



# DRY PET FOOD PROCESSING.

Complete processing lines for extruded pet food.

# PET FOOD AS NEVER BEFORE.



Many years of experience in the food sector, customer-tailored development and a constant focus on innovation allow us to create a new generation of pet food.

## **Experience in the food industry**

On a market where customers increasingly demand products as similar as possible to ones for humans from a nutritional and production quality point of view and for the variety of formats, our many years of experience in developing food processing technologies allow us to offer futuristic solutions able to set new standards on the market.

Our experience in the food industry and the humanization trend in pet food, as well as the legendary flexibility of our extrusion and drying processing solutions, allow us to offer a pet food product with a leader's capacity and awareness.

## **Tailor-made philosophy**

Our philosophy leads us to work alongside our customers, supporting them in creating and developing innovative products, helping them define the formulations, forms, consistencies, weights,

flavors and colors that best satisfy the demands of the final consumer. We share their goal of obtaining an innovative and high-quality industrial production based on collaboration that starts with research and is embodied in the provision of the most advanced processing technologies.

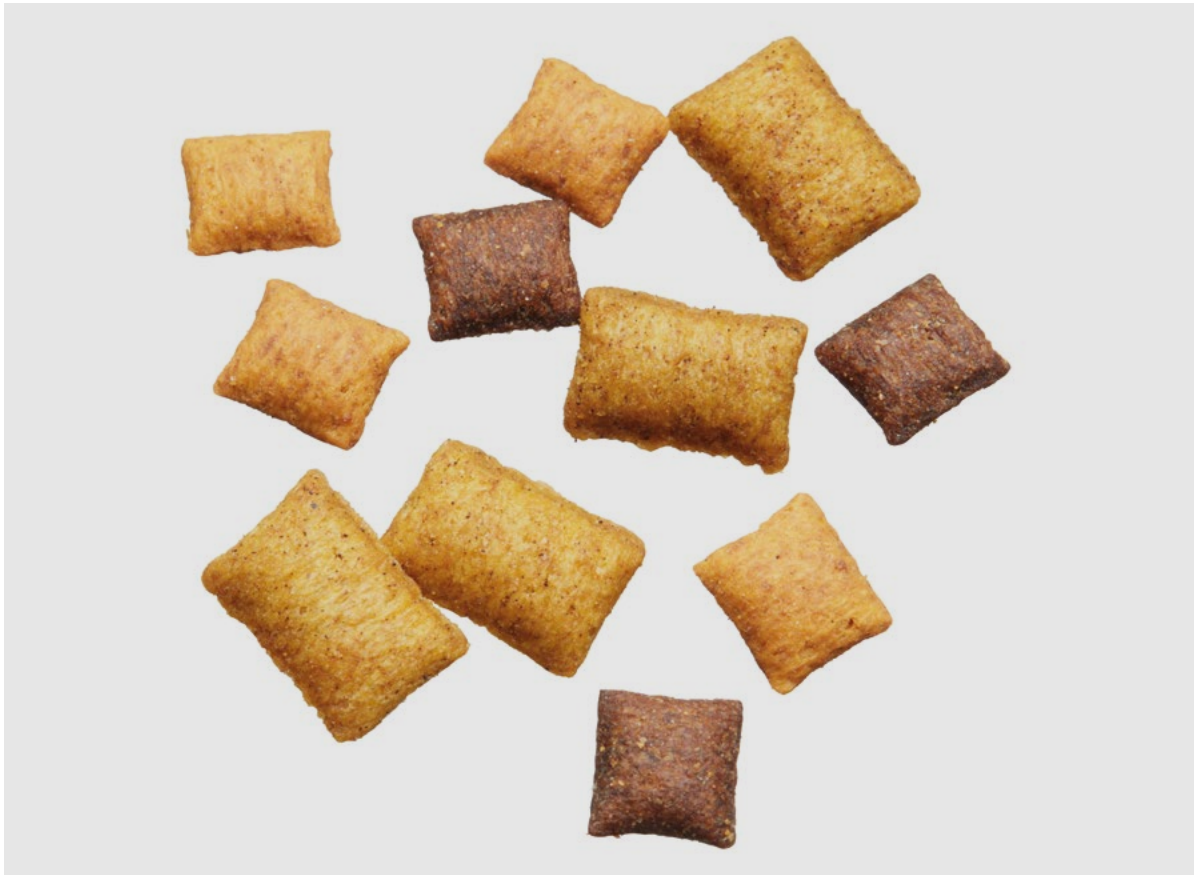
## **R&D Dept. and pilot plant**

We feed our success through constant and thoroughly organized Research & Development activities performed by a team of 30 people that includes process technicians, analysts and mechanics. They have at their disposal 2000 sq. m of facilities equipped with a completely new pilot plant capable of developing new products in all respects and a laboratory equipped with all types of instruments for chemical, chemical-physical and rheological analysis and nutritional/organoleptic testing.



# DRY PET FOOD APPLICATIONS

By travelling our own path and imagining the future, we got there before the others. We have developed futuristic technologies and continue to refine them.



A variety of pillow type formats.



**Kibbles**

Thanks to a detailed study of the formulations and formats that both satisfy energy and nutritional needs and whet the pet's imagination, kibble is considered the basic food in pet diets. The ingredients and format can vary according to the animal's size, age and state of health.



**Pillows**

These are intended as snacks whose main purpose is to be tasty and reward the pet for positive behavior. Through our extrusion technology, we can combine grains with a flavorful and nutritious filling according to requirements.



**Dental sticks**

Designed and developed specifically for use in cleaning dogs' teeth. Their unique star shape gets into hard-to-reach areas to clean teeth, protecting the animal's health while also providing it with the nutrients it needs.



**Pet biscuits**

Complementary snacks used as a reward to gratify the pet. Biscuits can come in a wide variety of shapes and sizes to suit to any pet size as well as to prevent dental disease.



# DRY PET FOOD PROCESSING

The technologies and processes developed for the manufacture of products for human consumption are now being applied to the world of pet food.

## Ingredient Preparation

The solid raw material composed primarily of grain flours, meat flours and nutritional ingredients, is mixed and perfectly dosed in the optimal recipe to meet the quality needs of any type of product.

## Cooking Extrusion

Our cooking-extruders are the result of our experience in human food and combine the gentle of cooking in the steaming tank with the power and sanitization of heat extrusion to obtain a highly digestible and nutritious product.

## Product Processing

Thanks to our technological experience and know-how, we can offer solutions for any type of format,

recipe or product, from kibble to various kinds of treats.

From the cooking technology and integration of ingredients to cutting, transport and drying to cooling and packaging, we can transfer all our experience to bring your projects to fruition.

## Drying and Cooling

We examine every aspect to ensure the final product has the desired characteristics. Our dryers are designed to reach very high temperatures while allowing multiple format changes with insignificant or even zero contamination between products.

Our coolers are developed to gently moderate product temperature for uniform cooling without impacting the flavor, aroma and quality of the food.



## Ingredient Preparation

Sieving, mixing and storage.



## Cooking Extrusion

Head of a GEA xTru Twin 70 cooking extruder installed on a pillows processing line.



## Product Processing

Detail of a pillows cutter.

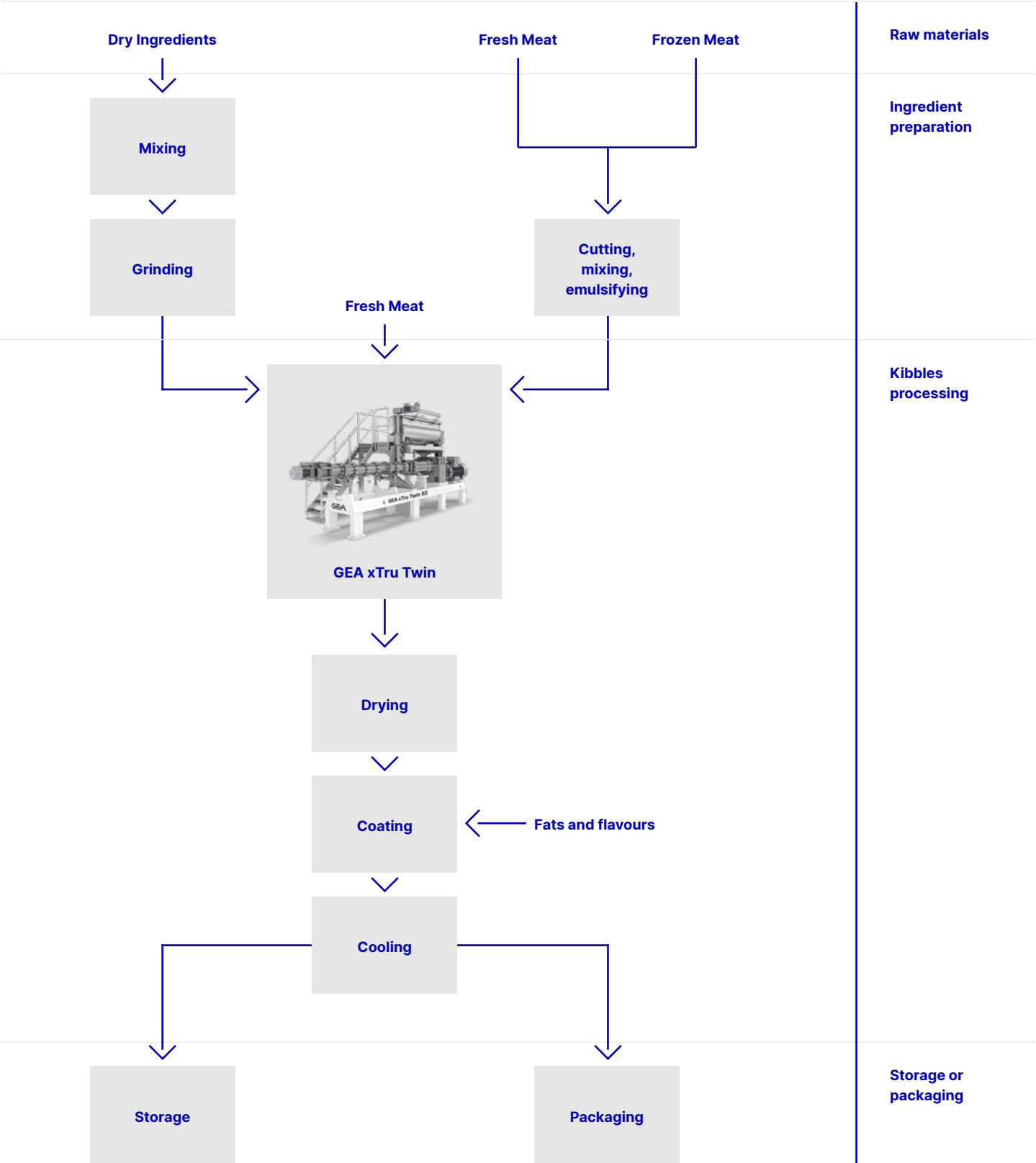


## Drying and Cooling

Dryer for kibbles.



# KIBBLES PROCESSING



Any kind of shapes for pets basic diet.

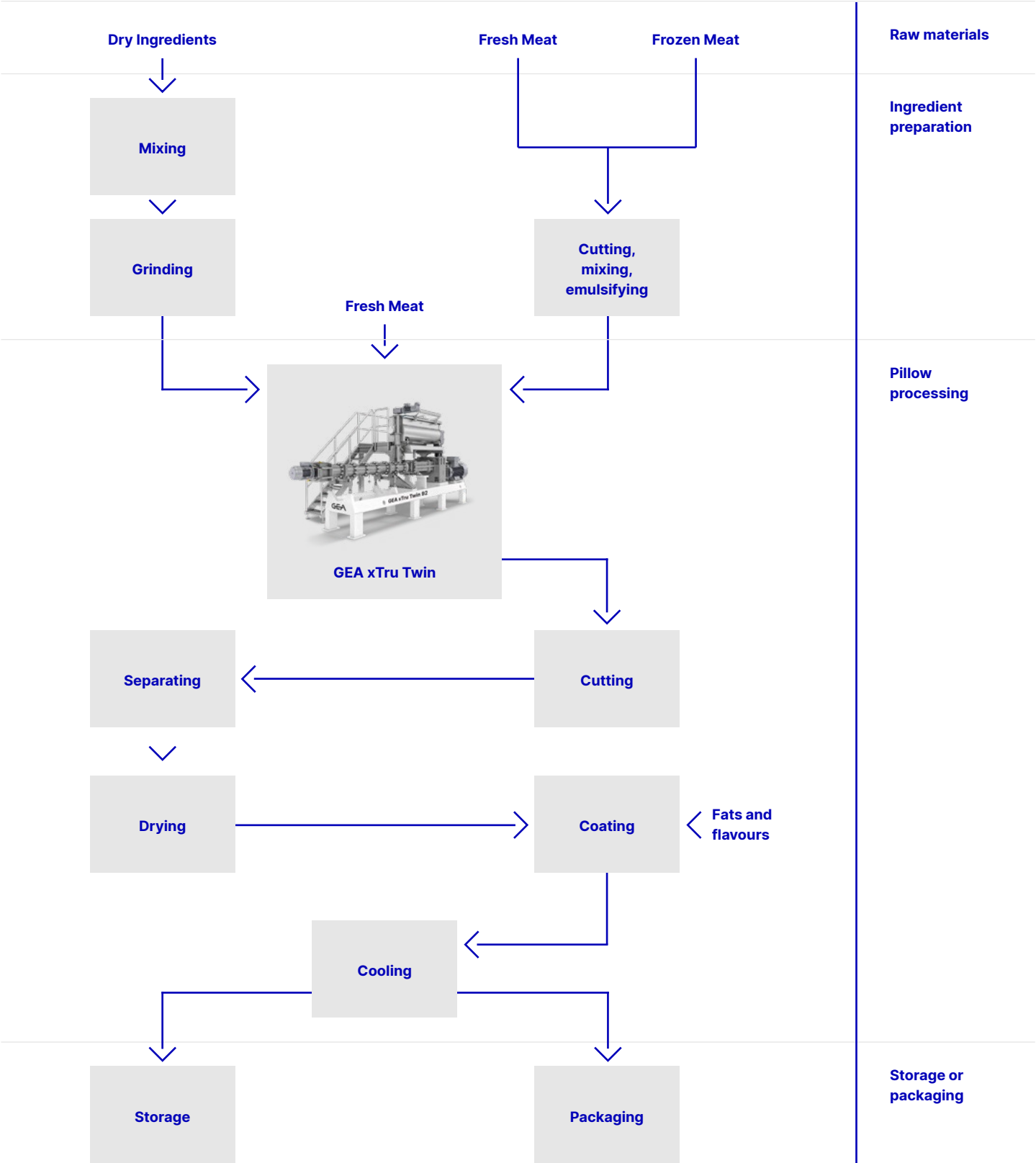
**A solution for any format**  
Our dies are designed, engineered and built in house so we can provide a solution to any customer requirement in terms of product shape.

**A High-Quality product from any raw material**  
Thanks to our ability to customize the extruder's modular screw configuration along with our technicians' experience, we can adapt the line characteristics based on the raw materials selected and thus provide a high-quality product.

**Durability and ease of maintenance**  
Our in-depth knowledge of the processes (use of multi-blade cutters) and use of top-quality construction materials (dies made of high-tensile steel) allow us to guarantee a long life and operability of the processing lines.



# PILLOW PROCESSING



An explosion of flavors for a snack created for humans and perfected for pets.

### Our tradition applied to Pet Food

Thanks to years of experience in developing and perfecting technologies for the production of snacks for human consumption, we now have high-quality and reliable snack production lines dedicated to pets.

### Precision and high performance

The ability to guarantee the repeatability of a high-precision product in large quantities is a path and an objective that we have reached through experience and technological knowledge.

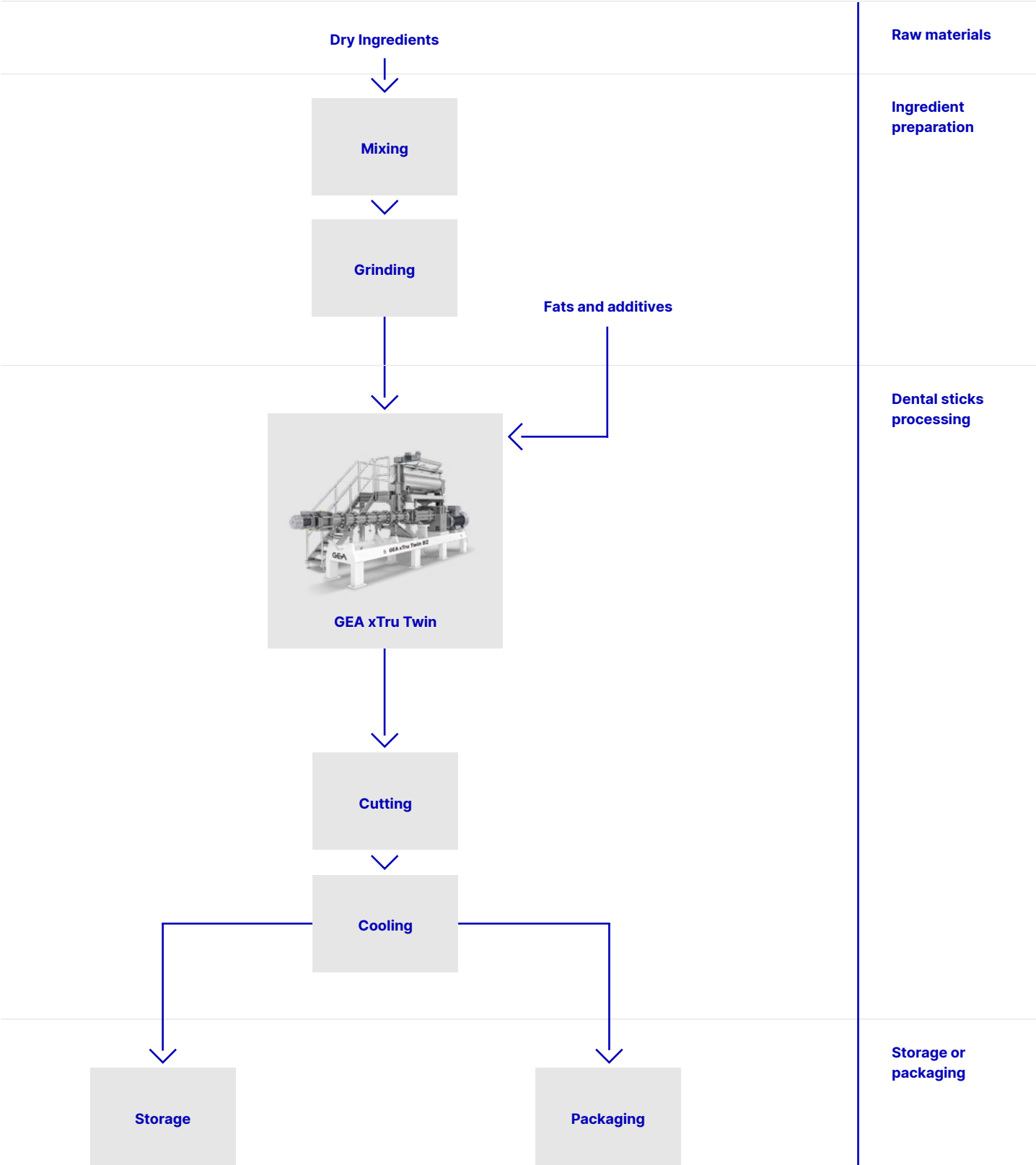
Our lines can boast:

- fixed-pitch rollers to ensure constant size;
- very high-speed machinery to guarantee high performance and capacity;
- specially designed dedicated pumps for continuous and precise dosing of fillings.





# DENTAL STICKS PROCESSING



Technologies and processes developed for the well-being of pets.

**Perfection right from the extrusion phase**

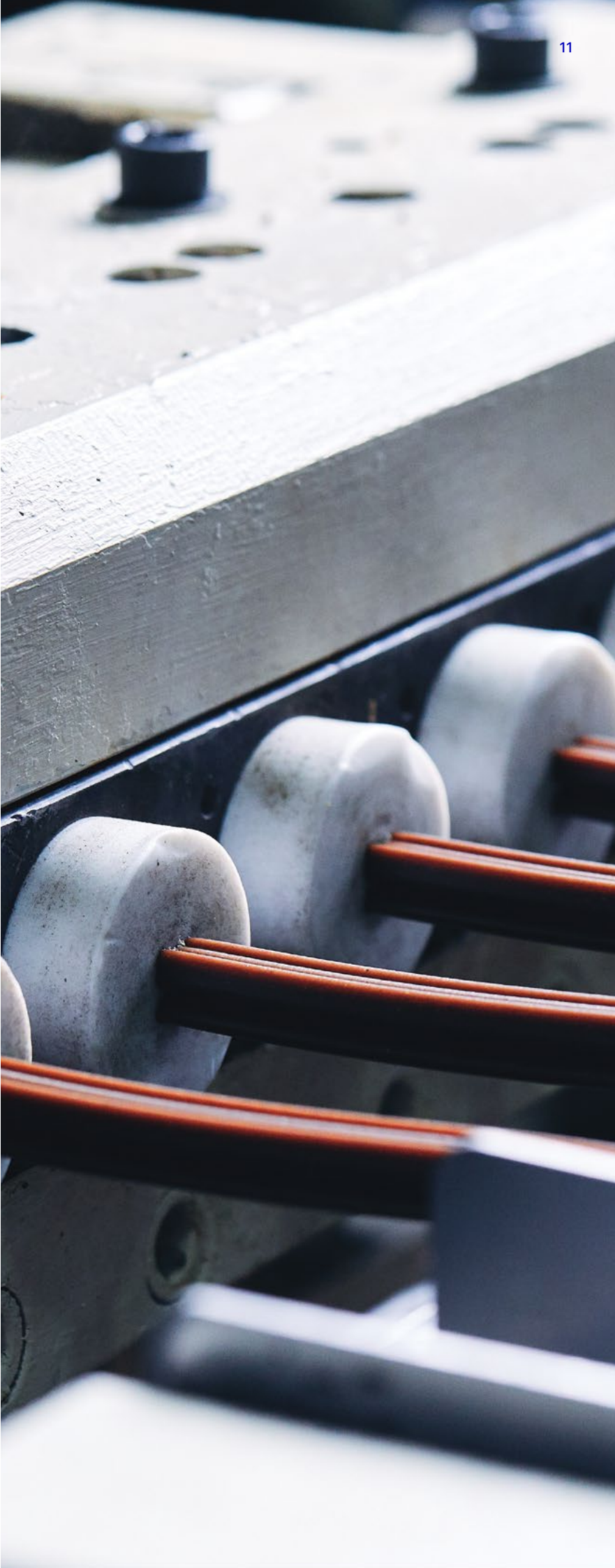
Perfect flow management at the cylinder head, based on our experience and technology developed for long pasta lines, means we can distribute the product rows in the cutter in an orderly manner, thus improving cutting and final quality.

**Cutting precision and uniformity**

Our cutter was specially designed and developed for dental stick lines to ensure maximum weight and length consistency in the single pieces, thus guaranteeing extreme consistency of the product that will then be packaged.

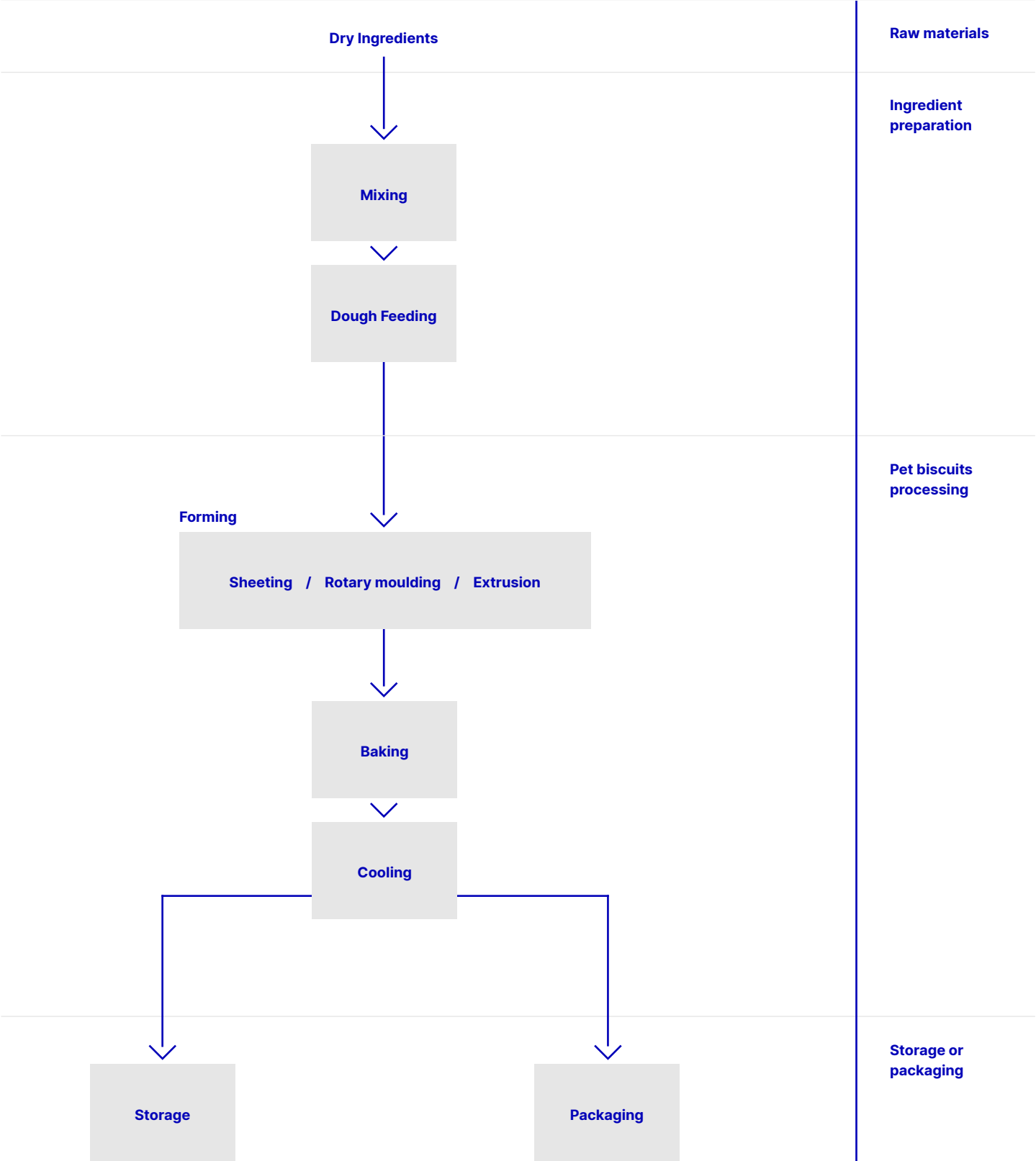
**The cooling phase**

Developed and specially designed for dental sticks, the cooler gently lowers the temperature of the product, bringing it as close as possible to room temperature and thus avoiding unpleasant condensates and deterioration of the finished product.





# PET BISCUITS PROCESSING



Reward your pet in any shape or form you can imagine.

**Flexible capability in terms of product shape**

A wide variety of moulds allow to process different shapes of cookies under an accurate tolerance over size and weight.

Rotary moulding technology allows to quickly switch from one product shape to another thanks to clever solutions for tool-free change over.

**Baking: the final tune for a tasty biscuits**

GEA ovens allow to achieve the best baking results from every standpoint:

- radiating technology (cyclotherm) with an option for a hybrid oven with convection technology;
- a consistent and delicate heat source enhancing product taste and guaranteeing even color through the web;
- energy saving option available to reduce CO2 emissions and energy consumptions.





# INGREDIENT PREPARATION

We develop the best technologies to enhance ingredients and satisfy any requirement for the finished product.

## GEA grain milling technologies

Hammer mill and plansifter installed in our Pet Food Technology center.

## Grain handling

Thanks to our experience and technology developed in the milling world, our flour plants allow optimal high-precision care and management of raw materials.

From automated systems for mixing the raw material, to cleaning and selection machinery, to precise dosing devices for recipes, every step is studied and designed to produce products of the desired quality. Through extreme consistency in dosing grain size (even starting from different raw materials) and constant micrometric control after the mixing stage, our lines create a very homogeneous product right from the extrusion phase.

## Meat slurry

Synergy and collaboration between the technologies of GEA's world allow us to use well-tested machines to prepare meat-based ingredients that are then paired with extrusion technologies.

The reference machine in the industry is the GEA CutMaster: it cuts, mixes and emulsifies all different kinds of meat products from coarse to very fine. All processes take place within the same machine and are, therefore, independent from peripheral equipment. The slurry that result from the GEA CutMaster could be injected in the cooking extruder through a meat slurry pump: this pump is equipped with specially shaped lobes to avoid surging and is fully washable and inspectable to guarantee the highest hygiene standard.



GEA MS - Hammer mill.



GEA CutMaster.



# EXTRUSION TECHNOLOGY

The heart of our manufacturing process: flexibility, speed and solidity, serving any product and format.

**GEA xTru Twin 70**  
Cooking extruder  
installed on a kibbles  
production line.

## Pioneers of extrusion technology: the cooking extruder

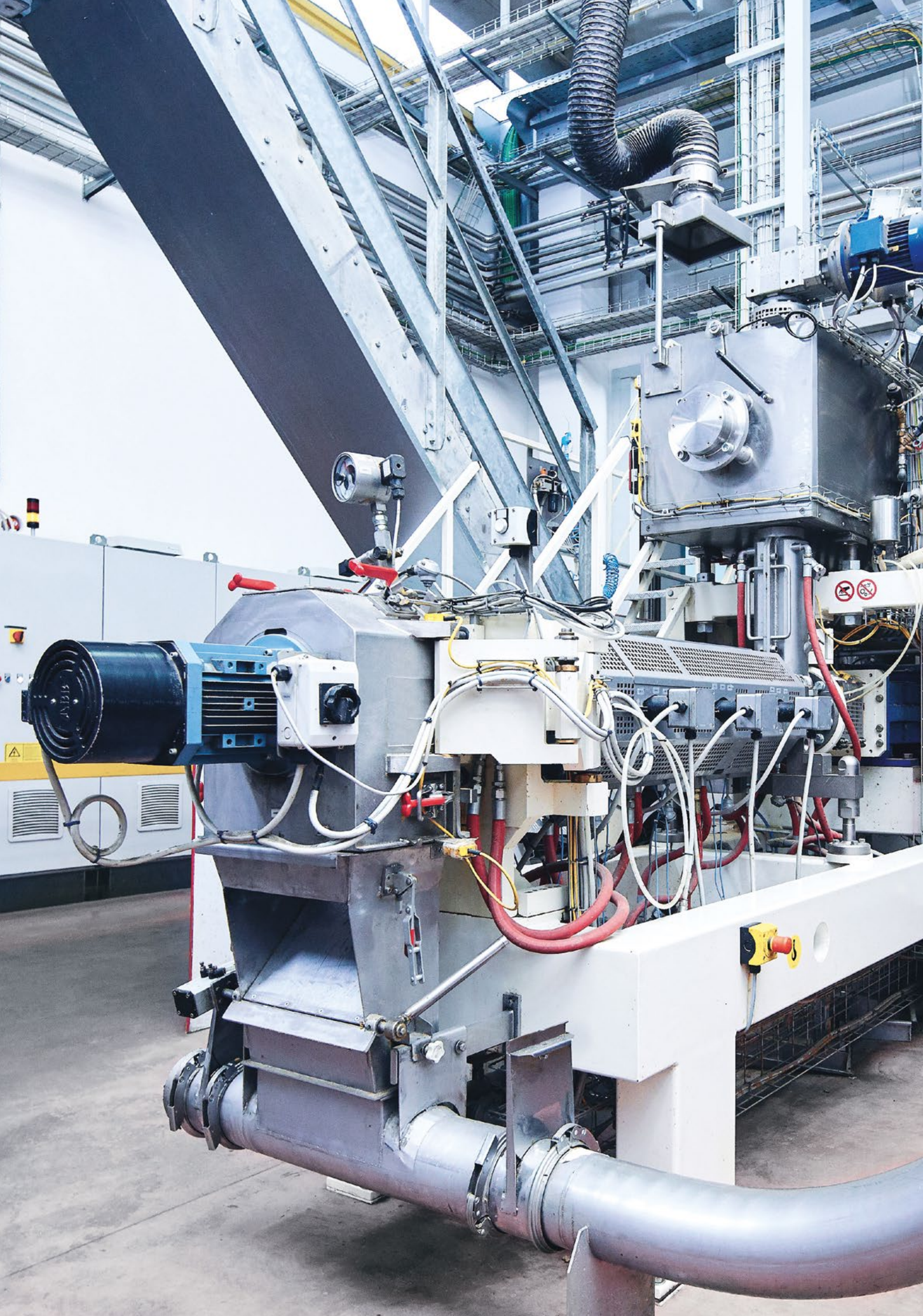
Based on our extensive knowledge of technologies and processes in the food world, our technicians have created extruders able to produce highly digestible and nutritious products.

The steaming tank positioned before the extrusion process pre-cooks the ingredients, thus triggering starch gelatinization and protein denaturation to guarantee digestibility and avoid anti-nutritional factors.

The combination of the gentle of steaming in the tank followed by heat treatment during the extrusion phase guarantees a sanitized product with a high degree of gelatinization.

## Technical characteristics

- Steaming tank for ingredient pre-cooking;
- Double screw made of the highest quality materials for durability and strength;
- Automation system for constant and customized control of all values and processes;
- Solid and quality construction means the system can run for a long time with no need for frequent maintenance;
- Can be equipped with one or two interchangeable heads.



Side view of a GEA xTru Twin 92 Cooking Extruder.



# COOKING EXTRUDERS: THE GEA XTRU TWIN SERIES.

The GEA xTru Twin cooking extruder continuously and automatically gelatinises flours and starches.

After dosing the raw materials, the mixing phase begins, which can be adjusted according to product needs. Then comes extrusion. The GEA xTru Twin extruder is a modular machine with segmented barrels available with different heating and cooling systems. They can be equipped with a feeding port, steam/liquid injection port or venting port (atmospheric and under vacuum according to specific needs).

**Technical characteristics**

The co-rotating, fully intermeshing screws assembly is composed of sectional modules with the following functions: forward and backward transport, mixing, feeding of additives, injection of liquids, de-gassing, cooking and forming. The screw profile ensures high mechanical working capacity and high torque transmission. The driving system is composed of an AC variable speed drive, a safety clutch and a double cascade gearbox for correct reduction. The thrust bearing system inte-

grating the gear box and with a forced lubrication circuit is composed of a large thrust bearing on one shaft and a multiple thrust bearing series on the other shaft, for a compact and robust construction. The extruder can be equipped with a head unit with independent temperature control, product pressure device and interchangeable dies with a series of different cutting units selected based on the different production needs of the finished product.

**Control system**

The typical control system of the GEA xTru Twin extruder features a supervising unit monitoring all extruder functions from dosing to the cutting unit, allowing easy recipe management and displaying all process variables, such as raw materials flows, extrusion torque, specific mechanical energy value, barrel temperatures and die pressure. The supervising system stores the values and allows data export and management with the most commonly used spreadsheet software.

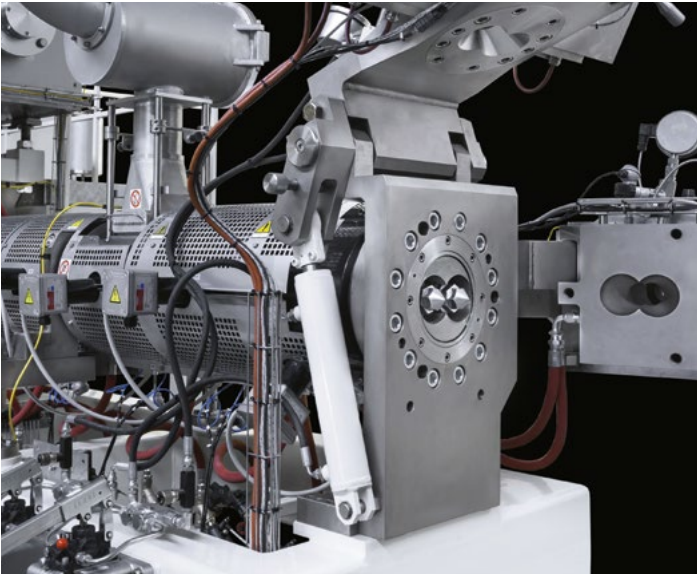


**GEA xTru Twin 92**  
The twin extruder with the highest power and range of original products. It is equipped with a completely new ergonomically designed frame that is stable, sturdy and easy to clean.

Product	Kibbles	Dental Sticks	Pillows	Extruder
				
Max. Line Capacities		250 kg/h	300 kg/h	GEA xTru Twin 58
	1000 kg/h	400 kg/h	500 kg/h	GEA xTru Twin 70
	2500 kg/h	800 kg/h	1000 kg/h	GEA xTru Twin 92
	4500 kg/h			GEA xTru Twin 112
	10000 kg/h			GEA xTru Twin 140



Detail of a GEA xTru Twin 92 cooking extruder steaming tank and the characteristic paddle shaft.



Detail of the extruder head showing the two extrusion screws characteristic of the GEA xTru Twin.



# STORAGE AND HANDLING

Good quality raw materials and finished products need to be protected and stored with the utmost care and efficiency.

Left  
**Discharge descender**  
It feeds product into the silo, from the base to the top, without damaging it.

Right  
**DED, Direct discharge descender**  
It conveys the product directly to the packing plant or other plant, without damaging it.

## Complete systems for raw material and finished product care

We offer complete systems or single machines to transport, dose, clean, rework and store raw materials, pet food and small items.

Advanced technology applied to design and production makes it possible to fine-tune a sophisticated production chain, which results in higher quality standards.

This leads to an extremely reliable plant with consistent and high performance.

The design and engineering of the systems were developed by highly qualified professionals using the most advanced technologies. The solution and final layout are designed in cooperation with the customer to optimise existing resources, equipment and facilities.

## Recipe control and optimization

Thanks to our PLC equipped plants, the entire process can be managed from a single control point.

The recipe for every production line can be programmed, the filling level in the silos monitored, every production batch tracked and every production chain fine-tuned.

In addition to complete automated control of the equipment, the automation tools provide the client with critical information to reduce waste and downtime, thereby optimising resources.





# PEX - PET FOOD EXPERIENCE CENTER

PEX aims at driving innovation in cooperation with customers and industry partners and functioning as a locus for sharing latest know-how, where partners can anticipate a high-level of technological development support.

## High-tech equipment for product development

The 1000 sqm facility is home to a team of 30 employees, including process technicians, analysts and mechanics who now have at their disposal a new pilot plant for developing new products as well as a laboratory equipped with diverse instruments for chemical, chemical-physical and rheological analysis and nutritional/organoleptic testing. Customers visiting the PEX will find a complete solution line with the latest machinery technology for each processing step.

## Interactive pet food workshops offered

The R&D center can also be used as a training ground for customer employees, where they can learn about efficient processing and best practice. The primary aim is to help attendees learn how to be efficient at every step of the dry pet food production process, which includes: selection of raw materials, raw material intake, handling, weighing and dosing, mixing, grinding, conditioning, extrusion-cooking, forming, drying, coating and storage/packaging.





# START TO FINISH SOLUTIONS FOR PET FOOD FROM GEA.



- 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



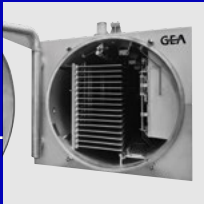
- Emulsifying**
- GEA EcoCut: accurate control over emulsion quality, fineness and temperature
  - Cassette mounted double- and triple-knife sets
  - Automatic knife adjustment



- 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 minimum energy consumption
  - Modular configuration for perfect integration into your processing line



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



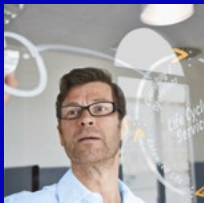
- Cutting, Mixing & Emulsifying**
- GEA CutMaster: Cutting, mixing and emulsifying in one step
  - Processing different kind of meat products from coarse to very fine
  - Easy to clean and maintain
  - Steam injection and cooking
  - Very versatile



- Dry Pet food processing lines**
- Tailor-made processing lines
  - High capacity and low maintenance cooker extruder
  - Technology for the production of any kind of extruded dry pet food



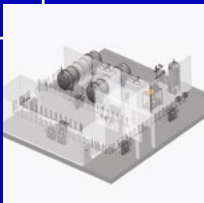
- Packaging**
- GEA SmartPacker: vertical form, fill and seal packaging machine
  - Consistent high quality of produced packages
  - Reliable and smooth film transport
  - Quick film reel and bag format exchange



- 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



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

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



