



AGITATED NUTSCHE FILTER / DRYER

Designed for washing and isolating solids



TURNKEY DRYING & FILTRATION UNITS

Our specialised and experienced engineering teams have the capability to design systems of equipment to meet specific application requirements.

Based on our extensive experience, we offer the complete engineering of your drying / filtration installation.

One single point of contact for your project, supplying a turnkey package integrating peripheral functions to the Filter / Dryer:

- Materiel transfer (by vacuum)
- Containment (for charging or discharging)
- Pressure control (vacuum skid)
- Condensation
- Temperature control
- Skid building
- Discharge and Pack Off systems
- Instruments
- Automation



Turnkey solutions include Containment and Powder Handling

PACK OFF STATION

Charging powders into drums using continuous liners, single bags or mini big bags, for high containment:

- Safe handling of toxic and explosive powders
- Maintains industrial hygiene
- Wet or dry powders
- Ergonomic Design
- Perfect integration with Filter / Dryer automation
- Possibility to integrate milling, sampling, seed collection
- High accuracy filling to target weight



GLOVE BOX

Contained discharge of your Dryer or Filter / Dryer.

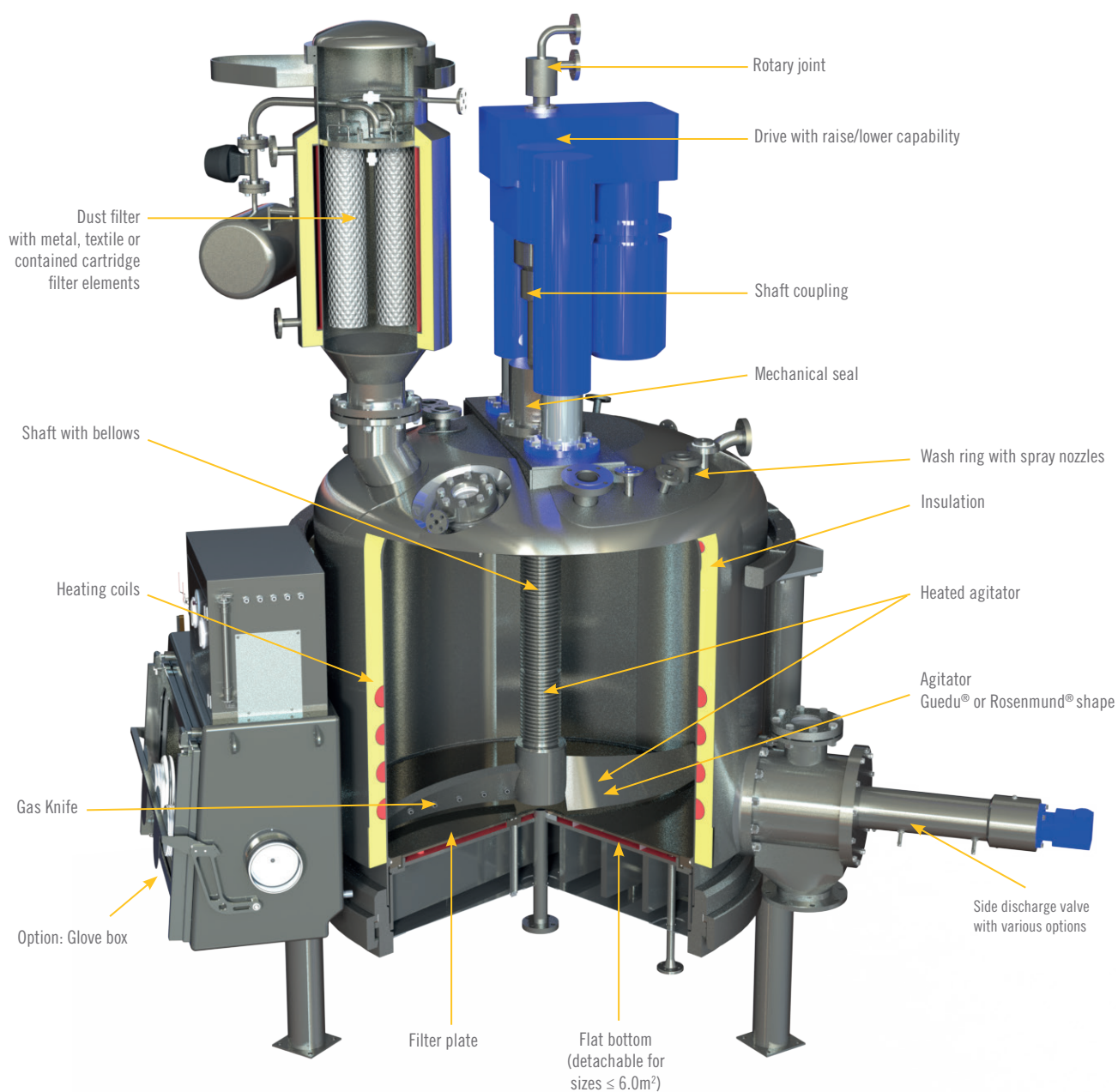
Particularly suited for the handling of cytotoxic or highly potent material (HPAPI), for the pharmaceutical industry.

Benefits

- User friendly design
- Easy cleanability of discharge plug
- Creation of a microenvironment limiting impact on the cleanroom
- Reduction of the need for PPE (Personal Protective Equipment)
- Full recovery of the product heel
- Limited total life cycle cost
- Easy sampling

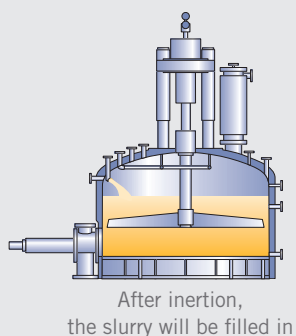


FILTER / DRYERS DESIGN

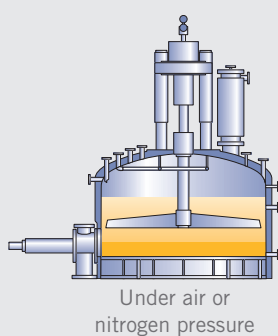


POSSIBLE PROCESSES

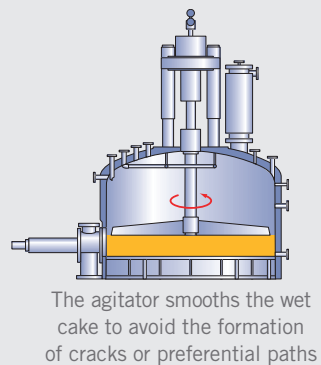
1. FILLING



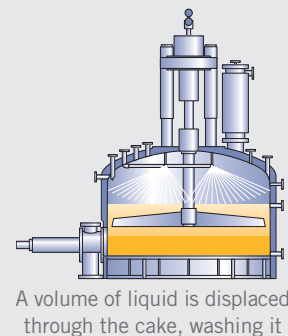
2. FILTRATION



3. SMOOTHING (Anti-clock-wise)



4. DISPLACEMENT WASHING



FILTER / DRYERS BENEFITS

FILTRATION

The flat base of the vessel is fitted with an interchangeable filtration media, made of metallic or textile cloth. The base is removable for ease of filter media change and other maintenance operations.

Benefits

- Hygienic (GMP) design for pharmaceutical industries
- Interchangeability of different media types
- Quick lock of the filter base using a bayonet system
- 0.03m² to 16 m² filtration surface

MIXING AND SMOOTHING

The agitator design allows several successive operations:

- Smoothing the cake at the end of filtration to avoid cracks or preferential paths
- Efficient mixing for good thermal homogeneity of the product during drying
- Breaking the cake
- Discharging the product

Benefits

- Guedu® S-Type agitator design for improved mixing
- Rosenmund® agitator profile for a slim cleanable design



DRYING

Drying is performed under vacuum, while agitating the product. A dust filter protects the vacuum source from potential contaminations. The heat transfer input during drying is performed through the heated side walls, base and agitator. The dome and dust filter are maintained at a suitable temperature to avoid condensation. Various options are available for sampling in respect to vacuum and containment.

Benefits

- Drying cake to less than 0.1 % moisture
- Dust filter with quick & easy maintenance, safe change design available for toxic product
- Low filtrate area for efficient bottom heating

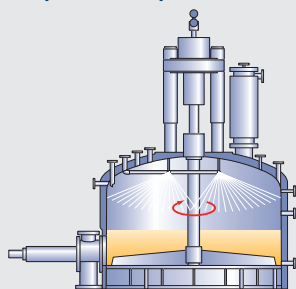
DISCHARGING

The discharge is performed through the side of the machine, by means of a specially designed discharge valve or glovebox. The «S-shaped» agitator pushes the product into the side opening.

Benefits

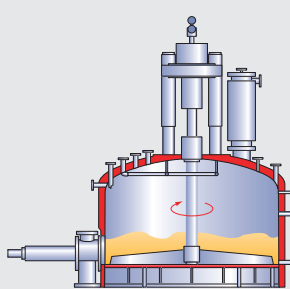
- Metal/metal sealing, efficient even with abrasive or sticky materials
- Valve seats with integrated dry or wet Cleaning In Place

5. RE-SLURRY WASHING (Clock-wise)



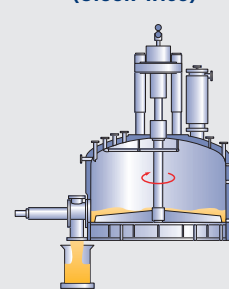
The agitator is used to re-slurry the solid in a washing solvent. (further filtration steps may follow)

6. DRYING AND COOLING



Drying under vacuum while walls and agitator heat the product (using thermal circuits)

7. DISCHARGING (Clock-wise)



The specially designed agitator pushes the product towards the side discharge port

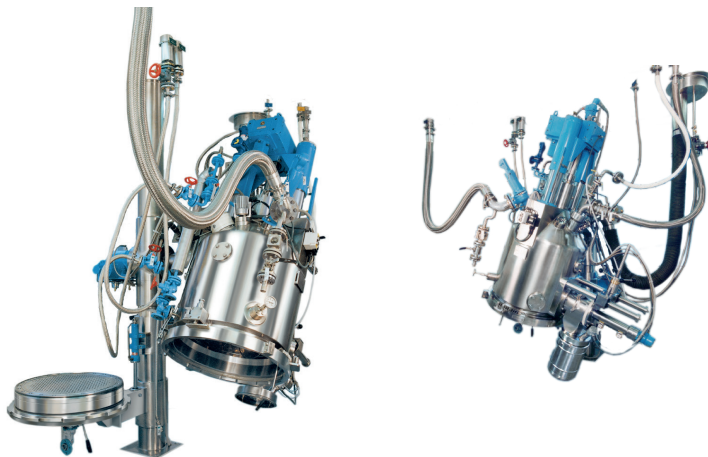
FILTER / DRYERS PERIPHERAL EQUIPMENT / OPTIONS

SPECIAL DESIGNS

Custom-built designs are available.

We meet specific designs like:

- Sterile designs
- Glass-lined Filter / Dryers
- Tiltable vessel
- Central discharge



S-Type Agitator with Gas Knife

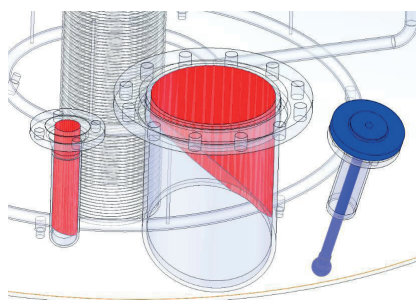
CIP DESIGN

The Filter / Dryers meet any cleanability requests, from regular to sterile designs. Based on experience and 3D CAD spray simulations, De Dietrich Process Systems can design the CIP solution for your equipment to achieve 100% wettability.

This service includes spray balls and spray nozzles selection. Wetting result is documented with riboflavine test.

Benefits

- 100% guaranteed wettability
- Simulation validated with riboflavine test



GAS KNIFE

Gas Knife is a unique patented technology designed to fully automate the discharging of dried powder. The Gas Knife agitator pushes the dried heel with nitrogen into discharging valve. The Gas Knife is also used to improve drying, mixing or dissolution and cleaning.

Benefits

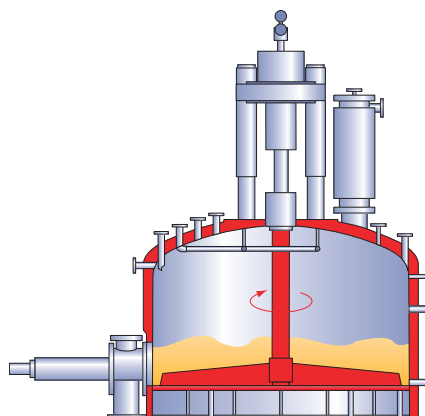
- Depending on the product, up to 99% discharge efficiency can be achieved
- Discharging occurs in contained environment, with no need to open the vessel or the filter
- Hot carrier gas can be used as well to shorten the drying time

HEATED AGITATOR

The agitator has a thermal circuit for circulation of heating/cooling liquid. Through a high product renewal rate on the blades, we estimate that a heated agitator can provide over half the heat required to dry a product.

Benefits

- 15 to 20% faster drying with heated arm and agitator thanks to 30% increased heat exchange coefficient
- 20 to 25% faster drying with a 3-blade agitator
- No risk of thermal fluid leakage in the product



NUTSCHE FILTER / DRYERS RANGE

Agitated Nutsche Filters and Filter / Dryers are available in laboratory, pilot and industrial sizes.



Glass C22 Pocket Filter



Pilot Equipment (RoLab)



12m² Filter / Dryers with single pot design

Pilot and industrial Filter / Dryers range		Filtration surface (m²)	Agitator stroke (mm)	Base stroke (mm)	Cake volume (litres)	Slurry volume (litres)	Total volume (litres)	Vessel outlet diameter	Total height	Discharge valve diameter	Nominal drive power (kW)	Empty weight (kg) approx.
	Production range (standard values)											
	0.1	0.12	250	300	30	80	100	400	3300	150	4	1400
	0.2	0.22	250	300	55	145	180	550	3300	150	4	1500
	0.3	0.3	250	300	75	185	230	630	3300	200	4	1800
	0.4	0.43	300	300	130	350	420	750	3400	200	5.5	2000
	0.6	0.62	300	300	185	490	600	900	3400	200	5.5	2500
	1.0	1.11	400	300	440	1050	1310	1200	4400	400	7.5	3500
	1.5	1.5	400	300	600	1400	1750	1400	4400	300	11	5500
	2.0	1.97	400	400	800	1800	2260	1600	4400	300	11	6500
	2.5	2.5	400	400	1000	2340	2930	1800	4700	300	11	7000
	3.0	3.09	400	400/(w)	1200	2860	3580	2000	4800	300	15	8000
	4.0	4.08	400	500/(w)	1600	3720	4660	2300	4800	400	15	10000
	5.0	4.83	500	500/(w)	2400	5220	6530	2500	5300	400	18.5	14000
	6.0	6.07	500	500/(w)	3000	6430	8060	2800	5300	400	18.5	14800
	8.0	7.94	500	(w)	4000	9690	12050	3200	4800	500	22	15500
	10.0	10.63	500	(w)	5300	12540	15770	3700	5200	500	22	19000
	12	12.44	500	(w)	6200	13930	18160	4000	5200	500	30	20000
	16	15.73	500	(w)	7850	16830	22170	4500	5200	500	37	25000

(w): welded single pot

MATERIALS

Filter / Dryers are preferentially made of stainless steel 316 L.

We also provide Hastelloy C22 and other alloys, as well as borosilicate glass for laboratory and pilot Filter / Dryers.

AFTERMARKET

A PROFESSIONNAL TEAM AT YOUR SERVICE

SPARE PARTS

We can provide OEM spare parts, to keep your equipment in shape for reliable production, even for equipment over 30 years.

All parts manufactured are in accordance with the original parts (as built drawings).

ASSISTANCE

- Remote and on-site assistance
- Health check inspections (new and old equipment)
- Annual servicing/maintenance contracts
- Repair
- Trouble-shooting and fault finding
- Installation of equipment
- Commissioning and testing
- Specific on-site training
- Maintenance shutdown preparation

REVAMPING / UPGRADING

Better efficiency of your process can be reached with renovating or upgrading with technologies like Gas Knife or Heated Agitators.

We can provide on-site and off-site solutions specifically to your needs and equipment.

From initial inspection and diagnosis to advice, recommendations and to the full conception and testing of your equipment.

Upgrade and renovating possible even for non De Dietrich Process Systems equipment.



Tech Lab
TEST & DEVELOP NEW SOLUTIONS

RENTALS / TRIALS

Trials can be performed at your site or at our Tech Lab in Semur/France, equipped with an Atex capable room, in the presence of our experts.

- Laboratory Filter / Dryers
- Pilot Filter / Dryers
- Dryers with all geometries: conical, double conical, spherical or pan dryer
- Pack Off Station
- Characterisation equipment: FT4 powder rheometer, humidity content, powder size

We propose a wide range of test equipment, allowing you to perform **Filtration, Drying and Powder Handling Trials** and to prepare **scale-up** for your industrial equipment.

Filtration Trials

- Measure of the filterability of a product
- Calculation of the cake specific resistance
- Definition of the best type of media (pore size, media type: textile or metal monolayer or multilayer)
- Extrapolation of filtration areas and cycle times at the industrial scale

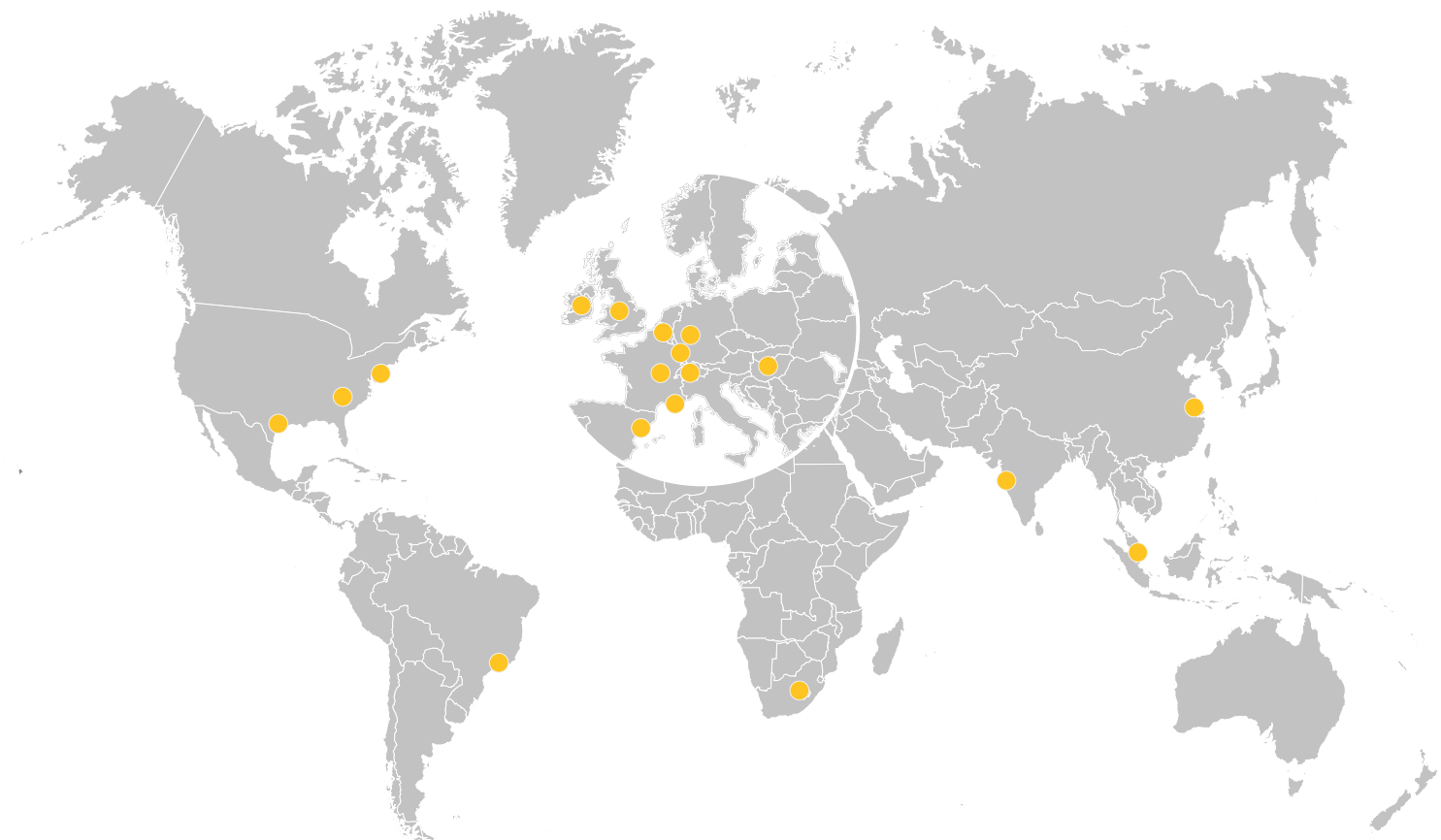
Drying Trials

- Measurement and extrapolation to the industrial scale of a product drying properties
- Drying cycle duration
- Agitation speed
- Lump breaking
- Dust Filter area
- Required heating power
- Vacuum pump and condenser sizing
- Final product humidity content
- Microwave assisted drying

Powder Handling Trials

- Powder Pump capability
- Need for delumper
- Charging and discharging ergonomics: Pack Off Station or Drum Dock Station
- Containment ergonomics: Glove Box installation





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