

Ishida X-ray Inspection System

Protecting your customer
and your brand



Ishida X-ray Inspection Systems

Ishida X-ray inspection systems can be used at any stage in your production line to identify, with the greatest accuracy and reliability, when foreign bodies are contaminating your product, thus protecting your brand and reassuring your customers.

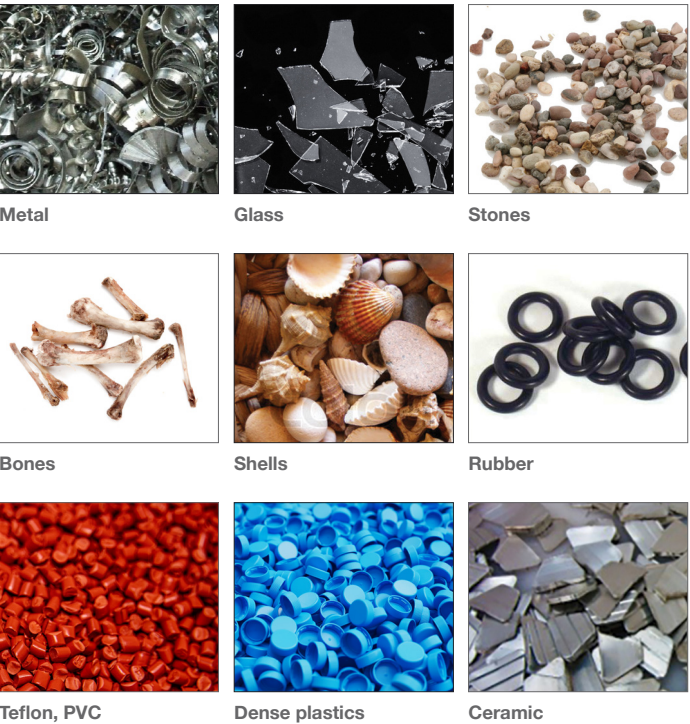
Benefits of an X-ray inspection system

X-ray inspection has several key benefits, especially for food producers, that are fundamentally linked to safety and quality:

- **Brand protection**
 - ▶ Customers will trust the product
- **Food safety**
 - ▶ Ensuring only food that is free from foreign bodies and safe for consumption
- **Can do much more than just finding foreign bodies:**
 - ▶ Counting components
 - ▶ Weight estimation
 - ▶ Checking fill level control
 - ▶ Detecting flaws such as missing or broken items
 - ▶ Measuring product size
 - ▶ Sealing control

All these functions combine to deliver an efficient and also cost-effective performance
- **Cost savings due to no product recalls and customer complaints**
 - ▶ Fewer recalls and customer complaints lead to fewer fines
- **Confidence**
 - ▶ Use of state-of-the-art technology delivers 100% food safety
- **Due diligence / auditing**
 - ▶ Ensures up-to-date records for all products, including reject data, with all data and images securely stored

Detection of foreign bodies



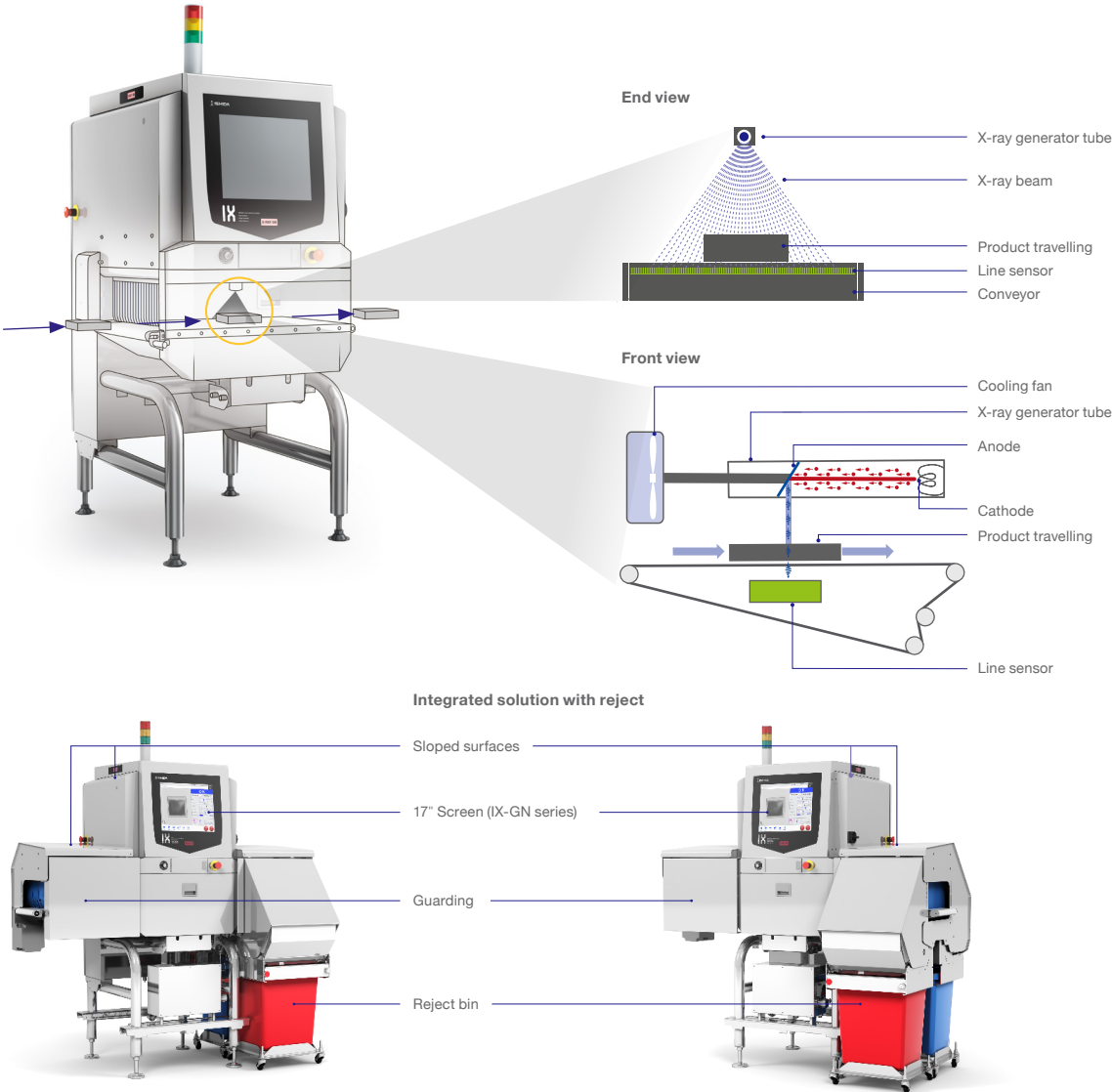
How Ishida X-ray works

X-rays are used to see through objects to get a clear picture of what is inside. Ishida X-ray inspection systems are primarily used to detect foreign bodies, such as dense plastic, rubber, metal, bone, shell, stones or glass, to prevent them from contaminating a product.

Principles of X-ray inspection devices

X-rays are transmitted onto the product. A line sensor captures an image formed by penetrating X-rays and a complex image analysis procedure identifies foreign material or defective/missing products.

As well as spotting any foreign bodies, X-ray machines can detect a wide range of product defects and can also check product or piece weights.



Highly sensitive foreign body detection using Genetic Algorithm (GA) technology

The ability to develop unique imaging analysis for your products and your foreign bodies.

Evolutionary image processing (GA)

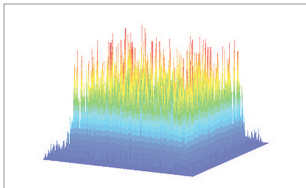
GA (Genetic Algorithm) is a patented technique which is used exclusively in our IX Series. It allows you to accomplish a very high detection sensitivity for your products which cannot be accomplished anywhere else.

The use of GA allows the user to optimise the X-ray machine's performance to each unique product that it is used for. Each GA can be tuned to focus on a specific foreign body that poses an inherent risk to the product. As such, every Ishida X-ray machine can be uniquely and easily optimised to meet your specific challenges.

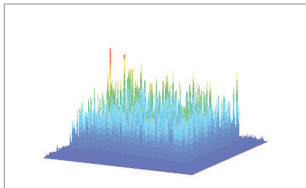
- GA benefits**
- ▶ Improves sensitivity and detection rate
 - ▶ No need to send product or contaminant to a manufacturer's lab – everything is done on site
 - ▶ No need for service engineer or operator intervention

Example: detecting foreign matter in a pack of sausages

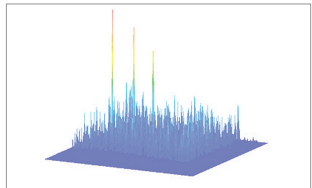




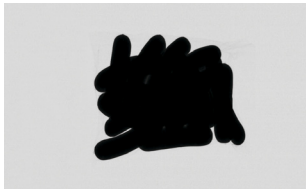
X-ray image with no image processing



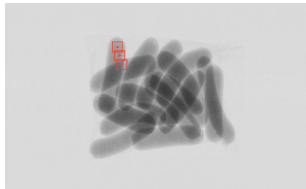
X-ray image after initial image processing



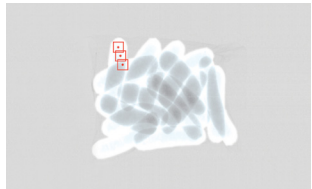
X-ray image with final image processing



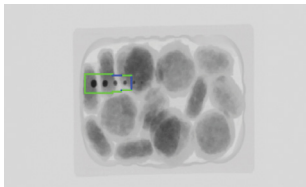
No image processing
Foreign matter cannot be identified from the uneven profile of the sausages



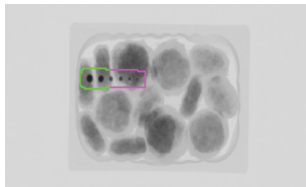
Initial image processing
Background product effect is reduced enabling foreign bodies to be identified



Final image processing
The background product effect is further reduced enabling foreign bodies to be identified



Without Genetic Algorithm



With Genetic Algorithm

Photon Counting

Photon counting detection combined with Ishida-patented Genetic Algorithm (GA) imaging means you can reliably inspect your food products for potentially harmful foreign bodies - even those with low density, while enjoying superior detecting sensitivity.

Exceptional Performance

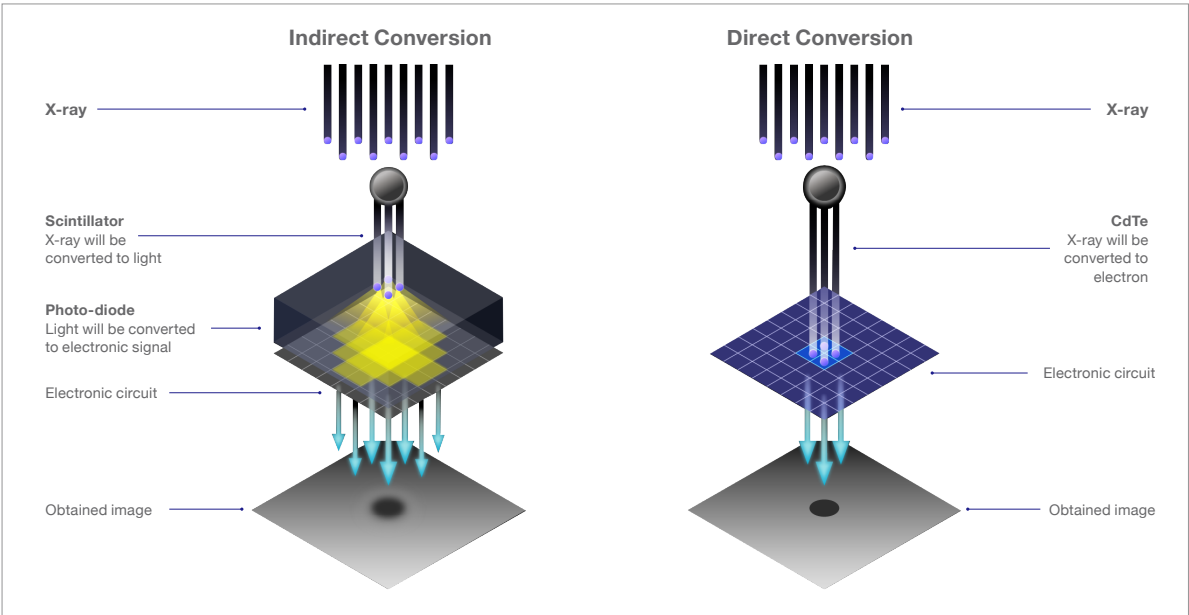
Rigorous testing has shown the IX-PD achieves near 100% detection rates for bones in various food products, including chicken, diced meats, and sausages. For instance, the system improved bone detection in chicken breast fillets from 40% to 100% compared to traditional X-ray systems.

Optimized for High-Density and High-Volume Production

Engineered for demanding production environments, the IX-PD excels in scenarios where products are tightly packed, overlapped, or randomly oriented, conditions that typically compromise contaminant detection and lead to excessive false positive rejections. Its enhanced performance ensures consistent quality assurance in even the most challenging packaging setups.

Unmatched Detection Accuracy with Advanced Imaging

Combines Ishida's proven Genetic Algorithm (GA) and energy analysis technologies to deliver ultra-high-resolution imaging. This breakthrough significantly enhances image processing, compared with conventional systems, ensuring superior detection of low-density contaminants such as fish bones and rubber as well as improving detection for minute foreign objects such as stainless-steel wires.



PD vs standard

The benefits of low voltage

For contaminants of low density, such as bones in meat products, lower voltage X-rays, created by using less KV, show a greater contrast between the materials.

Our most popular model of IX machines uses a 300W generator, which allows us to vary the kV value from 25-75kV and the current from 1-8mA (depending on the model).

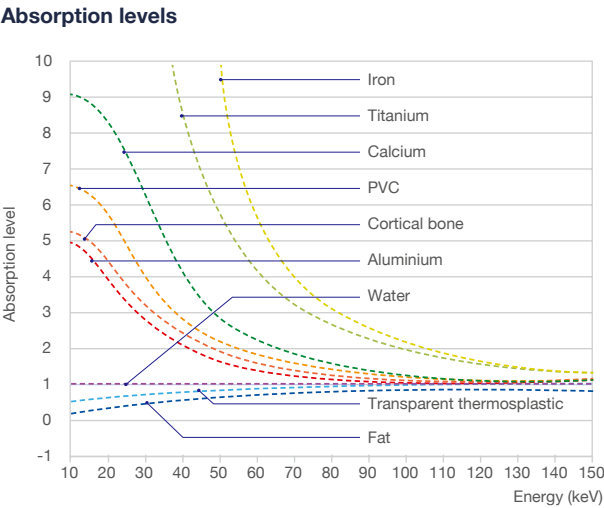
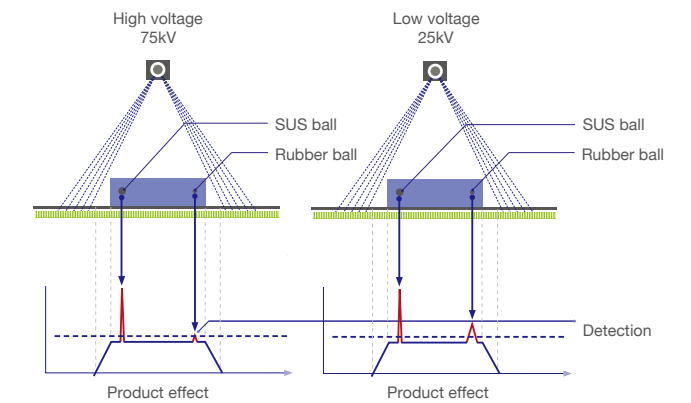
The ability to vary the KV and mA gives Ishida a strong advantage in the detection of lower density foreign bodies.

The graph on the right shows how different materials behave with low and high levels of energy. The lower the energy, the higher the absorption difference which leads to better detection results.

Examples with rubber ball

The image below right depicts the effect of using lower voltage X-rays, with the rubber ball being more clearly visible in the right-hand image, because the rubber stops a greater percentage of the X-rays penetrating through when lower energy is used.

Example with rubber ball



IX-PD Series

Ultra-high-resolution imaging powered by photon counting, Genetic Algorithm, and energy analysis technologies.

The IX-PD demonstrates the highest possible detection levels for difficult to find foreign bodies such as bone through to minute metal fragments.

- ▶ Cutting-edge imaging technology tells the difference between food products and contaminant densities, reducing false positive detection
- ▶ Provides uncompromised detection of foreign bodies in overlapping and uneven products that were previously considered difficult or impossible to inspect
- ▶ Detects even minute foreign objects such as stainless-steel wires as small as 0.2mm in diameter
- ▶ User-friendly interface for easy operation and monitoring
- ▶ Ergonomic, stainless-steel design for easy cleaning



IX-PD

Complex* products from 0-150mm

High sensitivity foreign bodies

Examples of complex products

Poultry	Fish	Cereals	Meat
Ready Meals	Fresh	Frozen	Frozen Veg
Metal	Glass	Stones	Bones
High Density Plastics	Rubber	Ceramics	

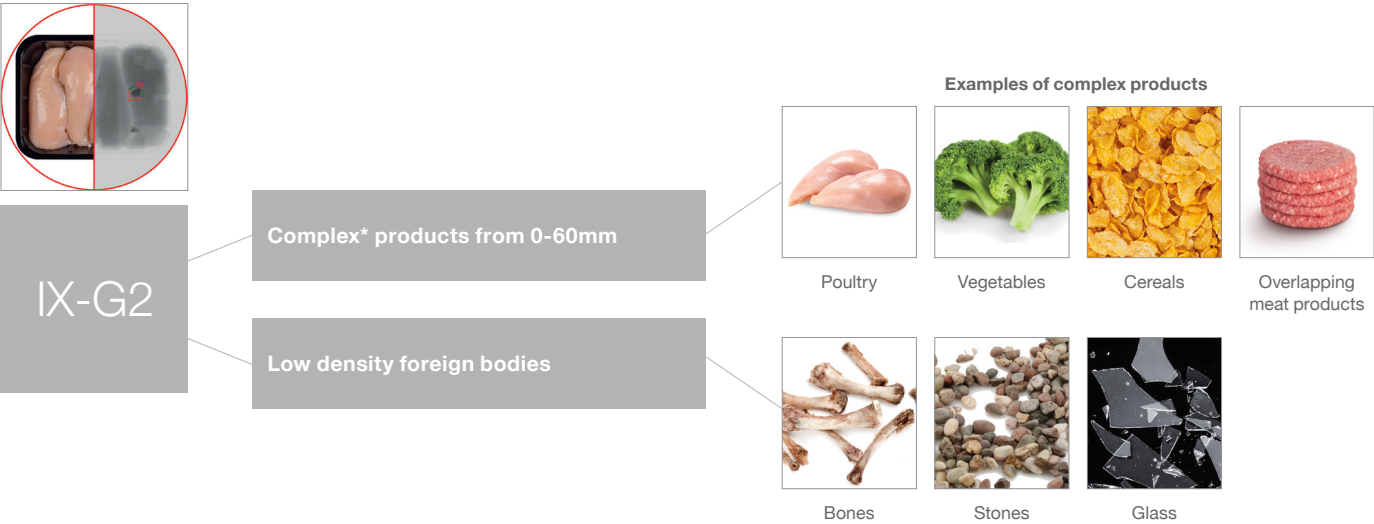
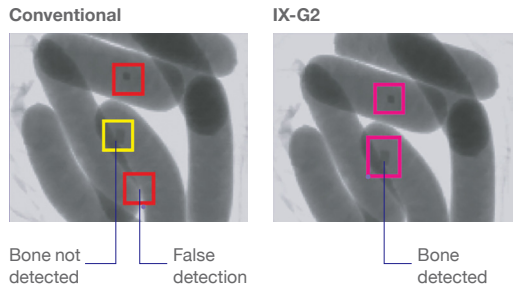
*Products which include different thicknesses, are overlapping etc.

IX-G2 Series

Dual Energy Sensor detects what other inspection systems miss.

Most effective X-ray detection of low-density objects, including bone, shell, metal, glass and rubber.

- ▶ Pinpoint detection of foreign bodies under 0.6 mm thanks to enhanced G2 technology, from shell and stone to metal and bone
- ▶ Accurate X-ray inspection capable of handling packaged products with uneven surfaces, granular products and overlaps
- ▶ Reliable, high speed, small footprint solution, that can easily integrate into your line
- ▶ Ergonomic, stainless-steel design for easy cleaning



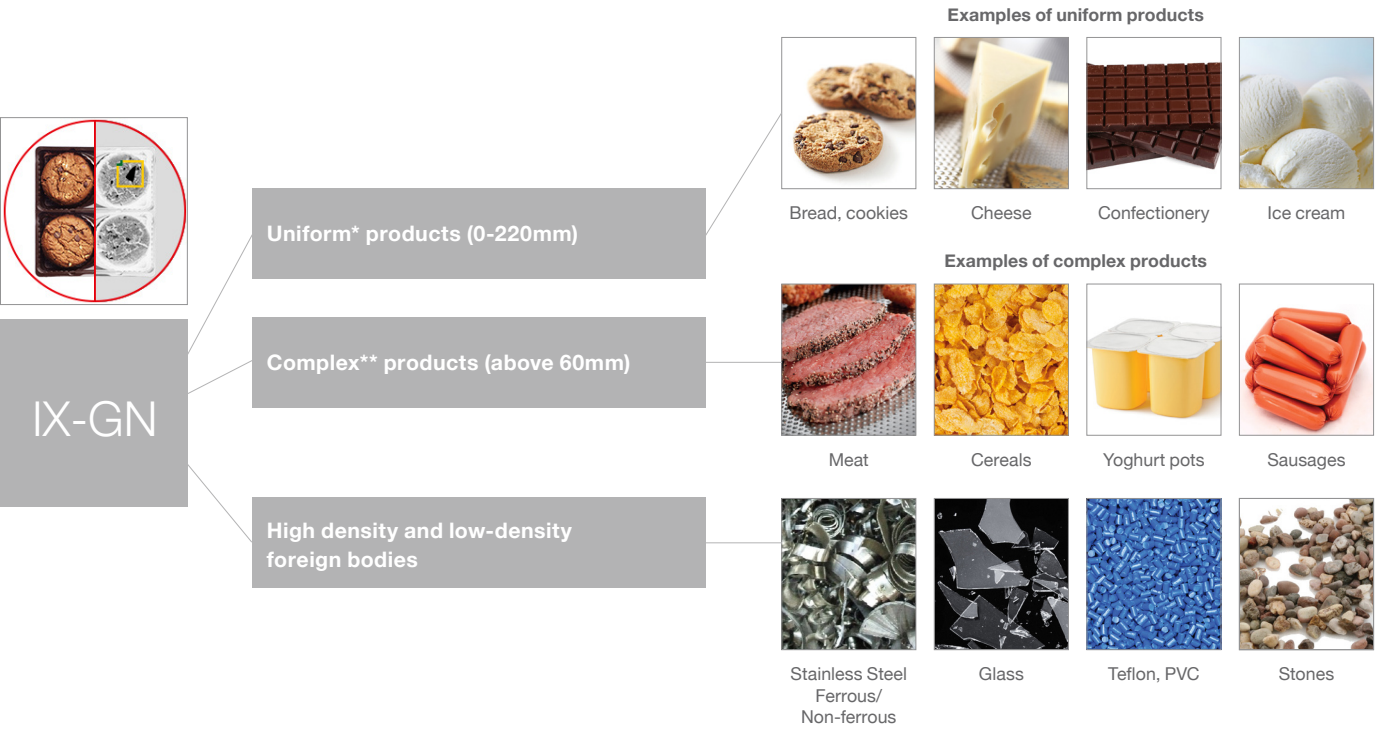
*Products which include different thicknesses, are overlapping etc.

IX-GN Series

The definite choice for a wide range of products.

The IX-GN Series provides high-performance X-ray inspection for an unrivalled range of foreign matter.

- ▶ Unrivalled versatility for a wide range of packed and unpacked products
- ▶ GA image processing automatically generates optimal sensitivity for fast and efficient product changeovers
- ▶ Integrated air conditioning system
- ▶ User-friendly 17" touch screen control
- ▶ Ergonomic, stainless-steel design for easy cleaning



* A group of products that are standardized or identical.

** Products which include different thicknesses, are overlapping etc.

IX-EN Series

Your first step into Ishida X-ray technology.

The X-ray inspection system that enhances quality control on your production line, both affordably and effectively.

- ▶ Reliable inspection suitable for uniform products
- ▶ Easy to set up and integrate into your production line
- ▶ User-friendly 15" touch screen control

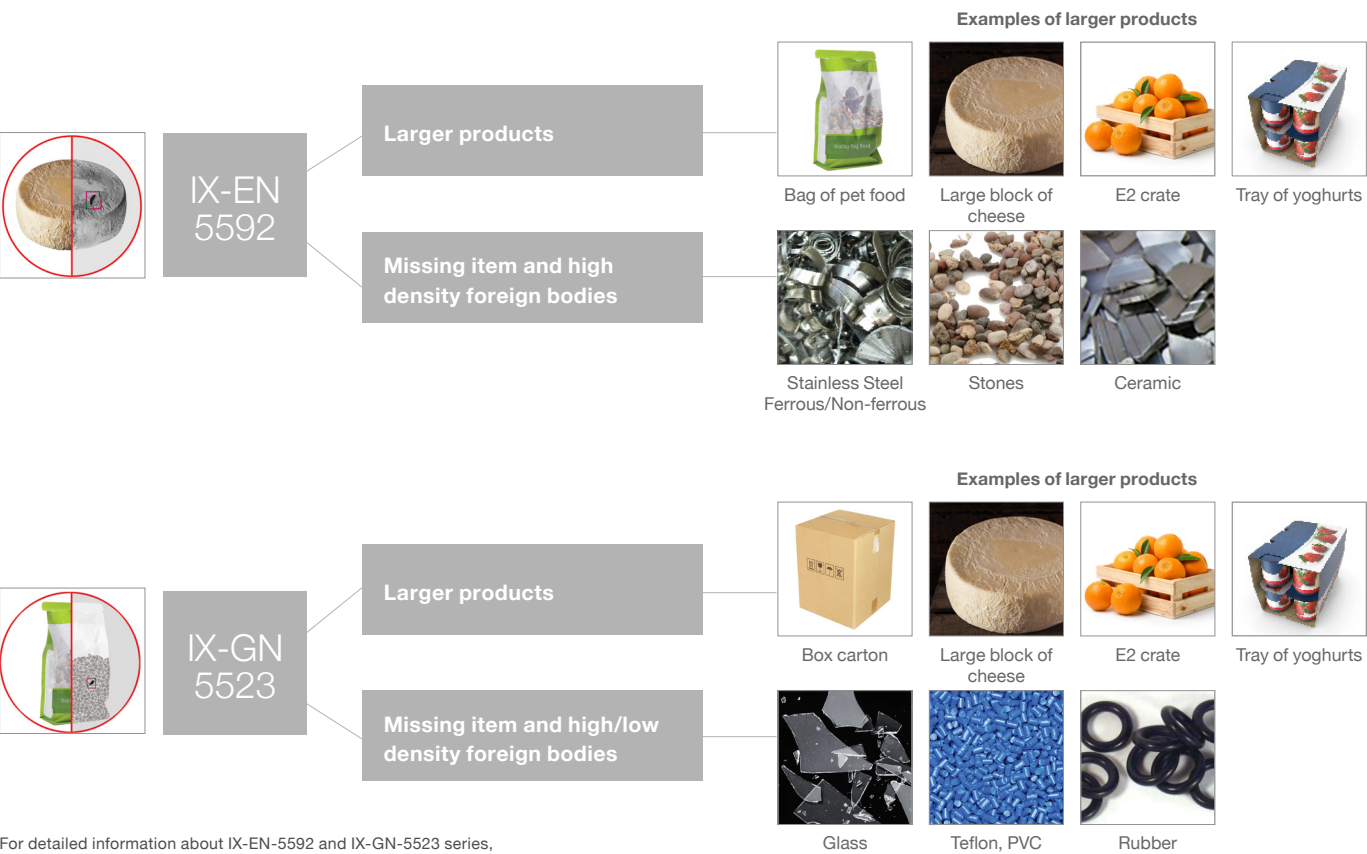


IX Large Series

All the security of X-ray inspection for larger items.

IX-EN-5592 / IX-GN-5523

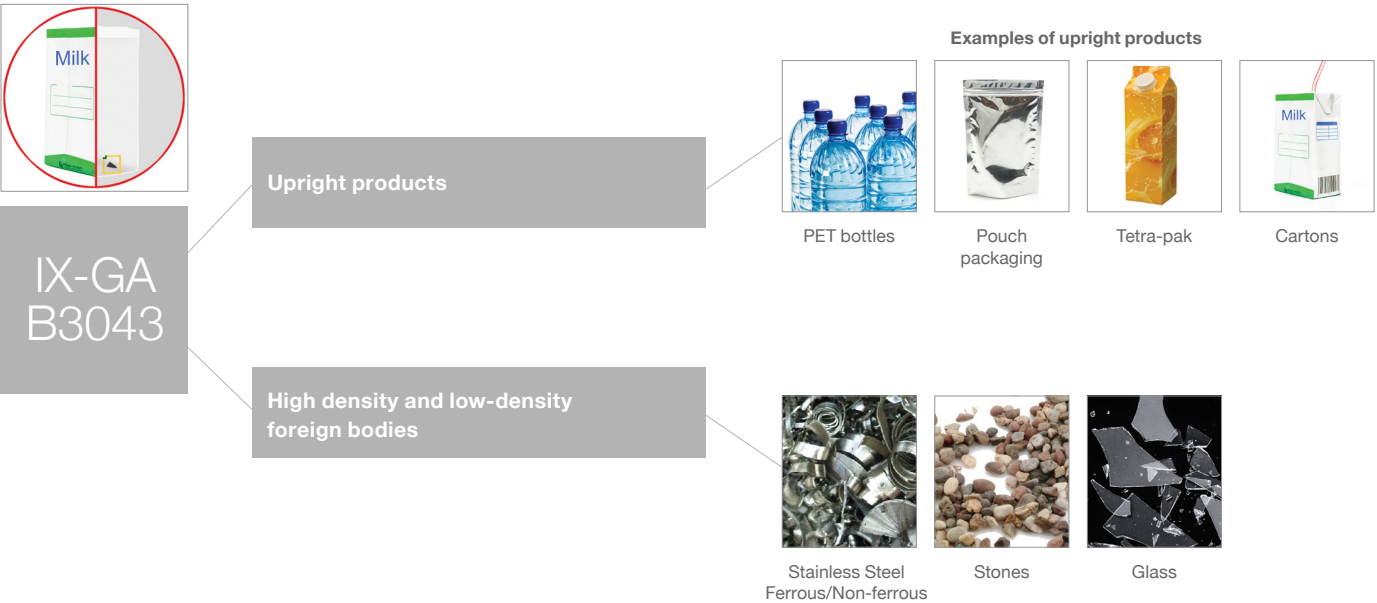
- ▶ High sensitivity, sophisticated X-ray inspection system for large sized products
- ▶ The Ishida X-ray inspection systems IX-EN-5592 and IX-GN-5523 can be integrated at any stage of your production line to detect foreign body contamination with exceptional accuracy. By identifying contaminants precisely and reliably, these systems help safeguard product integrity, protect your brand reputation, and provide customers with complete confidence in your product quality.



For detailed information about IX-EN-5592 and IX-GN-5523 series, please refer to the "Ishida X-ray differentiation" table on the page 17.

IX-GA-B3043

- The highest level of inspection performance for bottled products.
- ▶ Achieves industry leading sensitivity
 - ▶ The unique way in which the IX-GA-B3043 is designed, means that no protective curtains are needed, ensuring perfect product transition
 - ▶ Automatic bottle pitch control
 - ▶ Easy-to-install in existing production lines
 - ▶ Small footprint



Hygienic Design

Angled surfaces on the main machine body and guarding prevent water and bacterial build up.

The uncluttered open frame design allows easy access around and beneath the machine for thorough cleaning.

Protective curtains and conveyor belts are all easy and quick to remove for cleaning without tools.

The inspection chamber on all models meets IP66 requirements to facilitate thorough cleaning in product contact areas.



Protective curtains

X-ray Ancillaries



Removable reject bin



Front and rear reject bin



Inline reject bin



Roller track reject



Drop belt reject bin



Product handling



Bulk



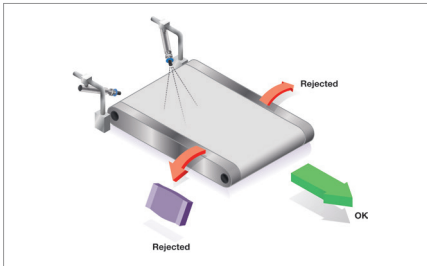
Poultry

Easily removable and interchangeable reject bins remove the need for double handling when clearing rejected product from the locked reject areas, saving time and minimising the risk of rejected product accidentally re-entering the food chain. Bins are on wheels to allow easy and convenient movement of defective product away from the line for safe disposal.

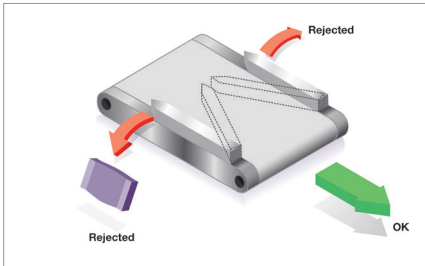
Various bin configurations are available to meet customer requirements and to handle a wide range of product sizes. Front facing bins are ideal where ease of operator access is a priority, for lines where space is at a premium and where double rejects are required. Front and rear rejects minimise line space.

For heavier products or those where prevention of damage is key roller tracks are available for a more controlled rejection as opposed to rejection into a bin.

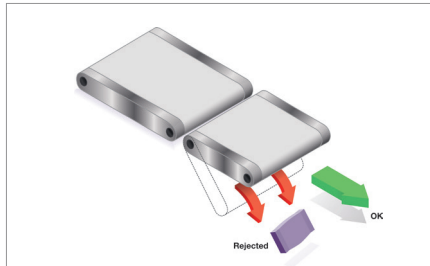
Reject Types



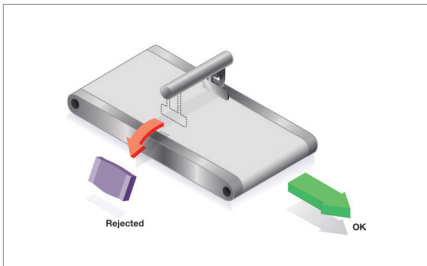
Air blast reject



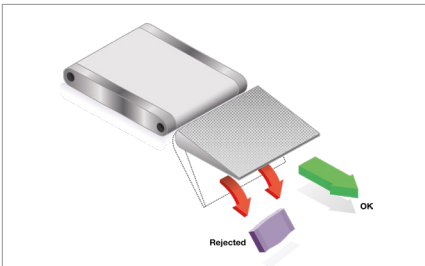
Catch arm reject



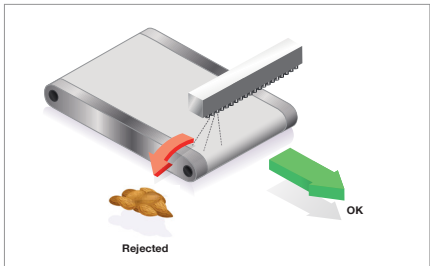
Drop belt reject



Overhead paddle reject



4 lane upflap



Multilane airblast

Not all customer products are the same and Ishida is able to provide a range of reject solutions to meet the varied demands.

For higher speed and relatively lightweight products air blast rejects are the ideal solution and can be available in all bin configurations.

Where the product is heavier and speeds are moderate the range of arm-based rejects are the method of choice.

The heaviest products can be rejected with the overhead paddle system which is most commonly used in conjunction with the roller track option for reject accumulation.

For thinner and bagged products that can be a challenge when using conventional reject methods, our innovative integrated drop belt system provides a reliable solution in a compact footprint.

X-ray Software Options

Whilst foreign body detection is the core function of any X-ray inspection system the ability to provide additional inspection to confirm product quality is becoming increasingly important to many customers.

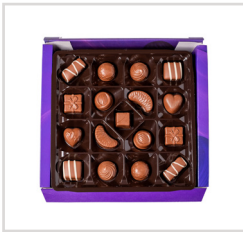
Masking functions allow items of packaging or inherent objects (such as clips) to be masked from the inspection to maximise the detection levels that can be achieved. Additionally, these functions are able to confirm the presence of items such as clips and reject those products where the clips are not present.

Count, size and perimeter inspection allow missing, broken, misshapen or incomplete products to be detected and rejected.

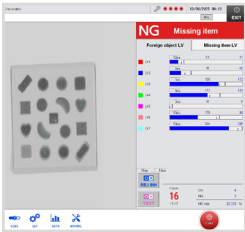
Fill inspections are able to determine that each individual component of a product (for example a meal box or compartment yogurts) is filled to the correct level. Due to the normal product variance in each compartment these defects can often be missed when weight is used to determine quality, whereas X-ray inspection can offer a reliable detection solution here.

Where the product weight is important the X-ray is able to calculate an estimated weight based on the overall density of the product. Upper and lower levels of tolerance can be set to ensure products outside of these limits are detected and rejected by the X-ray system.

Piece count inspection



Confirm the correct number of items are contained within the final product



Example: Detection of a single missing chocolate in a two layer box containing 34

Masking features



Mask areas such as metal clips and packaging to maximise foreign body detection

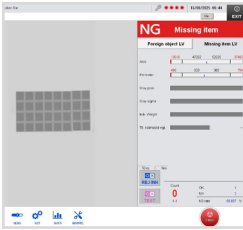


Example: Metal clips masked and counted to confirm presence. Stainless steel detected down to 0.6mm

Size and perimeter inspection



Measure the size and perimeter to check for part and broken products

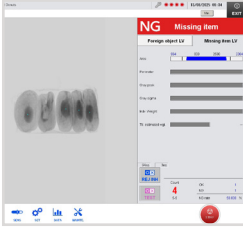


Example: Detection of a broken chocolate bar inside the outer wrapper

Low or missing component or filling



Confirm the presence of additional components or fillings within products

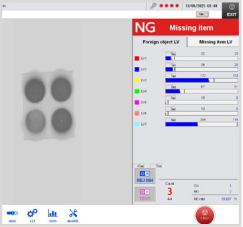


Example: Low custard filling detected in a finished pack of donuts

Checking fill level



Confirm the correct filling level in single or multi packed products such as yogurts and desserts



Example: Single low filled pot detected within a sleeved multi pack

Ishida X-ray differentiation

	IX-EN xx62/63	IX-EN xx93	IX-GN xx43/44	IX-EN -5592	IX-GN-5523	IX-GA-B3043	IX-G2 xx27	IX-PD 36/45 A2
Hygiene								
Sloped surface	●	●	●	●	●	●	●	●
Toolless disassembling for cleaning	●	●	●	●	●	●	●	●
Machine rating	IP54	IP54	IP54	IP54	IP54	IP54	IP54	IP54
Inspection chamber rating	IP66	IP66	IP66	IP66	IP66	IP66	IP66	IP66
Mechanical interlocks	●	●		●		●	●	
Magnetic interlocks			●		●		●	●
Image processing								
Standard image resolution for an optimum detection on small and hard foreign bodies	●			●				
High image resolution for a better detection on small and hard foreign bodies		●			●	●		
Finer image resolution for an enhanced detection on small and hard foreign bodies			●				●	
Ultra-High image resolution for an enhanced detection on small and hard foreign bodies								●
5 levels of customizable and powerful algorithms	●	●		●		●		
7 levels of customizable and powerful algorithms			●		●		●	
9 levels of customizable and powerful algorithms								●
Dual Energy technology for enhanced detection of bone and other lower density materials and improved detection in overlapping products							●	●
X-Ray power								
Minimized power range, perfect for thinner products	●							
Optimum power range for medium sized products		●		●			●	
Full flexible power range suitable for a wide range of products			●		●	●		●
Usability								
Quick production start up time (30-90 sec)	●	●	●	●	●	●	●	●
15" Remote Control Unit (RCU)	●	●		●		●		
17" Remote Control Unit (RCU)			●		●			●
Interfaces for saving images and statistics	USB, CF Card, Ethernet	USB, CF Card, Ethernet	USB, CF Card, Ethernet	USB, CF Card, Ethernet	USB, CF Card, Ethernet	CF Card, Ethernet	USB, CF Card, Ethernet	USB, CF Card, Ethernet

All information supplied within is correct at time of publication.

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Sentinel 5.0

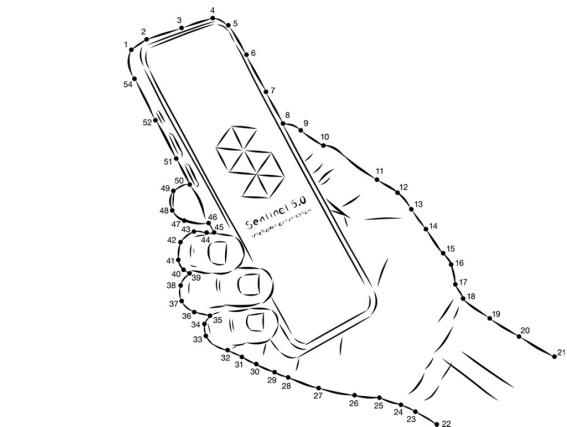
Sentinel 5.0 represents the next generation of advanced production monitoring systems.

Joined-up-thinking is smarter thinking

When it comes to optimising your quality control, joined-up-thinking is smarter thinking. With Sentinel 5.0 Production Monitoring, you can connect multiple systems through one integrated dashboard. Unlocking greater efficiency, reducing waste and downtime, and saving resources with digital proof of regulatory compliance.

More control at your fingertips

With Ishida knowledge built in, advanced AI data analysis provides unique insights. Anomaly detection learns normal behaviour and detects sudden deviations and long-term trends - continually improving quality control processes. Sentinel 5.0 enables real-time, remote monitoring and preventative maintenance, with direct assistance from Ishida experts when needed, therefore reducing costly downtime and maximising production performance.



Shaped around your needs

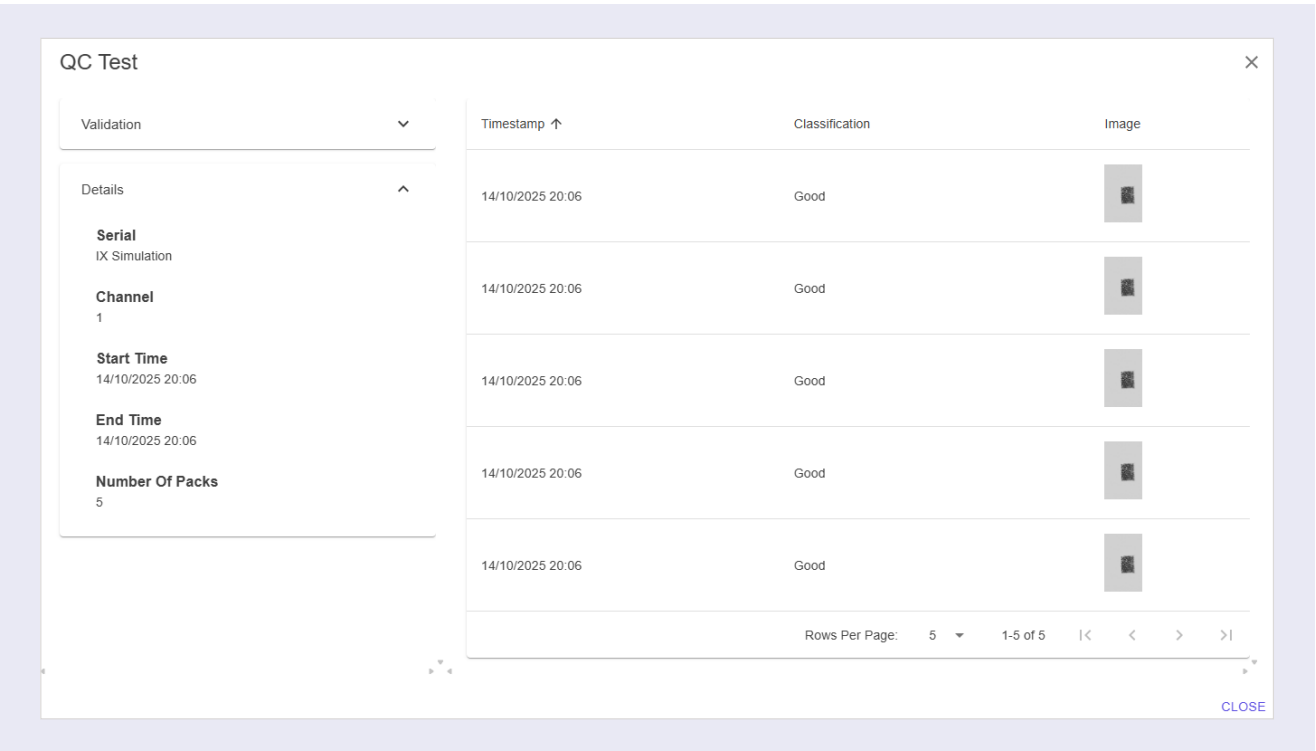
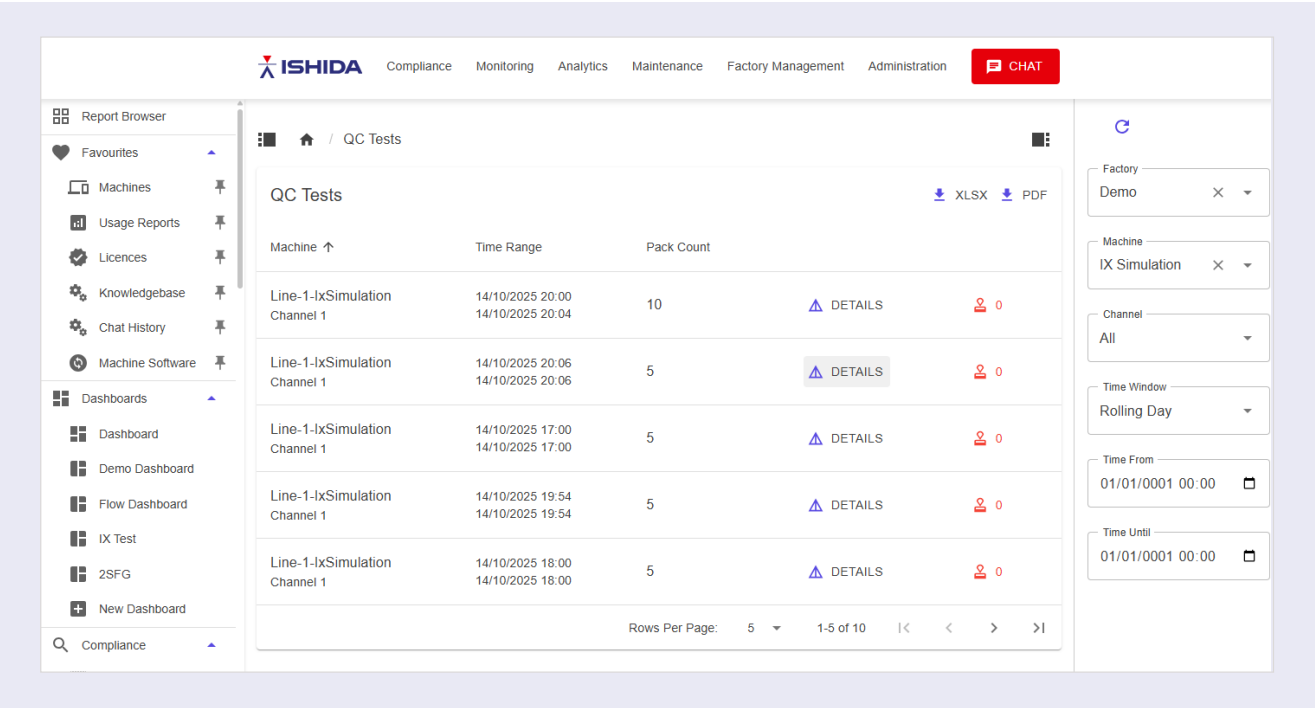
Sentinel 5.0 can be scaled to your requirements through a choice of platforms, while the dashboard is fully customisable for a more user-friendly experience. Thanks to its open architecture, it can easily integrate with your current systems, allowing you to maximise efficiency across all your assets – without additional investment.

Total Pack Traceability with Sentinel 5.0

Sentinel 5.0 takes quality control to the next level by storing every individual pack, complete with IX images. This unmatched visibility empowers teams to swiftly investigate quality issues, streamline complaint handling, and maintain the highest standards of product integrity.

Digital QA Assurance and Compliance

Sentinel 5.0 enables you to store detailed QA test reports, providing clear confirmation that HACCP processes have been completed. Multiple users can easily validate and digitally sign off reports, ensuring full traceability and compliance across your quality assurance workflows.



For every challenge, there's Ishida

Want to cut food and packaging waste,
and reduce costs? Find minute foreign
objects and big performance gains?
Discover smarter ways to significantly
reduce product giveaway?

We've been turning questions into answers for 130 years,
which means we have all the product solutions, sector expertise
and proven know-how you need

Trust Ishida

The most important question and the one we answer every day.
Providing more compelling reasons for you to put your trust in us.

- ▶ Full range of weighing, x-ray inspection, checkweighing, tray sealing, packing and leak detection equipment, plus supporting software
- ▶ Fast and efficient installation, aligned to your specifications
- ▶ Built to the highest industry standards and powered by the latest technology, including advanced AI
- ▶ Specialists in both food and non-food applications
- ▶ Complete flexibility from a single machine to a fully integrated line solution
- ▶ Solutions fully tailored to your sector and your products
- ▶ Dedicated parts and servicing support, with 24 hour delivery in most cases
- ▶ Expert training online or at your site
- ▶ Dedicated engineers on call 24/7/365



Helpline

Spares

Service

Training



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