



STANNOL

Pioneers of Soldering

Low-Silver Solder Pastes

For Cost-Efficient and Reliable SMT Processes



STANNOL | SP6000 and SP6500

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SP6000 and SP6500: Less Silver, More Flexibility

Rising material costs and volatile silver prices are increasing the pressure on SMT manufacturing. With its SP6000 and SP6500 low-silver solder pastes, Stannol offers two high-performance No-Clean solutions that reduce silver content while supporting cost-efficient, sustainable manufacturing with reliable processes.

Both solder pastes are available with the low-silver alloys SnAg1.0Cu0.5 and SnAg0.3Cu0.7. This choice allows the pastes to be precisely matched to different manufacturing requirements – from flexible standard processes to demanding fine-pitch applications.

Study Results: Low-Silver Alloys in Practice

Studies conducted by the University of Rostock show that, with appropriately adjusted process parameters, low-silver alloys can achieve good solderability and comparable reliability.

SnAg1.0Cu0.5 exhibited wetting behaviour that closely matched that of the reference alloy SnAg3.0Cu0.5. This makes the alloy well suited to cost-effective conversion with a manageable need for process adjustments. SnAg0.3Cu0.7 reduces the silver content even further. Good solderability can also be achieved with this alloy if the soldering temperature is sufficiently high; precise optimisation of the reflow profile therefore becomes increasingly important.

The studies also showed that:

- After thermal storage at 125 °C for 1.000 hours, no significant changes in shear strength were observed.
- Temperature cycling between –40 °C and +150 °C revealed no fundamental disadvantages of the low-silver alloys tested.
- After 1,000 temperature cycles, SnAg0.3Cu0.7 showed the highest stability and the lowest loss of strength.
- The more matt appearance of low-silver solder joints should be taken into account during optical inspection; on its own, however, it does not constitute a quality defect.

The studies show that, with appropriately adjusted process parameters, low-silver alloys can provide good solderability and reliable results. With SP6000 and SP6500, Stannol is transferring these findings into practical applications — with two No-Clean solder pastes tailored to different requirements in SMT manufacturing.

SP6000: Flexible and Robust

SP6000 is a versatile, lead-free No-Clean solder paste for robust SMT processes. It is suitable for fine-pitch applications down to 0.4 mm and is available with Type 4 solder powder (Type 5 on request).

- Good wetting on common surface finishes
- Very low levels of transparent, non-corrosive residues
- Reliable reprinting, even after extended printing interruptions
- Reflow in air or nitrogen
- Typical peak temperature range of approximately 230 to 250 °C

SP6000 is therefore a high-performance solution for standard and fine-pitch applications requiring a high degree of process flexibility.

SP6500: Precise and High-Performing

SP6500 was developed for demanding fine-pitch printing processes and high production-line throughput. The lead-free, halogen-zero No-Clean solder paste is designed for Type 4 solder powder and provides high print-to-print consistency as well as a long stencil life.

- Fine-pitch capability down to 0.4 mm
- High tack strength for high-speed placement processes
- Low tombstoning defect rate
- Very low levels of transparent residues with high electrical reliability
- Reflow in air or nitrogen
- Typical peak temperature range of approximately 232 to 250 °C

SP6500 combines precise solder paste printing with high process stability, providing a strong foundation for high-performance production lines.

Combining Cost Efficiency and Sustainability

Only recycled solder is used for SP6000 and SP6500. Compared with conventional solder pastes, this enables significant CO₂ savings. SP6000 and SP6500 are also available for use with silver-free alloys such as SN100CV.

Sources for the Technical Background:

- [1] Nowottnick, Mathias; Novikov, Andrej; Trodler, Jörg: Processing and Reliability of Low-Silver-Alloys.
- [2] Nowottnick, Mathias; Novikov, Andrej; Trodler, Jörg: Prozessierung und Zuverlässigkeit von SAC-Loten mit reduziertem Silbergehalt.
- [3] Nowottnick, Mathias; Novikov, Andrej; Trodler, Jörg at the SMTA International Conference in October 2009 in San Diego, USA:
"Processing and Reliability of Low-Silver-Alloys"