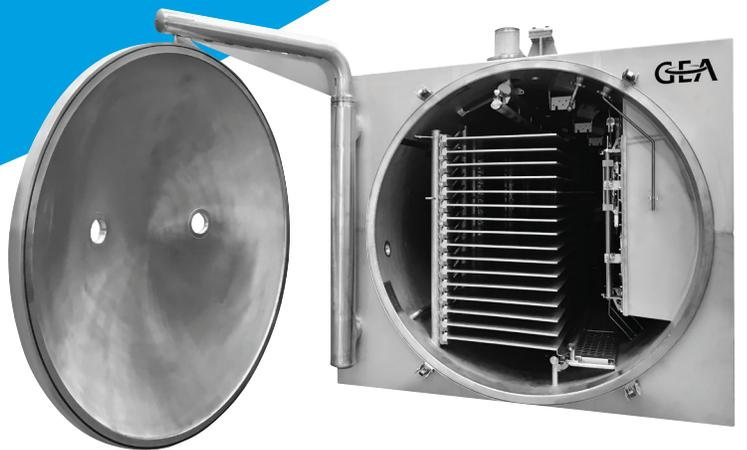




Freeze drying solutions for pet food

Quality cuisine for our furry friends



engineering for
a better world

gea.com

Freeze dried pet food

Reliable manufacturing equipment is essential if you want to stay ahead in the competitive pet food industry. Employing the latest technology, and proven processes, enables you to meet your current and future productivity requirements and benefit from new business opportunities as they come along.

Benefits of freeze dried pet food

Freeze drying is a form of dehydration in which pet food has its intrinsic moisture removed through condensation. It is a proven process that creates food with very low moisture levels that can be stored, unopened, at room temperature, much longer than traditional pet foods, without spoiling. Most pets like the taste of freeze dried raw food, even those with poor appetites.

When raw means raw

The freeze drying process removes moisture from food but, as no heat is applied, does not cook it. Freeze dryers lower the atmospheric pressure around the food causing the water to sublimate (transition from ice directly to vapor) and diffuse out of the food. This makes a high value product that remains largely intact and is attractive to 'raw food' feeders.

Freeze drying at a glance

GEA freeze drying is performed at temperatures below 40°C (100°F). This enables meat products to keep their original uncooked appearance and maintain their key nutritional properties. GEA's many years of experience and process knowledge, will enable you to create products that are:

- light weight
- shelf-stable
- easy to store at room temperature
- tasty and nutritious.



Raw meat



Cooked meat



Kibble

GEA know-how

GEA has provided technology for the freeze drying of fish and meat products for over 50 years and now has reference sites worldwide. This global experience means GEA technicians have extensive application know-how which, combined with innovative equipment and process optimization expertise, creates petfood and freeze drying lines that are tailored to your specific process needs.

The GEA scope of supply includes processing solutions for a variety of pet food products, including freeze dried raw meat, cooked meat, snacks and treats. GEA engineers will help you to optimize your processing line to produce the highest quality products, reliably and cost effectively.

Working with GEA offers the following advantages:

- minimized energy costs
- reliable and easy to use plant design
- access to pilot plant and test facilities.

Complete lines

GEA technology covers every step of pet food production to provide complete lines including: pre-breaking, grinding, analyzing, mixing, batching, emulsifying, pumping, material handling, forming, cooking, cooling, chilling, freezing, freeze drying and packaging. Advanced control software maintains the essential reliability and repeatability of the whole process.



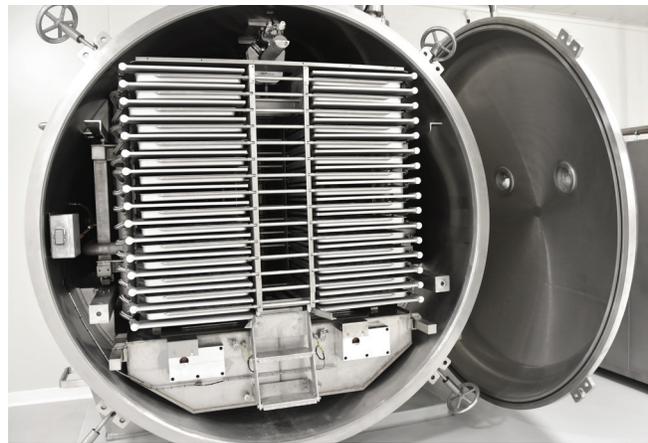
GEA freeze drying technologies

For many years, food processors worldwide have chosen RAY™ technology from GEA as the natural way of producing high-quality freeze dried products. By drying frozen products in a vacuum, it's possible to make certain that any inherent water in the product is removed as vapor, preserving the overall structure and size of the final product, including its vitamins, proteins, flavors and colors.

Refined efficiency

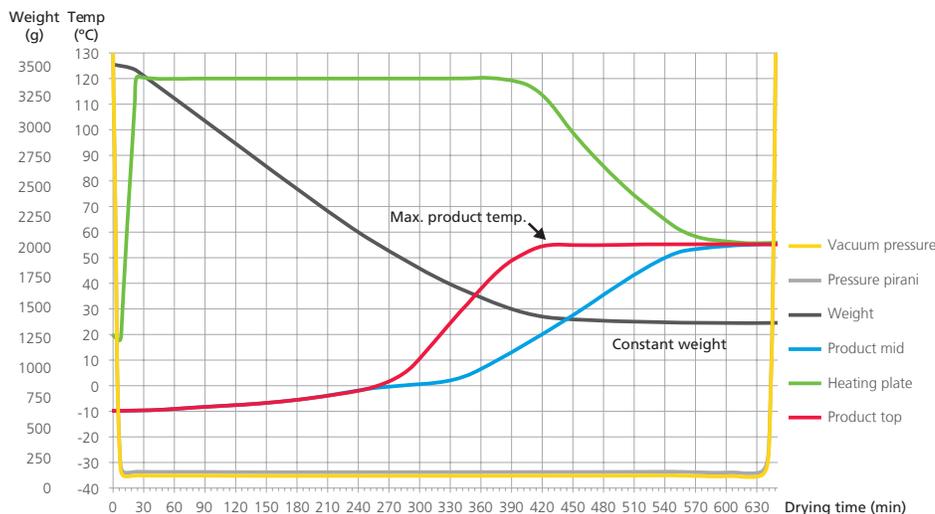
With RAY™ technology, we have refined the freeze drying process to achieve a highly efficient and economical plant design. This efficiency shows itself in negligible power loss (less than 0.1%), low energy consumption, uniform drying, high sublimation capacities and modular design.

The freeze drier's cabinet, heating plates and vapor condensers are built as individual units to provide shorter lead times and easy access for cleaning and maintenance. The compact design also minimizes the machine footprint and makes both installation and operation easier.



The overhead rail system for loading and unloading, and the Continuous De-Icing system, enable a changeover time between batches of under 30 minutes.

Freeze drying profile for pet food – RAY™



Typical drying times for raw meat products range from 8–16 hours depending on the allowable product temperature and the water content. Most pet food product can be dried in less than 12 hours. During drying the temperature is constantly monitored and the system automatically regulates to avoid scorching the product.

Freeze drier	RAY™ 16	RAY™ 50	RAY™ 75	RAY™ 100	RAY™ 125	RAY™ 150
Dry matter	30%	30%	30%	30%	30%	30%
Typical input capacity /24h	210 kg	1440 kg	2250 kg	3020 kg	3770 kg	4500 kg
Output capacity /24h	65 kg	445 kg	700 kg	935 kg	1165 kg	1400 kg

RAY™

Smaller RAY™ cabinets, that are simple to operate and require the minimum of investment, use a water-flushing de-icing system. This uses pre-heated water to flush the condenser at the end of every freeze drying cycle. The ice melts in less than 10 minutes and the resulting water is drained immediately.

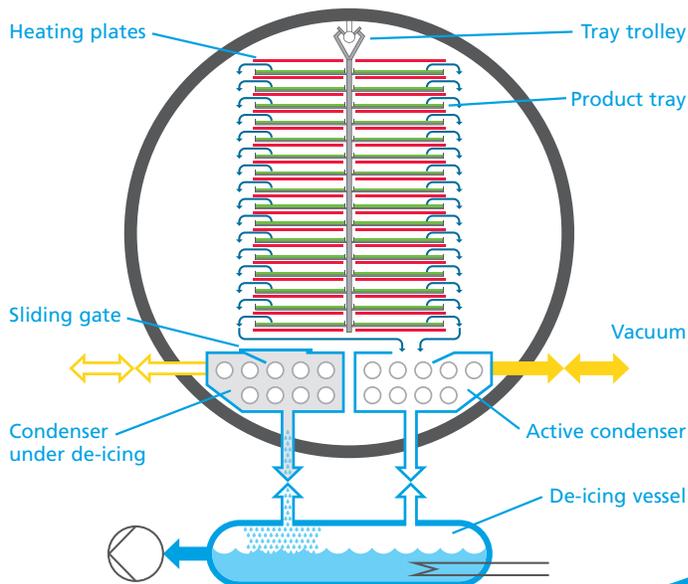
RAY™ with CDI

The larger RAY™ (75, 100, 125, 150) cabinets, for higher capacity operations, use the Continuous De-Icing System (CDI) in which vapor at 25°C, from the de-icing vessel, condenses on the cold surface, melting the ice. The condenser chamber is then closed off from the de-icing vessel to restore it to operating temperature, and any remaining vapor is condensed.

RAY™ Pilot Plant and test facilities

GEA's RAY™ Pilot Plant (RAY™ PP) is a batch-based freeze dryer specifically designed for new product development. It offers a wide range of benefits, enabling the testing and optimization of important process parameters ahead of commercial-scale production. The freeze dryer is also suitable for pilot production, providing accurate data that can be used to seamlessly scale up production to an industrial level.

No matter what the application, our experts can help to optimize both products and processes and provide ongoing support. GEA's fully-equipped test centers provide the opportunity and expertise to help with equipment selection, develop new products and bring them to market quickly and profitably.



Start to finish solutions for pet food from GEA

GEA has developed a comprehensive range of technologies, equipment and know-how to configure and install solutions for pet food manufacturing plants.

Pre-crushing & Grinding



- GEA BlockCrusher: heavy-duty crusher to break individual or multiple blocks or complete pallet loads of frozen raw materials
- GEA PowerGrind: high capacity grinder for efficient and gentle grinding
- For fresh and frozen products with same set-up

Mixing



- GEA ProMix: robust, reliable and flexible mixer
- Best distribution and absorption of liquids
- Steam injection

Cutting, Mixing & Emulsifying



- GEA CutMaster: Cutting, mixing and emulsifying in one step
- Processing different kind of meat products from coarse to very fine
- Easy to clean and maintain
- Steam injection and cooking
- Very versatile

Forming



- GEA MultiFormer: produces rectangular, round, triangular, irregular and novelty shapes with a flat or 3-dimensional appearance
- User-friendly operation and cleaning
- Fast product changeover
- Accurate process control

Freezing

- GEA IQF Tunnel Freezer: designed for hygienic requirements
- High yield and minimal energy consumption
- Modular configuration for perfect integration into your processing line

Emulsifying

- GEA EcoCut: accurate control over emulsion quality, fineness and temperature
- Cassette mounted double- and triple-knife sets
- Automatic knife adjustment



Service

- Installation, commissioning, training
- Spare parts, corrective maintenance, preventive maintenance
- Upgrades/modernization/ optimization, predictive maintenance, factory-rebuilt
- Performance contracts, on-site project support, service software products



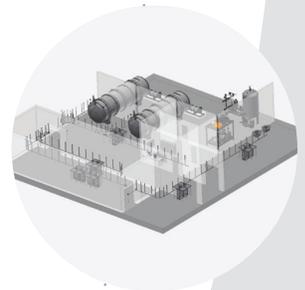
Test facilities

- Process development and validation
- Fully scalable test equipment for processing including freezing and freeze drying
- Industry leading know-how, spanning early stage product development through to final process refinement



Process Engineering

- Process design and engineering
- Project management
- Plant installation and commissioning



Packaging

- GEA SmartPacker: vertical form, fill and seal packaging machine
- Consistent high quality of produced packages
- Reliable and smooth film transport
- Quick film reel and bag format exchange



Freeze drying

- Industrial solutions for efficient freeze drying of raw, cooked meat and mixed products
- Highly efficient RAY™ freeze driers which allow products to keep their original properties and uncooked appearance
- RAY™ pilot plants designed for new product development and scale up



Automation & control systems

- Process automation and MES solutions
- Integrated company-wide network systems with corresponding MES
- Data capture and evaluation





We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

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