



MODULAR PROCESS
SOLUTIONS FOR
A FLEXIBLE WORLD

JET MIXER



POWDER MIXING

What is a Jet Mixer?

The smartest way to mix powder directly with liquids.

How it works

The patented nozzle system creates an accelerated jet, which draws in a significant amount of powder.

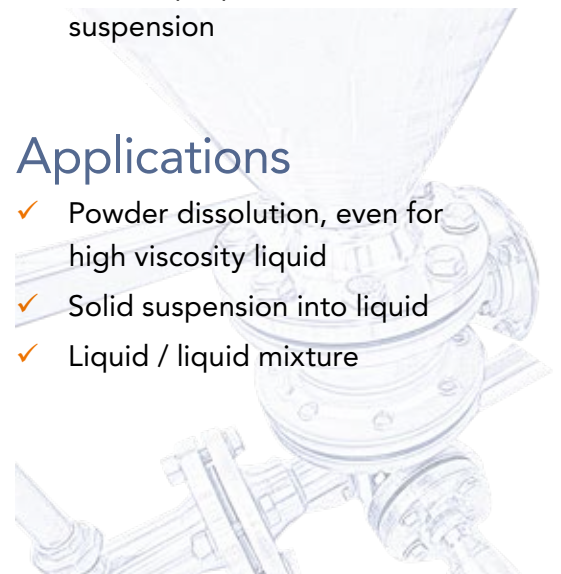


Features & Benefits

- ✓ Rapid mixing
- ✓ Complete dissolution of the powder
- ✓ No clumping of powder
- ✓ No moving parts = no maintenance
- ✓ Low footprint
- ✓ GMP design
- ✓ No introduction of shearing forces on the powder, thus preserving all their properties for solids suspension

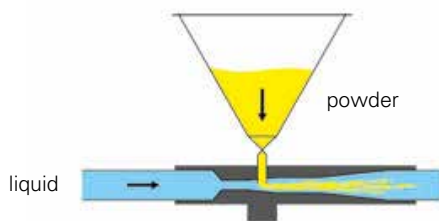
Applications

- ✓ Powder dissolution, even for high viscosity liquid
- ✓ Solid suspension into liquid
- ✓ Liquid / liquid mixture



JET MIXER

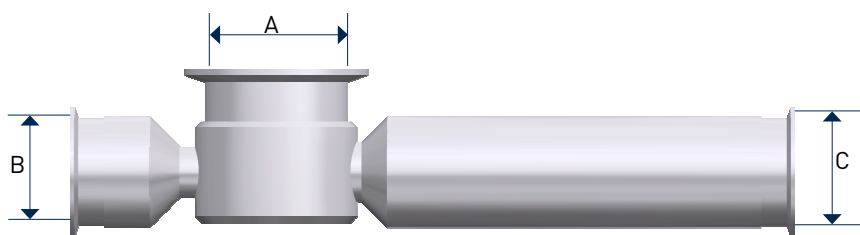
Operating principle



Dosing and mixing system application



Available Dimensions

[illegible]

Mobile skid



Skid for big bag discharging up to 25t/h



JETBREAKER



DELUMPING

What is a JetBreaker?

Simple solution for reducing agglomerated bulk material.

How it works

The raw material coming from FIBC, bag, barrel, equipment such as dryers, etc. is fed by gravity into the JetBreaker. The agglomerate is sheared between the stator and the rotor until resulting particles are smaller than the grid. (various sizes available) Thanks to the specific geometry of the milling chamber, the product is always in motion, thus ensuring the complete removal lumps.

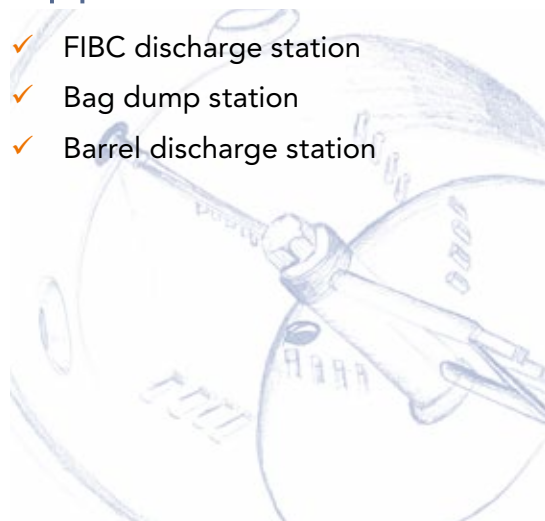


Features & Benefits

- ✓ Single block up 0.5m reduced to few mm grains in one step
- ✓ Low footprint
- ✓ GMP design
- ✓ High yield
- ✓ In-line or stand-alone unit
- ✓ Available in ATEX execution

Applications

- ✓ FIBC discharge station
- ✓ Bag dump station
- ✓ Barrel discharge station



JETBREAKER

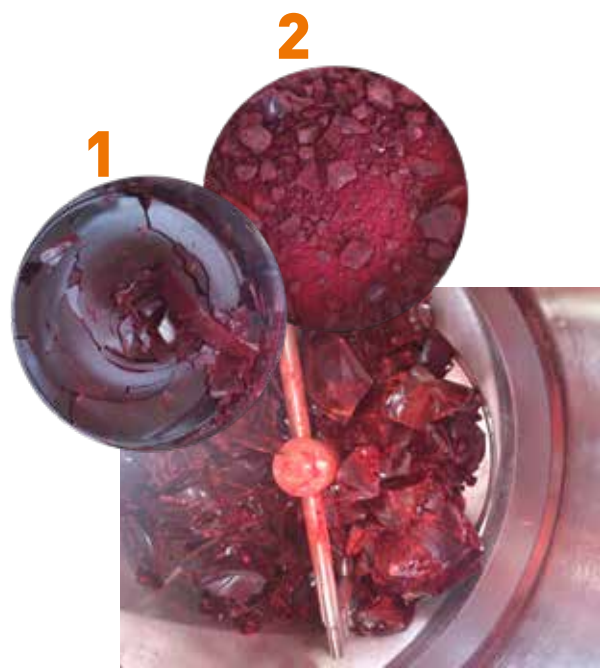
Electropolished execution



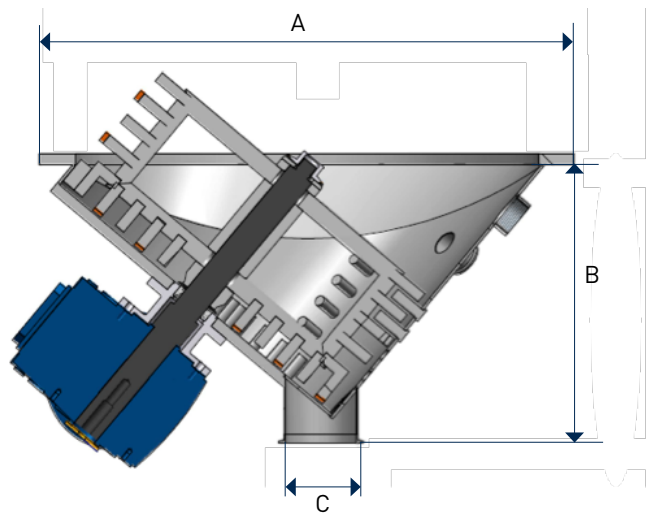
Milling chamber after CIP



Resin before and after delumping



Available dimensions



type 1

type 2

A	Ø650mm	Ø300mm
B	443mm	
C	DN100-DN200	DN80
	with calibration grid 10x10, 15x15 or 20x20	with calibration grid 10x10, 15x15

SPT SAMPLE TAKER



POWDER SAMPLING

What is an SPT Sample Taker?

Means for taking powder sample on a production line.

How it works

The carved piston/screw is advanced into the product stream to retrieve the powder sample.

The control of the motion/speed of the piston/screw allows perfect control of the amount and time of collection.

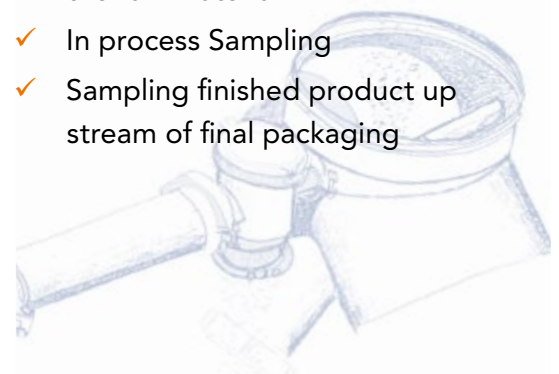


Features & Benefits

- ✓ Available in high containment version (OEB 5)
- ✓ Available in ATEX (Eex) execution
- ✓ Customized connection to specific vessel
- ✓ No friction parts in the product stream
- ✓ GMP design
- ✓ Continuous sampling

Applications

- ✓ Sampling during the unloading of the raw material
- ✓ In process Sampling
- ✓ Sampling finished product up stream of final packaging



SPT SAMPLE TAKER

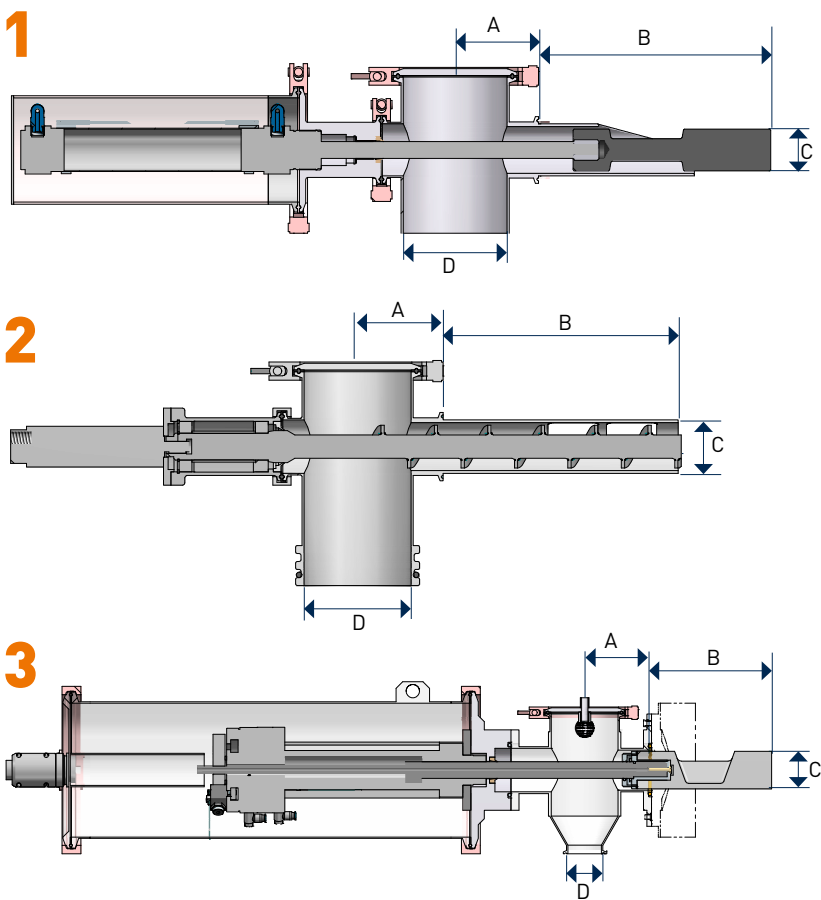
Continuous liner for high containment/
Threaded bottle connection



Magazine for
automated
bottle change



Available Dimensions



Secured vial with
depressurization for
the sampling



	1 Piston		2 Screw		3 Spoon
A	220mm	A	300mm	A	270mm
B	300mm	B	220mm	B	170mm
C	Ø40mm piston	C	Ø40mm screw	C	Ø56mm spoon-piston
D	customized connection to customer need	D	customized connection to customer need	D	customized connection to customer need

SAK- EXTRACTION CONE VALVE



POWDER EXTRACTION

What is a SAK- extraction cone valve?

Conical extraction valve for bulk products from good to poor flow properties and from medium to large silos.

How it works

The lifting of the extraction cone raises the product column, thereby breaking any bridges material. Circular product extraction ensures mass flow from the silos, thus avoid demixing.

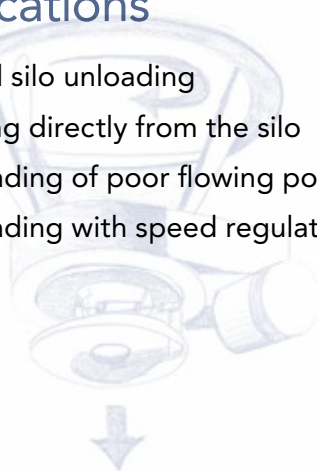


Features & Benefits

- ✓ Allows the extraction of poor flowing powders
- ✓ First-in First-out
- ✓ Avoid the segregation of mixture
- ✓ Adjustable unloading speed
- ✓ Available in different sizes from Ø480 to 1800mm
- ✓ GMP design
- ✓ Available in ATEX execution

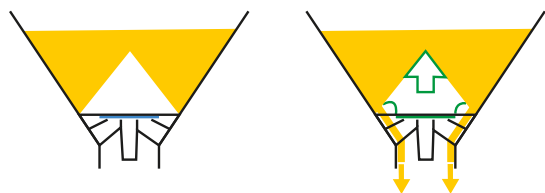
Applications

- ✓ Rapid silo unloading
- ✓ Dosing directly from the silo
- ✓ Unloading of poor flowing powders
- ✓ Unloading with speed regulation



SAK - EXTRACTION CONE VALVE

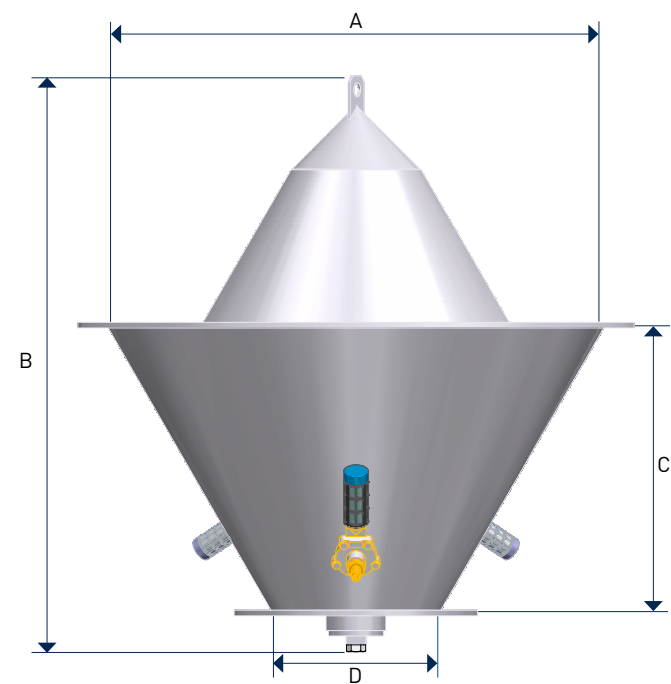
Operating principle



Silo discharge



Available dimensions



SAK closed and open position



	SAK480	SAK620	SAK900	SAK1200	SAK1500	SAK1800
A - Inlet diameter	480mm	620mm	900mm	1200mm	1500mm	1800mm
B – Total height	600mm	785mm	950mm	1075mm	1075mm	1520mm
C – Outlet diameter	200mm	300mm	300mm	610mm	900mm	900mm
D – Housing height	350 mm	285mm	530mm	560mm	595mm	905mm
Weight	80kg	100kg	220kg	415kg	475kg	500kg

LIQUEFYER



POWDER EXTRACTION

What is a Liquefyer ?

Powder extraction system for bulk products with middle to poor flow properties.

How it works

The blade continuously rotates around the entire discharging hopper, breaking the friction between the product and the wall, allowing a continuous discharge of the powder with low flowability.

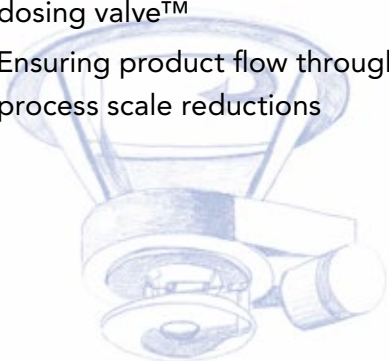


Features & Benefits

- ✓ No moving parts in contact with the product thanks to the Dynaform™ membrane
- ✓ GMP design
- ✓ Low footprint allows easy integration
- ✓ Available in different sizes from Ø100 to 200mm
- ✓ Available in ATEX execution

Applications

- ✓ Fast, accurate dosing when combined with the Dosimat™ dosing valve™
- ✓ Ensuring product flow through process scale reductions



LIQUEFYER

Quick disassembly version for cleaning or maintenance

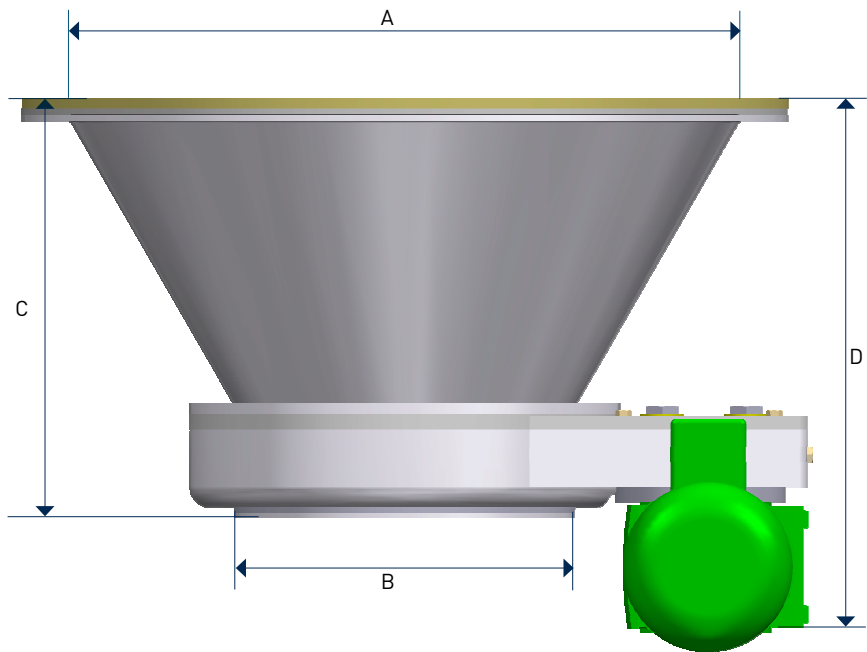


Feeding a PST injector



Dynaform™
EPDM, FEP, PUR

Available dimensions



type	A – Inlet connection	B – Outlet connection	C – Height	D – Total height	Weight
AA-200/600	620mm	200mm	380mm	495mm	85kg
AA-150/600	620mm	150mm	410mm	495mm	90kg
AA-100/600	620mm	100mm	455mm	495mm	90kg

VTR HOMOGENIZER



POWDER MIXING

What is a VTR Homogenizer?

Add shear to your mixing process to speed mixing of hard to mix particles using our in-line size reducer.

How it works

The liquid containing suspended particles is pumped to the homogeniser and successively through the following zones:

1. Acceleration zone: increases the kinetic energy
2. Turbulence: abrupt change of direction of flow
3. Impact area: Particle size reduction



Features & Benefits

- ✓ Homogeneous size reduction
- ✓ Guaranteed repeatability
- ✓ Continuously adjustable homogenising chamber (even during the production)
- ✓ No moving parts
- ✓ GMP design

Applications

- ✓ Homogeneous mixing line in combination with the PST injector

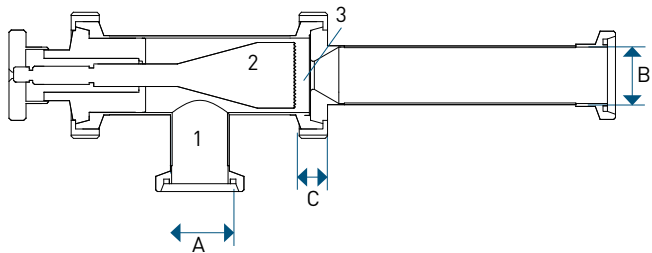


VTR HOMOGENIZER

Plate-mounted homogenizer

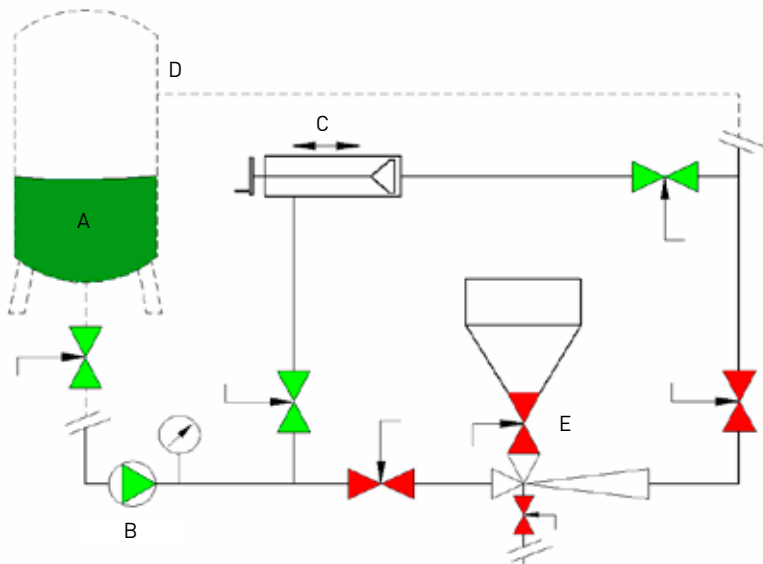


Layout



A	Non-homogeneous premix feeding DN25/40/50/65//80/100
B	Homogeneous mixture outlet DN25/40/50/65//80/100
C	Continuous turbulence adjustment

Typical layout



A	Premix tank
B	pump
C	VTR homogenizer
D	Return of homogenized product into tank (also possible to use VTR in in-line process)
E	Jet-Mixer used for the primary mixing of powder into liquid

Mobile skid with Jet-Mixer, pump, homogenizer and electrical control



DRUM TIPPER



DRUM HANDLING

What is a Drum Tipper?

The JetSolutions Drum Tipper provides a solution to move, lift and swing a drum in a horizontal position in a safe way.

How it works

The drum can be loaded on the drum tipper from the floor. One adjustable belt in stainless steel secures the drum on the stainless steel cradle. A pneumatic drive swings the drum in horizontal position in order to be connected to the next step of the process.

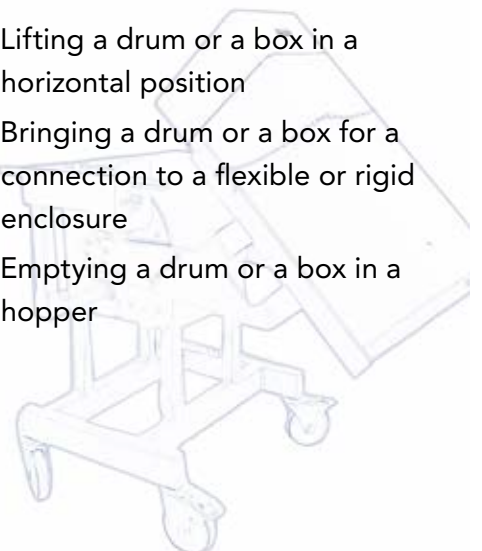


Features & Benefits

- ✓ Safe handling of heavy drums
- ✓ Available in mobile or fixed design
- ✓ Powered with air pressure
- ✓ Available in ATEX execution

Applications

- ✓ Lifting a drum or a box in a horizontal position
- ✓ Bringing a drum or a box for a connection to a flexible or rigid enclosure
- ✓ Emptying a drum or a box in a hopper



DRUM TIPPER

Mobile drum tipper in operation



Drum loading

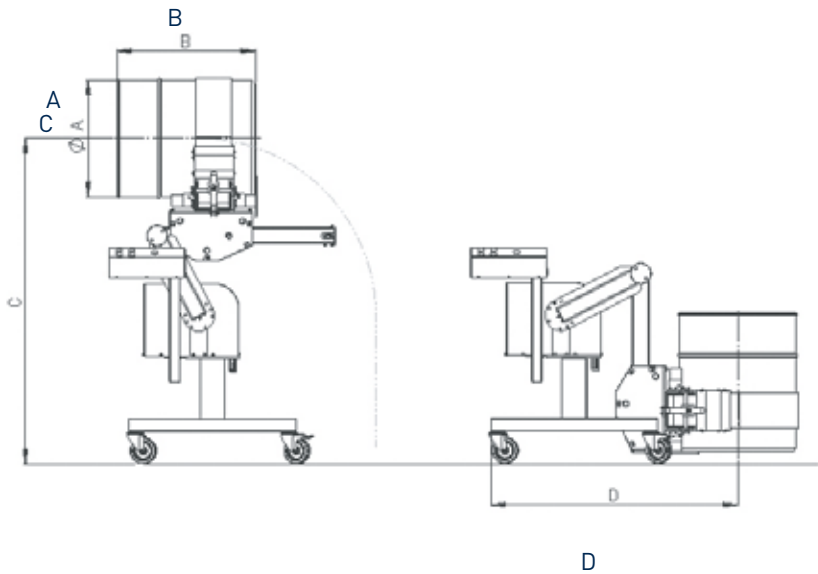


In Horizontal position



In forward position

Available dimensions



Drum size		
A	340>550mm	Diameter
B	400>1000mm	Length

Drum size		
C	~1500mm	Swinging height
D	~1150mm	Drum position in loading state

Installing a box from the floor



Drum tipper integrated in a process equipment



BAG DUMP STATION



BAG EMPTYING

What is a Bag Dump Station?

Station to unload solids in clean and safe way.

How it works

Depending on the size, weight, pace and level of containment, the product can be fed by:

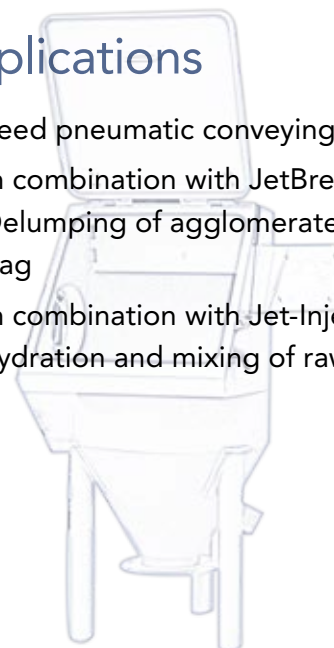
- the front door
- dedicated door for the semi-continuous loading the side airlock

Features & Benefits

- ✓ Various configurations depending on containment constraints (from OEB1 to OEB5)
- ✓ Custom manufacturing with various handling assistance
- ✓ System outlet adapted to your downstream equipment or process

Applications

- ✓ Feed pneumatic conveying line
- ✓ In combination with JetBreaker, Delumping of agglomerated 25kg bag
- ✓ In combination with Jet-Injector, hydration and mixing of raw materials



BAG DUMP STATION

Big bag dump station with storage capacity



Hybrid system



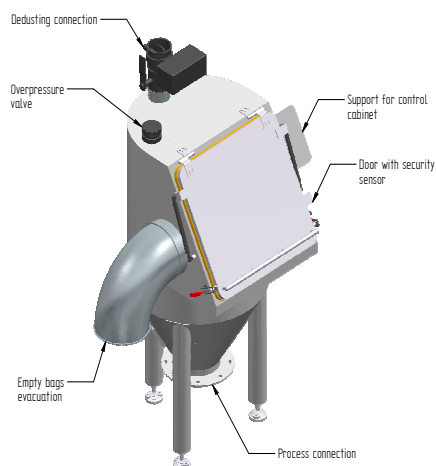
Receipt prep



Option side table with roll conveyor



Layout



Option- SAS door containment application





PNEUMATIC CONVEYING

What is a PCS ?

Move powder safely and pneumatically with either a push or pull action depending on your application.

How it works

The choice between over or under-pressure conveying is in function of the distance, height of transfer, density and characteristics of the powder. Depending on the mode of conveying, the powder is pushed or pulled through the piping by gas (air or nitrogen). The end point is the filter separator for separating air (vacuum or pressure) of the powder.

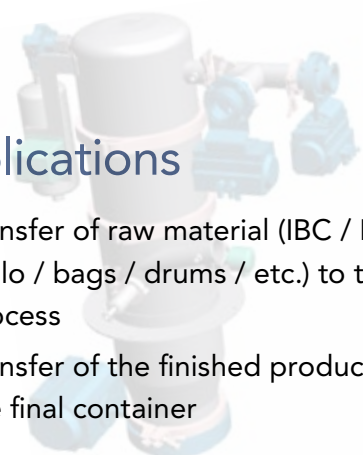


Features & Benefits

- ✓ Wide range of product able to convey from few kg to several tons per hour
- ✓ Capability to determine the filtering surface and pump required for each application
- ✓ GMP design
- ✓ Available in explosion proof and ATEX approved executions
- ✓ Easy access and cleaning

Applications

- ✓ Transfer of raw material (IBC / FIBC / Silo / bags / drums / etc.) to the process
- ✓ Transfer of the finished product to the final container

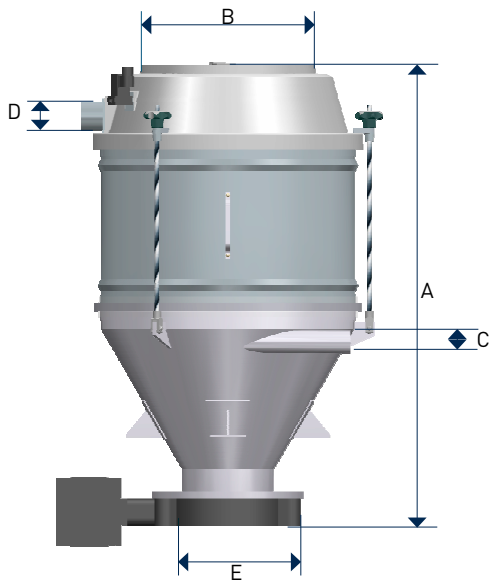


PCS

PCS for recipe prep 6 t/h
of capacity



Available dimensions

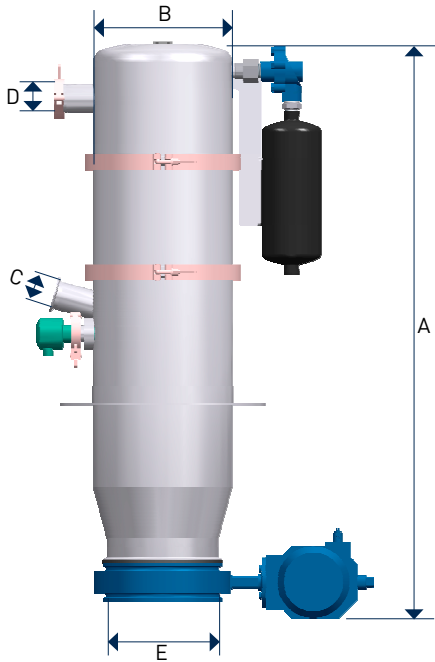


	F15	F25	F60
Volume [l]	60	60	60
A – Height [mm]	1200	1450	1450
B – Diameter [mm]	570	570	570
C – Product inlet	DN40 / DN80	DN40 / DN50	DN50
D – Clean air connection	DN40 / DN50	DN40 / DN50	DN50
E – Product outlet	DN 150	DN 200	DN 250
Filtration surface [m²]	1.5	2.5	6

PCS



Available dimensions



	PCS200	PCS 250	PCS300
Volume [l]	9	20	27
A – Height [mm]	970	1060	1150
B – Diameter [mm]	200	250	300
C – Product inlet	DN40 / DN50	DN40 / DN50	DN50
D – Clean air connection	DN40 / DN50	DN40 / DN50	DN50
E – Product outlet	DN 150	DN 200	DN 250
Transfer capacity [l/h]	up to 1200	up to 2400	up to 3250

ATMOSPHERIC CONTROLE MODULE



AIR CONTROL SYSTEM

What is an Atmospheric Control Module (ACM)?

Designed for use with cascading HVAC systems, ACM's ventilation unit and precise fan speed deliver accurately controlled negative air pressure to ensure proper flow into flexible wall or zippered isolators, while reducing the risk of worker exposure. The Atmospheric Control Module can also deliver positive air pressure for applications requiring sterility, or to help in controlling relative humidity when containment is not necessary.

How it works

The pressure inside the enclosure measured with high precision is used to control fan speed and gas inlet. The flow of gas pass through filter which can use the safe change filter technology.

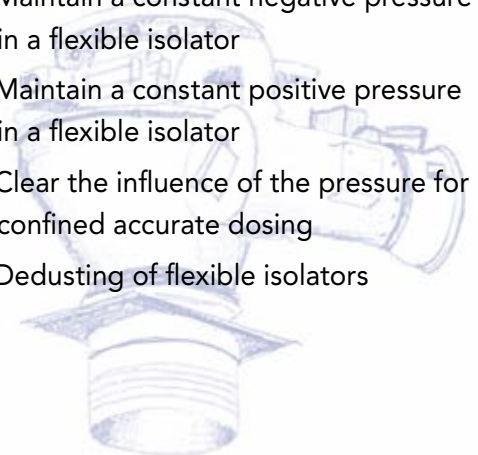


Features & Benefits

- ✓ Holding a negative or positive pressure inside a contained compartment during all the process.
- ✓ Fixe or mobile unit
- ✓ Ventilation unit can be installed in a separate room as the contained compartment
- ✓ Available in ATEX execution

Applications

- ✓ Maintain a constant negative pressure in a flexible isolator
- ✓ Maintain a constant positive pressure in a flexible isolator
- ✓ Clear the influence of the pressure for confined accurate dosing
- ✓ Dedusting of flexible isolators

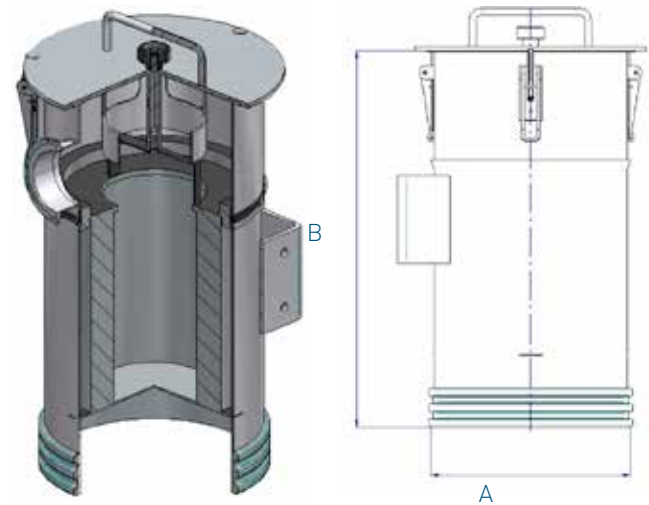


ATMOSPHERIC CONTROL MODULE

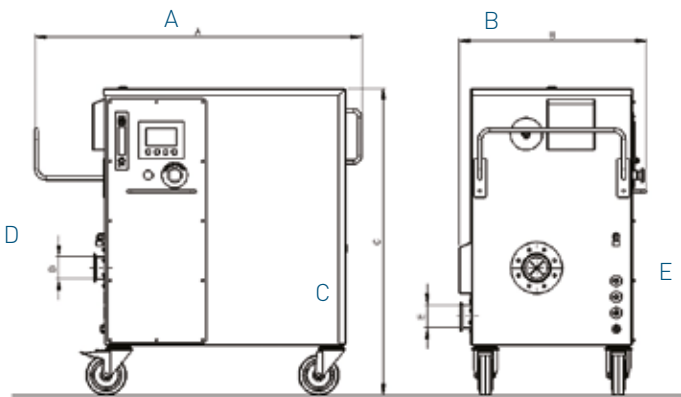
Push push filter



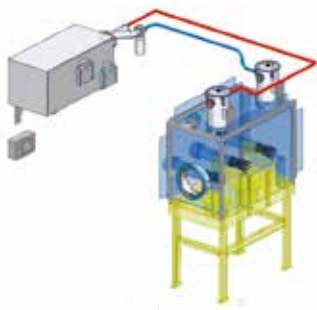
Safe change filter unit (push push)



Ventilation unit



Process venting application



	300m ³ /h
A -Diameter	280mm
B - Length	860mm
Filtration class	H14

Vent unit

A -Depth	1025mm
B - Width	587mm
C-Height	959mm
D- Inlet diameter	DN 65 DIN 32676
E-Outlet diameter	DN 65 DIN 32676

Flexible enclosure venting application



FIBC DOCKING



FIBC HANDLING

What is a FIBC DOCKING?

Tight, dust-free connection of the FIBC to be discharged.

How it works

The outlet liner of the FIBC is pinched between the top-plate seal and the discharging pipe.



Features & Benefits

- ✓ Easy to use
- ✓ ATEX approved
- ✓ Optional dedusting system allows clean disconnection of empty FIBC
- ✓ Improved discharge flow
- ✓ GMP design

Applications

- ✓ FIBC discharge station
- ✓ Direct mounting on the manhole of the reactor



FIBC DOCKING

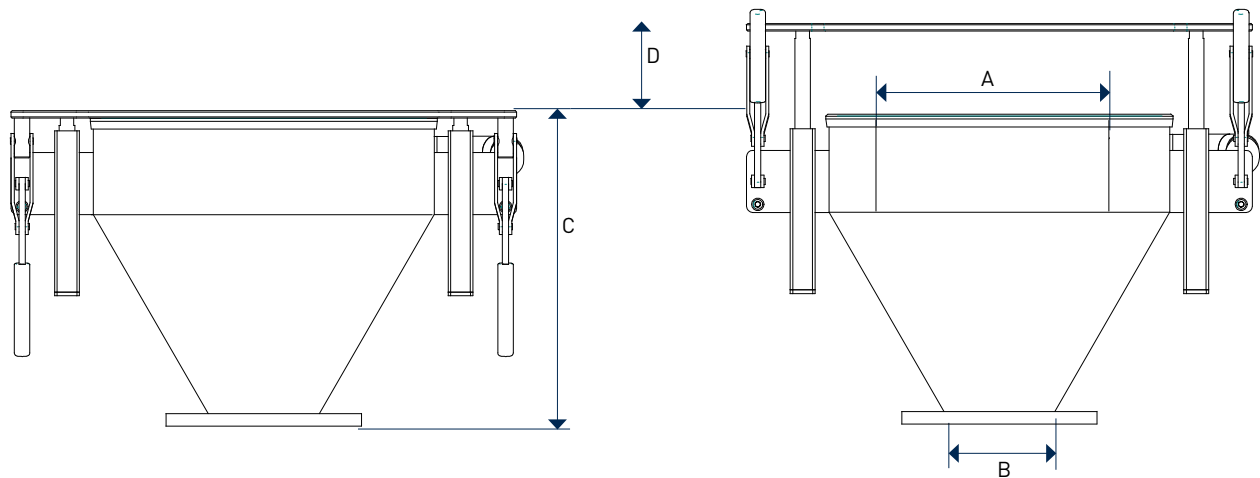
With FIBC discharging spout closing valve



FIBC Docking butterfly valve



Available dimensions



A	Discharging spout connection Ø380mm*	C	Total height (closed position) 500mm*
B	Connection to downstream equipment Ø200mm *	D	Stroke of the upper plate 140mm

* other dimension on request

FIBC docking in combined with bag dump hopper



Into glove-box



FIBC DISCHARGE STATION



POWDER HANDLING

What is a FIBC discharge station?

Complete installation for discharge FIBC.

How it works

Custom made installation to meet the most stringent requirements in terms of finishing and containment.

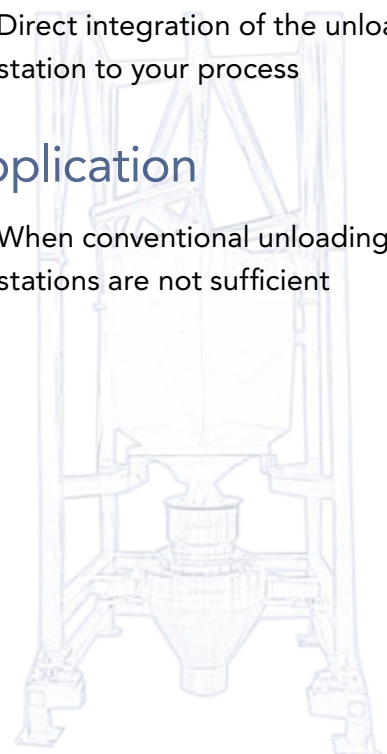


Features & Benefits

- ✓ Designed to meet the regulatory and performance demands of your industry
- ✓ Facilitate unloading of systems to agglomerated powders
- ✓ Direct integration of the unloading station to your process

Application

- ✓ When conventional unloading stations are not sufficient



FIBC DISCHARGE STATION

FIBC station with
titling table,
lumpbreaker and
Jet-Mixer

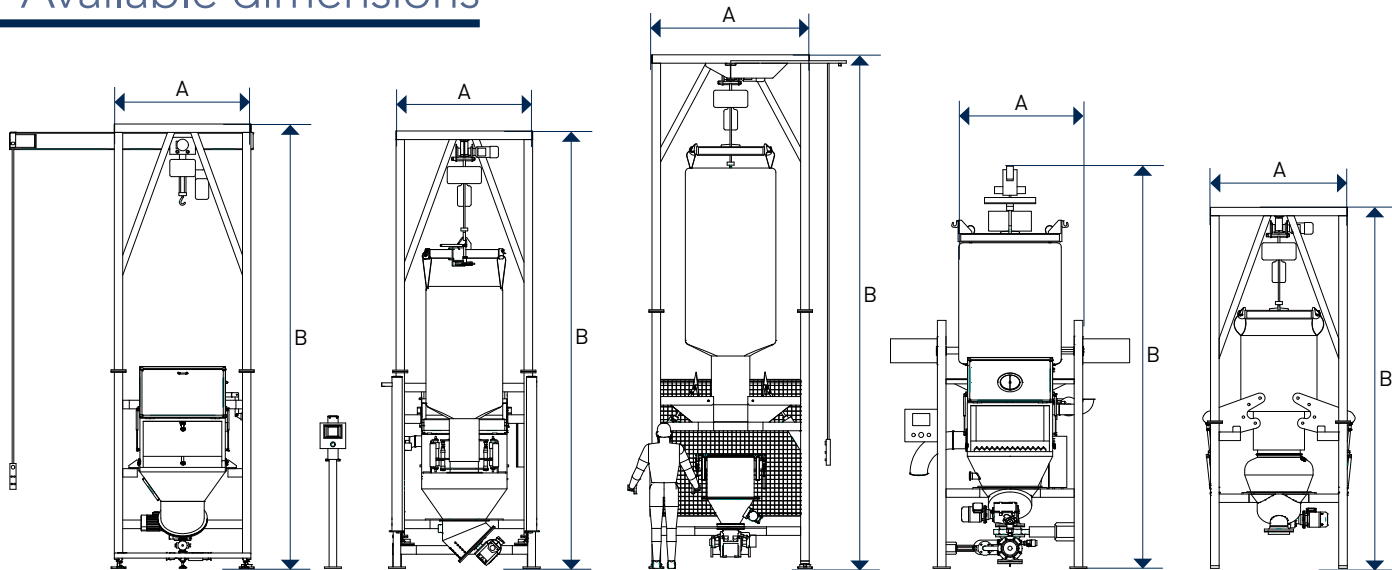


Delumping systems



A	Tilting table
B	Compression plates
C	Massage rods
D	Swinging massage with 6 rolls

Available dimensions



A	Floor space requirement 1600-1900mm depending to the size of FIBC
B	Total height 3000-6500mm depending to the size of FIBC and downstream equipments



CLEANING SOLUTIONS

What is a WIP-CIP ?

The Jetsolutions Washing-in-place and Cleaning-in-place Systems are customized solutions, which provide the cleanness for single devices to complete production lines.

How it works

Preparation of different utilities for cleaning and execution of the different cleaning cycle.

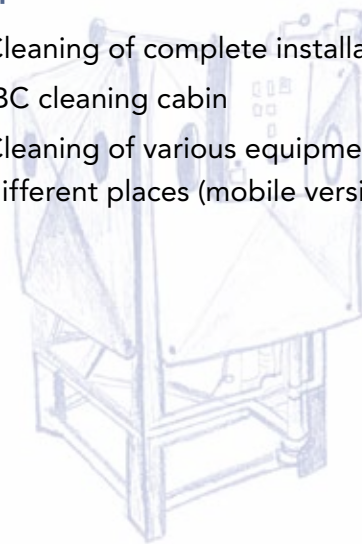
Features & Benefits

- ✓ Full-computerized automatic cleaning
- ✓ Available in mobile or fixed design
- ✓ Reliable and reproducible cleaning
- ✓ Cleaning validation



Applications

- ✓ Cleaning of complete installation
- ✓ IBC cleaning cabin
- ✓ Cleaning of various equipments at different places (mobile version)



WIP-CIP

Container washing cabin



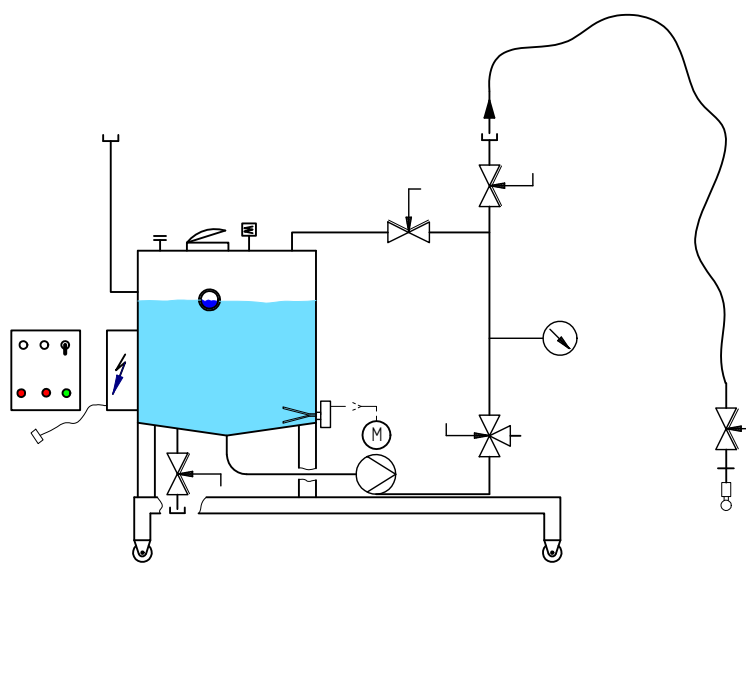
CIP system



CIP transfer panel



Typical layout



WIP-CIP



MULTI-DOSIMAT



POWDER DOSING

What is a Multi-Dosimat?

Multi-purpose unit for fluidizing, dosing and weighing of powders.

How it works

The combination of the extraction unit (Liquefyer) and the metering unit (Dosimat) allows to perform a fast and accurate dosing. The special blade and protective membrane (optional) ensure the insistent feeding of the dosing unit, even if the powder has poor flow properties. The dosing valve decreases its opening as the amount of the powder is approaching the setpoint. In this way, the speed and the accuracy are optimized.

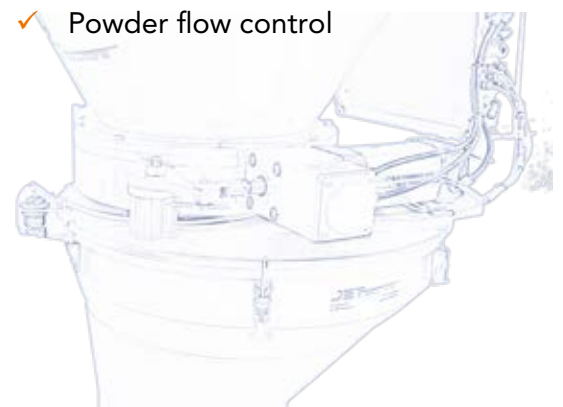


Features & Benefits

- ✓ Fast and accurate dosing
- ✓ ATEX approved
- ✓ Improved discharge flow
- ✓ GMP design
- ✓ Intuitively configurable recipes

Applications

- ✓ Subdivision and packing of finished product
- ✓ Powder flow control

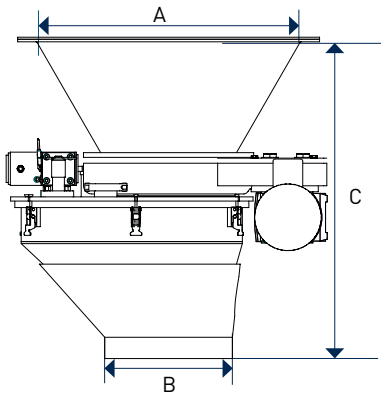


MULTI-DOSIMAT

Dosicon IBC discharge station



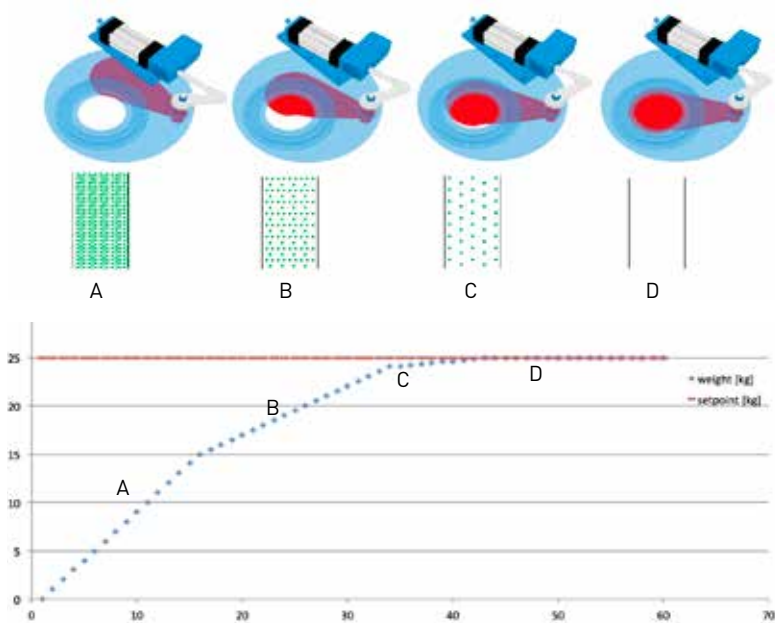
Available dimensions



Type	AAD-100	AAD-150	AAD-200
A, Ø powder feeding	620mm		
B, Ø dosed powder out [mm]	160mm*	210mm*	260mm*
C, total height [mm]	720mm	730mm	690mm

* could be adapted to specific downstream process

Dosing steps



A	Full opening at the beginning, fast dosing
B	Middle opening in approach to the setpoint, intermediate dosing
C	Small opening alternating with closed position, accurate dosing
D	Closed, setpoint reached

Bag dump station, lumpbreaker and Multi-Dosimat mounted on the lifting column to dose into IBC





IBC SYSTEMS

What is a Dosicon?

IBC with conical closing valve allowing dust-free filling and discharging of bad-flowing powders.

How it works

The conical valve container «Dosicon» is used to receive, mix, store and discharge powders for formulation preparation.

The closing cone valve enters and vibrates in the heart of the product thus allowing controlled discharge of any type of powder. The unloading station is equipped with a discharge cone so-called active, coming to connect to the closing cone of the container. The interface between these two cones are not in direct contact with the product during the discharge.

Therefore, when the container is removed from the discharge station, there is no emission of dust as in conventional container with butterfly valve.

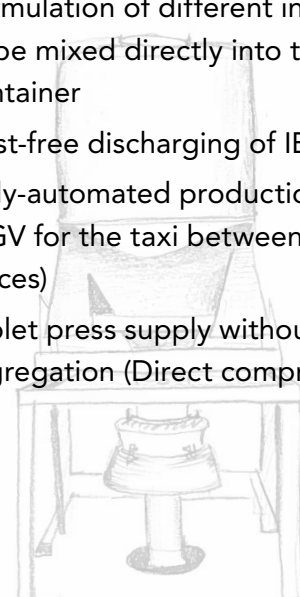


Features & Benefits

- ✓ Dust-free container filling and emptying
- ✓ Discharging of poor-flowing powders
- ✓ Discharging of mixed powders while maintaining product consistence
- ✓ Speed controlled discharge

Applications

- ✓ Formulation of different ingredients to be mixed directly into the container
- ✓ Dust-free discharging of IBC
- ✓ Fully-automated production line (AGV for the taxi between differents places)
- ✓ Tablet press supply without segregation (Direct compression)



Fully automated tablet manufacturing facility

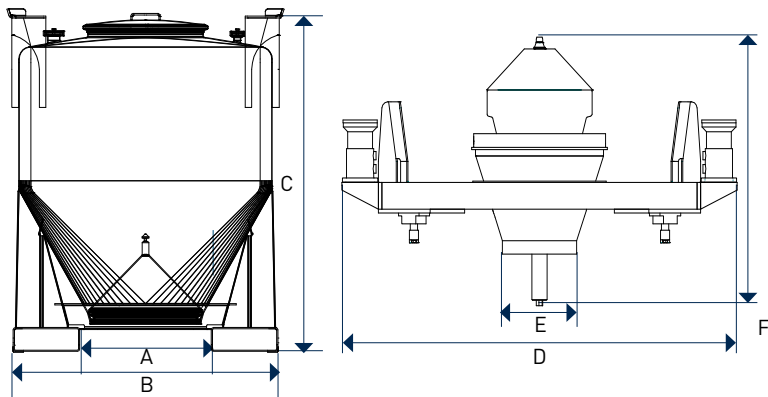


Operating principle

- | | |
|---|-----------------------------------------------|
| 1 | Placing the IBC on the unloading station |
| 2 | Connection of the active and passive cone |
| 3 | Discharge |
| 4 | Disconnection of the active and passive cone |
| 5 | Removal of the IBC from the unloading station |



Available dimensions



IBC

Capacity	500l	1000l	1500l	2000	2500*
A	Ø discharge: 470mm				
B	Floor space requirement 1160 mm				
C	1025l	1450l	1845l	2300l	2750l
weight (PE)	155 (190)	180 (230)	210 (270)	230 (310)	255

* not available in PE

IBC discharge station

D	Floor space requirement 1320x1620mm
E	Ø Discharge: 300mm
F	Total height: 1010

Dosing into dosicon IBC



1000 liters IBC



JET-CLEANER



DEDUSTING

What is a Jet-Cleaner?

Dust collection system to keep clean and safe the working environment.

How it works

The Jet-Cleaner is connected to the dust emission points of the installation. The dust is sucked through the filter system and is collected. The filtration and collection system are selected depending on the required containment level (from dust-free to high containment OEB5).



Features & Benefits

- ✓ Available for wide flow range (from a few to several hundred m³/h)
- ✓ Available from dust-free to high containment installation
- ✓ The high containment can be kept even when replacing the filter

Applications

- ✓ Silo dedusting
- ✓ Centralized dedusting unit for powder handling plant
- ✓ Mobile unit for several points dedusting

JET-CLEANER

Deduster for high containment application



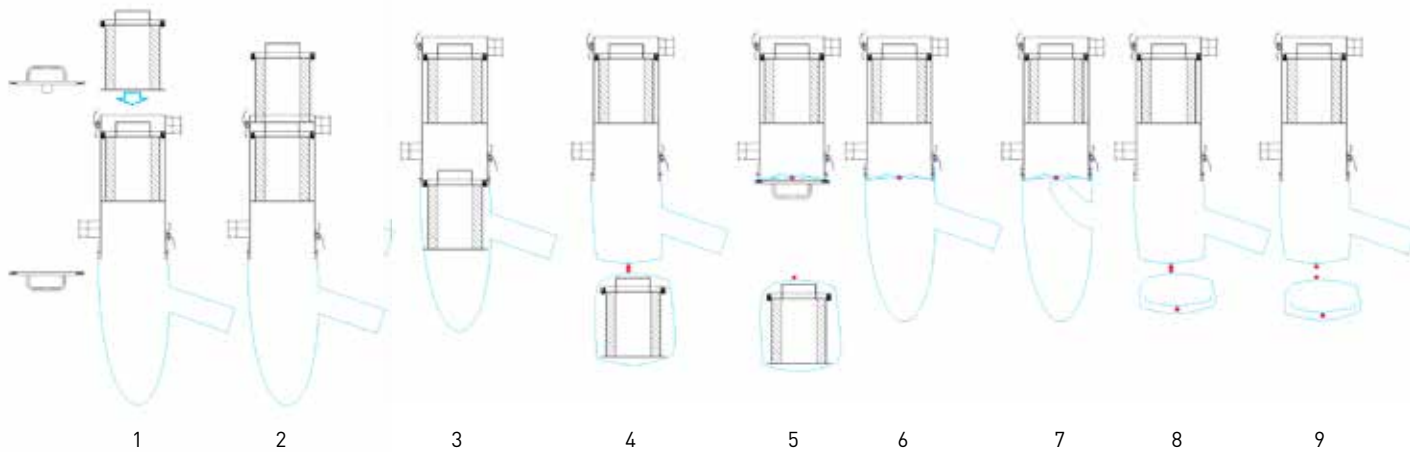
Silo dedusting



Central dedusting system



Safe filter change



HOW TO CHANGE THE FILTER

1	Remove the upper lid	4	Use the liner to remove the filter from the JetCleaner housing	7	Use the side sleeve to remove the stub
2	Use the new filter to push the old one	5	Twist, crimp and cut	8	Twist, crimp and cut
3	The new filter is in place	6	Place the new liner	9	JetCleaner ready to operate

CONTAINED PACK-OFF SYSTEM

MKT-0207 REV B



POWDER HANDLING

What is a Contained Pack-Off System?

The Pack-Off System consists of a set of modules and custom adaptations allowing to unload of your equipment (typically dryer and mixer) containing the end-product, to dose and to pack under high level of containment. The core of the system is composed by the skid, dosing valve, mass decoupling, scale and the containment. Depending on the needs of your process, additional components such as Conical mill, Screener, Sampler, etc. are grafted onto the core.

How it works

Connected to the output of your equipment, your product is if required processed (milling, sieving, sample taking, etc.), buffered, fluidized and dosed. The accuracy is achieved through our fluidizing/dosing device, our mass decoupling device, our internal pressure regulation system and our metering software.

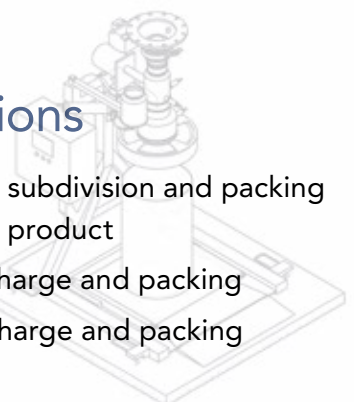


Features & Benefits

- ✓ Reproducible dosing accuracy up to 0.1%
- ✓ Pressure regulation system cancelling the influence of the pressure on the scale
- ✓ Pressure regulation system ensuring the smooth flow of the powder into the final container
- ✓ OEB 5 (<1g/m³) level containment
- ✓ GMP design
- ✓ ATEX and UL approved
- ✓ Dosing software covering all types of powder
- ✓ CIP
- ✓

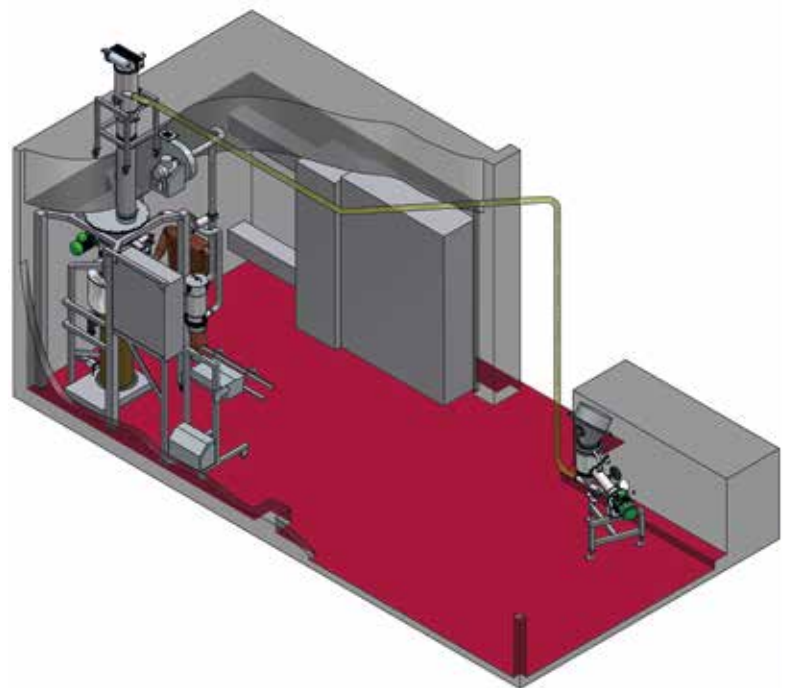
Applications

- ✓ Contained subdivision and packing of finished product
- ✓ Dryer discharge and packing
- ✓ Mixer discharge and packing

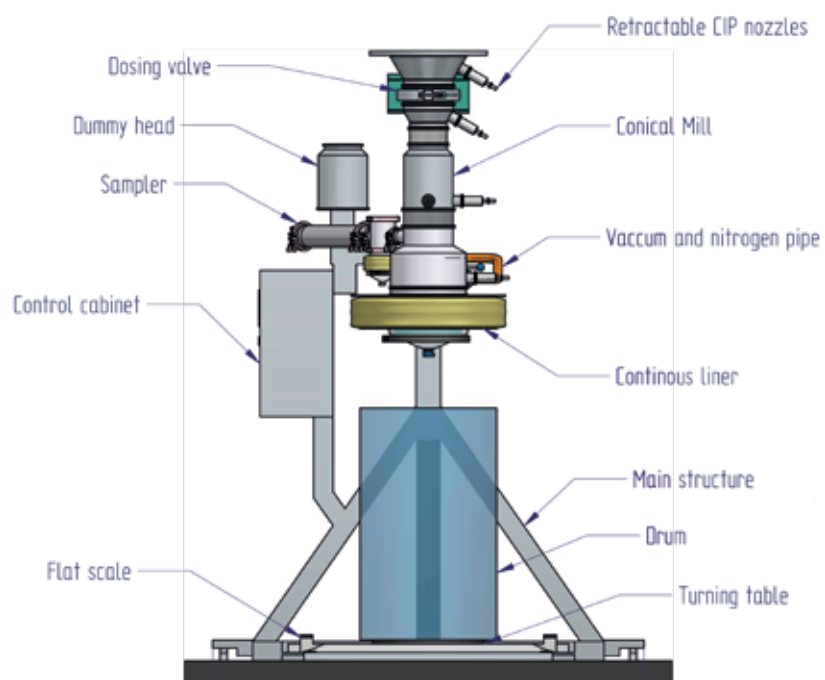


CONTAINED PACK-OFF SYSTEM

Pack-Off station with conical sieve mill vacuum conveyor and sample taker



Mobile CIP Pack-off station with conical sieve mill and sample taker



BEYOND BOUNDARIES™

Innovators at our core, we develop engineered solutions for our customers' complex problems. Recognized globally for our flexible containment solutions, ILC Dover serves customers in a diverse range of industries, including pharmaceutical and biopharmaceutical manufacturing, personal care, food and beverage, chemical, aerospace, healthcare and government agencies. At ILC Dover, quality is a culture, not a measurement. Our customers will tell you that we cater to their every need and that we're highly innovative, responsive, dedicated and competitive. We have been innovating since 1947. ILC Dover's visionary solutions improve efficiency, safeguard workers and product, and prevent disasters — proof that we are on the front line of business excellence.

Engineering evolution beyond boundaries.



Europe Hub

ILC Dover SA

Montena 89

CH-1728 Rossens

Switzerland

infoswitzerland@ilcdover.com

+41 26 492 68 00

USA

PH + 1 302 335 3911

Sales & Customer service

PH + 1 302 335 3911 x506

or 800 631 9567 (US Toll Free)