

# SN100C<sup>®</sup> Nihon Superior Lead Free Solder

## GENERAL DESCRIPTION

FCT Assembly has partnered with Nihon Superior to manufacture their patented lead free nickel stabilized tin/copper wave solder alloy in North America. SN100C was developed to offer a technically superior and more economical option to tin-silver-copper alloys. SN100C is also significantly less costly than silver containing alloys.

**With over 3000 lines in commercial production, some for over fifteen years, and more than 1.5 billion boards in service, SN100C gives you the confidence that switching to lead free does not have to be difficult.**

**The patented addition of nickel to the tin-copper eutectic offers the following advantages:**

- Bridge-free wave soldering at 250-260°C
- No shorts on QFP to 0.65mm, 100 pins
- Smooth, bright fillets
- Good penetration of through holes
- Can be used in air
- Does not require special solder pots
- Easy to manage in the solder pot
- Lower cost than silver containing lead free alloys
- Lower drossing than other lead free alloys
- Solder Pot Analysis Program

CHARACTERISTIC	SN100C	SN/.7CU	SAC405 (SN/4AG/.5CU)	SAC305 (SN/3AG/.5CU)	SACX0307 (SN/0.3AG/.7CU/BI)
Smooth, Shiny Joint?	YES	NO	NO	NO	NO
Reactivity to Equipment	LOW	HIGH	HIGH	HIGH	HIGH
Eutectic? (Paste Range)	YES	YES	YES	NO (4°C)	NO (10°C to 11°C)
Contains Bismuth?	NO	NO	NO	NO	YES
Easy Pot Management?	YES	NO	NO	NO	NO
Low Cost?	YES	YES	NO	NO	YES
Low Drossing?	YES	NO	NO	NO	NO

## APPLICATIONS

PRODUCT NAME	APPLICATION	MELTING POINT (°C)
SN100C	Wave soldering, manual rework, dip soldering, reflow soldering	227
SN100Ce	Used only when recommended through analysis	230-232
SN100CL	Hot Air Solder Level (HASL)	227
SN100CLe	HASL SN100CL bath maintenance	230-232
SN100C3	High temperature tinning and dip soldering	227-310
SN100C4	High temperature tinning and dip soldering	227-340

**TECHNICAL SPECIFICATIONS**

TEST	SOLDER ALLOY									TEST METHOD	
Name	SN96CI			SN100C			SN63				
Alloy System	Sn-Ag-Cu			Sn-Cu-Ni+Ge			Sn-Pb				
Melting Temperature (°C)	217-221			227			183			DSC	
Specific Gravity	7.5			7.4			8.4			S.G. Measuring Apparatus	
Specific Heat (J/kg*K)	220			220			176			Estimated	
Thermal Conductivity (J/m*s*K)	64			64			50			Estimated	
Tensile Strength (M*Pa)	52			32			44			10mm/min (25°C)	
Elongation (%)	27			48			25			10mm/min (25°C)	
Spread Factor (%)	230°C	77			-			91			JIS Z 3197 (NS-828A FLUX)
	240°C	77			77			92			
	250°C	77			77			93			
	260°C	78			78			93			
	280°C	-			78			-			
Wettability		Ta	Tb	Fmax	Ta	Tb	Fmax	Ta	Tb	Fmax	Wetting Balance 0.3x3.5x25mm Copper Test Piece Ta-Zero Cross Time Tb-Wetting Time Force
	240°C	0.72	2.10	0.213	1.0	4.53	0.159	0.12	0.80	0.195	
	250°C	0.37	1.46	0.213	0.86	2.79	0.181	0.11	0.64	0.200	
	260°C	0.23	0.81	0.192	0.47	1.46	0.186	0.10	0.41	0.206	
270°C	0.21	0.48	0.192	0.31	0.8	0.192	0.07	0.31	0.211		
Electrical Resistance (μΩm)	0.15			0.13			0.17			Four Terminal Method	
Copper Erosion Rate At 260°C	Approx. 2 minutes			Approx. 2 minutes			Approx. 1 minute			Time for Complete Erosion of 1.8mm Dia. Wire	
Creep Strength (Time to Failure)	> 300 HRS			> 300 HRS			20 HRS			145°C, 1KG Load	
	> 300 HRS			> 300 HRS			3 HRS			150°C, 1KG Load	
	> 300 HRS			> 300 HRS			7 MIN			180°C, 1KG Load	
THERMAL SHOCK	>1000 CYCLES			>1000 CYCLES			500-600 CYCLES			-40/+80°C Each 1 HR	
ELECTROMIGRATION	>1000 HRS			>1000 HRS			> 1000 HRS			40°C, 95%RH & 85°C, 85%RH	
WHISKER TEST	>1000 HRS			>1000 HRS			>1000 HRS			50°C	

SN100C lead free solder performs equally well in automated wave soldering, reflow soldering, selective soldering, and static solder pots. SN100C3 and SN100C4 have been specifically developed for high temperature dipping applications and can be used for tinning very fine copper wires at temperatures up to 400°C. SN100CL has been developed for use in lead free Hot Air Solder Level (HASL) equipment and provides a smooth bright finish with a solderable shelf life of over one year.

### RECOMMENDED OPERATING PARAMETERS

One of the major differences between SN100C and standard SN63 is the difference between the processing temperature and the melting point of the alloys. Because the differences are much smaller with SN100C, care must be taken to ensure the process settings are optimized.

Control air drafts in the machine

- Close off openings
- Adjust damper to reduce drafts
- Minimize gap between preheaters and pot
- Ensure cooling fans blow away from pot

Bottom side preheat and dwell time recommendations:

- Bottom side preheat should be set 25-35 °C above the topside setting.
- Dwell time in the solder pot should be 4-6 seconds.

Use adequate preheat and solder pot temperatures based on the board type as listed below:

P.C. Board Type	Topside Preheat Temperature Range (°C)	Solder Pot Temperature Range (°C)
Single-sided, Simple double-sided	90-100	245-250
Double-sided	100-115	250-255
Heavy double-sided, multilayer	120-130	255-260

Regular analysis of the SN100C solder pot is recommended. Contact customer service at FCT Assembly ([support@fctassembly.com](mailto:support@fctassembly.com)) for details.

### PACKAGING

SN100C and SN100Ce are packaged in 25-pound boxes. The bars are made through a casting process, so the individual bar weights vary slightly. Each trapezoidal bar weighs approximately two pounds. Each triangular bar weighs approximately one pound.

Feeder bar which includes a handing hole is also available and is packaged in 50-pound boxes. Each feeder bar weighs approximately 8-pounds.

### HEALTH AND SAFETY

Refer to the MSDS for guidance on safety and health issues.