

Press release

More detection and failure reliability during foreign object inspection

HEUFT SYSTEMTECHNIK GMBH will be putting the focus on its further developed technology for the pulsed X-ray inspection of foodstuffs with a reduced total cost of ownership at the Anuga FoodTec 2022 exhibition in Cologne, Stand 5.2 / B030 C031.

Top-down, from the side, from below or from different perspectives at the same time – with one, two or several height-adjustable, flexibly orientable X-ray flashers: what makes the HEUFT *eXaminer II* series of foreign body detectors so special is not only their versatility for the complete quality inspection of packages filled with food such as thermoformed trays, tins, stand-up pouches or jars.

The end-of-line systems of the new generation score points above all with pulsed X-ray technology which now achieves even more sensitivity with a considerably extended lifetime together with smart HEUFT *reflexx A.I.* image processing. X-ray tubes have been specially developed and other X-ray components have been carefully refined. The user is automatically informed proactively long before they can fail so that he still has enough time for preventive maintenance in good time. As a particularly important component, the filament is even integrated twice. If one of them fails, the other one takes over immediately – completely automatically, without manual intervention. The result: a new dimension in detection and failure safety for foreign body-free food and packaging with reduced Total Cost of Ownership (TCO).

The X-ray pulses, which are short by the millisecond and are emitted only when a product to be inspected is actually in front of the respective X-ray flasher, now cover even larger packaging areas and penetrate larger quantities of product at the same time. In contrast to conventional continuous beam systems, there is no emission of X-rays either in gaps

in the production flow or in stop situations. New full-field image converters with a significantly extended lifetime also increase the coverage and sensitivity of the unique pulsed X-ray inspection. In addition to reliable glass-in-glass or metal detection, the targeted identification of weaker absorbing foreign bodies such as bone fragments in pet food or plastic particles in yoghurt pots becomes even more precise with unrivalled low radiation.

In order to clearly distinguish them from harmless product and packaging structures the HEUFT *reflexx*^{A.I.} combines completely self-developed hardware and software for high-resolution real-time image processing with validatable artificial intelligence (AI) for a targeted object detection and classification as well as a teach-in based on human experience. The user thus always has the option of modifying the AI's judgement and teaching unknown objects, which are initially assessed as defects in principle, as good and uncritical for product and packaging safety into a multidimensional feature space, so that only those products are rejected that are actually contaminated with dangerous foreign objects.

Whether top-down, from the side, from below or from several perspectives at the same time: the modular end-of-line systems of the HEUFT *eXaminer*^{II} series realise the most varied approaches for a gentle, precise and completely covering X-ray inspection in the smallest of spaces. Further detection modules can be integrated in an uncomplicated manner, for example for a 360° closure inspection or marking verification. And the extended lifetime of the in-house-developed X-ray components ensures a lower TCO and fewer unplanned production interruptions.

The focus will be placed on the further developed turnkey solutions at Stand 5.2 / B030 C031 from 26th to 29th April at the Anuga FoodTec 2022 in a new type of presentation. The compact HEUFT *eXaminer*^{II} *XB* can also be experienced live in operation during the top-down inspection of pet food in thermoformed trays.

Press release

HEUFT *eXaminer*^{II} XS: more performance in the smallest of spaces

The compact HEUFT *eXaminer*^{II} XS opens up completely new perspectives for the gentle and precise detection of foreign objects at the end of the line with more flexibility in the combination, arrangement and alignment of performance and lifetime optimized pulsed X-ray technology.

The slim turnkey solution for the pulsed sideways X-ray inspection of cans, doypacks, squeeze bottles or carton packages achieves full detection reliability in a very small space: dangerous foreign objects with a high density in the product are identified gently and precisely. Modularly expandable, the compact system of the new generation can be equipped with one or two X-ray flashers – depending on the height of the full packaging to be inspected – to ensure that the inspection always covers the entire filling volume.

With two X-ray modules, precision is increased in the detection of high-density objects such as metal particles or hard plastic fragments. In addition, this enables a complete inspection of particularly large-format containers with a straight view of the sensitive fill line area. If only a base inspection is required, as is the case with liquid products in cardboard packaging, this packaging area alone can now also be specifically inspected with only one sideways X-ray flasher – thanks to an "unfolded" base view implemented by the intelligent HEUFT *reflexx*^{A.I.} image processing. Small foreign objects lying flat at the bottom of the packaging can be detected even more clearly this way.

A new option for particularly high full packages whose complete volume has to be examined is a special oblique alignment during the X-ray with only one detection unit. This makes it possible to identify foreign objects not only at the bottom, but also everywhere else in the packaging. A new type of full-surface image converter provides increased sensitivity

and ensures that each individual X-ray pulse covers a significantly larger container area than before.

Also perfected: The pulsed X-ray technology itself which is exclusively available from HEUFT and which generates X-ray flashes of milliseconds instead of a continuous beam and only emits these when they are really needed. Each individual X-ray pulse now penetrates considerably larger packaging volumes and product quantities than before so that the gentle and precise detection of foreign objects e.g. even in oversized gastro cans is successful. And all this with a significantly optimized lifetime for fewer downtimes in the filling and packaging process: before a total failure of important components can occur, the user is informed in good time so that he still has enough time for preventive maintenance. Essential X-ray components are even redundantly integrated – should one fail the other takes over directly.

The higher-level HEUFT *SPECTRUM*^{II} control unit of the HEUFT *eXaminer*^{II} XS to which many other detections can be connected – among other things for the precise verification of product markings – is highly automated. For example, the height and orientation of the upper X-ray flash module automatically adapts to the changed container format when there is a change of type or program. The HEUFT *NaVi* user guidance system provides the user with an audiovisual step-by-step assistance which not only makes type changes simple.

All this makes the compact HEUFT *eXaminer*^{II} XS a genuine turnkey solution for fully covering foreign object detection at the end of the line.

Press release

HEUFT *eXaminer II* XAC: Optimized glass-in-glass detection

The HEUFT *eXaminer II* XAC increases the sensitivity, coverage and reliability of the pulsed X-ray inspection for the precise glass-in-glass detection with new components optimized for a longer lifetime. The end-of-line system in the HEUFT *CleanDesign* inspects even oversized products without gaps and with high precision.

The HEUFT *SPECTRUM II*, its overall highly automated device platform with audiovisual HEUFT *NaVi* user guidance, already provides considerably more performance when detecting and rejecting full food jars which are contaminated with dangerous glass splinters. In addition compact full-field image converters now increase the bandwidth, speed and precision of the pulsed X-ray inspection with the further developed HEUFT *eXaminer II* XAC. Even oversized containers can be inspected without gaps. At the same time the size of the foreign objects to be reliably detected is halved with line outputs of up to 1,200 products per minute.

The compact new image converters replace the camera and image intensifier technology previously used. Almost square and optimally arranged, they expand the sensitive detection area with significantly increased resolution. Even the edge areas of the brilliant X-ray images remain free of distortions and aberrations.

The X-ray parameters adapted to the new image converters reduce the already unrivalled low radiation in the double bottom and 360° sidewall inspection. In contrast to conventional scanning, it is emitted in the form of X-ray flashes that are only a thousandth of a second short. And only when there is actually something to inspect. At high belt speeds, the flashes prevent motion blur, which can impair detection reliability. In addition it enables a static inspection: the product can be precisely

inspected – for example for internal quality assurance – even when the conveyor is stationary.

This pulsed X-ray technology which is exclusively available from HEUFT makes the worldwide unique use of the compact image converters in inspection systems for the food industry possible in the first place. As a result of this as well as thanks to further developed high voltage and lifetime optimized X-ray components the HEUFT *eXaminer II* XAC now simply offers more space and flexibility with a considerably reduced total cost of ownership (TCO) – for example for the reliable inspection of containers of different heights. As the generators no longer require cooling the risk of contamination of the product to be inspected due to possible leaking coolant is eliminated.

Its HEUFT *CleanDesign* predestines the HEUFT *eXaminer II* XAC for use in hygienically sensitive areas. Sloping surfaces make cleaning easier and prevent the accumulation of stubborn dirt. Special channels and openings allow the liquid required for cleaning to drain off completely. Dangerous germs and bacteria thus have no surface to attack.

The considerably increased automation and computing power of its HEUFT *SPECTRUM II* head with self-explanatory HEUFT *NaVi* user guidance makes the safe operation of the HEUFT *eXaminer II* XAC simply easy. The HEUFT *reflexx A.I.* teach-in capable real-time image processing clearly distinguishes between harmless product inhomogeneities and critical faults. And the new X-ray components, some of which are even redundantly integrated, increase the longevity of the end-of-line system which is predestined for the glass-in-glass detection. The result: A new dimension in bandwidth, detection and reliability in pulsed X-ray inspection for reliable glass-in-glass detection.

Press release

HEUFT *eXaminer*^{II} XB: a more powerful top-down inspector

The enhanced top-down inspector is the only system of its kind to combine lifetime-optimized pulsed X-ray technology with new types of image converters. The HEUFT *eXaminer*^{II} XB thus achieves previously unattained dimensions in terms of bandwidth, detection accuracy and operational reliability when detecting the most varied foreign objects in pouches, flow packs or thermoformed trays.

Equipped with novel full-field image converters for the first time the HEUFT *eXaminer*^{II} XB makes the detection of solid foreign objects made of glass, metal or plastic even more reliable, easier and more precise with a unique pulsed X-ray inspection: the size of the foreign objects which can be reliably identified has been halved.

The compact image converters expand the sensitive detection area of pulsed X-ray inspection with significantly increased resolution: even the edge areas of the brilliant X-ray images remain free of distortions and imaging errors. This means that even products of larger formats can be inspected without gaps and with high precision.

The X-ray parameters adapted to the new image converter technology reduce the already unrivalled low level of radiation. Unlike conventional scanners, it is emitted in the form of X-ray flashes that are only a thousandth of a second short. And only when there is actually something to inspect. At high belt speeds, the flashes prevent motion blur, which can impair detection reliability. In addition, it enables static inspection: the product can be inspected precisely – for internal quality assurance, for example – even when the conveyor is at a standstill. The multiple flash option realizes the complete inspection of particularly long products.

The pulsed X-ray technology which is exclusively available from HEUFT

makes the worldwide unique use of the compact image converters in inspection systems for the food industry possible in the first place. Newly developed X-ray tubes from our own production as well as sustainably optimized generators and high voltage components further increase the detection and operational reliability during the top-down inspection. Before a total failure of important components can occur, the user is informed in good time so that he still has enough time for preventive maintenance. Essential X-ray components are even integrated redundantly – should one fail the other takes over directly.

In addition the HEUFT *eXaminer II XB* now offers considerably more space and flexibility when adapting the conveyor for the reliable inspection of products of different heights. As the new X-ray generators no longer require cooling the risk of contamination of the product to be inspected due to possible leaking coolant is eliminated. A special technology for the self-adjusting tightening of the easily exchanged belt and the optimized drive mechanics of the transport belts reduce the need for manual intervention and simplify the maintenance of the system constructed in the hygiene-optimized HEUFT *CleanDesign*.

The high level of automation and computing power of its HEUFT *SPECTRUM II* head with self-explanatory HEUFT *NaVi* user guidance makes the safe, non-manipulable operation of the HEUFT *eXaminer II XB* simply easy. The HEUFT *reflexx^{A.I.}* teach-in capable real-time image processing clearly distinguishes between harmless product inhomogeneities and critical foreign objects or defects. The result: a new dimension in terms of bandwidth, resource efficiency, detection and reliability during the gentle top-down inspection with lifetime-optimized pulsed X-ray technology.

Press release

HEUFT *eXaminer^{II} XT*: Perfect pipeline inspection

The pulsed X-ray technology in the highly automated HEUFT *eXaminer^{II} XT* has now been optimized once again for the reliable identification of foreign objects in unpacked product mass at a reduced total cost of ownership (TCO).

Thanks to further developed pulsed X-ray and a computing power at HEUFT *SPECTRUM^{II}* level the compact pipe inspector not only offers more performance and precision in the gentle detection of foreign objects but also in the rejection of the contaminated partial quantity. With perfected generators and large-area new full-field imagers, the X-ray flashes cover an even larger area than before. In addition, they now penetrate larger volumes of highly absorbent product mass such as sausage meat just as completely as syrup or yogurt to identify metal particles, glass particles, stones or bone fragments even before the filling and packaging process begins.

Even when the transport speed in the pipeline is very high or fluctuates the further developed pulsed X-ray ensures clear detection images without motion blur at minimal radiation which make foreign objects of high density clearly visible and distinguish them clearly from harmless product inhomogeneities with the aid of special filters during the HEUFT *reflexx^{A.I.}* real-time image processing.

And the compact, easily accessible construction in the hygiene and maintenance-optimized HEUFT *CleanDesign* together with the strong performance of the highly automated HEUFT *SPECTRUM^{II}* device platform ensures the highest degree of accuracy in the targeted rejection of the part contaminated with dangerous foreign objects: instead of being positioned horizontally the pipeline which is scanned by unique X-ray flashers is now positioned vertically. This means that the contaminated mass can simply flow down through a valve, while the product free of foreign bodies continues to be filled and packaged.

Type and program changes are carried out fully automatically and without time-consuming recalibration. The HEUFT NaVi audiovisual user guidance supports each user individually and step by step. And also during the regular self-tests for checking the detection performance in an innovative procedure. Up to four carbon fibre fingers prepared with different test objects are moved directly into the beam path for this purpose so that the detection reliability can be checked under real production conditions and documented without gaps.

The result: a space-saving, gentle and precise foreign object detection at a genuine HEUFT level even before the filling and packaging process starts. With the new generation pipe inspector it is possible to realize exactly what is becoming more and more important in the supply chain with a markedly increased life cycle of all the X-ray components: the delivery and processing of bulk goods which are already pre-inspected and free of foreign objects. This minimizes the risk of metal particles, glass splinters or stones only being found in the finished packed end product and at the same time forms effective protection against wasting life and packaging material.

Press release

HEUFT *canLine*^{II}: Full covering empty tin inspection

Ensuring that the containers can be closed, preventing seaming blockages and the resulting loss of productivity, detecting and rejecting faulty and contaminated packaging in good time before filling: the HEUFT *canLine*^{II} carries out a precise quality inspection of up to 1,200 empty tins per minute.

Deformations, indentations, notches and defects at the flanged rim of the mouth of empty food tins can be identified just as reliably as dented or contaminated inner walls and foreign objects at their base. The compact HEUFT *canLine*^{II} does all this with only one top-down camera in which the adaptive LED illumination is directly integrated as well as smart image processing.

With this alone the empty container inspection covers the neck finish, crimped edge and inner walls as well as the complete container base in only one image – and achieves such a depth of field that neither shape faults such as oval can openings or dents in the can wall nor soiling and foreign objects are overlooked: Warped cans which cannot be securely closed are just as reliably identified and rejected as dented and contaminated ones. In this way the HEUFT *canLine*^{II} prevents seaming blockages which slow down productivity and at the same time protects the integrity and quality of the packaging as well as the safety of the finished filled end product.

An even more detailed inspection of the inside of three-piece food tins can be realized as an option: at line speeds of up to 800 units per minute the HEUFT *canLine*^{II} also inspects their flanged or welded longitudinal seam in order to reliably identify defects, leaks and the smallest impurities in this sensitive area. For the inspection and verification of markings and codes on the tin base, an additional optical system can be connected if required, which scans each individual empty tin from below.

The empty can inspector which is based on the highly automated HEUFT *SPECTRUM II* platform can be changed quickly and easily: the height of the top-down camera adapts to the changed can format just as automatically as the passage width of the guide rails in the inspection area if required. The HEUFT *NaVi* user guidance system provides the user with comprehensive audio-visual step-by-step assistance for uncomplicated grade and format changes. The LED lighting which is directly integrated into the sensor camera also adjusts itself fully automatically to the changed type regardless of whether the cans have a diameter of 50, 90, 150 or 200 millimetres: For each type of empty tin, the individually controllable LEDs automatically realize exactly the right, shadow- and reflection-free illumination of all areas to be inspected. All the sort settings are permanently stored in the system and can be reproduced at any time.

The HEUFT *canLine II* thus achieves a new dimension in detection and operational reliability when inspecting up to 1,200 empty cans per minute!

Press release

Company profile: HEUFT is SYSTEMTECHNIK

Quality, safety and efficiency: this is what matters when filling and packaging food, drinks and pharmaceuticals! The modular checking and inspections systems from HEUFT SYSTEMTECHNIK GMBH put these key factors into practice simply and effectively. They ensure, during maximum productivity, that only perfect products reach the market.

Unique camera, X-ray and image processing technologies for a precise empty and full container inspection, trend-setting labelling technology and smart tools for container flow optimisation, production data acquisition and performance analysis safeguard product quality and line efficiency sustainably!

A consistent modular design principle with a cross-system control unit for the most varied technologies, procedures and modules generates, together with a high component equality, the correct automation solution for every application.

Those who decide in favour of a user-friendly HEUFT system can depend on a high level of operational reliability. Competent support is always guaranteed with the long-term availability of spare parts and the 24/7 on call service.

This concept keeps the globally operating company on a dynamic course of growth. In the meantime the number of employees has long since exceeded the 1,000 mark. Its own locations in 18 different countries and a comprehensive network of service bases on all five continents meet the huge demand for the HEUFT systems which are manufactured exclusively in Germany.

The result: more safety, quality and efficiency during the filling and packaging of food, drinks and pharmaceuticals. HEUFT knows how!

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Press release

Fact sheet

Company:	HEUFT SYSTEMTECHNIK GMBH
Management:	Alexandra Heuft, Bastian Heuft, Bernhard Heuft, Dr Thomas Jahnen, Thomas Holzberger
Head office:	Burgbrohl, Rheinland-Pfalz, Germany
Other locations:	Argentina, Australia, Austria, Brazil, China, Denmark, France, Great Britain, Hong Kong, India, Italy, Mexico, the Netherlands, Russia, Spain, Thailand, USA
Founded on:	1 April 1979
Employees:	more than 1,200 in the HEUFT group
Industry:	special mechanical engineering
Product range:	inspection, quality control, labelling, rejection, transport and IT systems for the food, beverage and pharmaceutical industries
Tasks:	returned case inspection, bottle sorting, empty container inspection, fill management, full container inspection, foreign body detection, rejection systems, transport optimisation, conveyor control systems, labelling technology, full case inspection, code reading, label inspection, closure inspection, production data acquisition and line analysis
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