STANNOL

Kristall 611

FACTBOOK

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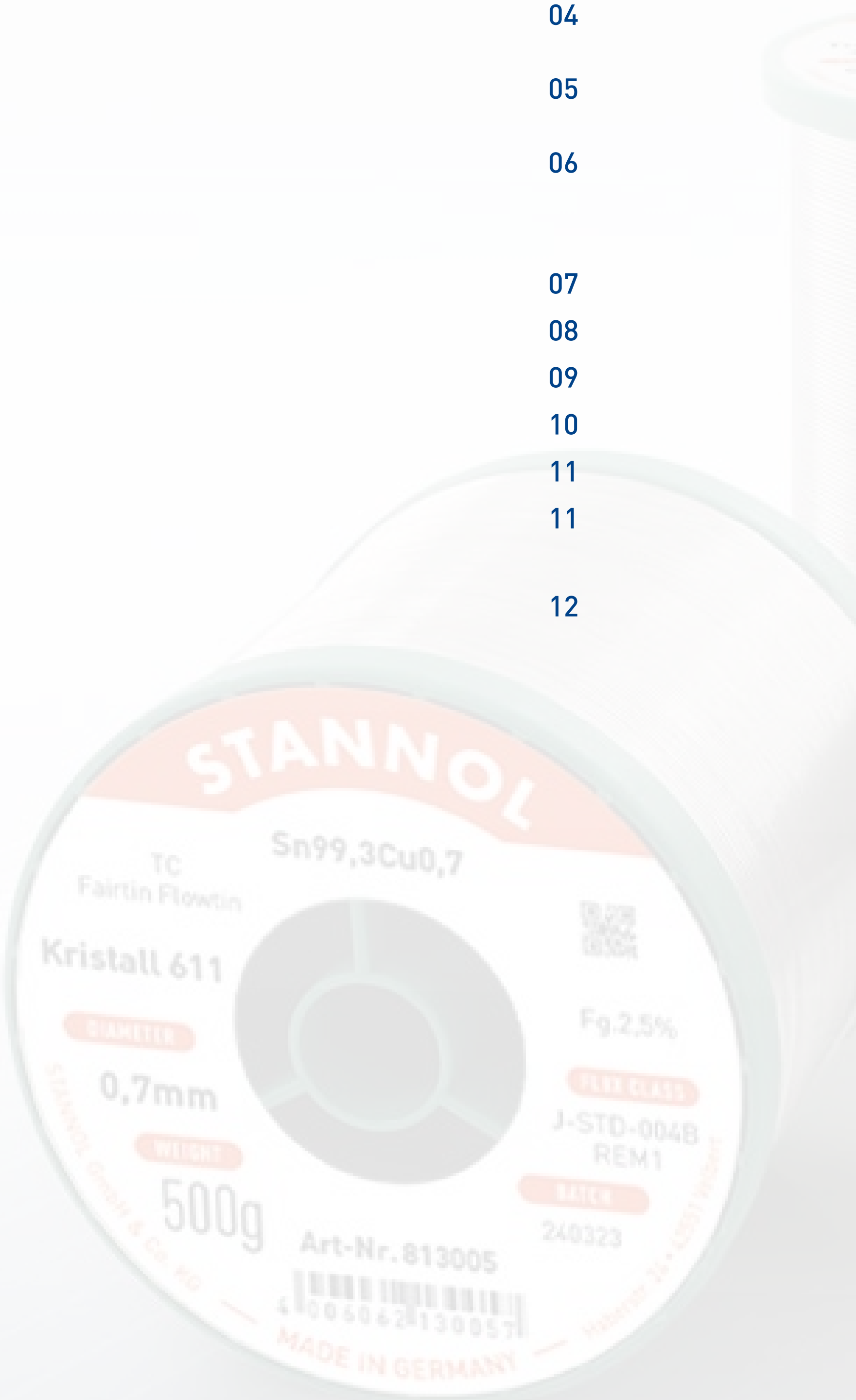

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Introduction

Kristall 611 solder wire extends the wide range of the established Kristall series from Stannol.

Kristall 611 is a halogen-activated, flux-filled solder wire that opens the process window in many places. Greatly reduced flux spitting in combination with good wetting behaviour on poorly solderable surfaces are the highlights of this product. Developed for manual rework as well as for automated soldering equipment, Kristall 611 makes it possible to cover the various production needs in modern electronics manufacturing. The contained flux fulfils the requirements of the J-STD-004B standards and is classified as a REM1 flux.

The advantages of Kristall 611

- reduced spitting
- light-coloured residues
- fast soldering
- no-clean
- chemically modified resin that minimises health risks when using colophony-based fluxes
- mild odour

Significantly reduced spitting

As the cleanliness of solder joints in electronics production is becoming increasingly important, this aspect was one of the key priorities in the development of the Kristall 611.

The most important target: to minimise contamination from flux residues and flux spitting during soldering. This was achieved by the best possible chemically modified resins in terms of low spitting behaviour.

Kristall 611 at a glance

<table>
<tr><th>General properties</th><th colspan="2">Kristall 611</th></tr>
<tr><td>Flux type:</td><td colspan="2">REM1/J-STD-004B</td></tr>
<tr><td>Flux concentration:</td><td colspan="2">2.5 % (+/- 0.3 %)</td></tr>
<tr><td rowspan="4">Available alloys:</td><th>Leaded</th><th>Lead-free</th></tr>
<tr><td>Sn63Pb37</td><td>SN100C Fair (Sn99,3Cu0,7NiGe)</td></tr>
<tr><td>–</td><td>Flowtin TC Fair (Sn99,3Cu0,7)</td></tr>
<tr><td>–</td><td>Flowtin TSC305 Fair (Sn96,5Ag3,0Cu0,5)</td></tr>
<tr><td>Available diameters:</td><td colspan="2">0.5 mm/0.7 mm/1 mm</td></tr>
<tr><td>Available reel sizes:</td><td colspan="2">500 g</td></tr>
</table>

Tests	Specifications	Results
Copper Corrosion:	ANSI/J-STD-004C – IPC-TM-650, Method 2.6.15	L = pass
Copper Mirror:	ANSI/J-STD-004C – IPC-TM-650, Method 2.3.32	L = pass
SIR-Test:	ANSI/J-STD-004C – IPC-TM-650, Methode 2.6.3.3/2.6.3.7	>108 Ω = pass
Electro Migration:	IPC-TM-650, Method 2.6.14.1	L = pass
Acid Number:	IPC-TM-650, Method 2.3.13	160 mg KOH/g
Halide Evaluation:	IPC-TM-650, Method 2.3.28.1	0.69 %

Kristall 611 in comparison

Kristall 611 outperforms most other solder wires by far in terms of wetting and spitting behaviour. When comparing the pictures you can see that the contamination and spitting of comparable solder joints is much lower when using Kristall 611.

The following surfaces show a good wetting in combination with the Kristall 611 solder wire:

- Copper
- OSP
- Brass
- Tin
- Chem. Tin
- Silver
- Chem. Silver
- Nickel
- Iron
- ENiG
- Nickel silver

Test and soldering method

The solder joints seen on the pictures were produced under the following test conditions:

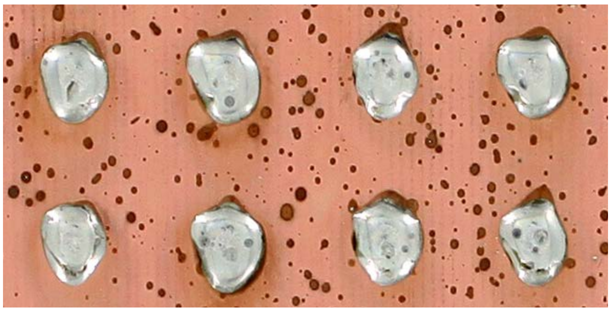
Temperature = 360 °C

Surface = bare copper (FR4)

Heat transfer = soldering iron

Contamination conventional solder wire

Contamination Kristall 611



Spitting behaviour conventional solder wire

Spitting behaviour Kristall 611

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Instructions for use

It is not necessary to remove the residues after soldering, as the residues are not corrosive according to the standard (see info box). If cleaning is required, this can be carried out with alkaline or solvent-based cleaning agents such as Flux-Ex 200B or Flux-Ex 500.

All information on safety aspects can be found in the safety data sheet.

Tested methods of heat transfer:

- laser
- induction soldering
- resistance soldering
- soldering iron [*1]
- micro flame [*2]

Heavily contaminated soldering iron tips should first be cleaned with Stannol Tippy soldering tip cleaner.

Transport/storage

Transport temperatures from -20 °C to + 80 °C can be tolerated for a few days without this having any effect on the properties or behaviour of the solder wire. It is recommended to store the solder wire at dry room temperature (0-40 °C). Stannol solder wires are not subject to a minimum shelf life.

[*1] We recommend a solder tip temperature of 340 – 360 °C for soldering with a soldering iron. 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 taken to avoid unnecessarily high tip temperatures for prolonged times. A high tip temperature will increase the tendency for flux spitting and may result in darker flux residues.

[*2] Heat transfer by micro flame or plasma is only recommended if there is no direct contact with the solder wire, otherwise the resin-based flux will be destroyed in a very short time.

Flux classification according to J-STD-004C

The test methods described in the standard are used to categorize fluxes for their properties under standardized conditions. Depending on the results, the fluxes are divided into the categories **L, M** and **H**. The following number indicates whether the flux contains halide (1) or is halide-free (0). If all tests are passed in the uncleaned state, the products are generally referred to as No-Clean products. However, this designation only indicates that the respective products have passed the tests in the uncleaned state.

The test conditions, do not cover all possible environmental conditions that a PCB can experience in the field. The final risk assessment of the residues and the associated decision as to whether the flux residues must be removed by cleaning after the soldering process is always the responsibility of the electronics manufacturer.

Tests

Surface Insulation Resistance (IPC-TM-650, Method 2.6.3.3/2.6.3.7)

Introduction

The abbreviation SIR stands for Surface Insulation Resistance. In a SIR test, the SIR values of an energised PCB are recorded over time under defined environmental conditions and with a defined PCB geometry. A drop in the SIR value during the course of the measurement indicates unwanted reactions, e.g. from flux residues.

Test conditions

Test board: 400 – 200 µm comb, bare copper on FR-4 base material

Environment: 40 ± 1 °C, 90 ± 3 % rH

Measuring range: up to 1013 Ω with 5 VDC bias voltage

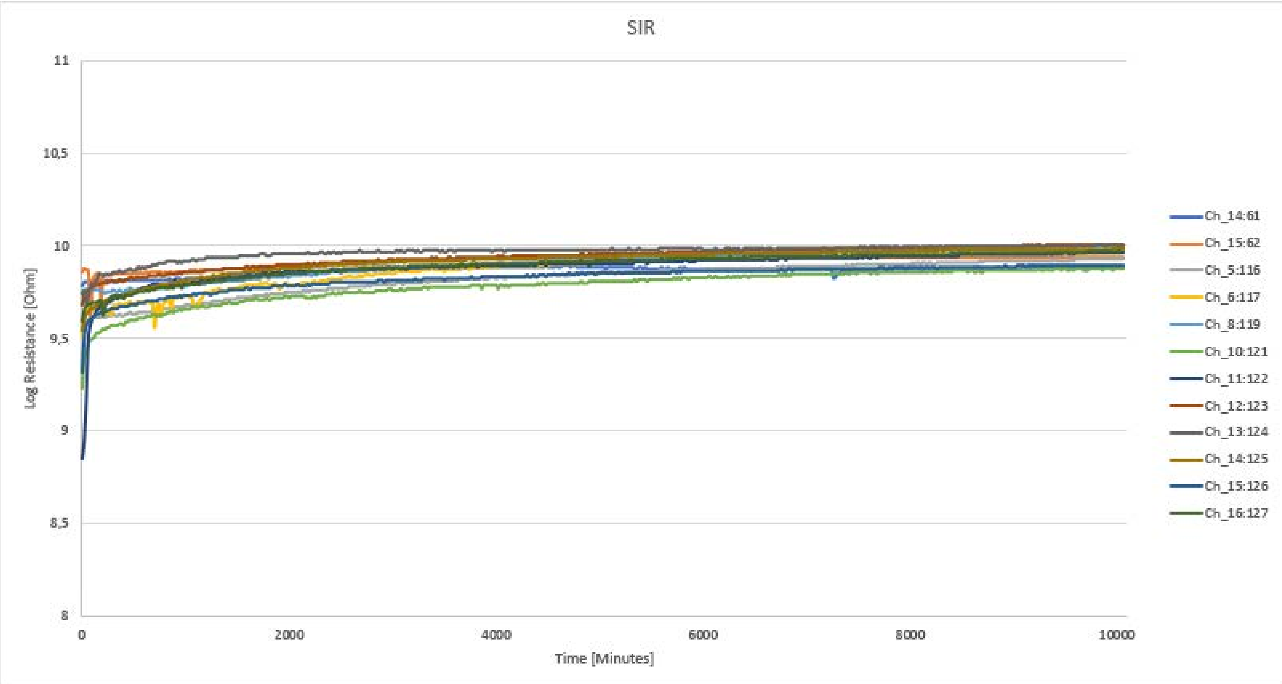
Test duration: 168 hours (7 days)

Test criteria

Criteria for passing the SIR test:

- All SIR measurements on all test samples must achieve a resistance of at least 100 MΩ on all test samples.
- There must be no evidence of electrochemical migration (filament growth) that reduces the conductor spacing by more than 20 percent.
- There must be no corrosion of the conductors (a slight discolouration is acceptable).

Test result



After 168 hours >108 Ω = Pass

Electro Migration (IPC-TM-650, Method 2.6.14.1)

Introduction

The abbreviation ECM stands for Electro Chemical Migration.

ECM is defined as the growth of conductive metal filaments under the influence of a DC voltage. The growth occurs by electrodeposition from a solution containing metal ions. The test includes in particular phenomena such as field-induced metal transport in semiconductors and the diffusion of products caused by metal corrosion.

Test conditions

PCB: IPC-B-25A comb D

Bare copper on FR-4 base material

Climate: 65 ± 2 C, 88.5 ± 3.5 % rH

Measuring range: Up to 1013 Ω, voltage 10 VDC

Test duration: 596 hours (25 days)

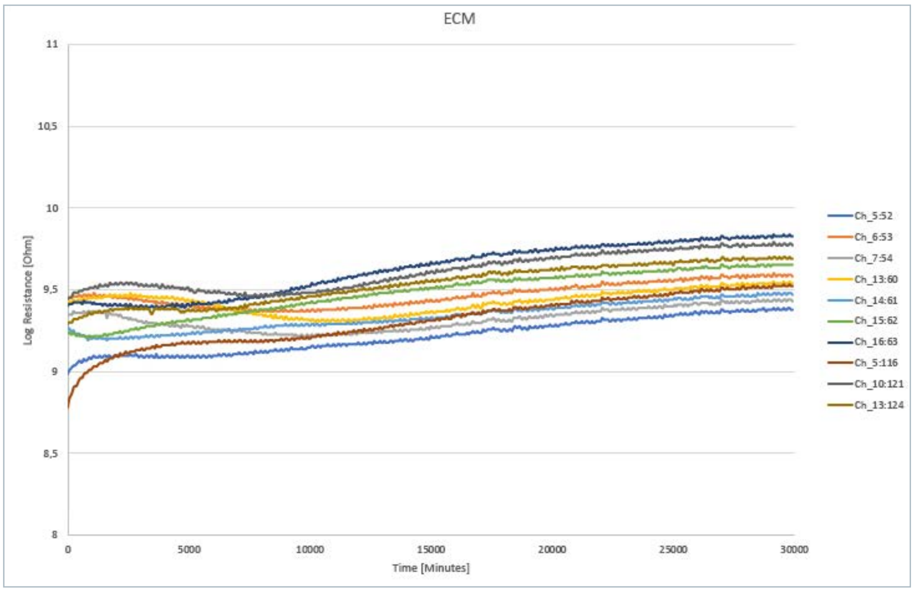
Test criteria

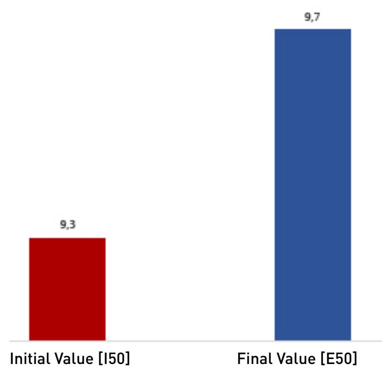
The I50 or initial insulation resistance is measured after a 96-hour stabilisation phase. The E50 or final insulation resistance is measured after a further 500 hours of continuous voltage of 10 V. I50 initial value and the final insulation resistance E50 must be reported after the test procedure.

Criteria for passing the ECM test:

- E50 ⩾I50/10, which means that the surface insulation resistance value must not fall by more than one decade during the course of the measurement.
- There must be no evidence of electrochemical migration (filament growth) that reduces the conductor spacing by more than 20 percent.
- There must be no corrosion of the conductor tracks. (A slight discolouration of the comb pattern is acceptable).

Test result





No electrochemical migration. The last IR is ⩾ the first IR = Pass

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Copper Corrosion (IPC-TM-650, Method 2.6.15)

Introduction

This test method is used to determine the corrosive properties of flux residues under defined environmental conditions.

Test conditions

Test coupon: 99 % copper
Climate: 40 ± 3 °C, 93 ± 5 % r H
Test duration: 240 hours (10 days)

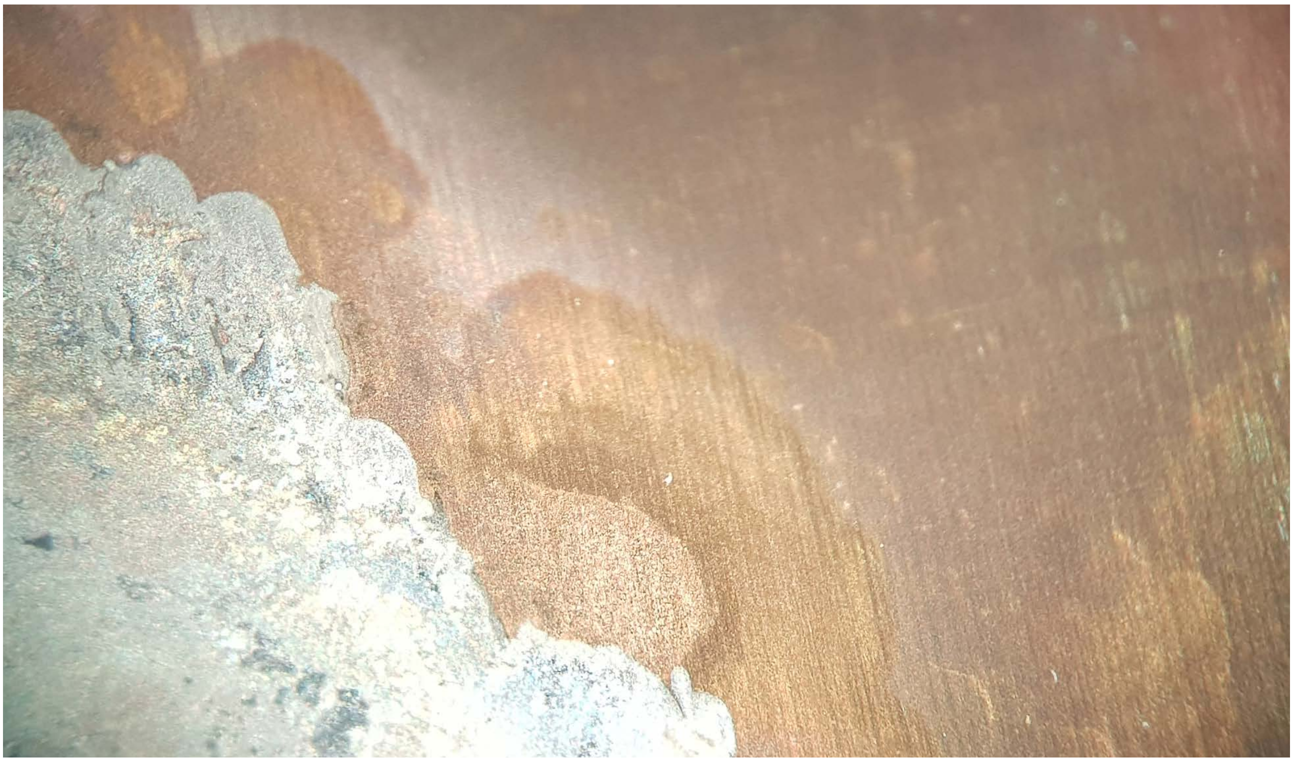
Test criteria

No corrosion (L): No signs of corrosion can be observed. The initial colour change, that can develop when the copper coupon is heated during the soldering process is not taken into account.

Minor corrosion (M): Slight white or coloured spots in the flux residues, but without copper corrosion.

Severe corrosion (H): Development of green-blue discolouration and/or visible corrosion.

Test result



No corrosion: Pass (classification L)

Copper Mirror (IPC-TM-650, Method 2.3.32)

Introduction

This test method was developed to determine the removal effect of the flux on the copper layer.

Test conditions

Test coupon: Glas panel with a thickness of approximately 50nm

Climate: 23 ± 3 °C, 50 ± 5 % rH

Test duration: 24 hours (1 day)

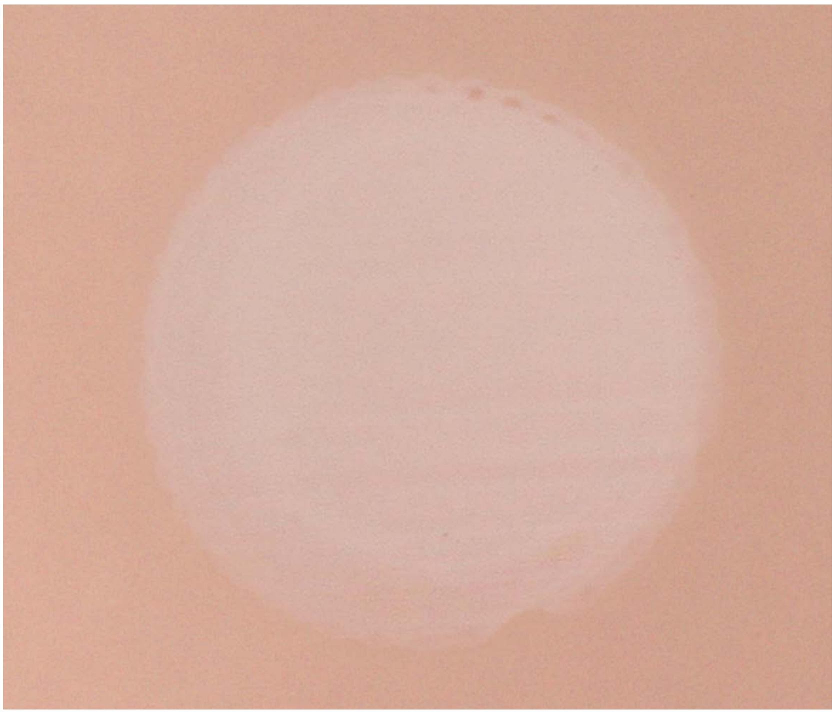
Test criteria

L = The copper layer has not been completely removed. No breakthrough of the copper layer

M = Complete removal of the copper only at the edge of the applied droplet (breakthrough less than 50 percent)

H = Complete removal of the copper layer on more than 50 percent of the wetted surface (breakthrough greater than 50 percent)

Test result



No breakthrough = Pass (classification L)

Acid Number (IPC-TM-650, Method 2.3.13)

Introduction

This test method is used to determine the acid value during the production process for internal specification.

Method

The method is described in IPC-TM-650, method 2.6.13. Method B is used.

Test result

160 mg KOH/g

Halide Evaluation (IPC-TM-650, Method 2.3.28.1)

Introduction

The halide evaluation is used to determine the concentration of chloride (Cl-), bromide (Br-), fluoride (F-) and iodide (I-) in liquid or extracted fluxes.

Test conditions

The method is described in IPC-TM-650, method 2.3.28.1

Test result

0.69 %

Delivery forms

Title	Alloy	Diameter	Weight
Kristall 611	Flowtin TSC305 F	0.5 / 0.7 / 1.0 mm	500 g
Kristall 611	Flowtin TC F	0.5 / 0.7 / 1.0 mm	500 g

Additional articles are available on request.

Further technical information can be found on our website at:
www.stannol.de/en/downloads

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greenconnect

responsible soldering products

Under the name greenconnect Stannol offers a complete product range that focuses on sustainability and fairness – for a greener future!

SOLDER WIRE

FLUX

SOLDER PASTE

ACCESSORIES

SOLDER BARS

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