

Welding batteries and accumulators safely

Telsonic has over ten years of experience in the area of battery welding

PLASTIC WELDING

METAL WELDING

CUTTING

CLEANING

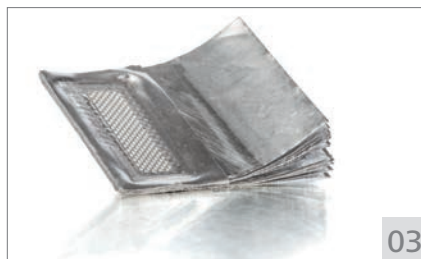
SCREENING



01



02



03



04

Metal and plastic welding techniques for batteries have their own particular challenges. Tight spaces, very thin films and interfering contours always require special solutions. With more than ten years of experience in this area, the Swiss company Telsonic has amassed an impressive stock of expertise in the field of battery welding. The torsional process invented by the ultrasonic welding pioneer has developed into one of its supreme disciplines. The process can be used to satisfy even the most complex of requirements – here are four examples of how it does this.

“Ultrasonic welding for contacts and arrestors on mobile phone batteries presents some particular challenges that need to be overcome. Not all processes are able to do this”, states Axel Schneider, Head of Sales at Telsonic. Production speed, for instance, is a significant challenge. In longitudinal ultrasonic welding, long positioning distances in the case of hammerhead sonotrodes come nowhere near to fulfilling the required cycle time. With the torsional ultrasonic welding process developed by Telsonic, the slim sonotrode approaches from above and can be held just a few millimetres directly above the welding point. This makes positioning extremely fast. Another benefit comes in the form of how the welding power is introduced. Specifically, this takes place in a central welding axis. The torsional movement hardly applies any force to the areas under the contacts and is therefore very gentle. What is more, the tools do not bend up during the process.

- 01 With the torsional process invented by Telsonic, even the most complex requirements can be satisfied during battery welding.
- 02 The Telsonic process achieves the best results in cylindrical welds for round bolts, rings or screws.
- 03 In the case of lithium-ion batteries, very thin films can be welded into film packages using Telsonic torsion welding, without damaging the delicate top film.
- 04 The torsional ultrasonic welding process from Telsonic securely welds aluminium cables with a cross-section of up to 200 mm² in a thick-walled tubular cable lug made of nickel-plated copper.

E-mobility requires reliable battery welding

The Telsonic process also reveals its strengths in battery production for e-mobility vehicles. The contacts for IGBTs are welded with torsion, for instance. In this case too, sonotrodes with short positioning distances approach from above. Due to the interfering contours in tall EMC plates, it is not possible to weld many power module contacts in any other way. Two production processes can be applied in this case: either the IGBT or the sonotrode is moved. Furthermore, the torsional process is extremely gentle on the lower join partners. This means that only low levels of force are applied to the delicate ceramic plate under the copper.

Securely contacting lightweight aluminium

Another impressive example is the secure, firmly bonded weld that can be created between the two different materials of nickel-plated copper and aluminium. An aluminium cable with a cross-section of up to 200 mm² is securely welded in a thick-walled tubular cable lug made of nickel-plated copper. What was previously difficult to solve by means of conventional processes can now be realised reliably with the PowerWheel® technology from Telsonic AG. Thanks to a high application of energy within a short time, the torsional ultrasonic welding process connects the aluminium cable to the copper contact. With the PowerWheel® process, a welding pressure level of up to 8000 N and a power output of up to 10 kW can be applied to the joint zone through the thick walls of the tubular cable lug within a very short time, creating a fixed connection.

Logically, the torsional process achieves the best results in cylindrical welds. Sonotrodes which have a hole in the middle can be used for round bolts, rings or screws. This is not something that is possible with any other process. It provides automotive suppliers, for instance, with a solution for welding a steel bolt pressed into a copper-nickel sleeve with the front end of an aluminium busbar as a contact with the starter. In this case, the weld is made 360 degrees around the bolt without any interruptions. Integrated into a fully automated system, this makes it possible to achieve the necessary short cycle times and high quantities.

Weld thin films without damage

In the case of lithium-ion batteries, very thin films can be welded into film packages using Telsonic torsion welding, without damaging the delicate top film. With this method, individual films measuring 10–20 µm in thickness and made of aluminium or copper are reliably connected through in the package with a high degree of strength.

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