

# Ishida X-ray Inspection System

Protecting your customer  
and your brand



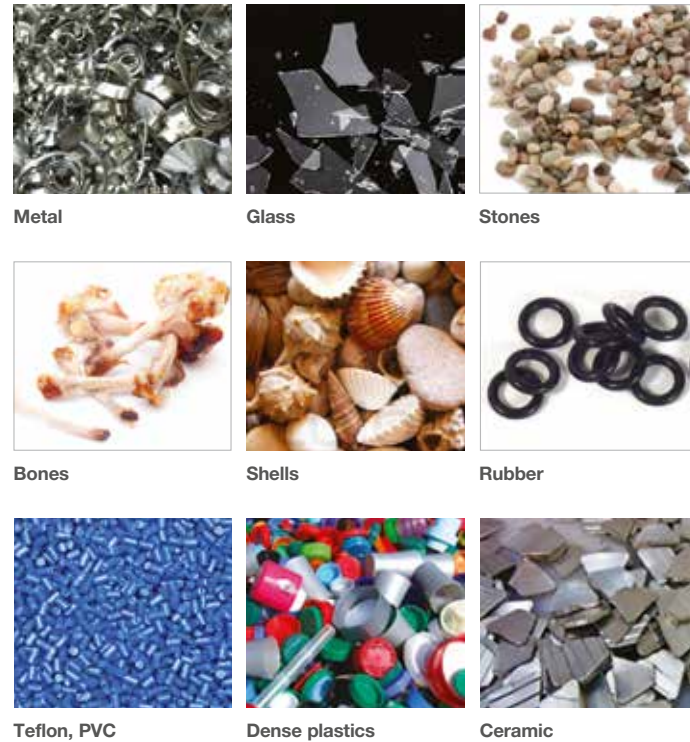


X-ray Range

# Ishida X-ray Inspection Systems

Ishida X-ray inspection 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.

## Detection of foreign bodies



## 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**
  - ▲ The food is free of foreign bodies and safe to eat
-  **Can do much more than just finding foreign bodies:**
  - ▲ Counting components
  - ▲ Weight estimation
  - ▲ Checking fill level
  - ▲ Detecting flaws such as missing or broken items
  - ▲ Measuring product size
  - ▲ Sealing control

All these functions in one machine lead to a cost-effective and efficient performance
-  **Cost savings due to no product recalls and customer complaints**
  - ▲ Fewer recalls and customer complaints lead to less fines
-  **Confidence**
  - ▲ You as a supplier are using the state-of-the-art technology and can therefore be confident of quality
-  **Due diligence / auditing**
  - ▲ Up-to-date records of all products including rejects, with all data and images stored securely

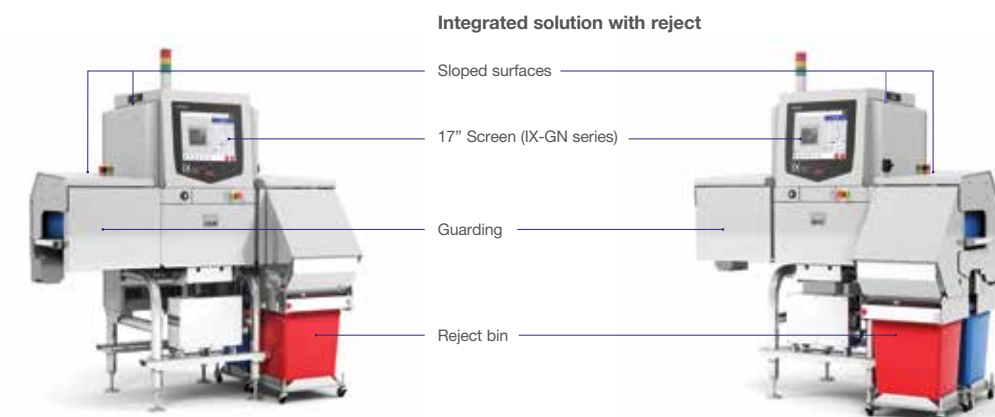
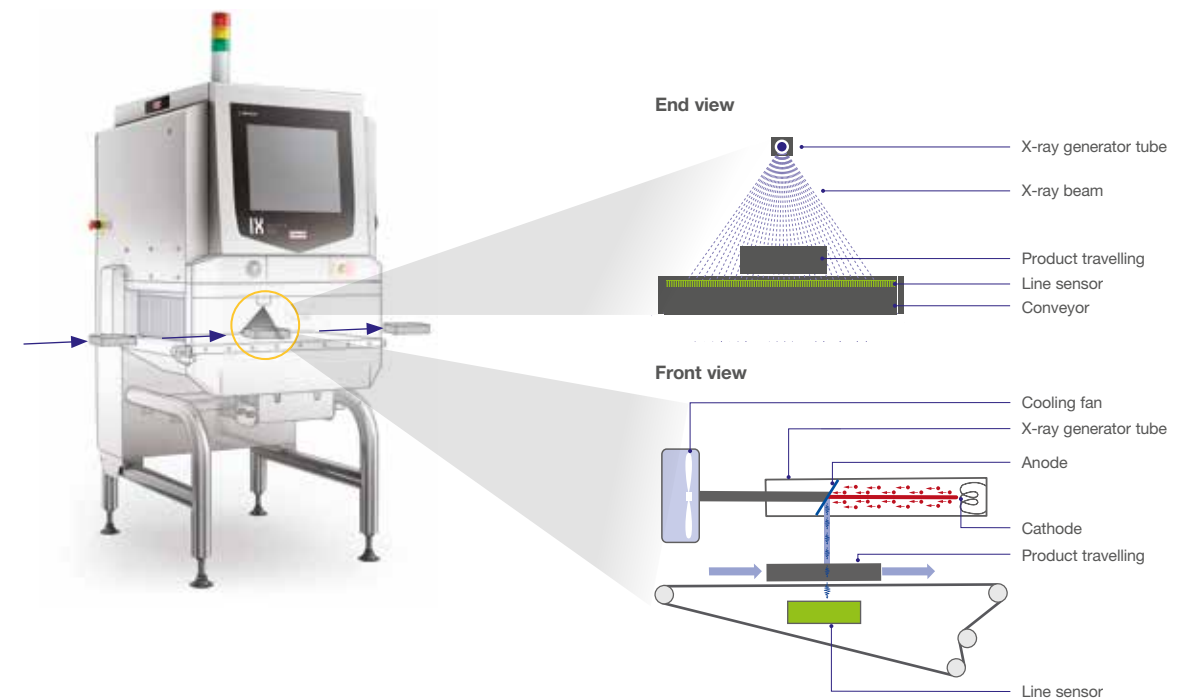
# How Ishida X-ray works

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 device

X-rays are transmitted onto the product. A line sensor captures an image formed by the 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)

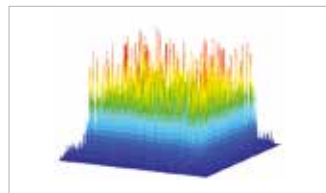
GA (Genetic Algorithm) is a patented technique which is used exclusively in our IX Series. It allows you to accomplish a very high detection sensitivity on your products which cannot be accomplished anywhere else.

The use of GA allows the user to optimise the X-ray machine for their own unique product characteristics. Each GA can be tuned to focus on a specific foreign body that pose an inherent risk to the product. As such, every Ishida machine can be uniquely and easily optimised to meet your specific challenges.

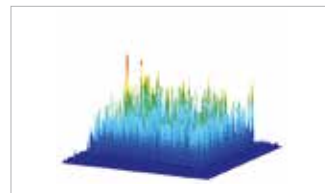
### GA benefits

- ▲ 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.

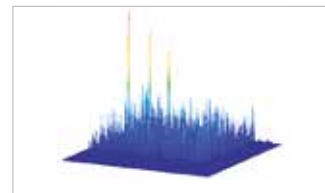
## Example: detecting foreign matter in a pack of sausages



X-ray image with no image processing



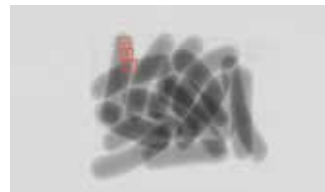
X-ray image after initial image processing



X-ray image with final image processing



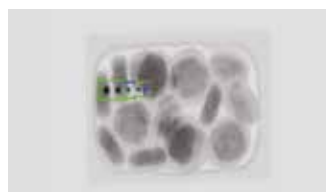
No image processing  
Foreign matter cannot be identified from the uneven profile of the sausages



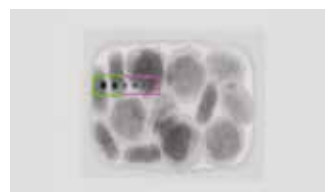
Initial image processing  
Background product effect is reduced enabling foreign bodies to be identified



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



Without Genetic Algorithm



With Genetic Algorithm

# 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).

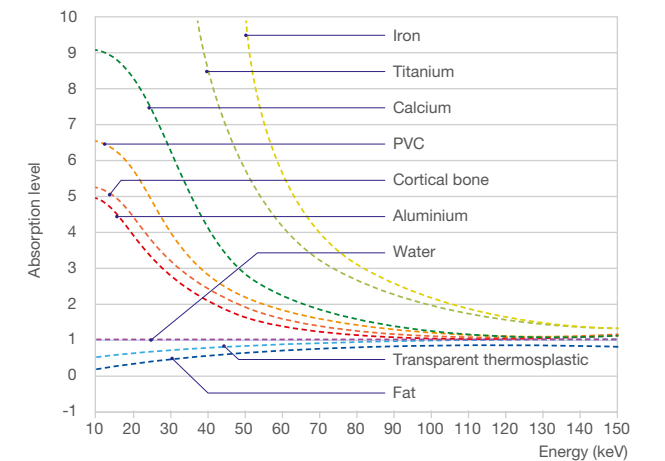
The ability to vary the KV and mA gives Ishida a strong advantage in the detection of lower density foreign bodies.

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.

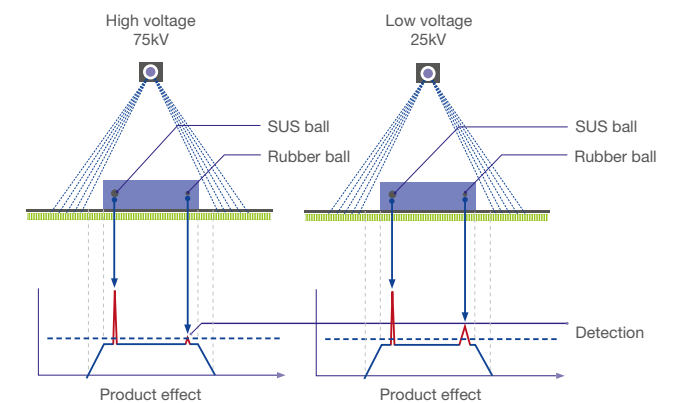
### Examples with rubber ball

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.

### Absorption levels



### Examples with rubber ball



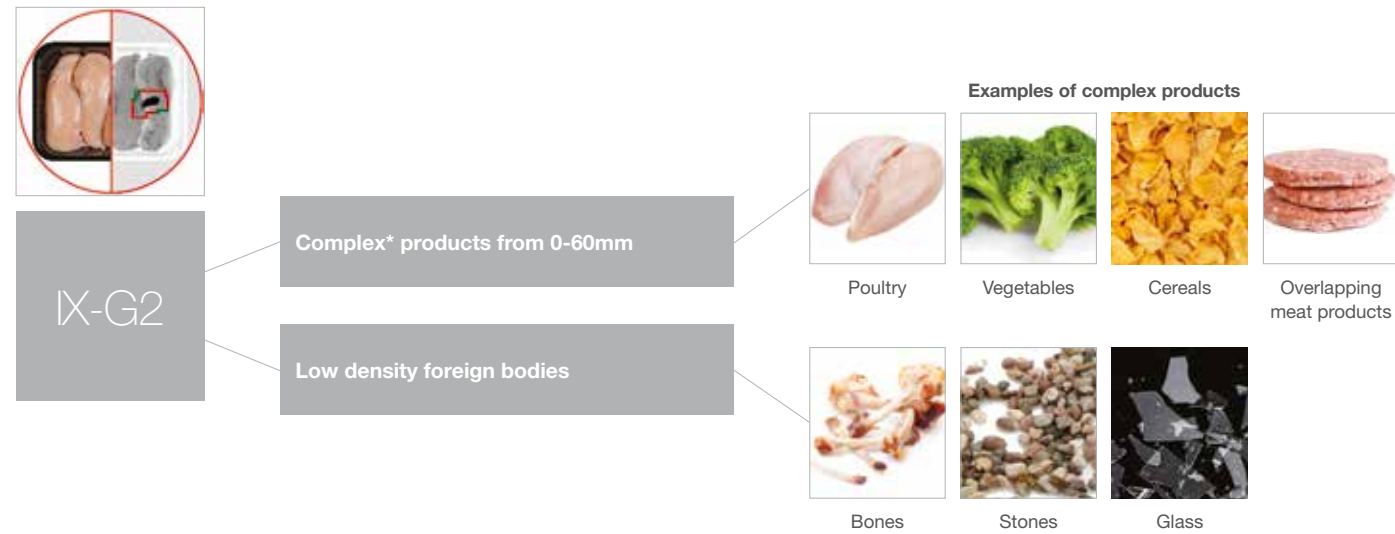
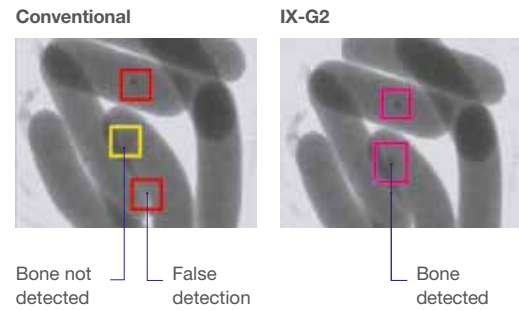


# IX-G2 Series

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, making it easy to clean.



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

For detailed information on the applications the IX-G2 series can handle, please refer to the "Foreign Body detection matrix" table on the page 15.



# IX-GN Series

The definite choice for a wide range of products

GN series provides high-performance X-ray inspections 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, making it easy to clean.



\* A group of products that are standardized or identical.

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

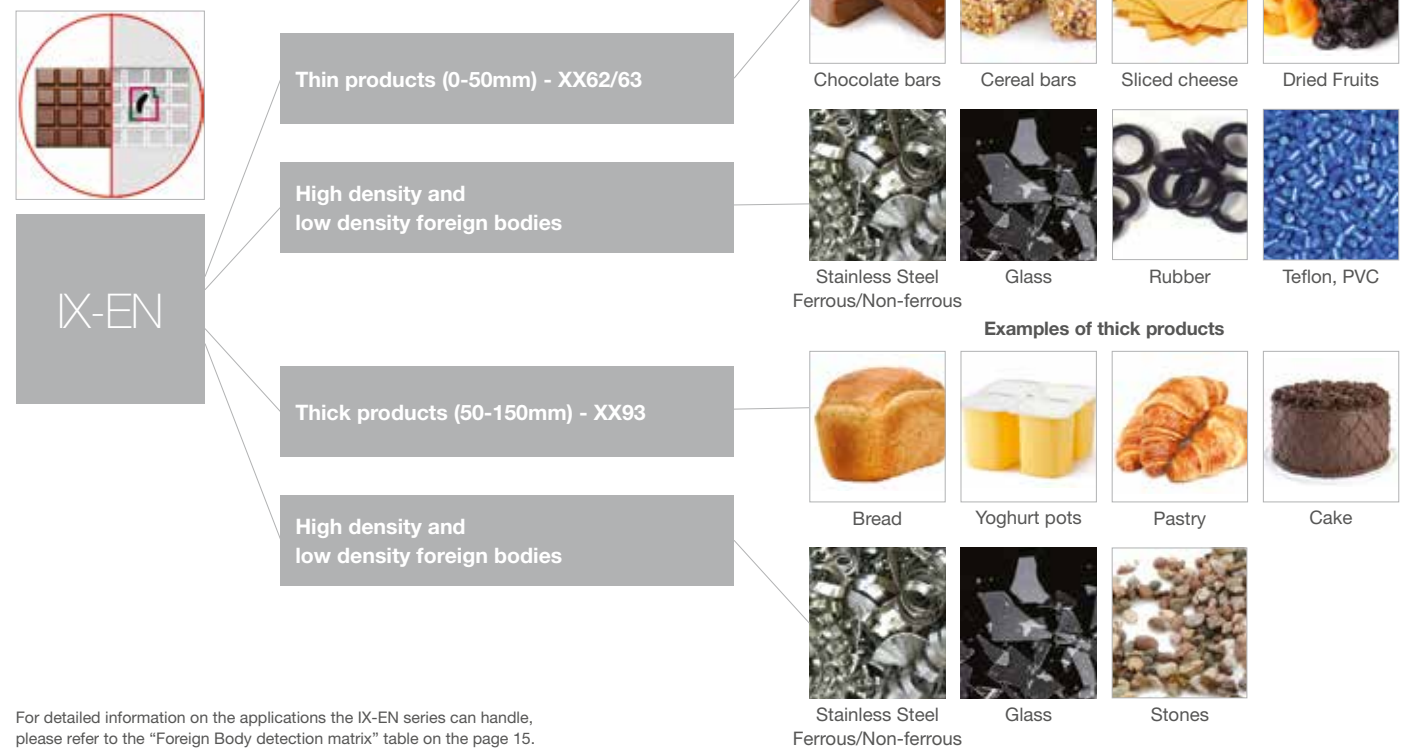
For detailed information on the applications the IX-GN series can handle, please refer to the "Foreign Body detection matrix" table on the page 15.

# 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 inspections suitable for uniform products.
- ▲ Easy to set up and integrate into your production line.
- ▲ User-friendly 15" touch screen control.



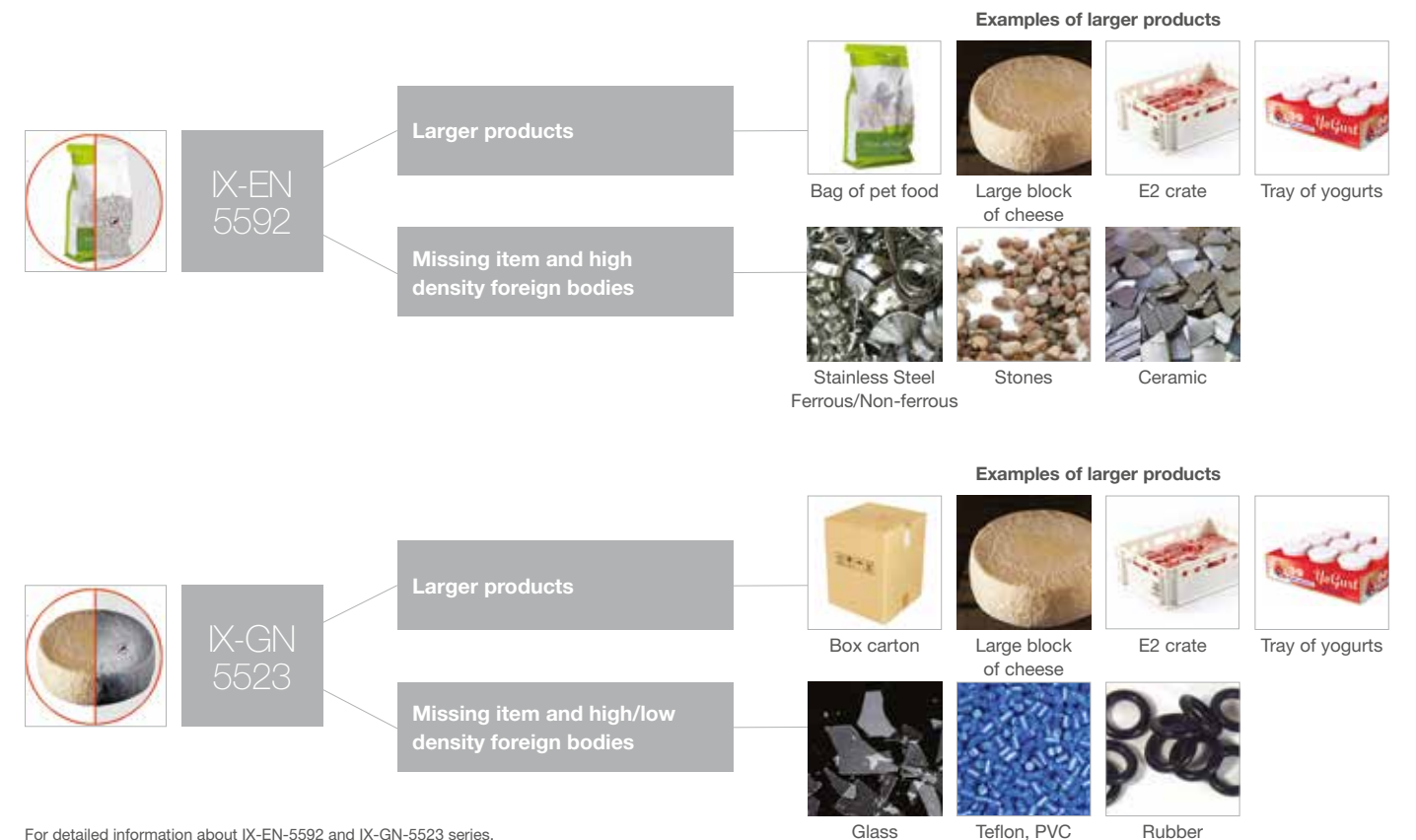
For detailed information on the applications the IX-EN series can handle, please refer to the "Foreign Body detection matrix" table on the page 15.

# IX Large Series

All the security of X-ray inspection for larger items

IX-EN-5592 / IX-GN-5523

- ▲ High sensitivity and latest sophisticated X-ray inspection system for large sized products.
- ▲ Ishida X-ray inspection systems IX-EN-5592 and IX-GN-5523 can be used at any stage in your production line to identify with the greatest accuracy when foreign bodies are contaminating your product, thus protecting your brand and reassuring your customer.



For detailed information about IX-EN-5592 and IX-GN-5523 series, please refer to the "Ishida X-ray differentiation" table on the page 14.



# IX-GE- B3043

The highest level of inspection performance for bottled products

- ▲ Achieves industry leading sensitivity.
- ▲ The unique way that the Ishida side beam 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.



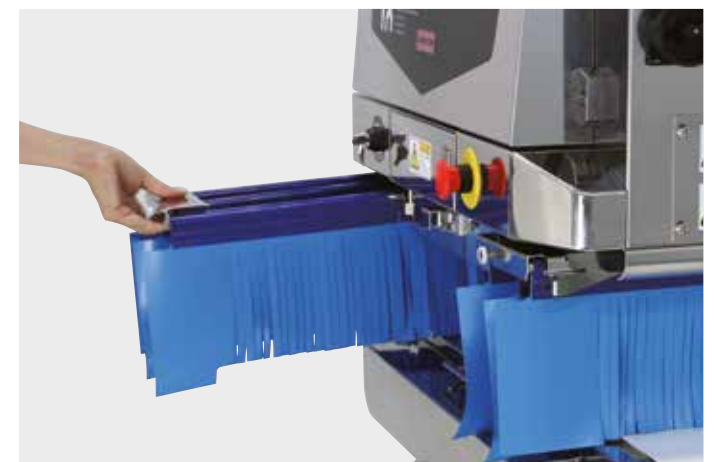
## Hygienic Design

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

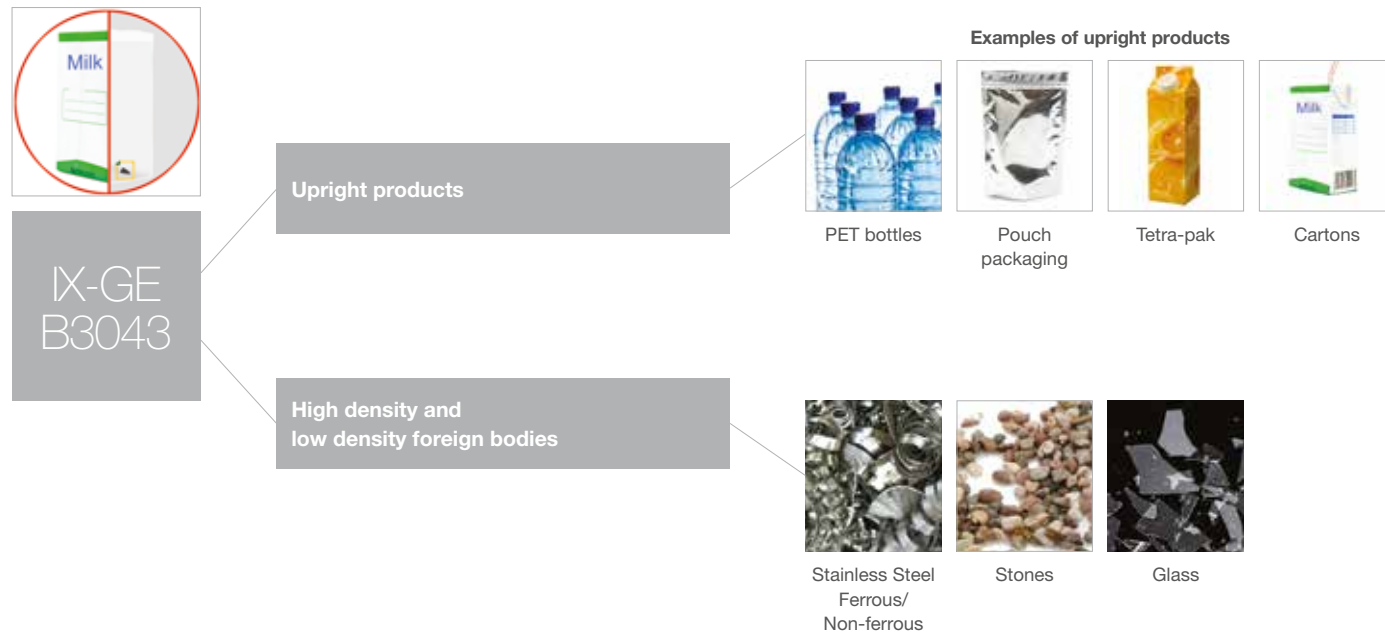
The uncluttered open frame design allows easy access around and beneath the machine for thorough cleaning.

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

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



Protective curtain



# Reject Bin Configurations



Removable reject bin



Front reject bin



Front and rear reject bin



Drop belt reject bin



Inline reject bin



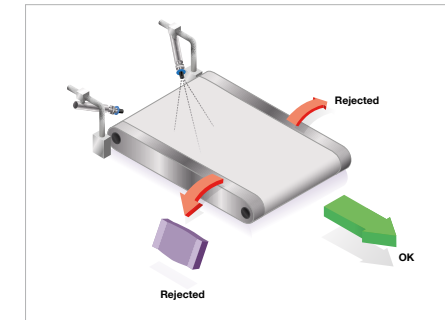
Roller track reject

Easily removable and interchangeable reject bins remove the requirement to double handle product when removing rejects from the locked reject area saving time and minimising the risk defective re-entering the process. Bins are on wheels to allow easy and convenient movement of defective product away from the line to the disposal location.

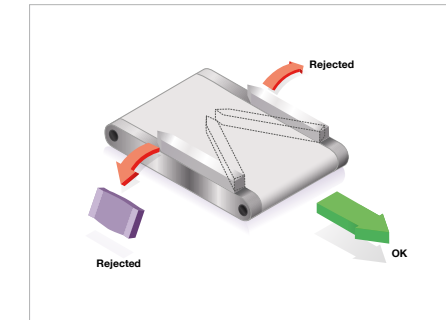
Various bin configurations are available to meet customer requirements and to handle a wide range of product sizes. Front facing bins are ideal where ease of operator access is a priority, for lines where space is at a premium and double rejects are required then front and rear rejection minimises the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

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

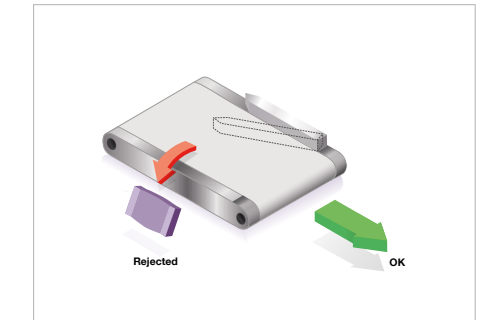
# X-ray Ancillaries Rejects



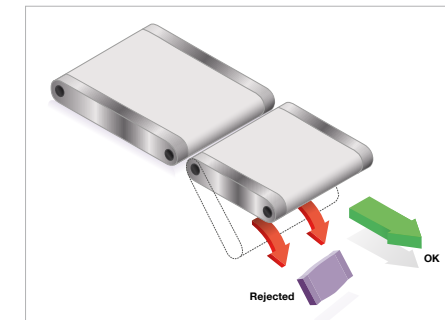
Air blast reject



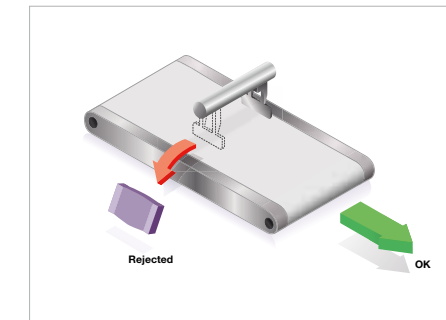
Catch arm reject



Slap arm reject



Drop belt reject



Overhead paddle reject

Not all customer products are the same and Ishida are 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 products and bagged products that can often be more of a challenge for rejection with conventional methods then our innovative integrated drop belt system provides reliable rejection 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 inspections to confirm product quality is becoming increasingly important to many customers.

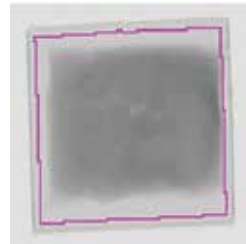
Masking functions allow items of packaging or inherent objects (such as clips) to be masked from the inspection to maximise the detection levels that can be achieved. Additionally these functions are able to confirm the presence of items such as clips and reject those products where the clips are not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

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

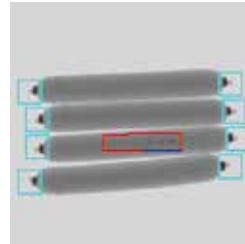
Fill inspections are able to determine that each individual component of a product (for example a meal box or compartment yogurts) is filled to the correct level. Due to the normal product variance in each compartment these defects can often be missed when weight is used to determine quality whereas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

Where the product weight is important the X-ray is able to calculate an estimated weight based upon 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.

## Masking feature



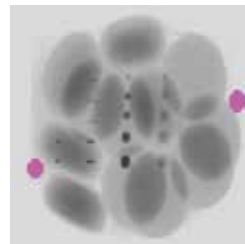
Masks packaging on product to enhance foreign body detection



Pattern masks exclude the marked area or can highlight missing elements



Metal clips in bag of cheese are masked

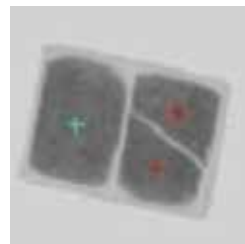


Pink areas show where the mask is applied

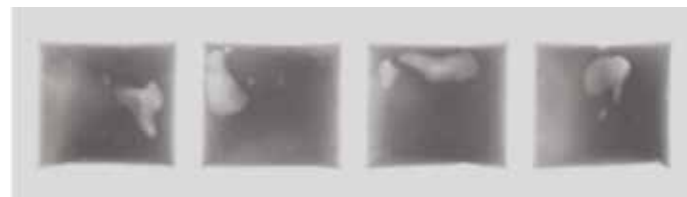
## Defect inspection



X-ray machines can be used to detect product flaws in packaged products

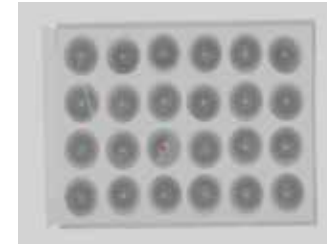


## Weight estimate feature



The darkness of an image relates to product weight and this can be used to measure multi packs or chain bags

## Piece count inspection



X-ray can be used to count the number of items in a packaged product



It is possible to check the shapes of products and ensure they adhere with the desired standards

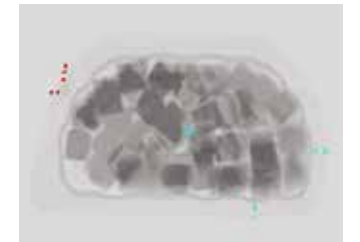
## Ensuring packaging integrity



X-ray offers the ability to ensure packaging integrity including clips on bread packs



It is possible to detect product in seal defects



## Checking fill level



It is possible to check for fill levels in packaging which could include butter and cheese



### Ishida X-ray differentiation

	IX-EN xx62/63	IX-EN xx93	IX-GN xx43/44	IX-EN-5592	IX-GN-5523	IX-GE-B3043	IX-G2 xx27
<b>Hygiene</b>							
Sloped surface	●	●	●	●	●	●	●
Toolless disassembling for cleaning	●	●	●	●	●	●	●
Machine rating	IP54	IP54	IP65	IP54	IP54	IP65	IP65
Inspection chamber rating	IP66	IP66	IP66	IP66	IP66	IP65	IP66
Mechanical interlocks	●	●		●		●	
Magnetic interlocks			●		●		●
<b>Image processing</b>							
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		●			●	●	
Finest 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			●		●		●
Dual Energy technology for enhanced detection of bone and other lower density materials and improved detection in overlapping products							●
<b>X-ray power</b>							
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			●		●	●	
<b>Usability</b>							
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	CF Card, Ethernet

All information supplied within is correct at time of publication.  
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### Foreign body detection matrix

Product type	Foreign body	Foreign body					Natural	
		Metal	Glass	Rubber	Teflon	Stone	Bone	
Uniform*	Dairy	Sliced cheese	●	●	●	●	●	
		Yoghurt	●	●	●	●	●	
		Ice-cream	●	●	●	●	●	
	Confectionery	Chocolate bar	●	●	●	●	●	
		Box with chocolate	●	●	●	●	●	
		Cookies	●	●	●	●	●	
	Meat	Minced meat	●	●	●	●	●	●
		Steak	●	●	●	●	●	●
		Burger	●	●	●	●	●	●
	Dried fruit	Packed	●	●	●	●	●	
Bulk		●	●	●	●	●		
Complex**	Meat	Chicken fillet	●	●	●	●	●	●
		Sausages in bag	●	●	●	●	●	●
		Overlapping burger	●	●	●	●	●	●
		Sausages in bulk	●	●	●	●	●	●
	Cereal	Packed	●	●	●	●	●	●
		Bulk	●	●	●	●	●	●
	Vegetables	Green bean	●	●	●	●	●	●
		Broccoli	●	●	●	●	●	●
		French fries	●	●	●	●	●	●
	Dried fruit	Packed	●	●	●	●	●	●
Bulk		●	●	●	●	●	●	

Key to foreign body detection:

- G2 ● GN ● EN
- Optimum solution ● Solution allowed



\* A group of products that are standardized or identical.  
 \*\* Products which include different thickness, overlapping etc.

# Working with you every step of the way

Our extensive R&D investment is directed at meeting the challenges of the fast-changing food industry around the globe.

We aim to support our partners fully, from the very start of the buying process, and you will find many equipment brochures, visual animations and case studies available on our website. When you are ready to make contact, a well-resourced network of Ishida companies, distributors and agents, extending across Europe, the Middle East and Africa, can provide advice and organise demonstrations and trials.

Installation is rapid and efficient. For integrated packing lines, we use proven project management techniques and methodologies, tuned to your key objectives and specifications.

A dedicated pan-European service engineering team helps to maximise the performance, functionality and reliability of our installed base. In addition, spares facilities are strategically placed throughout the territory, offering 24-hour delivery in most cases.



helpline • spares • service • training

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