



EMPTY BOTTLE INSPECTION

HEUFT *InLine*



What is the definition of an empty bottle inspection?



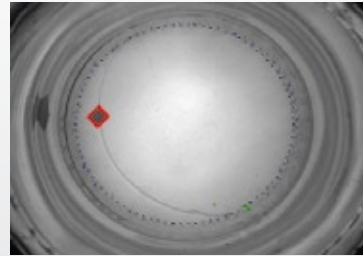
An all-around inspection of the bottle before filling - the HEUFT *InLine* solves this task using a minimum amount of space whilst providing maximum inspection quality.

It is possible to detect small faults even in difficult areas by means of the HEUFT *reflex* image processing system. The HEUFT *InLine* is impressive because it reliably detects faults with an extremely low false rejection rate whether dealing

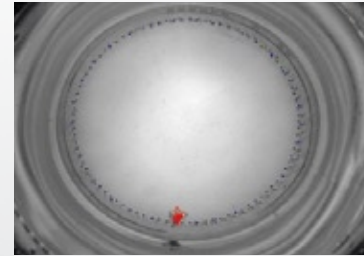
with stress cracks in the base of PET bottles or transparent faults behind knurling marks.

HEUFT offers this top-class technology in a linear machine. This reduces the investment and maintenance costs involved. The operating advantages e.g. during a brand change are a further plus factor which have made this system so successful.

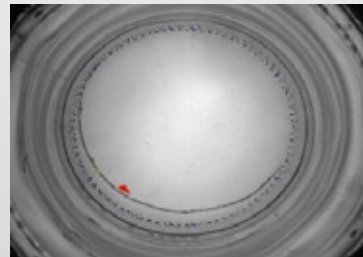
HEUFT redefines the state of the art in the empty bottle inspection sector again and again. Standards are set by combining extensive practical experience and the use of the latest technical possibilities. New techniques are regularly offered as retrofits so that this level of technological development is always achieved. This makes the HEUFT *InLine* a future-proof investment.



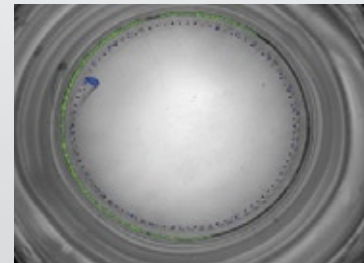
A 6 x 6 mm fault



A foreign object



A 3 x 3 mm fault



A glass splinter



Base inspection

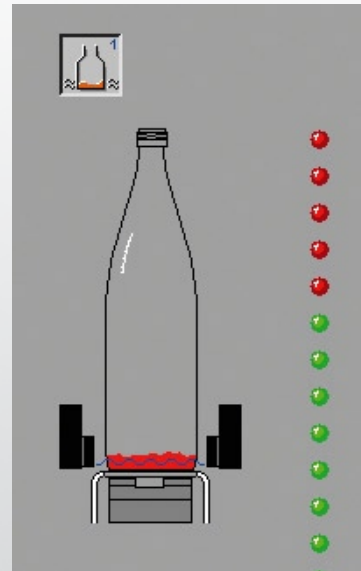


The base inspection checks the inside and the outside of the container base. An in-focus and extremely high-contrast picture of the base is taken by means of the stroboscope illumination. Existing structures such as knurling marks on glass bottles as well as mould injection points on plastic bottles are filtered out during the subsequent image analysis. Contamination or damage as regards

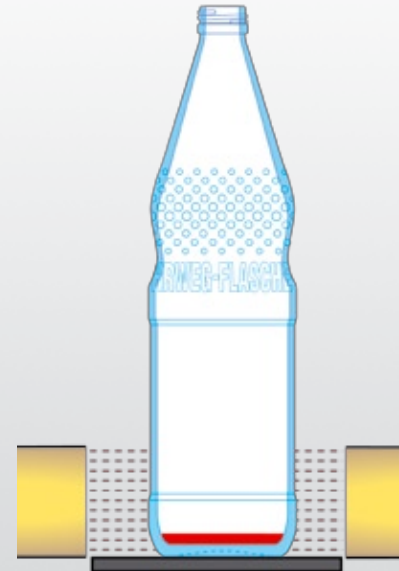
the base are marked as objects and evaluated. It is even possible to find transparent contamination which can hardly be identified by the human eye due to the use of optical filters.

HEUFT uses a sophisticated centring method for the base picture so that this also functions when the bottle material is not optimal. The selectivity between

a small fault and tolerable fluctuations in the bottle material therefore achieves an impressive quality.



Residual liquid in a container



Residual liquid detection



Liquid in a container before the filling process poses a high risk to the quality of a product. Such residue is found in the HEUFT *InLine* by means of two different measuring methods:

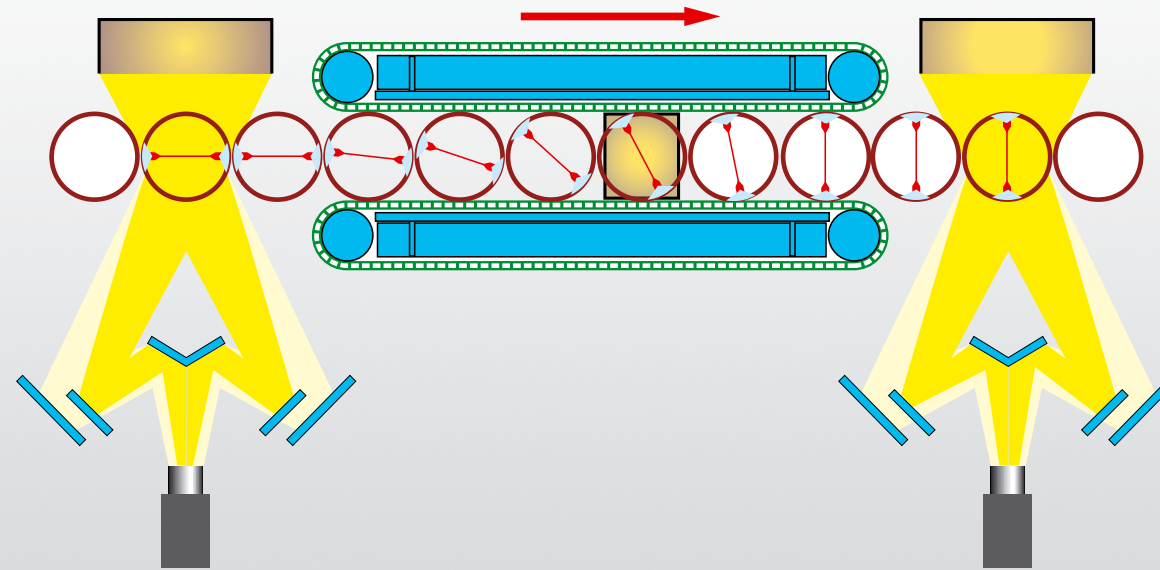
The HF detection

An electric field is generated in the base area of the container in the case of the high frequency measurement. Conductive liquids in a container

change this field. Even a single drop of lye can be reliably detected in this way.

IR detection

The infrared measurement is based on the absorption of infrared radiation in a liquid. Non-conductive material can be detected by a special sensor which measures the infrared radiation which has passed through.



Double sidewall inspection with a 90° rotation

Sidewall inspection



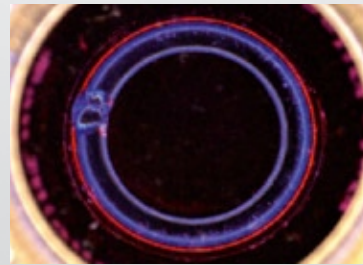
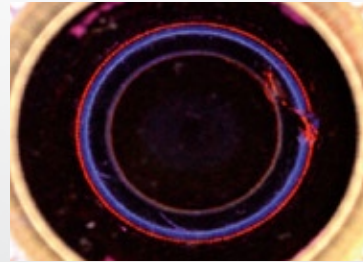
An all-around view of a bottle is a basic requirement in order to detect all the possible contamination and damage. A picture is taken, the bottle is rotated and another picture is taken in the HEUFT *InLine* so that the edge areas of one view are in the centre of the picture in the next view.

The existing structures are examined in the pictures of the bottles in order

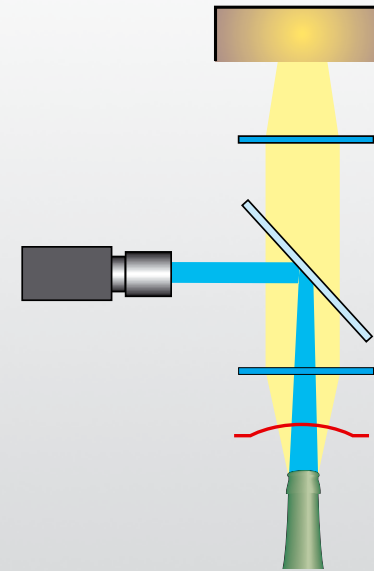
to clearly differentiate these from possible existing faults. Embossed marks which occur in an undefined position can be localised by means of the finely staggered sectioning of the picture signal. The image processing system is thus in a position to detect faults which are hidden behind such glass marks. It is now even possible to differentiate between common disturbing effects such as drops of water

on the bottle or scuffing and opaque as well as transparent faults due to the development of intelligent filters.

Therefore HEUFT has set another milestone towards optimal detection reliability with a minimum false rejection rate.



Multicoloured finish inspection



Finish inspection

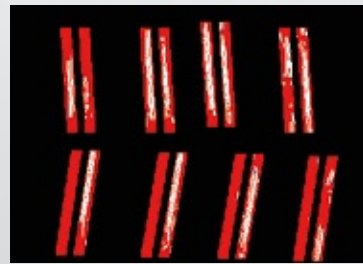
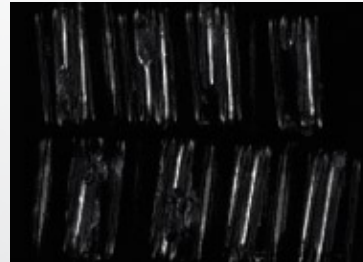


Faults and cracks on the bottle finish endanger the safety of the product and the health of the end user. The HEUFT *InLine* has a wide range of analysis tools for specifically identifying critical faults around the bottle opening. A specially developed detection technology is now also available providing even more precise results as an alternative to the standard integrated, single-coloured optical finish and sealing surface inspection.

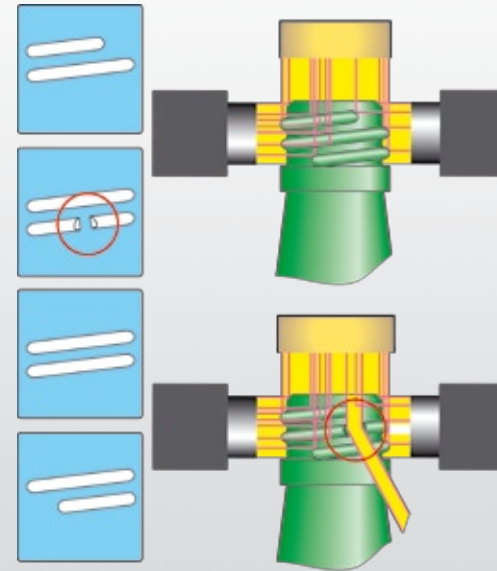
For this LED strobes project three different coloured rings of light from above onto the bottle opening. Their reflections are specifically analysed due to an interaction of high-resolution camera technology and high-performance image processing and filter procedures. Chips but also faults without the loss of material such as thermal cracks, stress cracks or rust stains which occurred in the glassworks are precisely detected in this way. Faulty bottles are removed

directly from the production flow. The inspection covers the complete sealing surface of the finish but also the seal lip, the locking ring and the curved side finish area below it.

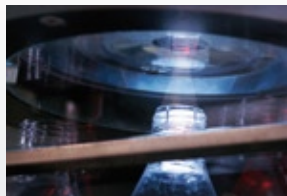
The technology clearly differentiates between tolerable signs of wear and real threats to the safety of the product. This reduces the false rejection rate to a minimum and increases the efficiency of the complete filling line.



Thread detection



Thread detection



Damage to the thread of a screw closure finish makes it difficult to open the bottle and can cause cuts depending on the extent of the damage.

The HEUFT thread detection inspects the screw closure finish on a glass bottle completely. In contrast to comparable systems the complete thread is also examined if it has more than one thread turn.

A picture is taken of the complete circumference of the closure area by means of two cameras and a mirror system. The individual pictures of the different views are then put together and checked for faults.

The HEUFT *reflex* image processing system makes a clear separation between uncritical signs of wear and critical chips in the thread turn possible.

The total length can also be measured when examining the complete thread. This ensures that smooth chips at the beginning or end of the thread turn can also be detected.



The HEUFT *reflex* image processing card

The HEUFT *reflex* image processing system



Combining two camera pictures in real time can only be achieved with an extremely powerful image processing technology. The calculating speeds of image processors available on the market are quickly exhausted in this connection. Therefore HEUFT develops its own image processing systems which are exactly tailored to the requirements of the inspection devices.

Many of the necessary image analyses are carried out by the HEUFT *reflex* technology at a hardware level. This saves time which can then be used for the subsequent analysis at a software level.

Each individual container is meticulously inspected using this procedure even in the case of lines with an output of 72,000 containers per hour.



The HEUFT *CleanDesign* - tidy and clean



The HEUFT *InLine* is not only impressive due to its inspection results. Furthermore importance was attached to optimal hygienic conditions with regard to its construction.

The machine platform integrated as standard already prevents the accumulation of dirt inside the device. Its smooth surfaces are easy to clean. The roof table which is available as an option ensures the highest level of

hygiene. The middle of the inspection table of this equipment variant is raised and therefore the liquids required to clean the device can drain off via special channels and openings. The risk of remnants collecting, „dirty corners“ forming and bacteria accumulating has therefore been eliminated. The surfaces to be cleaned are relatively high, arranged in a user-friendly manner, clearly visible and easily accessible. Dark corners which

could be overlooked when cleaning are searched for in vain in the case of this construction.

Easily accessible maintenance and operating elements are also part of the HEUFT *CleanDesign*. A central lubrication system and a motor-controlled vertical adjustment device are both examples of a clean intersection between man and machine which makes it easy to keep the machine in optimal condition during daily operation.



Brand changes at the push of a button

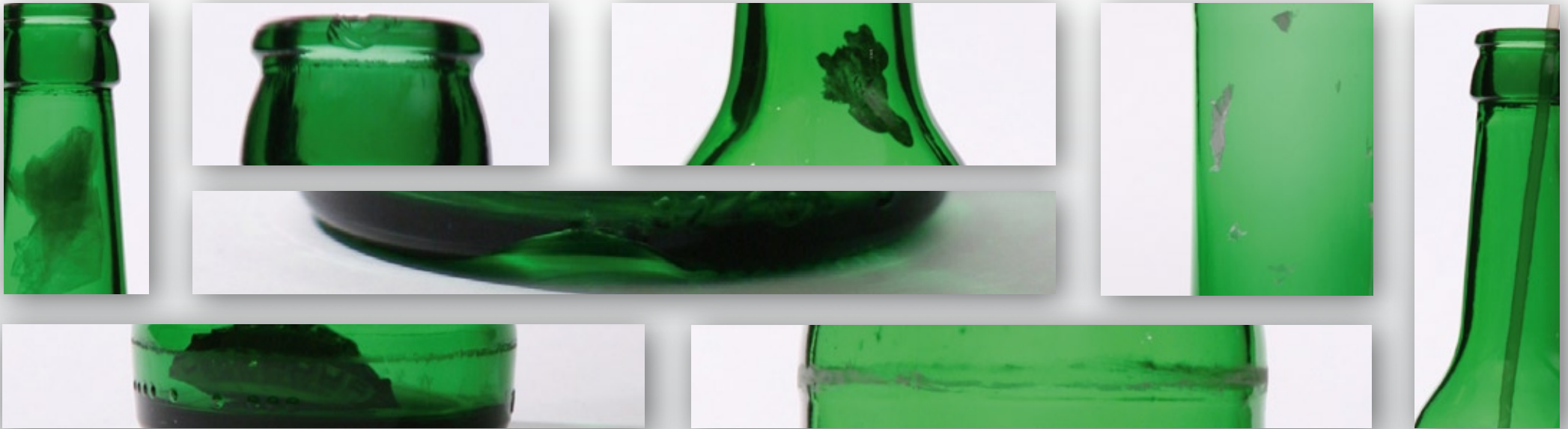


A specific container rotation for an optimal base, sidewall and finish inspection of empty bottles and an automatic adjustment of the conveyor belts for an uncomplicated and fast brand change: the HEUFT *InLine IS* makes it possible. Eight servomotors take over the separate drive in each case and the adjustment of the belt drives of this device variant - the infeed conveyor is also servo-controlled. Thus on the one hand a specifically adjustable angle of rotation is implemented respectively for each individual type of container - the bottles are correctly

positioned at all the inspection stations as a result. Brand changes are accomplished automatically due to clearly reproducible brand adjustments on the other hand: the touch of a button suffices and the height and width of the belts adapt themselves exactly to the changed bottle format. In addition the servo control reduces the proportion of components prone to wear to a minimum.

A special infeed check prevents non-brand containers impairing the performance of the empty bottle

inspector. The risk of causing damage to the system or interference to the bottle flow due to containers which are too large has therefore been eliminated. Furthermore container tracking along the complete system ensures that the bottles really pass through all the intended inspections and that the results are recorded in a container-specific electronic data sheet as in the case of all the HEUFT *InLine* models. The empty bottle in question is rejected if it contains an identified fault.



Specifications



The HEUFT *InLine* with HEUFT *reflex* technology offers an optimal fault detection with a minimum false rejection rate. In this way standard glass bottles which contain the following foreign objects are detected with a reliability of 99.9% and rejected:

wire (bent open paper clip), crumpled up film from a cigarette packet, a cigarette filter, a razor-blade (halved lengthways), a drinking straw (white, upright on the base), a crown cork, a condom, a hypodermic needle, a tamper evidence

ring for a plastic screw closure, crumpled up paper (wet, 70 mm x 70 mm) and an O-ring (10 mm diameter) lying on the base.

The detection accuracy is also 99.9% in the case of:

1 ml residual lye on the bottle base, a 25 mm² black mark on the sidewall, a 3 mm wide notch on the sealing surface of the finish and a 3 mm wide interruption to the thread.

The false rejection rate of the All Surface Empty Bottle Inspector (ASEBI) is less than 0.5% of the bottles processed.

We would be pleased to inform you of other guaranteed values for standard bottles as well as individual containers upon request.

An automatic test bottle log checks the detection reliability of the HEUFT *InLine* at regular, freely configurable intervals.

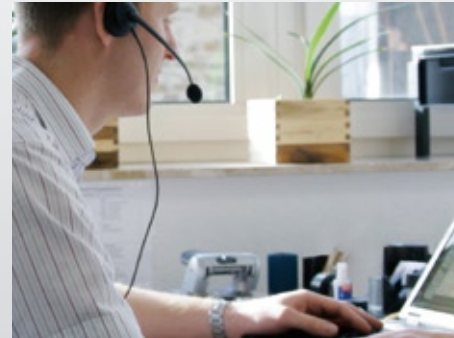


Your cost advantages with HEUFT

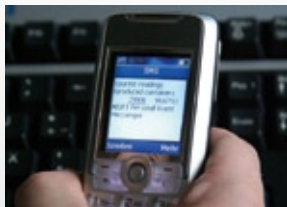


We do everything in order to provide the highest quality at the best price:

- the HEUFT *SPECTRUM* range with a uniform hardware and software architecture
- an in-house developed image processing system which is optimally tailored to the range of application
- easy integration into existing lines
- advantageous spare parts storage
- minimum amount of space required
- fast changeover times
- no change parts necessary
- fast trouble shooting due to the HEUFT *PILOT* operating surface
- low false rejection rate due to the clear differentiation between real faults and tolerable deviations
- minimum maintenance required
- minimal cleaning necessary
- robust and stable components
- long service life
- hardwearing design
- easy identification of wearing parts and spare parts due to an integrated spare parts catalogue with exploded views and photographs
- the HEUFT *TeleService* - fast trouble shooting by means of help for self-help
- a future-proof investment due to retrofit option for new technologies
- a modular system for easy retrofitting

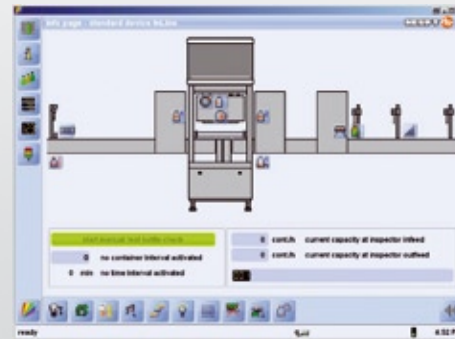


Networking

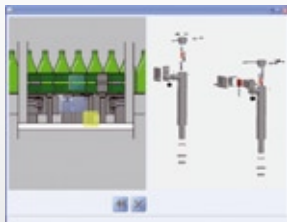


- operation possible either via jog shuttle or touchscreen on the TFT screen at the device or via a network
- integrated Ethernet interfaces and TCP/IP access to all networks
- the HEUFT *PILOT* graphical user interface with a comprehensible menu structure for easy operating
- automatic transfer of counter readings or fault messages by SMS to a mobile phone or by e-mail if required
- connection capability to a preconfigured DDE interface and SQL database
- firewall protected connection to the remote service via Ethernet -

the HEUFT *TeleService* can access the line directly and rectify faults at short notice by means of remote diagnosis if the customer wishes



The HEUFT PILOT



- multilingual, simply arranged, comprehensible menu structure with extensive help boxes and complete online user's manual - the user interface can be supplied in any language / graphic characters if required
- easy identification of spare parts with online and offline spare parts list with photographs and exploded

views - the order can be sent from the device either to an internal purchasing department or directly to HEUFT

- password-protected operator levels, can be freely adjusted to suit the tasks of the operating staff, the quality assurance department etc.
- the operator receives all the information during a brand

changeover regarding the necessary steps in order to exclude possible operating errors

- clear fault messages with service notes and support in order to avoid downtimes



The HEUFT *flip*



The HEUFT *DELTA-K*



The HEUFT *DELTA-FW*

The HEUFT *rejector*

Different rejection systems are used for the HEUFT *InLine* depending on the application.

The HEUFT *DELTA-FW*

- a robust all-round system for speeds up to 72,000 containers per hour
- lying containers, foreign objects and broken bottles in the infeed area are cleared away

The HEUFT *flip*

- a single-segment rejector for cylindrical containers
- a particularly smooth transversal acceleration of the containers
- an extremely compact, hygienic construction

The HEUFT *mono*

- a single-segment rejector for cylindrical containers
- an extremely compact, hygienic construction

The HEUFT *DELTA-K*

- a multi-segment rejector which is particularly well suited for the empty bottle section
- smooth rejection even of shaped or unstable containers by means of single-point guidance





The HEUFT SX

The HEUFT *fluid*The HEUFT *eXaminer XA*

Other HEUFT products



The following products may also be of interest to you:

The HEUFT SX

- sorts returnable glass and PET bottles
- up to 72,000 bottles per hour
- ensures an unmixed container flow
- compact construction, minimum space required

The HEUFT *eXaminer XA*

- an X-ray inspection for filled containers
- low radiation rates
- the detection of foreign objects even on curved container bases
- an optimal detection due to the use of the HEUFT *reflexx* image processing technology

The HEUFT *fluid*

- the detection of residual liquids and metal closures
- up to 120,000 bottles per hour

The HEUFT *synchron*

- careful bottle transport
- bringing containers together without applying pressure
- for glass and PET bottles, cans and plastic containers



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The HEUFT *InLine* empty bottle inspection

for containers made of glass and of plastic



- two residual liquid detections (for lye and water as well as lacquer and oil)
 - optional: brand change at the push of a button
- [more]*

FUNCTIONS

- base and sidewall inspection
- finish and thread inspection
- the detection of transparent foil
- mineral ring detection
- scuffing detection

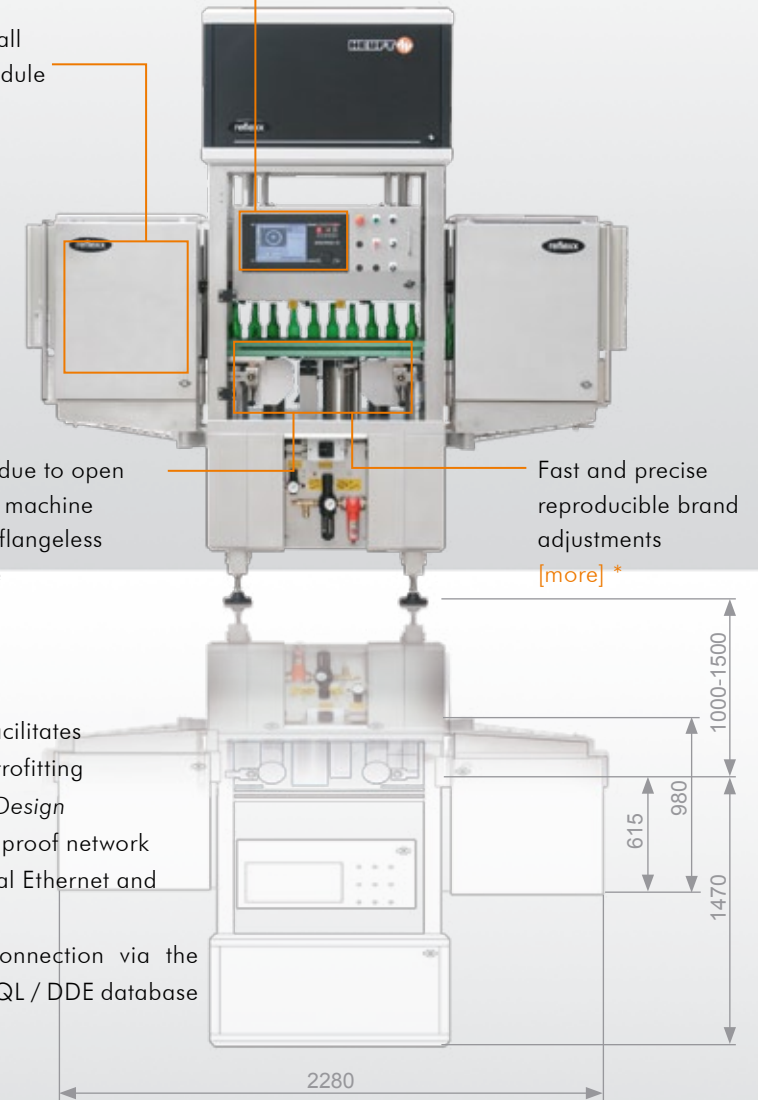
THE ADVANTAGES

- Maximum detection reliability
- series production makes short delivery times and a very attractive price possible

Folding sidewall inspection module for optimal accessibility [more]*

Very hygienic due to open construction - machine platform with flangeless superstructure [more]*

The HEUFT *reflex* image processing system for the highest inspection quality with a minimum false rejection rate [more]*



- modular design facilitates upgrading and retrofitting
 - the HEUFT *CleanDesign*
 - integrated, future-proof network interface (Industrial Ethernet and TCP/IP)
 - remote service connection via the Internet and the SQL / DDE database interface
- [more]*

* [more] informationen on www.heuft.com/ir

