



# SOLDER ECOLOY TSC

Lead-Free Alloy for Electronics

## DESCRIPTION

Stannol Ecoloy TSC (S-Sn95,5Ag3,8Cu0,7) is a lead-free solder according to DIN EN ISO 9453 (alloy no. 713) designed to substitute the use of tin-lead alloys in all assembly operations of electronics manufacturing. Where lead has already been eliminated from PCBs and component surfaces, a complete lead-free process for manufacturing can be installed, using Stannol Ecoloy TSC.

Use of Stannol Ecoloy TSC alloy eliminate disposal of toxic lead containing waste and dross.

## CHARACTERISTICS

Stannol Ecoloy TSC offers the following advantages:

- proven in production use for electronics manufacturing
- lowest melting point of all suitable high-tin alloys
- eutectic alloy (no melting range)
- enhanced wetting characteristics

## APPLICATION

Some adjustments have to be made on production equipment, e.g. setting of temperature profiles in the reflow equipment. The properties of the resulting solder joints will perform as well as tin/lead solder joints or even better in all respects.

## PHYSICAL AND MECHANICAL PROPERTIES OF LEAD-FREE ECOLOY ALLOYS COMPARED WITH S-Sn63Pb37:

GENERAL PROPERTIES	S-Sn63Pb37**	Stannol Ecoloy TS (S-Sn96,3Ag3,7)**	Stannol Ecoloy TC (S-Sn99,3Cu0,7)**	Stannol Ecoloy TSC (S-Sn95,5Ag3,8Cu0,7)**
<b>Melting point, °C:</b>	183	221	227	217
<b>Electrical Conductivity, %IACS:</b>	11.9	14	15.6	13
<b>Electrical Resistivity, μΩcm:</b>	14.5	12.3	12.6	13
<b>Brinell Hardness, HB:</b>	17	15	9	15
<b>Density, g/cm<sup>3</sup>:</b>	8.4	7.5	7.3	7.5
<b>Tensile strength, (20°C) N mm<sup>-2</sup> at 0,004 s<sup>-1</sup> strain rate:</b>	40	58	-	48
<b>Joint shear strength N mm<sup>-2</sup> at 0,1mm<sup>-1</sup>, 20°C:</b>	23	27	23	27
<b>N mm<sup>-2</sup> at 0,1mm<sup>-1</sup>, 100°C:</b>	14	17	16	17
<b>Creep strength* N mm<sup>-2</sup> 20°C:</b>	3.3	13.7	8.6	13.0
<b>N mm<sup>-2</sup> 100°C:</b>	1.0	5.0	2.1	5.0

\*shear stress for 103 hours to failure

\*\* Complying with DIN EN ISO 9453

## RECOMMENDED CONDITIONS OF USE

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**Wave soldering:** The use of Ecoloy TSC for solder bath application requires operating temperatures of approx. 260 to 280°C. It is necessary to find out the optimum temperatures, which can differ depending on the type of PCB and the types of components. The use of nitrogen as a protecting atmosphere is advantageous allowing to open the process window. The wetting of the solder and the separation of wave and joint will be easier. No excess solder will be left. Dross formation is considerably reduced.

**Alternative:** Stannol Ecoloy TSC385 (Sn95,7Ag3,8Cu0,5)

Low copper content for wave applications is preferred because of copper leaching from the PCB. The copper content will rise automatically, therefore extended life-time of the solder bath is expected.

**Liquid flux for wave soldering:** In principle common liquid fluxes can be used for lead-free wave soldering. Adjustment of solid content may be necessary. Increased preheat and solder pot temperature requires better heat resistant and temperature stable flux formulation which can be achieved with an increased solid content. A complete ecological solution can be installed using VOC-free fluxes, e.g. Stannol WF300S. Water based fluxes require proper adjustment of the process conditions.

**Rework and manual soldering:** Stannol Ecoloy TSC is available as solder wire to complete all soldering processes which are possible on a PCB to avoid having different solder alloys on one board. Only one unique solder alloy guarantees similar properties of all solder joints.

Solid solder as well as flux cored solder are available. Flux formulations and flux content adjusted for a lead-free process provide easy soldering in post production soldering and repair.

Components which are not available with lead-free coated pins can be soldered, but dependent on the lead content it is possible that the melting range starts at 179°C, which is the solidus of the tin-lead-silver alloy system.

## SUPPLY FORMS

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Solder Wire (solid and flux cored)

Triangular bars

Kg-bars

Ingots with hanging hole

## HEALTH AND SAFETY

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Before using please read the material safety data sheet carefully and observe the safety precautions described.

## NOTICE

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The above values are typical and represent no form of specification. The Data Sheet serves for information purposes. Any verbal or written advise is not binding for the company, whether such information originates from the company offices or from a sales representative. This is also in respect of any protection rights of third parties, and does not release the customer from the responsibility of verifying the products of the company for suitability of use for the intended process or purpose. Should any liability on the part of the company arise, the company will only indemnify for loss or damage to the same extent as for defects in quality.