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SN100C- High First Pass Yield & Reliable Joints

Reduced Shrinkage Effect

SN100C is an excellent lead-free solder that offers *high first pass yield, reliable joints* and economical operation.
Because of the way it solidifies joints made with SN100C do not suffer from shrinkage defects.

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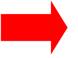
Pictures of Solidified Samples

Solder Alloy	Whole image	Magnified center	Cross-section of top surface
SN100C			
Sn-3.0Ag -0.5Cu			



The surface of the SN100C mini-ingot is smooth and bright with no shrinkage cavity visible in the cross-section. By contrast the Sn-3.0Ag-0.5Cu alloy has a dull grainy surface with a deep shrinkage cavity apparent in the cross-section.

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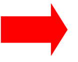
Examples of shrinkage effects

Solder Alloy	As Soldered	After 1000 cycles (-40/+125℃ 30 mins dwells)
SN100C		
Sn-3.0Ag -0.5Cu	Shrinkage cavities	Develops into crack



Testing has confirmed that the shrinkage cavities in the fillets of joints made with Sn-3.0Ag-0.5Cu develop into cracks during thermal cycling. The surface of the SN100C fillet is disturbed by slip bands but there were no shrinkage cavities that developed into cracks.

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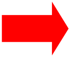
Animation of solidification process

X2 Play

Click on the pictures to play the video

SN100C

SCAB
(Sn-Cu-Ag-Bi)



A high speed video camera was used to follow the solidification of SN100C and a proprietary Sn-Cu-Ag-Bi alloy during slow cooling from 280 ° C.
Click on the image to play the video.

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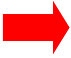
Animation of Shrinkage of SACB Alloy

Normal play



It could be seen that no shrinkage cavity developed in the SN100C. Click on the image to follow the solder solidification of the Sn-Cu-Ag-Bi alloy in real time.

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Mechanism of Shrinkage Occurrence (SCAB)

(1) Full molten

(2) Intermetallic crystals precipitate

(3) Structure of tin dendrites visible

(4) Eutectic solidifying from remaining undercooled liquid

(5) Shrinkage continues after solidification

These images were captured from the video of the solidification of the Sn-Cu-Ag-Bi alloy. Solidification proceeds in the steps from (1) to (5).

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Pictures of Solidified Tin-Copper Family

	SC family	SCA family		SCN family		
	SC	SC0.3A	SCAB	SCNP	SCN	SN100C
Whole Surface						
Magnified Center						
Shrinkage	occurrence	occurrence	occurrence	occurrence	No occurrence	No occurrence

Negative effect of P

Effect of Ni

Slow cooled SnCu-based alloys. While SnAgCu and SnCu develop shrinkage defects SN100C and SnCuNi do not. This confirms the effectiveness of the Ni in promoting eutectic behavior by facilitating early nucleation of the Cu6Sn5 intermetallic. Adding P to the SnCuNi system reduces the effectiveness of the Ni so that shrinkage effects reappear.