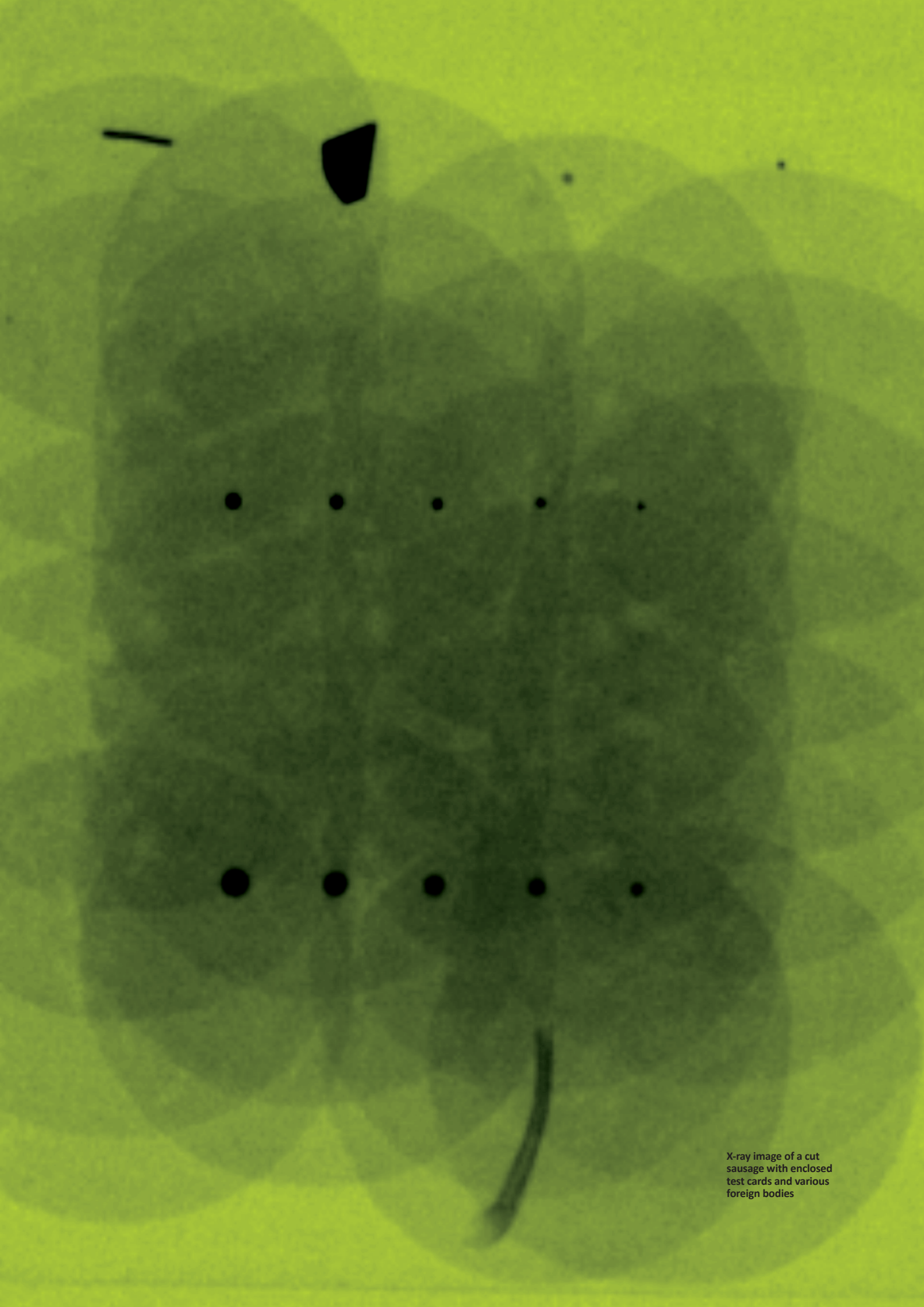# X-RAY Inspection Systems

X-ray image of a cut sausage with enclosed test cards and various foreign bodies

Purity matters. X-ray systems for packaged products.

Content

Your product

Meat and sausage products

With a current meat production of 330 million tons per year, the global meat industry has more than tripled in the last 50 years. Metal and bone contaminations as well as plastic parts or even ceramics and wood can get into the meat during production.

Bread and baked products

Sales in the European baking industry are expected to be around 142,168 million euros in 2019. Annual sales growth of more than 2% is expected until 2023. Increasing price pressure calls for efficiency and productivity improvement and require easy maintenance and accessibility.

Cheese and dairy products

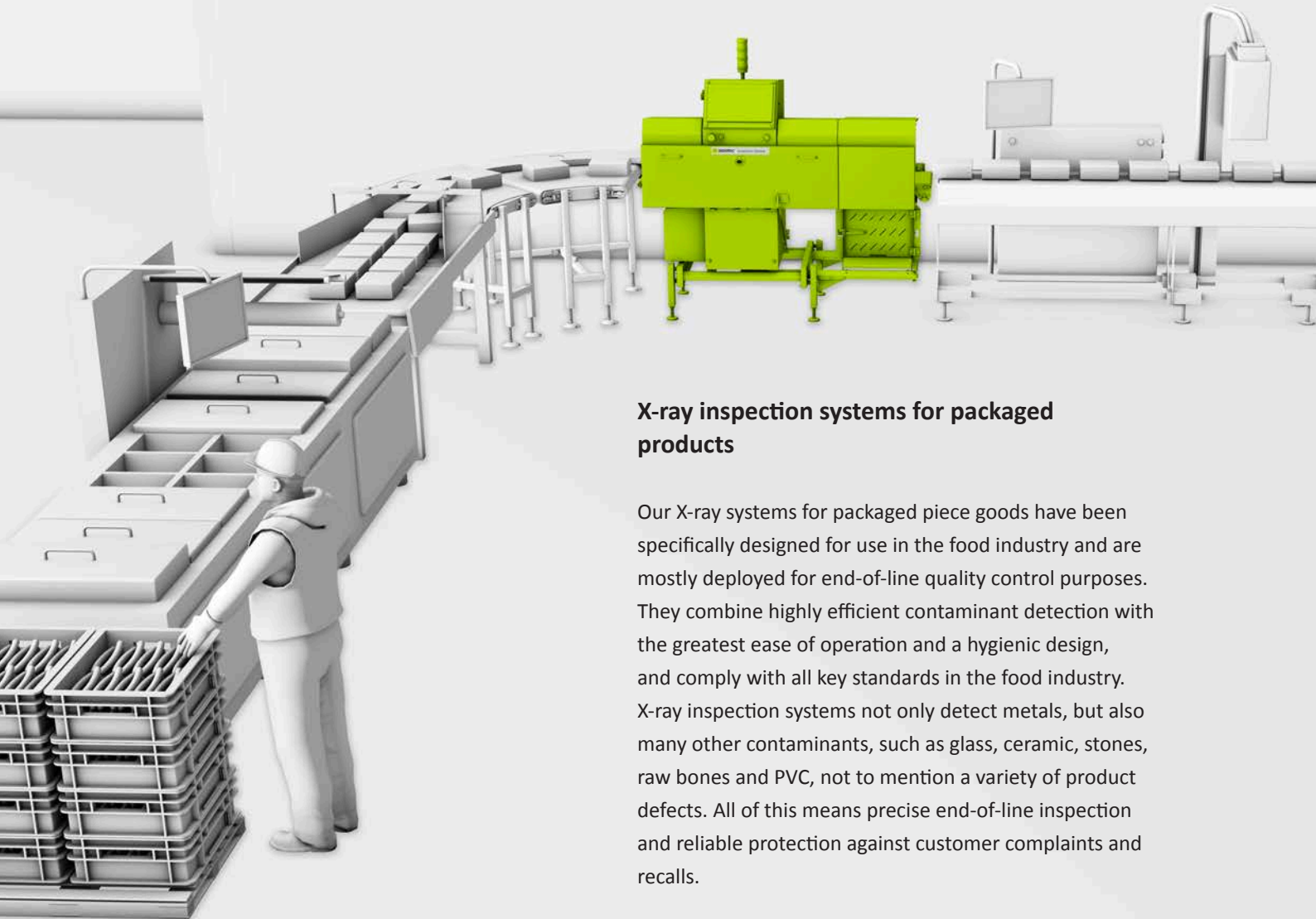Milk and dairy products are in general among the most strictly inspected foods - quality assurance has top priority. The global market for dairy products is highly competitive.

Cans, frozen food and ready meals

Due to continuously increasing quality standards, various types of contaminations and a large percentage of products with metalized packaging food inspection will remain a top issue.

Our solution

X-ray inspection systems for packaged products

Our X-ray systems for packaged piece goods have been specifically designed for use in the food industry and are mostly deployed for end-of-line quality control purposes. They combine highly efficient contaminant detection with the greatest ease of operation and a hygienic design, and comply with all key standards in the food industry. X-ray inspection systems not only detect metals, but also many other contaminants, such as glass, ceramic, stones, raw bones and PVC, not to mention a variety of product defects. All of this means precise end-of-line inspection and reliable protection against customer complaints and recalls.
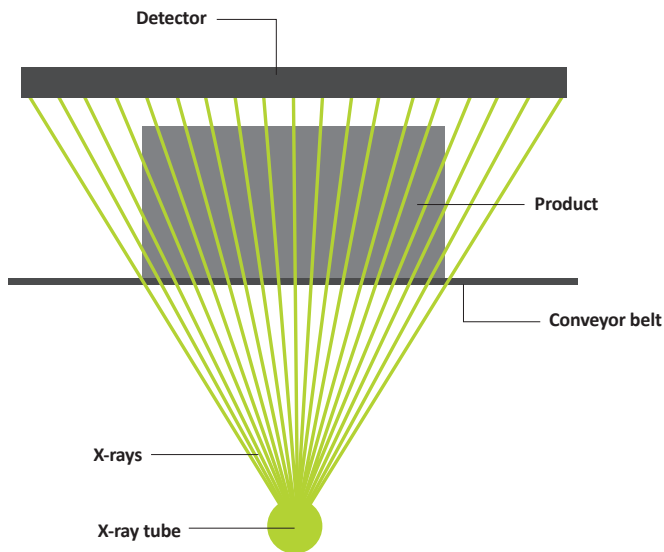
The functioning of an x-ray system and its decisive advantage

Use of X-ray inspection systems in the food industry

Product inspection has become an indispensable element of responsible food production, an inherent part of any HACCP concept, and an absolute prerequisite of successful IFS certification. Any contamination of food with impurities of any kind may have most serious consequences for a company because according to the product liability law every food producer is liable for contaminations of his products in case a consumer gets harmed by such contaminations.

Systems for contaminant inspection are used to prevent such problems. Metal detectors are most useful for the detection of magnetic and non-magnetic metals, but they reach their limits for example in the inspection of aluminium-coated packing materials. Contaminations with glass, ceramics, stones, and similar materials also constitute a serious problem.

X-ray detection systems for food are therefore used for such applications. Sesotec RAYCON systems furthermore offer additional advantages compared to conventional metal detectors and other X-ray systems available on the market. For example, RAYCON allows the parallel inspection of two different products. Also incorrectly placed or overlapping products are no problem at all. Apart from contaminations, other product defects such as missing product components can be detected also.

How does an X-ray system work?

The X-rays for „radiographing" are generated by an electric X-ray tube. A line-shaped detector that measures the arriving radiation is positioned above the conveyor belt (see picture). X-rays have a very high energy and are thus able to penetrate solid bodies. Depending on the density of the inspected object the X-rays are attenuated to a higher (high density) or lower (low density) degree when passing through the product. The detector converts the remaining radiation into an electrical signal, differentiating the density of the inspected object in an image. The higher the density of a material, the darker its representation on the X-ray image, and vice versa. The image processing software detects the contrast differences in the image, highlights the contaminants or the missing products, and outputs a corresponding signal.

Every food producer or processor is obliged to deliver only „safe" products to the market.

This is required by international and national laws. Guidelines support manufacturers in implementing these demands.

Detector

Product

Conveyor belt

X-rays

X-ray tube

✓ **Proposed legislation**
Food guidelines ✓
✓ **Quality requirements**
Customer complaints ✓
✓ **Customer requirements**

Food safety and food standards

Food safety means - as the name implies - safe food for trading because unsafe food can harm consumers. The consequences for food processing companies are very unpleasant and can have fatal consequences.

How it all started...

It is hard to believe, but the origin of the globally recognized „HACCP" concept for the assurance of food quality lies in the space industry. In 1959, the National Aeronautics and Space Administration (NASA) commissioned the development of guidelines for the production, storage and processing of 100% safe space food. In 1963, the WHO (World Health Organization) and the FAO (Food and Agriculture Organization of the United Nations) created the internationally acknowledged Codex Alimentarius on the basis of these guidelines. This includes the development of an HACCP concept.

HACCP - legally required according to the EU hygiene regulation

HACCP is the abbreviation for „Hazard Analysis and Critical Control Points". A hazard analysis takes into account the probability of occurrence, the extent of damage and the probability of detection of foreign bodies at critical points in the production process. The implementation of the HACCP concept is intended to detect, prevent or reduce hazards that could have harmful effects on the health of end consumers to an acceptable level.

Other countries, other obligations

For each country there are different variants of food standards but they all have one thing in common: their recognition by the Global Food Safety Initiative (GFSI). Food standards define a clear framework for controlling and ensuring product safety, integrity, quality and legality and are aimed at companies in the manufacturing, processing and packaging of food and food ingredients.
Over the years, the European area has evolved into a clear pioneer of high food safety standards.

BRC

Global Standard for Food Safety / Commonwealth (GB)
- Founded in 1998 of BRC (British Retail Consortium)
- Since then, continuous advancement and adaptation to requirements of the food industry
- The currently valid version, BRC Global Standard for Food Safety Issue 8', was published on 1st of August 2018
- BRC is a trade association of British retailers established in 1992

IFS

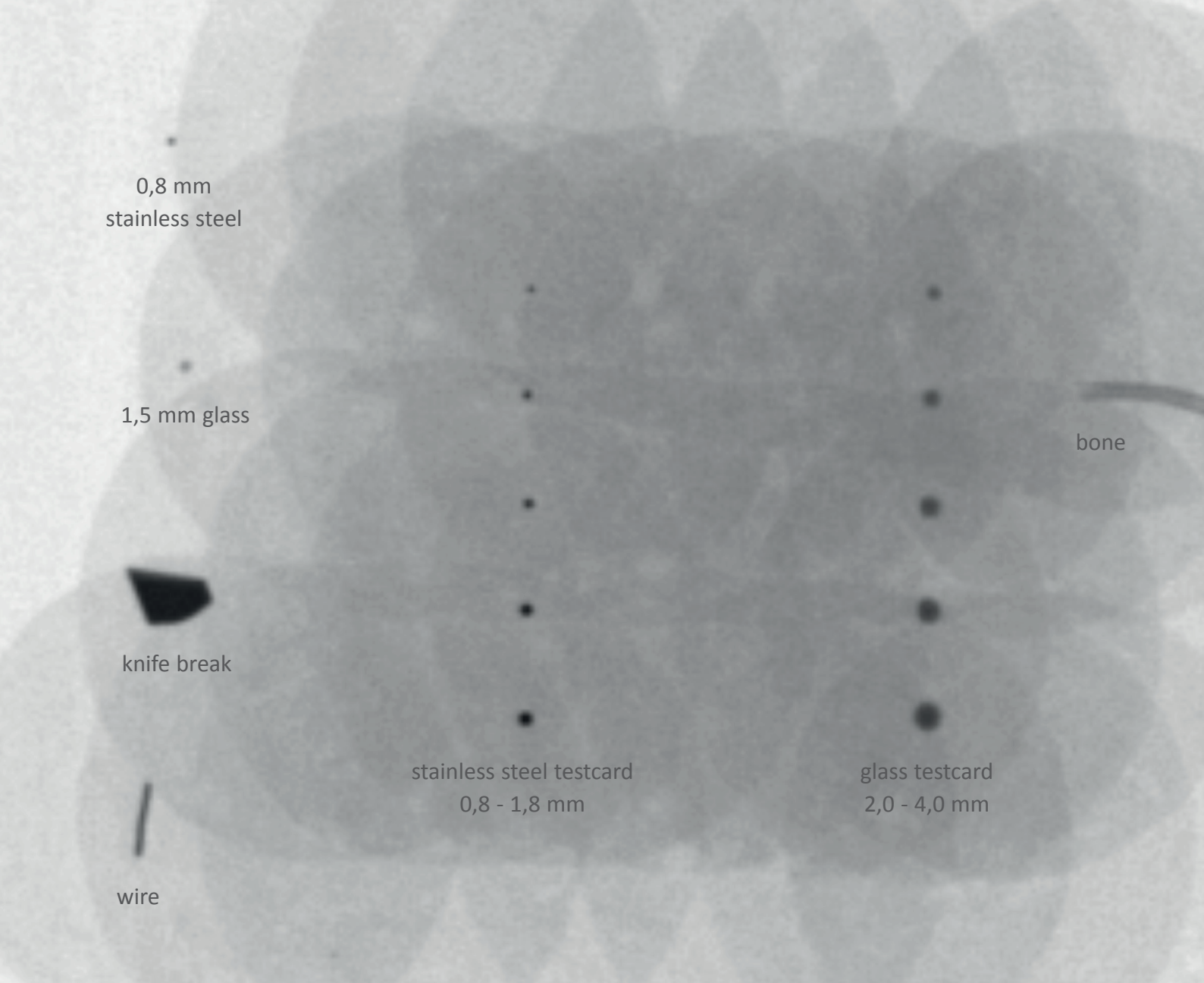International Featured Standard Food / Western and Eastern Europe, North America
- Founded in 2004: development by member companies of HDE (Hauptverband des Deutschen Einzelhandels) and FCD (Fédération des Enterprises du Commerce et de la Distribution)
- Quality and food safety standards for commercial own-label brands

FSSC

Safety System Certification 22000 / global
- Founded in 2009 by a group of multinational companies
- Linkage of ISO 22000:2005 and PAS 220:2008
- Global standard to ensure food safety in food production (Food Safety Management)
- Advantage: not owned by an interest representation and therefore an independent practice due to ISO standard

SQF 2000 Code

Safe Quality Food / USA
- Founded in 1995: introduction of the certification program Safe Quality Food (SQF) after a decade of food crisis to improve the quality and safety of the food industry and regain consumer confidence
- Since 2004: Administration by SQF Institute (SQFI) and worldwide recognition
- Reduction of food risks and guarantee of continuous security throughout the supply chain

0,8 mm
stainless steel

1,5 mm glass

knife break

wire

stainless steel testcard
0,8 - 1,8 mm

glass testcard
2,0 - 4,0 mm

bone

X-ray image of a packaged cut sausage tested with various foreign bodies

80KV

Product inspection system RAYCON operates with a very low X-ray power of only 80 kV

There is a difference between biological hazards, chemical hazards and physical hazards.

Physical hazards, such as foreign bodies, entail a wide variety of materials and can lead to injuries in mouth and throat or even suffocation.
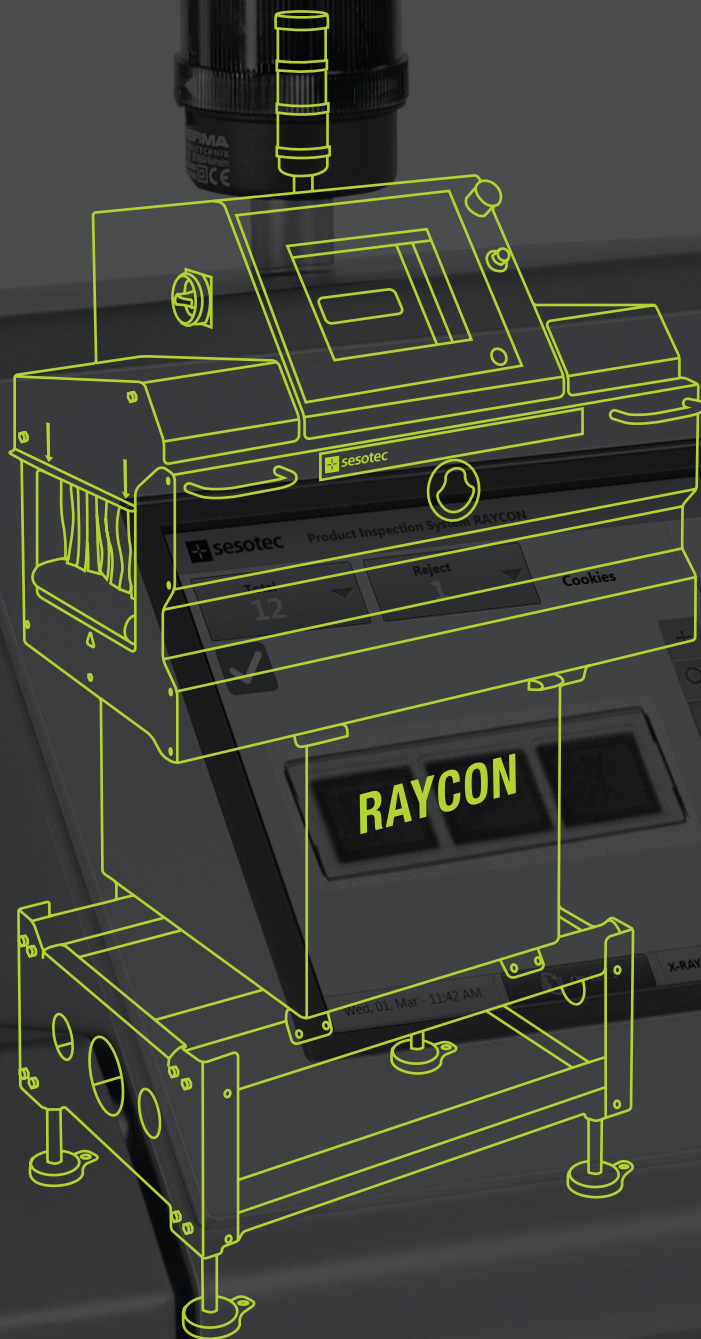
The solution is RAYCON

Our systems meet all requirements of the common food standards, which means you obtain the necessary certifications with ease and you no longer have any delivery restrictions. Since the food industry never sleeps, more and more retailers only accept goods that have been inspected by an X-ray system.

RAYCON is a highly efficient X-ray system which detects any contaminations that absorb X-ray radiation better than the surrounding product due to their density, chemical composition or mechanical dimensions – in short: foreign bodies that are more dense than the actual product.

Our „**Dual Energy Technology**" is already in the starting blocks to free your products even more effectively from foreign bodies such as **bones, ceramics, and plastics**.

X-ray systems for packaged products

RAYCON

200 mm max

120 mm max

RAYCON EX1 is Sesotec's entry level system for the inspection of packaged products.

- nlow cost of ownership
- durable and high-quality mechanical and electrical components
- low energy consumption
- IFS compliance

RAYCON EX1

RAYCON EX1 is a full-featured X-ray unit in industrial design at a moderate price.

X-ray technology is now available at an affordable price and thus gives you the opportunity to enter new markets.

Our operating software is based on the handling of our metal detectors.

We offer you an additional value by enabling you to carry out the operation of the system independently after a short briefing – and without specific prior knowledge of filters for image processing. The software includes guided user processes and adapts settings automatically. New products can therefore be adjusted in only two minutes, even during normal production.

With RAYCON EX1 we offer a plug & play solution with short installation length.

For you this means that the system is delivered fully assembled. All you have to do is provide the electrical connection and compressed air connection, and the system is prepared. Due to simple operation, your products can be adjusted in only a few minutes and the system is ready for operation. Due to short installation length the system can be installed in practically any line.
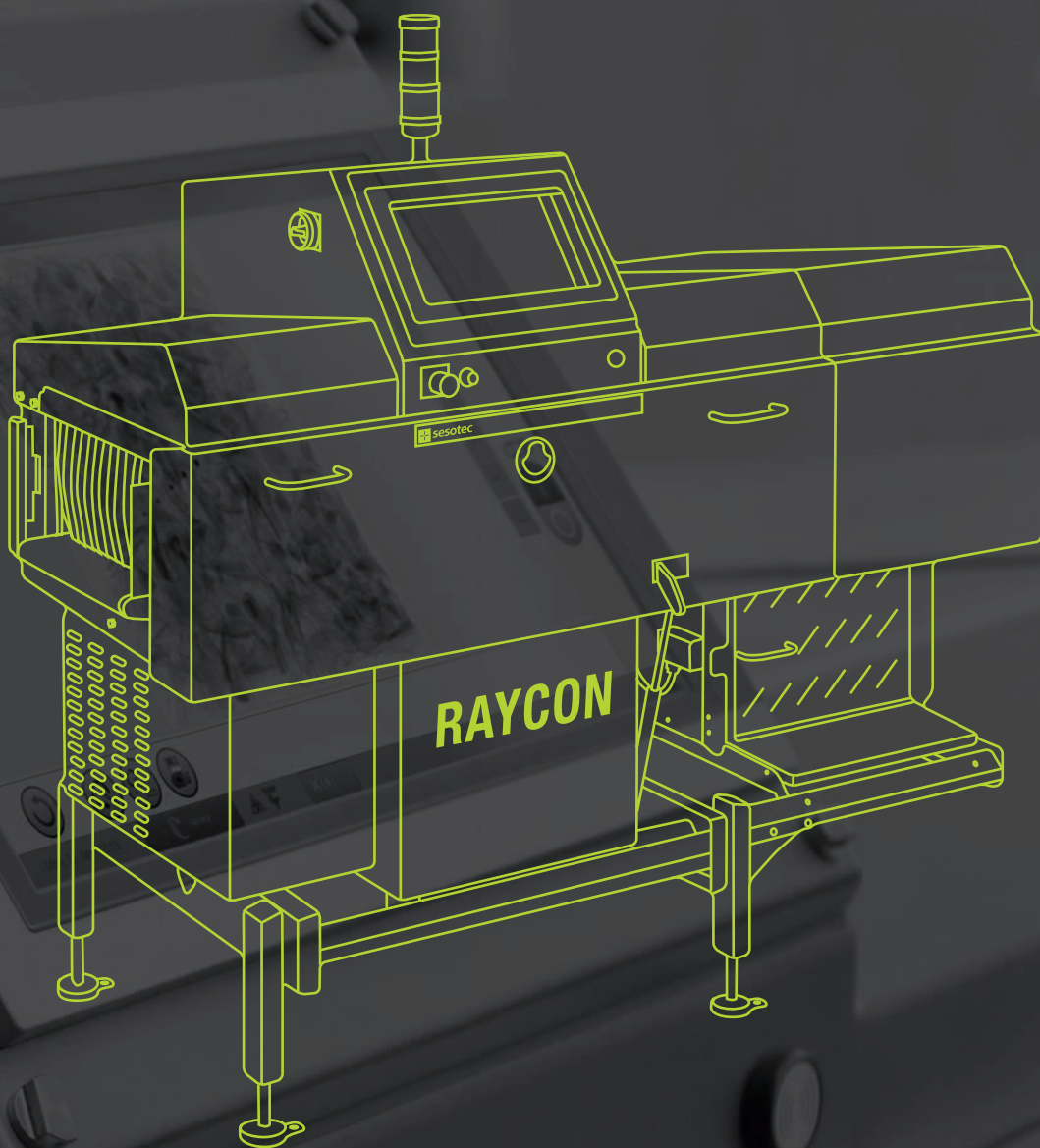
RAYCON D+

RAYCON D+ is our high-end system in the area of X-ray inspection with outstanding detection accuracy and variability for many applications.

With **RAYCON D+** we offer you a premium machine that reliably detects even contaminations which are difficult to detect, and that checks your product for completeness - by means of counting and weighing function. **RAYCON D+** is suitable for practically every product application and therefore the right solution for your product.

Precision, intelligence and flexibility combined in one system.

RAYOCN D+ exceeds the latest food requirements in terms of detection accuracy by up to 400%. With intelligent power management **RAYCON D+** automatically adjusts the X-ray power for the product to be inspected. This technology ensures sustainable energy savings and a lifetime extension of the X-ray tube. Due to a modular machine design, technology upgrades are easy to accomplish and the system can be used for a variability of specific applications. The hardware and software equipment of the system comprises many useful features and high ease of use.

RAYCON

200 mm max

320 mm max

RAYCON D+ is Sesotec's high-end system for the inspection of packaged products.

- high performance for food inspection

- intelligent power management

- modular machine design for integration into all process steps

- IFS compliance

Altes Gewürzamt counts on Sesotec

Sieben
Gewürzmischung

Ideal für Kurzgebratenes, Steak, dunkles Fleisch, ganze Teile wie Lammkeule, Lammkarree, Schweinerücken sowie für Wokgerichte, Geflügel und Fisch zu verwenden. Lecker als Topping-Gewürz auf aufgeschnittenem Fleisch.

Altes Gewürzamt
Fam. Holland

RAYCON — an X-ray system with plenty of pepper

Spices are the soul of a lovingly created dish. They characterize fantasy and individual culinary art. And this is exactly what Ingo Holland, founder of the „Altes Gewürzamt", lives for. The „Altes Gewürzamt" is a fine, creative and individual family manufactory from Klingenberg am Main. Ingo Holland started in 2001 with only one employee. Today, 40 employees roast, mix and grind 120 tons of exquisite spices, spice mixtures and other delicacies on 4,000 square meters annually. Mass is not the criterion here though, but working with heart and hand, with enjoyment and passion.

During his career as gourmet chef, Ingo Holland loved experimenting with spice mixtures but the inferior spice qualities offered to him as cook prompted him to search himself. This was the cornerstone for the „Altes Gewürzamt".

Only best quality gets canned

„Taste and quality - these two criterias are our top priority", Ingo Holland explains, „Only premium quality is bought, processed and filled".

Gourmets beyond the borders of Germany know the famous spice mixtures in the green cans and value the exclusive range and premium quality. In order to meet the high quality demands of the Hollands, a product inspection system was integrated into the production process. In this way the „Altes Gewürzamt" guarantees its customers the greatest possible security in the prevention of foreign bodies.

RAYCON RAYCON detects any foreign bodies which absorb X-rays better than the surrounding product due to their density, chemical composition or mechanical dimensions.

0,8mm

X-ray inspection system RAYCON detects contaminations with a detection accuracy of 0.8 mm.

Where craft production stops, end-of-line detection begins

After being filled into cans of tinplate, the spice mixtures are packaged in cartons and the cartons ready for dispatch are then inspected for foreign bodies. Although the „Altes Gewürzamt" is a small manufactory, a reliable and safe inspection requires mechanical equipment. An inspection by X-ray technology is necessary for the „Altes Gewürzamt" because after many years of experience not only metallic contaminations but also stones and glass were determined. RAYCON is a highly efficient X-ray system that detects all foreign bodies which absorb X-rays better than the surrounding product due to their density, chemical composition or mechanical dimensions - in short: foreign bodies that are denser than the actual product.

RAYCON inspects packaged products - even in metalized packaging. It combines the proven Sesotec detection technology with an outstanding design, which in particular meets the requirements for simple operation and easy cleaning. The quick installation as stand-alone unit or with integrated rejection system completes the features of RAYCON systems.

RAYCON's special feature also detects virtually invisible contaminants at the edge

Due to the thick soils and edges of the metal cans, the edge filter was particularly important for the „Altes Gewürzamt". The feature divides the product into two zones that are inspected simultaneously with optimum sensitivity: a zone at the edge and another zone for the rest of the product. The feature empowers RAYCON to inspect the inside of the can – despite "interfering" edge – with higher sensitivity in order to achieve the best detection accuracy.

RAYCON was tested with a demonstration system in the manufactory in advance. The detection accuracy of 0.8 mm met the high quality requirements and convinced the Hollands in combination with the competent advice on site.

RAYCON being tested

Contaminants

RAYCON specializes in small and medium-sized packaged products. **RAYCON**'s performance was tested for the detection of glass, stainless steel, ceramics, Teflon and bone parts using test cards in various products.
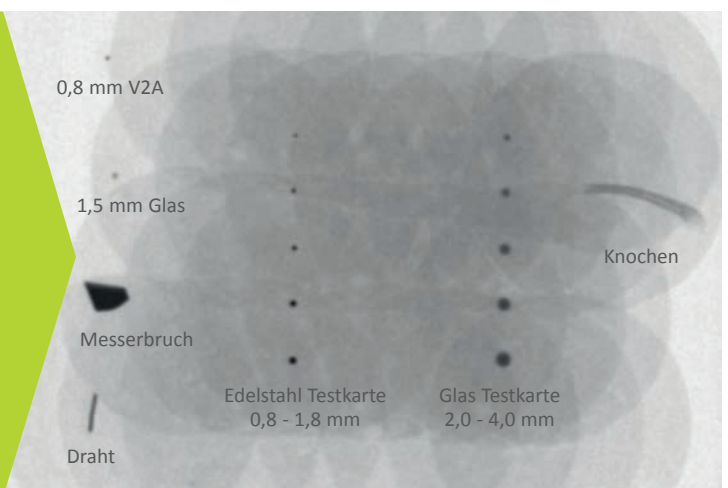
Technology

With product inspection system **RAYCON**, any contaminations that absorb X-ray radiation better or worse than the surrounding product due to their density, chemical composition or mechanical dimensions can be detected. A detection power of 50 kV was used for the tests with **RAYCON**. For small packaged products, the system achieves an inspection performance of 150 - 200 pieces per minute.

Results

RAYCON detects stainless steel, glass, ceramics and Teflon included in the test cards with 100 % detection accuracy. Even bone parts can be reliably detected in flat products.

0,8 mm V2A

1,5 mm Glas

Knochen

Messerbruch

Edelstahl Testkarte
0,8 - 1,8 mm

Glas Testkarte
2,0 - 4,0 mm

Draht

Facts about radiation protection

Why radiation protection? — Because we have to protect our consumers and ourselves

X-rays are among the ionizing types of radiation. If used improperly, these can pose a risk to the life and health of staff or third parties involved as well as their environment. Therefore, proper use is required, taking into account all necessary technical and organizational measures, in order to be allowed to operate an X-ray system.

In addition, the hazard potential also depends on the energy and dose of the radiation. Therefore prevention of unnecessary radiation exposure, minimization of unavoidable radiation exposure and compliance with the legally prescribed limit values for radiation exposure are paramount.

RAYCON complies with legally required limit value

RAYCON complies with the German limit value of 1 mSv/a according to the X-ray Ordinance (RöV) (this corresponds to 1 millisievert per calendar year).

- Our RAYCONs work with a maximum of 100 kV and are therefore even suitable for organic products without separate declaration.

- RAYCON D+ automatically adjusts the X-ray voltage and power for each product, i.e. for products with a low density only a fraction of the available power is retrieved. This means in turn that the limit value is never exceeded for either operators or products at any time.

- The X-ray tube is safely shielded.

- All radiation protection covers are monitored by security switches.

- X-rays can only be turned on if the system is functioning properly.

Protection against the harmful effects of ionising and non-ionising radiation

What seems complicated at first glance follows a clear scheme at second glance and is mandatory to ensure maximum protection with maximum detection accuracy at the same time.

We offer individual advice and guide you through the purchasing process with sample documents and checklists and support you in the utilisation phase.

Certainly you will have already asked yourself the following questions in the context of X-ray systems:

✓ **„Is such an X-ray system safe?"**

„Can I expect my staff to work with such a machine without concerns?" ✓

✓ **„Does such a system contaminate my products?"**

„What do I have to consider before, during and after the purchase?" ✓

✓ **„And why does all this always sound that complicated?"**

Do Product – Think Service

Insight.NET

Every product inspection system records operational data such as the detection of foreign objects, product changes, audit checks and error messages in a log. Each data entry is timed and dated and all X-ray images are recorded by the RAYCON system.

Insight.NET is a central data management software for monitoring and controlling all RAYCON inspection systems and metal detectors from a central control desk (e.g. smart-phone or laptop). For you this means you can read, save, load, delete and print all logged operating data (e.g. logbook or X-ray images) and simultaneously access and fully operate all devices remotely – at any time and anywhere.
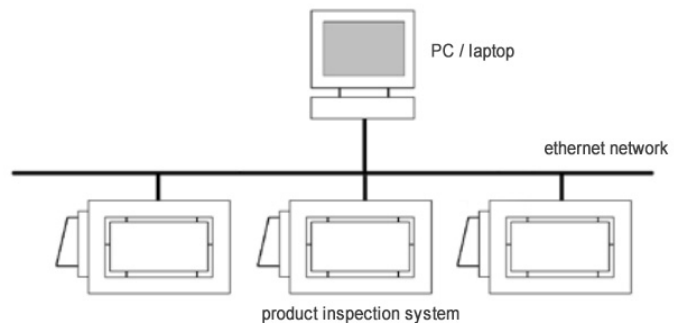
Your must-have for smooth Audit Check, HACCP and optimized production

- Panic due to Audit Check? Especially if your device is installed at a difficult position to reach or the required product data isn't at the expected place? With Insight.Net this is a matter of the past due to remote insight to all logs and view of operating data with a single click.
- Insight.NET improves your quality management. Your products are traceable at any time. All quality and process-relevant events are available to the quality management for further inspection and processing. Evaluating such operational data is an important component of HACCP processes. They are the basis for monitoring critical control points in production and assist the traceability of events in foreign body detection.
- You can fast and easily switch products during normal production remotely. In other words: no downtime and increased output.
- Efficient working instead of wasting valuable staff due to remote access and full operability of your devices. This saves time – and money.
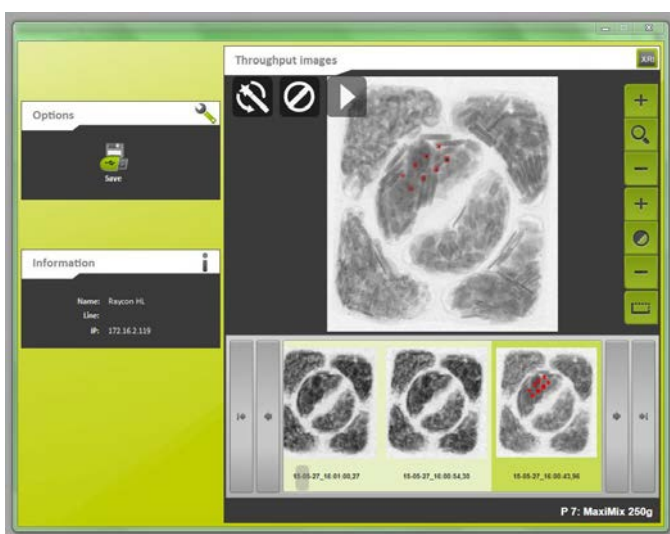
Your advantages

- **Filter** all required errors, warnings, information and more
- **Create required reports** (in html or .csv) with a single click by our integrated Report Generator
- **Show product data** of the connected devices, e.g. name of the product, sensitivity, product angle and more
- **Backup and restore product data** to be 100% sure these important information can't get lost
- **Show metal signal** in an diagram (long-term or current)

We offer you support with remote service via Team Viewer and automatically inform you via email in case limit values are exceeded.

Connection to a central PC or laptop via serial interface (RS232 or RS485) or in a network (Ethernet or WLAN).

Download from the stored x-ray images of good and rejected products on RAYCON inspection system

365 days

Our service is available 365 days a year and guarantees fast response times and short distances, thanks to service centers located all over the world.

Insight.NET's handling could not be easier

- No additional expense or extra cost due to easy and quick installation
- Immediate setup without training of staff thanks to user friendly design
- Intuitive operation by Windows® environment
- Suitable for all new RAYCON inspection systems and all metal detectors and separators with Control Unit GENIUS+ and GENIUS+ Touch controllers
- Up to 50 devices can be integrated in the monitoring and operating system
- Insight.NET is available in multiple languages (German, English, Slovenian, Polish, Czech, Dutch, French)

Try Insight.NET for free and convince yourself

We want to make sure that you have convinced yourself of the usefulness and simplicity of Insight.NET. That's why you are free to enjoy the full advantages of Insight.NET for 4 weeks. Just give us a call, get your software key and keep on optimizing your production in future!
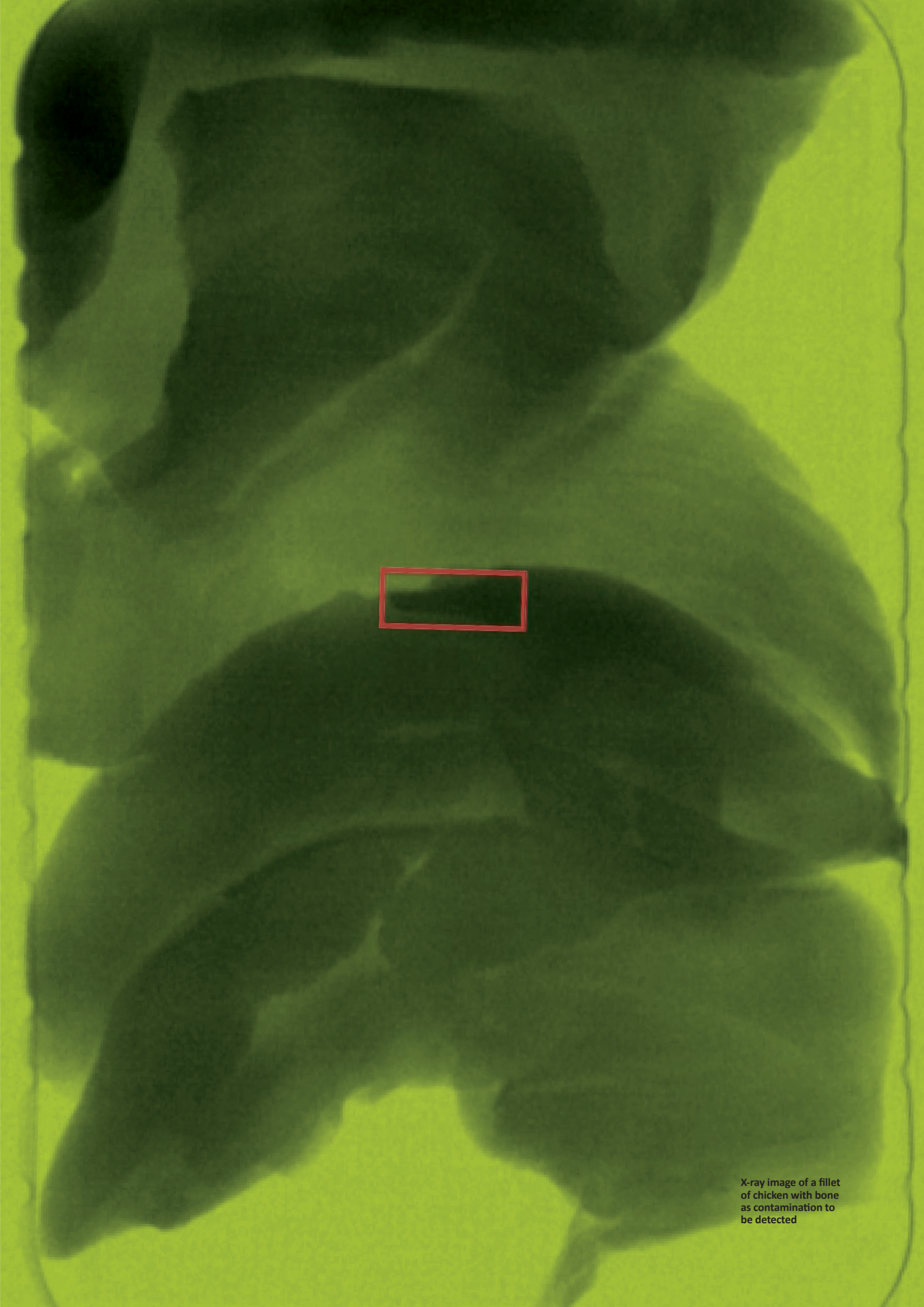
Scan QR-Code and get more information

www.sesotec.com/emea/en/x-ray-inspection-for-packaged-food

X-ray image of a fillet
of chicken with bone
as contamination to
be detected

HAUPTSCHALTER | MAIN SWITCH
ÖFFNEN IN | OPEN IN
O-STELLUNG | OFF-POSITION

EAT·N

Sesotec Product Inspection Sys