

Powder Handling & Process Containment Solutions

From a Single Source



Welcome to the World of Powder Handling Excellence

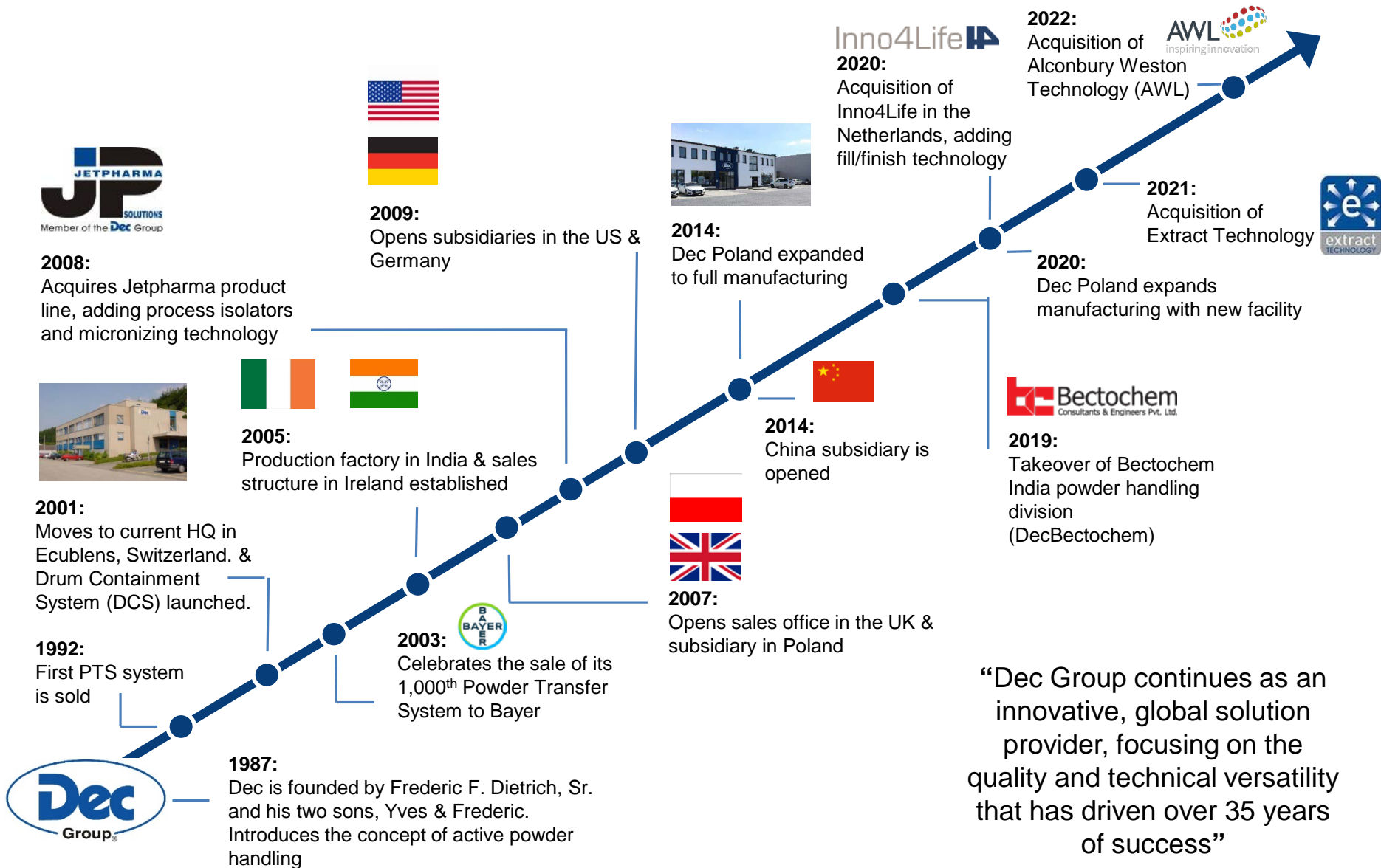


From the raw material handling to the final product packaging process, Dec acts as a global player throughout the production chain.

Customers benefit from comprehensive solutions from feeding reactors to the final drug production stage.

From mg to tons

Dec's Key Milestones



“Dec Group continues as an innovative, global solution provider, focusing on the quality and technical versatility that has driven over 35 years of success”



Dec in a nutshell:

- Over 35 years of experience
- 700 employees
- Global engineering in Switzerland, Poland, Netherlands, UK, India, USA and China
- Customer proximity with 11 subsidiaries and an agency network covering 60+ countries
- Over 10'000 successfully implemented projects worldwide

Industries

Chemical



Pharma - API



From mg to tons

Dec provides innovative solutions worldwide for various industries where powder and liquid processing under strict and controlled conditions is essential.

Dec's customized solutions fit to specific requirements for customers active in many industries, from chemical and pharma to cosmetic, food and those using special materials such as applied in battery manufacturing processes or by the nuclear industry.

Pharma Secondary



Food



Cosmetic



Advanced Materials



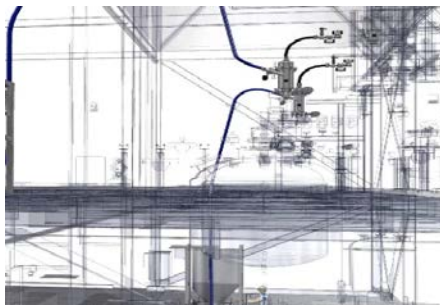
Dec Group Business Divisions



- Sales of standard Dec technologies & equipment
- Supply of technically straightforward projects



- Sales of complex process integrated systems
- Supply of engineered & turnkey solutions
- High degree of project management



- Provision of consulting services
- Operator and product protection
- Sterile/aseptic process
- Supply of Front End Engineering Design Studies (FEED)
- Process development & education



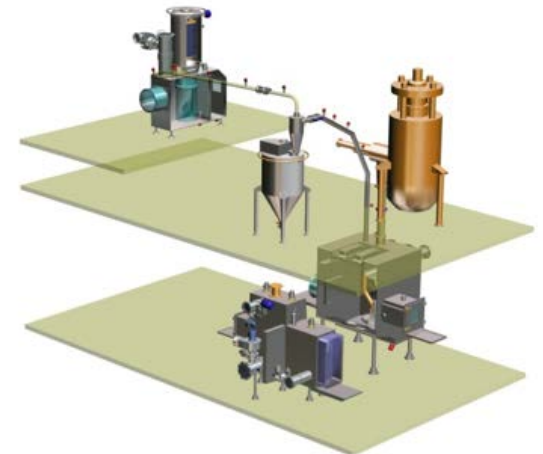
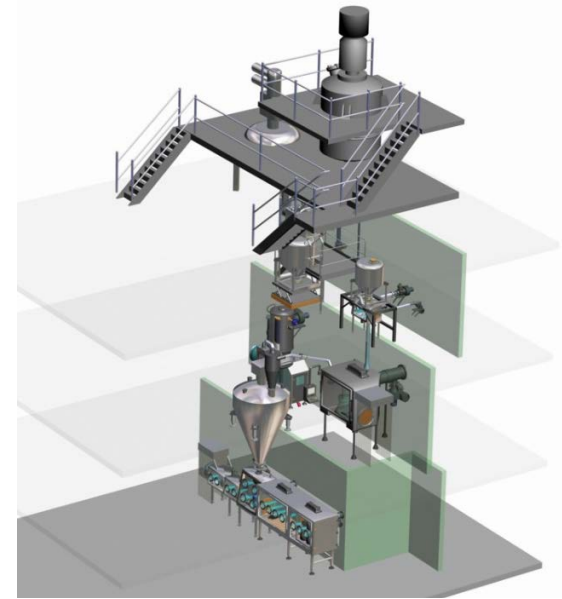
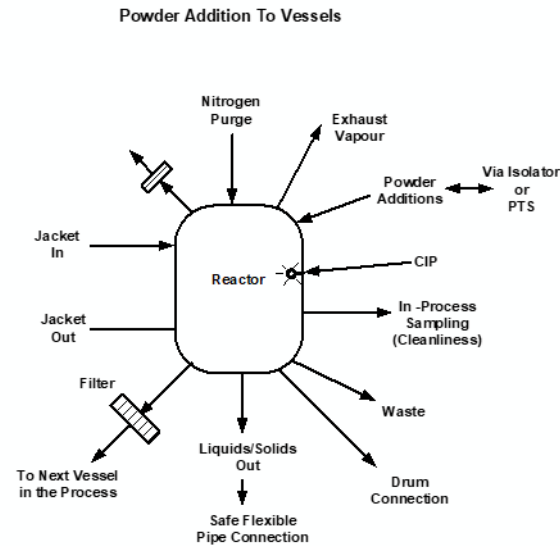
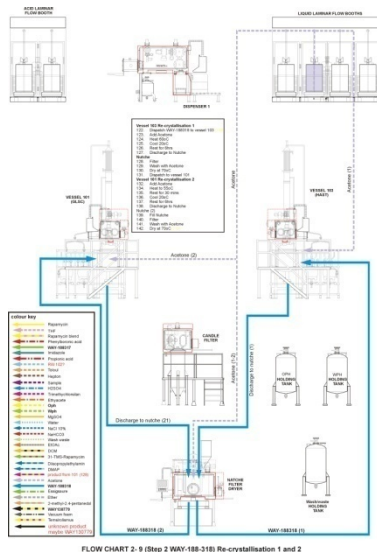
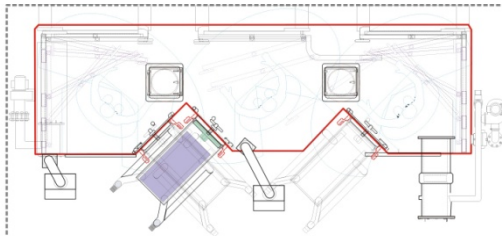
- Customer technical support
- Qualification & Validation
- After sales services & parts supply
- Maintenance programs
- System upgrades
- Testing Facilities
- Training

Dec Group Product Divisions



Customer Cooperation

Working closely with clients on
Front End Design Studies
and process development



Dec Keywords

Keyword	Description	Example
Safety	Prevention of explosion	Charging powder into reactors containing solvents
Containment	Operator protection	Dispensing high potent APIs in the pharmaceutical industry
Hygiene	Avoiding cross contamination by offering high cleaning abilities	Handling powders in multi-purpose operation
Sterility	Guaranteeing product integrity	Packing powder under sterile conditions
Preservation	No changes of product characteristics	Transferring powder without segregation or particles damage
Productivity	Increasing efficiency by process linking	Upgrading plant design from batch to semi-continuous process
Complexity	Solving complex requirements	Dosing powder at mg level with high accuracy

Dec's Key Technologies

PTS Powder Transfer System®



Active Powder Handling
PTS for safe reactor charging and
efficient powder handling



Operator Safety



High Containment



Explosion Proof



Easy Cleaning



Easy Sterilization

Dec's Key Technologies

DCS® Drum Containment System

Dec sets new standards to empty drums with the introduction of its closed and contamination free DCS® Drum Containment System* – perfectly designed to work in combination with the PTS



* Patented



Contamination Free



High Containment



Explosion Proof



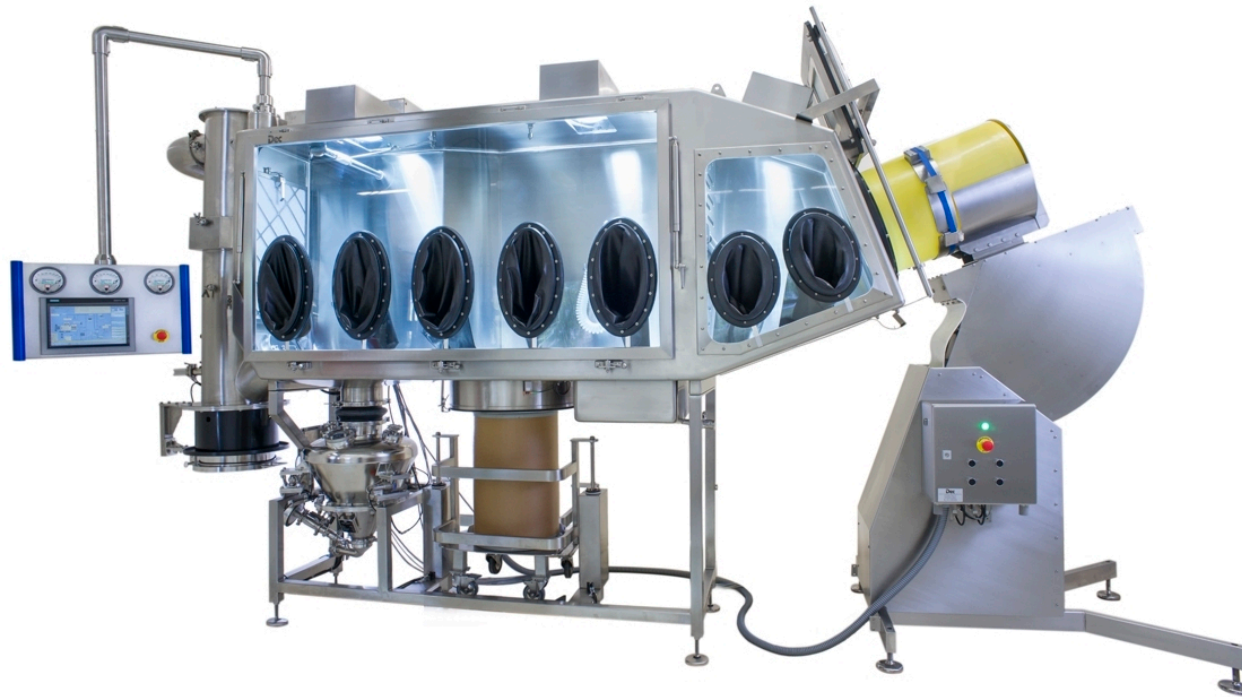
No Gravity



Operator Safety

Dec's Key Technologies

Isocharge



High Containment



Contamination Free

Isocharge is the first technology combining the advantages of isolation and laminar flow technology, providing high containment solution for fast dispensing and charging powders into process

* Patent pending

Dec's Key Technologies

API Packaging



API pack off station*

With the launch of this high containment conveying, dosing and packing system clean rooms are no longer required



High Containment



Contamination Free

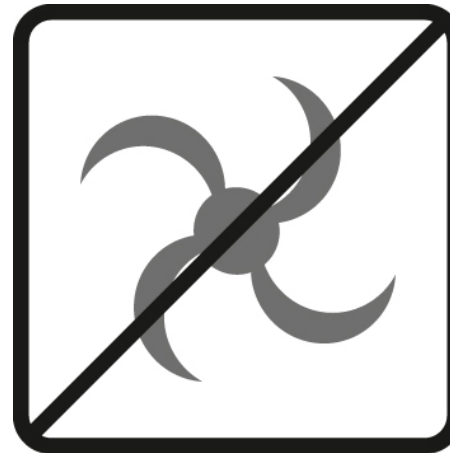
* Patented

Dec's Key Technologies

PTS Batchmixer® *



Dec brings an innovative powder blending solution to the industry. First mixer without moving or rotating parts



No Rotating Parts



Enhanced
Performance



High Containment



Easy Cleaning



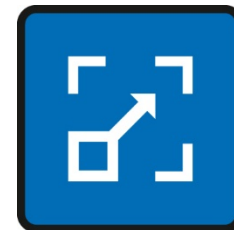
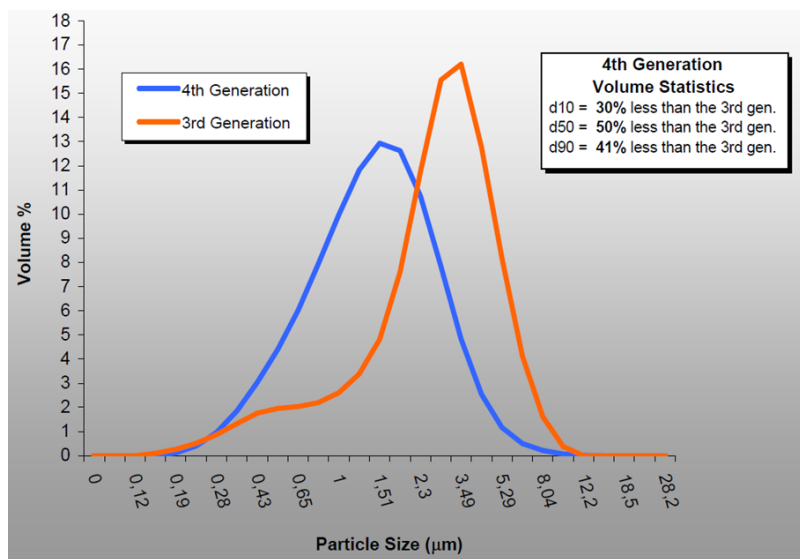
Easy Sterilization

* Patented

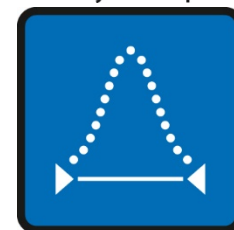
Dec's Key Technologies

MC DecJet® 4th Generation

Dec introduces their 4th generation* jet mills achieving outstanding micronizing results in terms of particle size and PSD (Particle Size Distribution)



Easy Scale up



Narrow PSD



Enhanced Performance



Explosion Proof

Dec's Key Technologies

Isolator Technology

Part of Dec's Product Portfolio - an extensive range of process isolators to safely contain dispensing, micronizing, drying and sterile applications



High Containment



Easy Cleaning



Easy Sterilization

Dec's Key Technologies



Downflow Booths



Mobile Clean Rooms



Workbenches



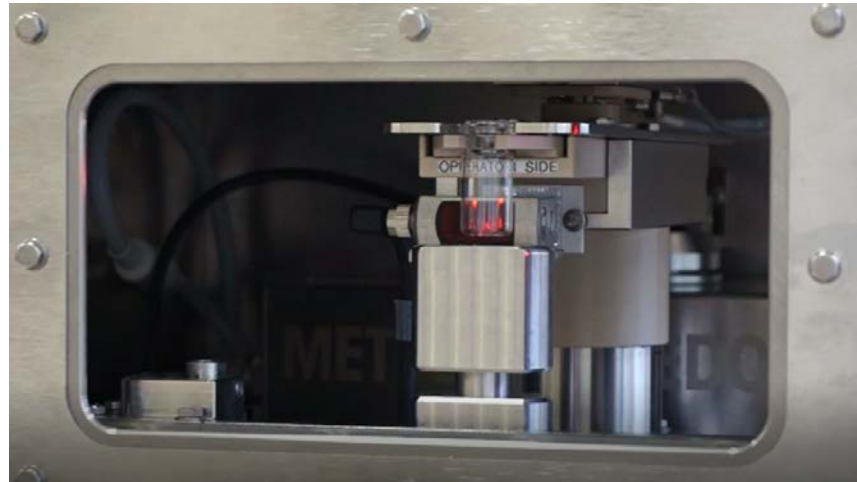
Nuclear Containment



Dec's Key Technologies

μ PTS - Microdosing

Dec launches μ PTS* for volumetric dosing of small quantities of powder (milligram range) allowing a rapid dosing process compared to conventional gravimetric systems.



High Accuracy



Time Saving



Easy Cleaning

* Patented

Dec's Key Technologies

Aseptic Filling Lines for powder and liquids








Destined for small molecules, biologics, cell/gene therapies and other ingredients in the field of advanced therapy medicinal products (ATMP) for a range of delivery systems such as dual chamber syringes, cartridges, vials etc.



Dec's Key Technologies

Serialization Equipment Solutions



Item	Bundle	Case	Pallet	Expertise
				
Print, inspect, reject, apply, temper evidence, top labeller	Item to bundle, aggregate, print, inspect, reject	Print, inspect, apply, aggregate items or bundles, (de) commission	Print, inspect, apply, reject, aggregate to pallet, (de) commission	✓ Certified PE ✓ Certified FE ✓ Dec Engineers

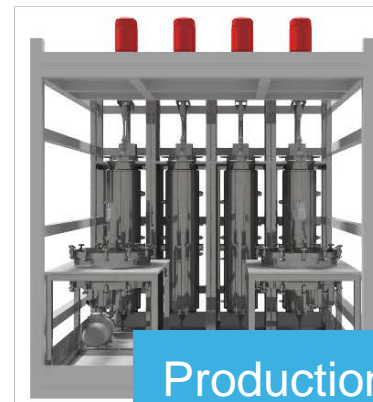
Continuous Processing and Thermal Technologies



Lab



Pilot



Production

Flow Chemistry

- Continuous reactors & crystallizers
- Continuous filtration & drying systems
- Intervessel transfer & dosing solutions



Thermal Solutions

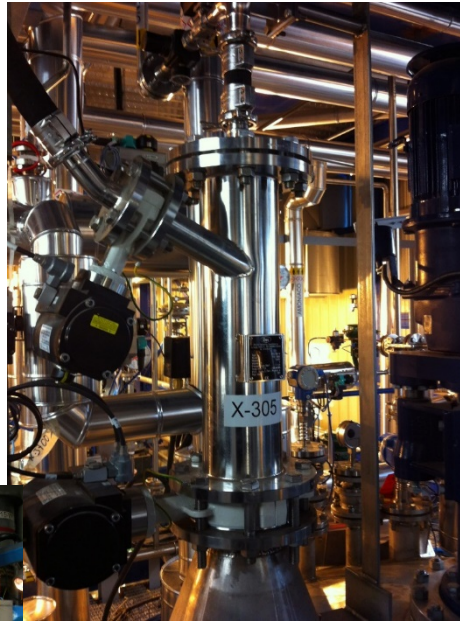
- Electric & liquid heated transfer lines
- Temperature controllers & heat exchangers
- Unique Plug Flow Reactor solutions

Some Achievements

Reactor Charging With Toxic and Highly Corrosive Powder



Big bag station
with DCS®
docking system



PTS in Hastelloy on reactor

Contained charging of cyanuric chloride from big bags into a chemical reactor with a PTS

Some Achievements

Multiple Reactors Charging for the Specialty Chemical Industry



Sack cabinet and Isocharge for bag discharge



PTS on reactor with multiple entry

Safe multiple reactors charging solution for toxic and non toxic powders from bags with high capacity over 3 tons/hour

Some Achievements

High Containment Filter Dryer Discharge and Dispensing Isolator



- Containment performance $< 5 \text{ ng/m}^3$ (OEB 6)
- Twin chamber system with double endless liner
- Fully integrated pilot scale filter dryer
- Meets class ISO-7 inside

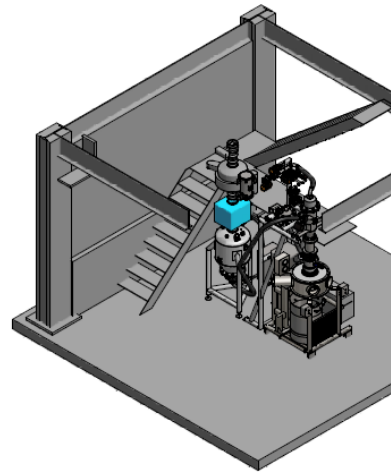


Some Achievements

Highly Contained Pack-Off



Dryer discharge into a sieve, transfer,
dosing (± 50 g) into drums under
controlled argon atmosphere



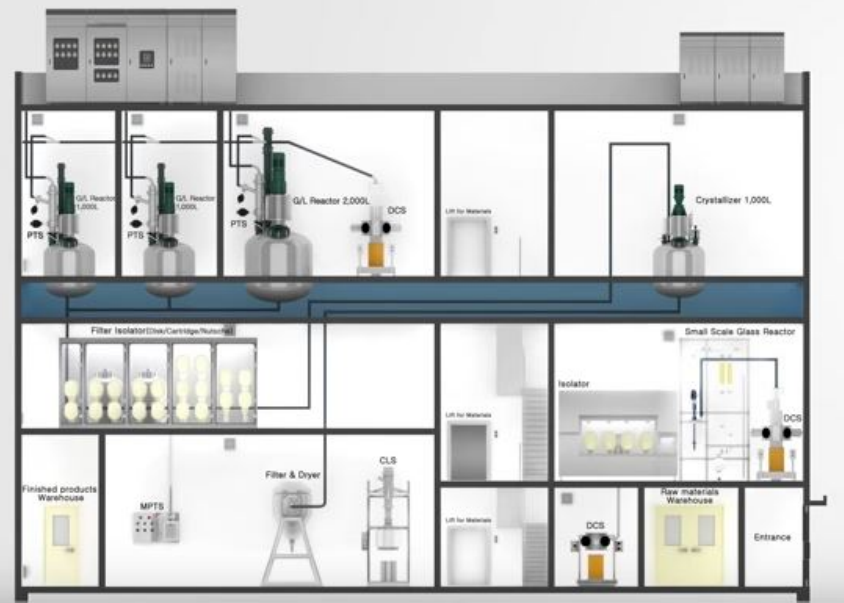
Some Achievements

HPAPI Manufacturing Facility



Antibiotics and cytotoxic APIs, flexibly adaptable to different batch sizes.

From raw material sampling, feeding reactors to final packaging

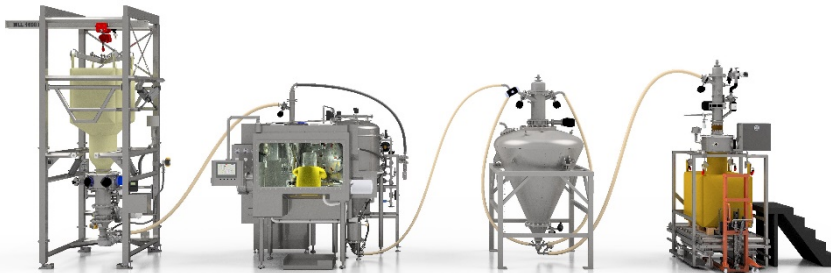


Some Achievements

API Plant From Reactor Feeding to Final Packing



- Multiple reactor charging from big-bags, drums and bags
- Filter dryer discharge and filling into continuous liners or big-bags
- Contained micronization from FIBCs
- Contained blending with PTS Batchmixer® *
- Contained pack-off with CLS Continuous Liner System or into big-bags



* Patented

Some Achievements

High Containment API Manufacturing



Dispensing and milling isolator



PTS Batchmixer® above tablet press



Dispensing/milling, blending
(excipient feeding from LAF) with
online sampling and direct tablet
press feeding

Some Achievements

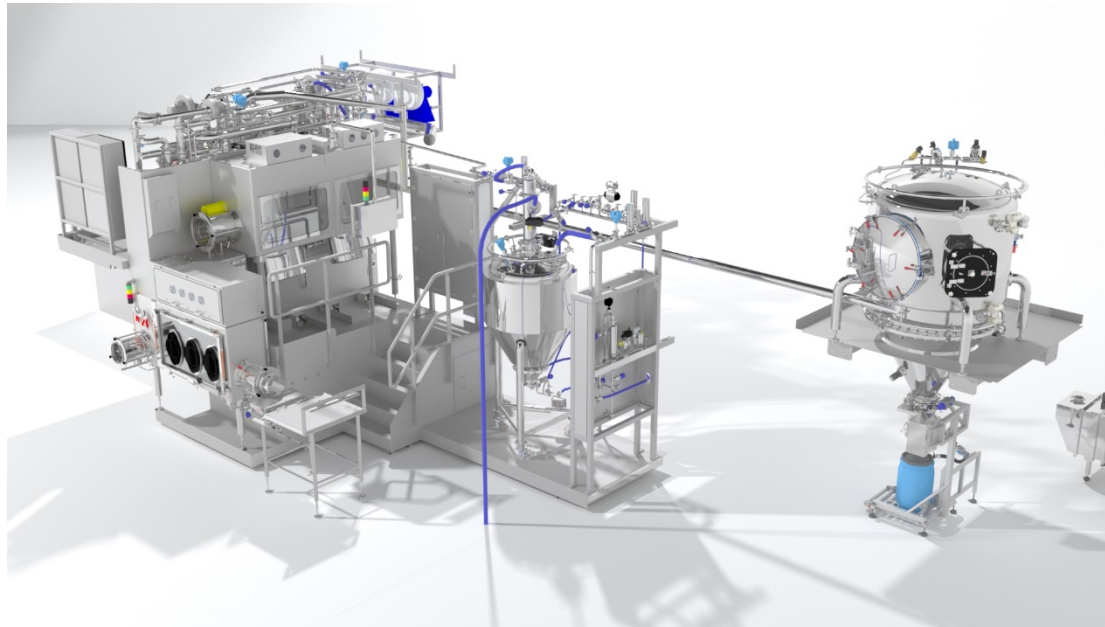
HSE & cGMP Compliant Blending

High containment dispensing
& pre-blending isolator
LAF large scale dispensing
& sieving



Some Achievements

Sterile Micronizing Facility

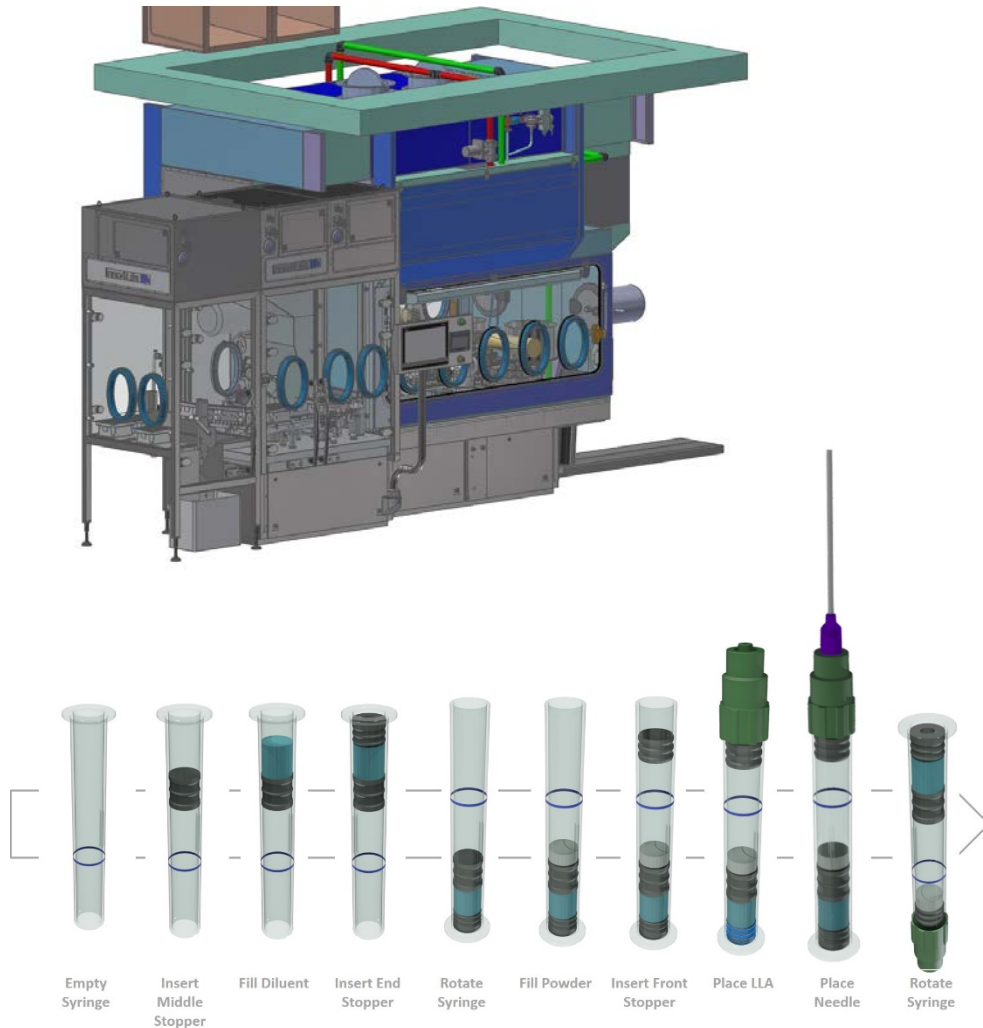


Complete sterile/toxic plant from
dryer tray discharge, transfer by
PTS, micronizing and final packing in
liners



Some Achievements

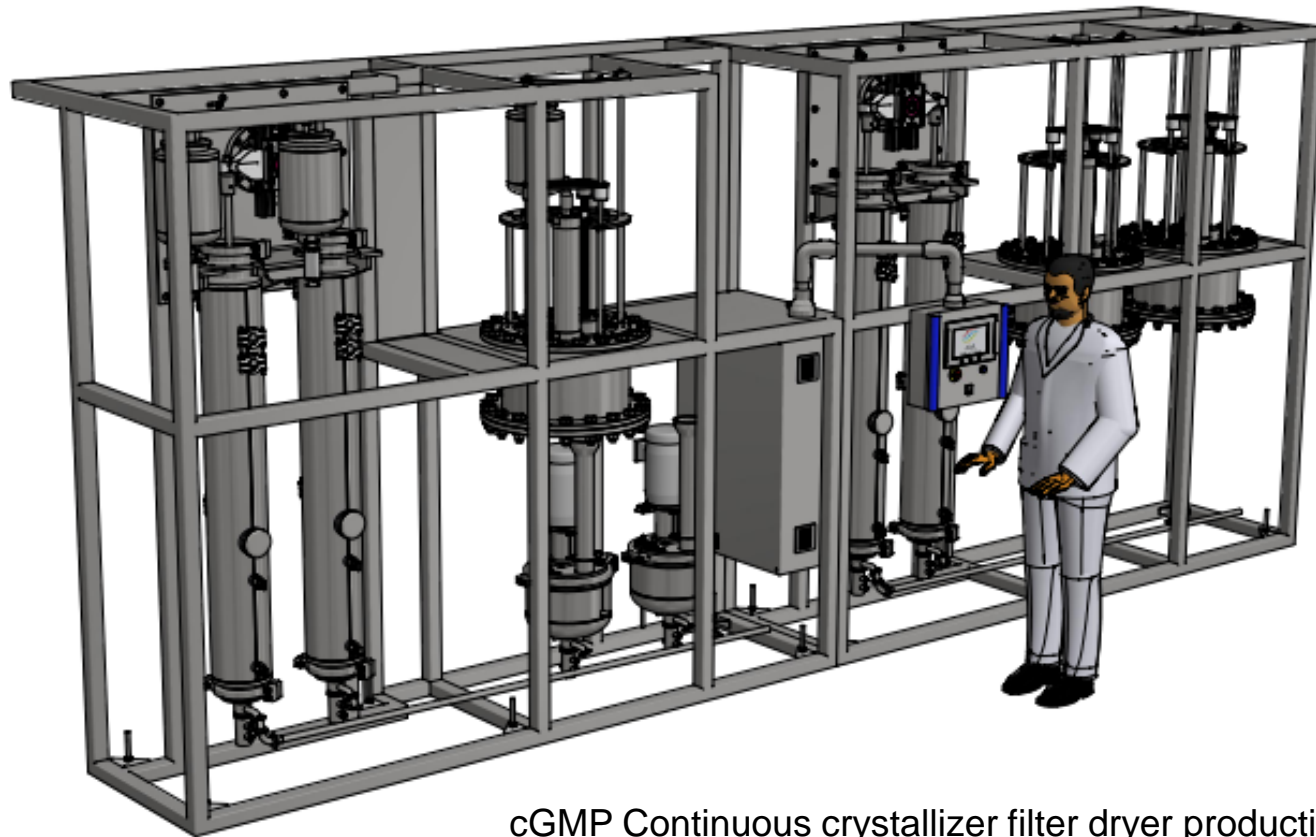
Automatic Sterile Filling Line



Sterile filling line for dual syringes for powder and liquid.



The worlds first production scale continuous crystallizer filter dryer!



cGMP Continuous crystallizer filter dryer production-scale system
for hazardous location



Containment out of the Box