

Tight and safe welding with ultrasonics

Quick joining process for the lid components of resealable drinks cans

PLASTIC WELDING

METAL WELDING

CUTTING

CLEANING

SCREENING



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Resealable drinks cans are convenient, especially when driving and walking, but also for many other activities. You do not have to drink the entire can in one go, the drink retains its taste and fizz and it is not possible for insects or dirt to get into the can. Ultrasonic welding technology has proven itself to be an effective and economical means of joining the lid components of resealable drinks cans. Xolution GmbH, a company based in Munich, has developed an ingenious resealable lid mechanism for drinks cans. The innovative XO relock system is suitable for all can sizes.

Unlike traditional drinks cans that can only be opened once, the XO-sealed versions feature an opening mechanism made of plastic, which can be used to close the can again. In addition, a tamper-proof band is attached over the slider. The tamper-proof band breaks when the can is opened for the first time, and reassures the consumer that the can has not previously been opened. In order to connect the plastic components to the aluminium lid of the cans, it was important to find a joining process that works quickly and precisely, and enables short cycle times for high throughput rates. Today, millions of lids featuring the patented relock system are already being supplied to the drinks industry worldwide.

Technically and economically impressive

After extensive tests, the company finally settled on Telsonic ultrasonic welding systems for their joining process. Their choice was based both on technical and economic reasons: during the ultrasonic welding process, an acoustic tool generates high-frequency sound waves. These waves vibrate the molecules of the parts to be connected, generating heat that "breaks" the material boundaries and fuses the materials together. This results in high-strength connections which can withstand the 7 bar internal pressure of the drinks cans.

At the same time, the process is fast and environmentally friendly because it does not require additives and therefore supports recycling. The welding process is reliable and safe as it depends on only a few parameters that can be easily adjusted and monitored. These parameters include the welding energy, force and time, as well as the maximum power (Pmax). In the first process step, four small



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pin domes for connecting inner and outer sliders are welded quickly and tightly through the aluminium lid. The tamper-proof band is welded onto the lid in the second step.

Spotlight on the MAG ultrasonic generator

The ultrasonic equipment consists of four components that can be easily integrated into equipment manufacturers' systems: the ultrasonic generator that generates the high-frequency electrical vibrations, the converter that converts them into mechanical oscillations, a booster for amplification and the sonotrode. The latter introduces the mechanical oscillations into the workpiece. Converter, booster and sonotrode have a fixed mechanical coupling and their acoustic resonances are tuned to one another. The generator has a key function, as it not only generates the high-frequency electrical vibrations, but also provides the connection to the higher-level automation technology in the context of Industry 4.0. State-of-the-art bus systems enable welding parameters to be adapted and results to be read out in real time. Furthermore, system costs can be optimised because it is possible to switch between different resonance units. The external setpoint defaults for amplitude, time, energy and Pmax, as well as soft start for large sonotrodes and frequency autotuning, are just some of the additional features that provide maximum process stability. Xolution GmbH has therefore found the ideal joining technology for manufacturing can lids with the XO relock system.

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