

ENSURE HEALTHY PET FOOD:

How Pet Food Processors Benefit from Sanitary, Reliable, & Efficient Process Equipment

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Overview

When it comes to pet food processing, the number one goal is ensuring safe, healthy pet food and treats. Factors such as regulatory requirements, operating costs, efficient processing techniques and suitable equipment selection all impact pet food safety and operations.

On the other end of the spectrum, pet owners expect safe and nutritional food and will take great strides to ensure their safety, seeking out the best and safest food money can buy. After all, pets are furry, affectionate, and loyal, making them ideal candidates for pampering. From spa and upscale grooming appointments to providing them with the finest nutritional pet foods and treats money can buy, its obvious people are taking better care of their pets.

In an industry already heavily regulated, many well-known pet food recalls have increased the level of concern for pet food safety. As such, pet food operators are looking for ways to tighten up their processing lines with safer, more reliable, and efficient processing equipment.






Improve Your Process

Pet Food / Pet Treats Market & Outlook

The pandemic had an adverse effect on supply network in terms of supply and cash flow, however, pet food demand grew steadily in many parts of the world as individuals adopted more pets in response to a desire for companionship during lock downs. In 2021, the US pet food/treat market saw expenditures of \$50 billion according to the American Pet Products Association ([APPA](#)), an increase of 13.6% over 2020. The market is forecasted to have a CAGR of 7% for the years 2022 – 2029.

Types of Pet Food & Pet Treats

Types of pet food, ingredients, and moisture content can vary from one manufacturer to another. In general, pet foods include kibble (dry food), moist food (wet or canned food), semi-moist, fresh or home-cooked, and raw meat-based diets.

Dry Kibble	Wet Canned	Semi-Moist	Fresh Home-Cooked	Raw
				
<ul style="list-style-type: none">• Typical moisture 6-12%• Oral hygiene benefits• Economical, long shelf-life• Cooked & shaped in an extruder	<ul style="list-style-type: none">• Typical moisture 60-80%• Higher price, less shelf-life vs. dry food• No oral hygiene benefits• Vacuum sealed & sterilized with heat/steam	<ul style="list-style-type: none">• Typical moisture 20-30%• Cooked & shaped in an extruder• Hybrid dry/wet food choice• Less likely to cause oral hygiene issues vs. wet food	<ul style="list-style-type: none">• Typical moisture 20-30%• Cooked at lower temps• Short shelf life• No preservatives	<ul style="list-style-type: none">• Typical moisture 20-30%• Homemade, store-bought freeze-dried, or dehydrated• Some oral hygiene benefits• Nutrients in purest form but must purchase frequently or freeze-thaw

Pet Food Regulation

The pet food industry approaches food safety by complying with the same general standards as human foods. Per the [Food and Drug Administration](#), “the FDA regulates pet food similar to that for other animal foods. The Federal Food, Drug, and Cosmetic Act (FD&C Act) requires that all animal foods, like human foods, be safe to eat, produced under sanitary conditions, contain no harmful substances, and be truthfully labeled.”

The FDA says that ingredients used in pet food should be safe and provide a function in the pet food. Ingredients such as meat, poultry, vegetables, and grains do not require USDA approval. Sources of minerals, vitamins, flavorings, preservatives, or processing aids may be recognized as safe for their intended use or function under specific Code(s) of Federal Regulations.



We all want our dogs and cats to have the best and healthiest food. However, just like our food, pet food and treats can sometimes be contaminated with germs. The good news is that you can take steps to keep your pets and family healthy.

Safe food for dogs and cats

Safe pet foods have been cooked or heated to a high enough temperature to kill germs.



Kibbles are cooked and shaped before being dried.



Canned pet foods are sealed before being sterilized (heated to a high temperature).



Fresh pet foods are cooked food with fewer or no preservatives, often delivered to your home as part of online pet food subscription services.

For your dog's or cat's main diet



Look for the words "complete and balanced" on the product label.



If you cook food for your pets, talk to your veterinarian or a veterinary nutritionist to make sure you're providing a complete and balanced diet.

Keep your pets safe



Don't feed your pet any recalled food or treats. Scan QR code for links to recalls.



Clean pet food and water bowls, food scoops, placemats, and treat toys frequently.



Follow storage instructions on pet food or treat labels.

Keep yourself and your family safe



Wash your hands with soap and water before and after handling pet food or treats. Make sure children wash their hands properly.



Don't let your pet lick your open wounds or areas with broken skin, and try not to let your pet lick your mouth or face immediately after they eat.



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Pet Food Regulation (continued)

Guidelines have also been established by the Association of American Feed Control Officials ([AAFCO](#)). AAFCO regulates the sale and distribution of animal feed, pet foods, and drug products for safety and follow applicable local, state, and federal laws. Their safeguards include food ingredient standards and laboratory operations.

Minimizing Recalls: Pet Food Safety & Quality

Pet food safety starts with reliable suppliers. With pets often intaking one specific food type for most of their lives, it must satisfy all nutritional necessities to sustain a long and healthy life, making quality and consistency extremely important. Without food safety, sanitation measures, sanitary equipment and the right process in place, pet food can become exposed to various types of bacteria and other types of contamination.

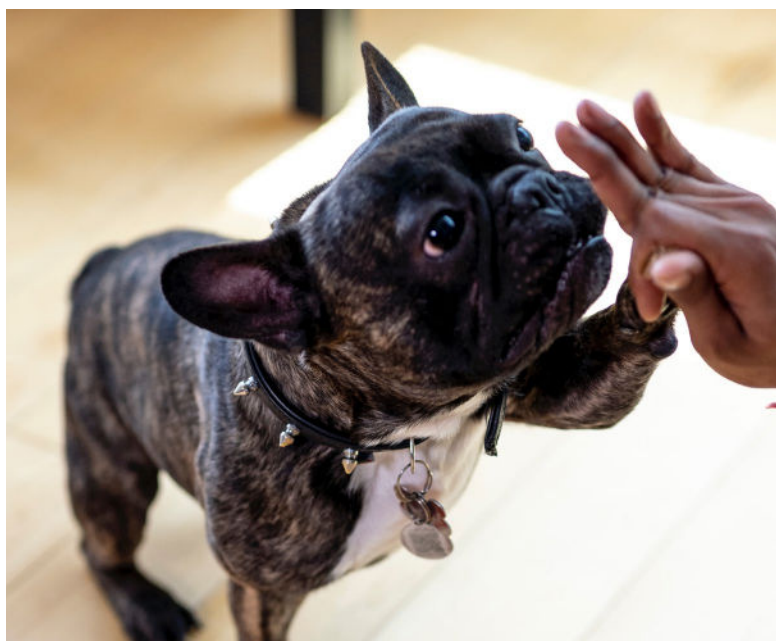
To minimize the risk of detrimental recalls, pet food manufacturers follow these general industry standards:

- Careful vetting and approval of food ingredient suppliers.
- Concerted focus to ensure hygiene, sanitation, and good manufacturing practices.
- Quality control and sampling of raw materials, specifications, and procedures for precise measurement of materials for each recipe.
- Precise control of processes such as extruding, cooking, drying temperature and retention times, and cooling time.
- Clearly defined and labeled specifications of ingredients, nutritional profiles, and moisture content.
- Regular monitoring of the integrity of packaging and palletizing methods.

Safe & Sanitary Equipment

In addition to vetting equipment suppliers, careful consideration should be given to each piece of equipment in the process line. From receiving and handling of raw materials, through multistep processing to final packaging and shipment, selecting process equipment that meets sanitary guidelines is critical to the success of pet food operations.

Major pet food manufacturers that produce high-quality foods and/or treats use customized, sanitary (or food grade) equipment for processing their recipes by food type (E.g., dry kibble or wet/moist products).

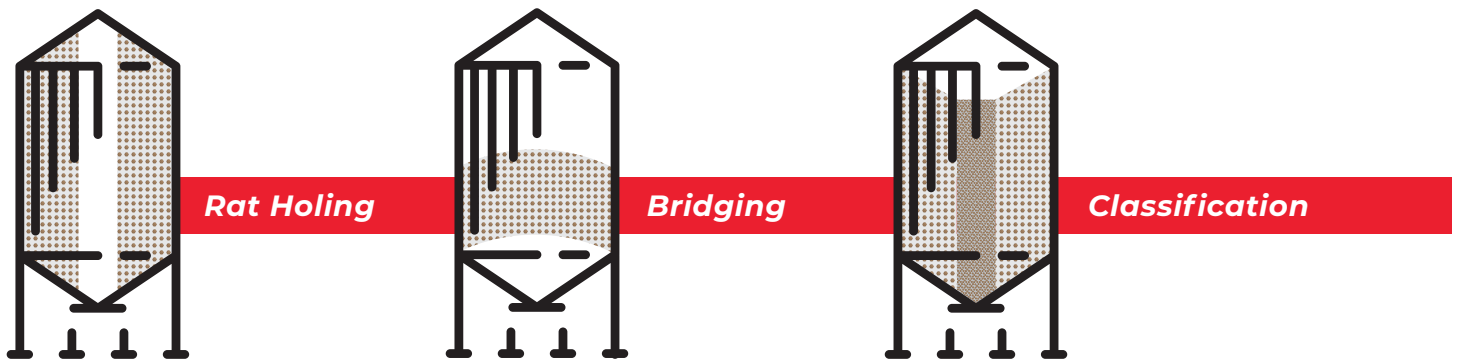


Tightening Up Process Lines with Modern Products

Manufacturers have an extensive knowledge base of ingredients and recipes along with modern process equipment built with pet food safety and quality requirements in mind. However, tightening up operations does not end with just the addition of hygienic equipment. Selecting reliable and efficient equipment that is the most suitable for each step in their process will help.

Receiving

Pet food ingredients such as soy, corn, wheat, dry meat, and bone meal are received in bulk by railcar and truck. Raw ingredients can be stored in tanks, bins, rail cars, or truck trailers. For those stored in storage bins, vibrating bin dischargers (or bin activators) are used as material flow aid devices and should be designed to mitigate rat holing, bridging, and classification of these ingredients in the storage bins.



For the pet food industry these bin dischargers are designed with safety precautions and sanitary interior finishes. Interior surfaces and welds are polished to an 80 grit (71 Ra) interior finish or better and product contact surfaces are cleaned and coated with vegetable oil.



S. Howes sanitary equipment minimizes residue build-up during processing and is designed for easy access and high cleanability. S. Howes mixers deliver uniform, high-capacity blending at low power cost. High polishes and additional design features are available to meet specific pet food requirements.

Mixing & Blending

Mixers play an important role in processing pet foods and treats. Mixers must achieve the desired homogenization, solubilization, emulsification, and deagglomeration per formula prior to transferring to additional process steps. [Mixing and blending](#) can be accomplished with ribbon, paddle, or plow agitators depending on the recipe and requirements should be designed for speedy changeovers, specific deagglomeration targets, and easy cleanups in mind.

Continuous paddle mixers offer continuous high-volume production of powder blends. These blends can be multi-component powder blends, or they can be for powders requiring a coating of liquid agents for nutrition supplement, binder, or water addition. S.Howes [continuous mixers](#) can have custom configured agitators to suit a specific process. Features can include multiple inlets, various spray addition configurations, segmented covers, access ports, inspection windows, and others.

Transfer Conveying & Feeding

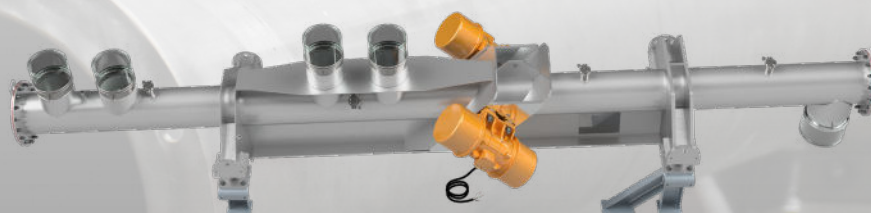
Mixed product is generally transferred by vibrating conveyors or feeders. Transfer equipment should be designed with monolithic troughs free of ledges, crevices, hollow components, or tubing which trap product or contaminants. These units may also use food grade grease, connectors, and gaskets. Equipment surfaces can be polished (typically to 80 Grit/71 Ra or better) to prevent product build up and sticking.



Vibrating conveyors have inherent advantages for the handling and transfer of pet foods. The vibration amplitude and frequency can be tuned to provide smooth and gentle conveying, or if desired, a high-G motion which homogenizes product and breaks up agglomerates.

Transfer feeders designed by Carrier Vibrating Equipment can include a variable frequency drive (VFD) to provide frequent start/stop functionality and variable feed rates.

Tubular-trough vibrating conveyors handle a wide variety of pet foods and are well suited for conveying high quality ingredients that need special handling to avoid damage to product. Their easy-clean design makes them ideal for food processing.



Tube Conveyor with Twin Drives



Bias cut vibrating conveyors and feed conveyors on an oscillating base are effective solutions for spreading product evenly on a wide belt or band dryer. Spreading out the product evenly will allow the material to dry uniformly and more efficiently.



Screw conveyors can be used to move material throughout the process line. [S.Howes](#) provides horizontal and inclined screw conveyors in various configurations including a unique split-tube design for superior cleanability as well as tubular and U-Trough housings. Thermal screw conveyor designs provide heating or cooling process needs. For example, thermal screw conveyors are ideal for pre-treatment to heat and kill off harmful bacteria and enzymes that could end up in the process downstream.

Screening

Pet food may be screened at various steps of the process to separate materials by their particle size and remove fines and/or clumps. Screeners can be designed to screen, scalp, and dewater washed or heavily wetted product making them highly efficient. In addition to this versatility, screeners can be designed for quick changeovers and can also remove foreign contaminants such as metal, plastics, bone fragments, and hair.



High-capacity screening conveyor designs are used to separate agglomerations, larger chunks, and fines. These screens often feature dust tight covers sealed with a food grade gasket. These covers are typically designed to be either quickly removed or hinged and clamped for easy access. The screen decks are also designed to be removed quickly for cleaning and product changes. In some cases, these units can also be outfitted with CIP (clean-in-place) spray nozzle systems.



Delivering adaptable process solutions [Carrier Vibrating Equipment](#) offers multifunctional screeners for stringent requirements and the most discerning pet foods brands - screen, scalp, separate or dewater. Designed with high capacity, high efficiency, easy access, and food grade regulations in mind.



[Centrifugal sifters](#) can also be used for sifting out clumps from desired pet food material and can be equipped with a variety of screening types including nylon or stainless-steel wire sieves as well as wedge wire screens, all with various mesh sizes.

Extrusion or Baking

Extruders can be multi-functional allowing a wide variety of products to be mixed and formed into a specific profile or shape with custom dies. Ingredients added to an extruder hopper are processed with a screw, heated, and steamed to help dry the product. Baking generally requires several pieces of equipment. Ingredients are weighed in batches then transferred to a mixer where the material is kneaded into dough, then sheeted, cut, and formed into desired profiles or shapes.



Drying Equipment

Pet foods and treats need to be dried to specific moisture contents. Drying may be accomplished with a variety of equipment including thermal screws, belt dryers, fluid bed dryers, pellet cookers, ovens, and others.

Fluid bed dryers provide gentle efficient drying and allow for specific retention time control which results in evenly dried product. Fluid bed drying is an ideal way to evenly dry materials very quickly and efficiently because air flow surrounds the individual particles allowing them to dry on all sides. The fluidization that occurs allows for the material to be constantly mixed for a more uniform final product.



Fluid bed dryers can be manufactured in either vibrating or static arrangements and can be designed to accommodate varying feed rates. Carrier Vibrating Equipment provides sanitary, food grade [fluid beds](#) with options such as unibody designs for easier cleaning and custom fluidizing decks which allow delicate and friable material to dry without degradation. Custom deck designs include directional, step, and variable drill patterns for different air velocities.

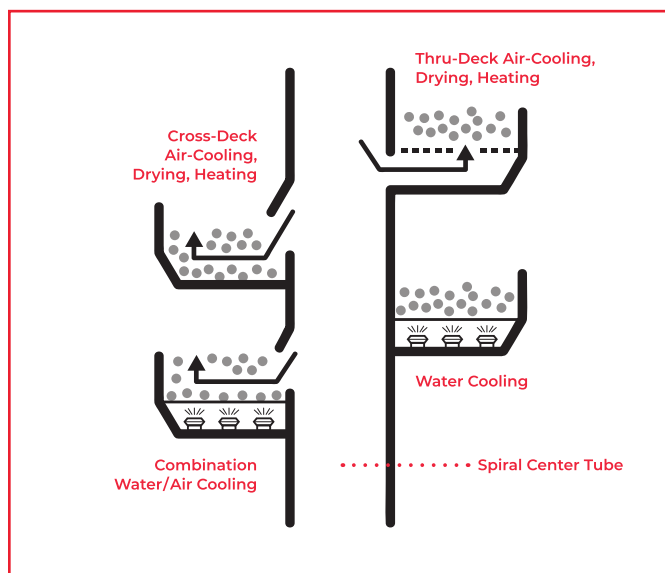
Additional processes such as coating and spraying provide pet food processors an efficient way to produce quality kibble nutrition with improved palatability. Coating ingredients can include poultry-based fats, vegetable and fish oils, antioxidants, and flavorings. Due to the product being fluidized and constantly mixed, fluid bed dryers can be customized with spraying nozzles to allow for coating and drying in a single unit.



Belt dryers require the material to be evenly spread across the full width of the belt. The product's distribution over the wide belt area of the dryer can be controlled by using oscillating feeders or bias-cut feeders. Without even distribution, material in deeper pockets can be under dried while material in shallow pockets can become over dried or even burnt. Under dried material that is packaged as final product can lead to mold or other moisture related issues like clumping.

Cooling Equipment

Product must be cooled between processing steps or prior to being sent to final packaging to prevent condensation, product caking, or agglomeration inside the packaging. Equipment options largely depend on the characteristics of the pet food or treats but can include vertical coolers, horizontal coolers, fluid bed coolers, cooling conveyors, and spiral elevators. Cooling conveyors and [spiral elevators](#) can include water jackets to provide indirect cooling. Spiral elevators can provide a lot of surface area as well as easier cleaning when compared to bucket elevators.

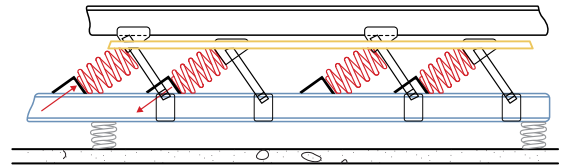


Conveyors In Sensitive Process Areas

Processes that require easy to clean vibratory conveyors sometimes need to be installed near sensitive equipment such as weighing scales or packaging equipment. These units are often installed on second or third floor mezzanines to gain the elevation required for packaging.

Vibratory conveyors that are isolated and balanced can minimize dynamic reactions. The reduced dynamic reaction will not affect sensitive packaging equipment which needs to be precise (i.e., weigh scale readings) for operational efficiency. They can also be designed with wheels and other temporary mounting arrangements to accommodate uneven floors or mobile operations for ease of cleaning.

Carrier Vibrating Equipment designs [isolated and balanced](#) vibrating conveyors that minimize dynamic reaction up to 98%.



Counterbalanced Member & Isolated Weight Base Mounted on Springs to Reduce Reaction

Air Pollution Control / Dust & Wet Particulate Collection

Process operations create emissions that require capture before ventilation gases can be exhausted to the atmosphere. Dust particles created during pet food manufacturing can present respiratory problems, potential explosive hazards, impact equipment performance and longevity, and could lead to EPA concerns and/or fines.

Two types of dust can be generated in almost any industry, either nuisance dust or process dust. Nuisance dust that accumulates in the workspace creates an unhealthy environment for workers. A [dust collection system](#) can help eliminate these issues by efficiently controlling airborne dust particles. Process dust results from the manufacture of the product and can be valuable to the production stream. With an appropriate dust collection system, process dust can be captured and recycled into production.



Spray drying processes create particulate and odorous gas contaminants that require capture before ventilation gases can be exhausted to the atmosphere. A [wet venturi scrubber](#) and cyclonic separator is ideal for particulate contaminant capture. A packed bed wet scrubber that utilizes recirculated caustic and oxidizing scrubbing solution can be used for odorous gas contaminant capture. Sly's custom-designed and fabricated [packed tower scrubbers](#) are engineered specifically for pet food manufacturing to provide optimum tower diameter, packing depth, recirculation flow rate, and the appropriate mist eliminator style.



Packaging & Palletizing

End of line packaging and palletization operations may include dosing, weighing, bagging, packaging, and palletizing equipment. Each play an important role in getting pet food products out the door while ensuring operational efficiency.

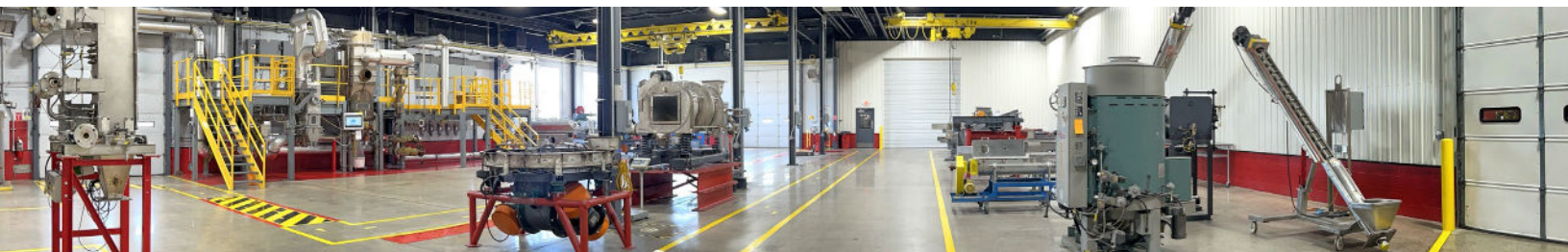
Accurate and efficient feeding or metering into packaging systems can be accomplished with vibratory feeders that include variable speed controls integrated into loss-in-weight systems.

[Bag flattener conveyors](#) can be used to quickly flatten bottom-heavy or irregular-shaped bags and then convey to a palletizing area for safer and more stable shipping pallets. Bag flattener systems from Carrier Vibrating Equipment feature removable and adjustable angle dams to effectively flatten different bagged products and a fines scalping section for removal of loose dirt and debris.

Lab Testing

Pet food manufacturers conduct testing of raw materials and ingredients using industry standards as well as their own defined processes and standards. Some may also perform lab process testing in-house, while others may need to go externally to have their process tested.

Whether testing is performed in or out-of-house at a third-party testing lab, testing will not only identify inefficiencies in process lines, but it can also reveal potential areas for food safety control. Prior to the installation of new equipment, testing can help mitigate the risk of contamination and product recalls.



Partnering with a company that combines experience in pet food processing equipment design and engineering and has the capability to test multiple process steps in a scaled, real-world environment helps identify inefficiencies and improvements for safe processing and handling.

CPEG provides the following - all under one roof:

- Comprehensive line of pet food processing equipment
- 500+ years of combined experience in equipment design, engineering & manufacturing
- Extensive line of test equipment to simulate scaled field operation with multiple pieces of equipment for multistep and multistage testing needs
- Full analysis of material characteristics and measurements of material behavior in specific processing applications

Make Food Safety a Priority with Sanitary Processing Equipment

Pet food processors are tasked with producing safe and nutritional pet food while meeting industry regulations and maintaining a healthy bottom line. Many factors such as a focus on sanitary manufacturing practices, approval of food ingredient suppliers, and quality control throughout the process must be taken into consideration to meet this task. To compliment these considerations, pet food manufacturers are looking for sanitary, reliable, and efficient process equipment.

Looking for an equipment supplier with expertise in designing safe and sanitary process equipment? Consult the pet food processing experts at CPEG. Our family of brands include Carrier Vibrating Equipment, S. Howes, Sly, and Heyl Patterson Thermal Processing.

