



EMPTY BOTTLE SORTING UNIT

HEUFT SX



A homogeneous bottle population for increased line efficiency



One thing is decisive for the efficiency of a returnable filling line: that only that enters which is allowed to. The efficiency of the complete line is affected if there is a mixed supply of empty glass / PET bottles. The HEUFT SX puts things right.

The empties sorting unit examines returnable containers closely and only allows those to flow into production

which should be there. The solution based on the HEUFT *SPECTRUM* determines which these are using numerous criteria:

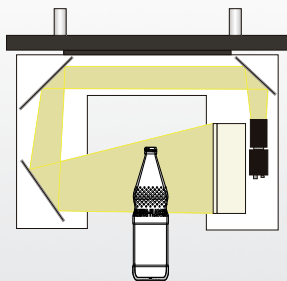
It detects different bottle heights, shapes, colours and materials just as reliably as closures, applied colour labels or deviating finish shapes and container structures.

The HEUFT SX compares the analysis results with an internal data sheet: the container in question is rejected via various lanes if these do not correspond to the specifications entered there.

This ensures that only that which is allowed to enters the filling line!



Shadow play with the power of judgement



No one can jump over his own shadow. This is especially true of bottles. Their shadow pictures reveal whether their height and shape correspond to the template when they are illuminated.

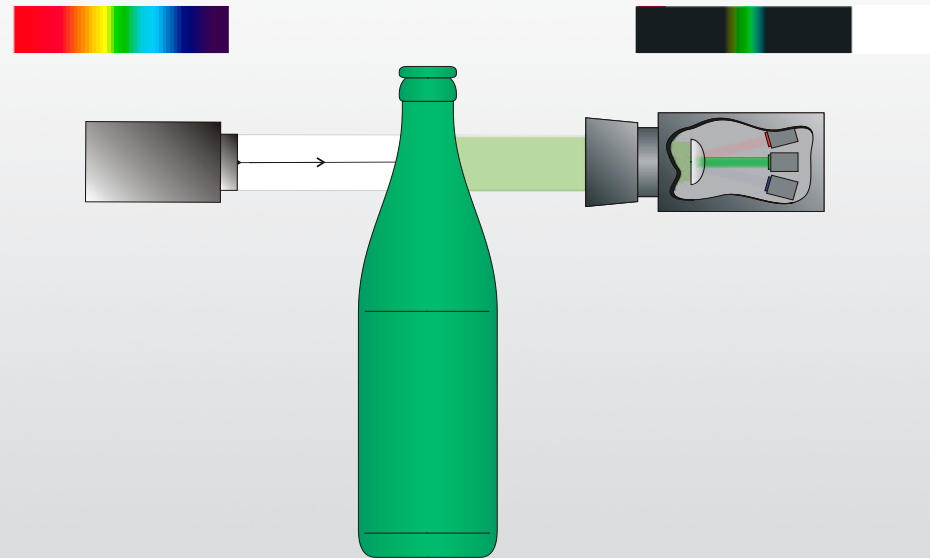
The HEUFT SX carries out this task in real time - using a sophisticated camera technique: the most up-to-date LED strobes illuminate the bottle for a short time from the side. At the same

time a CCD camera copies its shadow picture. A highly efficient image processing unit analyses the picture and checks the bottle height first of all.

Other shape features are examined and compared to a sample shape which has been read in only if it corresponds to a previously defined height category. It is a foreign container if nothing corresponds.

The HEUFT SX also detects special container structures such as indentations and bulges or applied colour labels using the same method.

The analysis results are combined and a judgement is passed by means of fuzzy logic: to fill or to reject.



Keeping track



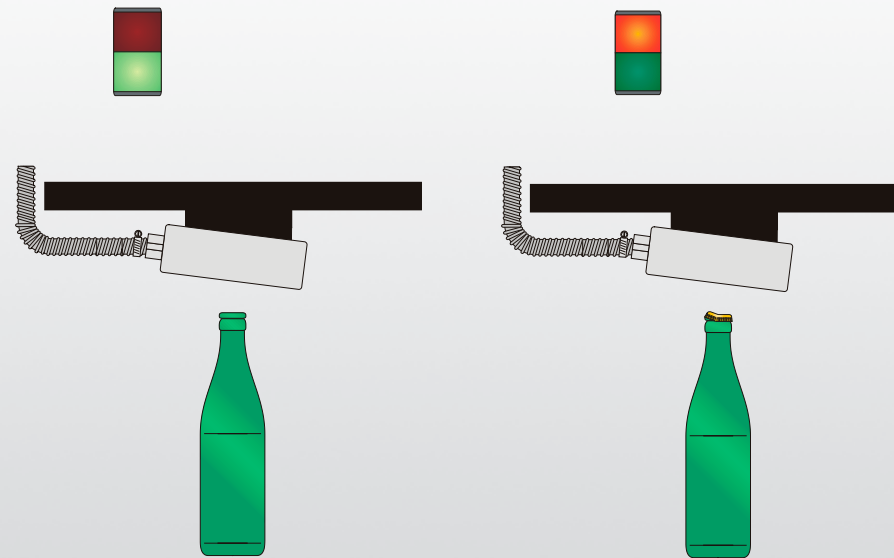
Keeping track with transmitted light: the empties sorting unit detects the brightness and colouring of transparent bottles using the transmission method.

For this a reference container has to show its colours first - the desired coloration is adjusted in the HEUFT SX using this. It is illuminated and a special receiver records its specific colour signal.

The measuring results of the containers to be examined are compared to these reference values: the bottle enters production if the relative parts of the individual spectral ranges correspond. It is rejected if this is not the case.

At the same time the relative measuring procedure compensates variations in brightness and colour automatically.

The HEUFT SX also reliably identifies coloration which the human eye does not even register at first glance but which can have an influence on the product quality which should not be underestimated: UV coating which protects the drinks in clear glass bottles from too much light in the same way as a pair of sunglasses.



No displeasure with the closure



Closeness has disadvantages. At least when dealing with empties to be refilled. For example if a closed container enters a washing machine it cannot be cleaned on the inside.

The HEUFT SX checks for the presence of plastic or metal closures in order to avoid the loss in efficiency which results from this - this also takes place without any delays whilst passing on the conveyor.

For this a concentric ring of seven fibre optic photocells scans the container finish. The light which is emitted is only reflected to a sufficient degree if the finish is closed. The device records this and rejects the container in question.

Even the finish itself has to fit. Otherwise problems could occur in the closer at the latest which could affect the complete production flow. Therefore

the HEUFT SX also checks that the shape of the finish corresponds to the previously adjusted tolerances of the reference containers using the shadow picture technology described.



An assortment is a thing of the past

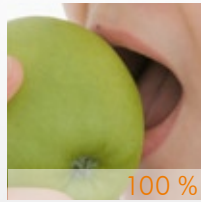
Glass or PET? The empties sorting unit also examines the material properties of the containers which pass through before they reach the filling process. It separates glass and PET containers without using complex X-ray or gamma radiation.

This is made possible by means of a measuring bridge with very special emitters and receivers which use the

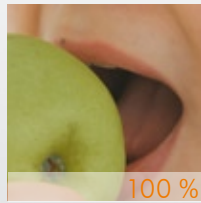
different optical properties of the two materials and strictly differentiate between them.

Variations in the colour and the thickness of the glass containers cannot mar the precision of the HEUFT SX: glass is always identified as glass and the danger of confusing it with PET is ruled out.

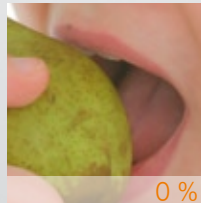
The result: a real homogeneous bottle population - only bottles made of the same material enter the filling line; an assortment is a thing of the past.



100 %

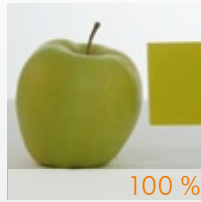


100 %



0 %

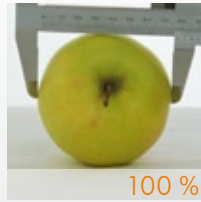
Easy for the human to differentiate



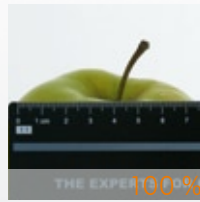
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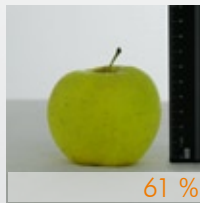
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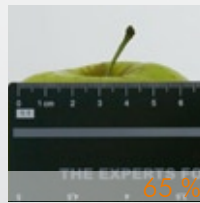
59 %



61 %



57 %



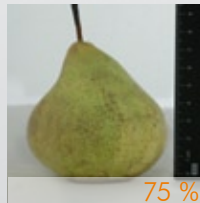
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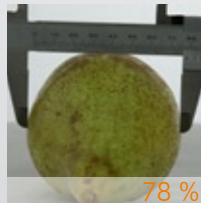
85 %



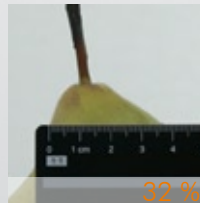
79 %



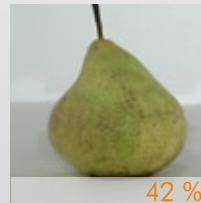
75 %



78 %



32 %



42 %

Colour

Height

Width

Neck diameter

Result

HEUFT SX



We compare apples with pears:

Although the small apple comes off worse than the pear in three out of four detections it is passed for production. Each detection may contribute a maximum of 80% to the result. This ensures that individual results do not affect the total result too much.

All containers with values less than 50% are considered to be faulty and have to be rejected.

It is easier for the human: he can quickly differentiate between an apple and a pear by taking a courageous bite.

Reference

Good product

Fault

What is fuzzy logic anyway?



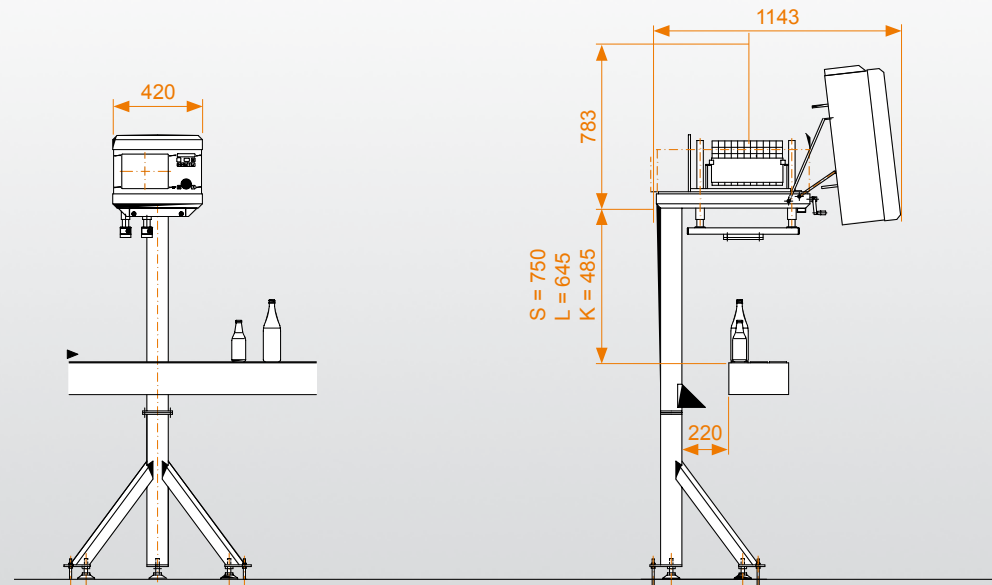
Different detection methods are necessary in order to make a decision regarding the usability of a container or case. However some cannot be clear - therefore the results have to be combined. And that is exactly what the fuzzy logic does. It uses probabilities and not absolute values for its calculations.

This means the following for each detection: how likely is it that the current con-

tainer corresponds to the desired one? This value expressed as a percentage is saved. A total probability is calculated from the probability values calculated using a complex algorithm upon completion of all the measurements. This states by how many percent the current container corresponds to the requirements.

Containers can also be incorporated by means of these calculation methods with

attributes which may be marginal but they nevertheless belong to the current production.



Specifications



The HEUFT SX creates order in the bottling hall and in doing so reacts flexibly to the special requirements which prevail there. The sorting of single containers is impressive with the following performance characteristics:

- a minimum false rejection rate depending on your special requirements as regards the quality of the product
- 72,000 containers checked per hour
- up to 32 different brand programs saved
- 63 different containers can be taught in per brand program
- up to 16 different reject definitions possible per brand program



Your cost advantages with HEUFT



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

- a future-proof investment due to modular construction - simple retrofitting, upgrading and converting
- the HEUFT *SPECTRUM* range with a uniform hardware and software architecture
- easy integration into existing lines
- minimum changeover times
- minimum maintenance required due to the use of robust components
- high-performance image processing specially developed for the task and its requirements
- a high level of reliability regarding spare parts due to in-house developed components
- long service life
- space saving construction
- fast trouble shooting due to the HEUFT *PILOT* graphical user interface
- connection to the HEUFT *TeleService* - fast troubleshooting by means of help for self-help
- easy identification of wearing parts and spare parts due to an integrated spare parts catalogue with exploded views and photographs

The HEUFT *flip*The HEUFT *DELTA-K*The HEUFT *DELTA-FW*

The HEUFT *rejector*

HEUFT has the matching rejector for each type of container.



The HEUFT *DELTA-FW*

- upright rejection of glass containers
- removal of lying containers, foreign objects and burst bottles
- virtual follow-on multi-segment rejection curve
- specially suitable for heavy containers

The HEUFT *DELTA-K*

- rejection of PET and glass bottles
- virtual follow-on multi-segment rejection curve
- the upright rejection of shaped containers by means of single point guidance.

The HEUFT *XY*

- smooth rejection and laning of difficult types of containers

- upright rejection of unstable containers
- controlled transversal acceleration

The HEUFT *mono*

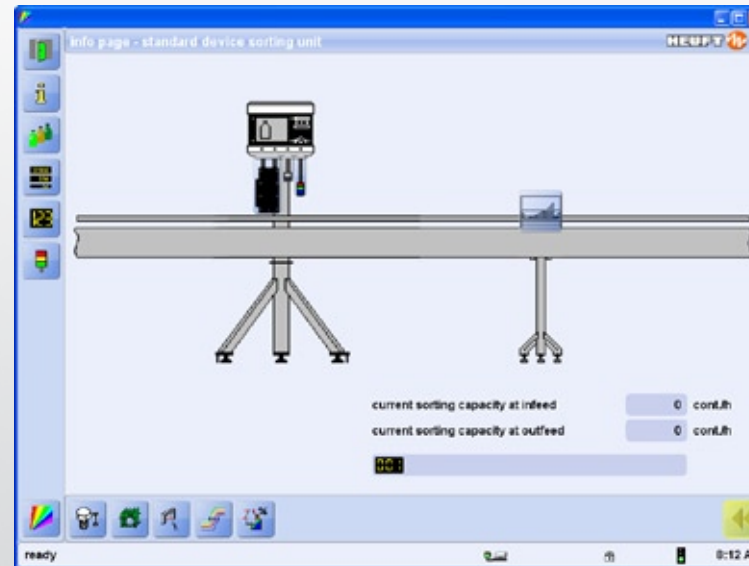
- rejection into a bin
- competitive, multifunctional system



Networking



- integrated Ethernet interfaces as well as TCP/IP access to all networks
- connection capability to a pre-configured DDE interface and SQL database
- the HEUFT *PILOT* graphical user interface with a comprehensible menu structure for easy operating
- operation possible either via jog shuttle or touchscreen on the TFT screen at the device or via a network
- automatic transfer of counter readings or fault messages by SMS to a mobile phone or by e-mail if required
- firewall protected connection to the remote service by Ethernet – the HEUFT *TeleService* can access the line directly and rectify faults at short notice by means of remote diagnosis if the customer wishes



Device operation and the HEUFT PILOT



- simply arranged, comprehensible menu structure with extensive help boxes and complete on-line 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
- clear fault messages with service notes and support avoid downtimes
- can be adjusted to suit the tasks of the operating staff, the quality assurance department etc. by means of password-protected and customisable user levels
- the operator receives all the information during a brand changeover regarding the necessary steps in order to exclude possible operating errors

The HEUFT *LGX*The HEUFT *InLine*The HEUFT *fluid*

Other HEUFT products



The following products also ensure the quality of the empties:

The HEUFT *LGX*

This quality control procedure for incoming returnable cases detects

- bottles which are too tall, too short or closed
- bottle colours and bottle majorities

- lying bottles and top-down bottles
- foreign objects
- case colours and logos

The HEUFT *InLine*

- empty bottle inspection of the highest standard
- minimum space required due to linear transport

- optimal detection quality due to tailor-made hardware and software
- minimum false rejection rate

The HEUFT *fluid*

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



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The HEUFT SX sorting unit for sorting individual containers



FUNCTIONS

- checking the bottle height and shape
- checking the brightness and colour of bottles
- detecting UV coating
- finish and closure check
- differentiating between glass and PET bottles

[more] *

THE ADVANTAGES

- radiation-free separation of glass and PET
- clear detection of the container and finish shape despite flagging labels, tamper evident rings or drinking straws
- several brands processed with one mechanical adjustment

Optimal result as regards the sorting procedure due to the combined evaluation of all the measurements using fuzzy logic

[more] *

Compensation of container variations in brightness, colour and thickness

[more] *

In focus pictures even at high speeds due to LED strobes

[more] *

Clear differentiation between glass and PET

[more] *



- convenient operating using the multilingual HEUFT *PILOT* surface
 - integrated future-proof network interface (Industrial Ethernet, TCP/IP)
 - remote service connection via the Internet
- [more] *

* [more] detailed information on www.heuft.com/sx

HEUFT 
...knows how