

# Ensuring food safety and brand protection for pet food products

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#### Keywords

food safety, brand protection, pet food, product inspection, pets, foreign object detection

#### Summary

The right combination of inspection solutions ensures consistent production of highquality, contaminant-free pet food products, safeguarding pet safety and protecting brand reputation.

Pet food represents a lucrative, growing market opportunity for food producers. Per Frost & Sullivan, the global pet food ingredients market is expected to grow from \$818.9 million in 2020 to \$1.2 billion in 2026, at a Compound Annual Growth Rate (CAGR) of 6.6%, due to increasing consumer spending on pet food products.

Increased pet adoption in high-spending economies during the COVID-19 pandemic, combined with pet owners' consciousness towards pets' health, further bolsters this opportunity. In addition to traditional kibble and canned foods, treats and supplements that contribute to pets' immune, digestive, and joint heath all are competing for market share.

Product quality sits at the heart of this competition, challenging small pet food manufacturers, emerging companies, and multinational food producers' pet divisions.

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Pet owners' general view of their animal companions as members of the family drives decision-making based on the same high standards of quality applied to human family members' diets. Accordingly, pet food producers cognizant of both the need for pet safety and protection of their brand reputation strive to meet worldclass food inspection standards.

To do so, producers must use the right equipment for each food type — dry, moist, liquid — but also packaging type. There is no one-size-fits-all solution. Innovation in packaging is constant as brands seek more sustainable formats and containers that stand out to consumers perusing store shelves or can travel undamaged directly to consumers' homes via e-commerce. Additionally, producing pet food products at sufficient volume to meet consumer demand means ensuring high manufacturing throughput while achieving the highest level of product quality and safety. Such inspection integrity requires a deep understanding of both inspection technologies and the regulations guiding inspection standards for human consumption.



The regulatory framework governing human food production and pet food production are the same. However, governmental regulations, like those of the U.S. Food & Drug Administration (FDA), generally are broad and cover a wide spectrum of risks and processing requirements for manufacturers. Retailer codes of practice set even higher standards, establishing a wider food safety framework through increased prescriptiveness.

Retailer codes of practice typically are guided by the Global Food Safety Initiative (GFSI), a non-profit, industry-driven effort seeking continuous improvement of food safety management systems. GFSI's benchmarking model determines equivalency between food safety strategies while attempting to give retailers flexibility to do what works best for them. While several food safety schemes fulfill GFSI criteria, the three most-used certification schemes are the BRC (British Retail Consortium), the Food Safety System Certification FSSC 22000 and the Safe Quality Food (SQF) code.

A retailer might define not only the inspection techniques a pet food supplier should use, but then specify which stages of production



should include which inspection technique(s). Stipulations also could include equipment sensitivity requirements at particular inspection points, hardware-driven fail-safes, record-keeping rules for audit purposes, periodic verification of equipment performance, and expected standard operating procedures (SOPs).

#### Inspection equipment types and where to apply them

Where to place inspection equipment in the process depends on where foreign matter, including debris resultant of worn processing equipment, could enter the process. These areas of greatest risk are where inspection may be most needed: the critical control points.

At each critical control point, producers must think about what is being inspected and how it is packaged, and then use that information to select the right technology or combination of technologies. Other factors contributing to this decision-making process are the production environment, machine calibration and machine sensitivity.

Processing environment considerations include equipment cleaning regimens, which can vary between light (end-of-process dry and wet food packaging) and heavy (cooking and mixing ingredients, where food buildup is difficult to avoid). In addition to preventing microbial contamination, manufacturers must select instrumentation with an adequate ingress protection rating, able to withstand moisture and dust from the surrounding environment across a long service life.

Other plant environment concerns can include vibrations or sources of electromagnetic interference (EMI) that could impact inspection systems. Are the system subcomponents sufficiently robust to endure the weight of the packages being inspected and the speed at which the line is moving? In short, detection technology is a starting point, but a more holistic approach to the system is required for smooth integration into your specific factory environment that provides reliable, long-term operation.

Most of the principles guiding inspection equipment type in the process vary based on differences in the manufacturers' food products, package type and packaging materials. The most commonly deployed types of inspection equipment include metal detection, X-ray inspection and checkweighers. "Placement" indicates the equipment's position along the manufacturing line.

**Metal detection** — Metal detectors, which can identify ferrous, non-ferrous, and stainless-steel foreign objects are the ideal solution for a variety of pet foods, such as frozen raw meal or kibble. The metal detector measures magnetic and conductive properties of the packaged product being examined. Any inspected product will have intrinsic magnetic and conductive signals, considered as product effect. Product effect varies between product and package types - for instance, dry product like kibble will have very low product effect, whereas wet cat food will show significantly more product effect due to its high moisture and salt content. A successful metal detector measurement will ignore product effect and only respond to contaminant signal. The presence of contamination will shift the magnetic and conductive signal of the package, triggering detection and then activating a reject system or even a line stop, depending on operation preference.

A typical process for pet food manufacturing involves incoming ingredient processing, blending, cooking, molding, packaging, and then storage. Contaminants, such as debris from aging blending blades or loose bolts and nuts, can be accidentally introduced at any stage during this process. To minimize contamination risk and meet Hazard Analysis and Critical Control Point (HACCP) objectives in food safety compliance, metal detection may be used at multiple locations in the process from incoming raw material to molding to final packaging.

Metal detectors cannot be used for metalized film packaging due to its "package effect." Consider that wet dog foods generally are packaged in metal containers or metalized film pouches. If such packaging passes through a metal detector, the machine will alarm based on the package material. Since the metal detector generates a signal whose strength varies according to the amount of conductive material it senses, rather than an image, such a compounded signal prevents inspectors from identifying exactly what triggered the detector. Therfore X-ray inspection is needed for metalized film packaging.

X-ray inspection — X-ray inspection equipment provides an image of each package's contents, allowing inspectors to identify packages with metallic and non-metallic contaminants, such as glass and rubber, as well as broken food pieces and missing components. X-ray inspection is not influenced by product effect or package effect, so it can be used for a wider range of products and packaging materials, especially those made from metalized film and aluminum foil trays.



X-ray inspection can be employed as early as the incoming ingredients stage in place of metal detection, and as late as case packing. Since many pet foods provide a full-diet solution, they may contain a bevy of nutrients and vitamins supplementing the main ingredients, widening the number and variety of contaminants that may be introduced at the raw ingredient stage or later in the process. For example, incoming meats might have metal shavings inside from previous processing; vegetable harvesting can pick up stones and pieces of metal that could be missed prior to processing.

**Checkweighing** — Checkweighing, a complementary food quality technology to foreign object detection, helps ensure the weight listed on the product label is the correct weight of each package. This ensures the food processor is not underfilling packages, resulting in hefty fines from regulatory bodies, or "giving away" excessive product by overfilling. Checkweighers regularly are stationed after portioning and packaging. A final check for complete weight usually occurs after case packing, too, to ensure the right number of packages inside each case.

Some checkweighers also can provide feedback to the operator on the filling process. For example, the manufacturer sets a fill level and/or fill amounts for a particular package. Over time, the filler may drift away from that set point, leading to overfill or underfill. A checkweigher's capability to examine data trends showing how close each fill is to the target weight and provide real-time feedback on the filling machine can aid production cost control, driving efficiency in an automated fashion while proactively ensuring consistent product weight over time.

## Other product inspection considerations

Integral to food product inspection is ensuring that the equipment is properly

calibrated throughout the production run. Therefore, regular equipment verification is required. Correct system set-up balances high detection sensitivity and reliable system performance, enabling safe and efficient production. A company's food safety plan typically includes the frequency of calibration confirmations per hour, shift, or day. The most common practice is to affix standard contaminant samples on the outside of one or more packages to ensure the detection technology can identify the specified contaminant at the specified size. The operator can then adjust settings or recalibrate as needed.

Preventive maintenance on detection and weighing technologies also is crucial to ensure uptime and reliable, optimal equipment performance, as well as support increased food safety and quality. It is recommended that processors arrange for semi-annual or even more frequent preventive maintenance visits by a qualified engineer at a time that will be minimally disruptive to the production schedule. The frequency of these service calls will vary depending on the shift patterns at a particular plant, how rugged the plant environment and process are, and how much use the systems get. For instance, excessive radio frequency signal from motors and other process equipment will introduce background noise to metal detectors, decreasing the equipment's sensitivity and possibly causing false product rejection. Vibration of the production floor may reduce checkweigher accuracy during operation. The equipment provider can help determine the appropriate frequency of preventive maintenance visits based on historical data across many users and with consideration of individual plant circumstances.

#### **Determining the right inspection solution**

It is a best practice when considering inspection technology types and models to have inspection equipment vendors conduct a sample test simulating the actual production environment (to the extent possible).

Such testing generally comprises a customer shipping product to an equipment manufacturer's test lab, where it is run through the proposed inspection system. The system's response to contaminants as well as the product and its packaging is characterized, and then the customer is provided a report whose findings they can apply to the decision-making process. Gleaning such specific information about a system's performance, limitations, and optimal settings — with consideration toward the wider production environment — helps ensure the equipment choice will meet the food company's food safety plan contaminant-detection requirements.

Much is at stake for pet food producers, from maintaining consumer confidence in the quality and safety of their products to gaining access to the retailers who are the gatekeepers to the nearly \$1 billion market. The right product inspection solution for the application is the best assurance – and insurance – to meet food safety and plant productivity goals.

<u>https://store.frost.com/global-pet-food-ingredients-growth-opportunities.html</u>
<u>Food Safety Standards: ISO 22000, SQF and BRC - ISO Update</u>



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