

09. March 2016

Micro sealing and potting for the electronics industry under ESD-compliant conditions

In times of industry 4.0 and self-propelled cars, more and more complex and thus highly sensitive electronics are used, packed into ever smaller components. To protect them from adverse environmental conditions and to ensure a long lasting and trouble-free operation, they are sealed, glued or potted. The toll manufacturer Sonderhoff Polymer Services Austria GmbH (PSA) in Dornbirn, Vorarlberg, has therefore specialised in gasketing, gluing and potting of small and micro components, especially for telecommunication, electronics and medical devices. For these applications the protection against uncontrolled electrical discharges (ESD, electro static discharge) plays a major role. It avoids damaging electrostatic sensitive devices such as sensors or semiconductor circuits and preserves them from functional failures.



Certified ESD protection zone at the production of Sonderhoff PSA in Dornbirn, Austria

The toll manufacturer from Dornbirn offers its customers situated in the border triangle Germany, Austria and Switzerland a comprehensive range of services. The company provides sampling of prototypes and produces on the mixing and dosing systems from Sonderhoff either small or serial productions for foam gasketing, gluing and potting of different industrial components. Sonderhoff PSA is virtually the extended workbench for its industrial customers by covering production peaks or low production capacities without the customer having to invest in its own equipment.

Contract foaming and potting on a miniature scale

The miniaturisation of components especially in the medical and electronics industries and the higher demands on the smallest subunit of total components has led in recent years to small and smallest housings, which need to be sealed by the so-called micro seals or encapsulated

by micro-potting. For these plastics processing companies Sonderhoff PSA primarily provides foam gasket and potting applications on a microscale and under ESD-compliant conditions.



The toll manufacturer offers its customers the ESD-compliant foam gasketing, gluing and potting for a wide range of different industrial components.

Several years of technical innovations are preceded before a new mixing head for precise dosing of small quantities of small-sized components can be introduced to the market. Another major step towards smaller applications makes the mixing head MK 650, developed by Sonderhoff Engineering in Hörbranz, Vorarlberg, Austria. It is equipped with technical innovations such as the pressure-controlled recirculation technique and the high-pressure water rinse for maintenance-free cleaning of the mixing chamber. Due to continuous developments of the mixing head technology Sonderhoff PSA can realise smallest quantities up to a lower limit of 0.1 g/s for foamed seals or even 0.05 g/s for potting compounds with the mixing head MK 650.

A high degree of automation and the most appropriate method is needed for the reliable, precise and inexpensive application of foam seals, adhesives and potting compounds in industrial series productions. Due to the technology of the mixing head MK 650 it is possible to apply even very narrow foam seals in-situ on the device with all benefits of the formed in-place foam gasketing (FIPFG) method. This method has become widely accepted in recent decades and has become a standard procedure for the application of foamed housing seals of all kinds in various industries. Especially complicated, three-dimensional parts can be foam sealed quickly and reliably and in reproducible quality.

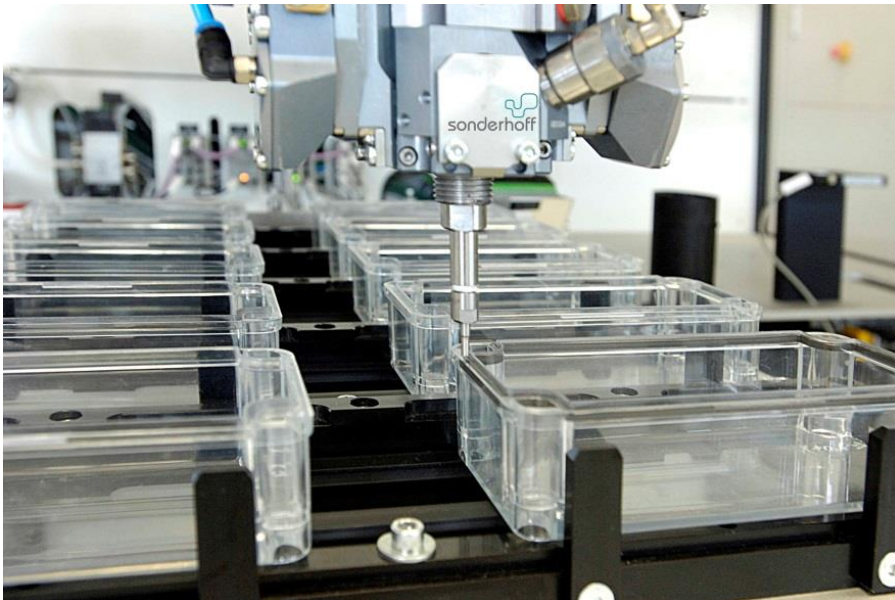
For the precise application of foam seals and potting material from 0.05 to 0.2 g/s in the very narrow contour profiles of small parts, the exact guiding of the mixing head of the fully automatic mixing and dosing process is primarily responsible. Herein the linear robots built by Sonderhoff Engineering ensure a maximum tolerance of ± 0.1 mm for a repeat accuracy of the path control, which makes it possible to always precisely position the mixing head to the same place. The interplay of repeatability and high precision of Sonderhoff mixing head technology is ideally suited for creating a constant and exact contour sealing, however small the material discharge rates may be.



The company has specialised in micro seals and micro potting of smallest components.

ESD-compliant contract manufacturing

The mixing and dispensing equipment used by Sonderhoff PSA are certified according to DIN EN 61340-5-1 for the "Protection of electronic devices from electrostatic phenomena". Thus, the increasing customer demands for ESD protection for ESD sensitive devices can be met. Especially in certain plastics charge potentials may arise that if mishandled can cause malfunction of the electronics. Sonderhoff PSA ensures that the sensitive components are not damaged by electrostatic discharge by wearing dissipative safety shoes, coats and gloves in the production area. In the contract manufacturing of Sonderhoff PSA each ESD order is treated individually. For each customer order specific manufacturing instruction is stored, which is checked during production by individual measurements. The foamed, glued or encapsulated components are allowed in and out of the ESD-protection zone only in standard-compliant packaging or special transport containers, so-called trays.



The range of services includes, e. g., component sampling as well as small and large series productions using the low pressure mixing and dosing systems from Sonderhoff.

Electronics failures due to electrostatic charges

The phenomenon of electrostatic discharge (ESD) describes the effects of the balance of electric charges between two differently charged materials. If these contact each other, positive and negative charges are exchanged (potential difference) and cause a very short but

high electrical current pulse. Cause of potential difference is usually a charge by static electricity or electric influence. Static electricity occurs for instance while running on a carpeted floor, where a person can be charged to about 30,000 V. Electric influence is for example one of the largest electrostatic problems in the electronics industry. When conducting uncharged bodies enter a static field isolated, there will be a charge transfer to them. This charge transfer caused a positive charge of the conductor and a negative if this circuit has no galvanic connection to other electrical conductors. In itself this circuit remains electrically neutral. With brief electrical grounding in a field a partial charge (first discharge) flows off, when removing the body from this field, he is then charged to the deficit and there is a risk of an unexpected second discharge, which can cause damage to electronic components. ESD causes millions of annual damages in business. Errors in the control of information technologies of automated production lines do not always have their origins in the software. Rather, in integrated circuits semiconductor based electrostatic discharges are one of the most common causes of failure. The economic damage thereby is considerable, especially since the share of electronics has increased by four times from 1993 to 2003. Electronic failures are the cause for 60 % of all stranded vehicles. The increasing complexity of semiconductor devices at ever higher clock rates and the continuous reduction of structures of electronic components of 1.5 μm (1985) down to 32 nm (2008) as well as a rapidly increasing performance of electronic circuit units and their increasing interconnection complexity lead to a higher susceptibility to the risk of an electrostatic discharge. Today it is assumed that 10 % of “ESD stressed” semiconductor devices cause mistakes. This may be a total loss or damage to the device. The latter often remains undetected and can lead to costly product recalls. Therefore, the protection against electrostatic discharges is essential today, in all areas of microelectronics.

About the author:

Florian Kampf

f.kampf@sonderhoff.com

Senior Manager Marketing/PR

Sonderhoff Holding GmbH, Cologne, Germany

URL: <https://www.gupta-verlag.com/news/technology/17880/micro-sealing-and-potting-for-the-electronics-industry-under-esd-compliant-conditions>