



WE ARE HEUFT!



*And HEUFT knows how!*



**WE ARE YOUR INVESTMENT IN A SECURE BRAND.**

FOR YOU. FOR YOUR CUSTOMERS. FOR THE CONSUMER.

# Heineken waarschuwt voor stukjes glas in bierflesjes



30-06-2022 20:14 | Binnenland | auteur ANP

LEIDEN - Heineken is een terugroepactie gestart voor kleine bierflesjes. De brouwer waarschuwt dat er mogelijk volgens het bier



@coop\_ch @MorettiBeer that's not expected in a beer

De flesjes weten de aankoop

reken laat e en het



4:29 PM - Apr 24, 2022

Reply Copy link

Read 5 replies

## Stella Artois recalls beer bottles that could contain particles of glass

DAVID CARRIG | USA TODAY

Stella Artois has issued a voluntary recall of some of its 11.2-ounce bottles of U.S. and Canada that may contain particles of glass.

The Belgian beer brand, owned by Anheuser-Busch InBev, said the recall covers glass bottles sold in North America.



## Warning on imported Coca Cola in glass bottles

Health Community

2. März 2020 | Times of Malta | 0

1 min read



CNN health

Audio

## Corona beer recalled because bottles may contain glass particles



By Dana Ford, CNN

Updated 0256 GMT (1056 HKT) March 11, 2016



Drei Chargen betroffen

Kann Glas enthalten: Krombacher ruft Limobier zurück

Teilen Pocket



Avoid Recalls – Ensure brand & customer protection

FOREIGN OBJECT INSPECTION



HEUFT *eXaminer II* XAC



HEUFT *eXaminer II* XOS



HEUFT *eXaminer II* XB



HEUFT *eXaminer II* XT



HEUFT *eXaminer II* XS



# HEUFT *eXaminer II* XOS

The modular all in one solution for foreign object inspection in the beverage sector.



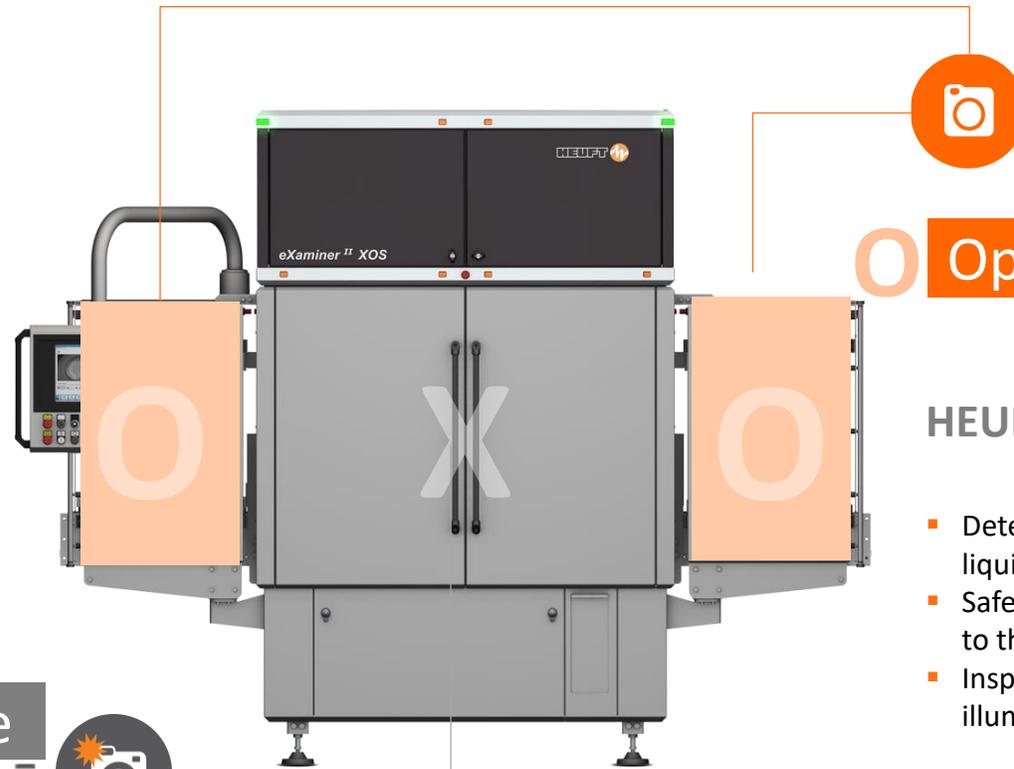




## Protection against foreign objects and damage

- check for foreign objects after the filling process and inspection of the closed primary packaging
- risk of foreign objects is significantly reduced and product safety increased
- consumer and brand protection

Protection against foreign objects and damage



## X Radiometric module

HEUFT *eXaminer II* x2

- Detection of high density foreign objects such as glass fragments at the base of liquid products.
- 360° coverage of the container base.
- Glass in glass inspection independent of bottle and product color, product opacity, label and ACL.

## O Optical modules

HEUFT *floater* x4/x8

- Detection of low-density foreign bodies in transparent liquid products over the entire container.
- Safe inspection from the highest point of the glass dome to the fill level.
- Inspection of dark products by means of special illumination.

HEUFT *sinker* x8

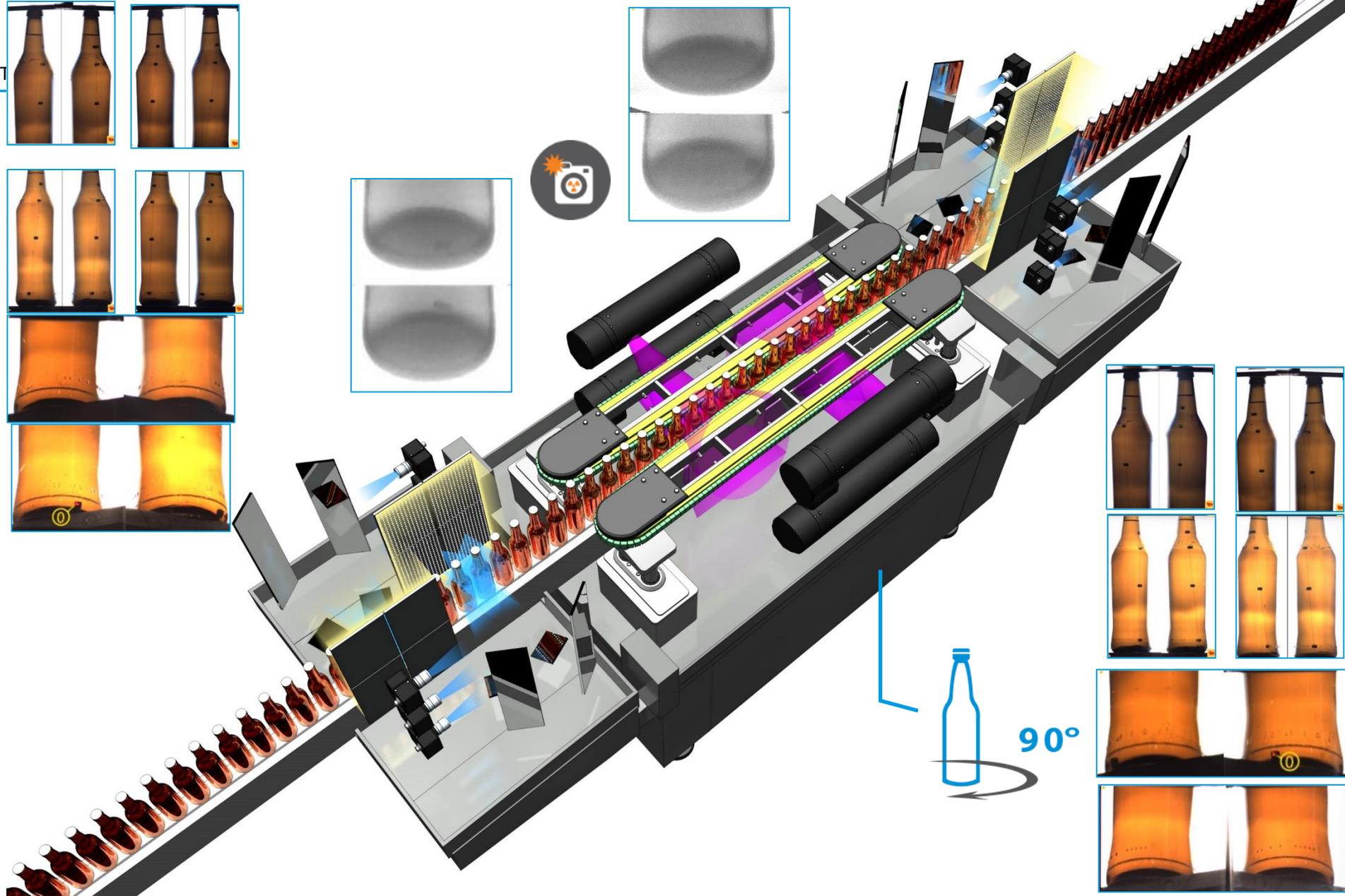
- Detection of low density foreign bodies in transparent liquid products at the edge area of the container bottom.
- Safe inspection of the outer base area by means of special viewing angles.
- Inspection of dark products by means of special illumination.

HEUFT *eXaminer II* XOS – inspection modules

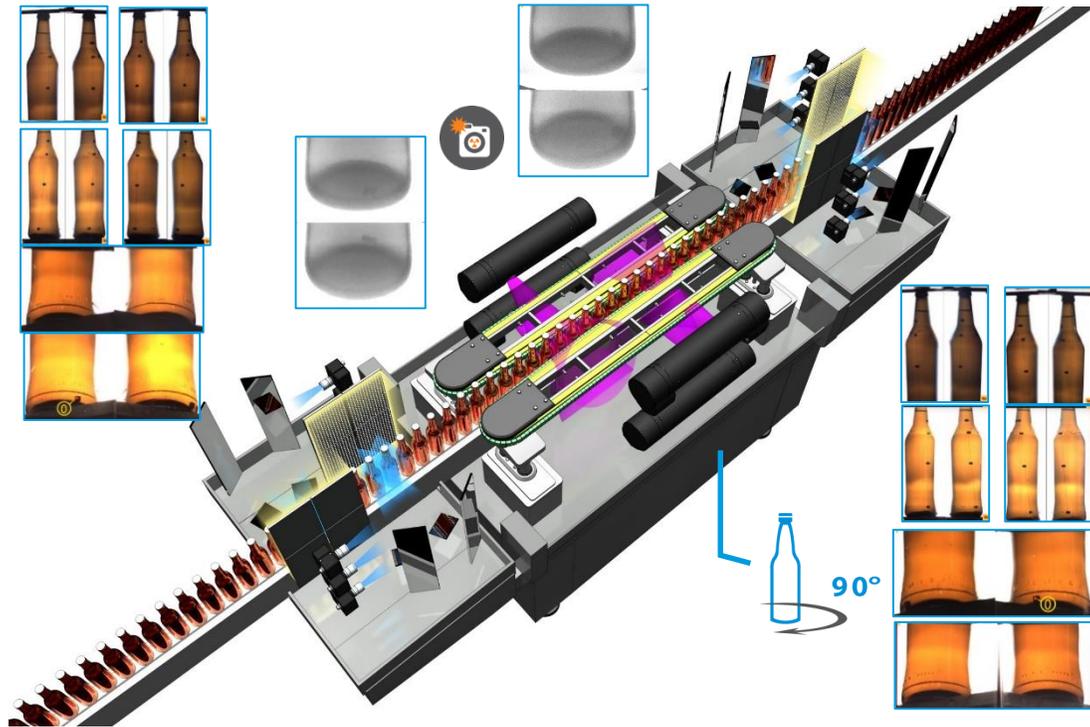
| type                                    | category             |  optics |  X-rays |
|---|----------------------|---|---|
| Mould / yeast (organic foreign objects) | low density objects  | ✓   | not visible   |
| label remains                           |                      |   |   |
| wooden splinters                        |                      |   |   |
| foils                                   |                      |   |   |
| plastic contaminants                    |                      |   |   |
| glue residue                            |                      |   |   |
| glass splinters                         | high density objects | ✓   | ✓   |
| metal fragments                         |                      |   |   |
| stones                                  |                      |   |   |
| Ceramic and metal inclusions            | damaged containers   | ✓   | ✓   |
| air inclusions (bubbles)                |                      |   |   |
| damages to the container                |                      |   |   |
| shell-shaped fractures base             |                      |   |   |



FULL BOTT



# HEUFT *eXaminer II* XOS – full bottle inspection



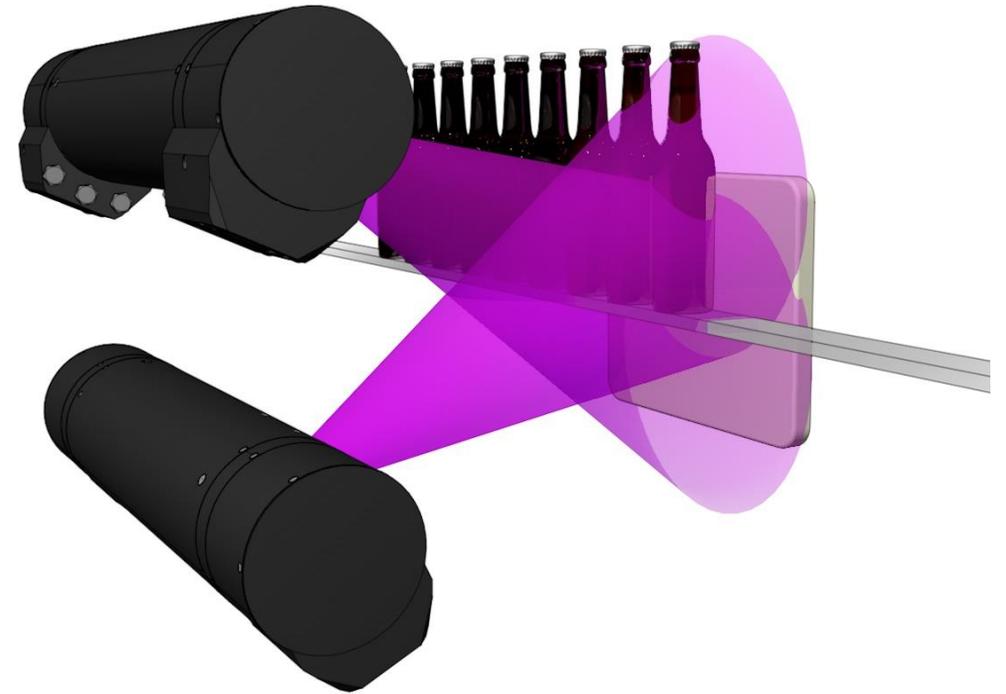
| Inspection                 | Views | Optical / X-ray |
|----------------------------|-------|-----------------|
| <i>floater</i> 1+2 Infeed  | 4     | Optical         |
| <i>floater</i> 3+4 Infeed  | 4     |                 |
| <i>sinker</i> 1 Infeed     | 2     |                 |
| <i>sinker</i> 2 Infeed     | 2     |                 |
| X-ray double base 1        | 2     | X-ray           |
| X-ray double base 2        | 2     |                 |
| <i>floater</i> 5+6 Outfeed | 4     | Optical         |
| <i>floater</i> 7+8 Outfeed | 4     |                 |
| <i>sinker</i> 3 Outfeed    | 2     |                 |
| <i>sinker</i> 4 Outfeed    | 2     |                 |

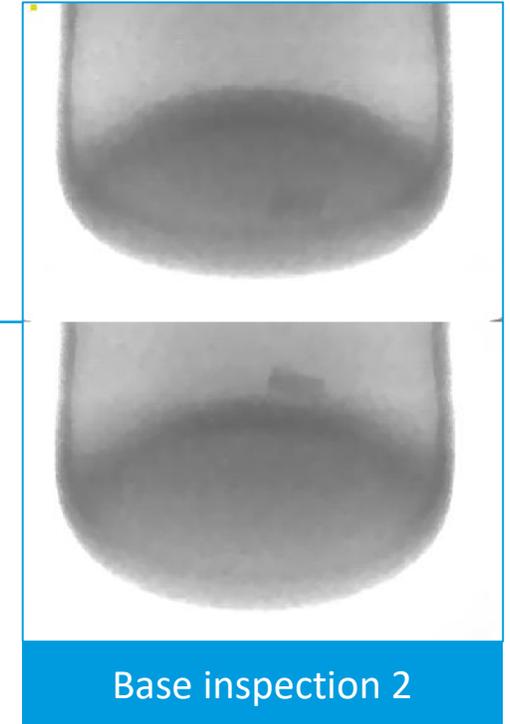
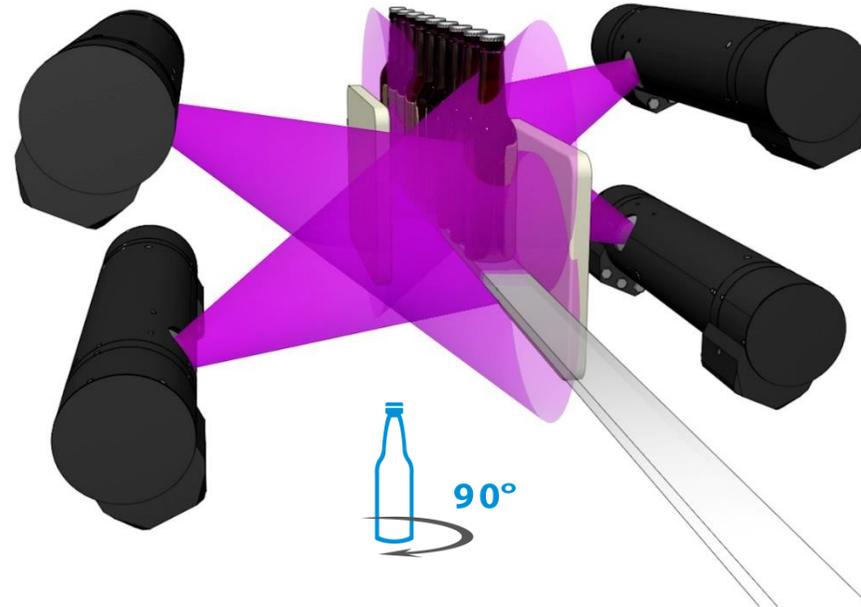
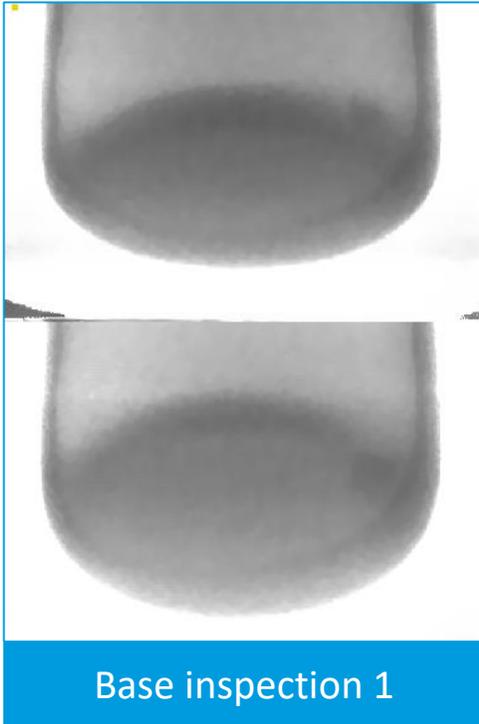
| Total Inspection modules | Total Views | Optical / X-ray |
|--------------------------|-------------|-----------------|
| 2                        | 4           | X-ray           |
| 8                        | 24          | Optical         |

# HEUFT eXaminer<sup>II</sup> XOS – full bottle inspection

## Radiometric methods

- penetrates opaque materials
- resolution not affected by "lenses"
- foreign objects of high and medium density can be detected:
  - glass splinters
- inclusions in the base area



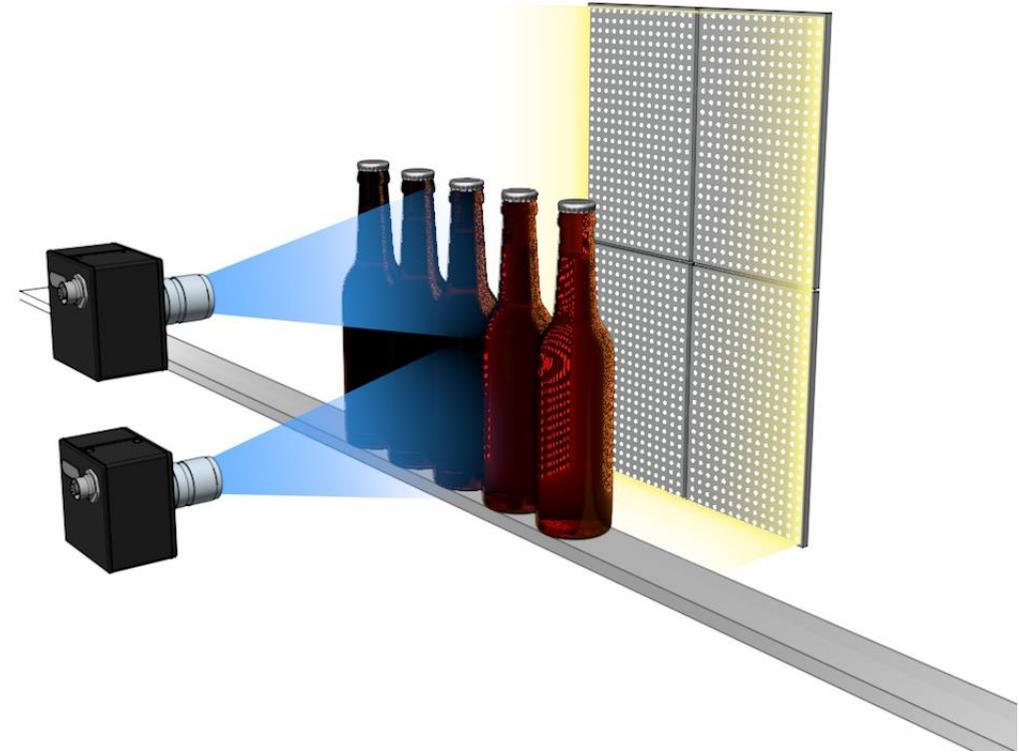


# HEUFT *eXaminer* – overlapping views

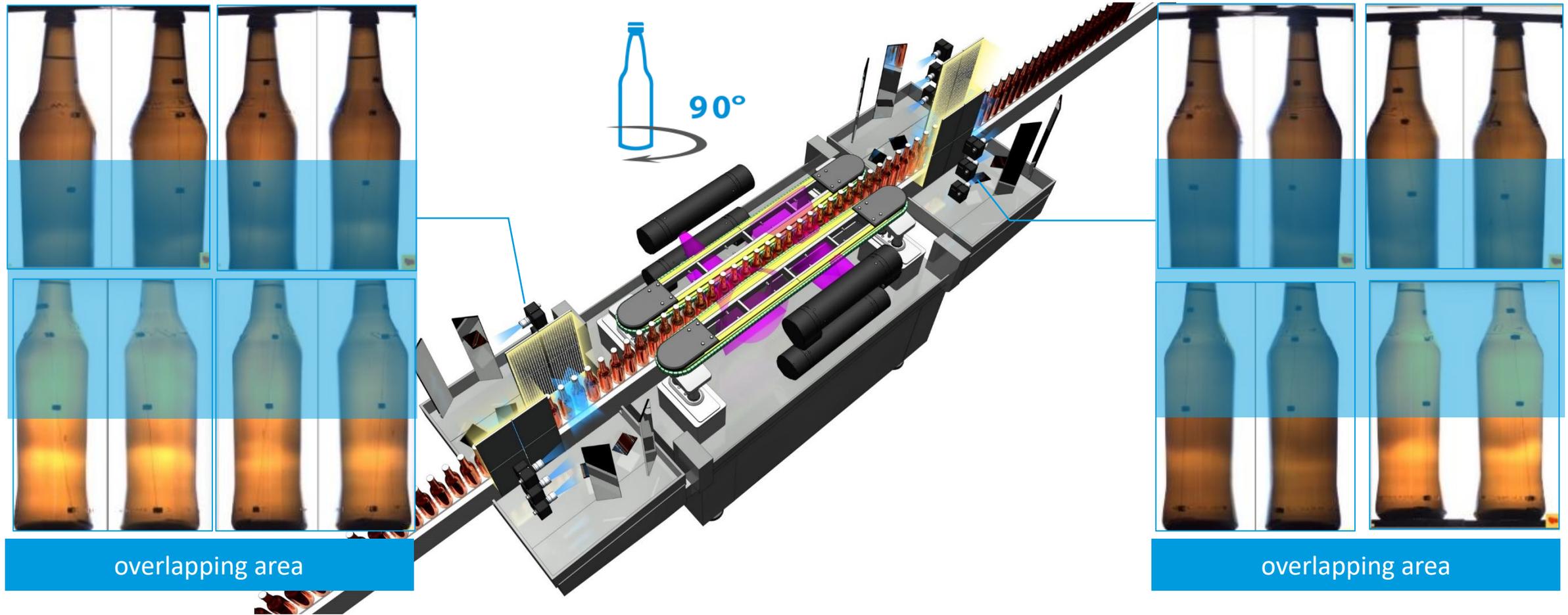
# Optical methods

Many foreign objects and contaminants visible:

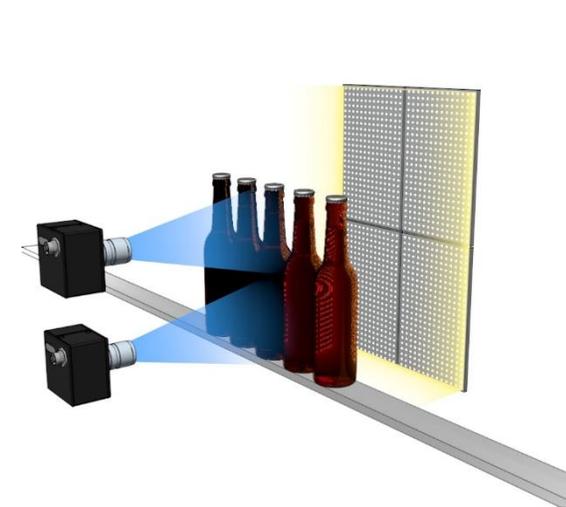
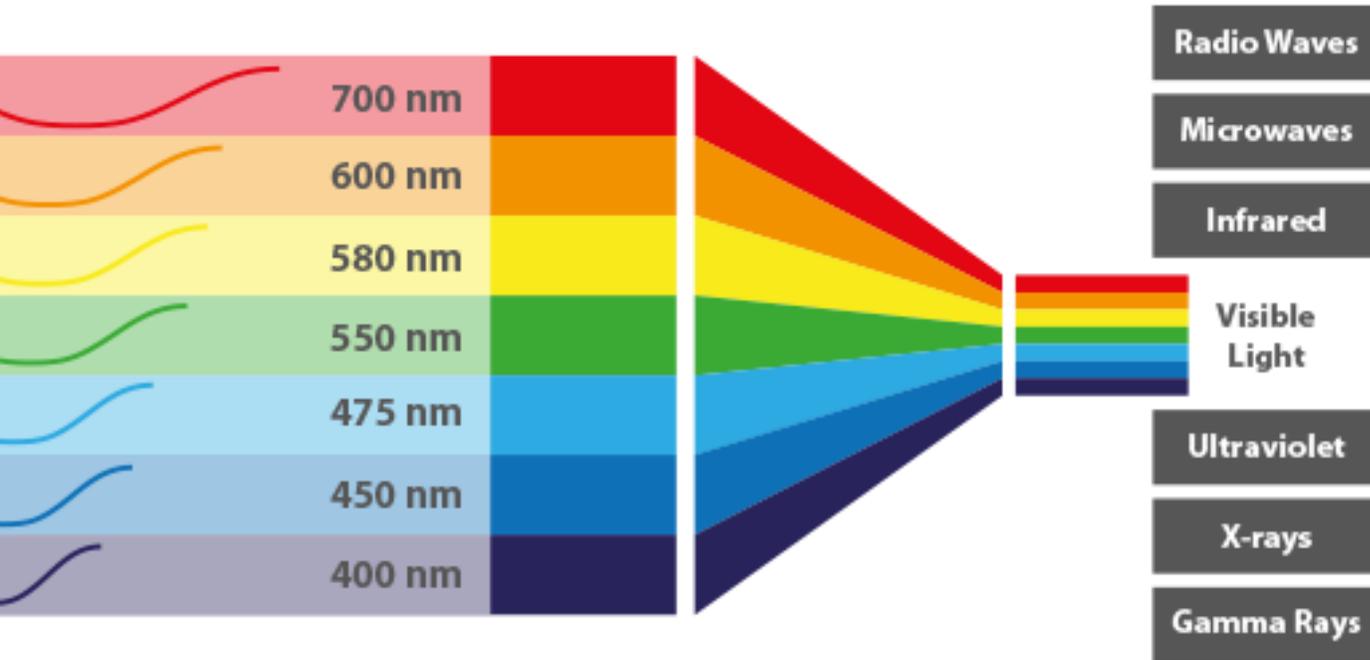
- floating objects
- floating objects in the fill level area
- adhesions on the body
- contaminations



Methods for visualization of foreign objects



## HEUFT *floater* – overlapping views



Infrared light

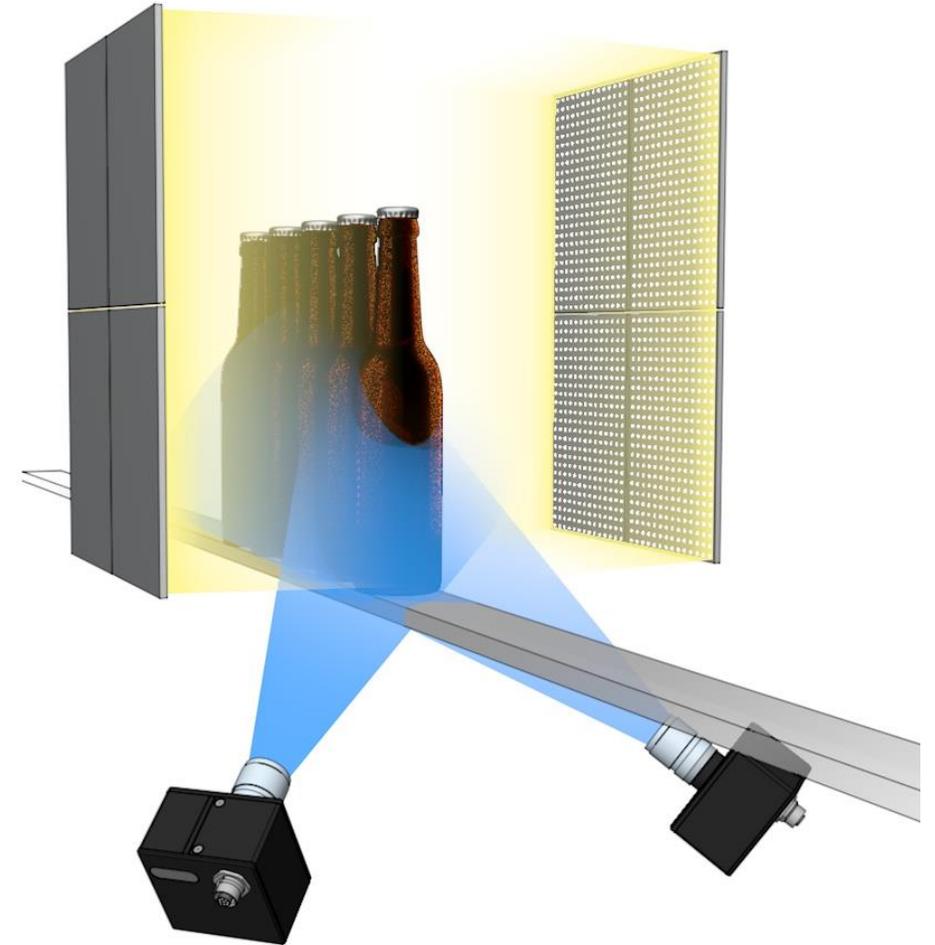


HEUFT *floaters* – solution non-transparent liquid

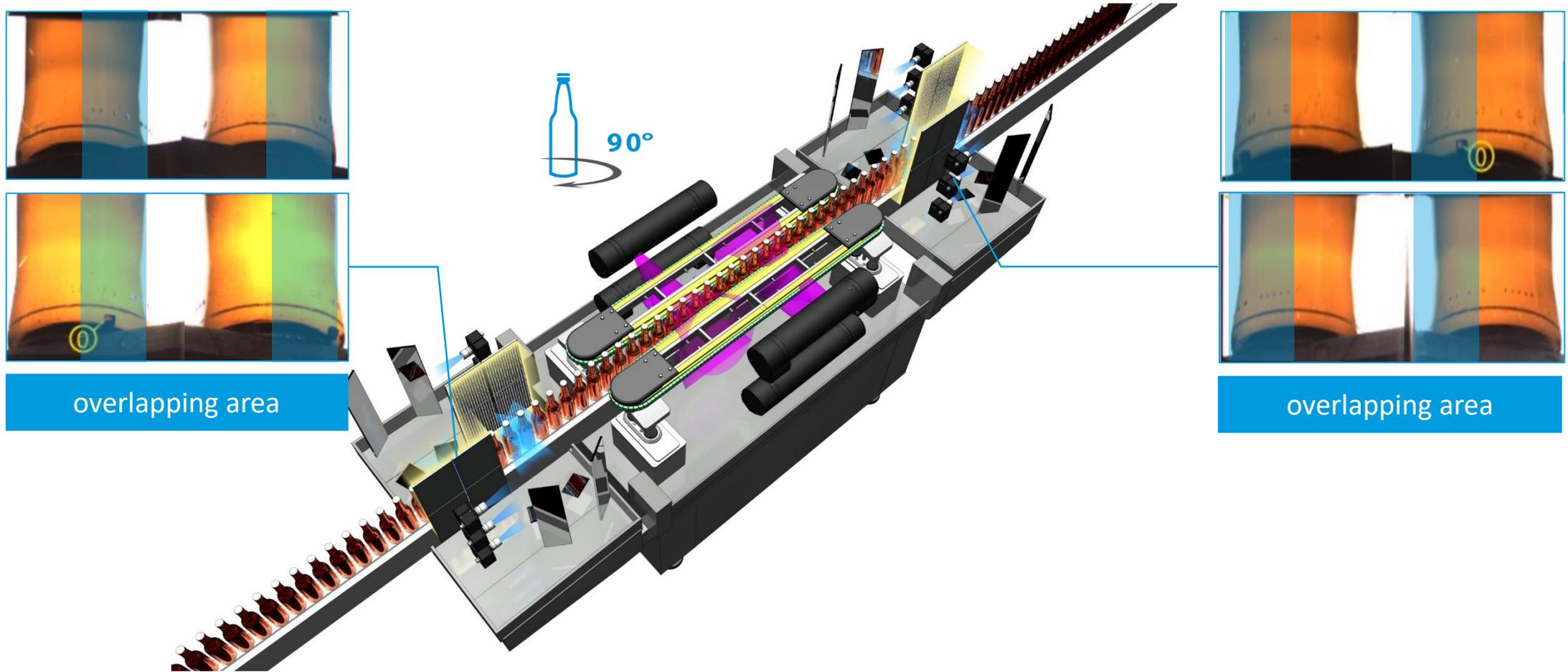
# Optical methods

Visual obstruction:

- for unfiltered products
- due to glass structures
- by labels and water drops
- Due to different glass qualities



Methods for visualization of foreign objects



# HEUFT *sinker* – overlapping views

HEUFT *eXaminer*

HEUFT *eXaminer*<sup>II</sup> XOS

-

Corona 12oz / 354ml

-

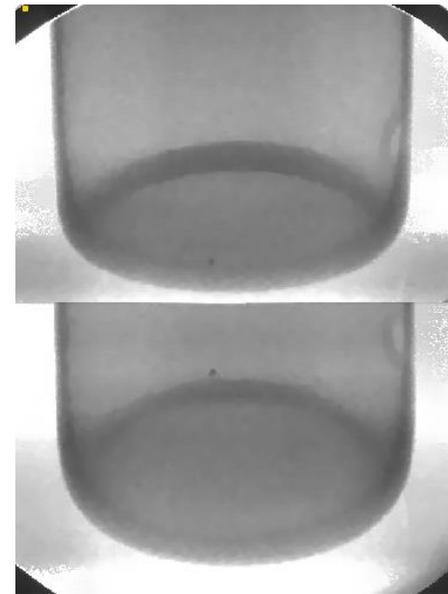
Steel ball 1.2mm

-

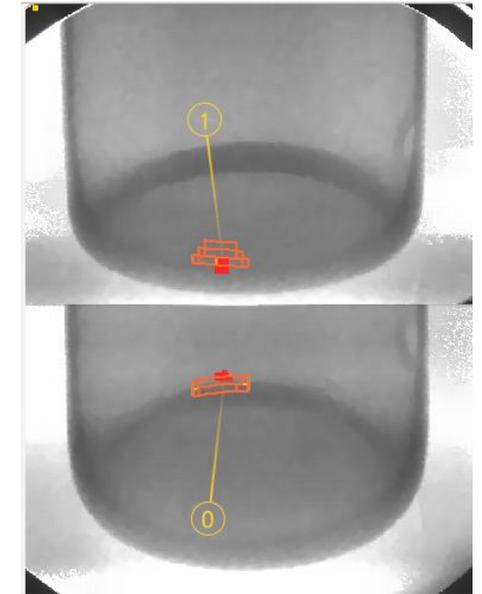
Clear cylindrical bottle  
with ACL  
with Alignment mark  
filled with bright beer



Original picture



Without marking



With marking

HEUFT *eXaminer*<sup>II</sup> XOS

-

Corona 12oz / 354ml

-

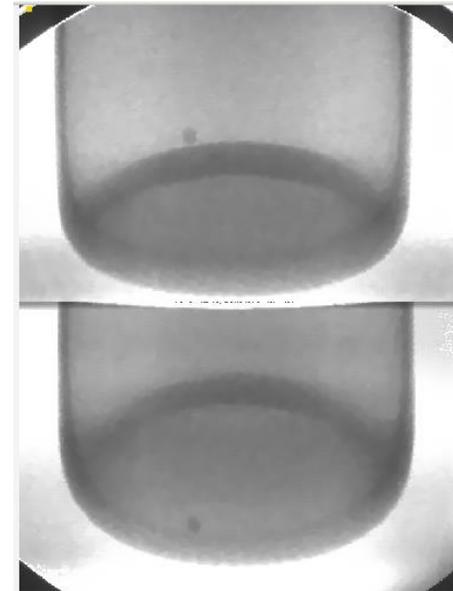
Glass ball 2.5mm

-

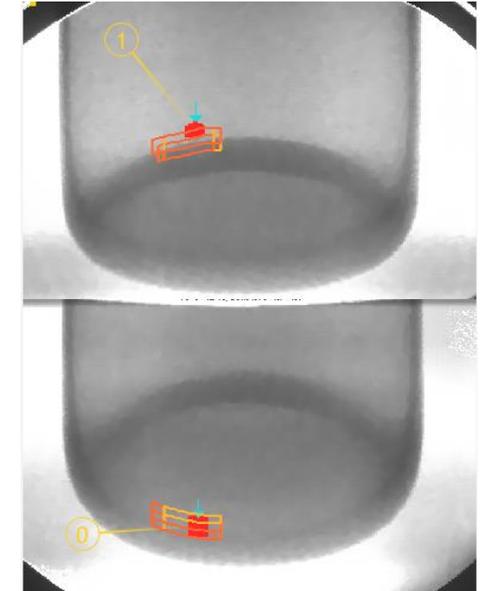
Clear cylindrical bottle  
with ACL  
with Alignment mark  
filled with bright beer



Original picture



Without marking



With marking

# **GLASS IN GLASS**

## **HOW DO I FIND THAT?**

WITH HEUFT YOU WILL FIND THAT VERY WELL!

HEUFT *eXaminer*

HEUFT *eXaminer*<sup>II</sup> XOS

-

Corona 12oz / 354ml

-

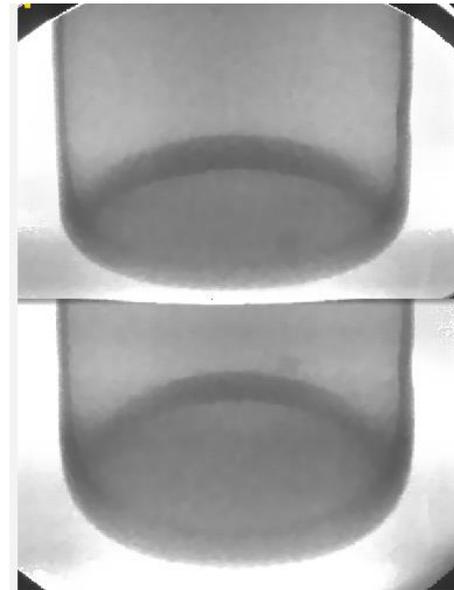
Own glass cuboid  
3x3x2.5mm

-

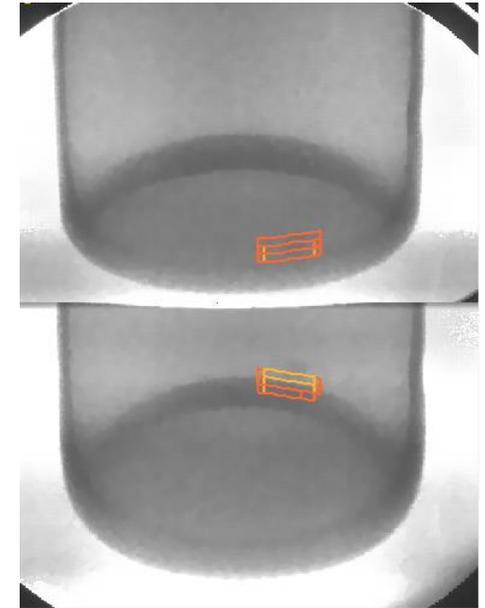
Clear cylindrical bottle  
with ACL  
with Alignment mark  
filled with bright beer



Original picture



Without marking



With marking

HEUFT floater

HEUFT eXaminer<sup>II</sup> XOS

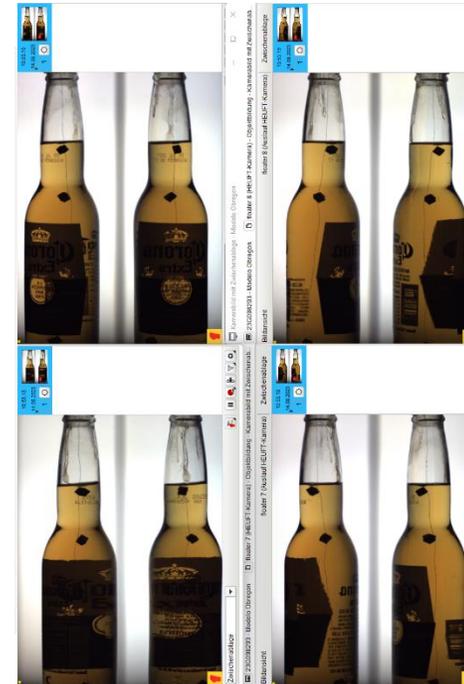
Corona 12oz / 354ml

Plastic cuboid  
4x4x4mm

Clear cylindrical bottle  
with ACL  
with Alignment mark  
filled with bright beer



Original picture



Without marking



With marking

HEUFT floater

HEUFT eXaminer<sup>II</sup> XOS

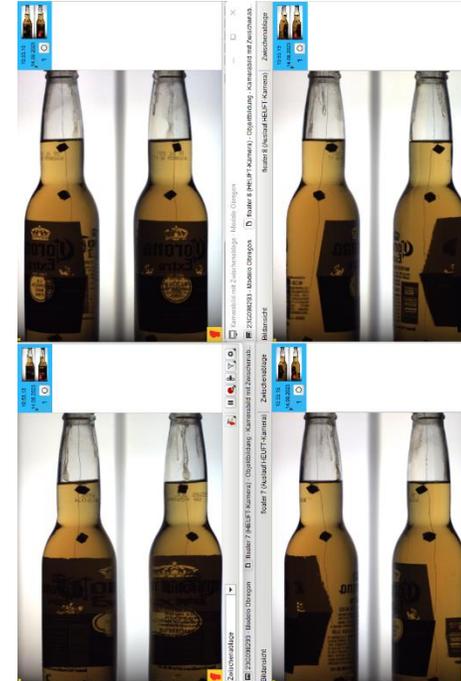
Corona 12oz / 354ml

Plastic cuboid  
4x4x4mm

Clear cylindrical bottle  
with ACL  
with Alignment mark  
filled with bright beer



Original picture



Without marking



With marking

HEUFT *sinker*

HEUFT *eXaminer<sup>II</sup> XOS*

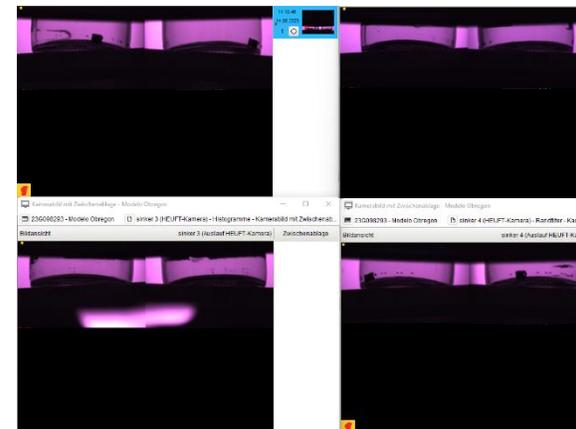
Corona 12oz / 354ml

Plastic cuboid  
5x5x5mm

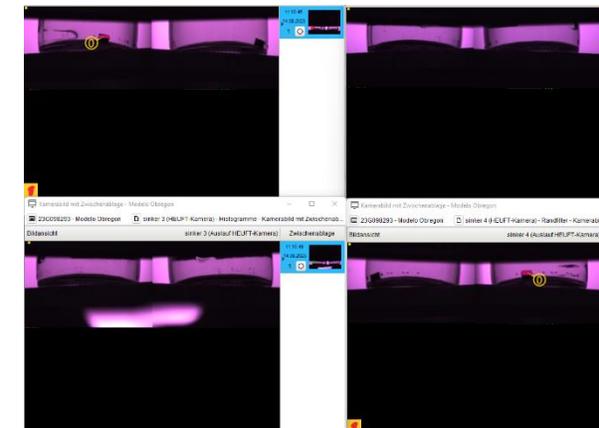
Clear cylindrical bottle  
with ACL  
with Alignment mark  
filled with bright beer



Original picture

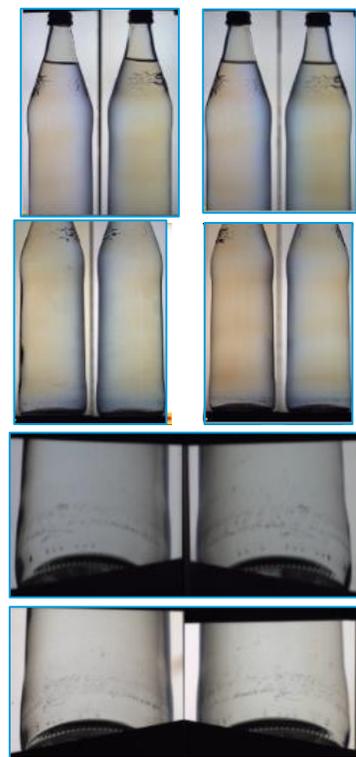
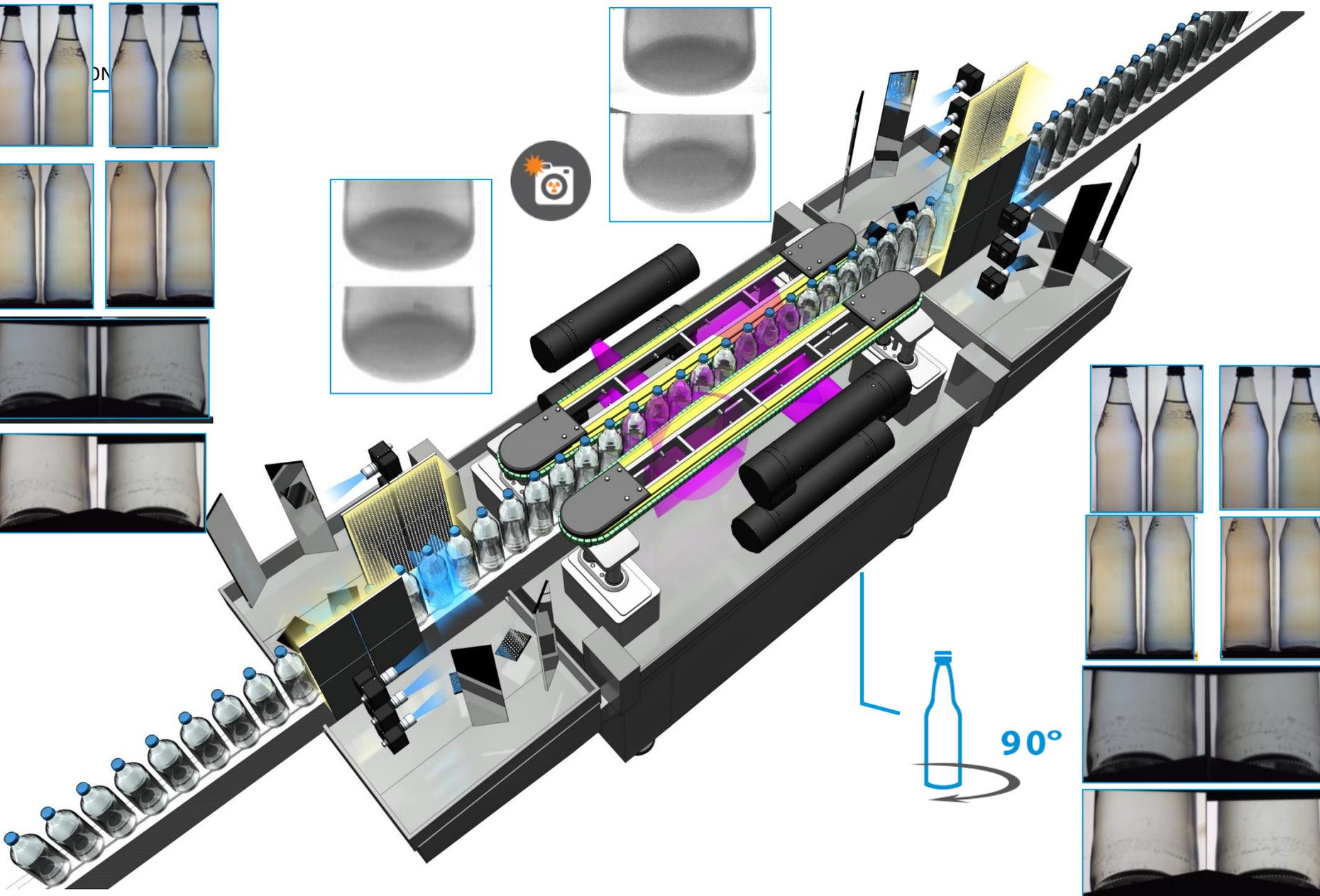
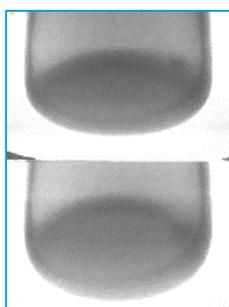
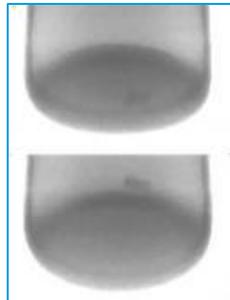
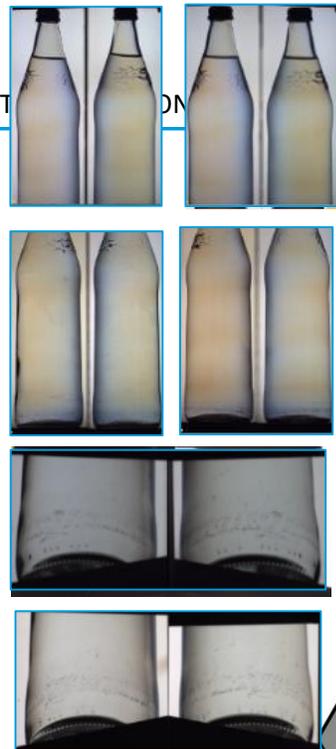


Without marking

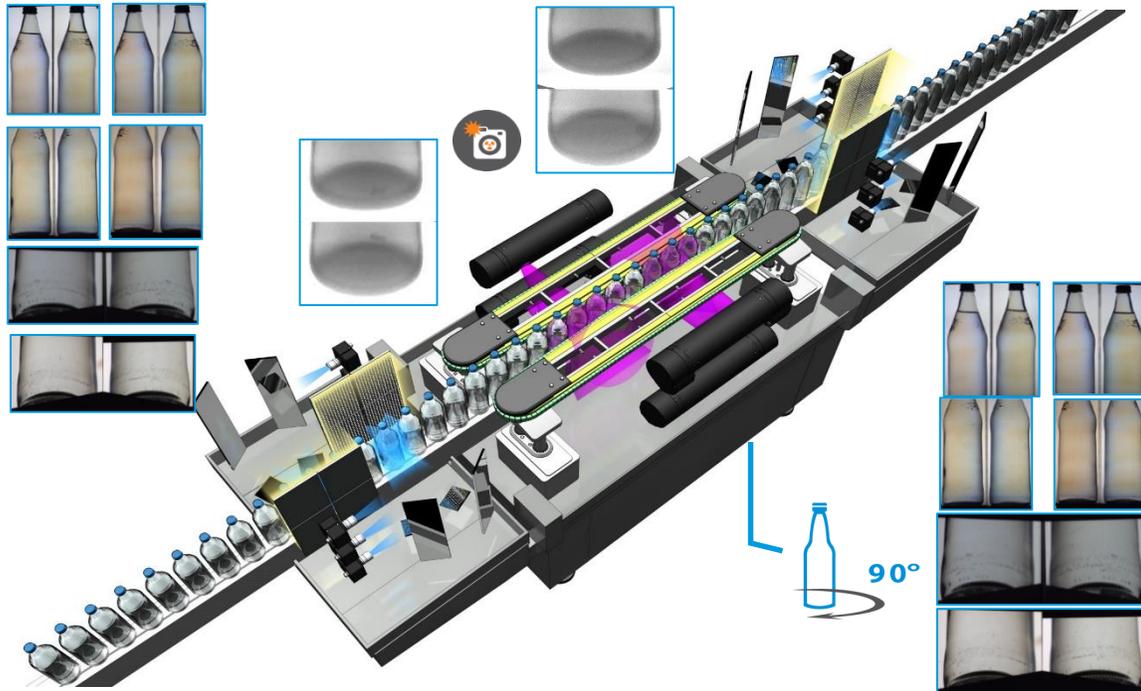


With marking

FULL BOTT



# HEUFT *eXaminer II* XOS – full bottle inspection

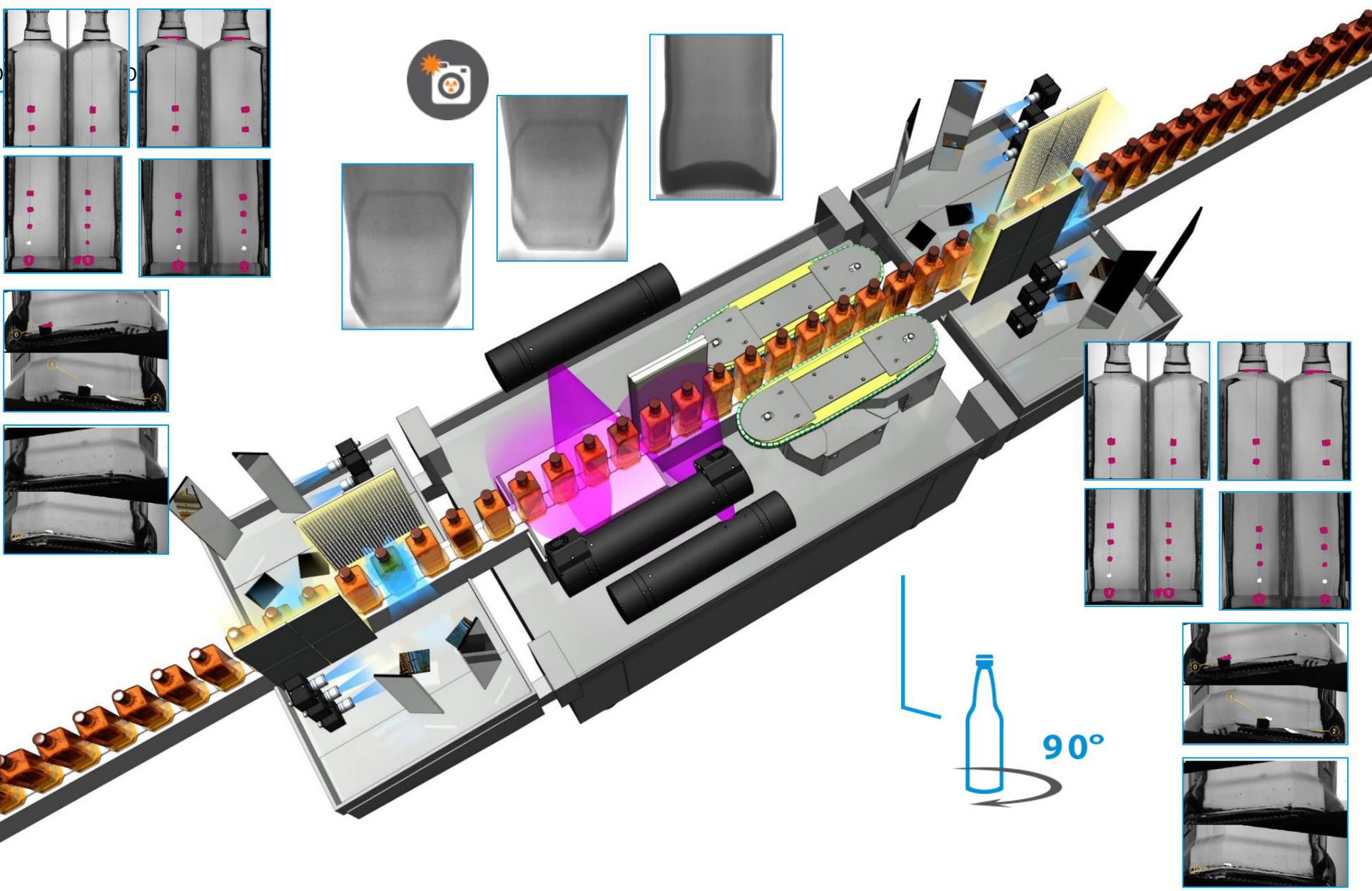


| Inspection          | Views | Optical / X-ray |
|---------------------|-------|-----------------|
| Floater 1+2 Infeed  | 4     | Optical         |
| Floater 3+4 Infeed  | 4     |                 |
| Sinker 1 Infeed     | 2     |                 |
| Sinker 2 Infeed     | 2     |                 |
| X-ray double base 1 | 2     | X-ray           |
| X-ray double base 2 | 2     |                 |
| Floater 5+6 Outfeed | 4     | Optical         |
| Floater 7+8 Outfeed | 4     |                 |
| Sinker 3 Outfeed    | 2     |                 |
| Sinker 4 Outfeed    | 2     |                 |

| Total Inspection modules | Total Views | Optical / X-ray |
|--------------------------|-------------|-----------------|
| 2                        | 4           | X-ray           |
| 8                        | 24          | Optical         |

# HEUFT eXaminer<sup>II</sup> XOS – full bottle inspection

FULL BO

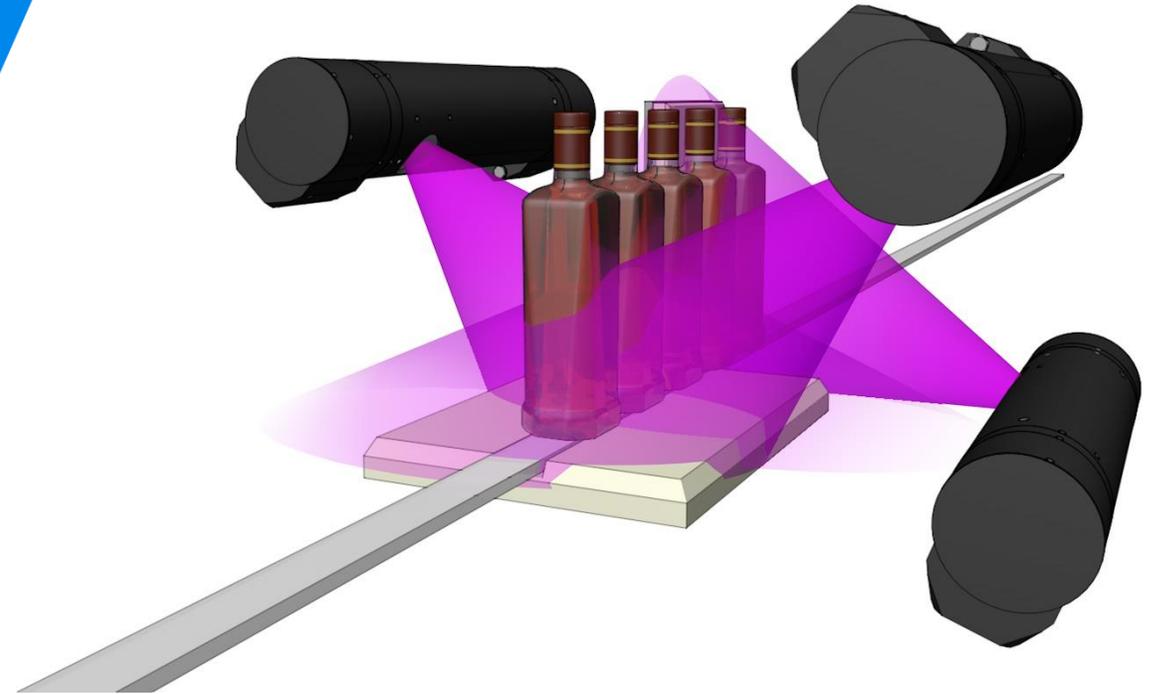


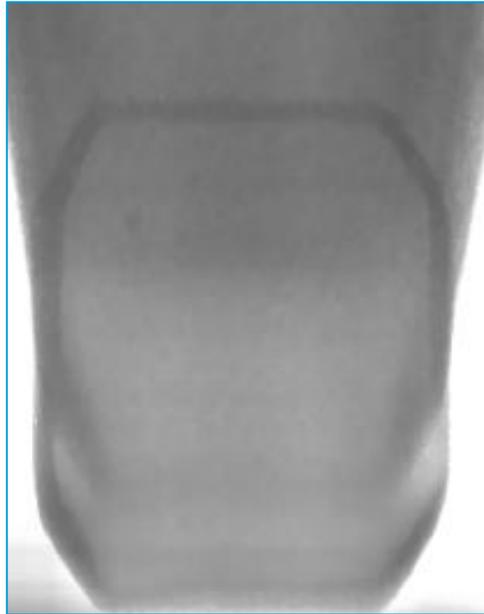
# HEUFT *eXaminer II* XOS – full bottle inspection



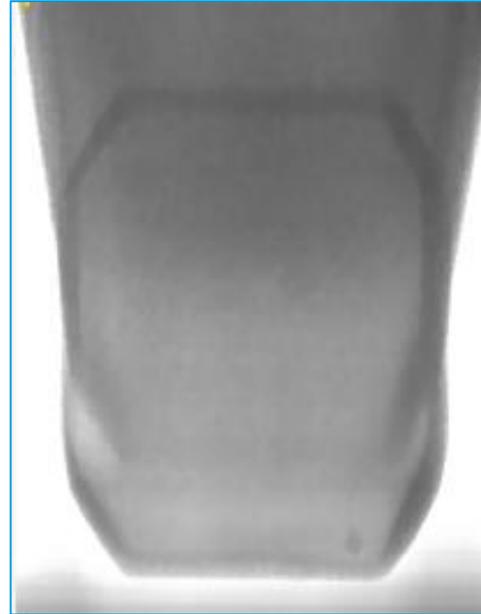
## Radiometric methods

- penetrates opaque materials
- resolution not affected by "lenses"
- foreign objects of high and medium density can be detected:
  - glass splinters
- inclusions in the base area





Base inspection 1



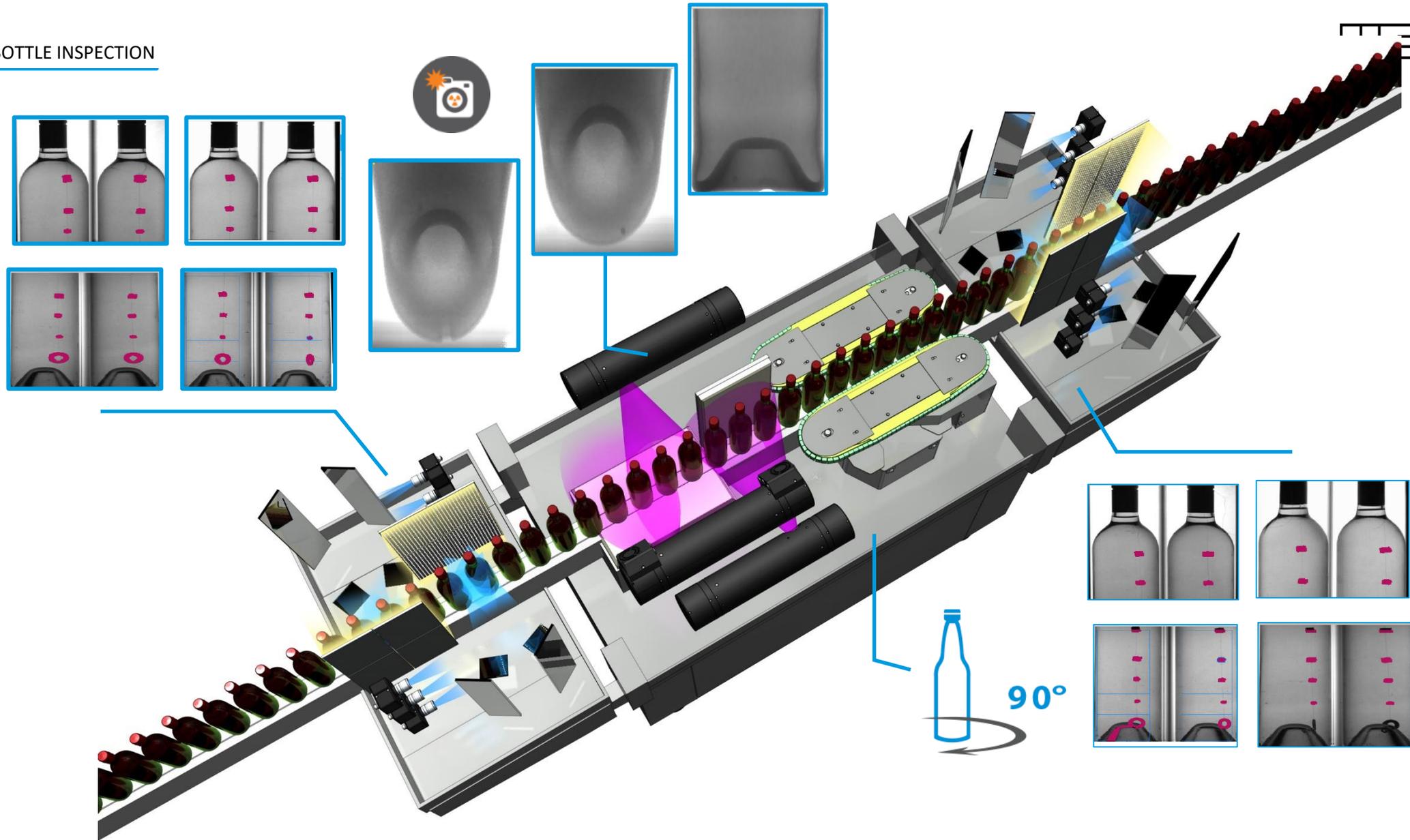
Base inspection 2



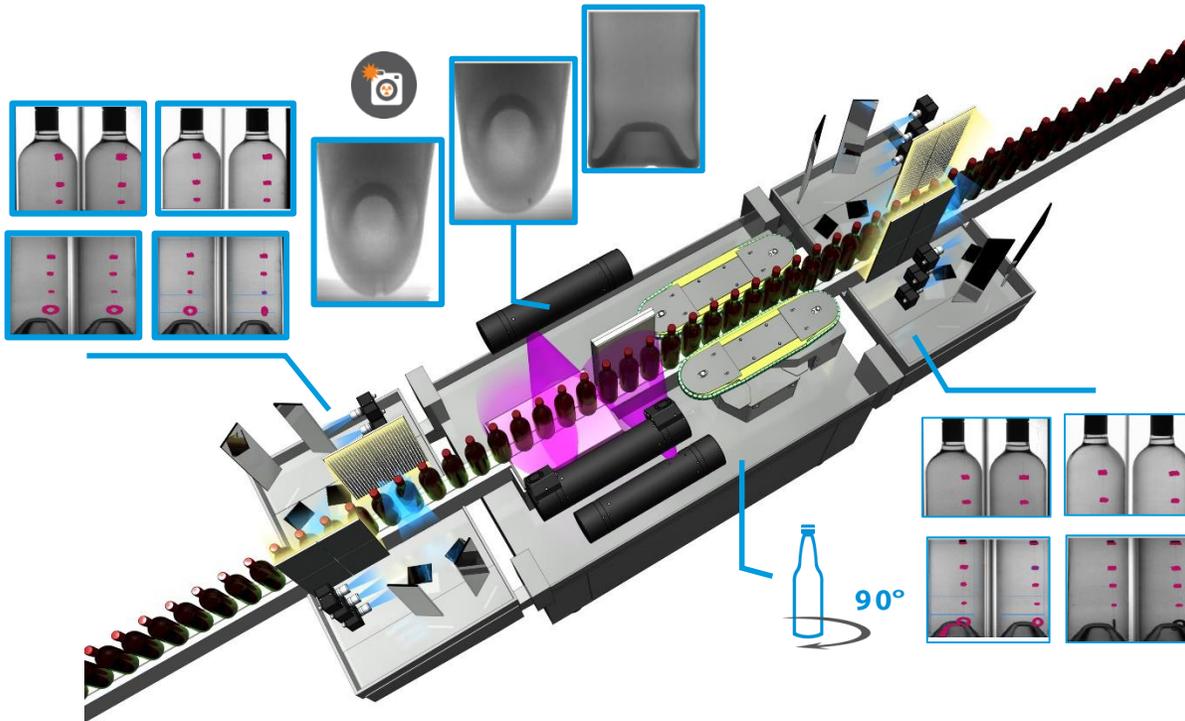
Sidewall inspection

HEUFT *eXaminer* – overlapping views

FULL BOTTLE INSPECTION



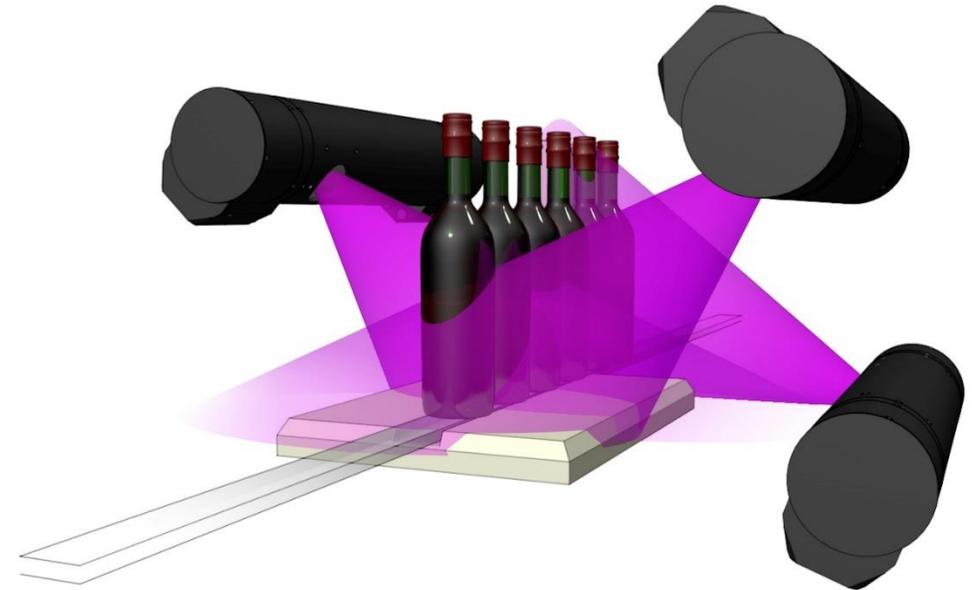
HEUFT *eXaminer II* XOS – full bottle inspection

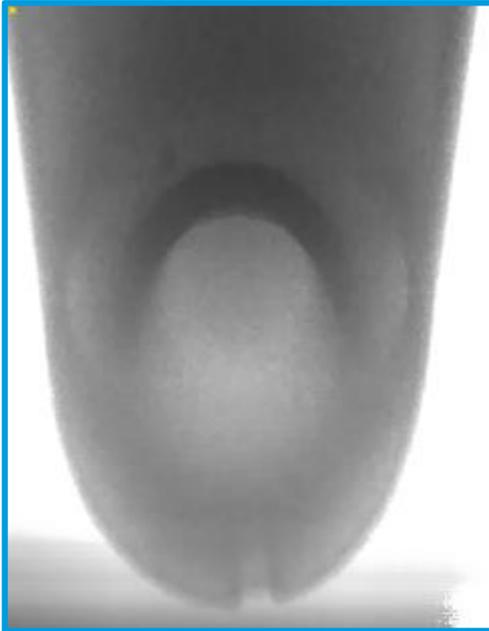


| Inspection                      | Views              | Optical / X-ray        |
|---------------------------------|--------------------|------------------------|
| Floater 1+2 Infeed              | 4                  | Optical                |
| Floater 3+4 Infeed              | 4                  |                        |
| Sinker 1 Infeed                 | 2                  |                        |
| Sinker 2 Infeed                 | 2                  |                        |
| X-ray base 1                    | 1                  | X-ray                  |
| X-ray base 2                    | 1                  |                        |
| X-ray sidewall                  | 1                  |                        |
| Floater 5+6 Outfeed             | 4                  | Optical                |
| Floater 7+8 Outfeed             | 4                  |                        |
| Sinker 3 Outfeed                | 2                  |                        |
| Sinker 4 Outfeed                | 2                  |                        |
| <b>Total Inspection modules</b> | <b>Total Views</b> | <b>Optical / X-ray</b> |
| 3                               | 3                  | X-ray                  |
| 8                               | 24                 | Optical                |

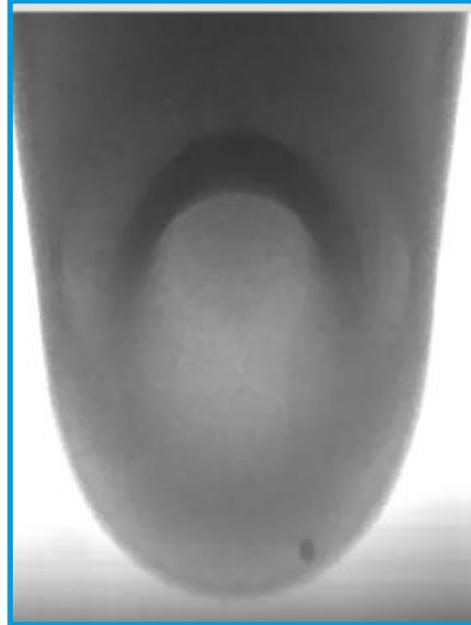
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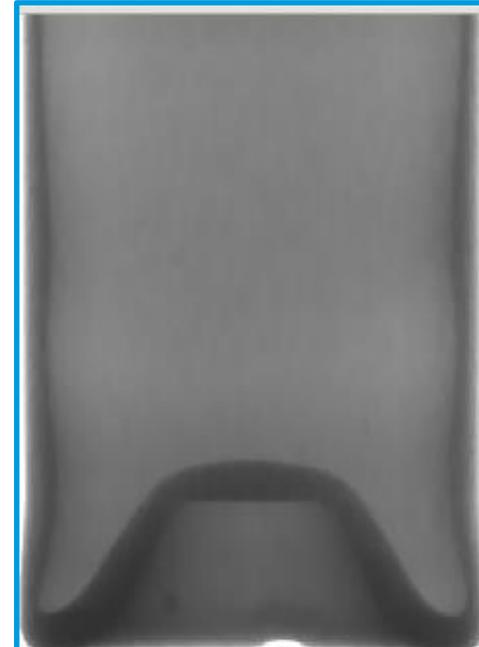




Base inspection 1



Base inspection 2



Sidewall inspection

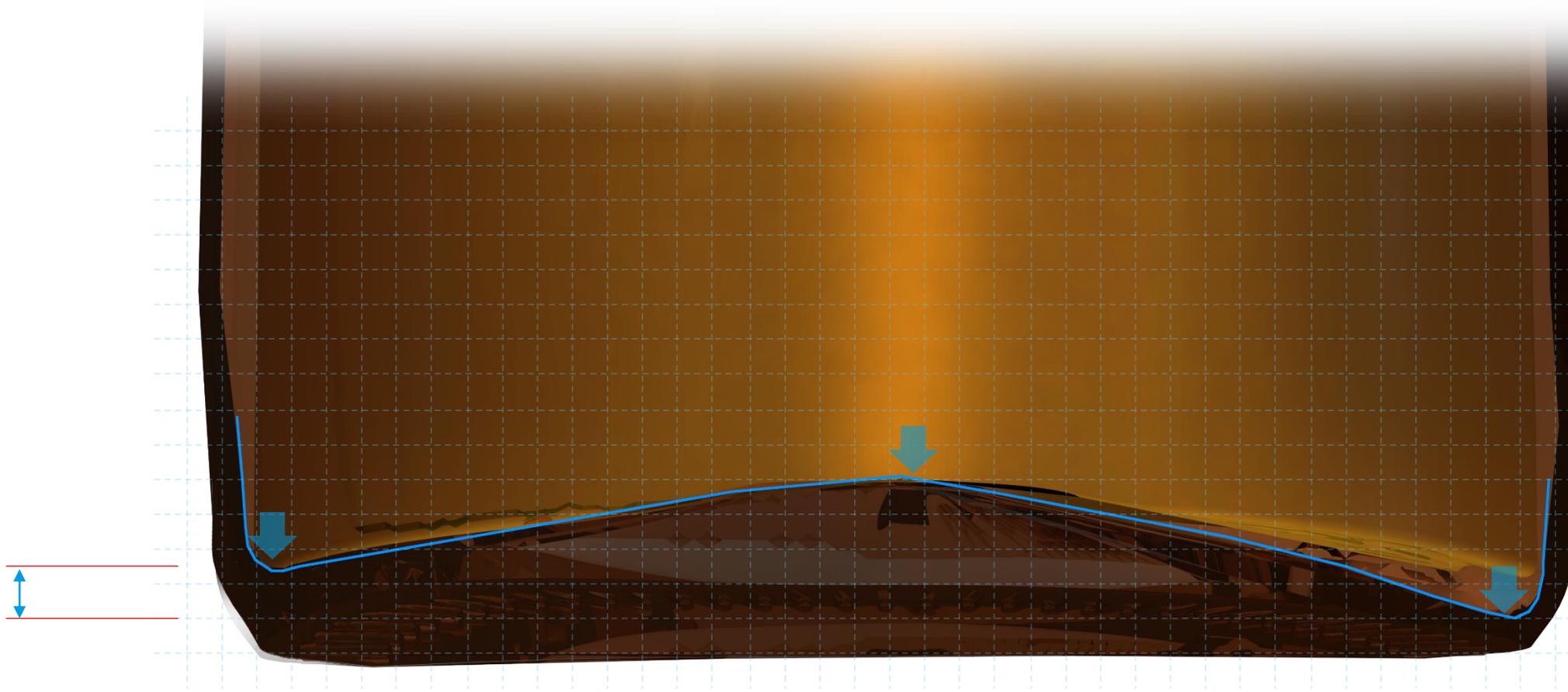
HEUFT *eXaminer* – overlapping views

## Radiometric methods

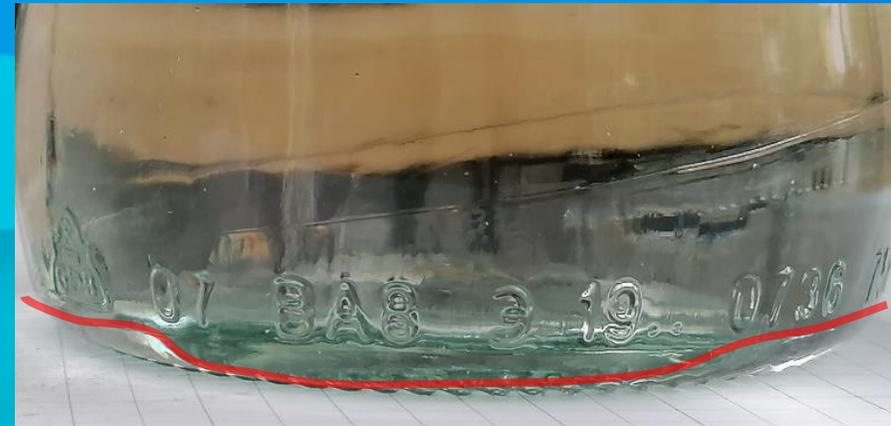
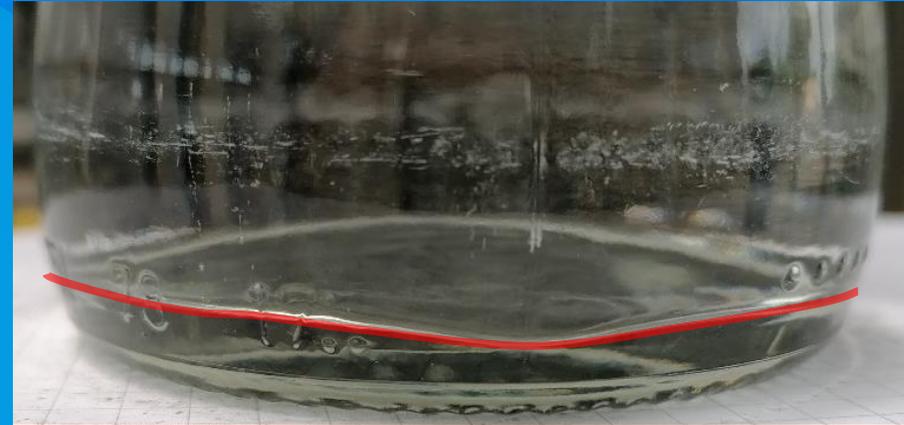
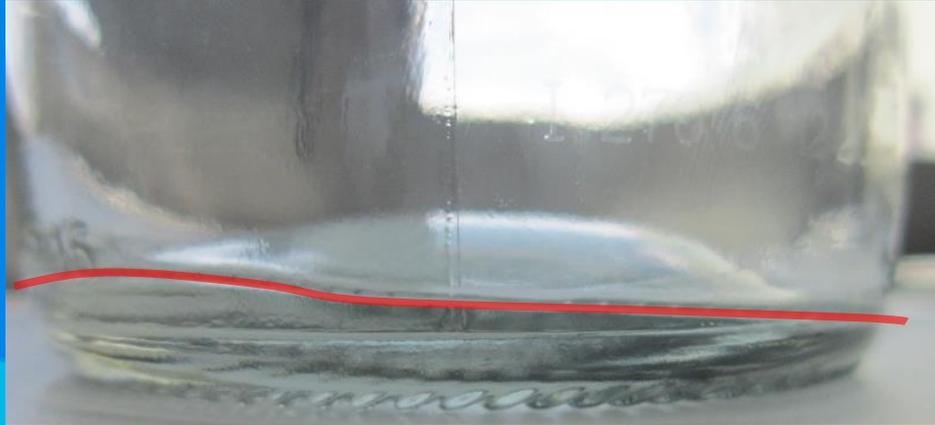
- Varying container materials are a challenge for the X-ray base inspection.
- glass thickness variations result from:
  - different suppliers
  - different bottle generations
  - different recipes



Methods for visualization of foreign objects

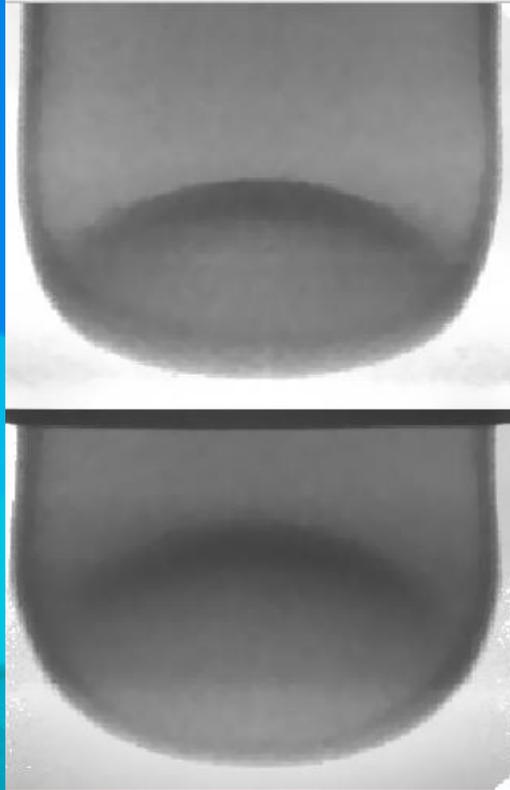


Challenge: glass thickness variations in the bottle base

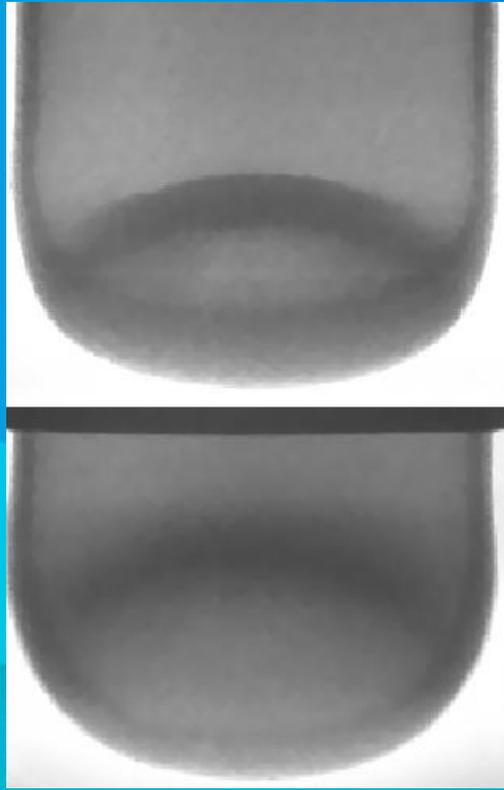


ENLIGHTENMENT 

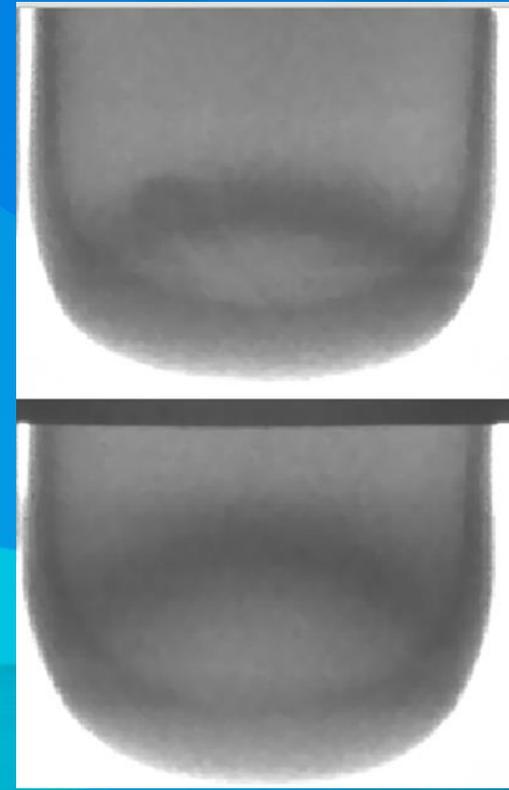
Challenge: glass thickness variations in the bottle base



thin



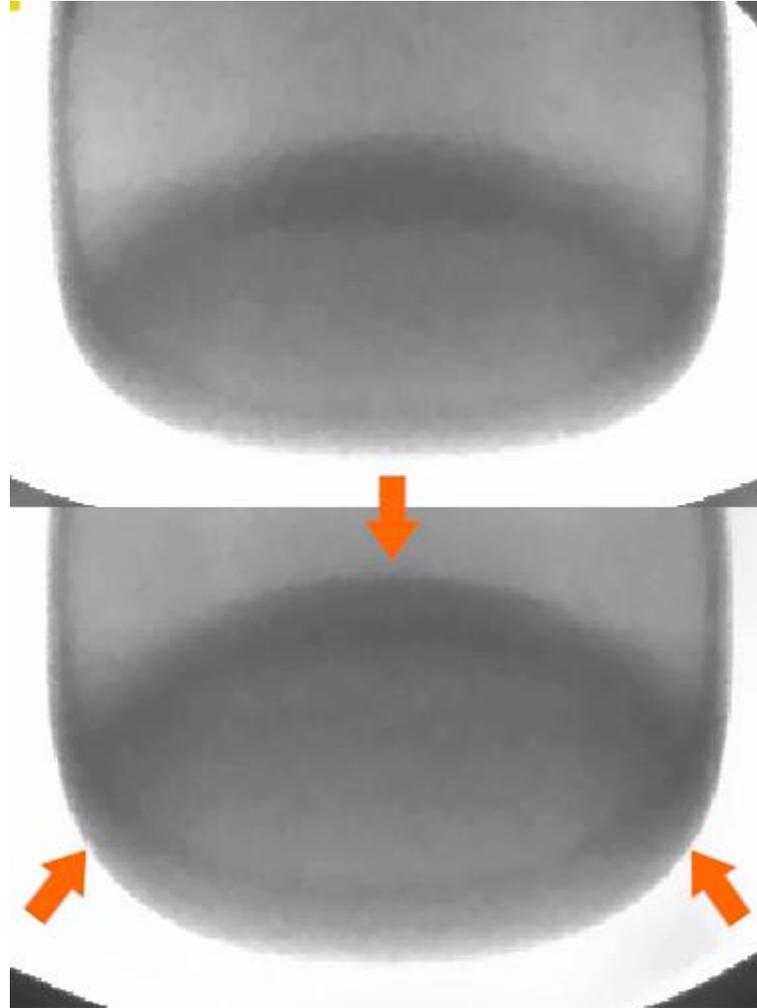
medium



thick

ENLIGHTENMENT  

Challenge: glass thickness variations in the bottle base



ENLIGHTENMENT

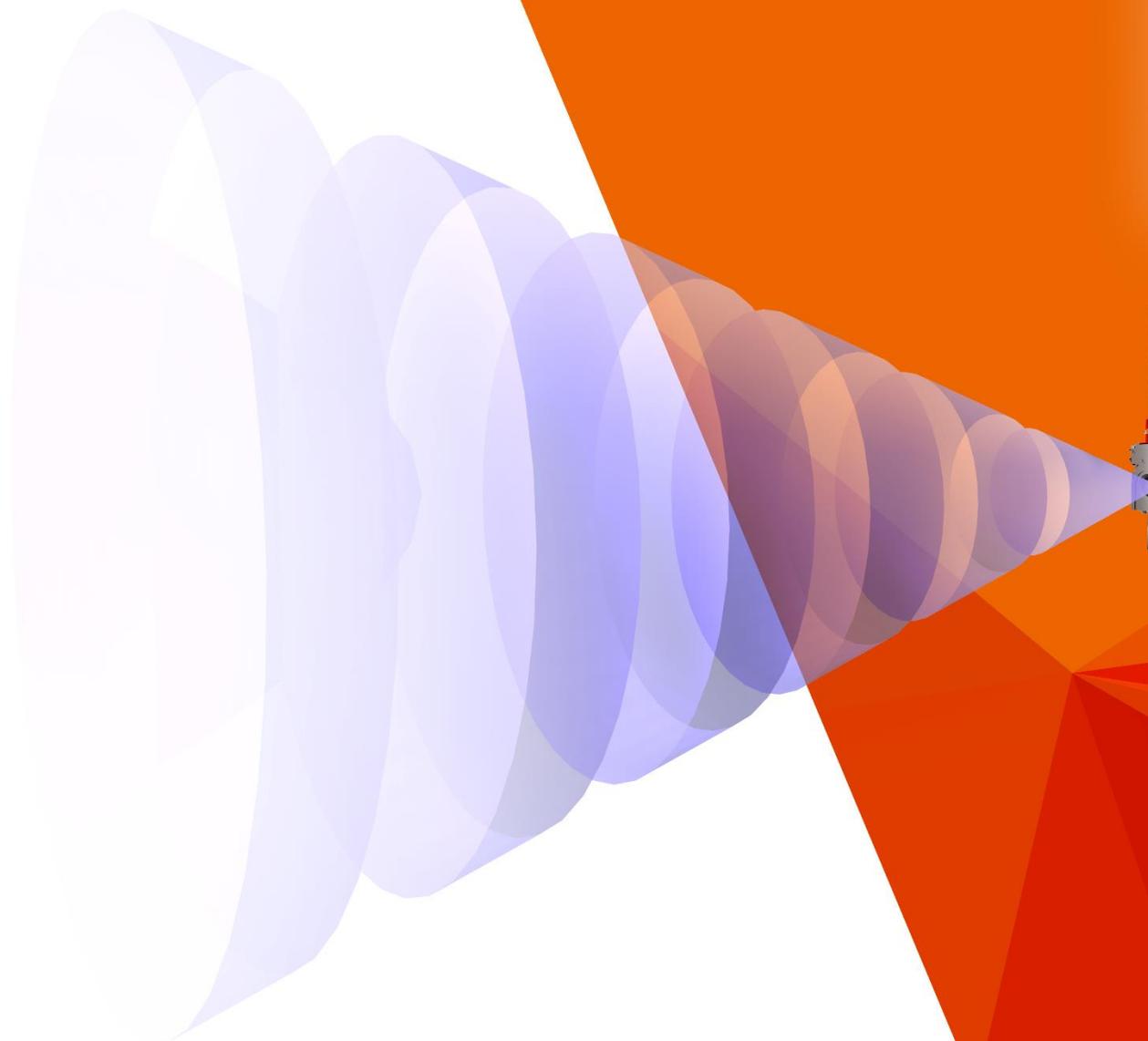


Dynamic image processing for glass thickness variations

**NEW  
HEUFT**  
development



X-ray generator



HEUFT - Image processing

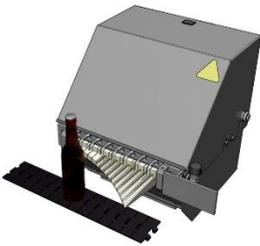


HEUFT - X-ray tube



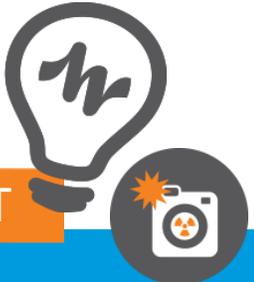
Special chain

HEUFT – Rejection unit



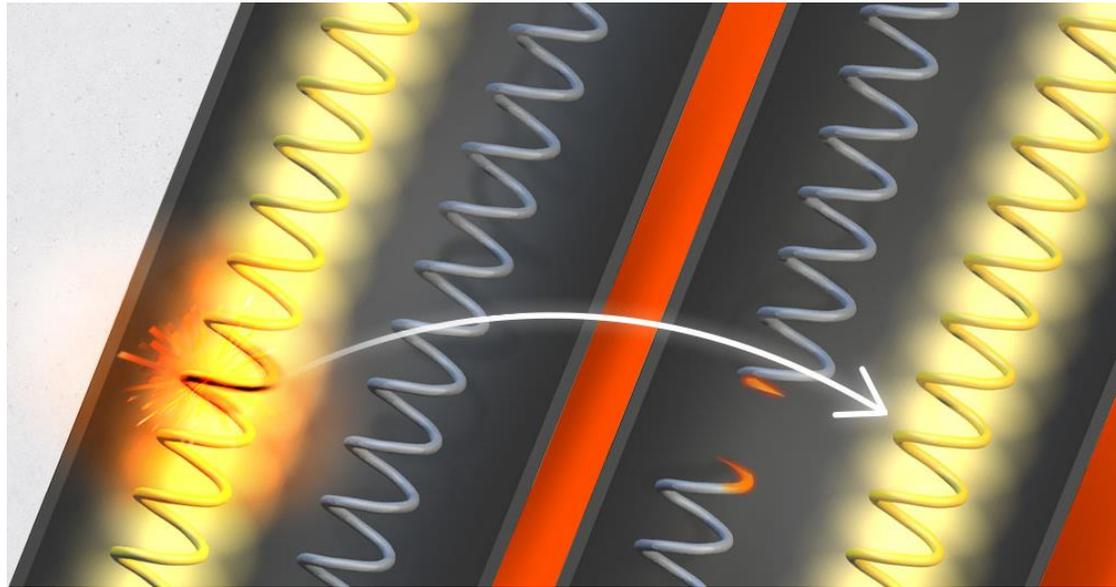
Digital receiver

ENLIGHTENMENT



Development of the digital X-ray technology

## HEUFT *eXaminer II* - Generation of the X-ray flash



before

after

- Two redundant filaments
- One filament is used during operation
- Wear of the filament increasing over operating time
- In case of failure of the first filament, automatic switch-over to the second filament
- Replacement of generator as part of preventive measures

Fault-tolerant unit due to redundancy



✓ Gapless and variable bottle flow

Variable and high speeds possible ✓

**72,000** up to  
containers per hour

ONLY AVAILABLE WITH THE  
PULSED X-RAY TECHNOLOGY



✓ Start/stop possible  
Line clearing not necessary

HIGH PERFORMANCE AT  
HIGH SPEED

No reduction in detection performance at high speeds ✓

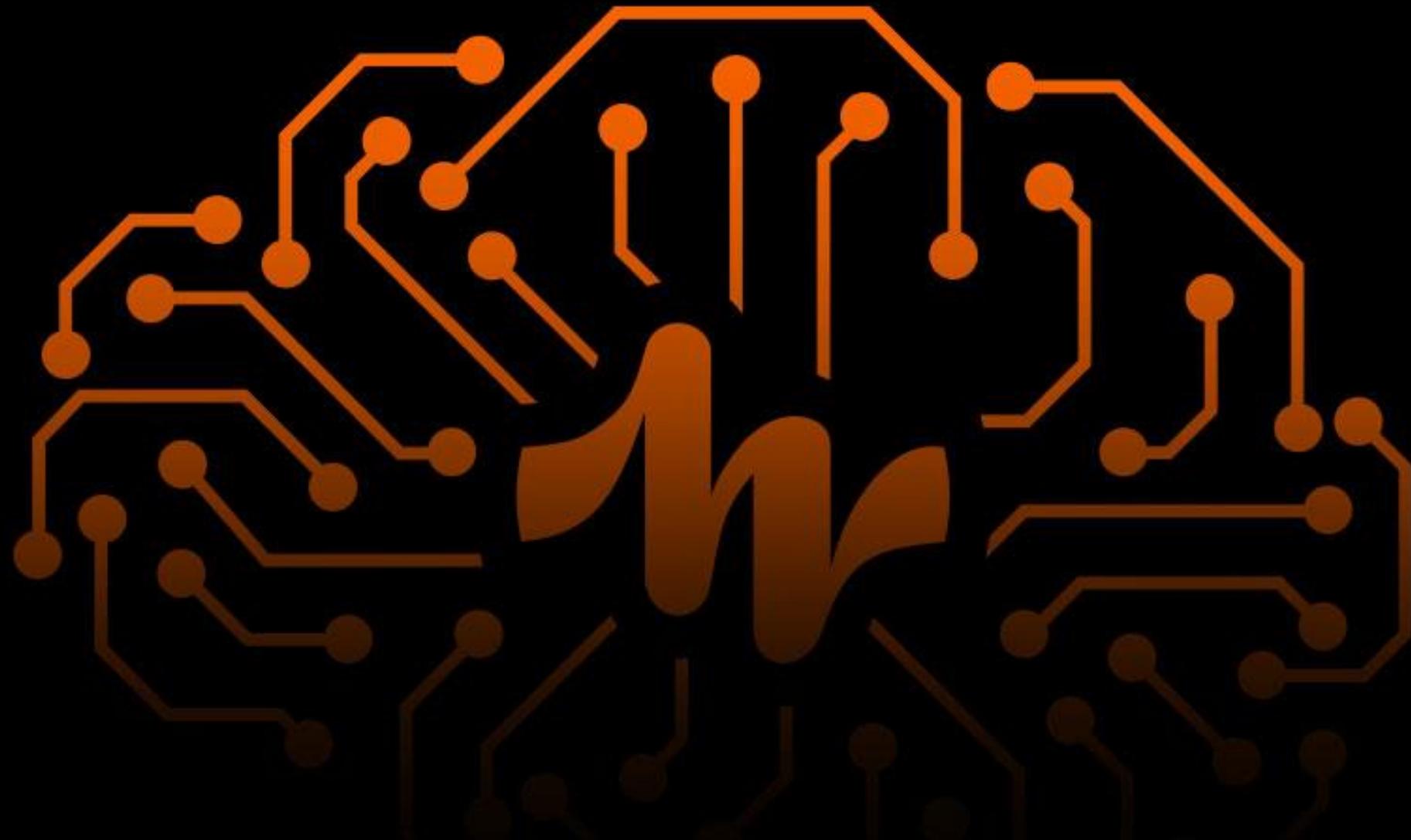
ENLIGHTENMENT

The advantages of pulsed X-ray technology

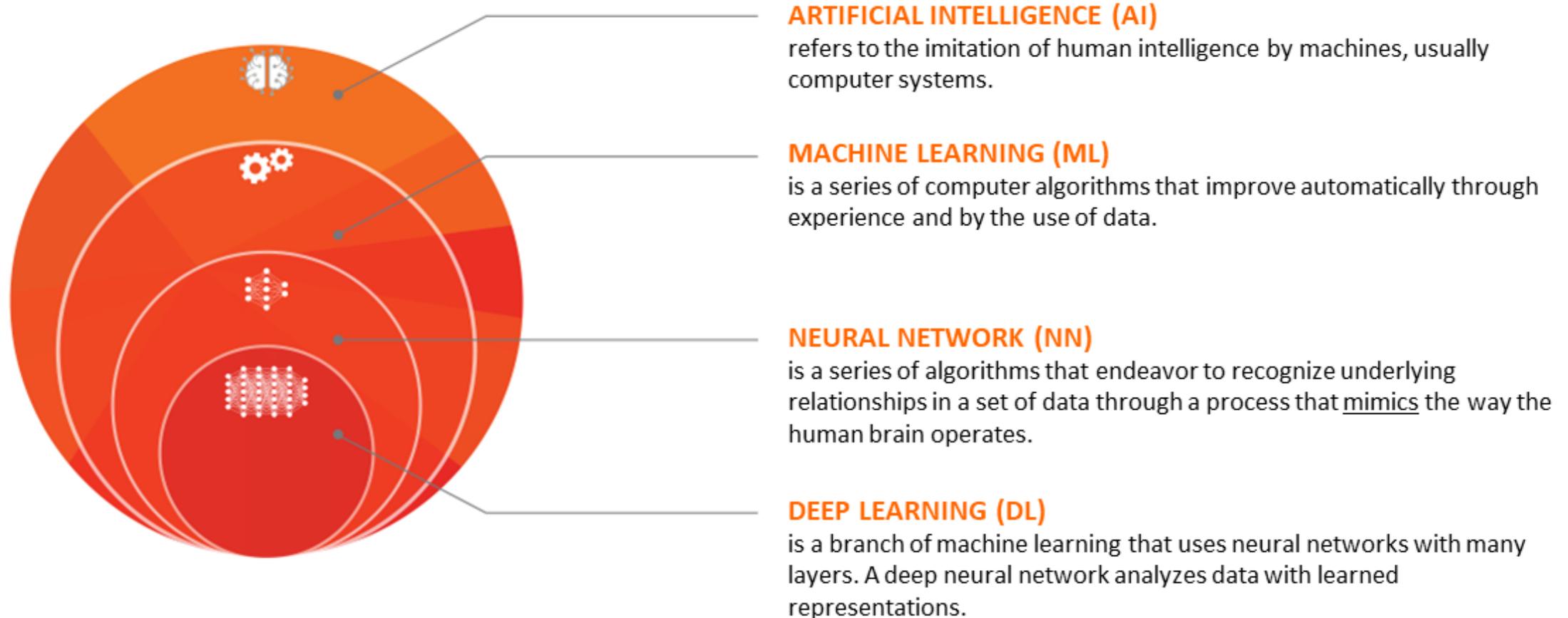
ARTIFICIAL INTELLIGENCE

Artificial Intelligence  
Inspection with  
HEUFT *reflexx* A.I.

X-ray picture denoising



**HEUFT *reflexx* A.I.**

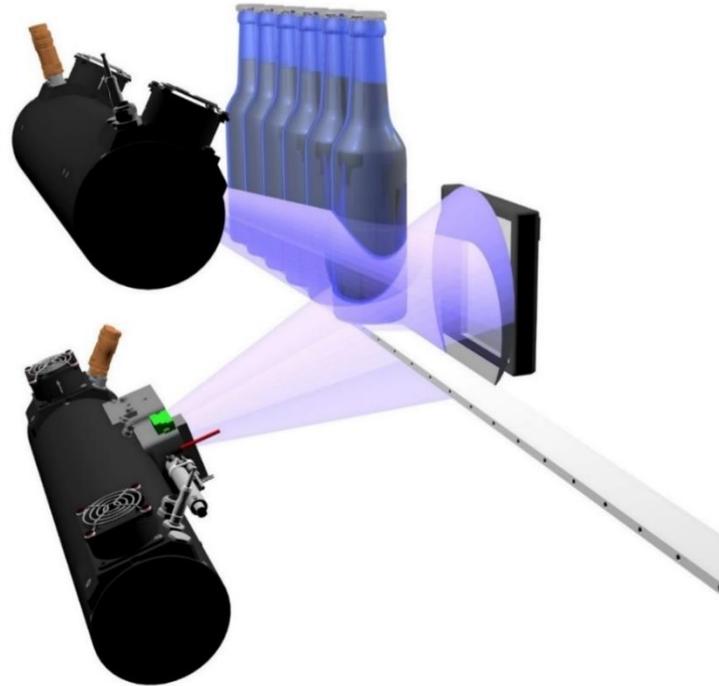


X-ray base inspection:

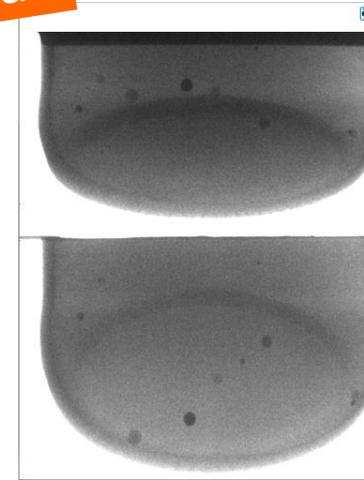
Due Using X-ray inspection a natural physical effect so called noise occurs. This noise has an influence on the detection capability of low absorbing defects like glass particles.

With a machine learned (ML) algorithm HEUFT is already able to reduce this noise and rise detection capability and lower false rejection rate on the glass in glass detection in full bottles.

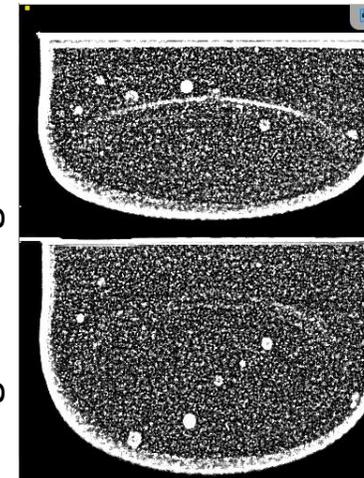
## Full bottle inspection with HEUFT *eXaminer II XOS*



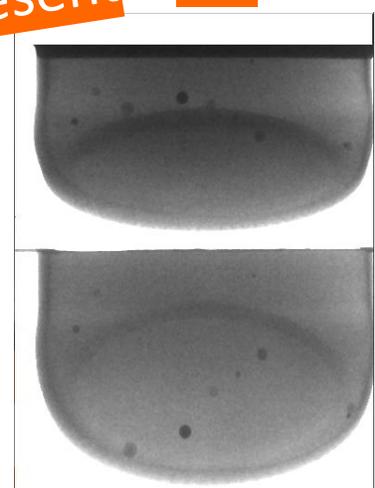
Past



Original image

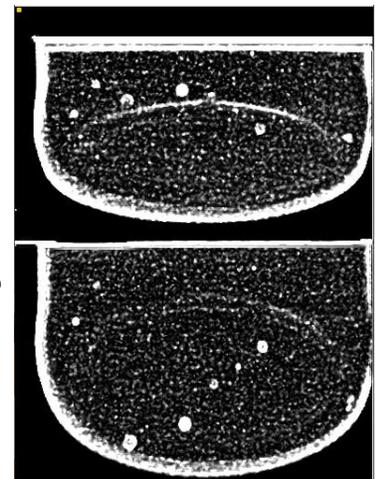
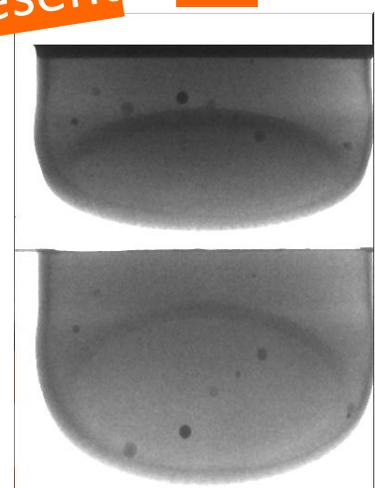
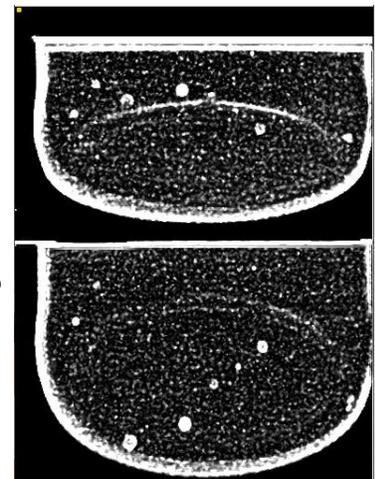
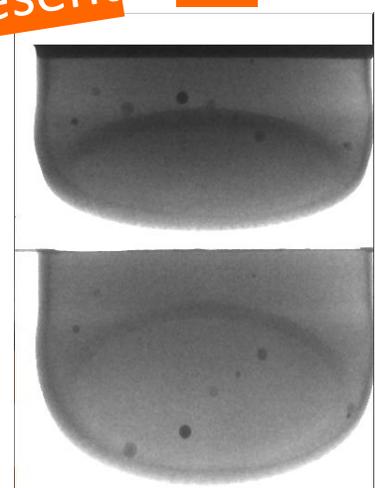
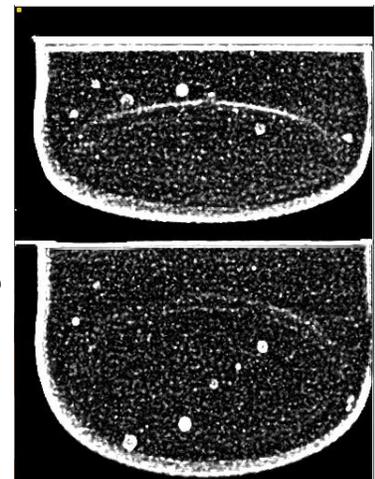
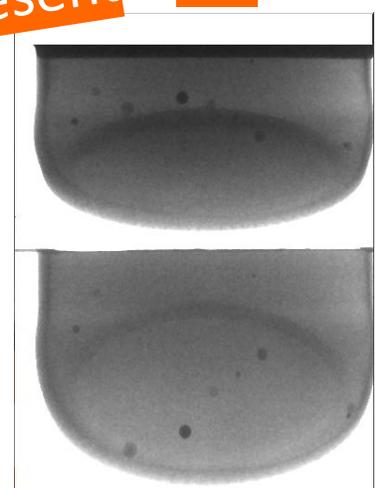
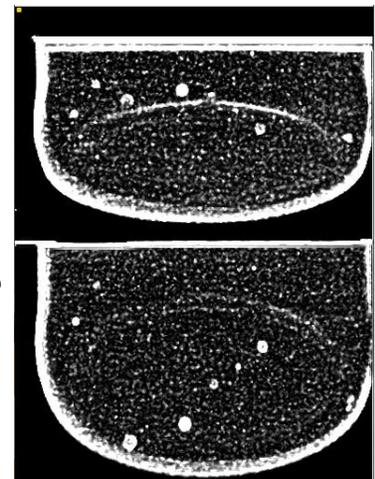
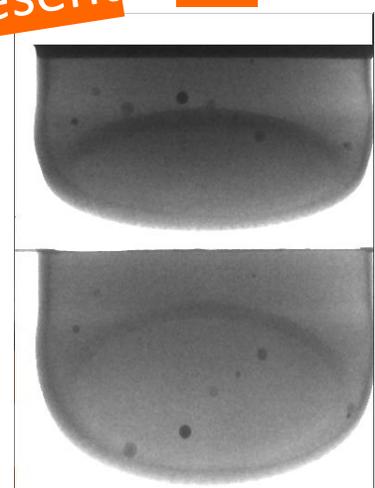
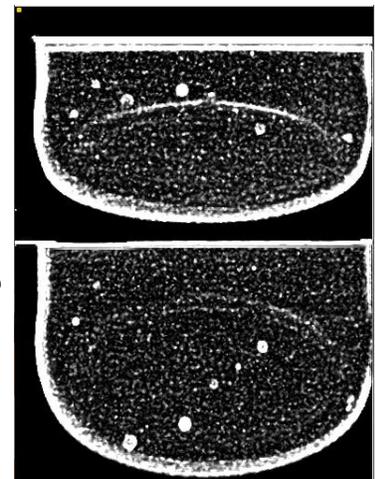


Present



ML

HEUFT *reflexx*<sup>2</sup> real-time noise filter

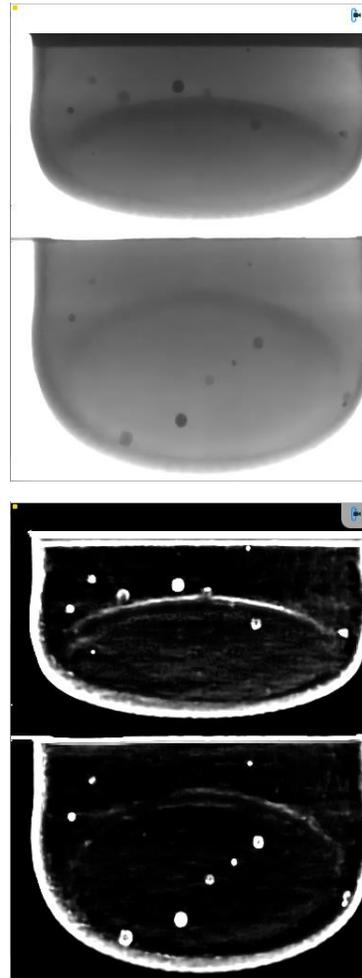


X-ray base inspection:

Artificial intelligence (AI) with HEUFT *reflexx*<sup>A.I.</sup> is applied with a neural network which brings a general improvement to the inspection performance. Due the filtering of the electronic noise images are de-noised and cleared of artifacts before they undergo normal processing of the image evaluation according to proven structures.

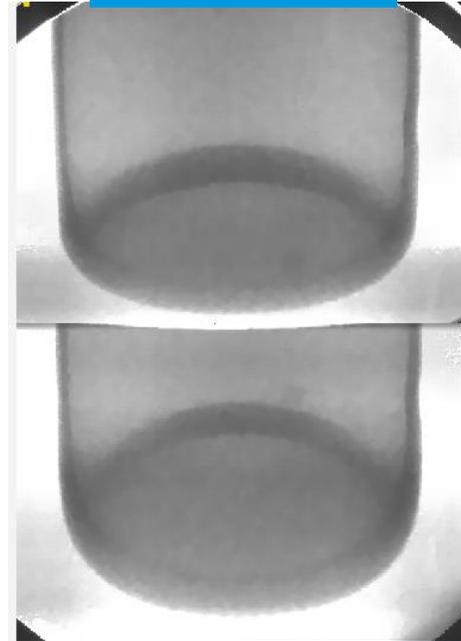
The HEUFT *reflexx*<sup>A.I.</sup> therefore combines artificial intelligence with human and proven image analysis. AI increases the image quality of the X-ray picture with the combination of proven evaluation structures overall the sensitivity of the Glass in Glass detection is increased and lowers the false rejection rate.

HEUFT *reflexx*<sup>A.I.</sup> realtime noise filter

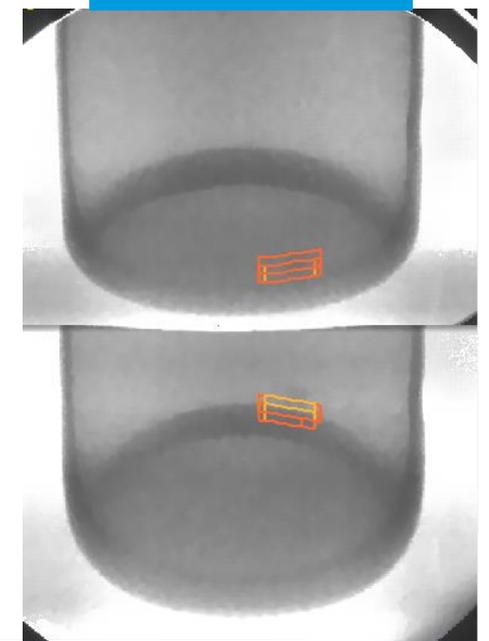


AI

Original  
picture



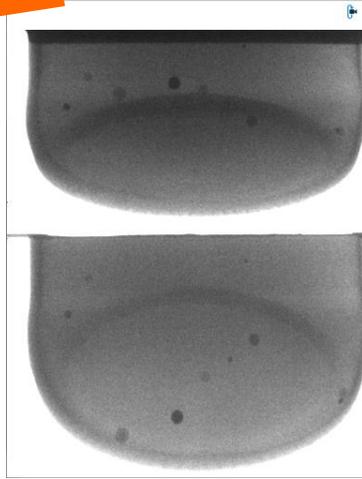
Marked  
picture



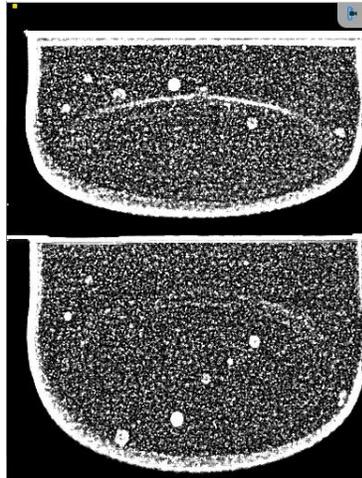
3x3x2.5mm



Past

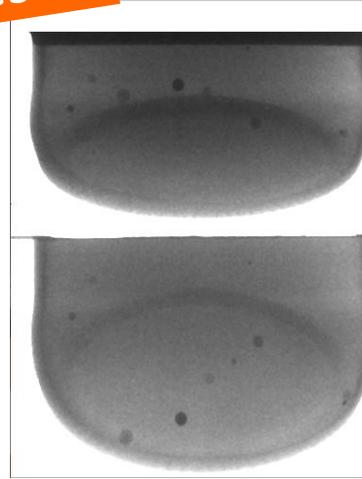


Original image

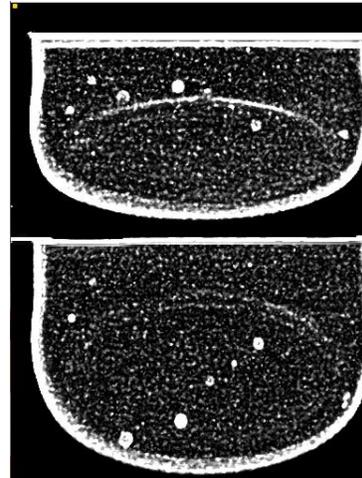


Present

ML

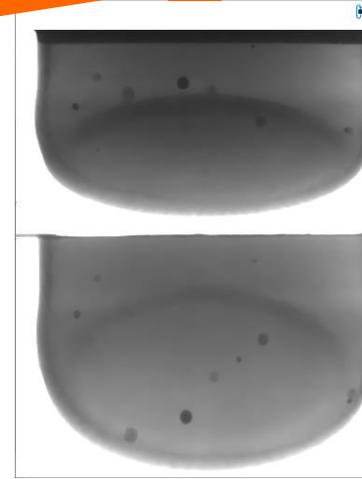


HEUFT *reflexx*<sup>2</sup> realtime noise filter

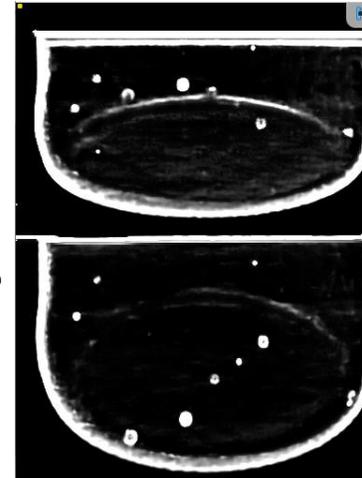


Future

AI

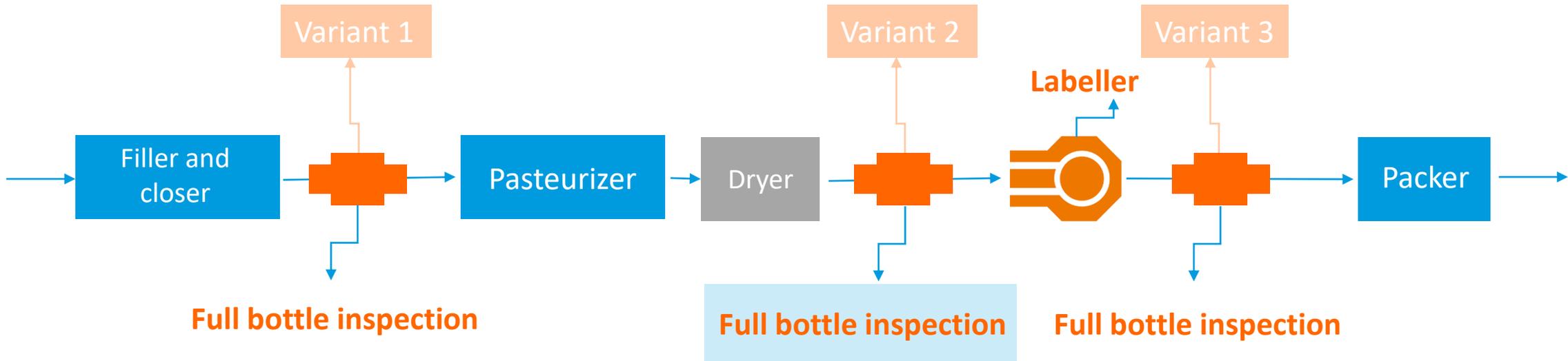


HEUFT *reflexx* A.I. realtime noise filter



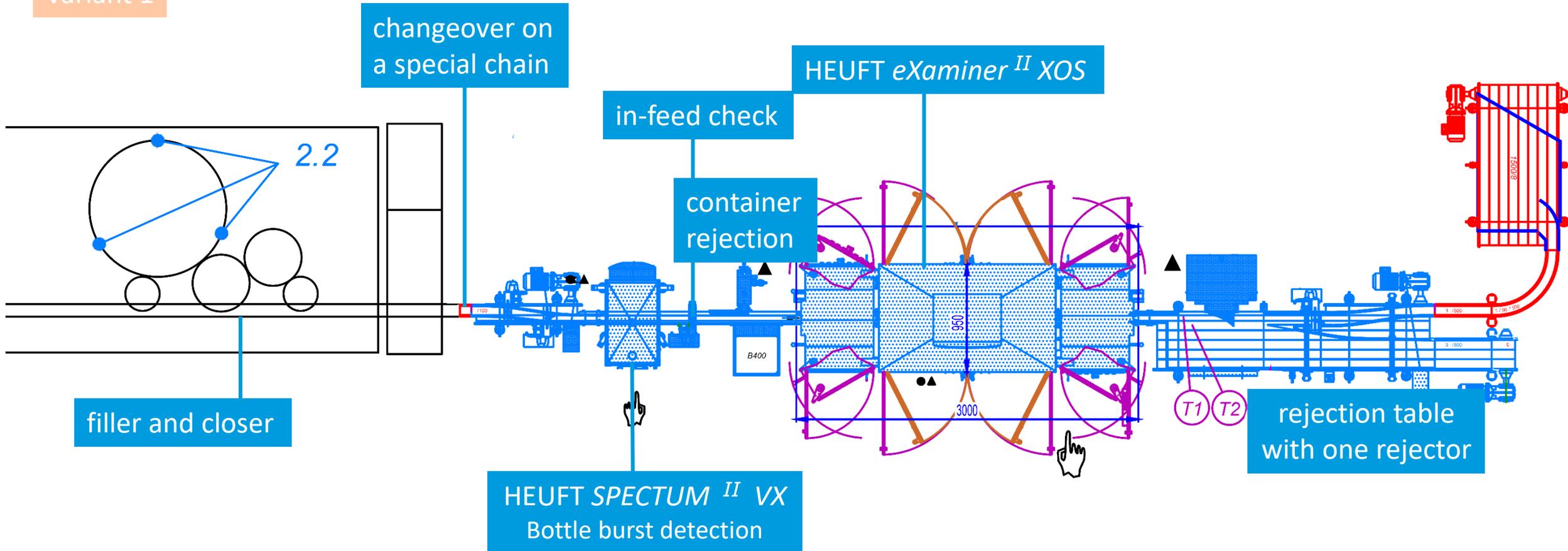
Intelligent image filtering and powerful image processing





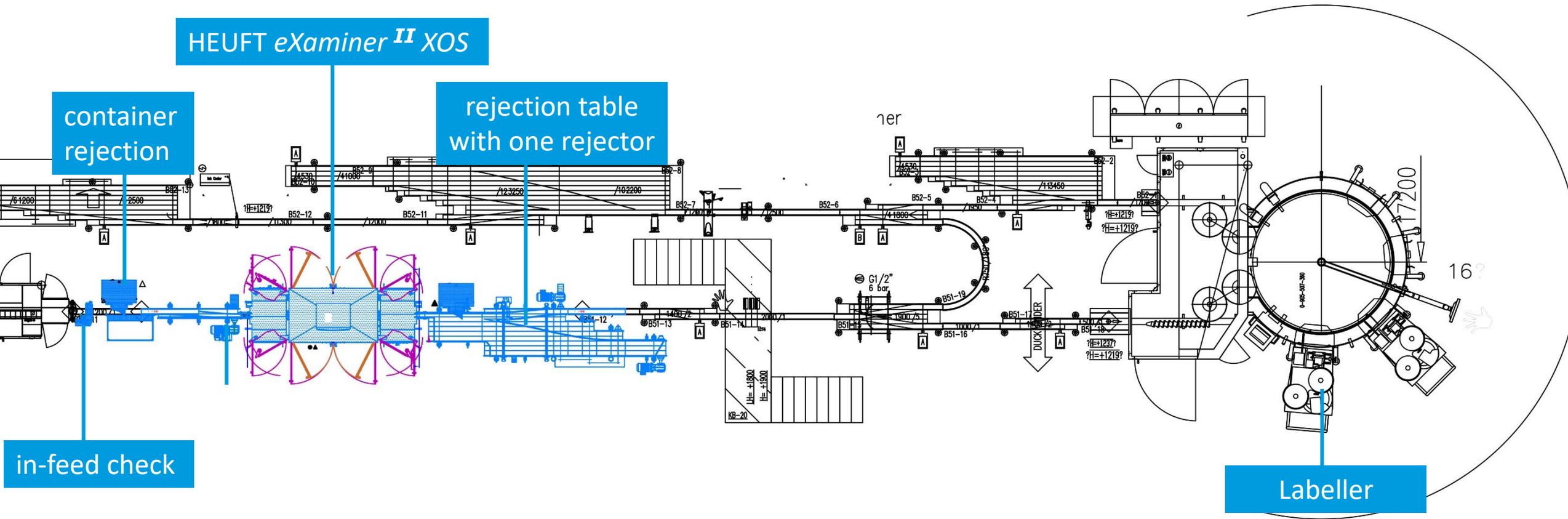
## Variants for full bottle inspection integration

Variant 1



HEUFT *eXaminer II XOS* – integration behind the filler

Variant 2



HEUFT eXaminer II XOS – integration in front of the labeller

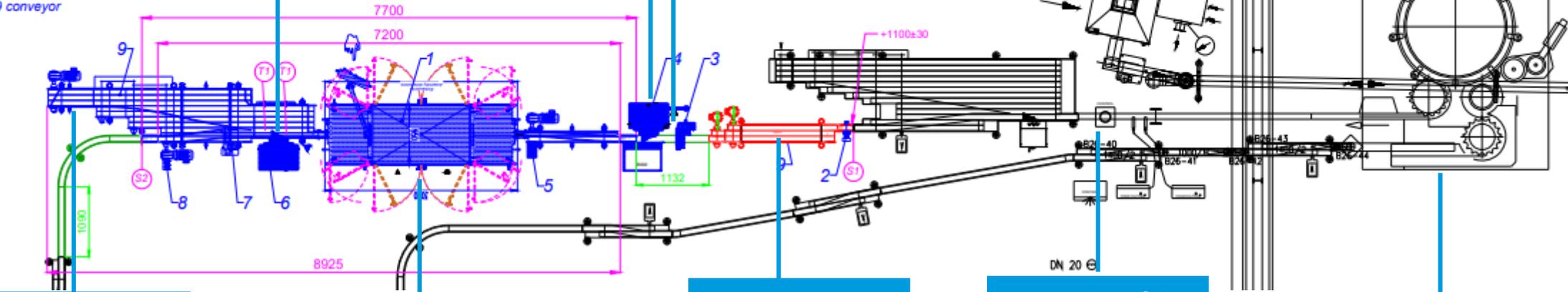
Variant 3

Delivery by HEUFT:

- 1 HEUFT eXaminer II XOS
- 2 Trigger deep standby
- 3 Infeed control
- 4 HEUFT DELTA-FW 10
- 5 Encoder
- 6 HEUFT DELTA-FW 10
- 7 Reject verification
- 8 Encoder
- 9 conveyor

rejection table with one rejector

Rejection of down bottles upfront



Adaption collective table

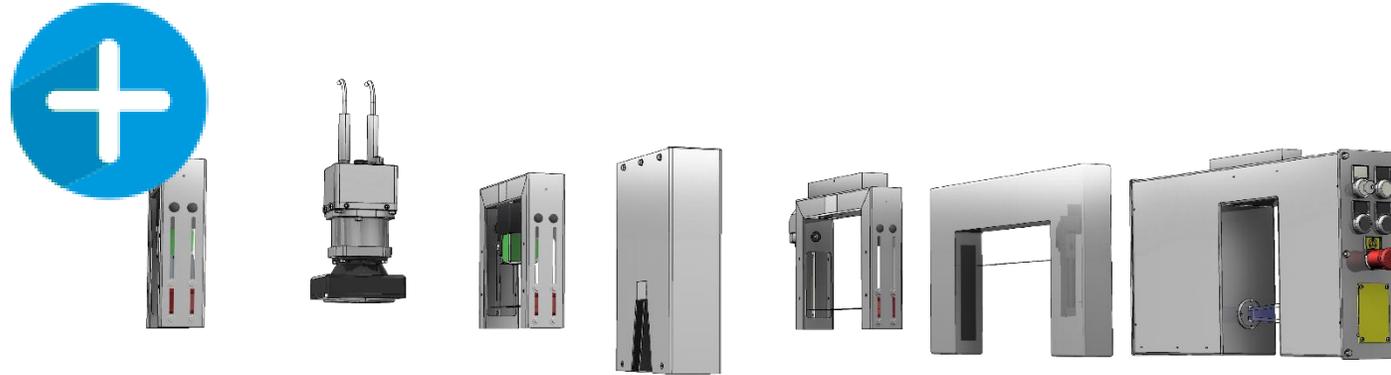
HEUFT eXaminer II XOS

Single lane combiner

Existing fill level and label check

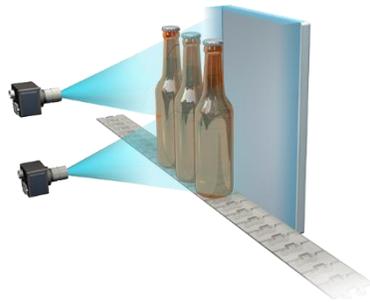
Labeller

HEUFT eXaminer II XOS – integration after the labeller



## Possible additional inspection modules

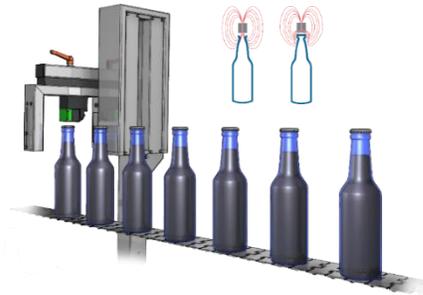
HEUFT *eXaminer II* XOS – further inspection modules



fill level check using  
HEUFT *floater*



fill level check using  
HEUFT *floater*



closure presence using  
inductive sensor



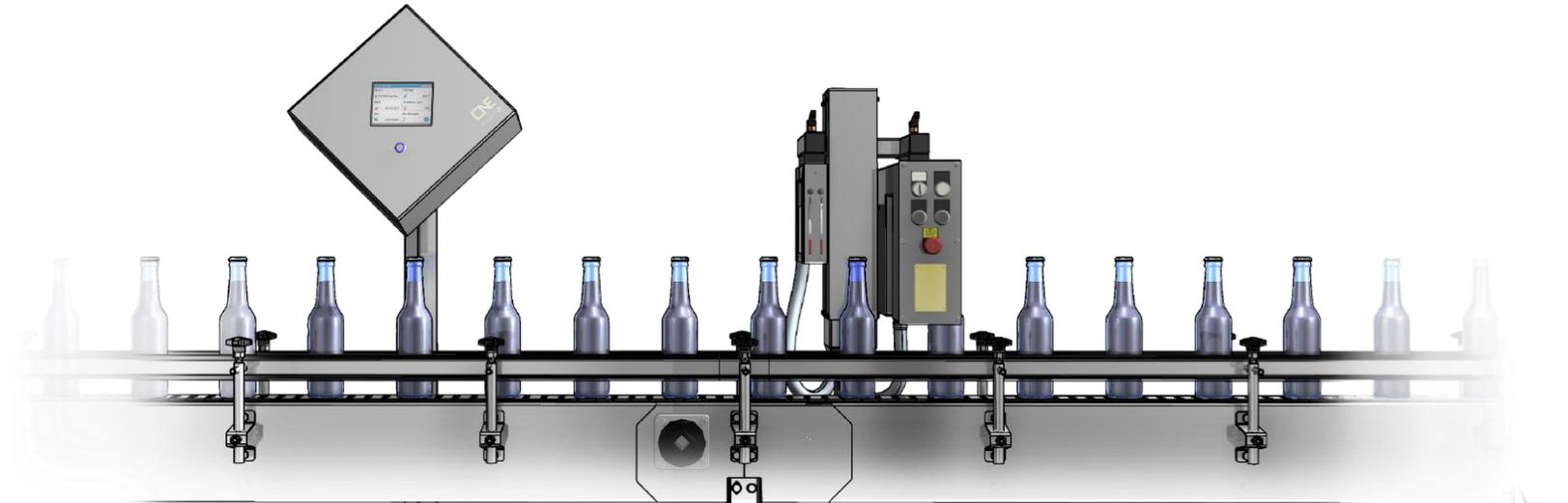
leakage check of metallic  
closures using HEUFT *sonic*



closure and  
correctness



HEUFT *eXaminer II* *XOS* – integratable modules



fill level check using X-ray  
HEUFT ONE



HEUFT *eXaminer II* XOS – integratable modules

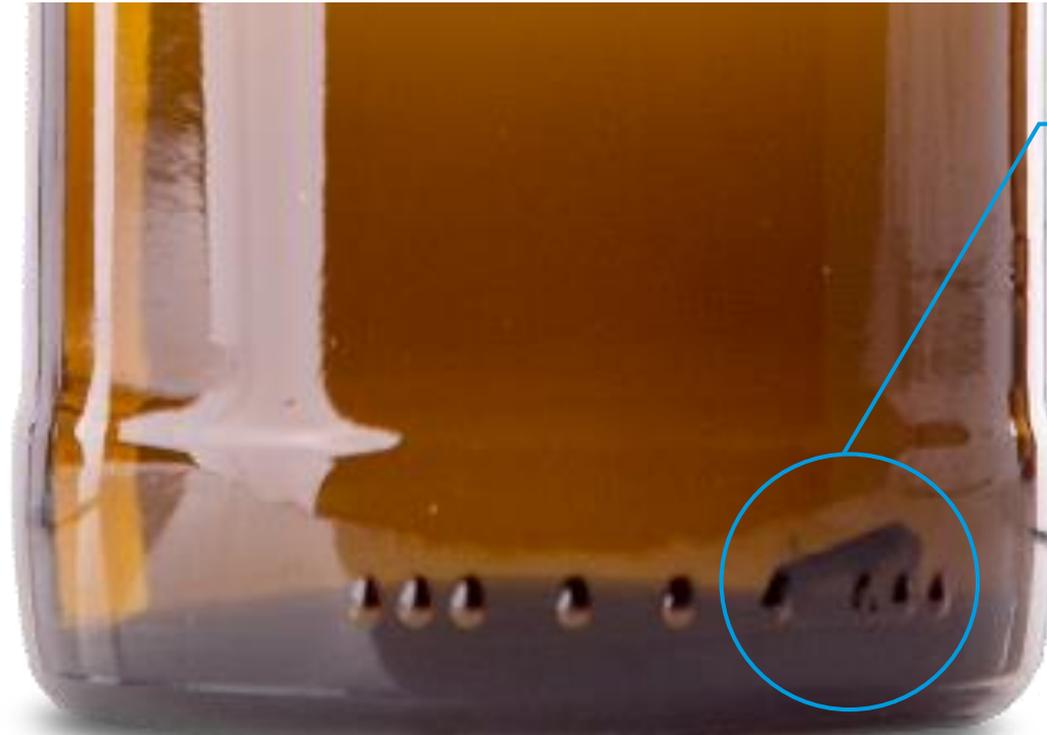
## Field report brewery

- high-speed line
- experience from production

HEUFT *eXaminer II* XOS

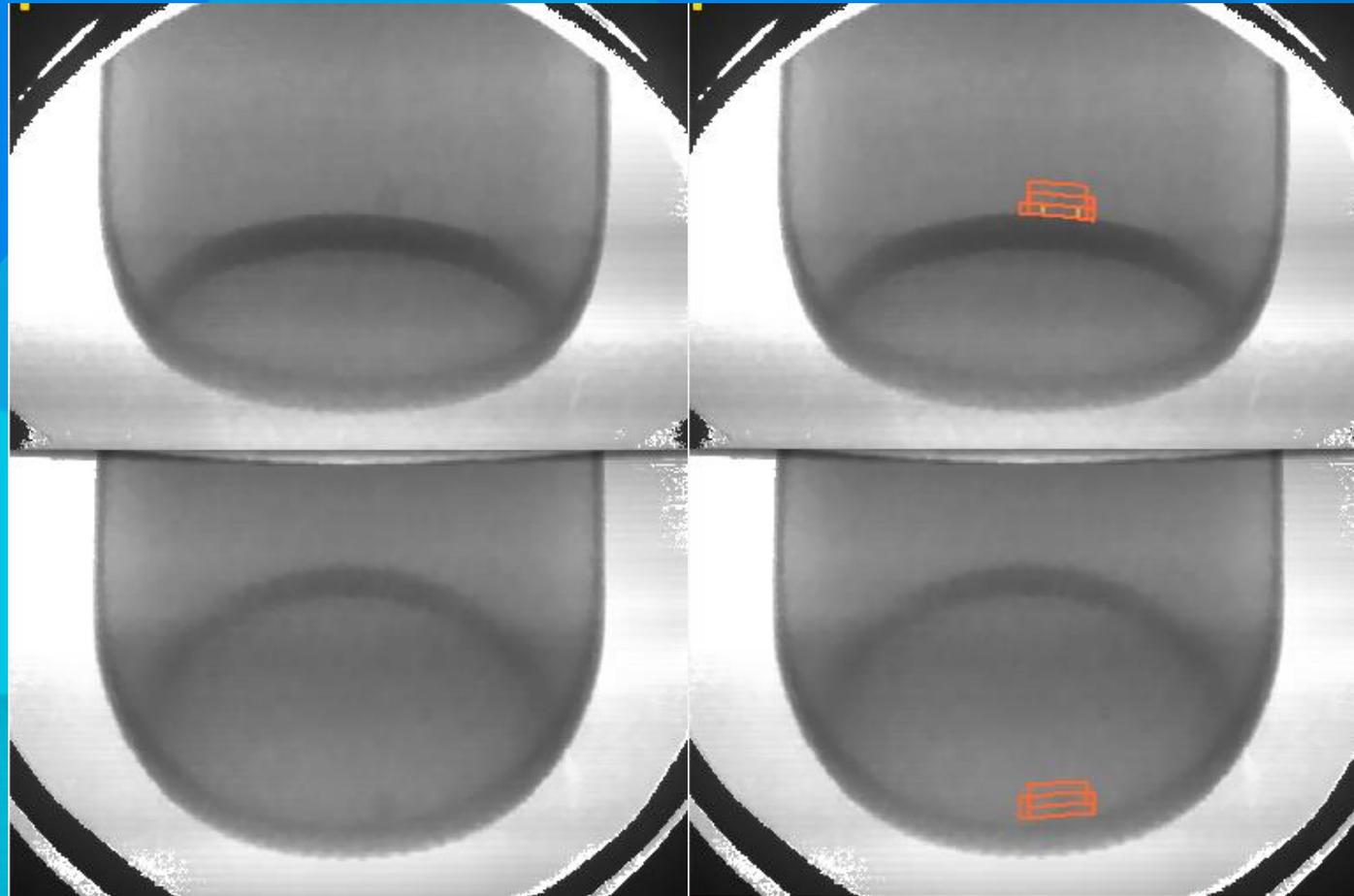


Field report brewery

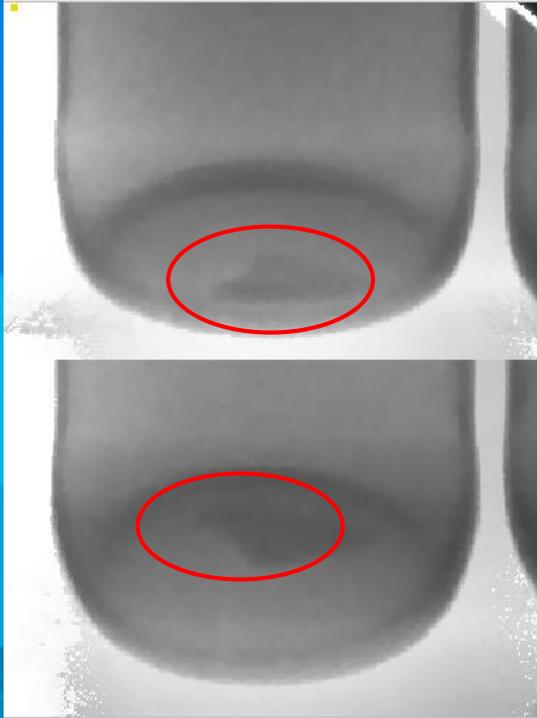


### Glass splinters:

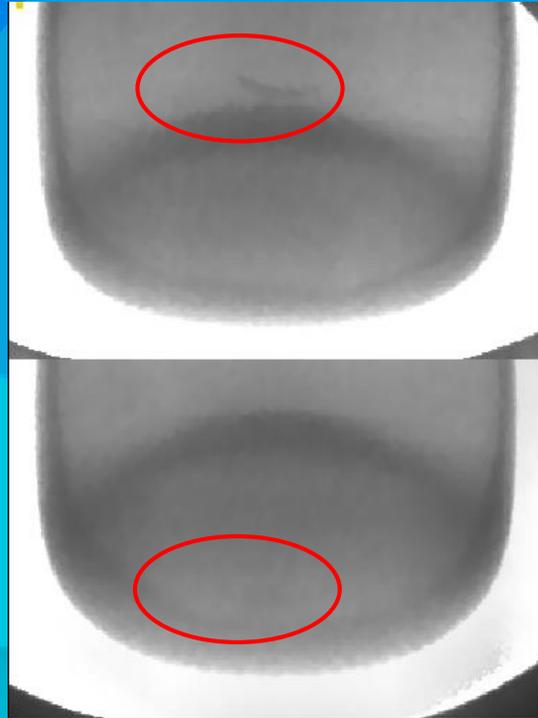
- false rejection rate < 0,2%
- speed: 1.3 m/s
- container diameter 72 mm
- 3 x 3 x 2.5 mm
- detection performance > 95%



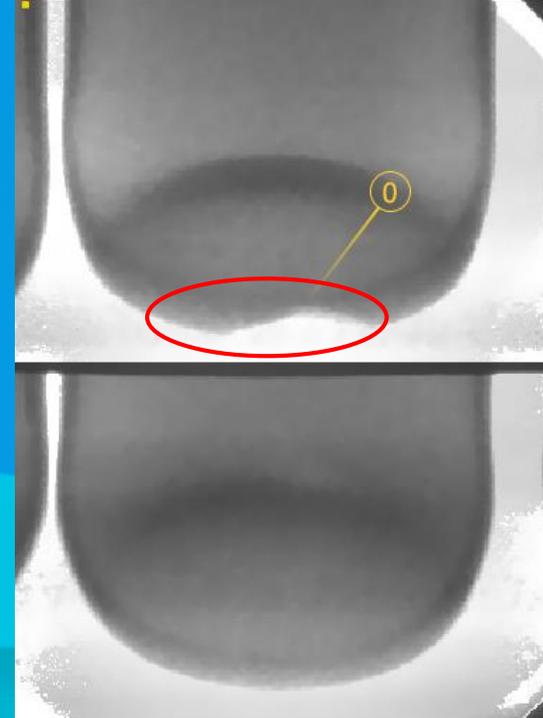
Field report brewery



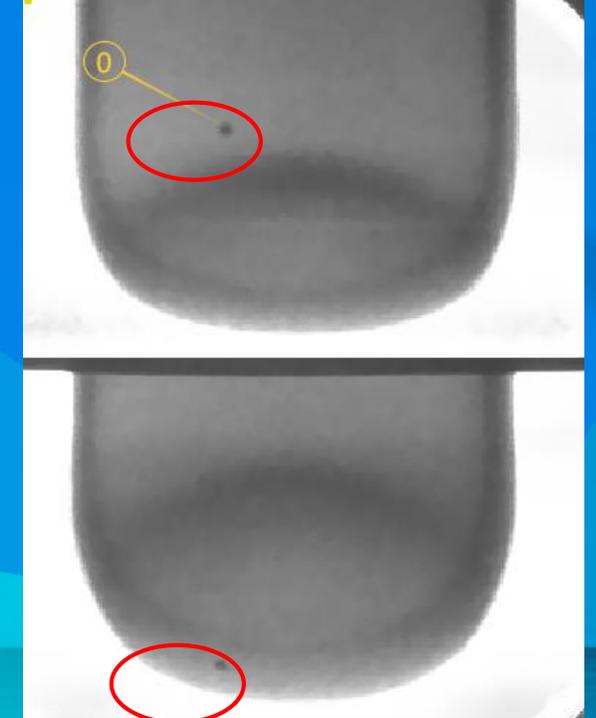
glass splinter in the container middle



needle-shaped glass splinters



crack



metallic inclusion

HEUFT *eXaminer II* – double X-ray base inspection

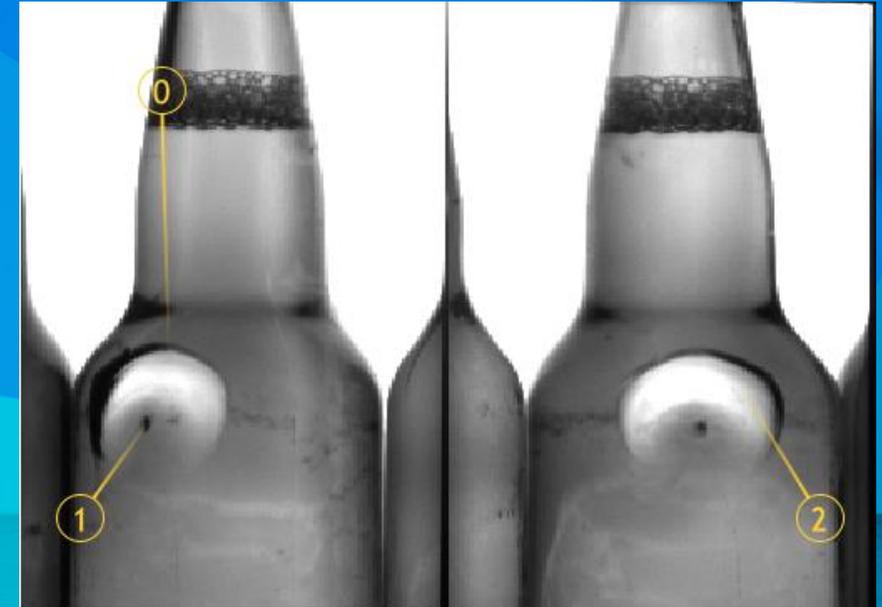




foil in the fill level line



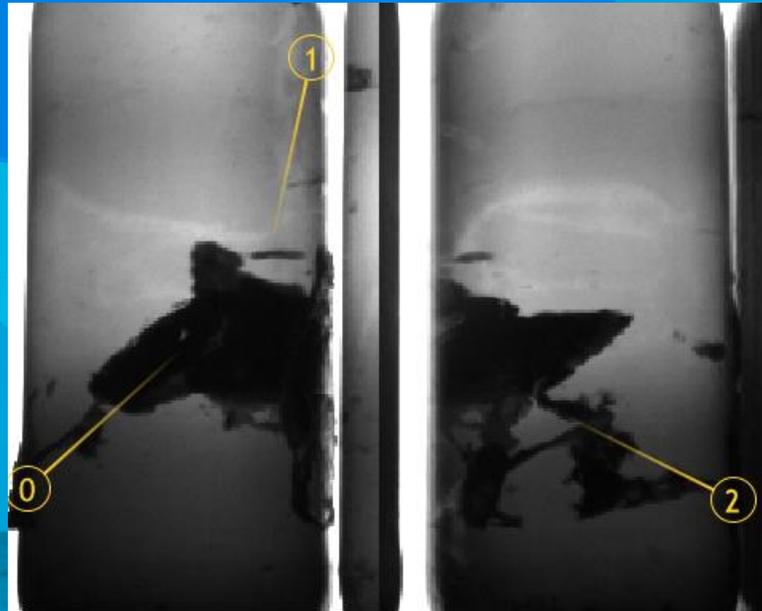
contamination in the shoulder area



crack in the shoulder area



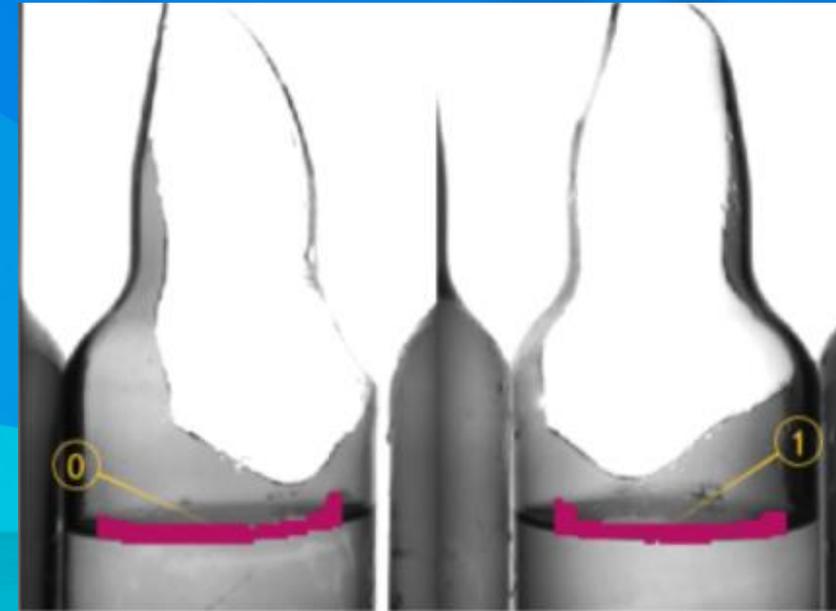
HEUFT *float*er - optical lateral inspection



contamination in the sidewall area



heavy underfill



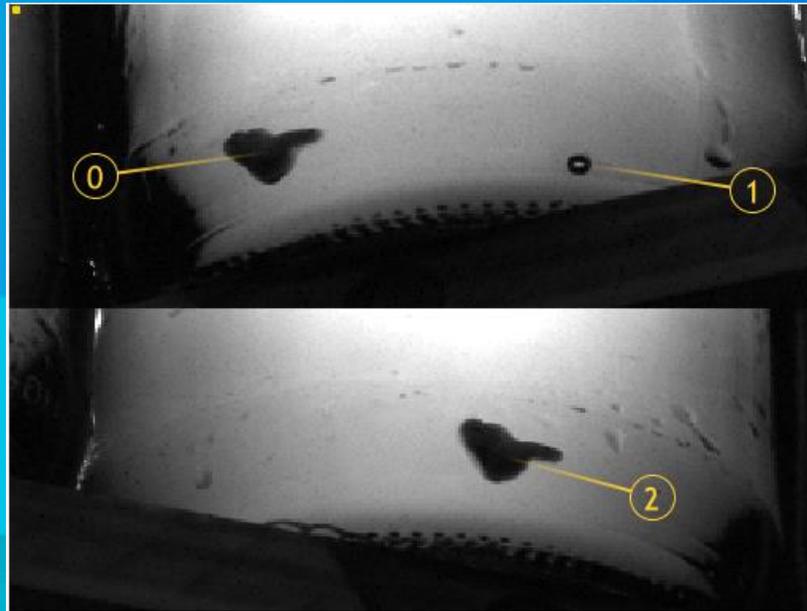
broken bottle neck



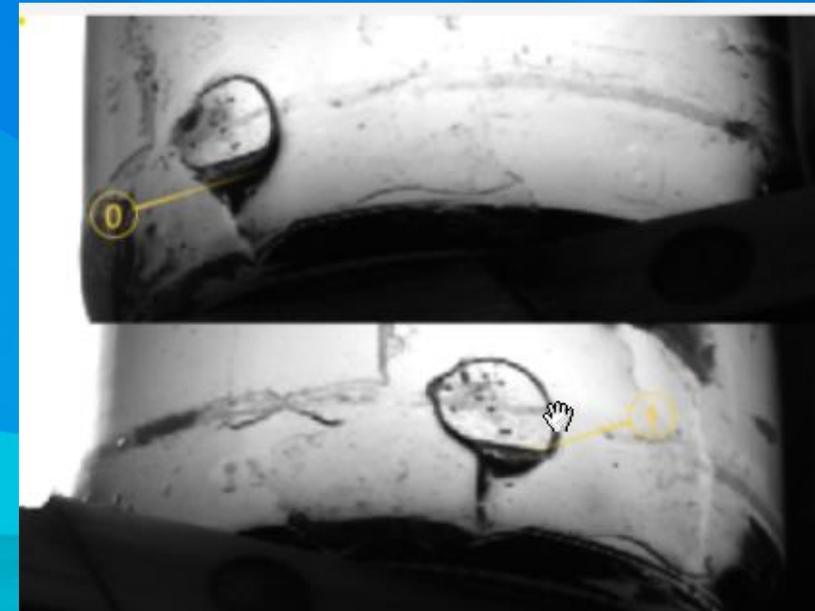
HEUFT *float*er - optical lateral inspection



plastics in the outer base area



floating residue



chip with crack in the lower  
knurling mark area



## HEUFT *sinker* - optical base inspection

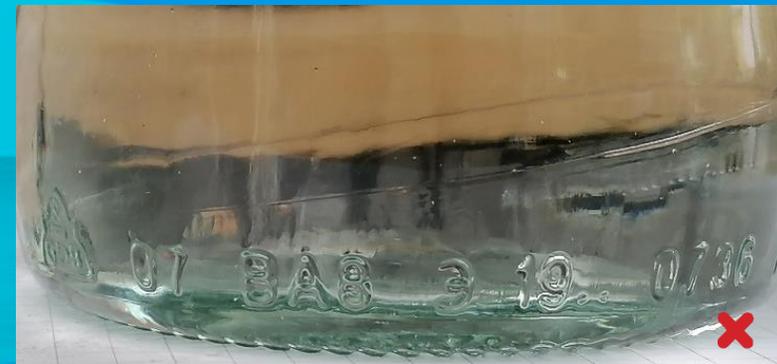
## Challenge test mineral water company:

- test of X-ray base inspection for tolerance to large variations in the base area
- test with own glass pieces & own glass cuboids
- container diameter 79 mm white glass



HEUFT *eXaminer II* XOS

Challenge test of the X-ray base glass in glass detection

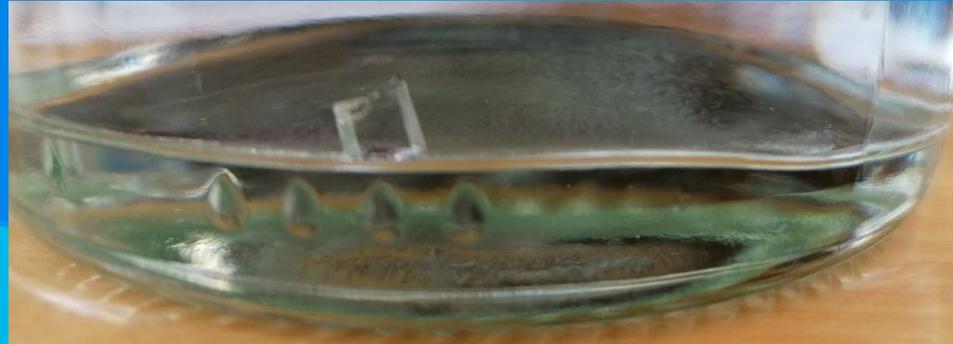


✗ Can no longer be tolerated. Too much material missing. Customer wants this bottle to be rejected.

ENLIGHTENMENT



Challenge test – glass thickness variation at the bottle base



cuboid 3 x 3 x 3mm



shard big 18 x 10 x 3.5mm



shard medium 12.5 x 7 x 1.9mm



shard small 8 x 7.5 x 1.5mm

Challenge test – test objects



10/10 detected

block 3 x 3 x 3mm



10/10 detected

shard big 18 x 10 x 3.5mm



9/10 detected

shard medium 12.5 x 7 x 1.9mm



8/10 detected

shard small 8 x 7.5 x 1.5mm

Challenge test – result

## Field report brewery

- high-speed line
- experience from production
- Customer requirements
  - Detection of chipped and damaged bottles
  - Foreign object detection

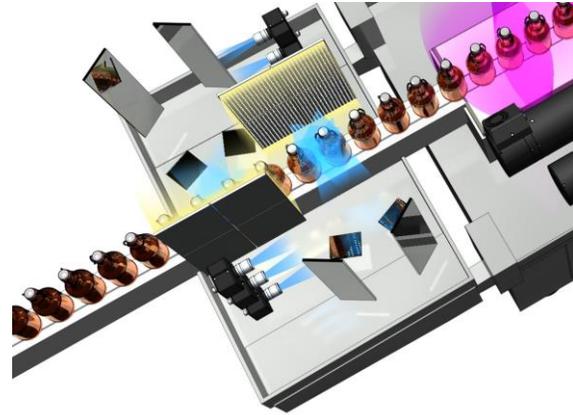


Field report brewery



Chipped Shoulder – Detected with optical and X-ray inspection

New optical modules



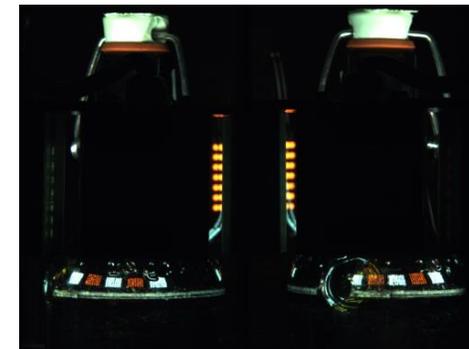
HEUFT *reflexx* <sup>A.I.</sup> camera



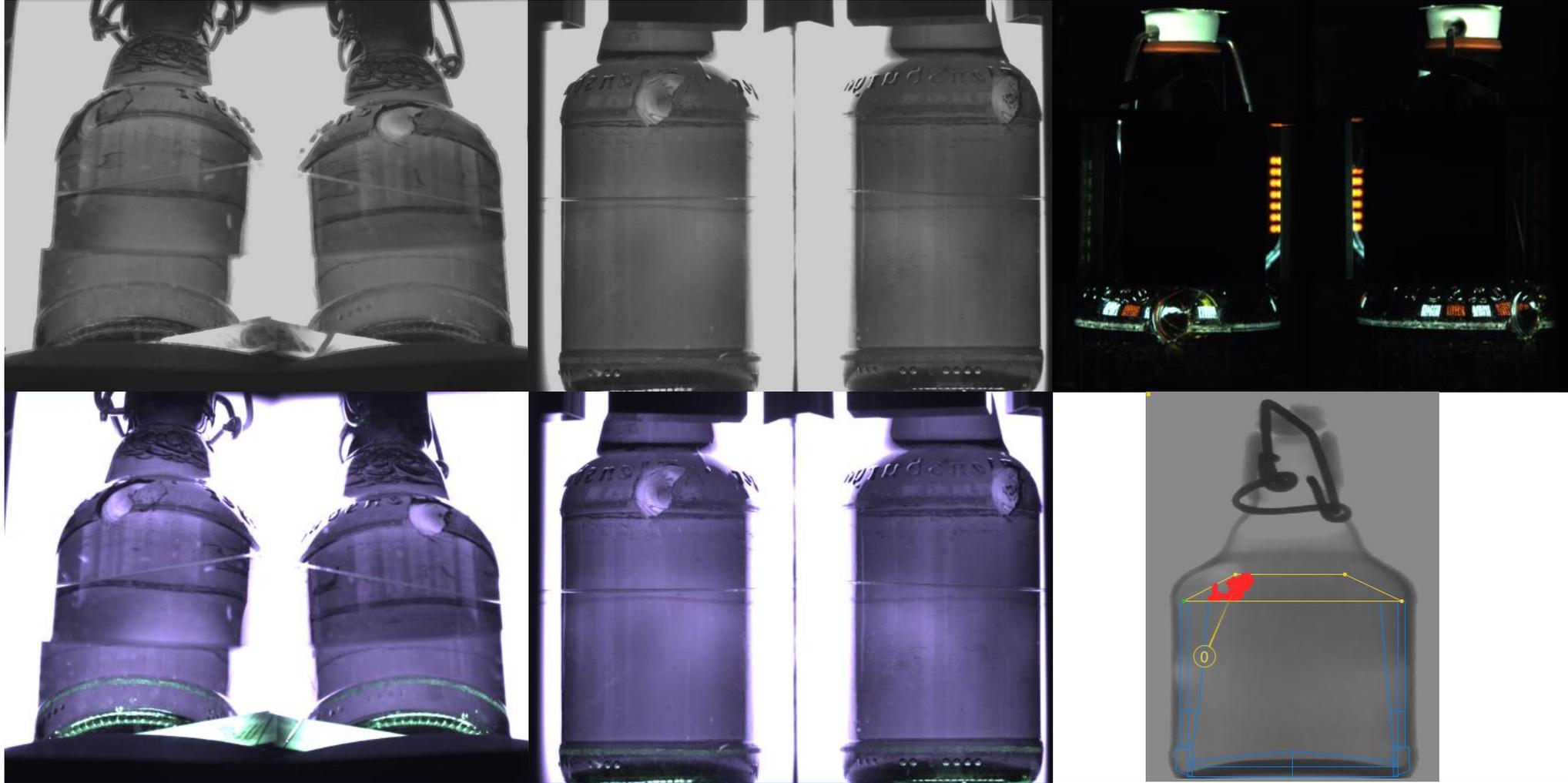
New illumination methods



New evaluation methods



Chipped Shoulder – Detected with optical and X-ray inspection



Chipped Shoulder – Detected with optical and X-ray inspection



Chipped Base – Detected with optical inspection



Challenge – Two bottle generations in one format

Full bottle inspection consisting of:

32 Optical inspection views

3 X-ray inspection views

$\Sigma$  35 Inspection views

Detection of:

- Chipped bottles
- Damaged bottles
- Cracked bottles
- Adhering Labels
- Floating foreign objects
- Glass splinters

Mixed generations pool  
< 0,15% False rejection rate

One generation pool  
< 0,1% False rejection rate

Outstanding balance between detection capability and false rejection

## Customer test X-ray inspection on empty and full bottles

- Test of own glass pieces in
  - Installed EBI's at sites with optical base inspection
  - Optical / X-ray base inspection in HEUFT Inline II IX
  - X-ray base inspection in HEUFT eXaminer II XOS



HEUFT *eXaminer II* XOS

Field report brewery

HEUFT *eXaminer<sup>II</sup>* XOS

-

12oz / 354ml

-

Customer bottle

Glass brown returnable

354ml

Diameter 63mm

Filled with bright beer



HEUFT *eXaminer<sup>II</sup>* XOS

Customer own glass defects



HEUFT *eXaminer<sup>II</sup>* XOS

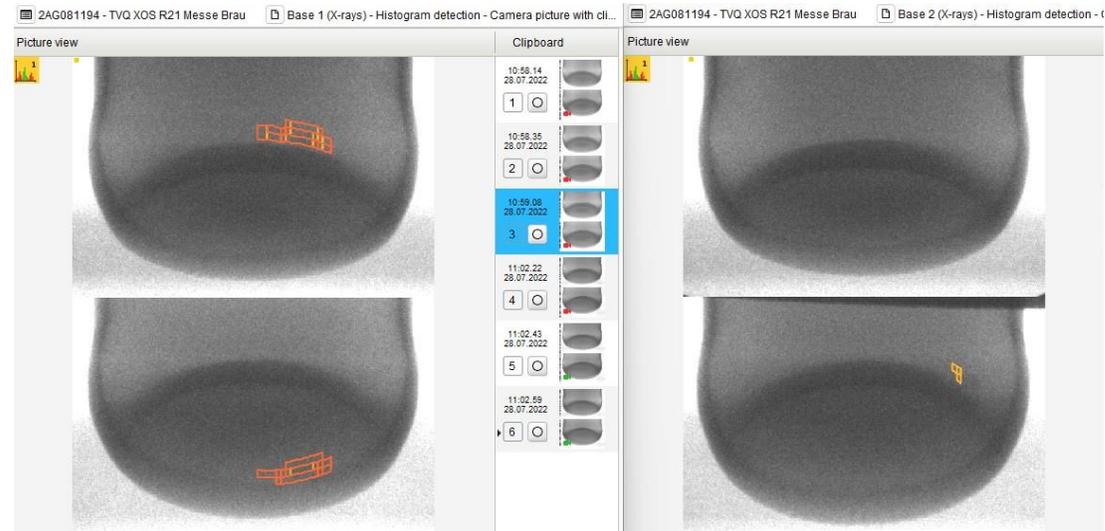
Customer own glass defects

No. 1

Without marking



With marking

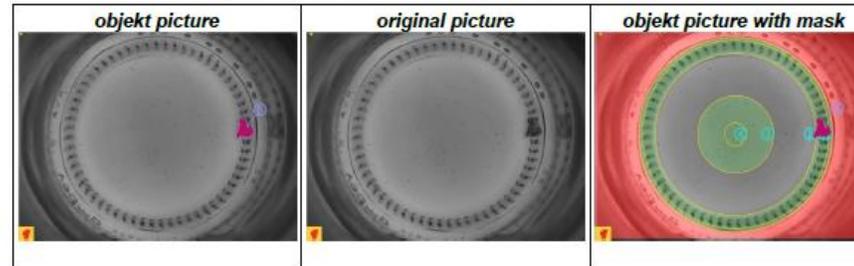


# HEUFT Inline II IX

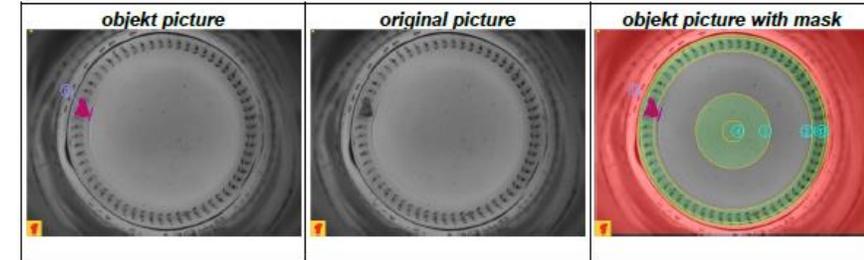
## Customer own glass defects

No. 1

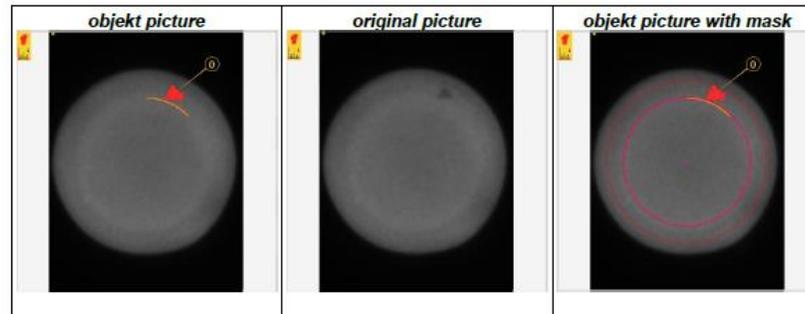
*Faulty bottle No.1 (without water) in 1st Base-Inspection*



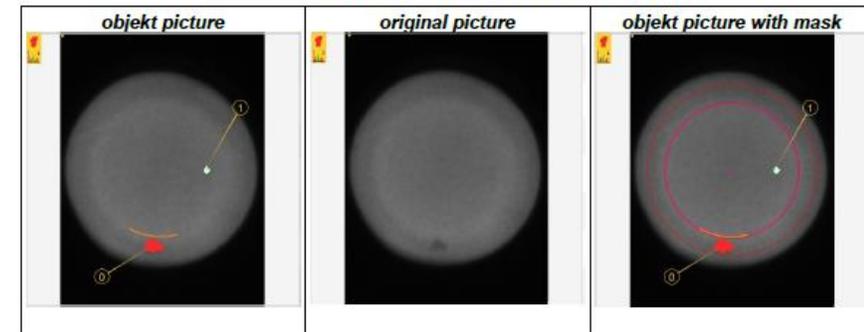
*Faulty bottle No.1 (with water) in 1st Base-Inspection*



*Faulty bottle No.1 (without water) in Base- x-Ray-Inspection*



*Faulty bottle No.1 (with water) in Base- x-Ray-Inspection*



# Glass in Glass detection in empty and full bottles customer test

| Size [mm]     | Picture  | ASEBI Competitor [%] | ASEBI Competitor [%] | ASEBI HEUFT <i>Inline II IX</i> [%] | FBI HEUFT <i>eXaminer II XOS</i> [%] |
|---------------|--|----------------------|----------------------|-------------------------------------|--------------------------------------|
| 2,0x4,0x4,5   |   | 50                   | 70                   | 100                                 | 100                                  |
| 1,3x5,2x6,1   |   | 30                   | 80                   | 100                                 | 100                                  |
| 1,2x2,4x9,6   |   | 10                   | 60                   | 100                                 | 100                                  |
| 0,95x1,1x15,3 |   | 10                   | 0                    | 100                                 | 30                                   |
| 1,7x2,2x20,0  |  | 40                   | 10                   | 100                                 | 100                                  |

Glass-in-glass detection - performance enhancement with pulsed X-ray

## Full bottle inspection

- dirty & damaged primary packaging is detected
- foreign objects in containers such as glass are detected
- increases product safety
- low operating costs
- state of the art

Full bottle inspection - state of the art

HEUFT SYSTEMTECHNIK GMBH – [heuft.com](https://heuft.com)

**Thank you for your attention!**





WE ARE HEUFT!



*And HEUFT knows how!*



## Full bottle inspection with HEUFT *eXaminer II XOS*

- check for foreign objects after the filling process and inspection of the closed primary packaging
- risk of foreign objects is significantly reduced and product safety increased
- consumer and brand protection

Protection against foreign objects and damage

## European Consumer Protection Agency

A study by the European Consumer Protection Agency showed that between 2011 and 2019, almost two-thirds (63%) of recalls were due to microbiological contamination and foreign bodies.

Foreign bodies such as: Glass splinters, metal shards, foils, plastics, pieces of wood etc. have a share of 26% here.

Out of those 26% total share glass splinters took the majority with 60%.



### Heineken waarschuwt voor stukjes glas in bierflesjes



30-06-2022 20:14 | Binnenland | auteur ANP

LEIDEN - Heineken is een terugroepactie gestart voor kleine bierflesjes. De brouwer waarschuwt dat er mogelijk glas in zit. Het gaat om flesjes van 25 centiliter met schroefdrop, zonder statiegeld. Volgens de brouwer kunnen er glasschilfers van de onderzijde loskomen en in het bier terecht komen.

De flesjes zijn verkocht door supermarkten, groothandels, slijterijen en webshops. Heineken laat weten dat consumenten de flessen kunnen terugbrengen naar de verkoopplocatie en het aankoopbedrag terugkrijgen.

### Stella Artois recalls beer bottles that could contain particles of glass

DAVID CARRIG | USA TODAY

Stella Artois has issued a voluntary recall of some its 11.2-ounce bottles of Stella Artois beer in the U.S. and Canada that may contain particles of glass.

The Belgian beer brand, owned by Anheuser-Busch InBev, said the recall covers less than 1% of its glass bottles sold in North America.



### Warning on imported Coca Cola in glass bottles

Health | Community

2. März 2020 | Times of Malta | 0

1 min read



Is there a risk when filling and packaging food and beverages?



## Global

The CODEX ALIMENTARIUS INTERNATIONAL FOOD STANDARDS from the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) the guidelines “GENERAL PRINCIPLES OF FOOD HYGIENE” are foundation for every food hygiene law of nation or worldwide trade organizations.

Are there legal obligations?



## Global

*Physical contamination Systems should be in place throughout the food chain to prevent contamination of foods by extraneous materials, such as personnel belongings, especially any hard or sharp object(s), e.g. jewellery, glass, metal shards, bone(s), plastic, wood fragments, that could cause injury or present a choking hazard. In manufacturing and processing, suitable prevention strategies such as maintenance and regular inspection of equipment, should be undertaken. Detection or screening devices which are appropriately calibrated should be used where necessary (e.g. metal detectors, x-ray detectors). Procedures should be in place for personnel to follow in the case of breakages (e.g. breakage of glass or plastic containers). Critical Control Point (CCP): A step at which a control measure or control measures, essential to control a significant hazard, is/are applied in a HACCP Hazard Analysis and Critical Control Point (HACCP) system."*

## GENERAL PRINCIPLES OF FOOD HYGIENE CXC 1-1969

Are there legal obligations?



## European Union

Thus, two main factors determine whether a food is safe [EU Regulation 178/2002]:

1. the effects of the food on the health of the consumer - considering the particular health sensitivities of certain risk groups.
2. the question of whether the food is contaminated (by foreign substances or by putrefaction or spoilage, etc.) has made the food unacceptable for consumption.

Are there legal obligations?

## Consumer point of view

- Especially foreign bodies made of glass are seen as a danger by consumer due to Injuries like bleeding.
- Consumers of high-quality products have a zero tolerance for the presence of foreign bodies which lead to loss in the trust of the brand.
- In particular the food and beverage industry are particularly dependent on consumer trust into the brands.



What is the point of view of the consumer?

## Perceptibility = a crucial factor!

- For the presence of foreign bodies in food, in addition to the health hazard, the question is therefore the question is: "Is the foreign body perceptible to the consumer?"
- Small foreign bodies - with no risk of injury - are capable of making a product "unsafe".



What is the point of view of the consumer?

FULL BOTTLE INSPECTION



HEUFT *eXaminer II* XOS

Customer experience with full bottle inspection

Customers and markets -  
Worldwide

HEUFT *eXaminer<sup>II</sup> XOS*

-

*Countries*

| Europe | Africa and Middle East | America | Asia |
|--------|------------------------|---------|------|
| 19     | 1                      | 22      | 10   |

| Total | No. customers |
|-------|---------------|
| 52    | 23            |

| Non returnable glass | Returnable glass | Use EBI / ASEBI | Use Bottle Burst Routine |
|----------------------|------------------|-----------------|--------------------------|
| 3                    | 20               | 20              | 20                       |

Customers Customer  
experience

HEUFT *eXaminer<sup>II</sup> XOS*

| Had problems with glass splinters in their process before using FBI | Had a recall public/ non public/ through official authorities |
|---|---|
| 20  | 15  |

|  |   |  |
|--|---|--|
| Found a glass splinter in rejected bottles from the HEUFT <i>eXaminer II XOS</i> | Found other foreign objects in rejected bottles from the HEUFT <i>eXaminer II XOS</i> | Have been able to sustainably improve their glass quality through exchange with glass supplier |
| 17   | 23  | 19   |

Customers Customer  
experience

HEUFT *eXaminer II XOS*

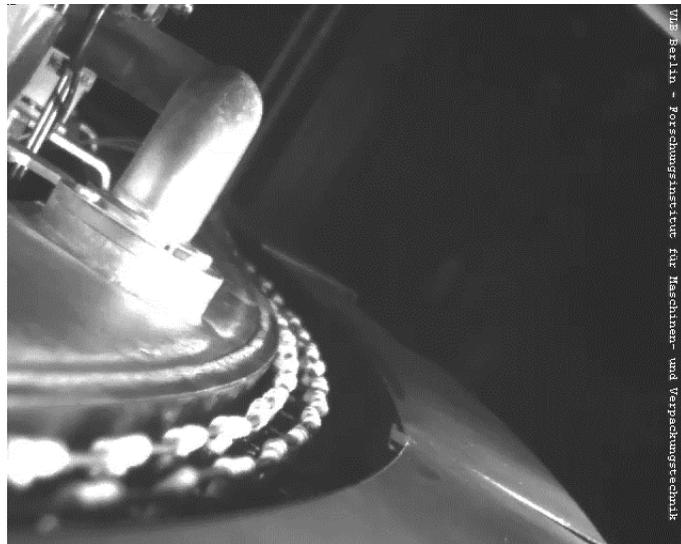
|   |
|---|
| See Full bottle inspection HEUFT <i>eXaminer II XOS</i> as State of the Art |
| 23  |



## Risk of contamination before filling

- Empty bottle inspection contributes significantly to the safety of the product. Today, it is state of the art because it reliably detects contamination and damage as well as residual liquids in the empty bottle. In addition, empty bottle inspection ensures the line efficiency of the central filler unit by separating damaged empty bottles from the good containers, thus reducing bottle bursts during filling or capping.
- However, the empty bottle inspector cannot detect and reject downstream contamination in the filling process.

Empty bottle inspection state of the art



UVE Berlin - Forschungsinstitut für Maschinen- und Verpackungstechnik

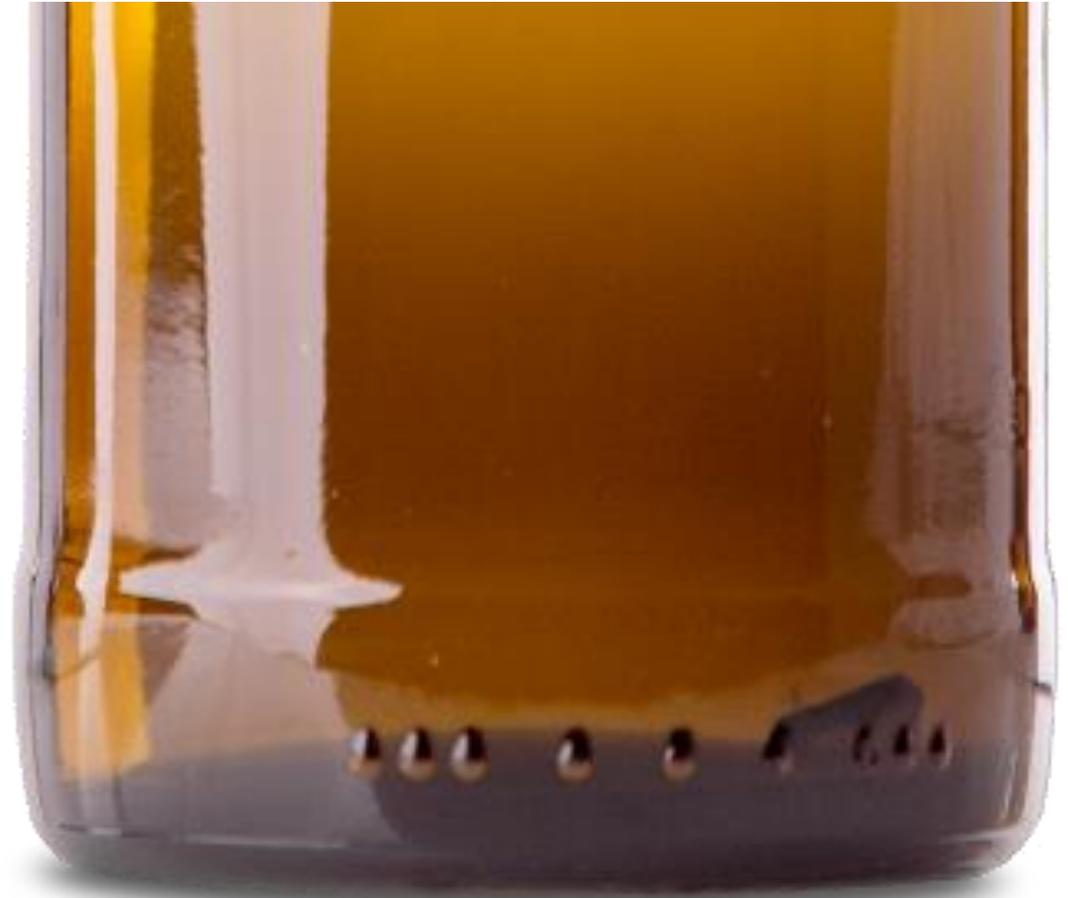
## Risk of contamination while filling

- Is achieving zero risk for glass splinters even possible? No!
- There is much that can be done to "minimize the risk".

Bottle Burst Routine sufficient?

*“The HEUFT eXaminer inspection is for us the last instant check to find any non-organic foreign bodies like metals our glass in glass. Due we are filling and packaging glass containers it happens that it comes to breakage and damage of the glass container. We are never safe from this danger despite all the measures taken in the previous process. However, with the HEUFT eXaminer we can guarantee a contamination-free product.”*

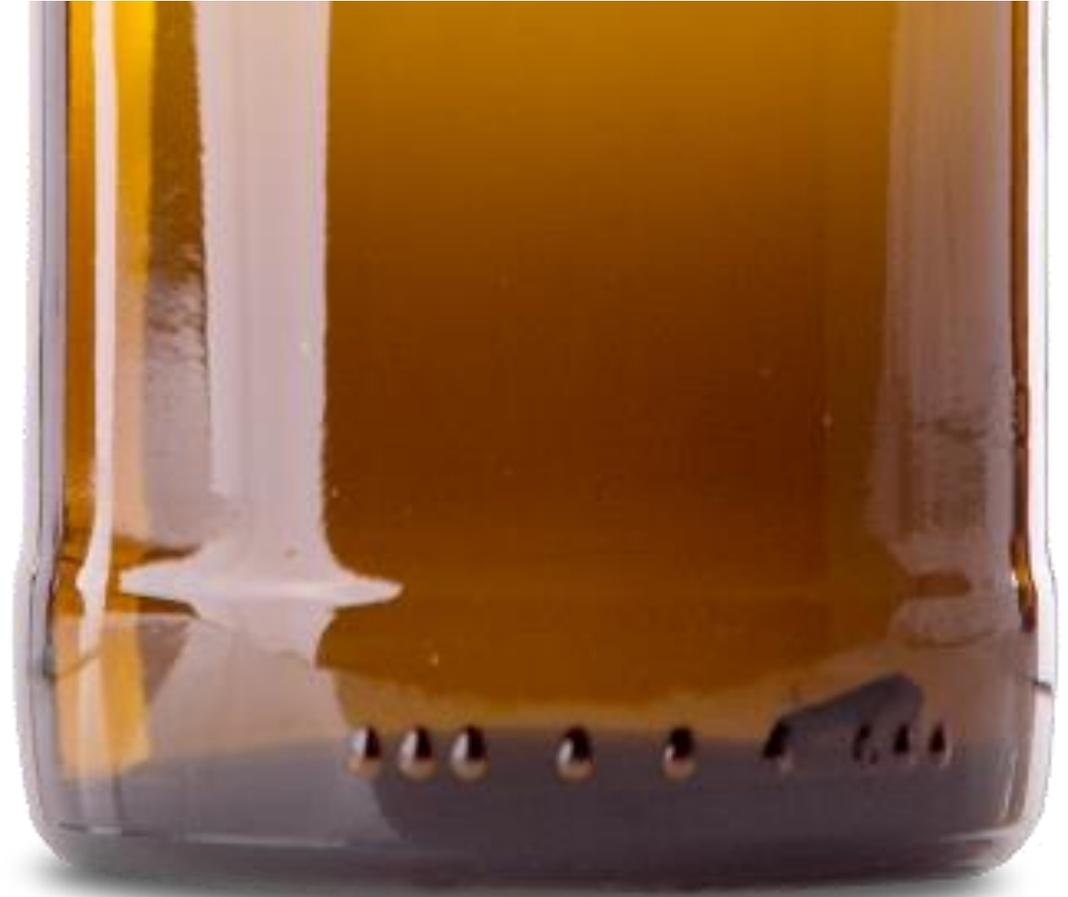
*“We have a very high standard in terms of quality when filling the product. Nevertheless, despite using all standards in the industry EBI and Bottle Burst, we had a recall for glass splinters. Shortly after commissioning the HEUFT eXaminer II XOS we found another glass shard. This means that the system has already paid for itself.”*



## Statements from customers

*“By using the HEUFT eXaminer II XOS we were able to better understand and identify problems in our upstream process. This has contributed significantly to the quality improvement.”*

*“Before the HEUFT eXaminer II XOS was used we had a high number of complaints from our customers in particular due to cosmetic and critical defects. Damaged bottles were rejected right at the beginning of the commissioning which created an immediate change in the way of thinking and quality awareness among the operators but also among supervisors. All involved parties are now implementing this together and the number of complaints has now been significantly reduced.”*



## Statements from customers



copyright by

# Customers and markets - Worldwide



HEUFT *eXaminer II* XOS



[Link for video and report](#)

→ Click on the device

Success Story



HEUFT *eXaminer II* XOS



Link for video and report  
→ Click on the device

Is the full bottle inspection state of the art



HEUFT *eXaminer II* XOS



[Link for video and report](#)

→ Click on the device

Success Story



## Full bottle inspection

- dirty & damaged primary packaging is detected
- foreign objects in containers such as glass are detected
- increases product safety
- low operating costs
- state of the art

Full bottle inspection - state of the art

HEUFT SYSTEMTECHNIK GMBH – [heuft.com](https://heuft.com)

**Thank you for your attention!**



A background image of a bottle inspection machine. The machine is dark and industrial, with a conveyor belt carrying several clear glass bottles. The scene is dimly lit, with a blueish tint, and the machine's internal components are partially visible.

Comparison between

HEUFT *eXaminer<sup>II</sup> XOS*

&

HEUFT *eXaminer<sup>II</sup> XAC*

HEUFT SYSTEMTECHNIK GMBH  
Anton Diehl – Product Manager

## HEUFT *eXaminer*

- Use unique Pulsed X-ray technology
- Use same design platform
- Turn Key solution including container tracking, rejection
- Have same operating system and picture evaluation



Comparison HEUFT *eXaminer II*



✓ Gapless and variable bottle flow

Variable and high speeds possible ✓

ONLY AVAILABLE WITH THE PULSED X-RAY TECHNOLOGY

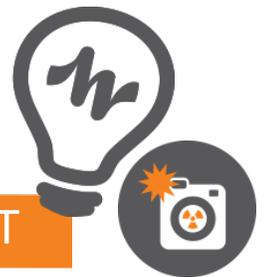


✓ Start / stop possible  
Line clearing not necessary



No reduction in detection performance at high speeds ✓

ENLIGHTENMENT



The advantages of pulsed X-ray technology

|   | <i>eXaminer II XAC</i>                                     | <i>eXaminer II XOS</i> |
|---|--|------------------------|
| Industry applied  | Food / Beverage  | Beverage               |
| Inspection technology   | X-ray  | X-ray & Optics         |
| Max. modules X-ray  | 3  | 2                      |
| Max. modules Optics   | 0  | 8                      |
| Possible X-ray modules  | 1x Double Base<br>2x Sidewall inspection                   | 2x Double Base         |
| Recommendation for X-ray from HEUFT on beverage glass bottles | 1x Double Base   | 2x Double Base         |
| Picture   | <p>HEUFT <i>eXaminer II XAC</i>: the detection modules</p> |                        |



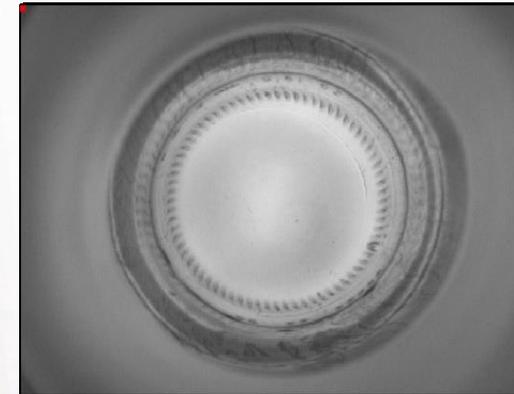
HEUFT SYSTEMTECHNIK GMBH – [heuft.com](https://heuft.com)

**Thank you for your attention!**

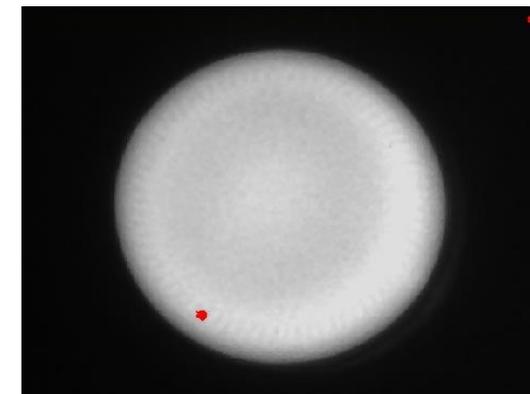




HEUFT InLine II IXS



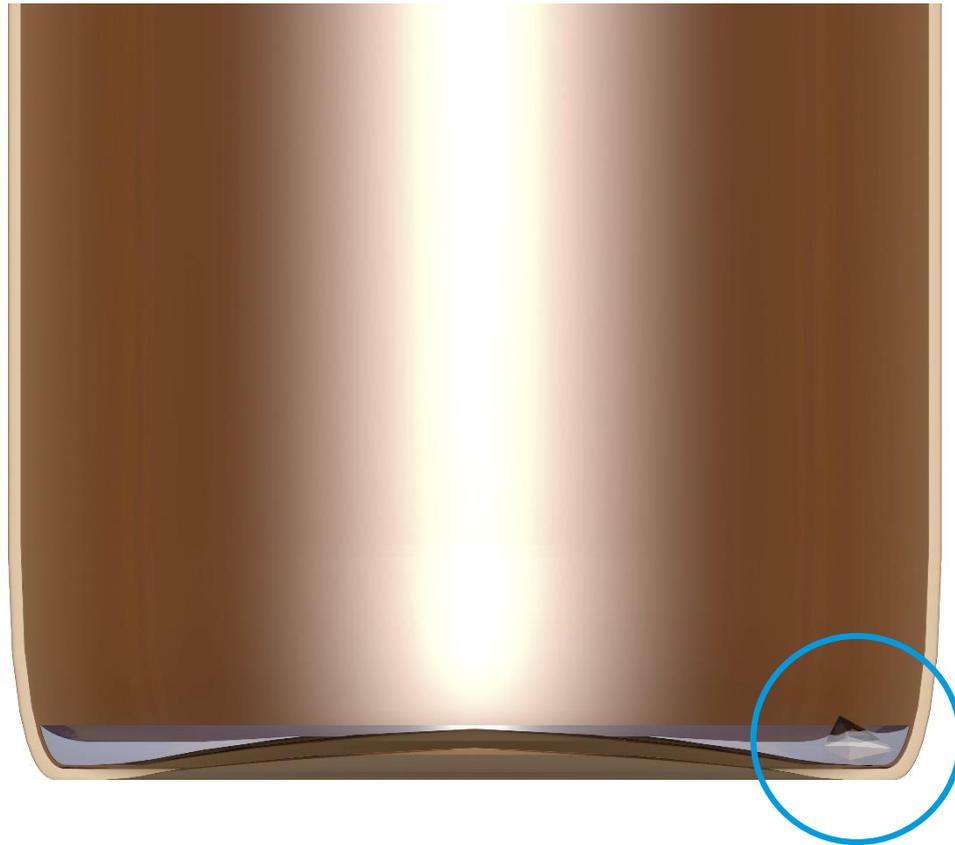
Optical



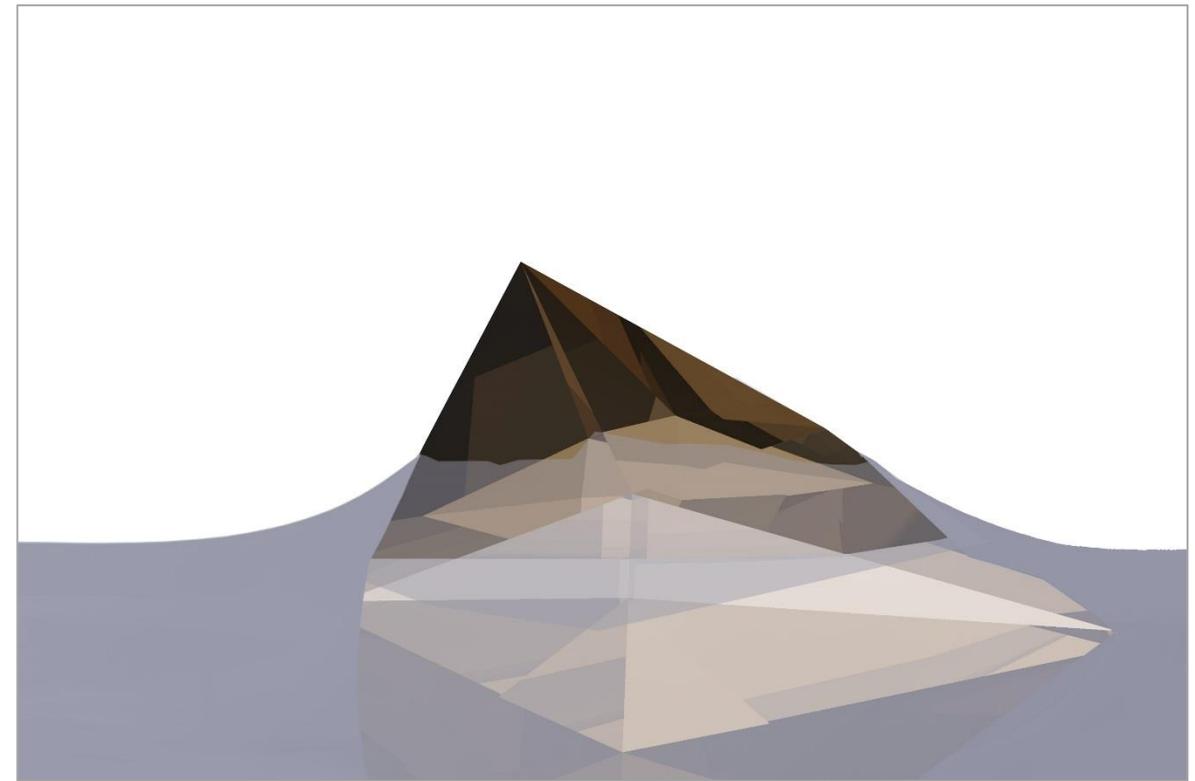
X-ray

Critical Control Point – All surfaces empty bottle inspection with X-ray

Glass splinter in residual liquid (water)



Surface tension of the water

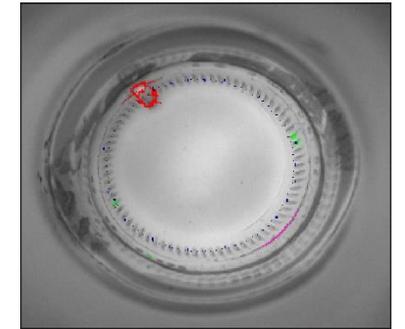
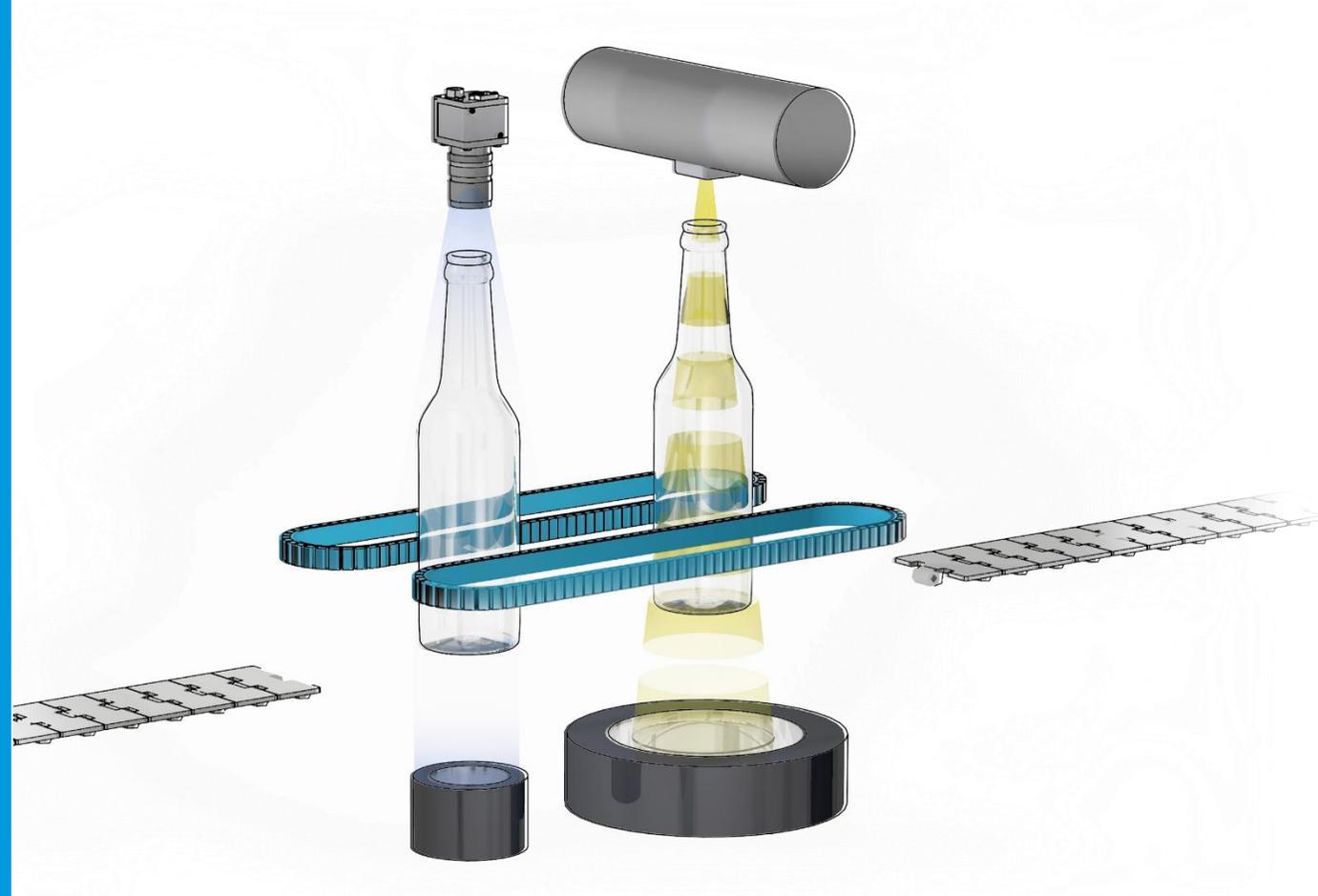


Danger: glass splinter in residual liquid (water)

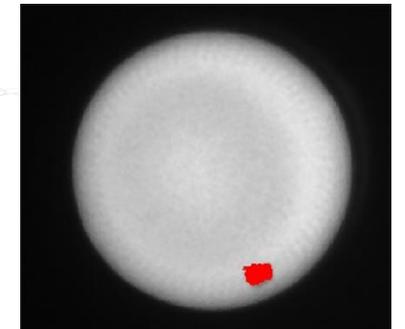
Optical base inspection:  
Glass particles in a dry bottle become visible in an optical inspection module when light is deflected at breaking edges and internal structures.

Residual liquid from the bottle washer in returnable glass lines located in the base area affects the light deflection. Thus the optical inspection capability is reduced.

## Empty bottle inspection with HEUFT *Inline II IX* Base inspection



Optical base inspection



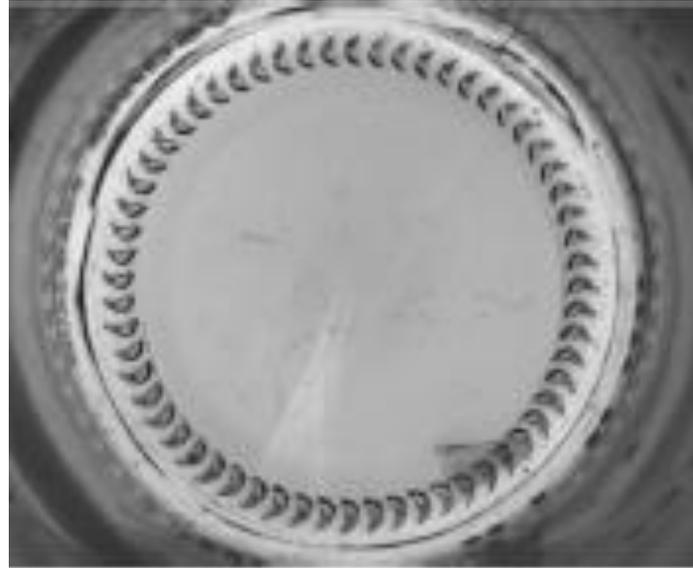
X-ray base inspection

## Glass in Glass detection in wet bottles

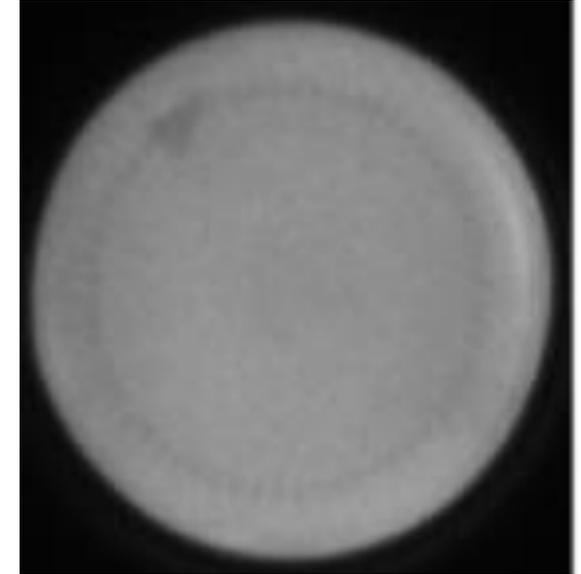
X-ray base inspection:

Residual liquid from the bottle washer in returnable glass lines that is located in the base area does not influence the X-ray base inspection.

With this the X-ray base inspection of the HEUFT Inline II IX contributes to the secure glass in glass detection in empty bottles.



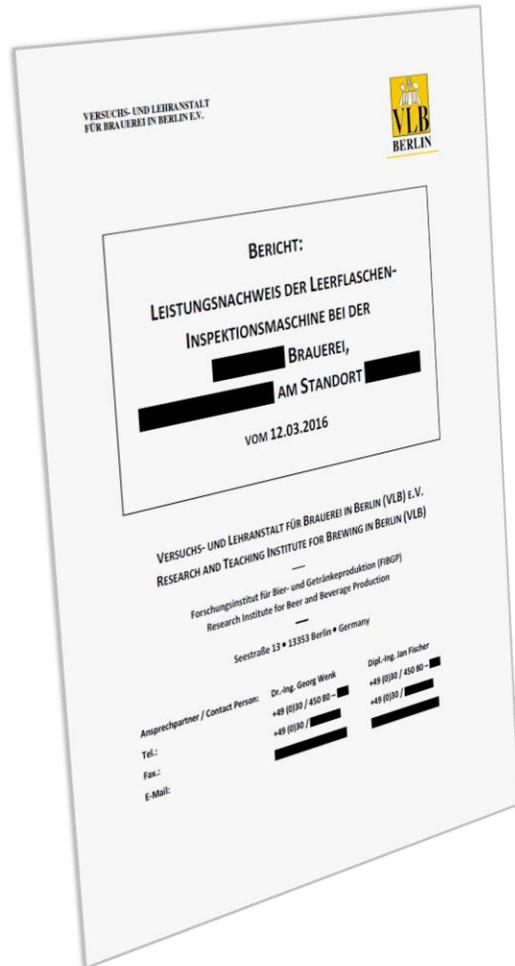
Optical inspection  
Detection capability: 50%



X-ray inspection  
Detection capability: 99%



## VLB Performance Test



- The largest extent of testing which a HEUFT *InLine II* has undergone. For own glass splinters alone 60 test bottles
- HEUFT *InLine II IXS* lowest false rejection rate and high detection rate even under operating settings
- High detection capability for glass splinters in residual liquid by combination of optical and X-ray base inspection

Benchmark test for empty bottle inspection machines