

**FrymaKoruma**  
› technology in motion

**FrymaKoruma Dinex**  
Vacuum processing unit for the cosmetics  
and pharmaceutical industries



# Vacuum processing unit

The FrymaKoruma Dinex is the proven system of choice for the production of creams, lotions, gels, ointments, toothpaste and other kinds of dispersion. The special requirements that must be satisfied for the manufacture of parenteral, pulmonary, peroral and percutaneous dosage forms are met by the Dinex machine and associated automation concept in every respect. This concept is based on an external process tool with recirculation and provides an ideal platform for precise processing of products spanning a very wide viscosity range.

At the heart of the system is a rotor-stator homogenizer, which is mounted underneath the process vessel and connected to its top part by a recirculation line (long loop). This configuration ensures that all ingredients pass through the homogenizer at least twice before being discharged, because ingredient materials are introduced through the running homogenizer. The homogenizer also incorporates the internal pumping function for circulating and discharging the products and cleaning the machine. The new homogenizer – which significantly improves the Dinex' performance – is a particularly exciting innovation.

The scraper agitator supports the top-down macro-mixing of the product in the vessel that is produced by the long-loop recirculation line. At the same time, it guarantees optimal thermal transfer between the vessel wall and the product during the heating and cooling cycles. The recirculation line can optionally be branched into the conical bottom section of the process vessel while the machine is operating. This short loop permits batch sizes with a larger variability and allows foaming products to be circulated underneath the surface.

## The new Dinex homogenizer

- has a 10 % better shear rate,
- produces smaller droplets (D50 value  $\leq 300$  nanometres) and a narrower particle size distribution,
- introduces less heat into the product,
- achieves optimal emulsion results faster.

Like the processing unit, the automation concept has a modular architecture that leaves nothing to be desired. Three basic concepts are possible according to the individual requirements of the application. Various modules and functions can be controlled and integrated, depending on the concept selected.

The Dinex is offered in two different versions, to enable the vacuum processing unit to be aligned to each customer's specification:

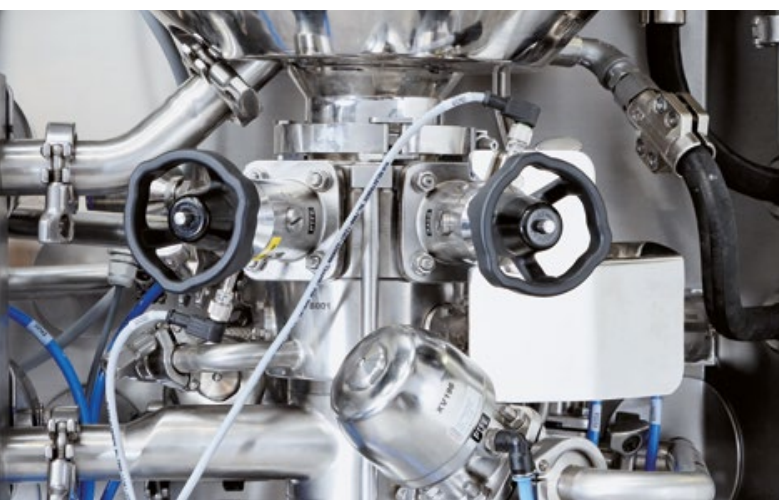
The Dinex V has a vertically mounted homogenizer, which can be operated in dispersion or pumping mode, depending on the position of the stator. In order to switch between shear-intensive and shear-free operation in this way, the rotor and stator have to be moved apart. At the same time, a defined shear energy input can be optimized and monitored thanks to the precise speed control.

The Dinex H features a horizontal homogenizer arrangement. The shear energy can be varied within a defined range by adjusting the speed. The pumping efficiency of the process tool changes proportionally. The horizontal design facilitates high powder feed rates and a lower machine height.



Homogenizer Dinex V (sterile version)

Homogenizer Dinex H





## Standard version

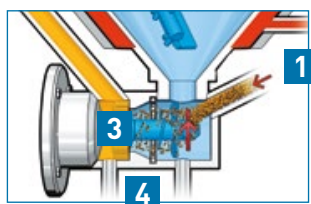
- Pressure vessel with safety device and scraper agitator
- Powerful vacuum system
- Rotor-stator homogenizer with integrated pumping function
- Double jacket for heating and cooling with insulating jacket
- Temperature control
- User friendly control/visualization
- External recirculation line (long or short loop)
- Full CIP capability

## Options

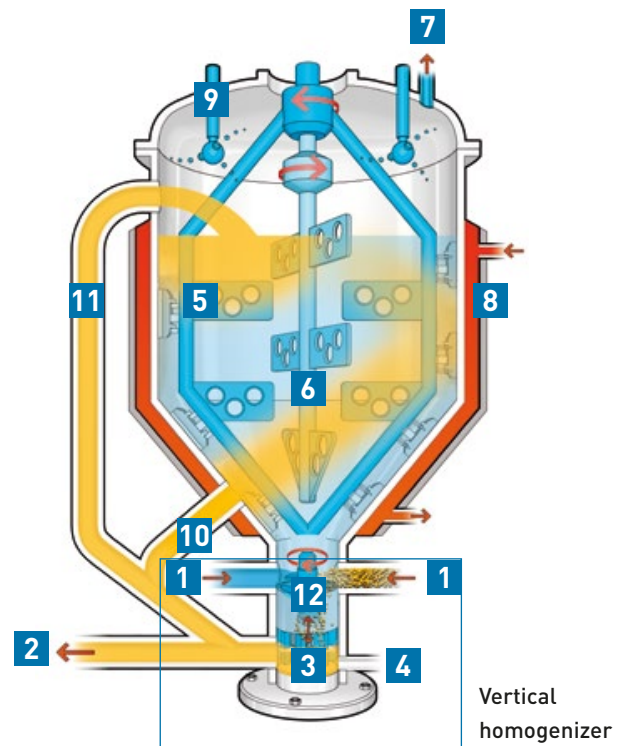
- Vertical or horizontal homogenizer arrangement
- Counter-rotating agitator
- Shaft seal or mechanical seal concepts
- Lid lifting device
- Three automation levels and additional modules
- Load cells and dosing units
- Comprehensive validation documentation
- ATEX / US-EX compliance
- Sterile versions
- Other options on request

## Applications

- Lotions, creams, gels
- Ointments, pastes, syrups
- Toothpaste
- Decorative cosmetics
- Haircare products



Horizontal homogenizer



Vertical homogenizer

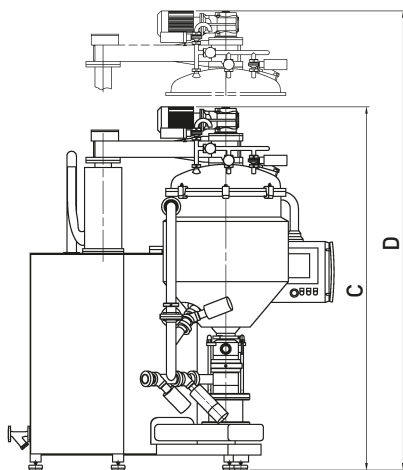
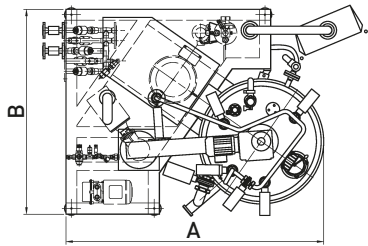
## Key benefits

- Shorter batch cycles
- Rapid feeding of dry materials
  - Efficient homogenizer with shear energy optimization
  - Defined homogenizing passages
  - Optimal control and monitoring of droplet size and distribution
  - Circulation of foaming products underneath the surface

- High reproducibility
- Recipe controlled production
  - Excellent cleaning and sterilization characteristics

- Lower operating costs
- Large variability in batch sizes
  - Fast creation of emulsions

- 1 Product infeed 2 Product discharge 3 Homogenizer 4 Residue discharge/CIP recirculation 5 Scraper agitator  
6 Counter rotating agitator 7 Vacuum system 8 Heating/cooling 9 CIP 10 Short loop 11 Long loop 12 Stator adjustment



	Usable volume (l) min. / max.	Installed power (kW)*, approx.	Length A	Width B	Dimensions (mm)		Weight (kg), approx.
					Height C	Height** D	
<b>Dinex V Lab</b>	3–12	9	1410	1020	1810	2100	700
<b>Dinex V 200</b>	15–160	26	2000	1500	2400	3000	1500
<b>Dinex V 400</b>	15–300	26	2000	1500	2700	3400	1900
<b>Dinex V 700</b>	15–500	26	2400	1500	3000	3900	2400
<b>Dinex V 1300</b>	50–1100	53	2500	1600	3600	4800	3500
<b>Dinex V 1800</b>	50–1500	53	2800	1800	3600	4800	4200
<b>Dinex V 2400</b>	50–2000	58	3000	2000	4000	5000	6500
<b>Dinex V 3500</b>	100–3000	65	3300	2500	4900		7000
<b>Dinex V 5200</b>	200–4000	101	3350	3000	5100		12500

\* without counter-rotating agitator \*\* with open lid

For over 65 years, FrymaKoruma has been a leading international supplier of processing machinery and equipment for the pharmaceutical, cosmetics, food and chemical industries. Based in Germany and Switzerland, the company employs about 150 people. Our goal is not simply to meet all our customers' expectations without any ifs and buts; we also attach great importance to the development of long-term partnerships. Our pursuit of this objective is altogether successful – over 23000 installations are currently in use in more than 180 different countries.

#### Customer support

FrymaKoruma is more than just a supplier of machines and plant. As a customer focused partner for plant engineering, we take an idea and turn it into a high-tech solution that matches your requirements exactly – with installation, documentation and commissioning from one source. If you need to be further

convinced before you commit yourself, ProTec – our process technology and training centre – lets you do just that. Profit from our specialists' vast know-how and years of experience in the development of liquid and semi-solid products. In our well-equipped, modern laboratory, you can develop or optimize recipes, test machine models, scale up processes and produce test batches for pharmaceutical, cosmetics, food or chemical applications.

Our Customer Service, which is available worldwide, makes sure you continue to keep abreast of a constantly evolving market long after the development and manufacture of your plant has finished. It includes much more than simply maintenance, modifications and upgrading. We also advise and support you in all matters relating to your equipment, provide on-site training and stock a range of spare parts which can be shipped to you promptly.