Image credit:

New solder paste systems are needed for matrix LEDs.

LED Soldering – “Low Void & Temp”

Soldering is an important step in the production of automotive LED systems. These systems place high demands on the solder joint. New data and independent studies show that there are ways to improve this process and increase reliability while reducing energy costs.

LED soldering is an important process in the production of highly complex multilayer LED (matrix) systems for automotive applications. LED systems are becoming increasingly common due to their high luminous efficacy and customisability. However, these systems place high demands on the solder joint that connects them to the substrate. The solder joint must have both high thermal conductivity and high mechanical strength to ensure the performance and reliability of the systems.

Most LED systems use SAC alloys as the solder material, which require a reflow temperature of around 245°C. This high temperature can lead to an uneven coefficient of thermal expansion (CTE) between the different materials. This can result in warpage. Voids can also reduce the thermal conductivity of the solder joint.

Durafuse LT is a patented low temperature alloy system designed for low temperature and high reliability applications. It consists of a low melting indium containing alloy and a higher melting SAC alloy. The SnInAg alloy initiates joint fusion and enables a reflow temperature of less than 210°C, reducing thermal stresses between the different materials and minimising deformation. The SAC alloy improves the strength and durability of the solder joint.

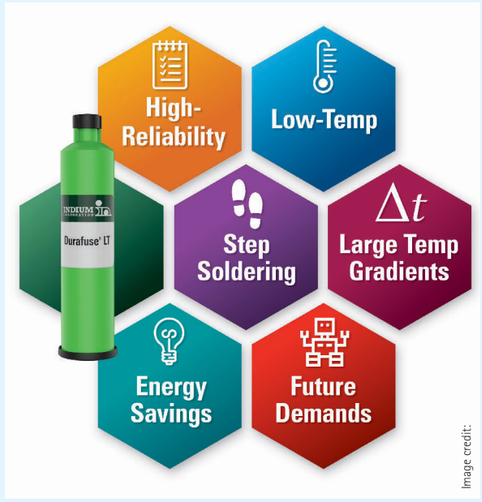

Image credit:

Performance spectrum of Durafuse LT

Durafuse LT offers better drop shock resistance than bismuth tin (BiSn) or bismuth tin silver (BiSnAg) and comparable to SAC305 when the process is optimised.

A further advantage is the low void content, which allows better heat dissipation and thus improves the overall performance of the system.

A material reliability study by the University of Rostock has shown that Durafuse LT has a high shear strength over the homologous temperature. This underlines the reliability of the system. The study was conducted by subjecting samples of Durafuse LT to shear stress at different temperatures and measuring the resulting shear strength.

The use of low temperature solder pastes can also reduce the energy consumption of a reflow oven, resulting in energy savings. Recent data shows that energy consumption can be reduced by up to approximately 13% when using Durafuse LT solder paste compared to a 240°C SAC profile.

Energy saving processes are essential to reduce the carbon footprint of your application and support the EU‘s targets to reduce carbon emissions by 55% by 2030 compared to 1990 levels.

Image credit:

The solder pastes are available in different sizes. This makes them suitable for different systems

CONTACT

Siegfried Lorenz is responsible for providing technical support to Indium Corporation‘s customers throughout the DACH region. He supports customers with technical information and specifications on solder pastes, solder preforms, fluxes and various materials for optimum thermal conductivity. He also helps to accelerate the sales cycle by providing technical recommendations. He joined Indium Corporation in June 2022 in the DACH region and has more than 19 years of experience in the electronics industry in sensor and PCB manufacturing. Prior to joining Indium Corporation, he worked as a Senior Mechanic, SMD Operator and head of SMD for a major semiconductor manufacturer and electronics design company. He holds a bachelor’s degree in electrical technology and management.

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COMPANY PROFILE

Indium Corporation® is a premier materials refiner, smelter, manufacturer, and supplier to the global electronics, semiconductor, thin-film, and thermal management markets. Products include solders and fluxes; brazes; thermal interface materials; sputtering targets; indium, gallium, germanium, and tin metals and inorganic compounds; and NanoFoil®. Founded in 1934, the company has global technical support and factories located in China, Germany, India, Malaysia, Singapore, South Korea, the United Kingdom, and the U.S.

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