



STANNOL®

Wenn's ums Löten geht  
When it's about soldering  
Quand il s'agit du soudage

## Technical Data Sheet

# STANNOL® solder wires of the Kristall-Series

## NO-CLEAN SOLDER WIRES WITH CLEAR RESIDUES

### Description

STANNOL® Kristall solder wires have been specially formulated to complement No Clean wave and reflow soldering processes. They are also applicable to repair operations carried out after a cleaning process, eliminating the need for further cleaning.

STANNOL® Kristall 400 is designed for users who require a halide free formulation.

STANNOL® Kristall 502, 505 and 511 contain different halide levels with maximised soldering power

STANNOL® Kristall 400, 502, 505 and 511 cored wires are manufactured with a range of flux contents.

Although users will normally be using products with a nominal flux content of 3%, the superior performance of the® Kristall products may allow a lower flux content to be specified e.g. 2.2%. This will further improve residue appearance by reducing the quantity. All are available in alloys conforming to national and international standards, including lead free alloys. Some alloys and flux contents may be manufactured to special order.

STANNOL® Kristall solid fluxes are based on modified rosins and carefully selected activators. In use they exhibit a mild rosin odour and leave a small quantity of clear residue. The used activated resin shows the following advantages:

- |                       |   |                  |                |
|-----------------------|---|------------------|----------------|
| ➤ halide free version | • Kristall 400                                      | ➤ clear residues |                |
| ➤ fast soldering      | • wide range of activities to suit all applications | ➤ heat stable    | • low spitting |
| ➤ good spread         | • on copper, brass and nickel                       | ➤ mild odour     |                |

STANNOL® Kristall solder wires provide fast soldering on copper and brass surfaces as well as solder coated materials. Activity of the halide activated versions on nickel is also good depending on the state of oxidation of the nickel finish. The good thermal stability of STANNOL® Kristall fluxes means they are also well suited to soldering applications requiring high melting temperature alloys. The resin and flux systems are designed to leave relatively low residues and to minimise residual activity. This is achieved by ensuring some decomposition and volatilisation takes place during the soldering process. In some situations, this may generate visible fuming but in all cases, rosin fumes must be removed from the breathing zone of operators.

### Application

**Soldering iron:** Good results should be obtained using a range of tip temperatures. However, the optimum tip temperature and heat capacity required for a hand soldering process is a function of both soldering iron design and the nature of the task and care should be exercised to avoid unnecessarily high tip temperatures for excessive times. A high tip temperature will increase any tendency to flux spitting and it may produce some residue darkening.

The soldering iron tip should be properly tinned and this may be achieved using STANNOL® Kristall cored wire. Severely contaminated soldering iron tips should first be cleaned and pre-tinned using STANNOL® Tippy, then wiped on a clean, damp sponge before re-tinning with Kristall cored wire.

**Soldering process:** STANNOL® Kristall flux cored wires contain a careful balance of resins and activators to provide clear residues, maximum activity and high residue reliability, without cleaning in most situations. To achieve the best results from STANNOL® Kristall solder wires, recommended working practices for hand soldering should be observed as follows:

- Apply the soldering iron tip to the work surface, ensuring that it simultaneously contacts the base material and the component termination to heat both surfaces adequately. This process should only take a fraction of a second.
- Apply Kristall flux cored solder wire to a part of the joint surface away from the soldering iron and allow to flow sufficiently to form a sound joint fillet - this should be virtually instantaneous. Do not apply excessive solder or heat to the joint as this may result in dull, gritty fillets and excessive or darkened flux residues.
- Remove solder wire from the workpiece and then remove the iron tip.
- The total process will be very rapid, depending upon thermal mass, tip temperature and configuration and the solderability of the surfaces to be joined.

**Cleaning:** STANNOL® Kristall flux cored solder wires have been formulated to leave pale flux residues and to resist spitting and fuming. In most industrial and consumer electronics applications cleaning will not be required and the product may therefore be used to complement a No Clean wave soldering or reflow process or to allow repairs to cleaned boards without the need for a second cleaning process.



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Should residue quantity be an important consideration, **STANNOL® X39B** flux cored wire may be specified if a halide free product is required. **STANNOL® Kristall 502, 505 and 511** offer good activity and consequently cored wire flux contents and hence residue levels may be reduced in comparison with equivalent conventional products.

Should cleaning be required, this is best achieved using **STANNOL® Flux-Ex 200B** or **STANNOL® Flux-Ex 500** solvent cleaner. Other proprietary solvent or semi-aqueous processes may be suitable but saponification is not recommended.

| General Tests   | Kristall 400   | Kristall 502   | Kristall 505   | Kristall 511   |
|---|----------------|----------------|----------------|----------------|
| <b>J-STD-004</b><br>- solder spread mm <sup>2</sup><br>- corrosion test               | 210<br>pass    | 310<br>pass    | 315<br>pass    | 340<br>pass    |
| <b>SIR Test</b> (without cleaning)<br>- IPC-SF-818 Class3<br>- Bellcore TR-NWT-000078 | pass<br>pass   | pass<br>pass   | pass<br>pass   | pass<br>pass   |
| <b>Electromigration Test</b> (without cleaning)<br>- Bellcore TR-NWT-000078           | pass           | pass           | pass           | pass           |
| <b>Classification</b><br>- J-STD-004<br>- IPC-SF-818                                  | RE L0<br>LR3CN | RE L1<br>MR3CN | RE M1<br>MR3CN | RE M1<br>MR3CN |

## Physical Properties and Data

| General properties                                  | Kristall 400                         | Kristall 502   | Kristall 505                            | Kristall 511                            |
|---|--------------------------------------|----------------|---|---|
| <b>Flux Type</b><br>IEC 61190-1-3<br>DIN EN 29454-1 | RELO<br>1.2.3.                       | REM1<br>1.2.2. | REM1<br>1.2.2.                          | REM1<br>1.2.2.                          |
| <b>Flux content:</b>                                | 2.2% ± 0.3%                          | 3.0% ± 0.3%    | 2.7% / 3.0% ± 0.3%                      | 2.7% / 3.0% ± 0.3%                      |
| <b>Acid Value mg/KOH/g</b>                          | 215                                  | 170            | 170                                     | 170                                     |
| <b>Halide content:</b>                              | none                                 | 0.2 %          | 0.5 %                                   | 1.1 %                                   |
| <b>Corrosion effect:</b>                            | none, according to DIN 8516          |                |   |   |
| <b>Standard alloys</b><br>acc. to ISO 9453:2006     | <b>lead-containing:</b>              |                |   |   |
|   | S-Sn60Pb40                           | S-Sn60Pb40     | S-Sn60Pb40                              | S-Sn60Pb40                              |
|   | S-Sn62Pb36Ag2                        | on request     | on request                              | on request                              |
|   | <b>lead-free (ECOLOY® Series):</b>   |                |   |   |
|   | <b>ECOLOY® TC</b><br>(S-Sn99Cu1)     | on request     | on request                              | <b>ECOLOY® TC</b><br>(S-Sn99Cu1)        |
|   | <b>ECOLOY® TSC</b><br>(S-Sn95Ag4Cu1) | on request     | on request                              | <b>ECOLOY® TSC</b><br>(S-Sn95Ag4Cu1)    |
|   | on request                           | on request     | on request                              | <b>ECOLOY® TSC305</b><br>(S-Sn96Ag3Cu1) |
|   | <b>lead-free (FLOWTIN® Series):</b>  |                |   |   |
|   | <b>FLOWTIN® TC**</b><br>(Sn99Cu1)    | on request     | on request                              | <b>FLOWTIN® TC*</b><br>(Sn99Cu1)        |
|   | <b>FLOWTIN® TSC*</b><br>(Sn95Ag4Cu1) | on request     | on request                              | <b>FLOWTIN® TSC*</b><br>(Sn95Ag4Cu1)    |
| <b>FLOWTIN® TSC305*</b><br>(Sn96Ag3Cu1)             | on request                           | on request     | <b>FLOWTIN® TSC305*</b><br>(Sn96Ag3Cu1) |   |
| <b>FLOWTIN® TSC0307*</b><br>(Sn98Cu1Ag)             | on request                           | on request     | <b>FLOWTIN® TSC0307*</b><br>(Sn98Cu1Ag) |   |
| <b>SN100C®</b>                                      | <b>lead-free (SN100C® Series):</b>   |                |   |   |
|   | <b>SN100C®</b><br>(SnCu0,7NiGe)      | on request     | on request                              | <b>SN100C®</b><br>(SnCu0,7NiGe)         |
| <b>Available diameters:</b>                         | from 0.3 mm                          |                |   |   |
| <b>Available reel sizes:</b>                        | 250 g, 500 g, 1 kg                   |                |   |   |

\* These alloys are partially subject to minimum order quantities

**Other alloys, flux contents or reel sizes are available on request.**

## Health and Safety

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

The mentioned 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.