







## Product Catalog



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## COMPANY

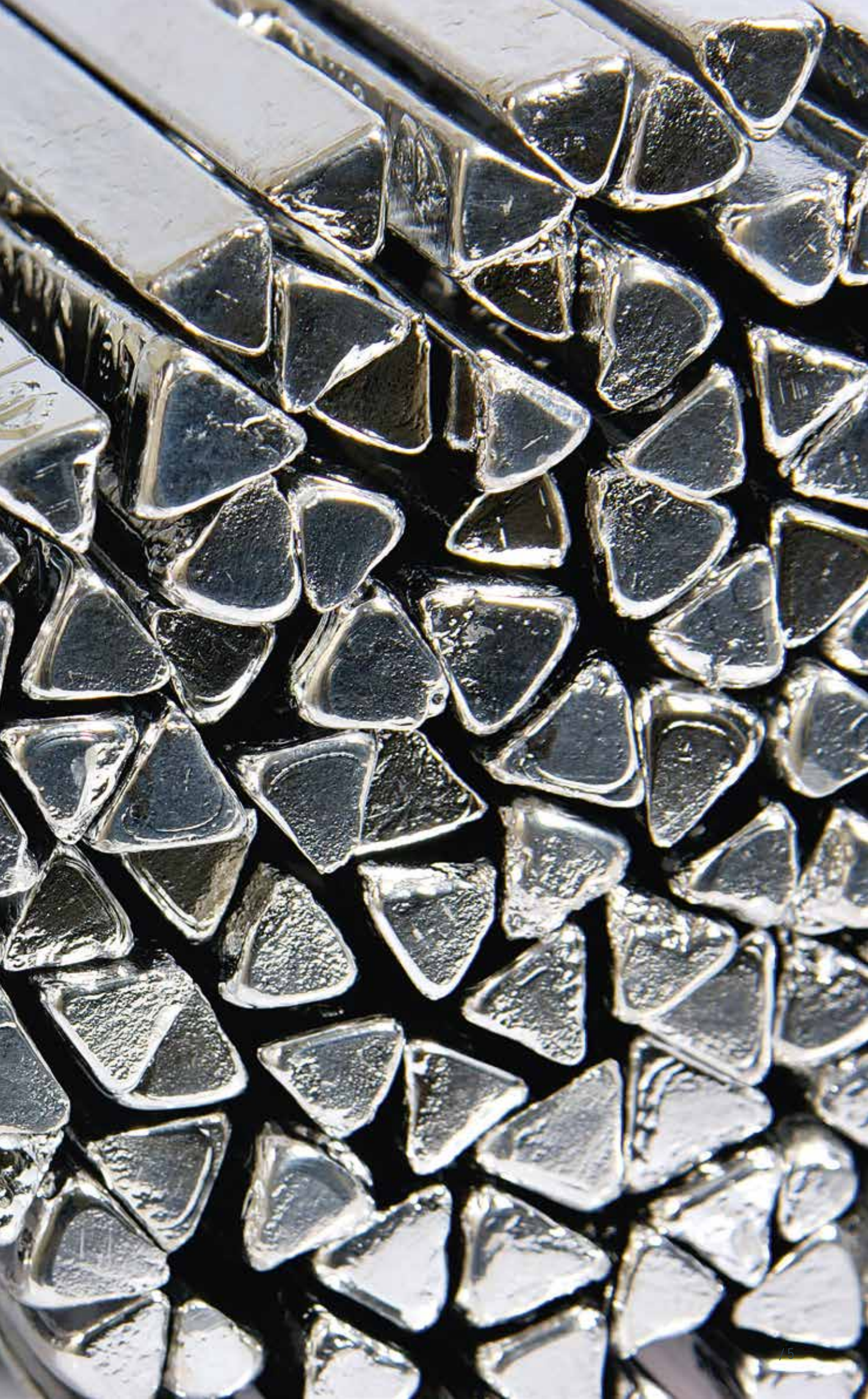
Since 1954 onwards ELSOLD® GmbH & Co. KG has developed from the JL Goslar Group into an independent profit centre in the areas of production, development, and sales of solder products. The actual company foundation took place in December 2010. Since then ELSOLD® has established itself as a leading manufacturer of innovative soldering products for the electrotechnical and electronic industry as well as for the automotive and solar industries all over the world.

At the end of 2017, ELSOLD® became a member of the Tamura Group, headquartered in Tokyo. Tamura will support with global market strength and know-how to further develop and expand at the Ilsenburg site.

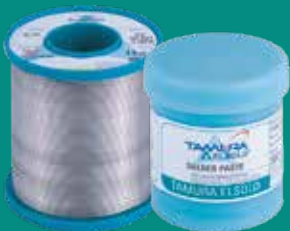
Since the first quarter of 2018 we are officially registered as TAMURA ELSOLD GmbH in the commercial register. Together we are expanding our sales network in Europe and Asia.

Our products stand for high quality, which meets the finest connection geometries of today's components: optimum solderability and high recyclability. Due to these properties, we are the only supplier of soldering alloys and fluxes for the European space industry.









STRONG IN THE REGION.  
SUCCESSFUL IN THE WORLD.

## RELIABILITY

Thanks to our 65 years of experience, we know the needs and requirements of the electrical, solar and electronics industries for modern soldering technologies like no other company. Our lead-free materials reliably meet all of the same requirements that are placed on lead-containing materials. Through constant contact with our customers, we know what the industry is dealing with on a daily basis and focus on solutions that lead to success and the highest quality in Germany and worldwide.



## ECO-FRIENDLY

At TAMURA ELSOLD® we see the environment as our most important asset. With our products we want to contribute to its protection.

The EU Regulation on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) has been in force since July 2006. It prohibits the placing on the market of new equipment containing more than 0.1% by weight of lead per homogeneous material.

With our lead-free solder products, we play our part in protecting the environment and ensure that electrical and electronic equipment complies with EU regulations. At the same time, our TAMURA ELSOLD® Recycling Service offers our customers the opportunity to take back scrap metal and process it directly into recyclable, high-purity metal.

## PHILOSOPHY

A traditional company with strong local roots, that thinks and does business globally. Long lasting relationships with our customers, partners and colleagues are an elementary component of our past and future development.

We handle the current challenges facing us as a manufacturer of soldering products with in-house production by providing high quality products and reliable delivery; but in particular, by permanently enhancing products and processes on the basis of the latest technologies. In doing so, we are, and remain able to compete in a highly competitive market.



# TAMURA ELSOLD® SN100(Ag) MA-S LEAD-FREE ALLOYS

## TAMURA ELSOLD® SN100(Ag) MA-S MICRO-ALLOYED SOLDER WITH NI, GE AND P

In addition to a complete range of high quality solder alloys, TAMURA ELSOLD® now offers a world class innovation the micro-alloyed TAMURA ELSOLD® SN100(Ag) MA-S. This solder is manufactured via a revolutionary process called “Frischen” or “Freshening”, which can be described as an ultra-grade cleaning operation. This proprietary technique results in a highly pure and highly stable solder alloy with a much lower tendency to oxidise solder equipment. Typical solder defects such as bridging and solder spikes are almost non-existent. Compared with Sn99.3Cu0.7, our new lead free micro-alloy solder boasts the lowest amount of dross formation whilst soldering, thereby making it extremely economical.

The following graphs show the enormous potential for slowing down production soldering losses and reducing costs. The numerous advantages of the revolutionary TAMURA ELSOLD® SN100 MA-S can be summarised as follows: good solderability; fine-grained & shiny solder joints; reduced erosion of solder pot & solder tools; reduced leaching; and the lowest dross formation resulting in the best cost efficiency.

### PRODUCT BENEFITS

- ▲ Good solderability
- ▲ Fine-grained and shiny solder joints
- ▲ Reduced erosion of solder pot and solder tools
- ▲ Reduced leaching
- ▲ Lowest dross formation
- ▲ Best cost efficiency

## PRODUCT PORTFOLIO: LEAD-FREE SN100(Ag) MA-S BARS

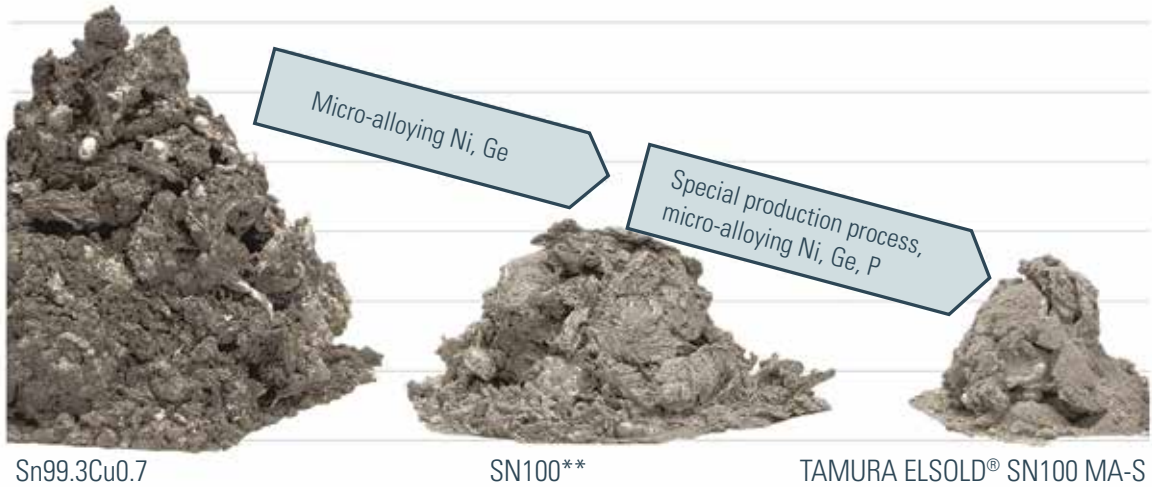
ALLOY	COMPOSITION	MELTING RANGE [°C]
SN100 MA-S	Sn99.3Cu0.7NiGeP	227
SN100 MA-S Refill	Sn99.8Cu0.2NiGeP	232–234
SN100 MA-S Refill Plus	Sn99.8Cu0.2NiGeP	232–234
SN100Ag0.3 MA-S	Sn99.0Ag0.3Cu0.7NiGeP	217–227
SN100Ag1 MA-S	Sn98.3Ag1Cu0.7NiGeP	217–223
SN100Ag3 MA-S	Sn96.5Ag3Cu0.5NiGeP	217–219

DELIVERY FORM	DIMENSIONS [MM]	WEIGHT [APPROX. KG]
Triangular bar	8/10 x 400	0.2
Bars	20 x 20 x 335	1
Ingots	50 x 20 x 490	3

**ALL LEAD-FREE SN100(AG) MA-S ALLOYS ARE ALSO AVAILABLE AS SOLID WIRE AND FLUX CORED WIRE.**



# LESS DROSS - MORE PROFIT **FACTOR 15X\***



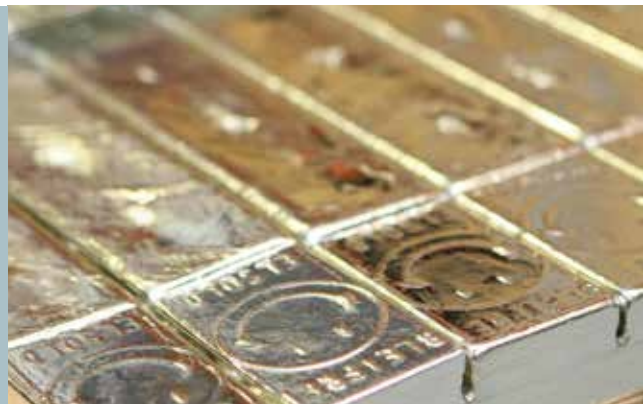
## FEATURES: MICRO-ALLOYED, LEAD-FREE SN100(Ag) MA-S ALLOYS

The special manufacturing process of SN100 MA-S eliminates unwanted impurities leading to a highly pure and stable alloy which shows a reduced tendency to oxidise. This proprietary manufacturing process guarantees an outstanding level of purity without contamination. Such alloys show a high stability and remains liquid with a low-viscosity, thereby reducing typical solder defects such as solder peaks and solder bridging. The soldering results are outstanding and quality fluctuations are kept to an absolute minimum.

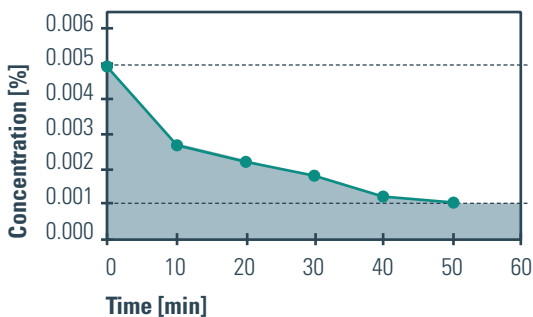
## HIGHLIGHT

### MICRO-ALLOYED SN100(AG) MA-S BARS

- ▲ All important Sn(Ag)Cu alloys
- ▲ Highest purity (first melt)
- ▲ Excellent solderability and wettability
- ▲ Lowest oxidation
- ▲ Lowest dross formation



### FRESHENING of SN100 MA-S Reduction of Impurities



One simple look at the molten solder bath surface after 8 hours and before dross removal clearly shows the difference between SN100 MA-S and SnCu0.7.



SN100 MA-S



SnCu0.7

## DROSS FORMATION IN 8 HOURS AT 290 °C (DYNAMIC SOLDER BATH)

SN100 MA-S	1.5 %
Sn99.3Cu0.7	22.6 %

\* Factor 15 x less solder dross taken after 8 hours in a dynamic solder bath at 290 °C. \*\*Competitive alloy according to No. 403 of EN ISO 9453 ELSOLD® SN100 MA-S also fulfils the requirements of this standard, but with better performance

## LONG-TERM STABILITY OF SN100 MA-S

In addition to the well known positive characteristics of SnCu/SnAgCu alloys, it is the outstanding cost/performance ratio that makes SN 100 MA-S truly stand out. When using lead-free alloys in an open or atmosphere wave solder machine, the dross formation can be larger than the required amount of solder in the product. This means that the manufacturing process of a product requires up to 3 times the amount of solder that ends up being built into the product. With TAMURA ELSOLD® SN100 MA-S, the dross formation is so reduced that the same product can be manufactured with a much lower solder requirement.

These enormous savings have an even greater payoff when using cost intensive silver alloys. A solder bath analysis will clearly substantiate that the value added outstanding properties of TAMURA ELSOLD® SN100 MA-S remain stable over a very long period of time. The solder bath remains stable. The concentration of all elements remain stable in the observed period of time. In fact, only a very slight amount of Germanium (6 ppm) and Phosphor (20 ppm) could be observed, which can be perfectly balanced by use of specially developed refill and refill plus alloys.



## TYPICAL ANALYSIS OF SN100 MA-S

COMPOSITION	TYPICAL ANALYSIS RESULTS	LIMITS (MAX.) ACCORDING TO EN 10 9453 [%]
Sn – Tin	Rest	Residual
Cu – Copper	0.70	0.5–0.9
Ni – Nickel	0.03	Undetermined
Ge – Germanium	0.006	Undetermined
P – Phosphorus	0.004	Undetermined
Ag – Silver	0.02	0.10
Pb – Lead	0.03	0.10
Sb – Antimony	0.003	0.10
Cd – Cadmium	0.0005	0.002
Zn – Zinc	0.0005	0.001
Al – Aluminium	0.0005	0.001
Bi – Bismuth	0.02	0.10
As – Arsenic	0.01	0.03
Fe – Iron	0.002	0.02
Co – Cobalt	0.002	Undetermined
Au – Gold	0.001	0.05
In – Indium	0.004	0.10

With TAMURA ELSOLD® MA-S alloys up to **70%** less waste.\*

\* Factor 15x less solder dross taken after 8 hours in a dynamic solder bath at 290 °C.



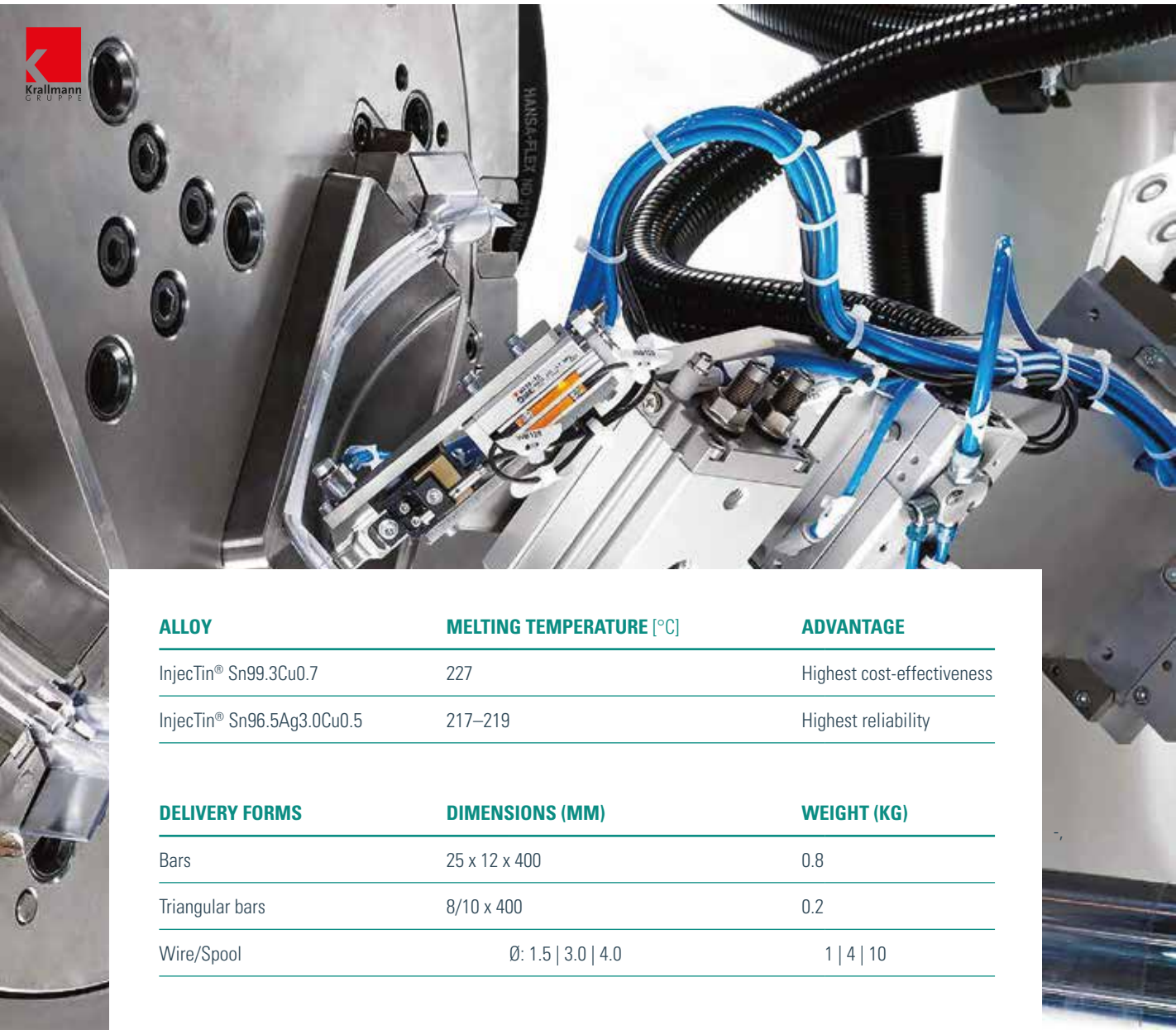
# TAMURA ELSOLD® INJECTIN® FOR IMKS® PROCESS ALLOY

MATERIALS FOR AN INNOVATIVE, INTEGRATIVE PROCESS TECHNOLOGY

Fluidity is a fundamental material property for injection moulding. This property is optimised by alloy and process development of TAMURA ELSOLD® InjecTin®. Fluidity, characterised by fluidity length, is significantly improved by special TAMURA ELSOLD® production process and use of micro-alloying elements, especially by a content of Nickel and Germanium optimised for the IMKS® process, in comparison to standard soldering alloy Sn99.3Cu0.7.

To sum up, TAMURA ELSOLD® InjecTin® is the material which fulfils all requirements of the innovative IMKS® process: lowest dross formation; longest lifetime of machines by non-aggressive metal; and highest fluidity for best injection results.

- ▲ Micro-alloyed with Ni, Ge & P
- ▲ Special production process for best properties
- ▲ Best fluidity
- ▲ Lowest oxidation and dross formation
- ▲ Fine microstructure improved mechanical properties and smooth surfaces
- ▲ Longer lifetime of crucible and machine components



ALLOY	MELTING TEMPERATURE [°C]	ADVANTAGE
InjecTin® Sn99.3Cu0.7	227	Highest cost-effectiveness
InjecTin® Sn96.5Ag3.0Cu0.5	217–219	Highest reliability

DELIVERY FORMS	DIMENSIONS (MM)	WEIGHT (KG)
Bars	25 x 12 x 400	0.8
Triangular bars	8/10 x 400	0.2
Wire/Spool	Ø: 1.5   3.0   4.0	1   4   10



## OUR PRODUCTS

The TAMURA ELSOLD® delivery program offers you an extensive selection of all materials for the production of safe, soldered joints for all known soldering processes (reflow, wave, selective, robot and hand soldering).

- ▲ Solder paste
- ▲ Solder wire
- ▲ Solder bars
- ▲ Fluxes for electronic and solar industry
- ▲ Analysis of solder bath
- ▲ Recycling
- ▲ TAMURA ELSOLD® lead-free alloys
- ▲ TAMURA ELSOLD® leaded alloys
- ▲ TAMURA ELSOLD® high-temperature alloys

## TAMURA ELSOLD® FACTOR

We are constantly researching the improvement of our products in order to create added value for you. With our TAMURA ELSOLD® Factor campaign, we make it easy for you to choose us and our products. Here we fill your RoHS compliant solder bath free of charge in exchange with TAMURA ELSOLD® SN100 MA-S so you can convince yourself of our quality at no extra cost.

For more information, please contact our technical consultant who will advise you on your processes and savings potential. The contact details can be found at the end of the brochure.





YOU CAN BE  
SURE ABOUT THIS  
CONNECTION.





- ▲ Tin from sustainable extraction in Peru
- ▲ Promote sustainably operating companies and increase market pressure on all other tin producers
- ▲ For all lead-free solder bars as well as solid and flux cored wires
- ▲ Well-known, highest TAMURA ELSOLD quality
- ▲ Proof of fair origin also for your customers and your ISO 14001 program automatically in the certificate of inspection



## SUSTAINABLE SOLDER PRODUCTS

TAMURA is committed to achieving the **17 UN Sustainable Development Goals** at all its production sites worldwide. Thus, **ISO 14001** certification, close coordination with local authorities to ensure compliance with all environmental and work safety standards, and purchasing only conflict-free raw metals have long been a matter of course for TAMURA ELSOLD as well.

As a company in the former mining region of the Harz, with the UNESCO World Heritage Site „Rammelsberg Mine, Old Town of Goslar and Upper Harz Water Management“, the challenges for people and the environment in ore and metal extraction are still omnipresent to us. We therefore want to support companies that actively share our values in the extraction of tin, the most important metal for us, and have created the FairSn product series for this purpose.

As the only tin producer worldwide, the Peruvian Minsur is a member of the **International Council on Mining and Metals (ICMM)**. The ICMM principles define environmental, social and governance requirements for the mining and metals industry through a comprehensive set of performance expectations. As such, Minsur maintains important **social, environmental and occupational health and safety programs** and is certified to ISO 9001, ISO 14001 and OHSAS 18001. Minsur has long been a tin supplier to TAMURA ELSOLD, with quality guaranteed to be consistently high. To support Minsur on their way and to encourage other tin producers to do even more against environmental destruction and child labor and for safe and healthy work under fair conditions than it is already required by law for all our listed suppliers, we need your support. Because next to political calls, economic demand is probably the most effective instrument for change in the global market economy.

**Therefore, when ordering all lead-free solder bars, as well as solid and flux-cored wires, ask for tin from fair and sustainable sources according to ICMM and help us further advance the achievement of the UN Sustainable Development Goals also in our industry.**





# SUSTAINABLE DEVELOPMENT GOALS

## Basic policy on promotion of SDGs | Tamura Group Code of Conduct

The Tamura Group recognizes our corporate social responsibility (CSR) of balancing the achievement of a sustainable society and the sustainable growth of the Tamura Group. We recognize the term "SDGs" as shared global language regarding social issues. In addition to understanding the business opportunities presented by SDGs and the responsibility of corporation in achieving SDGs, the Tamura Group will contribute to the solution of social issues through products, services, technology, and business activities.



## HIGHLIGHT BIO FLUX

- ▲ Reduction of CO<sub>2</sub> emissions with water-based or bio-ethanol-based fluxes.
- ▲ Water-based fluxes - always the most environmentally friendly solution, e.g. our 3007 NC (ORLO)
- ▲ BIO-Ethanol based - 70% CO<sub>2</sub> savings through ethanol from renewable resources: Highest quality and safety as known from standard solvents (IPA), easiest change without process adjustments. Many alcohol-based fluxes as BIO ethanol variant on request.



# TAMURA ELSOLD® BARS

TAMURA ELSOLD® alloys comply with standards DIN EN 29453, DIN EN 61190-1-3 and TAMURA ELSOLD® in-house standards. Further forms available upon request, such as thick and wide rods, flat tapes, thin rods and bars, threads, solid wire etc. All alloys can be supplied in deoxidised form upon request. Lead-free solder is also available as TAMURA ELSOLD® MA (micro-alloyed).

## TAMURA ELSOLD® LEAD-FREE BARS

ALLOY	MELTING RANGE [°C]	WORKING TEMPERATURE [°C]
Sn99.3Cu0.7	227	255–285
Sn99.3Cu0.7 MA	227	255–285
Sn99.3Cu0.7P	227	255–400
Sn96.5Ag3.0Cu0.5	217–219	255–285
Sn95.5Ag3.8Cu0.7	217	255–285
Sn97Ag3	221–232	255–285
Sn96Ag4	221–238	255–285
Sn96.5Ag3.5P	221	255–320

DELIVERY FORM	DIMENSIONS [MM]	WEIGHT [APPROX. KG]
Triangular bars	8/10 x 400	0.2
Bars	20 x 20 x 335	1
Ingots	50 x 20 x 490	3

## ADVANTAGES OF TAMURA ELSOLD® BARS

- ▲ Available in all common lead-free and leaded alloys
- ▲ Highest purity, virgin grade
- ▲ Excellent soldering and wetting properties
- ▲ Minimal oxides
- ▲ Minimal dross generation
- ▲ Also available as micro-alloyed (SAC) SC

## ADVANTAGES MICRO-ALLOYED SOLDERS

- ▲ Fine-grained structure facilitates visual inspection
- ▲ Low erosion of copper allows lead-free tinning of thin wire and circuit paths, multiple joints and repairs
- ▲ Significant cost saving though low metallurgical attack on material, soldering tips and equipment



# LEADED BARS

Increasing miniaturisation, stricter requirements with regard to long-term reliability of complex electronic products, components and related extended performance features thereof create the highest demands for soldering quality. TAMURA ELSOLD® soft solders are therefore produced only from carefully selected virgin-grade base metals. TAMURA ELSOLD® soft solders cover the entire range of electronic applications: machine solders, high temperature solders, special solders (low-melting alloys, solders for static baths).

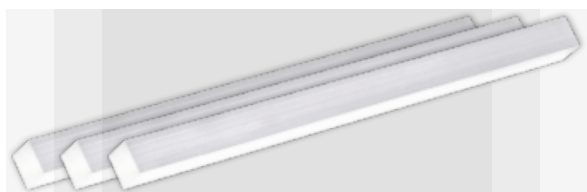
## TAMURA ELSOLD® LEADED BARS

ALLOY	MELTING RANGE [°C]	WORKING TEMPERATURE [°C]
Sn63Pb37	183	240–260
Sn63Pb37P	183	240–260
Sn60Pb40P	183–190	240–260
Pb95Sn3Ag2	304–310	> 450
Pb95Sn3Ag2P	304–310	> 450
Pb92Sn8(Sb)	280–305	> 450
Bi50Pb31.3Sn18.7	96	150–180

DELIVERY FORM	DIMENSIONS [MM]	WEIGHT [APPROX. KG]
Triangular bars	8/10 x 400	0.2
Bars	50 x 20 x 490	4
Bars	50 x 18 x 600	4.5
Thin bars	2/3 x 400	0.2



Triangular bars



Extruded bars



## TAMURA ELSOLD® SOLID WIRE

Modern manufacturing technology, i.e. selective soldering, demands ultimate quality solid wires by using virgin grade base metals. TAMURA ELSOLD® produces solid wires of highest purity. We guarantee consistent best product quality. Ongoing quality control of each and every production lot is recorded and filed. Our customers including the European Aerospace industry can fully rely on TAMURA ELSOLD®, we are the only approved supplier of solid soft solder material with ECCS certification.

Our modern production process permits the manufacture of all required alloys with or without lead, alloys for low and high temperature, and also solder alloys for static baths, for soft soldering processes in all areas of the electronic industry.

### TAMURA ELSOLD® LEAD-FREE SOLID WIRE

ALLOY	MELTING RANGE [°C]	WORKING TEMPERATURE [°C]
Sn99.3Cu0.7	227	255–285
Sn99.3Cu0.7 MA	227	255–285
Sn97Cu3	230–250	255–285
Sn97Ag3	221–232	255–285
Sn96.5Ag3.5	221	255–285
Sn96.2Ag3.8	221–238	255–285
Sn96.5Ag3Cu0.5	217–219	255–285
Sn95.5Ag3.8Cu0.7	217	255–285

ALL LEAD-FREE SOLDERS ARE ALSO AVAILABLE AS TAMURA ELSOLD® MA MICRO-ALLOYED.





## TAMURA ELSOLD® SN100 MA-S SOLID WIRE

ALLOY	MELTING RANGE [°C]
SN100 MA-S	227–230
SN100Ag0.3 MA-S	217–227
SN100Ag1 MA-S	217–223
SN100Ag3 MA-S	217–219



## TAMURA ELSOLD® LEADED SOLID WIRE

ALLOY	MELTING RANGE [°C]	WORKING TEMPERATURE [°C]
Sn63Pb37	183	240–260
Sn63Pb37P	183	240–260
Sn64Pb36P	183	240–260
Sn60Pb39.86Cu0.14P(HTF)	183–190	240–260
Pb95Sn3Ag2P	299–305	> 450

### ADVANTAGES OF ELSOLD® SOLID WIRE

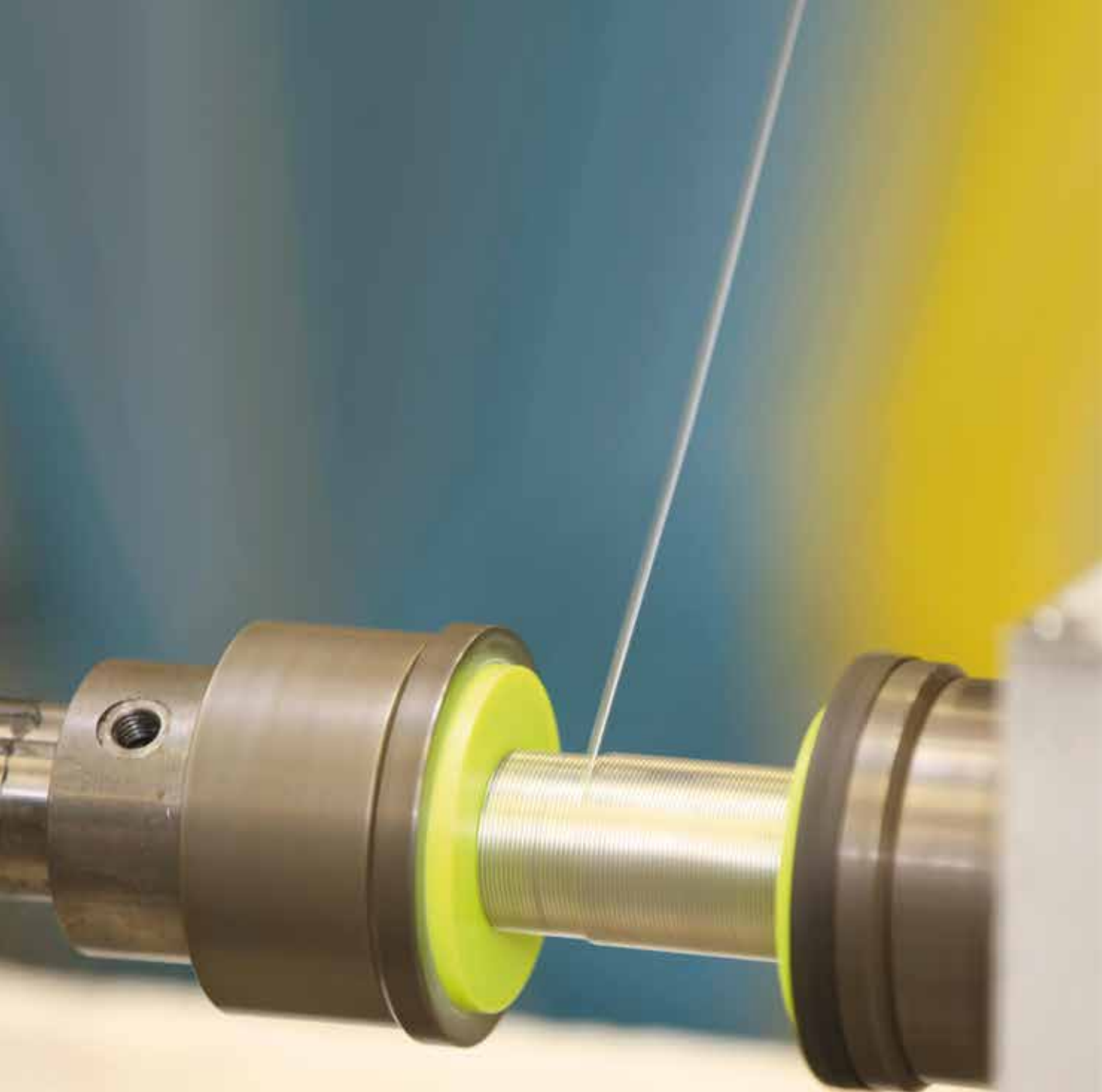
- ▲ Available in all common lead-free and leaded alloys
- ▲ Highest purity, virgin grade
- ▲ Excellent soldering and wetting properties
- ▲ Minimal oxides
- ▲ Minimal dross generation
- ▲ Also available as micro-alloyed (SAC) SC

### ADVANTAGES MICRO-ALLOYED SOLDERS

- ▲ Fine-grained structure facilitates visual inspection
- ▲ Low erosion of copper allows lead-free tinning of thin wire and circuit paths, multiple joints and repairs
- ▲ Significant cost saving though low metallurgical attack on material, soldering tips and equipment

The list above shows a selection of our most sought after products. Of course you can order the alloy you require.

- ▲ Diameters available up to 8.0mm
- ▲ Special dimensions available on request
- ▲ Standard coil sizes: 500g | 1kg | 4kg | 10kg | 25kg



## TAMURA ELSOLD® FLUX CORED SOLDER WIRE

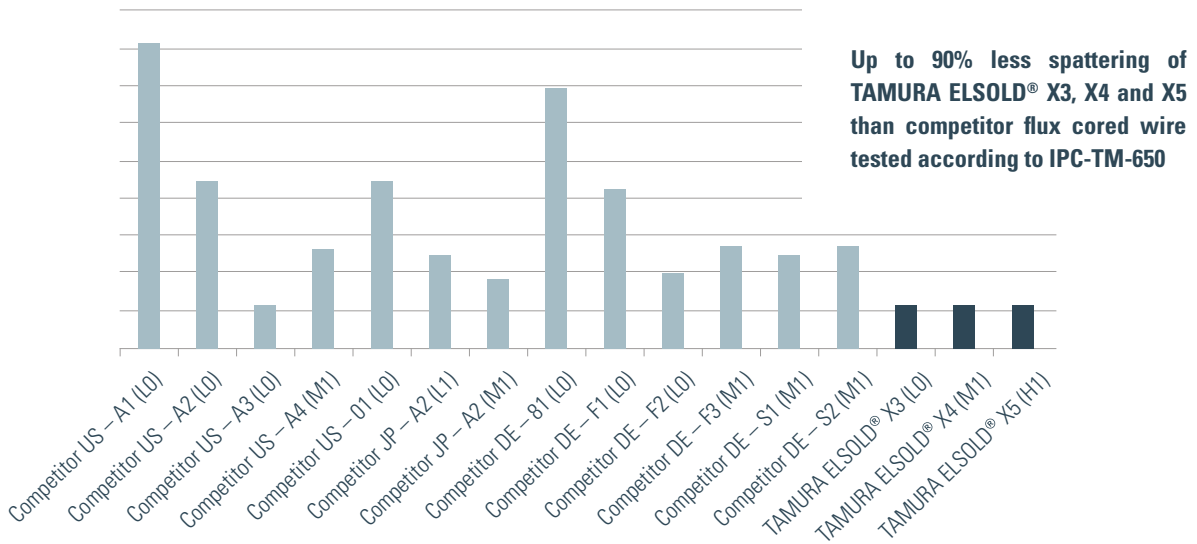
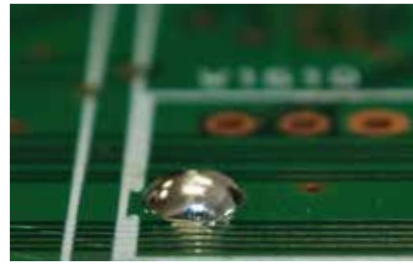
Cored solder wire – the oldest solder medium – has been used for many years in the electronic industry. Cored solder wire permits the simultaneous application of solder and flux to the soldering point. Despite development of solder paste which serves the same purpose, cored solder wire has defended its position. It is still preferred for applications such as manual and repair soldering processes, and automatic soldering.

TAMURA ELSOLD® cored solder wire is available in many types and is unchallenged because of its variety. Besides the purity of the base metals, the particular innovation is the constant adaptation of solder paste composition to production parameters and process. Rosin and activator must be adapted to higher or changed process temperatures. TAMURA ELSOLD® produces top quality cored solder wire by choosing suitable flux constituents along with strictly monitored production conditions.



## TAMURA ELSOLD® FLUX CORED SOLDER WIRE TYPE X3, X4 AND X5

The new TAMURA ELSOLD® flux cored solder wire X-Series offer an optimal process stability and consequently an efficient assembly of electronic components. During soldering X-Series wire shows a fast and reliable wetting and a significantly reduced spattering, even at high temperatures up to 500 °C, combined with bright, transparent, and very safe residues.



### HIGHLIGHTS TAMURA ELSOLD® SN100 MA-S X-SERIES

- ▲ Fine-grained & shiny solder joints
- ▲ Lowest copper leaching
- ▲ Reduced erosion of solder tools
- ▲ Uniform material usage in the whole process chain with SN100 MA-S ingots, bars, solid wire and solder pastes
- ▲ Up to 90% less spattering than conventional cored wire
- ▲ Best results even at highest soldering temperatures
- ▲ High corrosion resistance
- ▲ Fast and reliable wetting
- ▲ Bright, transparent ductile residues (no brittle spalling)



### TAMURA ELSOLD® SN100(Ag) MA-S FLUX CORED SOLDER WIRE

ALLOY	MELTING RANGE [°C]
SN100 MA-S	227–230
SN100Ag0.3 MA-S	217–227
SN100Ag1 MA-S	217–223
SN100Ag3 MA-S	217–219



## TAMURA ELSOLD® FLUXES FOR FLUX CORED WIRE

FLUX TYPE	CLASSIFICATION EN 61190-1-1	STANDARD FLUX CONTENT [%]	NO CLEAN
C3   C3 Plus	ROLO	2.5   3.5	✓
3064   3064 BF	ROM1	2.2   3.3	(✓)
TS-1	ROM1	2	✓
A3   A4	ROH1	2.5   3.5	–
X3	RELO	3	✓
X4	REM1	3	✓
X5	REH1	3	–
RS-1	REMO	0.7	✓
Z0	ORLO	2.5	✓
Z1	ORM1	2.5	(✓)
105-19	ORM1	1.4	–
T	ORM1	3	–
H	ORM0	2.5	(✓)
AI-S	ROH1	2.5   3.5	–

## TAMURA ELSOLD® LEADED FLUX CORED WIRE

ALLOY	MELTING RANGE [°C]
Sn63Pb37	183
Sn60Pb40	183–190
Sn60Pb39Cu1	183–190
Sn62Pb36Ag2	179
Sn60Pb36Ag4	178–180
Pb91Sn8Sb1	280–305

## TAMURA ELSOLD® LEAD-FREE FLUX CORED WIRE

ALLOY	MELTING RANGE [°C]
Sn99.3Cu0.7	227
Sn96.5Ag3.0Cu0.5	217–219
Sn95.8Ag3.5Cu0.7	217
Sn97Cu3	230–250
Sn95Sb5	230–240
Sn97Ag3	221–230

ALL LEAD-FREE SOLDERS ARE ALSO AVAILABLE AS TAMURA ELSOLD® MA MICRO-ALLOYED.

### HIGHLIGHT: NO-CLEAN FLUX CORED SOLDER WIRE C3 PLUS LEAD FREE

- ▲ Quick wetting
- ▲ Low, elastic residues
- ▲ Non-corrosive flux residues
- ▲ Short soldering time
- ▲ Thermal stable flux
- ▲ Fulfils all global standards
- ▲ For all soldering applications
- ▲ Excellent solderability



The list above shows a selection of our most sought after products. Of course you can order your alloy with the flux you require. For custom-made orders, the flux fraction can be selected from 0.5% to 3.5% in steps of 0.5%.

- ▲ Standard coil sizes: 0.50kg | 1.00kg | 2.50kg | 4.00kg
- ▲ Special coil sizes available upon request
- ▲ All cored solder wire are available with a diameter of 0.3mm upwards
- ▲ Diameters are subject to standard tolerances as per DIN 12224-1



## HIGHLIGHT: TAMURA ELSOLD® FLUX CORED® WIRE FOR SOLDERING ALUMINUM

- ▲ Direct soldering of aluminum-to-aluminum, and aluminum-to-copper joints
- ▲ No special equipment or processes necessary, use of conventional soldering irons
- ▲ Reduced risk of corrosion due to protection effect of rosin basis
- ▲ If required: Liquid flux Al-L available



## TAMURA ELSOLD® DEOXIDATION TABLETS

Deoxidisation tablets (for solder baths with or without lead)

- ▲ To reduce dross formation
- ▲ The oxidation of the solder is slowed down by a very thin protective layer
- ▲ Recommended dosage: 3 to 5 tablets for every 10kg of solder

### PRODUCT

Deoxidation tablets,  
bottle with 50 tablets

Deoxidation tablets,  
bottle with 800 tablets



# TAMURA ELSOLD® FLUXES

TAMURA ELSOLD® supplies a complete range of high-quality fluxes, specially manufactured to meet the toughest industry requirements. In addition to the solder alloy, the most important factor in ensuring a soldering process of a consistently high quality is the flux. It must prepare the surface to be soldered for the actual soldering process as well promote wetting. Furthermore, following soldering, the flux should have largely evaporated - without leaving behind any resistance-lowering or corrosive residues on the circuit boards.



## TAMURA ELSOLD® FLUXES FOR SOLAR INDUSTRY

- ▲ Particularly developed for solar module production
- ▲ All fluxes are halide-free
- ▲ Approved by notable manufacturers

## HIGHLIGHT: TAMURA ELSOLD® FLUXES 1025 NC AND 3007 NC

- ▲ Very good wetting and reliable hole filling
- ▲ Lowest residues
- ▲ Highest safety against corrosion and electro-migration
- ▲ Suitable for wave, selective and rework soldering
- ▲ Special SIR test, developed by Fraunhofer IZM/ZVE, for selective soldering fluxes, passed
- ▲ 3007 NC: VOC-free



## TAMURA ELSOLD® FLUXES - ELECTRONIC

ELECTRONIC FLUX	SOLID CONTENT [%]	BASIS	BASIS	EN 61190-1-1	APPLICATION
1003NC	5.9	Rosin-free, organic	Solvent based	ORLO	Tinning of cables in dip soldering process
1004NC	2.0	Organic	Solvent based	ORLO	Tinning of cables in dip soldering process
2000NC	2.9	With rosin, organic	Solvent based	ORLO	General electronics
2000M NC	2.9	With rosin, organic	Solvent based	ORLO	General electronics, automotive electronics, telecom; leaded and lead-free solder alloys
2001NC	2.3	With rosin, organic	Solvent based	ORLO	Wave soldering, lead-free
2001M NC	1.9	Organic	Solvent based	ORLO	General electronics
3002M NC	2.9	Organic	Water based, VOC-free	ORLO	General electronics, automotive electronics, telecom; standard and lead-free solder alloys, Sprayflux
3003NC	2.9	Organic	Water based, VOC-free	ORLO	Wave soldering, lead-free, low residues
1025 NC	2.4	Rosin-free, organic	Solvent based	ORLO	General electronics, automotive, wave soldering, selective soldering, rework
1026 NC	2.4	Rosin-free, organic	Solvent based	ORLO	See 1025 NC, for foaming
1027 NC	3.3	Rosin-free, organic	Solvent based	ORLO	See 1025 NC, higher activity
3007 NC	3.5	Rosin-free, organic	Water based, VOC-free	ORLO	General electronics, automotive, wave soldering, selective soldering, rework
2041 M NC	4,1	Organic	Solvent based	ORLO	General electronics, brass surfaces, difficult soldering tasks

Delivery of our fluxes in 5L, 10L or 20L canisters.



## TAMURA ELSOLD® FLUXES - SOLAR INDUSTRY

SOLAR FLUX	SOLID CONTENT [%]	PRODUCT BASIS	PRODUCT BASIS	EN 61190-1-1	APPLICATION
1004S	2	Rosin-free, organic	Solvent based	ORLO	Soldering processes in solar industry
2001S	1.7	Rosin-free, organic	Solvent based	ORLO	Soldering processes in solar industry
3003S	2	Rosin-free, organic	Water based, VOC-free	ORLO	Soldering processes in solar industry
3003 SW-1	2.3	Rosin-free, organic	Water based, VOC-free	ORLO	Soldering processes in solar industry

## HIGHLIGHT: REWORK FLUX SOLUTIONS

TAMURA ELSOLD® supplies a complete range of high-quality fluxes, specially manufactured to meet the toughest industry requirements. In addition to the solder alloy, the most important factor to ensure a solder rework process of a consistent and reliable quality is the flux. It must prepare the surface to be soldered for the actual rework process and promote proper wetting. Furthermore, following reflow the flux should have evaporated without leaving any resistance-lowering or corrosive residues on the circuit boards.



### TAMURA ELSOLD® REWORK FLUX – LIQUID

NAME	EN 61190-1-1	ACID NUMBER	PACKAGING
TAMURA ELSOLD® 200R	ORLO	24mg KOH/g	Filled Flux Pen
TAMURA ELSOLD® 200R	ORLO	24mg KOH/g	Flux Bottle 25ml
TAMURA ELSOLD® 400R	ROLO	70mg KOH/g	Filled Flux Pen
TAMURA ELSOLD® 400R	ROLO	70mg KOH/g	Flux Bottle 25ml

TEST METHOD	TEST RESULT	IPC-TEST METHOD
Copper Mirror Test	Passed	IPC-TM-650 2.3.32
Silver Chromate Paper Test	Passed	IPC-TM-650 2.3.33
Halide, quantitative	0.0%	IPC-TM-650 2.3.35
SIR test	Passed	IPC-TM-650 2.6.3.3
Corrosion Test	Passed	IPC-TM-650 2.6.15

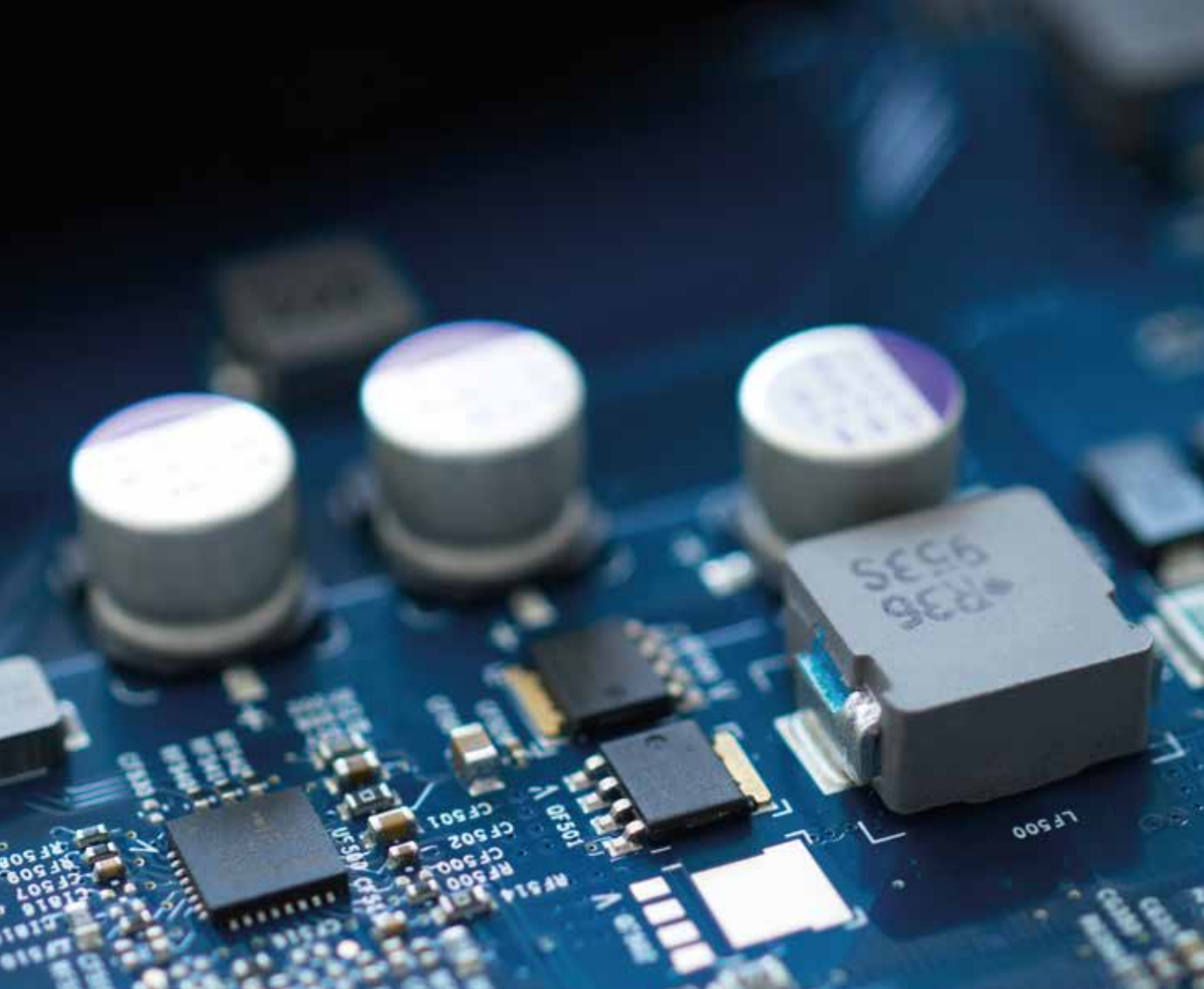


### HIGHLIGHTS TAMURA ELSOLD® FLUX PASTE AL-P FOR SOLDERING OF ALUMINUM

- ▲ Soldering of aluminum alloys
- ▲ Highest activity due to solder forming reaction
- ▲ Reduced melting temperature for a wide field of applications, soldering processes and best performance

### REWORK FLUX SOLUTIONS

The pasty fluxes from TAMURA ELSOLD® (gel flux / tacky flux) like AP 40 are suitable for a wide range of rework applications. Pasty fluxes combine the advantages of SMD (Surface Mounted Device) adhesives and fluxes. Due to this fact, the components are held in position until the rework process is finished. The fluxes are effective with existing solder depots as well as the separate dispensing of solder. The flux is highly adhesive, has excellent wetting properties, a broad process latitude, and a high degree of compatibility with all standard circuit board surfaces e.g. perfect for rework-applications. This applies to leaded and lead-free alloys and processes. To fulfil the requirements of improved controllability, as in automatic optical inspections, Colored Tacky Fluxes contain neon colouring agents. Different types and concentrations were tested to develop a formulation, which enables an optimal visibility of the applied flux as well as a good inspection of the residues after soldering.



## TAMURA ELSOLD® REWORK FLUX – PASTY / TACKY FLUX

FLUX	TYPE	EN 61190-1-1 PACKAGING [CC]	APPLICATION
AP-10	No Clean	ROL1	Leaded and high-lead content solder
AP-20	No Clean	RELO	Lead-free solder, especially reliable
AP-40	No Clean	RELO	High Reliability, as well as for leaded and lead-free alloys
NC 559 AS	No Clean	RELO	Especially light residue
SM-388	No Clean	RELO	Lead-free and lead-containing processes
NWS 4200	Water soluble	RELO	Lead-free and lead-containing processes
Al-P	Water soluble	INH1	For soldering of aluminum and aluminum alloys



TAMURA ELSOLD® Coloured Tacky Fluxes are available in neon yellow and neon pink. Delivery forms:

**Syringes:** 10cc | 30cc  
**Cans:** 90g | 180g  
**Cartridges:** 150g



# TAMURA ELSOLD® SOLDER PASTE

TAMURA ELSOLD® Solder Paste provides excellent wetting behaviour over a wide range of temperature profiles. At the same time, the solder paste not only has best slump characteristics but also excellent adhesion. Storage and durability is not critical because it is a special and modified synthetic material. Further advantages: minimal shrinking, high printing speeds, high activity on all surfaces, useful for high speed printing. Repeatability, constant and excellent printing results mean that PCB by PCB. TAMURA ELSOLD® solder paste is suitable for closed rakel systems as well as for Fine Pitch printing.

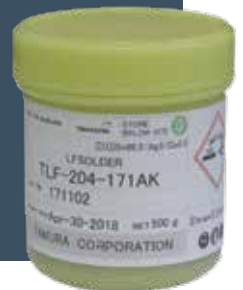
## TAMURA ELSOLD® SOLDER PASTE

			AP-10		AP-20		AP-40		TLF-204-171AK	
			ROL1		RELO		RELO		ROLO	
			Dispens	Print	Dispens	Print	Dispens	Print	Dispens	Print
SAC305	217–219 °C	T3			87.0	88.5	87.0	88.5		
		T4			86.0	88.0	87.0	88.5		88.5
		T5			86.0	87.5	87.0	88.5		
		T6			86.0	87.0	87.0			
SAC305 MA	217–219 °C	T4				88.0		88.0		
SN100Ag3 MA-S	217–219 °C	T4				88.0		88.0		
SAC0307	217–227 °C	T4						88.0		
SC07	227 °C	T3				88.0				
BiSn42	139 °C	T3	86.5	90.0						
BiSn42Ag1	137–139 °C	T3	86.5	89.0						
BiSn42Ag3	139 °C	T3				87.0				
BiSn(Ag)-SAC305	150–200 °C adjustable	T3	87.0			88.0				
SnPb37	183 °C	T3	87.0	90.0						
		T4	88.0	88.0						
SnPb36Ag2	179 °C	T3	87.5	90.0				90.0		
		T4	87.5	90.0						
PbSn5Ag2.5	287–296 °C	T3		90.0						



## HIGHLIGHT TLF-204-171AK (SAC305 T4 88.5%)

- ▲ Excellent printability
- ▲ Eliminate cold slump
- ▲ Best wetting and soldering behavior also for difficult surfaces as cutting edges of components
- ▲ Improve BGA Head in Pillow resistance
- ▲ Good tackiness for a long time



## HIGHLIGHT LEAD-FREE SOLDER PASTE AP-20

- ▲ Powder size T3 (45µm) to T6 (15µm)
- ▲ Non corrosive, halide-free residues
- ▲ Excellent wetting at air and nitrogen atmosphere
- ▲ Stable viscosity at room temperature for more then 70 days
- ▲ Tack time > 48 hours
- ▲ High thermal stability
- ▲ Also available as SN100Ag3 MA-S. Benefit from the well-known advantages of MA-S (see from p. 8) also with solder pastes



- ▲ Flux classification as per EN 61190-1-1
- ▲ Available powder types: 3 (25-45 µm), 4 (20-38 µm), 5 (15-25 µm) and 6 (5-15 µm) on request
- ▲ Various metal levels available depending on the required viscosity

### Delivery forms:

- ▲ Syringes 10cc | 30cc
- ▲ Cans 250g | 500g
- ▲ Cartridges 600g | 1.2kg
- ▲ Pro-Flow Cassettes 750g



# TAMURA SOLDER PASTES WITH OUTSTANDING PROPERTIES

## SOLDER PASTE TLF-204-NH (20-36)

- ▲ Absolutely halogen-free for maximum safety
- ▲ Powder size T4 (20-36  $\mu\text{m}$ ) | ROLO | for printing | 500 g can

## SOLDER PASTE TLF-204-GTS-VR1

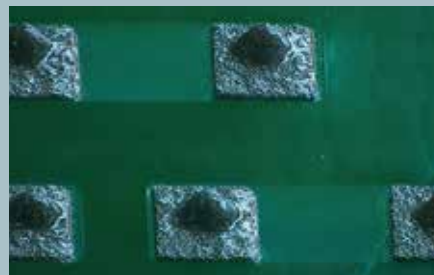
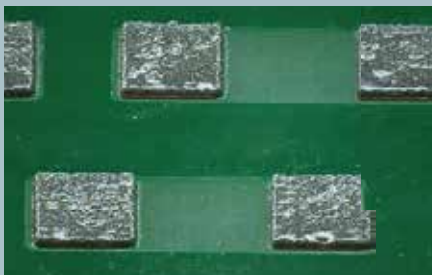
- ▲ Flux with innovative resin for crack-free, mechanically supporting residues
- ▲ Powder size T4 (20-36  $\mu\text{m}$ ) REL1 | for printing | 500 g can

## JET SOLDER PASTE JDS204G-MJ21-HF

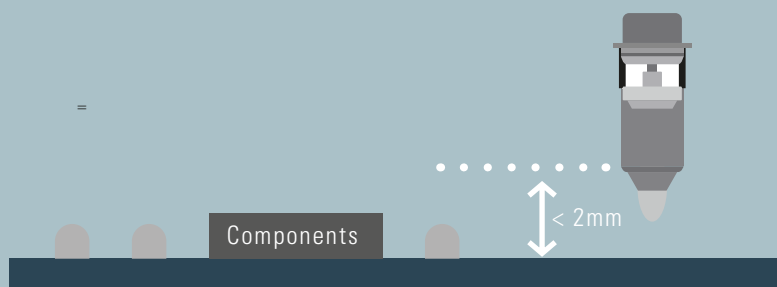
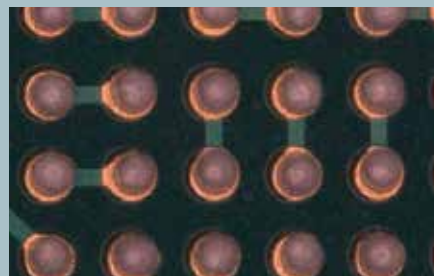
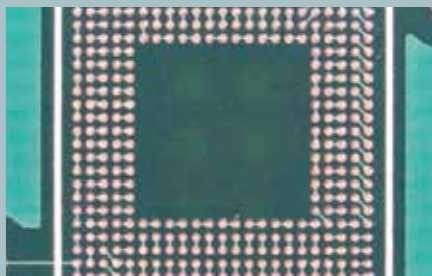
- ▲ For fast and exible jet-dispensing application
- ▲ Stable jetting
- ▲ Excellent shape of jetting dots
- ▲ Satellite-less
- ▲ Halogen-free
- ▲ Powder Size T6 (5-15  $\mu\text{m}$ ) | ROM0 | for jetting

## NEW DEVELOPMENT: JET PASTE

Flexible jet-dispensing instead of printing



Application and jetting result: 0.4mm pitch

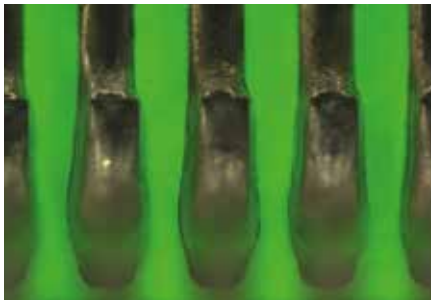




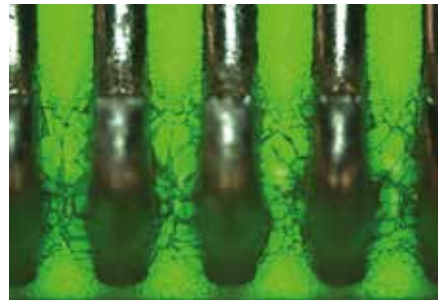
# HIGHLIGHT SOLDER PASTE WITH FLUX GTS-VR1

- ▲ Based on innovative resins (REL1 | NoClean)
- ▲ Crack-free flux residues also at high dynamic stresses
- ▲ Prevention of crack induced corrosion and electromigration
- ▲ Improved joint reliability by adhesive effect and mechanical stability of residues

No cracks in flux residues at thermal cycling (1500 cycles | -40 °C | 125 °C)



GTS-VR1

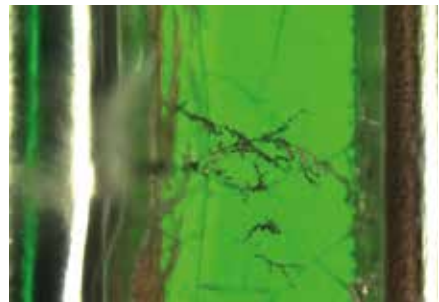


Conventional rosin based flux

No crack induced electromigration

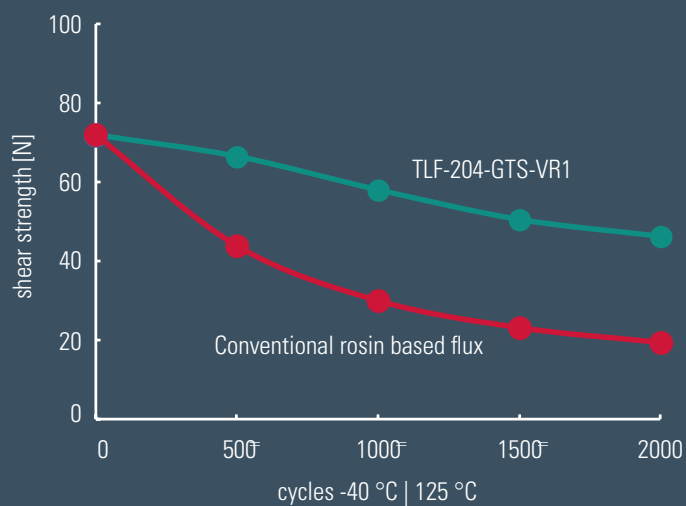


GTS-VR1



Conventional rosin based flux

Improved joint reliability and strength by adhesive effect and mechanical stability of residues



# TAMURA SOLDER ALLOYS #287 AND #251 FOR ALL SOLDERING PROCESSES AND HIGHEST RELIABILITY

## SOLDER PASTE TLF-287-GTS-VR6

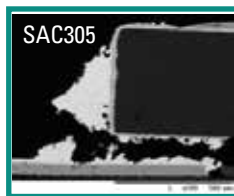
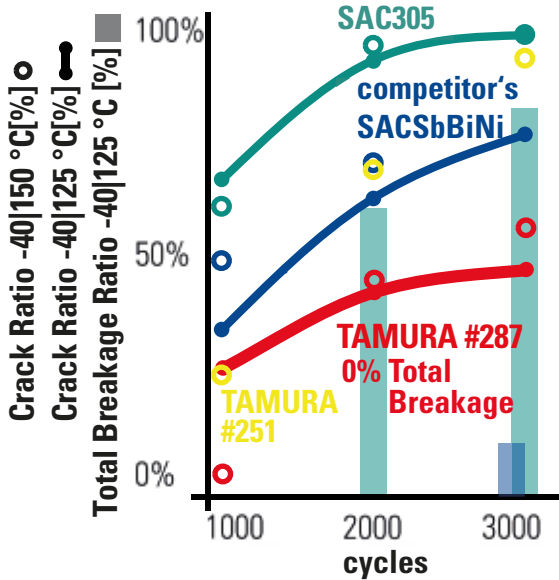
- ▲ T4 (20-36 µm) | REL1 | NoClean | for printing
- ▲ Crack-free flux residues also at high dynamic stresses
- ▲ Prevention of crack induced corrosion and electromigration
- ▲ Improved joint reliability by adhesive effect and mechanical stability of residues
- ▲ Perfect combination of solder and flux for highest reliability

## #251 SOLID AND FLUX CORED WIRES

- ▲ Solid & flux cored solder wire, esp. C3, C3+, X3 (ROLO | RELO) & X4 (REM1)
- ▲ Further flux types and content available upon request
- ▲ Standard spool sizes: 0.50 kg | 1.00 kg | 2.50 kg | 4.00 kg
- ▲ Special spool sizes available upon request
- ▲ Diameter of 0.3 mm or thicker

## BARS

- ▲ Triangular bars (8/10 x 400 mm | 0.2 kg) and bars (20 x 20 x 335 mm | 1 kg)
- ▲ Other geometries available upon request
- ▲ Improved bath stability due to optimized microalloying concept of #287 and #251
- ▲ Perfectly combined with TAMURA ELSOLD® solder bath analysis service



	SAC305	#287	#251
MELTING RANGE [°C]	217-219	209-226	221-227
TENSILE STRENGTH [MPa]	41	99	67
CRACK RATIO [%] 2000 CYCLES -40   150 °C	95 %	46 %	75 %



## SnAgCuSbx-LEGIERUNG #251 -

- ▲ Perfect balance between strength, reliability and ductility
- ▲ Ductile like SAC305 - Reliable like SACSbBiNi
- ▲ No Lift-Off
- ▲ The Full Range of Solder Products: Paste, Bars, Wires & Flux Cored Wires



## ALLOY #287: HIGH HEAT RESISTANT SOLDER

- ▲ The new Benchmark of Reliability and Lifetime
- ▲ Perfectly Suited for Automotive Applications by Highest Crack Resistance at Thermo Shock Cycle
- ▲ Reduced Polycrystallization and Growth of Intermetallic Phases
- ▲ Improved Stability in all Soldering Processes by Optimized Microalloying



# TAMURA ELSOLD® CERTIFICATION

The TAMURA ELSOLD® production process complies with the quality management standard ISO TS / IATF 16949. Certification for this comprehensive directive for the automotive industry was achieved in September 2007 and is still valid (Certificate Registration No. 391568 IATF16). TAMURA ELSOLD® has implemented and maintains an Environmental Management System certified according to ISO 14001:2015. TAMURA ELSOLD® products fulfil the standards DIN EN ISO 9453, DIN EN ISO 9454, DIN EN 61190 1-1 to 1-3; the key international standards and the TAMURA ELSOLD® works standards which are not covered by any official standard. Selected TAMURA ELSOLD® soft solders fulfil the ESA soldering standard ECSS-Q-ST-70-71C. All spacecraft launched into space by ESA (European Space Agency) are soldered with TAMURA ELSOLD® soft solders because of their high quality, high reliability and long service life.

## CERTIFIED SOLDER ALLOYS FOR EUROPEAN SPACEFLIGHT – EXCLUSIVE BY ELSOLD®

As bars, wire and flux cored wire

- Sn60Pb40
- Sn63Pb37
- Sn62Pb36Ag2
- Sn96Ag4

TAMURA ELSOLD® also offers suitable fluxes in liquid form (e.g. type 045) or for pastes (AP-10 or AP-40S) and cored solder wire (type K or C3).

# TAMURA ELSOLD® RECYCLING PROGRAMME

The correct handling of dross and scrap solder, e.g. resulting from wave soldering, represents an economic, ecological and qualitative challenge for which TAMURA ELSOLD® offers an optimal solution in all respects with its recycling programme. In-house recycling processes and the direct reuse of scrap solder in soldering processes have been proven to have a negative impact on soldering quality. Nonetheless, old scrap solder and metal contained in the dross represent a value. This is made economically viable by the TAMURA ELSOLD® Recycling Programme. You will receive an appropriate remuneration for taking part, and the recycled metal is reused for other industries with lower requirements, thus achieving sustainability without compromising quality.

## 1) COLLECTION

Free metal buckets for collection and shipment of lead-containing or lead-free metal waste\*.



\* solder material



## 2) ANALYSIS

Free analysis of the delivered waste\*.  
Certificate of Specification after recycling upon your request.



## 3) RENUMERATION

Fast and appropriate payment.





# TAMURA ELSOLD® SERVICE

## **Delivery Service**

TAMURA ELSOLD®'s entire product range is produced in Ilsenburg. This results in short delivery times allowing us to provide JIT deliveries upon special customer request.

## **Technical support and application advice**

In order to assure the quality of our customers finished products, we attach great importance to providing advice and support. Selecting the right soldering products and processing parameters with regard to the customers' production equipment and environmental issues is crucial for us.

## **Changeover to lead-free materials**

The changeover to lead-free materials creates costs and raises questions about the reliability and difficulties of lead-free material. We are pleased to offer our experience from successful changeover processes already implemented in our customer base. Join us as a partner when it comes to the need for competent answers to commercial and technical queries.

## **Internet Service**

Download technical data sheets for all important solder products from our website [www.tamura-elsold.com](http://www.tamura-elsold.com)

## **Solder bath analysis**

TAMURA ELSOLD® analyses submitted samples. The customer is informed about the level of impurities with a recommendation as how to proceed for further operation.

## **Disposal of used soft soldering material**

We dispose of your unusable old material (such as "Dross") at fair conditions.

## WE ARE HAPPY TO GUIDE YOU !



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2021/2022



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**From raw materials to complete systems,  
Tamura's technologies have contributed to safety  
and comfort as well as energy savings.**

Magnetic Technology    Circuit Design Technology    FA Technology

Transformer Technology    Material Technology

**Your One and Only Company**

High Reliability    High Efficiency    High EMI/EMC    High Density    High Performance



TAMURA CORPORATION WEBSITE  
<https://www.tamuracorp.com/>



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