SN100C
Lead-Free Wave Soldering Alloy

TECHNICAL DATA SHEET

SN100C is a lead-free solder alloy developed by Nihon Superior in Japan that is comprised of tin, copper, and a small amount of nickel. SN100C offers user-friendly properties and has been proven in commercial production for over six years.

The patented addition of nickel imparts to the cost-effective tin-copper eutectic the wetting and flow properties that make it possible to achieve excellent results in wave soldering at process temperatures comparable with those used with the tin-lead solder it replaces. Performance in wave soldering at least matches that of more expensive silver-containing alloys and the resulting joints are smoother and brighter.

Features of SN100C

- Does not contain silver or bismuth.
- Eutectic alloy.
- Bridge-free and icicle-free soldering.
- Smooth, bright, well-formed fillets, free of gross micro-cracks, irrespective of the cooling rate.
- Good through-hole penetration.
- Good topside fillet formation.
- Dross rate equal or lower than tin-lead solder.
- Does not require a nitrogen atmosphere.
- Does not erode copper from holes, pads and tracks.
- Low rate of copper leaching makes it easy to control the copper content of the solder bath.
- Lower aggressiveness to stainless steel and other solder pot materials as compared to tin-silver-copper alloys.
- Thermal fatigue resistance and creep strength better than tin-lead.
- Slow, even growth of the intermetallic layer at the solder/substrate interface.
- Also performs well in selective and dip soldering.

The "Bottom Line"

Customer experience over several years is that the TOTAL cost of running a standard wave soldering machine with SN100C when all factors are taken into account can be up to **one third the cost** of running the same machine with tin-silver-copper alloys. The actual savings in each case will depend on the number of factors that apply, but the cost of running a line with SN100C is always lower than the cost of running the same line with tin-silver-copper. Please contact AIM for additional information.

Availability

- Bar Solder
- Wire Solder
- Other forms such as Solder Paste, BGA/CSP Spheres, and Preforms.

SN100C Specification

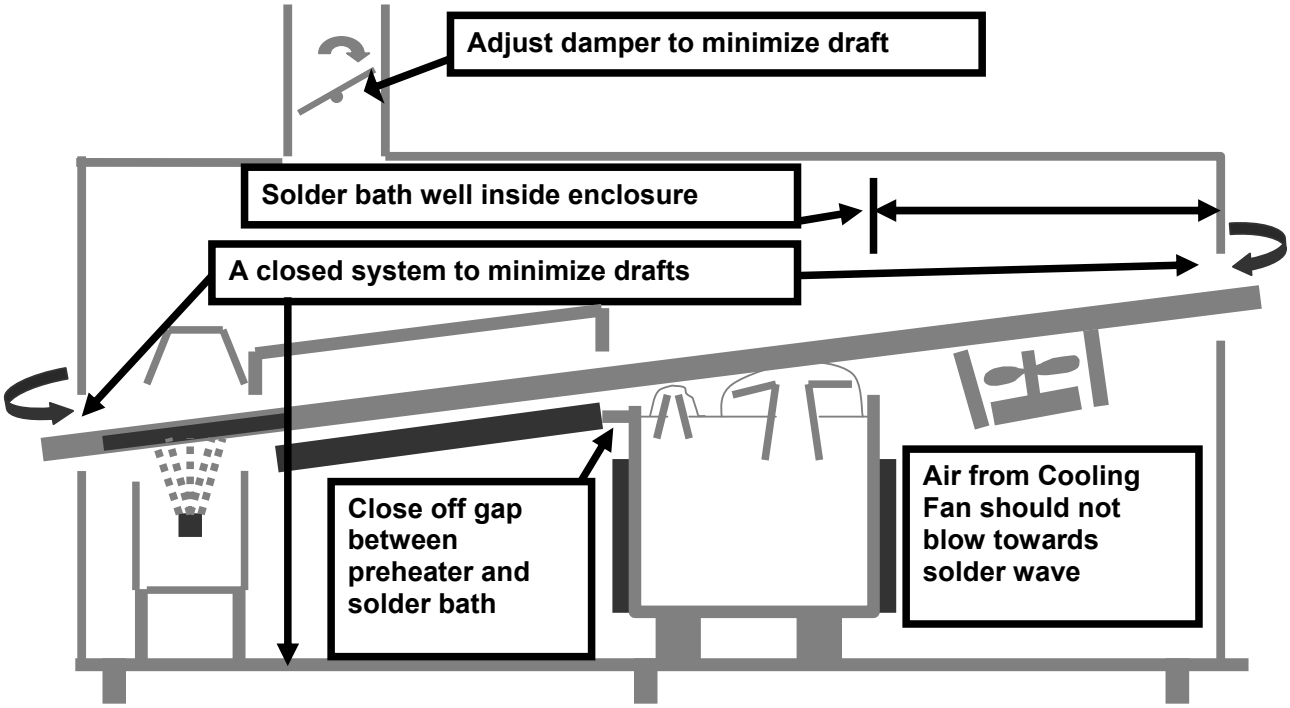
Material Property		SN100C	Test method
Melting Temperature [°C]		Solidus 227 Liquidus 227	Ramp rate for different thermal analysis 20°/min
S.G.		7.4	S.G. measuring apparatus 25°
Specific Heat [J/Kg·K]		220	Estimated value
Thermal conductivity [J/m·s·K]		64	Estimated value
Vickers Hardness	Slow cooling	16.1	Cast onto aluminium plate
	Fast cooling	12.9	Cast onto insulating brick
Tensile strength [M·Pa]		32	10mm/min. (25°)
Elongation [%]		48	10mm/min. (25°)
Electrical resistance [μΩm]		0.13	For Terminal method (25°)
Coefficient of Thermal Expansion	30-80°	$1.33x10^{-3}$	Conditions: Load:10.0grams, sample ; Almina (20mm), Programmed temperature:10□/min.
	80-130°	$1.38x10^{-3}$	
	130-180°	$1.46x10^{-3}$	
Spread Factor %	240°	77	JIS Z 3197
	250°	77	
	260°	78	
	280°	78	
Copper erosion rate at 260°		~ 2 minutes	Time for complete erosion of 0.18mmΦ wire
Thermal shock		>1,000 cycles	-40/+80° each 1hr
Electromigration		>1,000 hrs	40° 95%RH & 85° 85%RH
Whiskers		>1,000 hrs	50□

Wave Soldering with SN100C

The main differences between wave soldering with Sn-37Pb tin-lead solder and wave soldering with SN100C are that:

- The “process window”, the difference between the process temperature and the melting point of the solder, is smaller
- At the recommended process temperatures the wetting of SN100C is slower
- Ensure that the wave soldering machine is designed to keep board and solder temperatures within these ranges throughout the process
- Use settings as listed below

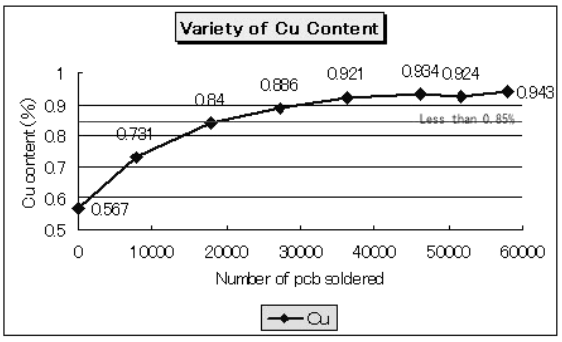
Preheat	Solder Wave	Dwell Time
100-115°C	260-270°C	5 seconds minimum



Management the Copper Content of the Solder Bath

As the SN100C solder bath is used copper is dissolved from boards and components leads.
If the copper content of the SN100C in the solder bath exceeds 0.85% there is likely to be an increase in the incidence of bridges, icicles and other defects. A simple but effective method has been devised to keep the copper content in the optimum range of 0.6-0.85% by replacing solder carried off on the soldered boards with a top-up alloy with a lower copper content, SN100Ce. For replacing solder removed during the skimming of dross the standard SN100C alloy can be used. AIM provides solder bath analyses as required to ensure that the copper content is within the recommended range.

Cu content when SN100C is used for top-up



Cu content when SN100Ce is used for top-up