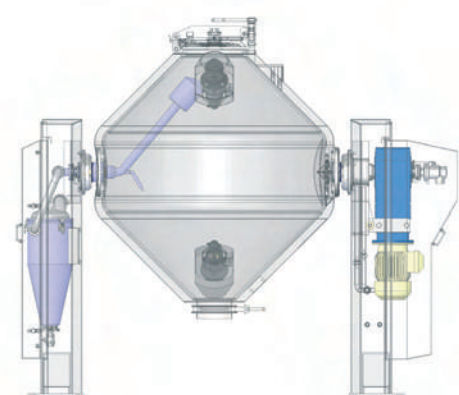
The almost complete absence of inside components and the large inspection door facilitate local cleaning procedures and automated CIP and SIP procedures, as well as easy inspection and visual check.

The **BICUUM** dryer body is fully covered by the heating jacket, suitable for applications using hot water, steam or even thermal oil. The loading and inspection door is also fitted with a heating jacket to avoid cold spots inside the machine.

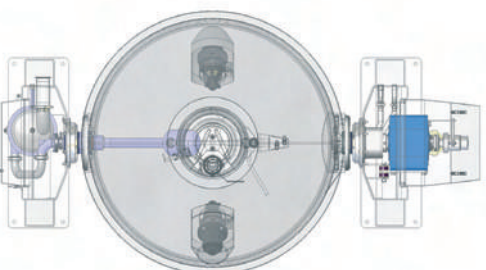


Unloading is carried out through a simple valve, which can be automatic, positioned at one of the **BICUUM** vertices. The same valve can be used for loading procedures. In sterile applications, alpha-beta valve systems are supplied for complete control of the process's sterile conditions.

For products that tend to form lumps during the drying stage, we have developed high-speed **chopper** knives, strategically placed on the dryer's walls. The function of the **choppers** is to break up the lumps or accumulation of wet product formed as a result of the machine's movements. The product can flow freely without clumping inside the dryer. This ensures that all of the wet particles are in contact with the dryer's heated walls, increasing the heat exchange and the resulting evaporation and drying effect.



The special **BICUUM** dryer characteristics and configuration, with no corners and components inside that could complicate the cleaning process, make it ideal for pharmaceutical applications that require product approval in accordance with GMP, or even FDA validation.





## Machine support. Bed frames and service cabinets

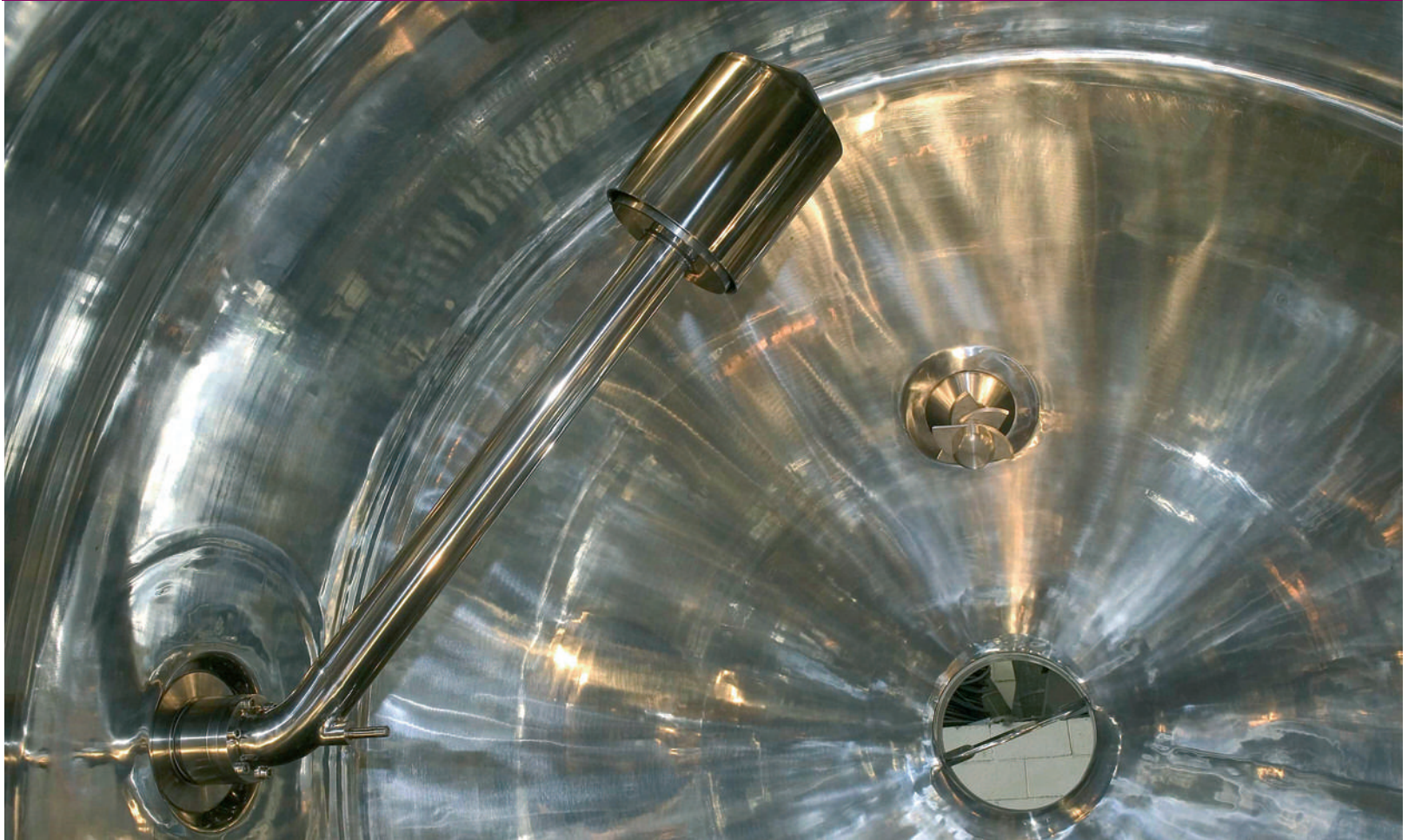
The **BICUUM** dryer is supported on two bed frames. These supports are equipped with accessible cabinets that house all of the mechanical and drive components as well as the rest of services.

Optionally, these beds can be used to install partition walls, so that the body of the dryer is completely separated from the mechanical elements. A clean work area is thus created which can be fitted out as a clean room.

The machine's electrical controls are commonly installed in the supporting bed frames. These can be either push buttons or touch screen.

# BICUUM

## Biconical vacuum dryer MBC-S



### Vacuum line and aspiration

In order to collect the vapours generated during the drying process, there is an aspiration connection inside the dryer equipped with a special filter to ensure that the product is not conveyed accidentally. The filter can be made from fabric, metal, sintered, or any other substance compatible with the product. The connection remains fixed while the dryer body rotates. Tightness by means of a special mechanical seal manufactured in FDA compatible materials.

Reverse gas jet pulse system for regular filter cleaning purposes. These reverse pulses are performed during the drying process and detach the product particles that have become stuck to the filter due to the suction effect. The filter can easily be removed and replaced.

A safety cyclone filter is located in the machine's bed frame to pick up fine dust particles or any other particles that may accidentally pass through the filter. This cyclone acts as a safety and protection filter for the vacuum pumps.





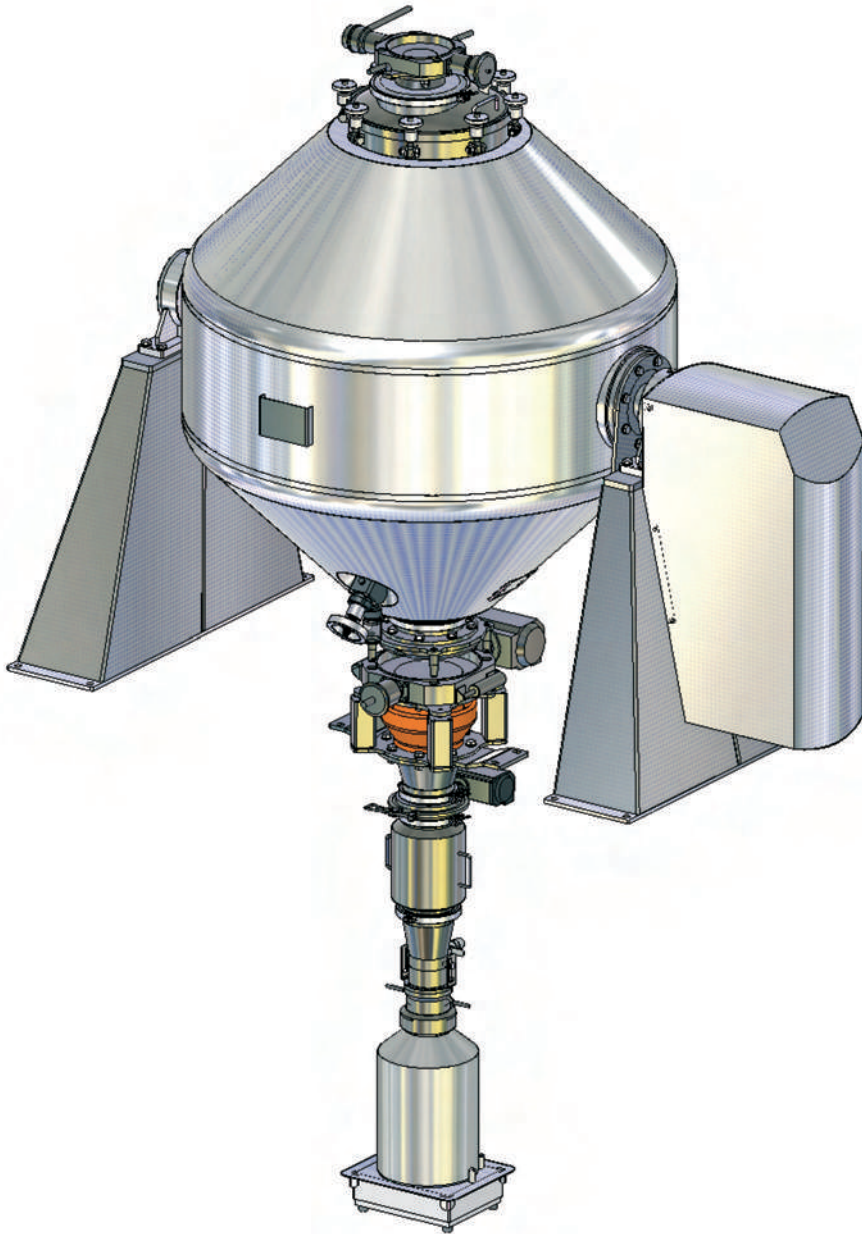
## ATEX versions for use with potentially explosive atmospheres

The BICUUM dryer can be supplied as an ATEX-certified version, even when the dryer inner part is classified as 0/20 zone and without the need of blanketing with inert gas during operation. The official certificates are issued by TÜV, and comply with BACHILLER's standard approval.



# BICUUM

## Biconical vacuum dryer MBC-S



### Automatic positioning system

Since this is rotating equipment and in order to automate the dryer loading and unloading operations, an automatic system is optionally supplied to stop the dryer inlet and discharge outlet at a specific desired position. Automatic connecting systems can therefore be applied to perform the loading and unloading procedures without any manual assistance from the operator.



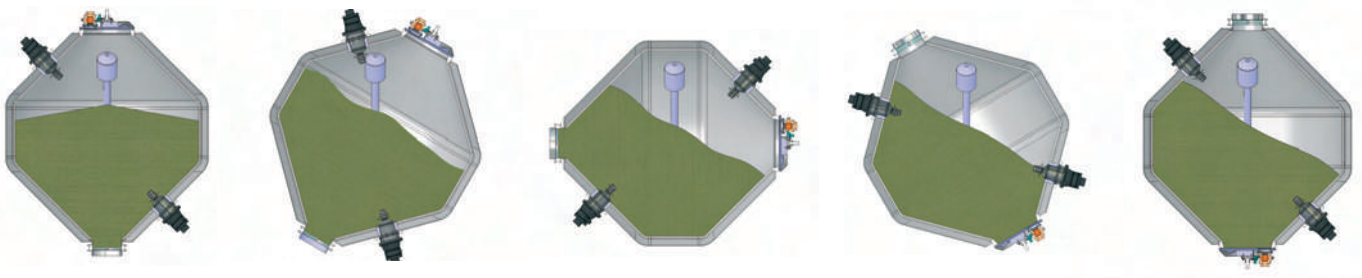
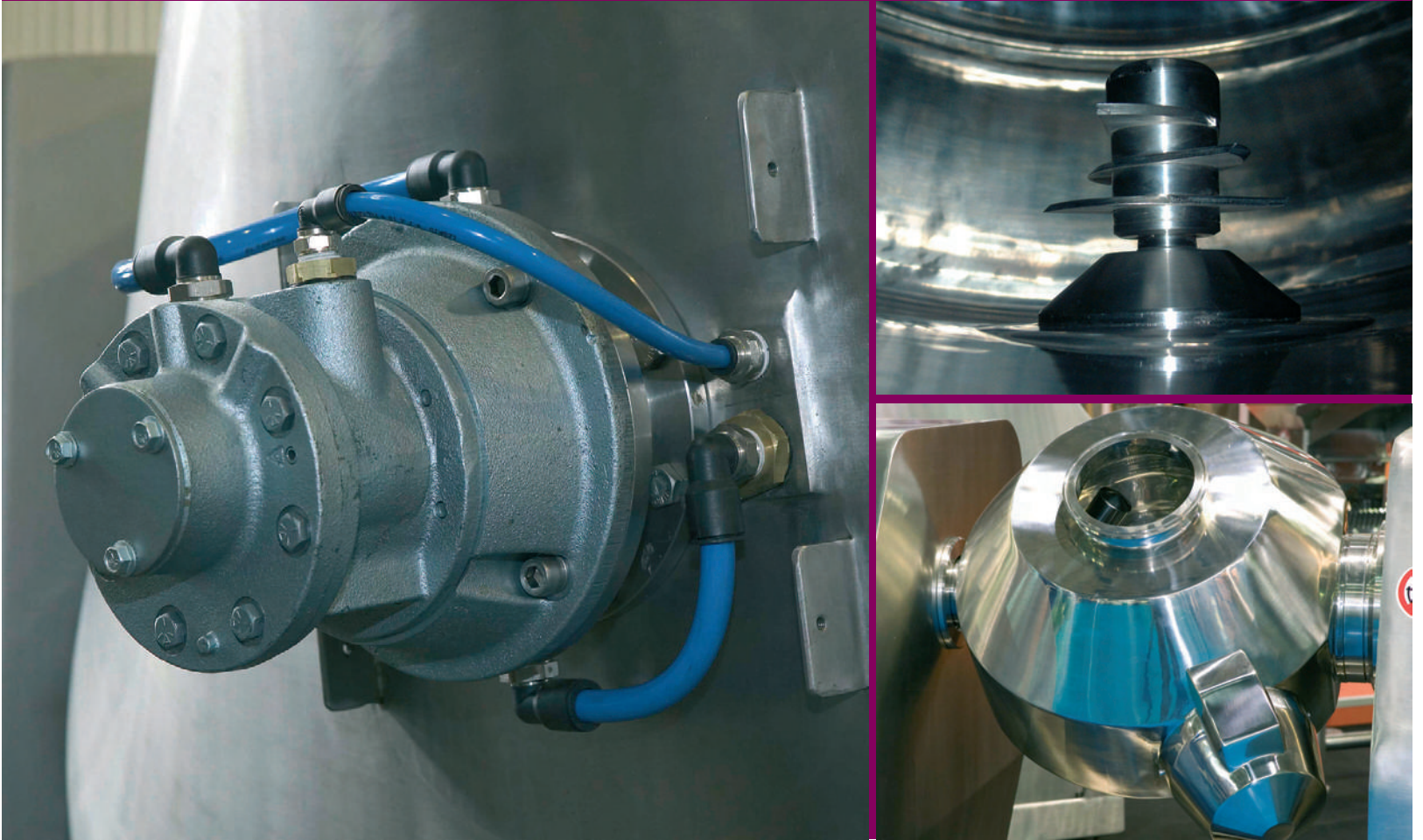


## Deagglomeration mills. Choppers

The **chopper** deagglomeration mills are groups of knives that rotate at high speed. They are especially suitable for applications where products tend to form accumulations, balls or lumps as a result of the equipment's rotating movement. These lumps are destroyed when they come into contact with the **choppers**, which are strategically placed on the dryer's walls. The size and number of **choppers** varies depending on the dryer model. They are essential to achieve high drying efficiency in these applications.

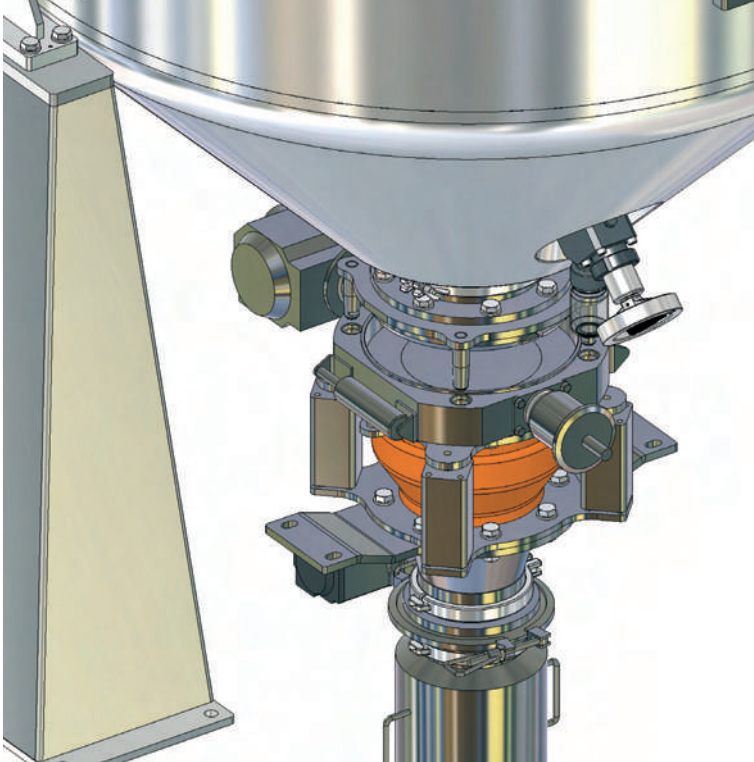
# BICUUM

## Biconical vacuum dryer MBC-S



### Typical drying applications

- Pharmaceutical products.
- Crystalline synthesis products.
- Powdery products resulting from filtration (Pressure filters, filter presses, rotary filters, etc.)
- Powdery products resulting from centrifugation processes.
- Pellets, polymers.
- Pigments and colouring.
- Natural extracts.
- Textile and plastic fibres.
- Drying and sterilisation of plugs and capsules for pharmaceutical products.



## Construction materials

BACHILLER manufactures the BICUUM dryer at Parets del Valles Workshop. The most commonly used materials are:

- Austenitic stainless steels, such as AISI-304L, AISI-316L, 1.4541, 1.4571, etc.
- Super-austenitic stainless steels, such as 904L, 1.4529, 254 SMO
- Duplex or super-duplex steel, such as SAF-2205, SAF-2507, etc.
- Hastelloy (C-276, C-22), Alloy 59, Titanium Gr.2

## Optional accessories

- Real product temperature measurement.
- Dryer pressure and vacuum indication.
- CIP and/or SIP systems.
- Pneumatic vibrator to unload low fluidity products.
- Sampling valve while in vacuum stage.
- Outer insulation of the dryer's body, panelled in stainless steel welded execution.
- Condensation equipment and one or two-stage vacuum pumps.
- Heating/cooling equipment for the outer jacket.

# BICUUM

## Biconical vacuum dryer MBC-S



### Complete drying installation

To complete the drying installation a set of peripheral elements can be supplied optionally with the BICUUM dryer.

#### Vacuum unit:

The goal is to achieve a high vacuum level in the dryer chamber (up to 1 Torr) and, later, to condense and collect the evaporated liquid, achieving insignificant levels of emission to the atmosphere. The system, which is usually supplied mounted on a skid, includes the following:

- One or two-stage vacuum pump, depending on the liquid to be evaporated. The vacuum pump may be a liquid ring, oil or dry type, and may be combined with Roots high flow pumps.
- Tube condenser to collect the evaporated liquid, connected to a collecting tank. These are properly sized according to process. A second atmospheric stage unit can also be supplied in order to improve condensate collection.

#### Heating or cooling unit:

For optimal control of the working temperature during the drying stage and, if necessary, its subsequent cooling.

- Tanks, pumps and heat exchangers properly sized in accordance with the services available and the working conditions.
- Proportional control valves and temperature regulation.

#### Electrical and process control panels:

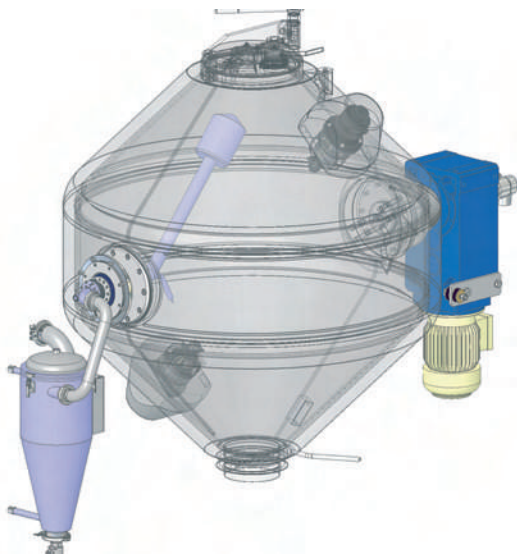
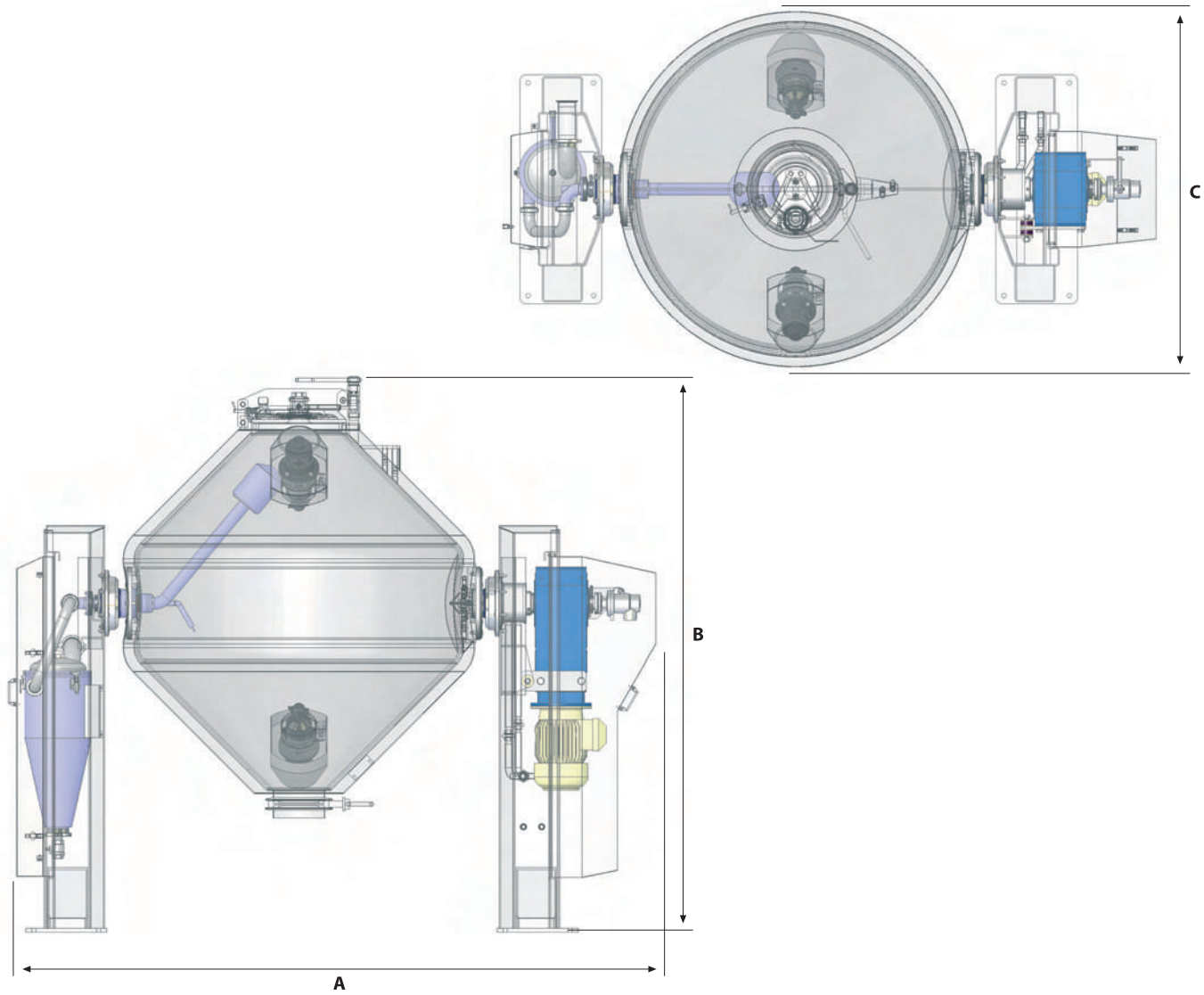
Designed in accordance with process requirements, from completely manual systems with visual display of the process conditions, to completely automatic systems, accredited by FDA 21 CFR Part. 11, for creating, editing and storing information.



#### CODES AND STANDARDS:

**BACHILLER** have the following certifications:

- ✓ ISO 9001.
- ✓ HP-0 stamp by TÜV, according to AD-Merkblätter 2000.
- ✓ U stamp of ASME.
- ✓ H1 Certification, according to European directive of pressure equipments PED.
- ✓ Homologation of the dryer according to ATEX95 category 1GD, 2GD and 3GD.
- ✓ Our sanitary equipments comply with the GMP and EHEDG standards.✓
- ✓ We prepare the equipments for validations by FDA.

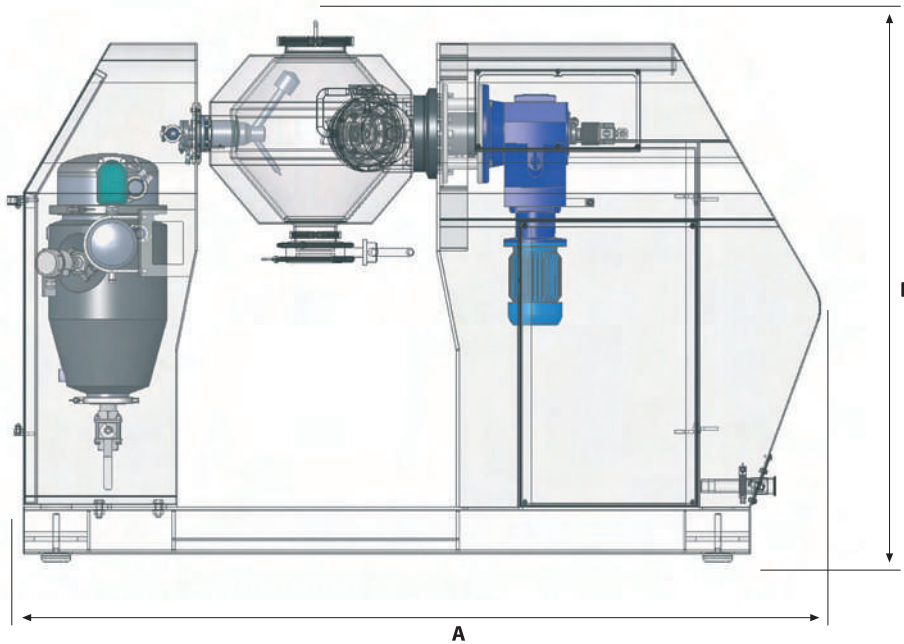
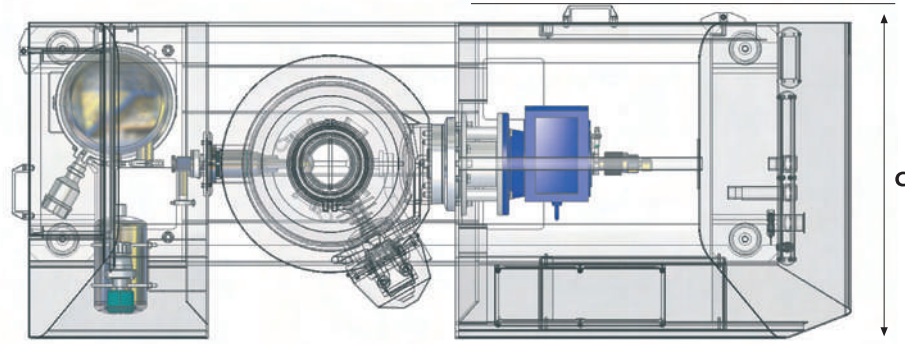


**GENERAL DIMENSIONS INDUSTRIAL SIZE**

Dimensions in mm.	A	B	C	TOTAL VOLUME (L.)	MAXIMUM USEFUL VOLUME (L.)
MBC0200-S	1.800	1.600	1.150	200	130
MBC0350-S	2.200	2.000	1.400	350	230
MBC0600-S	2.400	2.100	1.600	600	390
MBC1000-S	2.800	2.400	1.900	1.000	650
MBC1500-S	3.000	2.500	2.100	1.500	975
MBC2000-S	3.300	2.800	2.300	2.000	1.300
MBC3000-S	3.600	3.000	2.700	3.000	1.950
MBC4000-S	3.700	3.050	2.900	4.000	2.600
MBC6000-S	4.060	3.350	3.200	6.000	3.900
MBC8000-S	4.520	3.750	3.650	8.000	5.200
MBC10000-S	4.980	4.100	3.900	10.000	6.500
MBC12000-S	5.260	4.250	4.100	12.000	7.800

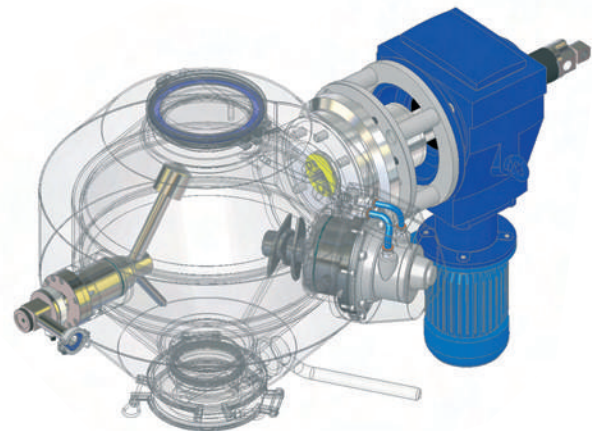
# BICUUM

## Biconical vacuum dryer MBC-S



### GENERAL DIMENSIONS PILOT PLANT

Dimensions in mm.	A	B	C	TOTAL VOLUME (l.)	MAXIMUM USEFUL VOLUME (l.)
MBC0030-S	2.100	1.400	850	30	20
MBC0050-S	2.250	1.500	900	50	32
MBC0100-S	2.400	1.600	950	100	65



### TECHNICAL INFORMATION

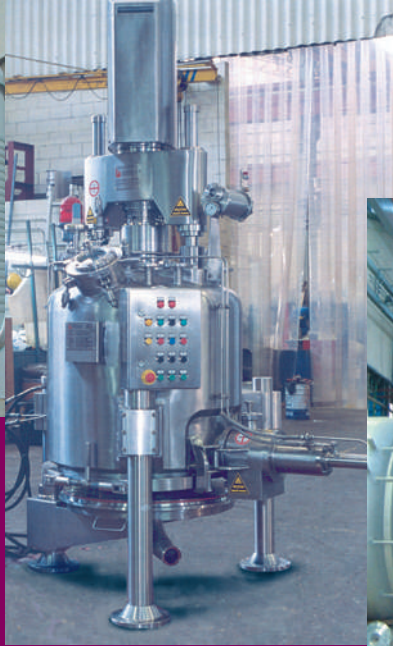
**Maximum vacuum level:**  
0,5 mbar  
(higher vacuum levels upon request)

**Maximum vacuum loss:**  
20 mbar l/s, with vacuum equipment turned off  
(higher seal level upon request)<sup>a</sup>

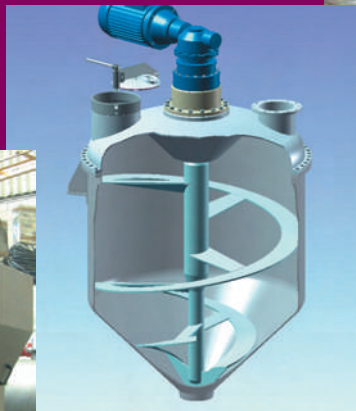
REACTION



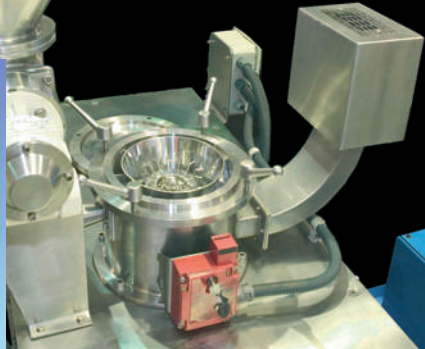
FILTRATION / DRYING



DRYING



BLENDING



MICRONIZING



HOMOGENIZING / DRYING



**b** **BACHILLER**  
Mixing and drying technology

**E.BACHILLER B. S.A.**

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