

Press release

interpack: hot topics at HEUFT

What will be trending at interpack 2023 can be experienced at the HEUFT stand A43 in Hall 13 of the Düsseldorf Exhibition Centre from 04th to 10th May.

Digital technologies for a continuous track & trace and full counterfeit protection. Innovative inspection procedures for the necessary packaging security in the circular economy. Precise foreign object detection for maximum product security. Real-time image processing with smart AI for full transparency and efficient resource management. HEUFT has the right solutions for all the hot topics at interpack 2023: Digital technologies for the unambiguous identification and complete traceability, serialization and aggregation of a wide range of products and packaging materials will be presented there at Stand A43 in Hall 13. From proof of origin to the complete documentation of the filling and packaging process they generate Big Data for a production which can be traced at any time.

This naturally also applies to all the data of network-capable HEUFT systems for the inspection of empties to ensure the safe reuse of packaging materials in the recycling industry and for the inspection of full containers to ensure full product safety right up to the archiving of the detection images.

This not only brings a great deal in terms of conformity with the law and protection against counterfeiting. A consistent track & trace also realizes, among other things, a targeted pool, resource and recall management.

The HEUFT *eXaminer^{II}* XT, one of the highlights of the system engineers' presence at the interpack exhibition, helps to prevent product recalls due to foreign object contamination from the outset. With a completely revised mechanical construction and further developed pulsed X-ray it offers more flexibility for space-saving integration and at

the same time more detection and operational reliability for the inspection of still unpacked product masses.

HEUFT will demonstrate what makes the X-ray components from its own development and production so special at a special Enlightenment station. And how this HEUFT *eXaminer^{II}* technology which has been optimized for a lifetime also detects not only foreign objects even more reliably during the top-down inspection of packaged pet food, the sideways inspection of cans or stand-up pouches and the all-round complete inspection of jam jars.

Innovative image processing technologies also contribute to this – for example the latest development stage of the HEUFT *reflexx^{A.I.}*! It combines artificial intelligence with human expertise in order to clearly distinguish harmless objects from critical ones. In this way valuable resources are no longer wasted and only products and packaging which are really no longer marketable are withdrawn from circulation. Whether and how well this is also feasible in difficult cases, for example when it comes to evaluating X-ray images of structured products such as loosely packed noodles, is also demonstrated at a dedicated Enlightenment station.

From empty bottle inspection to glass splinter detection in filled food jars: HEUFT's cyber-physical device stele can be used to bring just about all of our systems to the Düsseldorf exhibition centre! So everyone who wants to find out what will be trending at interpack 2023 will certainly find what they are looking for at Stand 43 in Hall 13 from 04 to 10 May.

Press release

Track. Trace. Protect.

Smart detection and verification, precise product tracking and secure data management in real-time: HEUFT technologies such as these are not only the key to in-line quality inspection at the highest level. In addition they also realize a continuous track & trace of the complete filling and packaging process. HEUFT will be showing what is inside at interpack 2023!

Anyone at the rejecTable (rejection bar) on the HEUFT stand who is not only after a tasty snack but also wants to find out a little more about precise tracking should take a closer look at how each individual snack container is clearly identified on the conveyor, reliably tracked, accurately rejected and served for consumption. This already gives an idea of what is possible with network-capable systems, smart recognition modules and digital technologies from the leading supplier in the field of track & trace:

Quality check and inspection systems of the HEUFT *SPECTRUM II* generation determine the current position of each individual product or packaging material to an accuracy of up to 0.5 millimetres and track it continuously in real time using a "shift register" – if only to ensure that each individual product is examined and that any which is detected as being faulty is actually removed from the production stream. This naturally also applies to all the network-capable HEUFT devices which are equipped with the new HEUFT *reflexx A.I.* camera. In addition to a wide range of inspection tasks it also carries out OCR functions and even checks the content of packaging codes. Adaptive LED illumination is integrated into the in-house developed color sensor camera as is image processing with artificial intelligence. It independently reads back and verifies GS1-128 barcodes and 2D data matrix codes in real time, so that the origin, tamper-evident, transport and process data of the respective product stored in them can always be clearly assigned to a specific packaging material and expanded.

The secure transfer and long-term archiving of all the information contained in the codes is guaranteed by the real-time data management of network-capable HEUFT systems. All the key figures, operating and quality data obtained during the inline inspection and line analysis with the HEUFT *PROFILER* are also included – right down to the individual detection images which are created during the empty and full container inspection. From the audit trail to unambiguous identification and complete traceability, serialization and aggregation of a wide variety of products and packaging materials, and from proof of origin to complete documentation of the filling and packaging process, they generate Big Data for traceable production. The current position of each individual container can be precisely determined at any time, regardless of whether it is still on the line, in the tray, or already finally packed on the pallet.

If the worst comes to the worst, all the results of quality control and inspection are documented in detail and permanently, and the batch to be withdrawn from circulation can be narrowed down so precisely that brand protection does not become a waste of food. The latter is also prevented by the proactive pool and resource management which makes a continuous track & trace at HEUFT level possible by, for example, only filling food jars which can be used safely and clearly identifying packaging which is not marketable, reliably tracing it and rejecting it in good time with pinpoint accuracy even before the valuable product enters.

Press release

Full flexibility in pipeline inspection

The pulsed X-ray technology in the highly automated HEUFT *eXaminer II XT* has been optimized once again for the reliable identification of foreign objects in unpacked product. The modular pipeline inspector has been completely redesigned mechanically and now also offers a significant plus in flexibility when integrating it into the smallest of spaces.

Thanks to further developed pulsed X-rays and a computing power at HEUFT *SPECTRUM II* level the compact pipeline inspector once again offers considerably more performance and precision during the gentle detection of foreign objects. The X-ray flashes cover an even larger area than before with perfected generators and large-area new full-field image converters. In addition, they now penetrate product masses such as sausage meat, jam, yogurt, syrup or even ointments, creams and toothpaste in even larger tube dimensions of up to 150 DN to identify metal particles, glass particles, stones and other high-density foreign bodies even before the actual filling and packaging process. Even at high or fluctuating transport speeds within the pipeline, the advanced pulsed X-ray ensures clear detection images with minimal radiation and no motion blur. Smart filtering, classification and learning processes during the real-time image processing with the HEUFT *reflexx A.I.* help to reliably distinguish genuine risks from product inhomogeneities and other harmless deviations. This ensures that only goods which are really no longer marketable are removed from the production stream by directly controlling a rejection valve. Simply more flexibility for the integration and installation of the compact HEUFT *eXaminer II XT* is offered by its completely revised, extremely modular mechanical construction. The X-ray generators and receivers, the product-carrying tube, the device casing as well as the control terminal with self-explanatory HEUFT *NaVi* user guidance can be positioned almost anywhere. In contrast to conventional pipeline

inspectors the most varied of installation positions can now be realized – right up to wall and ceiling mounting! Even if the space available is very limited different components from the HEUFT modular system can be arranged in such a flexible and space-saving way that the installation is successful and the full detection performance is always guaranteed. The types and programs can be changed fully automatically and without time-consuming recalibration. The HEUFT *NaVi* audiovisual user guidance supports each user individually and step by step. This also applies to 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 new-generation pipe inspector for gentle and precise foreign object detection works correspondingly reliably in still unpackaged product mass. Precisely that which is becoming increasingly important in the supply chain can be realized in the smallest of spaces with the particularly modular HEUFT *eXaminer^{II} XT* with a markedly increased life cycle of all the X-ray components: the delivery and processing of already pre-inspected bulk goods which are free of foreign objects.

Press release

Advanced pulsed X-ray

HEUFT has consistently developed its unique X-ray technology further with new tubes, generators, high voltage components and the right know-how. This once again increases the detection accuracy and availability of HEUFT eXaminer ^{II} systems and reduces the Total Cost of Ownership (TCO).

Full precision with minimal radiation! This has characterized it from the very beginning, the pulsed X-ray technology which is exclusively available from HEUFT for the gentle and precise detection of foreign objects, product faults and packaging defects. New X-ray components developed in-house now increase the detection and operational reliability of the quality inspection of product and packaging even further.

Since HEUFT developed it and launched it on the market in 1998 the patented pulsed X-ray has scored points above all with its extremely short exposure time for considerably clearer detection images. Because an X-ray flash which is at most one millisecond short is only emitted at the moment when there is really something to be checked there is no motion blur. In conventional line scanning with uninterrupted X-ray radiation, these make object recognition difficult, especially in high-speed lines. Pulsed X-ray inspection of up to 1,200 products per minute, on the other hand, literally freezes the product flow: streaks and blurred areas cannot even occur. And in up to 99 percent of the operating time, no radiation is emitted at all!

If it does, the intensity of an X-ray pulse of only 0.000015 Gray is a full 600 million times below the limit value up to which the World Health Organization (WHO) considers food irradiation to be harmless. The radiation energy is only 70 kilo-electron volts. And at 0.01 microsievert, the respective radiation dose is only one hundredth of what conventional X-ray scanners emit on average. For medical X-rays, it is even 900 times higher.

New X-ray tubes, generators and high voltage components developed in-house increase the coverage, sensitivity, detection and operational reliability of the HEUFT *eXaminer II* systems in combination with optimized image converter technology! 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 tins is successful. Depending on the application, the size of reliably detectable foreign objects is halved. At the same time, the lifetime is increased. And 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 immediately to avoid unplanned production interruptions.

Whether for the pipeline inspection of still unpacked product mass, the top-down inspection of thermoformed trays, the sideways inspection of cans and stand-up pouches or the glass-in-glass detection: the further developed pulsed X-ray not only increases the detection reliability but also the operational reliability – and sustainably reduces the TCO of the HEUFT *eXaminer II* series of foreign object inspectors which will be presented at interpack. Visitors to the exhibition can examine the optimized X-ray components from the company's own development for themselves at a separate Enlightenment station.

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Powerful top-down inspection

The further developed top-down inspector is the only system of its kind to combine lifetime-optimized pulsed X-rays with innovative image converters and intelligent HEUFT *reflexx*^{A.I.} image processing. In this way the HEUFT *eXaminer*^{II} *XB* achieves a previously unattained dimension 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 the HEUFT *eXaminer*^{II} *XB* with unique pulsed X-ray inspection for the gentle detection of solid foreign objects made of glass, metal or plastic makes the process even more reliable, easier and more precise: the size of the foreign objects which can be reliably identified is 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. 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 unrivaled low radiation levels. Unlike conventional scanners, it is emitted in the form of X-ray flashes that are only a thousandth of a second short. This also enables static inspection if required: the product can be precisely inspected – for internal quality assurance, for example – even when the conveyor is stationary. The multiple flash option realizes the complete inspection of particularly long products. The further developed pulsed X-ray increases the reliability of detection and operation during the top-down inspection in a lifetime-optimized manner.

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 reliability and reliability during the gentle top-down inspection.

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Optimized glass-in-glass detection

The HEUFT *eXaminer*^{II} XAC increases the sensitivity, coverage and reliability of the pulsed X-ray inspection for a precise glass-in-glass detection with new components which have been optimized for a 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 overlapping 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 at a considerably higher resolution. 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 X-ray parameters adapted to the new image converters reduce the already unrivalled low radiation levels during double bottom and 360° sidewall inspection. In contrast to the conventional scan it is emitted in the form of X-ray flashes which are only one thousandth of a second short.

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. With new lifetime-optimized 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. Its HEUFT *CleanDesign* predestines the full container inspector 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 intelligent HEUFT *reflexx A.I.* real-time image processing clearly distinguishes between harmless product inhomogeneities and critical faults. In this way the full container inspector achieves a new dimension in terms of bandwidth, detection reliability and reliability not only for the glass-in-glass detection.

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Further developed lateral inspection

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 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 the smallest of spaces: 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 further developed 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 which is exclusively available from HEUFT for even more detection and operational reliability.

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.

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Real-time image processing with artificial intelligence

In order to clearly distinguish genuine faults from harmless structures HEUFT's image processing has been using artificial intelligence for a long time. The HEUFT *reflexx*^{A.I.} has been consistently developed further, once again increases the detection accuracy and minimizes the false rejection rate.

Intelligent object detection instead of a simple brightness comparison during image evaluation: HEUFT already took this step more than 20 years ago in order to increase the precision of the in-line inspection and to reduce the proportion of goods which are incorrectly rejected. For more than ten years the image processing from HEUFT's own development and production has been using artificial intelligence (AI) in order to classify the objects detected, to distinguish genuine faults from harmless structures, to implement a targeted teach-in and to minimize the false rejection rate.

Continuously developed further, the HEUFT *reflexx*^{A.I.} now even realizes Deep Learning based denoising of X-ray images with brand new hardware in order to further increase the detection accuracy during foreign object detection and to find a non-matching straight among noisy ring-shaped noodles for example. And in optical quality inspection, smart image processing not only filters out drops of water on the bottle, for example, but even makes visible what is behind them. The smart image processing can now also be directly integrated into the specially developed HEUFT *reflexx*^{A.I.} camera which processes and evaluates its own images in real time. These do not first have to be transferred to the control or inspection equipment. The camera can be easily connected to the inspection equipment and thus offers even more possibilities for the high-speed inspection of empty and full containers. And at a significantly higher resolution.

The hardware and software developed in-house combines classic image processing with current AI methods such as object recognition,

classification and learning functions. Nevertheless, you are not completely at the mercy of the AI, as if you were sitting in a self-driving car without a steering wheel and brake pedal. This is because, unlike other providers, object evaluation does not come from an unchangeable "black box" with countless unknowns. Instead, humans can intervene in machine learning in a targeted manner:

If, for example, an unknown object that has never appeared before is detected, the AI basically evaluates it as an error first, just to be on the safe side. However, the user always has the option of modifying the quality judgment based on his own experience and defining the identified structures as good and uncritical for product and packaging safety – or to have them temporarily tolerated if necessary. Without affecting the AI network or having to retrain it in a time- and energy-intensive manner, production can then continue safely even in such cases.

So if necessary, the assessment can be easily changed at any time: The expertise of experienced people with experience in filling and packaging is not obsolete. Instead, it is incorporated into the smart image analysis as required. In this way each individual object can be taught into the multi-dimensional feature space fully automatically and classified individually in order to distinguish genuine faults from harmless structures such as water drops. In this way the HEUFT *reflexx* ^{A.I.} combines artificial intelligence with human and proven image analysis procedures with modern ones in order to increase the reliability of detection and to further minimize the proportion of falsely rejected good products.

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Shoulder view during empty can inspection

Ensuring that the cans 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 or beverage cans per minute - and even finds faults in the inner shoulder area which is difficult to see with the aid of smart new additional optics.

It can identify deformations, indentations and defects at the crimped rim of the mouth of empty cans just as reliably as dirty and dented inner walls or contaminants and foreign objects at their base. The compact HEUFT *canLine II* does all this with only one HEUFT *reflexx A.I.* camera in a top-down arrangement in which the smart image processing for the targeted object detection and classification is directly integrated. The color sensor camera including completely integrated image converter technology and adaptive LED illumination achieves such a depth of field that no critical defect is overlooked.

The compact system can now be extended by an additional detection unit in order to ensure that the empty can inspection also completely covers the sloping inner shoulder area just below the opening of a beverage can which is difficult to see: Based on the HEUFT *FinalView II* CAP technology for the 360° closure inspection this generates a total of eight high-resolution camera views from exactly the right perspective directly on the conveyor which depict the sensitive area below the rim of each individual can all around. Even the smallest damage, adhesions and contamination such as material defects, coating faults, oil or grease residues and stains are reliably identified there in conjunction with the HEUFT *reflexx A.I.* image processing. And this even with a minimal distance between the individual containers on the conveyor. The superordinate HEUFT *SPECTRUM II* platform on which the HEUFT *canLine II* is based realizes full automation and support for the user: the

height and LED lighting of the intelligent camera is adapted to the new container format just as automatically as the passage width of the guide rails in the inspection area in the case of a type change. The HEUFT *NaVi* user guidance system provides the user with an audiovisual step-by-step assistance which makes every changeover self-explanatory.

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The new standard for inspecting empty containers

The HEUFT *InLine*^{II} IS has long since set the standard for the all-surface inspection of up to 84,000 empty bottles and jars per hour. Among other things with new HEUFT *reflexx*^{A.I.} cameras, new optical arrangements and a new intelligent infeed check the highly automated system in the tableless HEUFT *CleanDesign* now achieves even more detection and operating reliability.

Intelligent HEUFT *reflexx*^{A.I.} cameras realize a gapless sidewall inspection which covers more than 360 degrees of the volume of each empty container, now with a considerably higher resolution and directly integrated image evaluation. Together with cleverly arranged mirror cabinets, these consistently enhanced high-performance optics simply achieve greater detection and rejection reliability. In addition, further newly developed detection technologies can be integrated: during the inspection of ACL bottles, for example, not only the presence of Applied Color or Applied Ceramic labels is verified. They can even be faded out for a really complete inspection using filters based on AI from the HEUFT *reflexx*^{A.I.} image processing – and they can now also be inspected in detail themselves using brand new special optics so that defects, soiling, misprints or labels, logos and coloration which do not match the type of bottle being handled can finally also be identified in this area – and even faults which are hidden behind the ACL.

Not only the accuracy of the sidewall inspection but also that of the underchip, thread, finish and sealing surface inspection has increased with the HEUFT *reflexx*^{A.I.} cameras developed in-house. Even the inside of the container mouth can be completely inspected. Chipping and shell fractures on its outer edge are now made even more clearly visible by the newly developed rainbow illumination. An intelligent infeed check which has been newly developed by HEUFT can now also be connected in order to detect and sort out empty containers which are

lying on the ground, damaged, too large, deformed and deviating in color even before the actual all-surface inspection. This increases the operational reliability during the empty container inspection and therefore also the efficiency and productivity of complete filling and packaging lines.

In contrast the open construction of the further developed empty container inspector has long been proven: the tableless HEUFT CleanDesign is easily accessible and minimizes the amount of cleaning and maintenance required. All the detection modules are fully integrated, safely enclosed and – amongst other things for fully automatic type changes – motor-driven adjustable.

Based on the latest release of the network-capable HEUFT *SPECTRUM II* platform the all-surface empty container inspector which has been optimized once again achieves a striking plus in automation, computing power and precision during product tracking - and thanks to the HEUFT *reflexx A.I.* a completely new level of detection reliability with a sustainably reduced false rejection rate! The HEUFT *NaVi* audiovisual user guidance system makes the central control unit with its swivelling new terminal simply self-explanatory.

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Label inspection with learning capability

The new HEUFT *FinalView*^{II} LBL generates an all-round panoramic view of each individual bottle for a complete label inspection. It now also realizes a teach-in of new labels in order to ensure short changeover times for full line availability even with a high variety of types.

As important information carriers and target-oriented equipment elements for the recognition value of brands and varieties at the point of sale, labels must not be missing from any full container. In addition, they should be applied exactly where they belong - accurately and in a straight line. Only in this way does the end product offer an attractive appearance which encourages a purchase.

The HEUFT *FinalView*^{II} LBL therefore checks the presence and correct positioning of all the labels. Four securely housed high-performance cameras on two levels each generate an undistorted 360° panoramic view of each individual full container in combination with adaptive LED lighting and intelligent HEUFT *reflexx*^{A.I.} real-time image processing on which unlabeled empty spaces are just as clearly recognizable as incorrectly positioned or skewed body, back or neck labels. Labels with off-brand coloring, wrinkles, tears, defects, missing design elements or a poor print image are identified just as reliably. The system even reliably distinguishes labels that differ from one another on the basis of just one tiny feature. Non-critical features such as a slight print offset can be taught as good objects using the intelligent HEUFT *reflexx*^{A.I.} technology so that they no longer lead to rejection. The latest version of the AI-supported image processing now even realizes a genuine teach-in of newly introduced labels. A reference image file only has to be digitally transferred to the HEUFT *FinalView*^{II} LBL when the shape of the container is known and the system has already memorized its typical characteristics so that incorrectly positioned, crooked or defective new labels are immediately detected

just as reliably as labels of a different type which deviate from the intended appearance of the original due to only one design element for example.

The homogeneous LED illumination ensures full inspection quality even with different illumination angles and new design details such as metallized labels. The intelligent HEUFT *reflexx*^{AI} image processing system rectifies, optimizes and analyzes the detection images - and compares them with the taught-in reference image in real time. The commissioning of new types and the adjustment of the label inspection to them therefore works just as quickly and easily as the automatic changeover from one to the other. Downtimes are minimized, and line availability is noticeably increased.

The HEUFT *SPECTRUM*^{II} control unit of the HEUFT *FinalView*^{II} LBL has an unprecedented degree of automation and support for the user for quick sorts and program changes: the height and alignment of the two camera levels automatically adapts to the changed container format. The same applies to the individually controllable LEDs so that the optimum harmonious illumination is achieved for each type. The HEUFT *NaVi* user guidance system provides the user with an audiovisual step-by-step assistance which not only makes it easy to change sorts.

Connected to the HEUFT *SPECTRUM*^{II} VX fill management system a precise fill level check including fill valve monitoring or even a closure check can be carried out in the same operation in addition to the detailed label inspection.

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Further developed closure inspection

The HEUFT *FinalView*^{II} CAP raises the inline inspection of closures and their safety elements to a new level. The further development shows its strengths above all when inspecting new types of tethered caps and detecting dangerous cut-ins in metallic screw caps.

Inspect bottle closures completely and easily find all critical faults! The HEUFT *FinalView*^{II} CAP achieves this even with new types of tethered caps which will become obligatory for non-returnable PET bottles throughout the EU next summer.

The smart HEUFT *reflexx*^{A.I.} image processing realizes a targeted teach-in of new features such as the unusually large gap between the cap and the tamper-evidence band of rotationally symmetrical tethered caps so that the full containers concerned are no longer rejected as faulty.

Specific software upgrades keep the false rejection rate at the lowest possible level even with asymmetrical tethered caps. This means that they can be inspected with truly seamless and high precision. In addition, the enhanced software masters another challenge in the detection of caps that are too high and possibly leaky. It now succeeds reliably from an overheight of just 0.5 millimeters. Also enhanced: The proven cap angle detection. It verifies that tethered caps and other screw caps are always correctly aligned and that they are actually screwed on as far as they should be when capping. For mouths which are made of darker, less transparent rPET HEUFT has integrated a new special light into the compact unit for the closure inspection of up to 72,000 PET bottles per hour directly on the running conveyor. Defective tamper evidence rings can thus be easily detected even under such conditions.

In addition the HEUFT *FinalView*^{II} CAP now also detects tiny cut-ins in metallic screw caps. The slim detection unit combines the precise roll-

on, contour and profile inspection with a new type of transmitted light illumination and image evaluation for this purpose. The special illumination makes single-cutters light up as bright pixels in the dark 360° view of the complete screw cap wall so that they can be specifically identified as faults by the intelligent HEUFT *reflexx*^{A.I.} image processing. This can now be achieved reliably even with nicks and cuts of a size of less than one millimetre.

This also applies to the highly precise top-down and 360° sideways inspection of the most varied closures in reflected light which detects, amongst other things, colors and logos of different types, defects and deformations of the closure wall or torn retaining rings. Compared with previous HEUFT solutions for cap inspection the HEUFT *FinalView*^{II} CAP offers twice as many color cameras and six times the resolution. The maximum diameter of closures which can be completely inspected is increased by a factor of 1.5 and the possible height difference between the smallest and the largest full bottle which can be safely inspected increases to 30 centimetres. Type and format changes can be made at the push of a button. The high degree of automation and the intuitively comprehensible, audio-visual HEUFT NaVi user guidance of the HEUFT *SPECTRUM*^{II} platform make the complete inspection of the closures easy to connect to full container inspectors and fill management systems such as the HEUFT *SPECTRUM*^{II} VX.

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Flexible leakage check

The HEUFT *squeezer II* offers the necessary performance and a flexibly extendable inspection path in order to identify even the smallest leaks and to reliably reject PET bottles which are affected. Detection reliability up, false rejection rate down: Simply because of the latest version of the highly automated HEUFT *SPECTRUM II* device platform the self-explanatory system simply performs better when checking the tightness of filled PET bottles.

The HEUFT *squeezer II* offers the necessary performance and a flexibly extendable inspection path in order to identify even the smallest leaks and to reliably reject PET bottles which are affected. Detection reliability up, false rejection rate down: Simply because of the latest version of the highly automated HEUFT *SPECTRUM II* device platform the self-explanatory system simply performs better when checking the tightness of filled PET bottles. The inspection path of the new HEUFT *squeezer II* can be flexibly extended depending on the application for the even more precise detection of stress cracks and micro leaks which are hardly visible to the naked eye: The transport belt which guides the bottles and pressurizes them in an exactly dosed manner for the comparative fill level check can now be integrated in different lengths for this purpose. At the same time, the sensitivity of the sensor system for precisely measuring the internal pressure of the full containers has been further increased.

The position of all detection modules and the height and throughput width of the servo-controlled belt drive adapt automatically to the changed container format. The ergonomic construction in the hygiene-optimized HEUFT *CleanDesign* makes the operation and cleaning of the further developed HEUFT *squeezer II* easy and convenient. The individually adjustable new gooseneck panel, for example, creates more flexibility.

Press release

Double fill level check

A new type of X-ray module provides the HEUFT full container inspection and fill management systems with an additional plus in functionality and detection reliability. Not only underfilled but also overfilled containers are now identified with one and the same measuring bridge. Variations in the thickness of the container material are compensated for so that an exact fill level check can be carried out even in difficult cases.

This works in one and the same operation with only one X-ray module which can be connected to the HEUFT ONE, the HEUFT PRIME and the HEUFT *SPECTRUM^{II} VX* as standard with immediate effect. Where previously two measuring bridges were required in order to detect both underfilled and overfilled bottles and cans the newly developed one alone is now sufficient in virtually all applications: even with a distance of a good 20 millimetres between the lower and upper fill limits the area in between is completely covered during the fill level check. Thanks to a recent extension of the self-programmed software and the extra-wide design of the multipixel X-ray receiver, the innovative measuring bridge realizes not only one, but up to eight parallel measurements of the X-ray absorption of each individual packaging material – distributed over the entire height of the filling area to be checked.

Variations in thickness and structures in the container glass, which absorb the X-rays so strongly in conventional one-dimensional measurement that the actual fill level of the contents could be overlooked, are compensated for in a targeted manner. In this way, checking the fill level delivers accurate results even in difficult cases. This can be achieved with the innovative X-ray measuring bridge even in opaque packaging, metal containers and full containers with special contents such as high-proof alcohol – in other words, in special cases where the use of the alternatively available high-frequency fill level

measurement is not always possible.

The new detection module can be easily integrated into the HEUFT *ONE* and the HEUFT *PRIME* for checking full containers as well as into the HEUFT *SPECTRUM* ^{II} VX fill management system and reliably detects both under- and overfills of the nominal fill quantity in one and the same operation even in difficult cases.

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 inspection and labelling 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!

heuft.com info@heuft.com marketing@heuft.com

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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