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New unit enhances the efficiency of closure inspection

In beverage bottling plants, the process of closing the containers constitutes a point of crucial importance for the product’s overall quality. Until now, quality-assurance solutions have used a combination of the reflected- and transmitted-light methods, but that requires quite an elaborate set-up. In order to meet more stringent quality standards and keep pace with innovative improvements like tethered caps and lightweighting while simultaneously upgrading the existing methods, Krones has developed the 360° closure inspection unit.

This new unit marries a precisely defined lighting system to a very high camera resolution. It measures the positions of the bottle’s closure and neck finish in three-dimensional space. Based on that, it can determine their relative position to each other. As its accuracy is ten times higher than that of its predecessor model, it is possible to take ultra-precise measurements down to 20 micrometres or smaller, even with customary container height tolerances or slightly angled bottle necks. In this way, the process ensures leakproof integrity for all containers, thus saving time and effort for manual testing in the lab where only random checks on individual specimens are performed. Thanks to its full-coverage all-round inspection, the unit checks the closures for presence, correct colour and placement (neither skewed nor too high), damage, jammed breakaway bands and torn perforations. “In contrast to previous solutions, sizeable beads of water don’t pose any problems for the 360° inspector. Therefore, bottlers can use a modular blower, which takes up much less space and is also more hygienic and more economical,” explains Stefan Piana, Head of Inspection and Monitoring Technology at Krones, and adds: “The unit’s selectivity is sufficiently high to ensure that as good as no faultless containers (“false positives”) are tagged as defective.” And even though its overall dimensions have once again been significantly reduced, the inspector also includes the TopCheck feature for inspecting the closure’s logo.

**A true multitasker**

The new technology enables bottles to be efficiently inspected for the correct placement of tethered caps as well. This new type of closure, which is intended to reduce plastic littering, will be mandatory in Germany as from July 2024 and is subject to stringent requirements. The integrated twist-and-clip mechanism keeps the lid out of the way while consumers are drinking from the bottle. Independently of the cap’s orientation, the inspection unit now also checks that both the perforation at the breakaway band and the twist-and-clip mechanism are in perfect condition and the latter has been correctly placed.

The new unit can be used for checking the correct position not only of plastic closures but of crowns as well. With the latter, it is important to detect typical errors like skewed crowns or drawn-in skirts. Besides, the 360° closure inspector offers full-coverage in-process monitoring by precisely measuring each crown’s diameter. That enables the bottler to do without manual reference-gauge tests in the lab that used to be required once every shift. What is more, the unit reliably detects any leaks or hairline cracks in the bottle’s neck finish by evaluating any foam that may be leaking out.

**Excellent ratings in every respect**

Not only does the new inspector reduce the manual work required in the lab, it offers the additional benefit of testing and assessing the closures’ leakproof integrity, which upgrades product quality. As it is easy to handle, the users’ feedback has been positive throughout. That is why it will gradually replace the presently used NeckCheck-based variant.

And here is some good news for older generations of our Checkmat inspectors: Depending on the specific circumstances in each case, the 360° closure inspector can be retrofitted in machines featuring DART 4.0 or higher.

Fig.: The new closure inspector from Krones enables bottles to be efficiently inspected for the correct placement of tethered caps as well.

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