SOLDER SN100C / FLOWTIN+ 403

Lead-free alloy for electronics

DESCRIPTION

SN100C/FLOWTIN+ 403 is a silver-free, micro-alloyed solder, SN100C has been developed by the Japanese company Nihon Superior. It was patented*. The micro-alloyed addition of nickel reduces the copper enrichment in the solder bath and guaranties a more stable process. The second micro-alloyed element germanium reduces the dross formation and thus helps to save resources and protect the environment. The nickel inside the solder results in a more refined intermetallic layer which increases the long-term stability of the solder joints. Apart from that, the alloy shows very good wetting behavior and a much lower tendency for bridge formation. This helps to reduce the defect rate and increases quality.

* NIHON SUPERIOR patent: Europe patent number 0985486; German (DE) patent number 69918758
The agreement was additionally extended by the patent documents EP2218540B1 and US8999519B2. These patents do not protect the composition of the solder, but the composition of the solder joint and the intermetallic phase. A decisive component of the soldered joint is the inclusion of the nickel in the intermetallic layer (IMZ), which significantly increases the reliability of the solder joint.

CHARACTERISTICS

This product offers the following advantages:
- **Micro-alloyed, eutectic alloy (melting point at 227 °C)**
- **Reduced dissolution rate in comparison with S-Sn99.3Cu0.7 alloy**
- **Reduced dross formation in comparison with S-Sn99.3Cu0.7 alloy**
- **Reduced tendency for bridging and icicle formation**
- **Shiny solder joints**
- **Does not contain any silver – cost-optimized solution**

APPLICATION

The SN100C/FLOWTIN+ 403 can be used with the same parameter settings on your soldering process as any other lead-free alloy based on SnCu or SnCuAg. When changing from lead containing to lead-free alloys, adjustments of the temperature profiles must be made.

The characteristics of the resulting solder joints are comparable with or better than Sn/Pb solder joints in all respects. The physical properties are not changed by the micro-alloyed additives.

The differences between lead-free standard solders and SN100C/FLOWTIN+ 403 are:
- **Solidification of the solder joint creates finer grain structures, resulting in shiny solder joint surfaces**
- **Reduced dissolution rate of copper - less copper is removed from the PCB and added to the solder bath**
- **Reduced dross formation**

Depending on process control and soldering method, there are still two aspects to take into account for the use of SN100C. The germanium content will decrease while the solder is in use. This results in increasing dross formation, if the level of germanium is less than 20 ppm. In this case we recommend the addition of our anti-oxidation additive S-Sn99Ge1 to restore the germanium content back to the required value.

Haberstr. 24 • 42551 Velbert • Tel: +49 (0)2051-3120-0 • Fax: +49 (0)2051-3120-111 • E-Mail: info@stannol.de • www.stannol.de

Despite the reduced dissolution rate of SN100C/FLOWTIN+ 403, the copper content in the solder bath can also increase to critical values. In this case, we recommend to use the alloy SN100Ce/CeS or FLOWTIN+ 403e with reduced copper content as refill solder. As a part or our customer support we offer you to use our analysis service for checking the composition of your solder bath on a regular base. Of course you will receive support from our laboratory and our application engineers for all technical questions.

PHYSICAL PROPERTIES AND DATA

ELEMENT	SN100C FLOWTIN+ 403	SN100Ce FLOWTIN+ 403e	SN100CeS	SN100CLe +	SN100CLe+ 250ppmGe
Sn:	Remainder	Remainder	Remainder	Remainder	Remainder
Pb:	0,01-0,045	0,01-0,045	0,01-0,045	0,01-0,045	0,01-0,045
Cu:	0,60-0,70	0,10	0,10	0,10	0,10
Ni:	0,04-0,06	0,04-0,06	0,04-0,06	0,13-0,17	0,13-0,17
Ge:	0,005-0,007	0,005-0,007	0,009-0,011	0,005-0,007	0,02-0,03
Co:	0,005	0,005	0,005	0,005	0,005
Sb:	0,05	0,05	0,05	0,05	0,05
Ag:	0,05	0,05	0,05	0,05	0,05
Bi:	0,03	0,03	0,03	0,03	0,03
As:	0,03	0,03	0,03	0,03	0,03
In:	0,03	0,03	0,03	0,03	0,03
Fe:	0,02	0,02	0,02	0,02	0,02
Au:	0,005	0,005	0,005	0,005	0,005
Cd:	0,002	0,002	0,002	0,002	0,002
Zn:	0,001	0,001	0,001	0,001	0,001
Al:	0,001	0,001	0,001	0,001	0,001

Content by mass in %, all single figure limits are maximum values

GENERAL PROPERTIES	SN100C/FLOWTIN+ 403
Melting point, °C:	227
Density, g/cm³:	7.4
Tensile strength, MPa 10 mm/min at 25 °C:	32
Elongation at break, %:	48
Electrical conductivity, µΩm:	13
Specific melting heat, J/g:	61

Haberstr. 24 • 42551 Velbert • Tel: +49 (0)2051-3120-0 • Fax: +49 (0)2051-3120-111 • E-Mail: info@stannol.de • www.stannol.de

RECOMMENDED OPERATING CONDITIONS

Wave soldering and selective soldering systems. The recommended operating conditions are the same as for lead-free SnCu alloys as the melting point remains the same.

SUPPLY FORM

Wire (solid and flux cored)
Triangular bars, Kilobars
Ingots with hanger hole
Pellets (approx. Ø 5 mm x 30-35 mm)

HEALTH AND SAFETY

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

NOTICE

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.

Haberstr. 24 • 42551 Velbert • Tel: +49 (0)2051-3120-0 • Fax: +49 (0)2051-3120-111 • E-Mail: info@stannol.de • www.stannol.de