

Content

Editorial 3

ARTICLES

The latest technology 8
New perspective on empty bottle inspection

A brand new brewery in Pittsburgh 11
Pittsburgh Brewing Company returns to producing its own beer using GEA technology

Harnessing strengths 14
Asahi UK uses Alpega TMS to manage growing transport volumes

Empowering operators through technology 17
Lifting the beer cap on brewery automation

Juice Summit 2022 – a great success 20

The Beer Industry in India 22

Save money, time & space 26
New analytical instrument unites 3 measuring tasks in 1 instrument

Humulus Lupulus 27

Doemens News 28

COLUMNS

World News 5

Beverage Innovations 30

Marketing & Advertisement 31

Allied Industries 32

Imprint 33

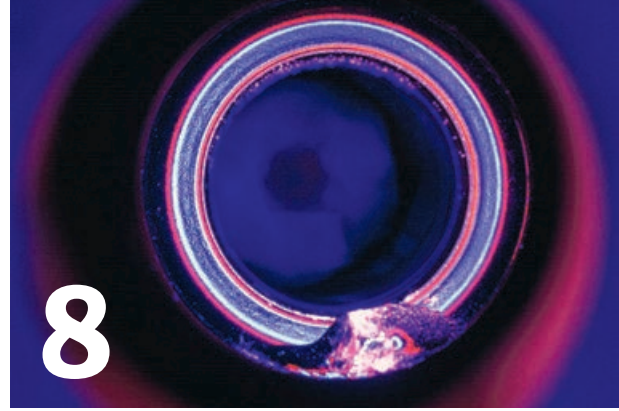


Image: Sysonona

New perspective on empty bottle inspection

Nothing new for empty bottle inspectors? Yes, there is a new alternative in this equipment sector, which shown for the first time at drinktec 2022. Despite the high development effort and established suppliers on the market, the inspection machine manufacturer Syscon has invested in a completely new design. A large number of own and customer experiences have now consistently led to a new linear rotor with maximum compactness, modularity, the simplest optimal adjustment of each individual station, the best possible hygienic justice as well as low operating costs and manufacturer dependencies for the user. Modern design principles can meet the requirements of slow as well as very fast lines, widely varying bottle shapes and formats as well as high standards of detection fineness and reliability. And a well shaped price structure actually offers new perspectives for medium-sized as well as large companies.

Lifting the beer cap on brewery automation

ABB, the global technology company supporting the food and beverage industry to continuously adapt and evolve to meet consumer demands, is delivering modern



Image: ABB

automation and digital solutions to breweries. Its latest innovation ABB Ability™ BeerMaker has been developed with some of the world's foremost beer producers and supports safety, quality, productivity and efficiency by connecting processes to enable brewers to take better decisions at the right time, saving water and energy resources while increased digitalization drives greater production.

17

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The latest technology

New perspective on empty bottle inspection

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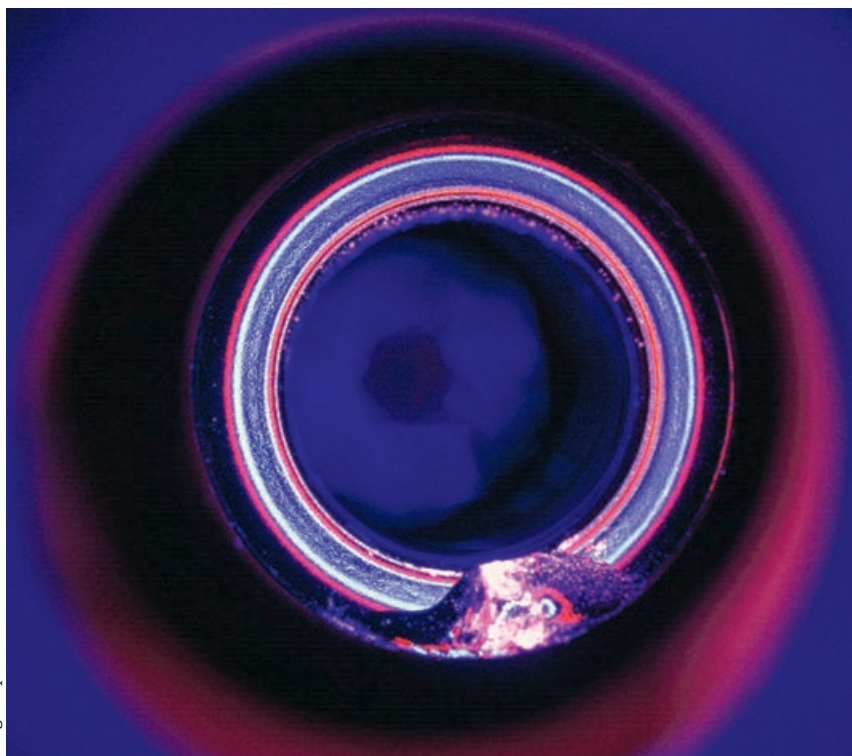
Notes and critical remarks from bottling companies all over the world on the installation, application, maintenance and operating costs of devices of this type as well as the intention of exemplary fulfillment of hygiene and safety requirements justified the mo-

tivation for this ambitious development work. Even the first impression suggests modernity and technological finesse: extremely compact dimensions, even when fully equipped, and a tidy interior of the machine, characterized by many smooth surfaces. The

exterior design also shows that modern requirements for hygiene, occupational safety and ergonomics have been incorporated here, see Figure 1. It is pleasing that only one central, clear control cabinet was created for the entire data processing and power electronics. For this, a swivel attachment to the central frame is even provided, similar to a door, in order to ensure the best accessibility to the interior from the back of the machine. And all inspection stations can be easily connected by plug connections on the main connection line. This sometimes saves considerable assembly times.

Exterior design

Inclined surfaces of all housing roofs as well as the protective screens along the test track favor the drainage of liquids. Tinted Macrolon windows all around serve as protection against flashing light emission and a generously dimensioned cullet shaft reduces the frequency of interference caused by previously undischarged harmful bottles. Even in the basic configuration, this new empty bottle inspector from the manufacturer Syscona with the name "Unicheck V" offers a large 18.5" touch display, which,



Images: Syscona

Syscona EBI, multicolor mouth inspection



"Unicheck V" empty bottle inspector at the Syscona test center

hanging on a high-quality stainless steel articulated arm, can be positioned as desired. Below the main level of the machine there is free space, apart from the two quality drives for the differential belts. Here, too, hygiene requirements have been consistently implemented.

What's inside

It is interesting that this empty bottle inspector requires a self-developed real-time control board called "Unicheck V" and only a powerful IPC from Hewlett Packard for all high-speed data traffic. With these modules, the entire image and sensor data processing, including bottle-accurate tracking of all result data, is carried out thanks to sophisticated computer science. Direct triggering enables maximum precision of image and sensor data acquisition and ensures fast and stable data communication via CAN bus. A highlight of this inspector and probably a unique selling point on the market is the servo-motor height adjustment of each individual inspection station inside the machine. In particular, this enables the optimal image sharpness setting of each individual camera station, for example for bottom, muzzle, optional inner side wall and thread.

What is this for? Well, the better the primary image, the higher the achievable detection reliability. And by no means is this more set-up effort with this machine. On the contrary, a bottle format change for the mechanical settings and the appropriate program selection takes place at the push of a button. Especially in lines with more frequent format changes, this is a considerable time and cost advantage, because set-up times can be significantly reduced over a course of a week. According to the manufacturer's specifications, bottles of different contours with a clamping dimension of 20 to 105 mm and heights of 100 to 400 mm can be easily inspected by motorized – optionally manual – adjustment, thanks to the single-station adjustment always with optimum image quality. In accordance with the guiding principles of hygiene and minimal maintenance, the servomotors are made of stainless steel and have protection class IP 68. And that's not all: this device series also offers a highly dynamic autofocus fine adjustment for optimal ground inspection using innovative liquid lens technology. Belt speeds of more than 2 m/s is specified to be reliably mastered. This corresponds to an average line output of around 60,000 bph.

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Interior of the "Unicheck V" EBI

Minimizing cleaning times has also been specifically considered. Cleaning or replacing protective windows in the interior of the inspector is done without tools in no time at all thanks to sliding or bayonet attachments. Any dirt that should accumulate inside can be pushed down through openings in the base plate. All inspection housings for sidewall inspection are mounted in precise joints that can be swiveled, so that access to protective screens is a matter of seconds.

And what can the new "Unicheck V" do?

Sascha Hoffmann, Head of Development, emphasizes that all common inspection tasks on a transparent glass container can be fulfilled by this compact machine. Which inspection tasks are decided by the customer, who can retrofit at any time with very little effort. A highly effective pulse blow-off prepares the ground inspection placed at a significant distance using the transmitted light method. A newly developed smart high-performance illumination unit is used for optimum mouth control in the incident light process, see Figure 3. A sequentially controllable multicolor LED lighting unit specially developed is used. With a precise IR inspection unit, which is height-adjusted together with the ground inspection station, organic liquids are detected. The HF sensor pair can be placed in the immediate vicinity of the measuring area of the bottle due to the

coupling to the adjustable belt station, whereby even small quantities of lye are detected particularly reliably. It is astonishing that with this basic configuration, despite the compact design, there is still enough space for up to two further optional, also product-specific inspection stations inside the machine, see Figure 2, e.g. an inner wall inspection through the mouth. The newly developed thread control station works with a 4-camera arrangement and mirror system in a particularly compact installation space, which is provided outside the interior. With a special evaluation algorithm, thread defects in the unwound 360° all-round image are detected with high recognition fineness. Incidentally, Syscona also offers this technology in an independent inspection station independent of the Unicheck V empty bottle inspector.

Independence

An inspection unit with a compact design is also provided on the input and output side for side wall inspection. By means of a sophisticated beam path using a mirror system, high-resolution GigE camera technology, special lenses and a sequentially controllable illumination unit, containers can be thoroughly examined using the transmitted light method. Depending on the required level of demand, the image acquisition is carried out with an inlet side, one or even two inspection units on the inlet and outlet side. Each cam-

era including mirror system can nominally capture about 240° of the bottle-circumference in transmitted light method. In a constellation with 4 cameras, side wall areas of a rotationally symmetrical, transparent bottle are even recorded and evaluated several times. The achieved view angle data take into account that the image processing system sets evaluation fields that naturally exclude the optically unfavorable edges of a bottle. Machine frame and central clamping unit as well as computer and terminal are the same for all equipment levels. The modern software architecture allows modular embedding of the various inspection stations without special effort at any time, i.e. even retrospectively. This should prove to be a great user advantage in the long term, as well as the use of HP's world-famous computer technology and Microsoft's very popular Windows 10 operating system. The independence of the customer from such important components can become a significant decision-making aspect. It should also be advantageous for the user that the software contains self-test routines as well as modules for product monitoring. Thus, the technical availability of this teaching bottle inspector (code OEE) can reach peak values, and the user is always informed about the quality of his empties and the effect of previous processes.

Summary

So if you want to bring your existing line updated with the latest technology and thereby significantly improve quality and save costs, the new development presented on the market is a thoroughly noteworthy perspective. The "Unicheck V" is currently already in long-term tests, so that the market maturity is imminent. ←

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