About Dec

Founded in 1987, Dec is a leading global provider of powder handling systems to the pharmaceutical, chemical, food and cosmetic industries. Their turnkey and custom designed solutions have been successfully integrated into complex operations in hundreds of companies worldwide, both multi-nationals and specialists.

The Dec range covers every facet of powder handling, including:

- Transferring
- Filling
- Emptying
- Dosing
- Blending
- Sampling
- Micronizing
- Milling
- Containment

Without exception, Dec products are of the highest quality. The options are infinite to suit the requirements of a diverse customer base, turnkey and custom built, and modified as required. All systems are modular to ensure simple integration into existing processes.

Over the years Dec has enhanced its global presence by opening subsidiary offices in Europe, America and Asia, creating a genuinely global organization providing full local support. In 2008 Dec acquired the Jetpharma product range, which includes world beating micronizing and containment systems.

Dec are established experts - innovators with an unparalleled depth of knowledge in their field. Their products are of the highest quality, at times challenging convention, always providing unique, effective solutions for forward thinking organizations.

Powder Handling Excellence

Dec Products

- PTS Powder Transfer System
- PTS Cleaning Device
- PTS Mobile
- PTS Feeder
- MicroPTS
- Pack Off Systems
- MPTS Sampling Device
- PTS Batchmixer
- PFL Powderflex
- DCS Drum Containment System Filling
- DCS Drum Containment System Emptying
- DCS Liquid
- DCS Inverter
- Dec Isocharge
- Big Bag Emptying
- Dec Isotube
- Lump Breaker Suction Lance
- Lump Breaker Pharma Design
- Suction Hopper
Transferring

**PTS Powder Transfer System**

- Unique filtration concept
- Safe handling of any wet or dry powder
- Ideal for toxic, hygroscopic or explosive powders < 1 mJ
- Oxygen exclusion
- Hygienic and sterile units
- Multi-purpose operation
- Contained
- Optimizes processes
- Thousands of working units worldwide

www.dec-group.net
PTS Powder Transfer System*

The PTS – Powder Transfer System* is an exceptionally effective and reliable method of transferring and dispensing both dry and wet powders and granules. Its unique filtration concept with a flat membrane makes it the only vacuum dense-phase system available on the market today.

The PTS challenges convention, using both vacuum and pressure to move powders as if they were liquid, dispensing with the need for gravity charging, making multi floor processes a requirement of the past. The system is a significant enhancement to any process, providing total containment where necessary, but always speeding up production whilst improving safety and hygiene. Batch time can be substantially reduced and existing process steps can be linked to each other.

There are currently over 3000 Powder Transfer Systems operational worldwide.

Design
- AISI type 316L stainless steel, electro-polished
- 3 or 6 bars design pressure
- DIN or ANSI flanges

Features
- Empties or fills all process equipment (including reactors, dryers and centrifuges)
- Transfers all powders (sticky, fine, non-free flowing, hygroscopic, humid, etc)
- Safe transport of toxic < 1µg/m³ or dust explosive powders < 1mJ
- Charges directly into closed vessels under vacuum or pressure
- Prevents dust creation
- Removes oxygen from powder before entering into the process
- Charges in the presence of solvents
- No product retention
- No particle damages
- Total containment
- Easy to clean – CIP system
- GMP compliant design, ATEX compliant

Options
- Various materials (HC22, internal coating, plastic, etc.)
- CIP
- Hygienic, sterile unit
- Explosion proof design 10 bars
- Portable unit

Dimensions

Conveying capacity (l/h) dependent on the powder characteristic

<table>
<thead>
<tr>
<th>PTS</th>
<th>50</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>h1</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>850</td>
</tr>
<tr>
<td>h2</td>
<td>520</td>
<td>600</td>
<td>680</td>
<td>800</td>
<td>810</td>
<td>830</td>
<td>860</td>
<td>1150</td>
</tr>
</tbody>
</table>

*patented
Cleaning

PTS Cleaning Device

- Fast cleaning and drying without PTS dismantling
- Spray nozzle or pressurized cleaning liquid not required
- Drying in place without additional features
- Sterilization in situ
- Minimal disruption to production
- No product contact
- Easy to install on existing PTS system
- Economical
- Effective

www.dec-group.net
PTS Cleaning Device

The PTS Cleaning Device ensures that the PTS Powder Transfer System can be cleaned automatically, in situ, with the cover in place.

A liquid separator installed in the upper part of the PTS body sucks liquids into the system - water or solvents depending on the powder transferred. A float in the main cover prevents the liquid from entering the vacuum line. The principle advantage over a spray nozzle is that it cleans the PTS body and the powder transfer hose at the same time.

The Cleaning Device is run with operational settings from the standard PTS control panel.

Design
- AISI type 316L stainless steel, electro-polished
- 3 or 6 bars design pressure
- DIN or ANSI flanges
- Available for models PTS 80 to 400

Features
- Full decontamination without human intervention
- Fully self-cleaning
- CIP with water or solvents
- No product retention
- No additional vacuum pump required
- Low cleaning liquid consumption
- Additional spray nozzle available for insolubles
- Anti-corrosion coating available
- Easy retrofit on existing system
- Also transfers liquids

Options
- Various materials (HC22, internal coating, plastic, etc.)
- Hygienic, sterile unit
- Remote cleaning device
Transferring

PTS Mobile

All the virtues of the PTS

- Unique filtration concept
- Safe handling of any wet or dry powder
- Ideal for toxic, hygroscopic or explosive powders < 1 mJ
- Oxygen exclusion
- Hygienic and sterile units
- Multi-purpose operation
- Contained
- Optimizes processes

And

- Easy redeployment

www.dec-group.net
Powder Transfer System Mobile

The portable PTS Powder Transfer System* allows the operator to charge multiple processes, giving maximum benefit for the investment. It provides all the benefits of the static system but is also easily dismantled for repositioning anywhere in the production unit. The control panel and vacuum pump remain permanently mounted on the trolley, while the PTS can easily be installed on the process equipment to be charged.

This exceptionally effective and reliable method of transferring and dispensing both dry and wet powders and granules uses both vacuum and pressure to move powders as if they were liquid, dispensing with the need for gravity charging, making multi floor processes a requirement of the past. The PTS is a significant enhancement to any process, providing total containment where necessary, but always speeding up production whilst improving safety and hygiene.

Design
- AISI type 316L stainless steel, electro-polished
- 3 or 6 bars design pressure
- DIN or ANSI flanges

*patented

Features
- Compact and space saving
- Control panel, vacuum pump, PTS and suction lance on a trolley
- Flexible and easy to install
- Ready for production in minutes
- Empties or fills all process equipment (including reactors, dryers and centrifuges)
- Transfers all powders (sticky, fine, non-free flowing, hygroscopic, humid, etc.)
- Safe transport of toxic < 1 µg/m³ or dust explosive powders < 1mJ
- Charges directly into closed vessels under vacuum or pressure
- Prevents dust creation
- Removes oxygen from powder before entering into the process
- Charges in the presence of solvents
- No product retention
- No particle damages
- Complete containment
- Easy to clean – CIP system
- GMP conforming design, ATEX compliant

Options
- Several adaptations available
- Various materials (HC22, internal coating, plastic, etc.)
- CIP
- Hygienic, sterile unit
- Explosion proof design 10 bars

Dimensions
Filling · Dosing

PTS Feeder

- Adapted for dosing a wide range of products
- Single operation, emptying, filling and dosing
- Optimal for equipment with limited head room
- CIP
- No requirement of dosing valve
- Accurate
- Single filling station for multiple discharge point
- Contained

www.dec-group.net
PTS Feeder

The PTS-Feeder* provides a single step solution for emptying process equipment and filling with accuracy bags, drums and big bags.

The system operates on the same principle as the PTS Powder Transfer System, but without pressure, filling both large and small receptacles. Combining speed with precision, a two speed system transfers the bulk of the powder rapidly. The discharge of the Feeder is effected by vibration and accurate dosing is guaranteed by an adjustable piston valve at the outlet. This device discharges most equipment into a wide range of different types of packaging, proving particularly effective when space above or below the equipment is limited.

The PTS Feeder is highly flexible and mobile, permitting an easy integration into existing process areas. Additional benefits are enjoyed when its one step operation results in eliminating conventional feed hoppers and intermediate silos.

Design
- AISI type 316L stainless steel, electro-polished
- Standard PTS Feeder models: 200/150, 150/100
- Electric motor 0.18 kW
- Special butterfly valves, easily dismountable
- ATEX zone 1/21

Features
- Empties several types of equipment (dryers, centrifuges, etc.)
- Optimal for dosing difficult products (fine, sticky, bridging, etc.)
- No requirement of intermediate hopper and dosing valve
- Integrated venting filter
- High transfer rate
- Precise powder dosing <20 g
- Discharges with limited space above and below
- Contamination free dosing and filling of bags, drums or FIBCs
- High containment level (<1 µg/m³) in combination with the DCS Drum Containment System
- Protects operator and product
- Operates under inert conditions
- Cleaning in place
- GMP compliant

Options
- Other materials available (Hastelloy, etc.)
- Double inlet
- Other sizes available

* Patent pending
Powder Handling Excellence

Microdosing

MicroPTS

- Dosing range from 1 mg to 100 g
- Adjustable dose during process
- Accurate and repetitive
- Unique filtration concept
- Easy to clean – CIP system
- Simple integration in existing filling systems
- Independent of bulk density variation

www.dec-group.net
Dec now offers a much-anticipated solution in the volumetric dosing of small quantities of powder. The product is filled in a calibrated chamber of variable volume by action of vacuum and emptied either mechanically by a piston or by applying pressure.

The MicroPTS* is based on the PTS technology and allows precise dosing of very small amounts (1 mg) of powder in less than a second, with an accuracy reaching up to 1%. High accuracy is achieved even with variation in bulk density, as the powder will be pre-compacted in the chamber by the vacuum effect.

The system is very compact and can be dismantled without tools. Another main advantage is its easy integration into dosing stations with multiple filling systems or products.

Design
Metal parts:
Stainless steel ISO 1.4435 or equivalent (AISI 316L)
Anodized Aluminum
Polymer components:
2002/72/EC and/or FDA compliant

Features
- No rotating or moving parts
- Very compact
- Dynamically adjustable volumes
- Hygienic design
- Fast, precise dosing process
- Volumetric and volumetric-gravimetric dosing
- Gravimetric or optical monitoring of each quantity of powder
- Simultaneous, multiple dosing
- Continuous dosing available

*patent pending
Pack Off Systems

- Safe packaging of toxic and explosive powders
- Adaptable to various types of packaging
- Modular and custom-made design
- From simple to fully integrated system
- Various levels of containment
- Accurate filling
- No clean room requirement
Pack Off Systems

Dec’s Pack-Off systems manage a range of packaging, from single inflatable seals to continuous liners integrated in a glove box if necessary. Modular packaging systems are available for different containment and process requirements, including sterile applications.

The installation has an accurate weighing system, which combined with appropriate dosing equipment such as a rotary valve or PTS Feeder ensures precise filling of the packaging.

Continuous liners are supplied vertically folded in unique cartridges in extended lengths compared to the standard. Liner material is specified to customer requirements and is manufactured in a clean room. Contained disconnection is guaranteed by a specific clip system or integrated welding machine.

For more stringent constraints such as high containment or GMP requirements a specifically designed Pack-Off system combines isolator, laminar flow and continuous liner technologies. This concept, already validated by the competent authorities, allows the final APIs to be packaged without the need of a clean room.

Features
- Accurate to 1 g
- Containment up to nanogram level
- Toxic and sterile product application
- Fills bags, continuous liners, aluminum canisters or containers
- Controlled product feeding with automatic weighing
- Manual or automated sampling
- CIP / SIP system

Options
- Welding machine
- Online sampling
- Venting filter
- RABs (Restricted Access Barriers) to ensure grade A transfer in and out

Continuous Liner Design
- Up to 80 m
- Class ISO 5, γ-sterilized if required
- Compact delivery form in sealed PE-Bags
- Antistatic, FDA approved (FDA 21 CFR part. 177)
Powder Handling Excellence

Sampling

**MPTS Sampling Device**

- Safe sampling of toxic or explosive powders
- Representative samples
- Variable sample quantities
- No mechanical parts
- Easy to clean
- Contained
- Automatic

www.dec-group.net
MPTS Sampling Device

The MPTS* facilitates complex sampling procedures directly from equipment, such as dryers, mixers, packaging units, etc.

The sampling procedure is simplified, whether from equipment with poor access, or where, for safety reasons, personnel are not admitted. The sample is taken in a few seconds, thus giving an instant image of the condition of the powder during the process (degree of mixture, humidity, homogeneity). It is extracted and transferred to its final destination whilst maintaining full containment, remaining homogeneous and representative as it is taken in dense flow, without using any mechanical device which could result in powder attrition. The system is particularly well suited for operation with toxic, radioactive or explosive powder as it is completely air tight and has the option to operate with protective gas. It can be partly or fully integrated into a glove box or any other cabinet.

The system takes a predetermined quantity of powder, even at gram level, in a fully automated manner. From single shot to continuous sampling, the system is easily integrated into any process.

Design
- AISI type 316L stainless steel, electro-polished
- 50 or 100 ml sampling volume
- 250 or 1000 ml bottles

Features
- Homogeneous representative samples
- Fast sampling to reflect true degree of mixture, humidity, homogeneity
- Online sampling
- Fills sampling bottles or directly into process
- No rotation or mechanical parts
- No fixed parts inside the process equipment
- No particle attrition or segregation
- Full emptying of the sampling line after each cycle
- Conveyance with inert gas to avoid oxidation
- GMP and ATEX compliant design
- Sampling out of equipment with low accessibility
- Easy to clean - CIP system

Options
- Various sampling volumes
- Different materials available
- CIP
- Hygienic, sterile unit
- Portable unit
- Design according to containment level

*patented
Mixing

PTS Batchmixer

- Fully contained powder mixer / blender
- Handles toxic and explosive powders
- Self-filling
- High turn down ratio
- No rotating or moving parts
- High efficient mixing < 0.1 %
- Mixes powders with various characteristics
- CIP, SIP
- Space-saving with low height requirement

www.dec-group.net
PTS Batchmixer

The Batchmixer* provides the ultimate in speed and flexibility, reducing overall process time compared to traditional systems, enabling the operator to mix powders with different characteristics in a contained environment. With applications from 2 litres to 5000 litres, the system also allows the operator to vary product volumes from 10-100%.

The system is particularly appropriate for pharmaceutical applications where active substances must be handled without contamination or changes to physical properties.

This easily integrated system has a main container with an integrated central deflector and a PTS with two tangential inlets on top. The powders are automatically introduced by the PTS and circulated within the container for a predefined period of time. The deflector ensures homogenous distribution of the mixture. The mixing process is faster and more effective as a result of the two jets of powder meeting in the PTS body, but with limited circulation speed, particles are not damaged. The system operates under inert conditions for hygroscopic, oxygen sensitive or explosive powders.

Powders can be transferred automatically from drums, bags or directly from process equipment like a granulator. At the end of the mixing process the system can be emptied completely and automatically for the next stage in production.

**Design**
- AISI type 316L stainless steel, electro-polished
- Various materials (HC22, internal coating, plastic, etc.)

**Features**
- Highly efficient mixing
- Mixes diverse powders with large differences in ratio (1/10'000)
- High level of containment
- Inert operation
- High turn down ratio < 10% - 100% product load
- Full discharge
- Introduction of additives without interruption
- Product characteristics not modified
- Extracts from different containers (drums, big-bags, silos, etc.)
- Emptying by gravity or active transfer
- Powders transferred over distances
- No moving or rotating parts
- Minimal maintenance
- Cleans in place

**Options**
- Hygienic, sterile unit
- Load cells
- Mobile
- Integration of high shear tools
- Discharge device for non free-flowing powders
- Sampling

* Patent pending

**Application Example**

**PTS Batchmixer (indicative values)**

<table>
<thead>
<tr>
<th>PTS Batchmixer</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch Size / Liters</td>
<td>50-100</td>
<td>100-250</td>
<td>250-500</td>
<td>500-1000</td>
<td>1000-3000</td>
</tr>
</tbody>
</table>
Transferring · Dosing

PFL Powderflex

· Combined system for conveying and dosing powders
· Ideal for toxic and explosive powders
· Continuous feeding
· Precision dosing
· Adjustable transfer capacity
· Perfect for pilot plants
· Streamlines processes
· Oxygen exclusion

www.dec-group.net
PFL Powderflex

The PFL Powderflex* provides continuous and precise dosing and conveying of small to medium quantities of powder, whether the requirement is for the controlled charging of powders into continuous production processes or for predetermined precision dosing.

The system comprises two small, calibrated chambers, each equipped with a flat filter in the upper part. A practically continuous powder flow or precise volumetric dosing is generated through a unique valve system, plus the combined effect of vacuum and pressure, which makes it possible to alternate, at high frequency, between filling and emptying the chambers. The transfer rate is easily adjusted by adapting the volume of the chamber or changing the frequency.

The PFL extracts powder from any container, transferring it over considerable distances. Its simple design ensures minimal maintenance and makes rapid changes of product possible. Powder characteristics are not modified during transfer. The PFL is to powder what a peristaltic pump is to liquids.

**Design**
- AISI type 316L stainless steel, electro-polished
- Other materials available (HC22, plastics, etc.)
- Various hose selection according to application

**Features**
- Constant feeding of process equipment (reactors, dryers, jetmill, etc.)
- Precision conveyance and dosing (1-2%)
- Enhanced precision (< 1 g) when combined with weighing device
- Automatic adjustment of transfer capacity
- Extracts powders from multiple containers (big bags, silos, drums, etc.)
- Conveys over long distances (> 50 m)
- Operable 24/7
- Permits mixing of several components online
- Economical creation of multiple dosing stations
- Operates under inert gas
- Charges inerted equipment
- Transfers explosive powders
- Compact, mobile, easy to dismantle
- Easy to clean - CIP

**Options**
- Adjustable chamber volumes
- CIP
- Portable unit
- Design according to containment level
- Weighing system

---

*Patent pending

<table>
<thead>
<tr>
<th>Model</th>
<th>PFL 01</th>
<th>PFL 1</th>
<th>PFL 5</th>
<th>PFL 10</th>
<th>PFL 50</th>
<th>PFL 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume cm³</td>
<td>0.1</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Frequency Cycles/sec. max.</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0.75</td>
</tr>
<tr>
<td>Conveying Capacity dm³/h</td>
<td>1.8</td>
<td>18</td>
<td>54</td>
<td>72</td>
<td>180</td>
<td>270</td>
</tr>
</tbody>
</table>
Containment · Filling

**DCS Drum Containment System**

- Contained drum and big bag filling
- Operator, product and environment protection
- Safe handling of toxic or explosive powders
- Adaptable to empty any type of process equipment
- Primary and secondary containment
- Compact and low height system
- Ergonomic

www.dec-group.net
DCS Drum Containment System

The DCS – Drum Containment System* is a stainless steel cylindrical glove box with glass cover and with two glove ports. Highly economical in comparison with conventional isolation systems, the DCS ensures precise, contamination free filling of drums or big bags. This space saving device can be easily connected to process equipment to be discharged and is adaptable to a multitude of containers.

The system can be installed directly under the equipment to be discharged, or where several items of equipment are to be emptied through one single station, or even in a remote area with limited headroom if required.

With safety always a priority, the DCS’s glove box enables the operator to open double liners in a sealed environment, guaranteeing both primary and secondary containment.

Design
- AISI type 316L stainless steel, electro-polished
- Other materials available (HC22, internal coating, etc.)
- HEPA 10 or 13 filters

Features
- Contamination free filling of drums of various sizes with double liners
- Filling of standard or custom made big bags
- Filling by gravity
- Filling in combination with a PTS Powder Transfer System if headroom limited
- High containment (<1 µg/m³)
- Single filling station for multiple discharge points
- Primary and secondary containment
- Containment not required during operation
- High system visibility
- Space saving
- Simple to install
- Easy to clean
- GMP compliant, ISO 6 class internal

Options
- Load cells for accurate dosing
- Inert operation
- Combined station for big bag and drum filling
- Viable for sampling
- Adaptable to nanogram level containment < 0.1 µg/m³

*patented
DCS Drum Containment System

-Contained drum emptying
-Operator, product and environment protection
-Safe handling of toxic or explosive powders
-Adaptable to any type of drum
-Primary and secondary containment
-Mobile
-Compact
-Ergonomic

www.dec-group.net
The DCS – Drum Containment System* is a stainless steel cylindrical glove box with glass cover and with two glove ports. Highly economical in comparison with conventional isolation systems, the DCS ensures precise, contamination free evacuation of drums.

Fully mobile, this space saving device has the flexibility to work with a multitude of different drum heights and diameters, in an inert atmosphere if required. Its Load Cell feature provides accurate charging, whilst the free moving suction lance connected to the PTS Powder Transfer System* and excellent visibility ensure residue free emptying.

With safety always a priority, the DCS guarantees both primary and secondary containment, with a glove box enabling the operator to open the double liners within the sealed environment.

**Design**
- AISI type 316L stainless steel, electro-polished
- Other materials available (HC22, internal coating, etc.)
- HEPA 10 or 13 filters
- ATEX zone 2/21

**Features**
- Contamination free emptying of drums of various sizes equipped with double liners
- Works in combination with the PTS Powder Transfer System
- High containment (< 1µg/m³)
- Primary and secondary containment
- No requirement of drum lifting or tipping
- No need to contain the drum during operation
- Limited use of gloves during the procedure
- Optimal visibility inside the drum
- Space saving
- Partial emptying possible
- Simple to install
- Easy to clean
- GMP compliant, ISO 6 class internal

**Options**
- Load cells for accurate dosing
- Inert operation
- Platform for small drums
- Possibility for sampling
- ATEX zone 1/21

*patented
Filling · Containment · Emptying

DCS Liquid

- Safe handling of toxic and corrosive liquids
- Total odor control
- Contained drum filling and emptying
- Operator, product and environment protection
- Inert conditions
- Compact and low height system
- Mobile
- Various drum sizes
- Dosing possibilities
- Ergonomic

www.dec-group.net
DCS Liquid

The DCS Liquid was specifically developed for toxic and corrosive liquids, achieving containment levels of <1 µg/m³.

The safe, contained emptying and filling of drums using the suction lance housed in a special venting tube with a sealing plug is thus made possible without additional precautions, such as full protective clothing or large Laminar Airflow booths. The DCS Liquid can also be equipped with Load Cells for precision dosing. Drums can be partially emptied, eliminating the need for inefficient and time consuming pre-dispensing.

The DCS Liquid is particularly recommended for the handling of liquids with strong odors, which are contained and removed by an extraction system. The DCS Liquid is easily cleaned in situ.

Design
- AISI type 316L stainless steel, electro-polished
- Other materials available (HC22, internal coating, etc.)
- ATEX zone 2/21

Features
- Ideal for toxic and corrosive liquids
- Contained charging and evacuation of drums
- High containment (<1µg/m³)
- Load cells for accurate dosing
- Partial discharge option
- Optimal protection of operator and product
- Space saving
- Simple to install
- Product transfer can be done under inert conditions when required
- Easy to clean
- GMP compliant

Options
- Load cells for accurate dosing
- Trolley for easy drum handling
- Inert operation
- Multiple lance system for different drum sizes
- ATEX zone 1/21

1 Access to the drum inside the DCS by removing the protection cover
2 Opening of the drum by removing the screw cap with a specially designed tool
3 Placing a small funnel to prevent liquid spillage
4 Removal of the suction lance protection cover before introducing the suction lance into the drum
DCS Inverter

- Contained emptying of drums
- Ideal for lumpy products
- Operator, product and environment protection
- Safe handling of toxic or explosive powders
- High containment < 1µg/m³
- Primary and secondary containment
- Mobile
- Fast and complete discharge
- Ergonomic

www.dec-group.net
Drum Containment System Inverter

The DCS Inverter is ideal for emptying lumpy and agglomerated products requiring a contained environment, eliminating the need for downflow booths.

Working with drums of various sizes, the DCS Inverter ensures that such products can be discharged easily using the lump breaker integrated in the suction hopper.

With this application the handling of the drums is simplified for the user, thus improving ergonomics and safety.

The drum is positioned under the DCS Inverter and connected with its liners to the DCS glove box, then inverted by motor. The powder is extracted and introduced into the reactor through a Powder Transfer System, maintaining high levels of containment at all times.

Features
- Empties drums with double liners of various sizes
- Works with lumpy and agglomerated products
- No requirement of extra drum lifting or tipping
- No need to contain the drum during operation
- High containment level (<1 µg/m³)
- Primary and secondary containment
- Low height requirement
- Operational under inert conditions
- GMP compliant, ISO 6 class internal
- Mobile system
- Easy to clean

Options
- Load cells for accurate dosing
- Inert operation
- Various suction hoppers

Design
- AISI type 316L stainless steel, electro-polished
- Other materials available (HC22, internal coating, etc.)
- HEPA 10 or 13 filters
Containment · Emptying

**DEC Isocharge**

- Fast operation for multiple bag emptying
- Safe handling of toxic, sticky or lumpy powders
- High containment (<1µg/m³)
- Stand-alone unit
- Cost effective
- Mobile
- One unit can be used to charge multiple receiving vessels

[www.dec-group.net](http://www.dec-group.net)
DEC Isocharge

The revolutionary DEC Isocharge is a low cost method of both dispensing and charging bags into reactors or receiving systems via the PTS Powder Transfer System*. The DEC Isocharge combines the advantages of isolation and laminar flow technology, providing high containment of < 1µg/m³ per 8 h TWA.

The station’s chamber is open to the side allowing easy bag introduction. A simple door only needs to be closed during WIP to prevent splashes. All WIP fluids can be drained from the chamber via the PTS Powder Transfer System* into the reactor, which also cleans the transfer hose and the PTS.

Using the gloves the operator will move the bag of powder into position on the charging bars above the integrated hopper. The bag is then split and the powder emptied through the bars. The empty bag is disposed through the adjacent continuous liner bag-out port. The operator now starts the PTS and charges the required amount of powder to the vessel.

On the other side of the station opposite the bag entry point is an exhaust plenum. A HEPA filtered exhaust is located on top of the plenum, connected to the exhaust fan. The fan is available with a simple manual damper or can be fully automated depending on requirements.

*patented

**Features**
- Containment levels up to <1µg/m³
- Fully surrogate tested and can be operated with closed or opened door
- Safe for operator and environment
- Fast emptying of multiple bags
- Good working ergonomics
- Good visibility
- Integrated fan including control options
- Continuous liner waste Bag-Out Port
- Safe Change HEPA Filtration
- WIP facility

**Options**
- Precise dispensing with integrated scale
- Assistance for heavy bag handling
- CIP with independent wash down facilities
- Integration of delumper for lumpy and agglomerated products

**Design**
- 0.7 m/s face velocity
- AISI type 316L stainless steel, glass and EPDM
- Other materials available (HC22, internal coating etc.)

1. Turn on the exhaust fan and open the door.
2. Place the required number of bags into the isolator.
3. Open the bags and pour contents into the hopper.
4. Turn on the PTS on the vessel and continue to empty.
5. When complete remove lid of bag-out port and place bags.
6. Replace lid, tie the bag and remove for disposal.
Emptying

Big Bag Emptying

- Modular design, easy upgrading
- From simple to fully integrated system
- Custom-made design
- Adaptable to various big bag types
- Safe handling of toxic and explosive powders
- Optimal discharge for bridging and sticky products
- Various levels of containment
- Minimized product loss

www.dec-group.net
Big Bag Emptying

Dec’s Big Bag Emptying Stations are modular. This ensures that they are easily adapted to product characteristics, and the appropriate docking systems can be selected, whether the material is non-potent or highly active. Similarly, depending on powder flow, specific massaging or delumping units mounted on load cells can be provided, thereby guaranteeing precise dosing.

A simple connection head with double tube and a two hand lever mechanism ensures that the big bag outlet spout has a dust tight connection. For primary containment requirements, a Liner Docking Head can be used for contained connection and emptying of standard big bags using a single liner with the side sleeve bag-in bag-out concept. For higher containment, a DCS Drum Containment System head can be used providing both primary and secondary containment.

If process and safety requirements are more restrictive, the use of the PTS Powder Transfer System** is recommended rather than emptying by gravity to ensure complete big bag emptying and full dust evacuation prior to disconnection.

**patented**

Features
- Big bag emptying by gravity
- Big bag emptying by active transfer via PTS Powder Transfer System
- From single station with safety frame to fully integrated stations
- Covering chemical and pharmaceutical design
- Various docking heads depending on powder toxicity
- Containment to nanogram level
- Various construction materials
- CIP
- One single station to fill various equipments

Options
- Weighing system
- Pneumatically operated massaging units (bottom or side)
- Suction hopper with integrated delumper / fluidization
- Electric or pneumatic chain hoist
- Bag reclosing device
- Combined bag emptying and big bag emptying
Containment

DEC Isotube

- Contained discharge of drums of various sizes
- Ideal for lumpy or compacted products
- High containment < 1µg/m³
- Low running costs
- Mobile
**DEC Isotube**

The DEC Isotube product transfer system is a low cost option for the safe loading and charging of drums of highly active pharmaceutical ingredients.

Equally effective when loading a process vessel or other charging application such as the Powder Transfer System, the DEC Isotube provides a high level of containment together with control over environmental conditions within the isolation system.

The system comprises a single vessel charging glove box, which can be connected directly to the vessel or application to be charged with powder from a drum or keg of any size. The DEC Isotube is equipped with a drum bag in/bag out system (using endless liner technology) to ensure contained loading both in and out of the isolator.

A scale in the drum access chamber makes the system equally ideal for dispensing.

**Features**
- Accommodates all drum sizes
- Simple to operate
- Flexible
- Vessel charging
- Product dispensing
- Ergonomic
- Containment to below 1µg/m³ per hour
- Multiple charge points
- Fully cleanable
- Works with lumpy and agglomerated products
- Charging by gravity or active transfer with a PTS Powder Transfer System

**Installation Process**

1. Using a suitable drum lifter, bring the drum to the charge tube and line up the drum.
2. Push the drum into the tube taking the continuous liner in with it.
3. Cut the continuous liner as shown and place any waste material into pocket holding the knife.
4. Fold the flaps back out of the way.
5. Remove the lid of the drum and place in the slot in the grill.
6. Open the inner bag and tip the contents into the Dec PTS Hopper.
7. When the contents is empty any waste material into the drum and fold the bag and push into the drum.
8. Replace the lid.
9. Fold the liner flaps back over the lid.
10. Pull the liner around the back of the drum and tie.
11. Using the drum lift/turner pull the drum out until you have about 300mm clear behind the drum.
12. Pull the liner together and double tie.
13. Cut tie and continue to remove the drum using the drum lift/turning device.

---

**Contact Information**

Dec Group Headquarters: Dietrich Engineering Consultants SA · Z.I. Larages Pièces A · Ch. du Dévent · P.O. Box 9 · 1824 Ecublens/ Lausanne · Switzerland · Tel +41 21 / 694 20 40 · Fax +41 21 / 694 20 59 · info@dec-group.net
Emptying · Accessories

**Lump Breaker Suction Lance**

- Emptying of lumpy or agglomerated products directly out of drums
- Specially designed for operation with the PTS Powder Transfer System
- No need of a drum tipper or additional crusher
- Mobile
- Compact
- Cost effective

www.dec-group.net
Lump Breaker Suction Lance

Working with the PTS Powder Transfer System, the Lump Breaker Suction Lance* is the perfect solution for emptying drums containing lumpy or agglomerated powder eliminating the need of tipping the drum.

A rotary tool moves out of the lance to maximize throughput, then at the end of the process withdraws to protect the liner. Thanks to a pneumatic motor, the system can be installed anywhere and the suction lance can also be used in ATEX zone 1/21. The Powder is sucked directly from the drum whilst smoothly crushing the lumps, leaving its characteristics unchanged. Combined with a lifting device the suction lance can be easily handled.

Design
- AISI type 316L stainless steel, electro-polished
- Compressed air requirement: 5-6 bars
- DN40 and DN50 suction tubes
- Equipment weight: 18 kg

Features
- Direct extraction of lumpy or agglomerated powder
- Fully pneumatically driven
- Reduces drum handling
- Dismountable for cleaning
- Low noise emission
- Empties drums of various sizes
- With or without liner
- Dust-free operation
- Powder characteristics unchanged

Options
- Other materials available (Hastelloy, etc.)
- Different couplings available
- Different delumper tools
- Lance length adaptable to the drum
- Different support frames with lifting devices

*Patent pending
Accessories

Lump Breaker – Pharma Design

- Smooth crushing of agglomerated products
- Robust construction
- Easy integration into process lines
- Cylindrical design
- Compact
- Wear resistant
- Cost-effective

www.dec-group.net
Lump Breaker – Pharma Design

The lump breaker enables the safe and smooth deagglomeration of bulk materials that tend to compact and form lumps. Its double bearing design allows gentle crushing of even hard products and works well with high product columns. The Lump Breaker is fed with agglomerated solids which, after crushing are transferred through the outlet to the next step in the process.

The device consists of a solid cylindrical body with inlet and outlet flanges, an integrated crushing tool which is driven by a laterally located motor and a grid. To obtain the required size, the blades and the grid are easily removable and can be adapted according to product characteristics.

Design

Drive:
- Standard speed 50 RPM, variable speed possibilities
- Power 2.2 kW
- Connected load 230/400 V, 50 Hz
- Insulation class IP 65
- Protection class Ex II2 G/D IIB ck T4/120° C

Lump Breaker:
- Material no. 1.4435 / 1.4460
- Other materials available
- Various surface finishes including electrolytic polished finish
- App. weight 125 kg
- Max. product temperature 50° C

Features
- Smooth crushing of compact and hard products
- Provides a homogeneous powder without lumps for a better product flow
- Can be connected to the outlet of any kind of process equipment, e.g. centrifuge, dryer, silo, etc.
- Low height requirement
- Easy installation
- Adaptable to various process lines
- Low-wear and economic
Suction Hopper

- Specially designed for operation with the PTS Powder Transfer System
- Optimal discharge of process equipment
- Compact
- Low height requirements
- Safe
- For lumpy and sticky powders
- Prevents bridging
- Low energy consumption
**Suction Hopper**

Mounted directly on the outlet of the equipment to be discharged, the Suction Hopper improves the emptying of any kind of equipment.

It is available in a range of sizes. Depending on the powder characteristics (lumpy, wet, non free-flowing, etc.) the design of the hopper can be adapted.

**Design**
- AISI type 316L stainless steel, electro-polished
- DIN or ANSI flanges
- Standard flange sizes from DN200 to DN400
- Outlet tubes according to PTS size
- Standard motor size of 1.5 kW

**Features**
- Evacuation of lumpy, compacted or sticky powders
- Direct discharge of dryers, centrifuges, containers, big bags, etc.
- Prevents bridging
- Provides a homogeneous powder
- Simple, compact
- Low noise emission
- Low dust formation
- No powder degradation
- Connects to any process equipment
- Ideal for wet powder
- Integrated fluidization cone optimizes flow
- Delumper Directive 94/9/EC (ATEX95) and the European standard EN-13463 risk analysis
- Delumper certified for Ex zone 1/21

**Options**
- Various materials available (Hastelloy, coated, etc.)
- Special flanges available
- CIP
- Dosing possibilities
- Different delumper tools
- Very low height design

---

1 **Standard Suction Hopper**
The hopper is designed with a special discharge angle allowing full emptying of the equipment. The size is adapted on one side to the equipment to be discharged and on the other side to the required PTS model. The standard hopper is equipped with a fluidization filter allowing an optimal control of the powder flow.

2 **Delumper**
The delumper, in combination with the PTS System, is the ideal solution for evacuating lumpy or compacted powder without changing its characteristics. It is equipped with a tool which breaks bridges and lumps to provide a constant powder flow. The system with its limited height is easily installed directly at the outlet of existing equipments such as dryers etc. with limited head space.

3 **Fluidization Hopper**
The hopper is equipped with a fluidization cone constructed of a special porous material. The product flow of sticky or non free-flowing powders is optimized by compressed gas which flows through the pores of the cone. Inert gas can be used in case of flammable products.

4 **Fluidization Hopper with Delumper**
In case of lumpy and bridging products, a combination of a fluidization cone and a delumper can be supplied. With this combination nearly any product can be handled efficiently.
Powder Handling Excellence

Dec Group Headquarters
Dietrich Engineering Consultants sa
Z.I. Larges Pièces A · Ch. du Dévent · P.O. Box 9 · 1024 Ecublens · Switzerland
Tel +41 21 / 694 20 40 · Fax +41 21 / 694 20 59 · info@dec-group.net

www.dec-group.net