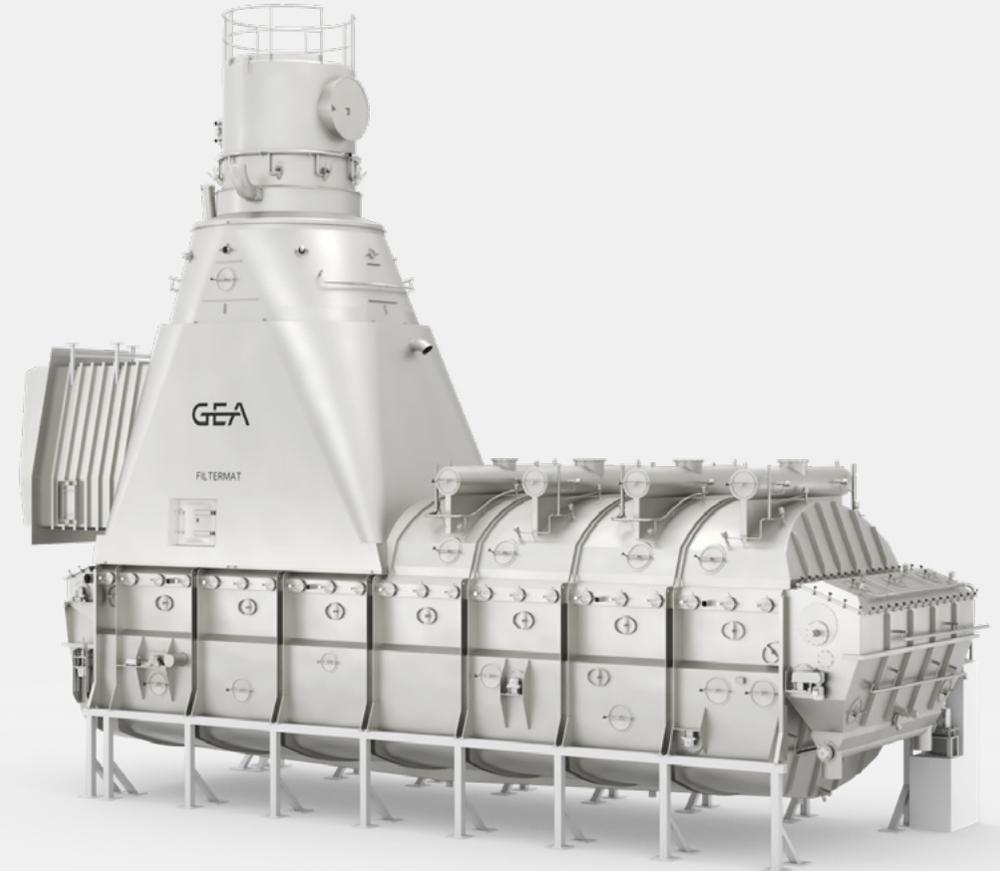


GEA FILTERMAT® spray dryer

A solution for challenging products



GEA FILTERMAT® spray dryer

As a manufacturer, you know that spray drying is a complex process. Not every product easily transforms into a free-flowing powder. GEA FILTERMAT® technology is designed to take the turbulence out of spray drying, making it more of a breeze to turn challenging products into high-quality powders.

Spray drying is used widely by the food and dairy industry to reproducibly process diverse products into stable, powdered formulations. But some types of food and dairy products are difficult to spray dry using conventional methods, because they can generate deposits in the spray dryer ducts and cone, or produce lumps in the fluid beds. This may be a particular problem when spray drying products that are sticky, hygroscopic, or slow to crystallize, and can impact on overall yield, product quality and safety.

For less straightforward applications GEA offers the FILTERMAT® spray dryer, which gently and evenly deposits the partly dried product onto a moving, perforated filter belt, through which the air passes as the belt is conveyed through the drying and cooling zones. Therefore the FILTERMAT® is ideally suited to drying products that are difficult to handle in conventional spray dryers. These may include whey permeate, high fat non-dairy creamers, toppings and fruit powders, as well as hydrolyzed proteins, palatants, fat soluble vitamins and lysed cells. For such products spray drying using the FILTERMAT® can minimize lumping and deposit formation, which means longer production run times, less waste, and fewer planned and unplanned stoppages for cleaning.

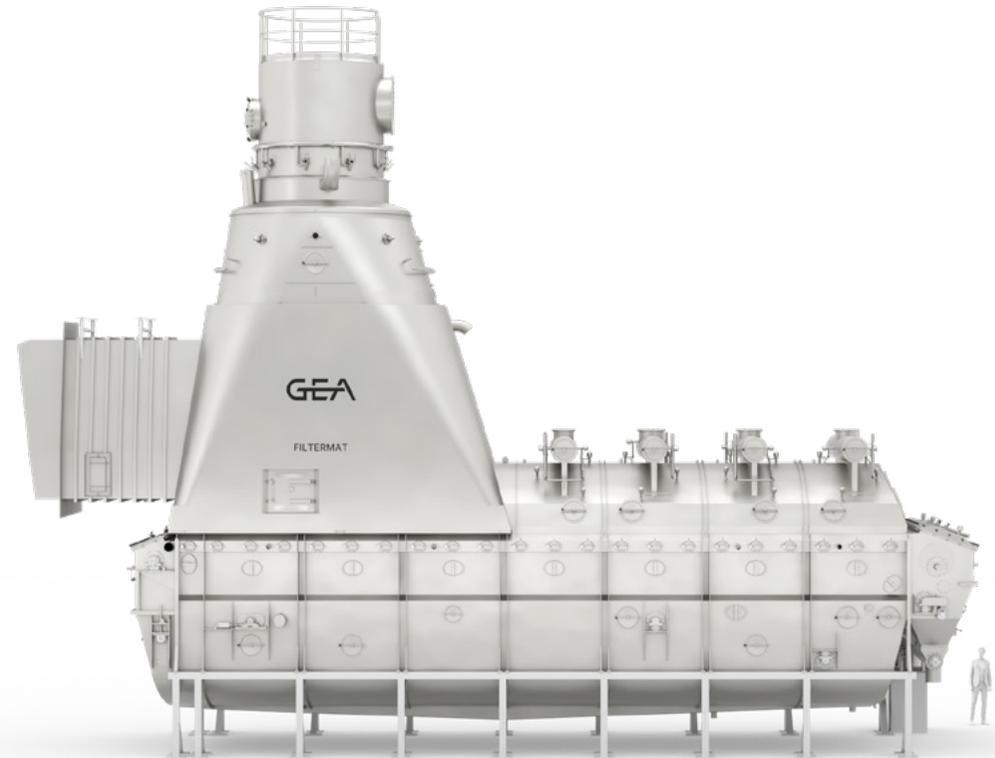


Precise control for defined powder characteristics

The GEA FILTERMAT® spray dryer has been designed to keep key process parameters, including retention time and temperature at different zones in the dryer precisely controlled.

Accurate adjustment makes it possible to reproducibly transform even the most testing of products into free-flowing, agglomerated powders with precisely defined characteristics such as moisture content, powder structure, degree of crystallization and dispersibility, as well as aid control of Maillard reaction.

The FILTERMAT® also operates at lower temperatures than conventional spray dryers, so you may be able to achieve increased yield when processing more heat sensitive products. The fine product particles are retained within the powder layer on the filter belt, which in addition means that only a very small fraction of product exits with the gas to be collected by a cyclone, bag filter and/or scrubber. And of course, every part of the FILTERMAT® meets the strictest regulatory requirements for food processing.



GEA FILTERMAT® spray dryer

Benefits of the FILTERMAT® at a glance

- Reproducible spray drying of sticky and thermoplastic products
- Gentle processing, with reduced heat impact
- Precise control of powder temperature and residence time
- Production of agglomerated powders without the need for powder fines recycling
- Easy equipment inspection and cleaning
- Longer production runs and less risk of unexpected stoppages
- Less product waste

Key applications for the FILTERMAT®



Whey permeate

Whey UF-permeate consists primarily of lactose, which in its amorphous state attracts water from its surroundings. This makes it sticky, which causes problems with lumps and deposits forming in conventional spray drying systems, even when the whey permeate is precrystallized. The FILTERMAT® system retains the product on the belt during drying, preventing lumping, but also supporting uniform lactose crystallization into a non-hygroscopic stable state that doesn't draw in water.



Fat-filled whey, cream and cheese powder

The FILTERMAT® is ideal for producing a multitude of dairy powders with a high fat content. Our technology makes it easy to set process parameters, so you can be confident of effectively spray drying products into free-flowing powders that have the desired properties, for different applications.



Toppings and non-dairy creamers

Using traditional spray drying technology to process high fat non-dairy products can result in the powder particles generating sticky lumps in the fluid bed, leading to product waste, and unscheduled stoppages in production. Spray drying using the FILTERMAT® allows you to reliably and efficiently process products that have a fat content of more than 60%.



Fruits and vegetables

The FILTERMAT® can be an ideal solution for drying fruit and vegetable powders such as oranges, tomatoes, apples and strawberries, carrots, onions, garlic and black root, which require more gentle processing, with less heat impact. Compared with the use of traditional spray dry methods, the FILTERMAT® technology can process products such as orange powder using less carrier, and let you spray dry products such as tomatoes without any filler. The resulting fruit and vegetable powders will have a greater concentration of product, and a more natural color, giving you a higher value product.



Savory flavors, hydrolyzed proteins and palatants

GEA FILTERMAT® systems reliably and efficiently spray dry hydrolyzed proteins and flavors, including fish and meat products, palatants and other pet food ingredients. Our technology can reduce the need for upstream processing of your raw materials, while allowing you to use less carrier, and generate flavor products with a higher fat content. And because every particle on the belt is exposed to the same, precise heat load, Maillard reactions can be better controlled, resulting in improved flavor characteristics.



Emerging food products, including lysed cells or fat soluble vitamins

A number of large biomolecules such as fat-soluble vitamins, or lysed cells including algae and yeast, may be heat sensitive or hygroscopic and so prove difficult to dry using traditional spray drying systems. The FILTERMAT® spray drying process can help to maintain product integrity and properties, and reduce the need for carriers, to give you a more concentrated, uniform and higher value product, so you can more easily develop new recipes, or diversify into niche and emerging markets.

GEA disperser flow straightener

Our goal is to provide you with value-adding technologies that help your processes run optimally, without adding complexity or staff workload. We think our compact disperser flow straightener is a great example.

The FILTERMAT® incorporates some key component features, including the compact disperser flow straightener (DFS), which features side-mounted, angled nozzle lance inlets to reduce lance length, making them simpler to access and adjust. The design accommodates a double-feed system that allows nozzle changes and feedline CIP while the dryer is operating.

The DFS disperser also uses a single main gas stream with much improved gas flow uniformity from the flow straightener system (patented). A single main air supply equates to a simple heater system with a compact inlet duct. The compact gas disperser design means that building height requirements are reduced, and the unit can easily be accessed for inspection and cleaning.

Gas disperser features and benefits

- Short, adjustable nozzle lances, easy to handle by one operator
- Opportunity for a double-feed system to give 24/7 operation
- Easy access for visual inspection of all process-contact surfaces
- Single main air supply, with a small secondary air requirement
- Simple heater system with compact inlet duct
- Lower building height requirements compared to traditional spray dryers



Compact disperser flow straightener (DFS)



Side-mounted, angled nozzle lance inlet

Options for new and existing plants

We understand that no two customers will have exactly the same requirements, so we offer a range of technology options that can be built into new FILTERMAT® plants, or retrofit into your existing setup.

Options that make a real difference

Both new and established FILTERMAT® spray drying plants can be configured or retrofitted with options including a double-feed system to allow continuous, 24/7 production. Clean-in-place (CIP) solutions, either for the entire plant – cleaning during production stoppage – or to enable belt cleaning while the plant is in operation, are also available. And to help give you greater confidence in your plant safety, the GEA COTECTOR® safety system (patented) can be integrated into different GEA spray drying systems, including the FILTERMAT®. The COTECTOR® carbon dioxide monitoring system is designed to detect and make early alert operators to potential fire or explosion risks.

Reducing energy consumption

The FILTERMAT® spray drying plant can also be configured with GEA AddCool high temperature heat pump technology, which uses electricity to recycle and amplify waste heat – such as exhaust gas – from the plant, and use this to preheat the spray dryer air up to 120°C. AddCool heat pump technology can reduce by 50% a FILTERMAT® plant's overall heating energy demand, cut fossil fuel consumption by up to 70%, and thereby significantly reduce carbon footprint.



GEA COTECTOR® – continuous, real-time carbon monoxide monitoring



GEA AddCool pilot plant

Testing with the FILTERMAT®

Want to find out more? At our Center of Competence in Denmark, you can work with us, in confidence to evaluate the FILTERMAT® spray dryer performance with your own recipes.

Testing at the GEA Center of Excellence

Contact your local GEA representative and ask about our Center of Competence in Soeborg, Denmark, where you can test out FILTERMAT® equipment for spray drying your existing and new products. GEA experts will help to configure the best FILTERMAT® model, size and operating parameters for your products and business needs, whether you are producing small volumes of just one powder, or you need high throughput, commercial capacity for multiple products. At the Center of Competence you can also witness first hand how GEA AddCool heat pump technology could further improve the efficiency and sustainability of a spray dryer system.

Ready-to-use pilot-scale technology

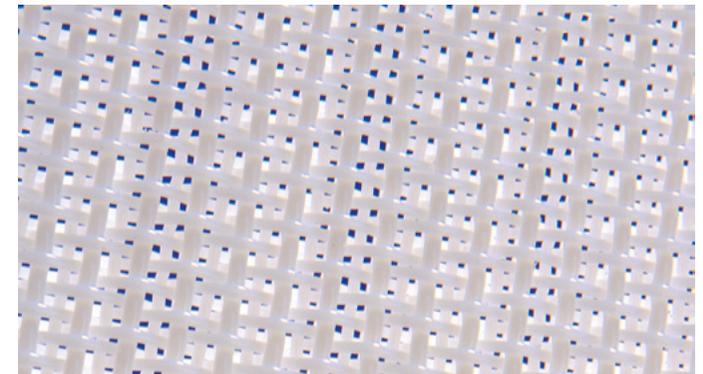
A FILTERMAT® for smaller throughput (20-70 kg/h) can also be offered. The pilot plant dryer is designed for process confirmation, process development and small production runs. The pilot scale FILTERMAT® also accurately simulates commercial FILTERMAT® spray drying processing, giving you accurate data for reliable scale up. Delivered ready to use, the pilot system comes with air heater, feed pump, nozzle, drying chamber with integrated filter belt, exhaust air system, and controls.



GEA drying test facilities



Agglomerated powder falling from the FILTERMAT® belt.



The polyester FILTERMAT® belt is designed for easy cleaning

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