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GC 10

solder paste

SCAN FOR MORE

HARIMA MULTICORE GC 10

ROOM TEMPERATURE STABLE SOLDER PASTE

HARIMA MULTICORE GC 10 has been created as a reliable temperature stable solder paste providing stability at room temperature (26.5 °C) for one year and for one month at temperatures up to 40 °C.

This provides benefits for both logistics and operations from shipping and storage to printing and reflow. The temperature stability of this no-clean solder paste delivers exceptional performance with 24 hour abandon time, consistent stable paste transfer efficiency, a wide reflow process window in air, greater than 95 % on-line paste utilisation and a significant reduction in solder related defects. These advantages combine resulting in higher yields and cost effective PCB assembly.

TEMPERATURE STABLE

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GC 10 BENEFITS

Improved printing	Improved stability	Improved reflow	Improved paste management
Six Sigma quality paste deposition with extended abandon times	On-line stencil stability of 3 days at 80 % RH	Excellent coalescence in air for 0201, 01005 and 0.3 mm pitch components	Exceptional on-line paste utilization
Groundbreaking standards for stencil life	At least 12x greater than conventional solder paste	Zero de-wetting in long soak, high temperature reflow profiles after 3 days at 80 % RH	End of day paste scrapping eliminated
High yield paste volumes with lowest aspect ratio: 20% lower than industry standard	Elevated temperature stability: x100 over conventional	Minimal hot slump at 182 °C, improving solder joint reliability	Eliminates requirement for refrigerated storage
Industry leader in paste transfer efficiency	Improved logistic management	Exceptional cosmetic appearance for lead-free solder joints	Eliminates requirement for cold or overnight shipment
Cost savings by reducing the amount of paste required	Wide process window	Flux technology improves total pad solderability in air with reduce paste volumes	Zero start up times and no kneading

GC 10 ATTRIBUTES AND BENEFITS

ATTRIBUTE		INDUSTRY STANDARD	GC 10	BENEFIT
FLUX	Regulatory compliance	Halide-free or halogen-free	Zero halogens added	✓
	IPC-J-STD-004B classification	ROL0	ROL0	
POWDER	Particle size distribution	Type 3, 4, 5	Type 3, 4, 5	
	Alloy	SAC305	SAC305	
STORAGE	Ambient (26.5 °C)	1 month	12 months	✓
	40 °C	1 day	1 month	✓
	50 °C	None	1 week	✓
PROCESS	On-line paste utilisation	75 %	> 95 %	✓
PRINTING	Abandon time	Up to 4 hours	Up to 24 hours	✓
	Stencil life	Up to 8 hours	Up to 12 hours	✓
	Startup time	4-24 hours	Immediate	✓
REFLOW	Soak temperature	150-180 °C	150-200 °C	✓
	Reflow atmosphere	Nitrogen	Air	✓

TEMPERATURE STABLE

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GC 3W

solder paste

SCAN FOR MORE

HARIMA MULTiCORE GC 3W

WATER WASH TEMPERATURE STABLE SOLDER PASTE

Following on from the GC 10, HARIMA MULTiCORE has developed a temperature stable solder paste for water wash applications. This new material is fully halogen free and combines the performance of a typical high activity flux with temperature stability, suppllied in a fully water washable product.

The temperature stability of GC 3W delivers similar advantages as the no-clean GC range of materials with respect to benefits in both shipping and storage. The introduction of GC 3W enhances the range by providing a product which is readily removed in aqueous cleaning systems without requiring the addition of a saponifier or co-solvent. Post soldering residue removal is fast and easy, even at cleaning temperatures lower than required to clean similar flux systems. This, coupled with a wider cleaning window of up to seven days, provides the board manufacturer greater flexibility in the process. Improved stencil life and abandon times over previous generations of water wash pastes provide additional potential cost savings.

WATER WASH

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GC 3W BENEFITS

Improved printing and stability	Improved reflow	Improved cleanability	Improved paste management
Industry's first temperature stable water wash solder paste	Excellent coalescence in air for 0201, 01005 and 0.3mm pitch components	Shorter cleaning times required at lower temperature compared to industry standard	Exceptional on-line paste utilization
Industry leader in water wash paste transfer efficiency	Zero dewetting after storage at 25 °C, 80% RH for 72 hours in long soak high temperature reflow profiles	Dual cleaning options: suitable for both spray under immersion and ultrasonics	End of day paste scrapping eliminated
Extended stencil life under high humidity production conditions	Minimal hot slump at 182 °C, improving solder joint reliability	No change in ease of residue removal after dual reflow cycles	Eliminates requirement for refrigerated storage
Exceptional cost savings from reduced amount of paste required	Exceptional cosmetic appearance for lead-free solder joints after reflow in air	No addition of co-solvents or saponifiers required	Eliminates requirement for cold or overnight shipment
Extended abandon times under high humidity production conditions	Flux technology improves total pad solderability in air with reduce paste volumes	Residue removal remains easy up to 7 days post SMT reflow	Zero start up times and no kneading
	Outperforms industry standard halide containing formulations		

GC 3W ATTRIBUTES AND BENEFITS

ATTRIBUTE		INDUSTRY STANDARD	GC 3W	BENEFIT
FLUX	Regulatory compliance	Halide or halogen containing	Zero halogens added	✓
	IPC-J-STD-004B classification	ORM1	ORM0	✓
POWDER	Particle size distribution	Type 3, 4	Type 3, 4	
STORAGE	Ambient (26.5 °C)	1 month	6 months	✓
	@ 40 °C	1 day	1 month	✓
PROCESS	On-line paste utilisation	75 %	> 95 %	✓
PRINTING	Abandon time	< 2 hours	> 4 hours	✓
	Stencil life	< 4 hours	> 8 hours	✓
	Startup time	4-24 hours	Immediate	✓
	Slump (IPC TM-650 2.4.35)	0.3 mm	0.2 mm	✓
REFLOW	Soak temperature	150-180 °C	150-180 °C	
AQUEOUS CLEANING	Time/temperature	5-10 minutes @ 55-75 °C	5 minutes @ 45-60 °C	✓
	Maximum cleaning delay	< 24 hours	Up to 7 days	✓
RELIABILITY	SIR post cleaning	Pass	Pass	
	Voiding performance	< 10 %	< 10 %	

WATER WASH

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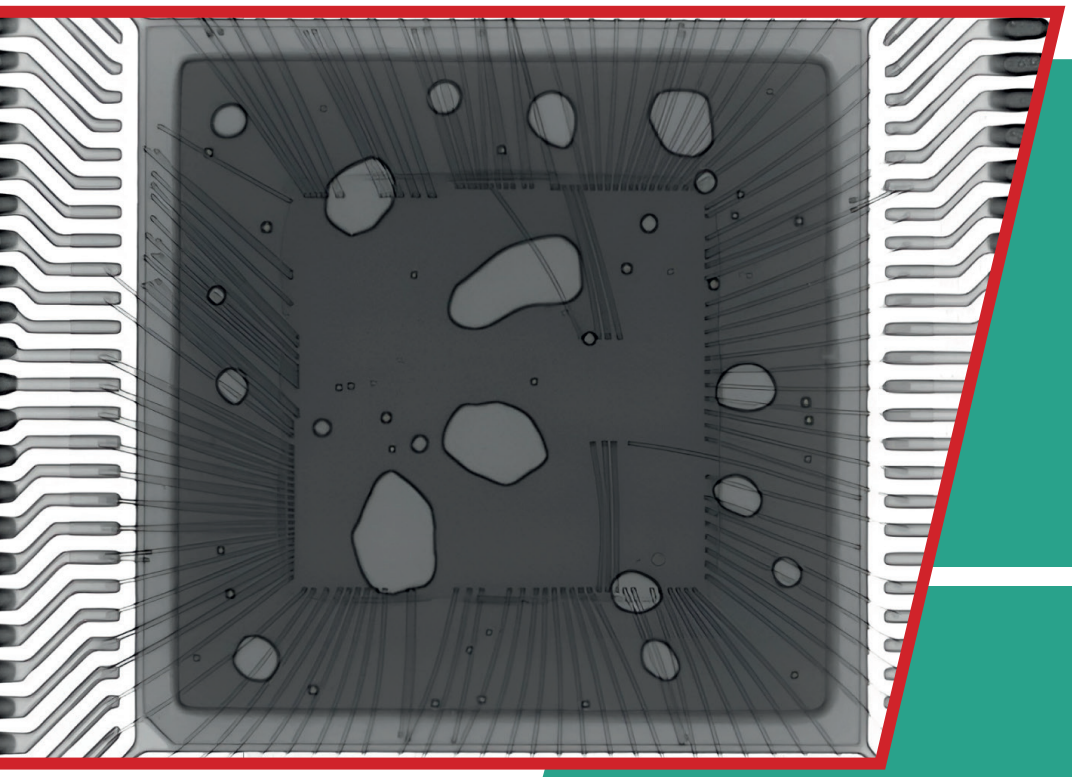

GC 18
solder paste

SCAN FOR MORE

HARIMA MULTiCORE GC 18
LOW VOIDING, TEMPERATURE STABLE SOLDER PASTE

HARIMA MULTiCORE GC 18 is the latest in the GC range of temperature stable solder pastes. From the same stable as GC 10, this new material combines the stability performance of its predecessor with improved thermal dissipation in bottom terminated devices due to reduced voiding within the solder joint.

HARIMA MULTiCORE GC 18 remains stable whether stored at room temperature for 12 months or for one month at elevated temperature (up to 40 °C) and is designed to provide excellent transfer efficiency for fine-pitch components and good fluxing action on challenging surface finishes.

GC18 is optimised to reduce the occurrence of voids in component joints, being especially effective on reducing voids in large ground-plane devices such as QFN's, DPAK's and MOSFET's. With it's specially designed fully halogen-free activator package thus it eliminates expensive nitrogen atmosphere reflow, reduces PPM defects and rework resulting in reduced processing costs.

LOW VOIDING

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GC 18 BENEFITS

Improved stability	Improved reflow	Post reflow reliability	Improved paste management
On-line stencil stability. Good process capability after up to 12 hours printing	Excellent coalescence in long, hot profiles for 0201 and 0.4mm pitch components	Specially formulated to provide low voiding in soldered joints of Bottom Terminated Components (BTC's - QFN, DPAK, LGA)	Exceptional on-line paste utilization
At least 12x longer than conventional paste	Excellent coalescence after storage of printed paste for up to 48 hours at 80% RH	Residues are compatible with encapsulation technologies	End of day paste scrapping eliminated
Elevated temperature stability: x100 over conventional paste	Minimal hot slump at 190 °C	Post reflow residues are benign and cleanable with existing chemistries (if required)	Eliminates requirement for cold packs or overnight shipment
Improved logistic management	Exceptional cosmetic appearance for lead-free solder joints	Flux residues are suitable for in-circuit test (ICT) even after multiple reflows	Eliminates requirement for refrigerated storage
Excellent long-term tackiness when small print deposit volumes required	Wide process window in both air and nitrogen	High SIR improves moisture resistance in challenging end applications	No refrigeration provides immediate start up

GC 18 ATTRIBUTES AND BENEFITS

ATTRIBUTE		INDUSTRY STANDARD	GC 18	BENEFIT
FLUX	Regulatory compliance	Halide-free or halogen-free	Zero halogens added	✓
	IPC-J-STD-004B classification	ROL0	ROL0	
POWDER	Particle size distribution	Type 3, 4	Type 3, 4	
	Alloy	SAC305	SAC305	
STORAGE	Ambient (26.5 °C)	1 month	12 months	✓
	@ 40 °C	1 day	1 month	✓
	@ 50 °C	None	1 week	✓
PROCESS	On-line paste utilisation	75 %	> 95 %	✓
PRINTING	Abandon time	Up to 4 hours	Up to 24 hours	✓
	Stencil life	Up to 8 hours	Up to 12 hours	✓
	Startup time	4-24 hours	Immediate	✓
REFLOW	Soak temperature	150-180 °C	150-200 °C	✓
	Voids: BGA	IPC Class III	IPC Class III	
	Voids : Chip components	< 20 %	< 10 %	✓
	Voids: QFN 3mm x 3mm	25 %	< 10 %	✓
	Voids: QFN 12mm x 12mm	50 %	< 20 %	✓
	Voids: low maximum temperature	> 240 °C	> 235 °C	✓
	Time above liquidus (217°C)	20-90 seconds	60-120 seconds	

LOW VOIDING

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GC 50

solder paste

SCAN FOR MORE

HARIMA MULTiCORE GC 50

TEMPERATURE STABLE, JET-PRINT SOLDER PASTE

The continuing miniaturisation of electronics in the consumer, medical and automotive markets present challenges for electronics assembly. While many components have become smaller within higher density assemblies they often need to be integrated amongst larger devices. This reality pushes the limits of the stencil printing process. Facilitating both small and large volumes of solder paste, solder jet printing technology has been developed providing the ability to deposit a customised volume of solder paste for each component, thereby overcoming the limitations of single thickness stencils.

HARIMA MULTiCORE GC 50 has been developed as a temperature stable solution for jet printing applications where the customer is using a Mycronic MY600 or MY700 jet printer system. The GC 50 is capable of jetting 400 µm deposits for components such as 0201's and 0.4 mm CSP's with statistical repeatability greater than Six Sigma Cpk performance.

JET PRINT

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GC 50 BENEFITS AND ATTRIBUTES

The temperature stability of GC 50 provides cost savings throughout the logistics chain with the material not requiring cold shipping or storage.

As the GC 50 is temperature stable it can be stored on the bench allowing for immediate start up, unlike all other jettable solder paste materials in the market which require a period to warm to room temperature before use. Therefore, the use of GC 50 improves both the process and output efficiency.

Another benefit of GC 50 is it may be stored in the ejector head either beside or in the jetter for up to 2 weeks without decline in performance thus improving paste utilisation, unlike all other materials which require returning to refrigeration overnight.

This no-clean solder paste delivers exceptional performance with consistent stable paste transfer efficiency, a wide reflow process window in air, greater than 95% on-line paste utilisation and a significant reduction in solder related defects. These advantages combine resulting in higher yields and cost effective PCB assembly.

GC 50 PROPERTIES

ATTRIBUTE		CURRENT MARKET	GC 50	BENEFIT
STABILITY	Life in Ejector head at 28 °C	< 1 day paused	< 1 week paused	Competitor materials can stiffen within the ejector causing blockage of the aperture. GC 50 remains mobile therefore reducing scrap and costs
		< 1 day in use	> 2 weeks in use	
	Shelf life at 5 °C	6 months	12 months	GC 50's inbuilt stability at elevated temperature increases process robustness
	Shelf life at 25 °C	1 week	12 months	
	Shelf life at 40 °C	Not applicable	1 month	
JETTING	Smallest component	0201	0201	GC 50 achieves a Cpk above 5. These high Cpk values for GC 50 on small dot dispensing allow for high reliability processes
	400 µm dot diameter at 28 °C	Not achievable after 1 week	Achievable for up to 2 weeks	
REFLOW	Short linear profile	May be suitable for air reflow	Achieved in both air and nitrogen	GC 50 has excellent reflow performance in air and nitrogen, resolving issues like de-wetting, graping and coalescence. It can also be used in vapour phase reflow systems.
	Long hot profile	Reflow in nitrogen only		
DEFECTS	Voiding	Low to moderate	Low	GC 50 outperforms even halide containing competitor materials
	Head-in-pillow (HiP)	Low to moderate	Low	GC 50 has been formulated to minimize oxidation, yielding excellent reflow performance in air, nitrogen and vapour phase and eliminating defects.
FLUX	IPC-J-STD-004B	ROL0/ROL1	ROL0	GC 50 contains zero halogen, resulting in high reliability
	Tackiness	Acceptable	Minimum 48 hours	Excellent tack of GC 50 improves production process
	Cleanability	Challenging	Acceptable	GC 50 is easy to clean
	Coating	Acceptable	Easy	GC 50 is suitable for conformal coating without need to remove residues
	Paste compatibility	Challenging	Easy	GC 50 is readily compatible over a wide range of solder pastes

JET PRINT

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HF 212

solder paste

SCAN FOR MORE

HARIMA MULTICORE HF 212

With a greater number of electronics applications requiring the use of larger printed circuit boards which have associated inherent thermal demands, HARIMA MULTiCORE have developed a fully halogen-free solder paste for use in such industrial and automotive applications.

HARIMA MULTiCORE HF 212 is available in standard SAC and high reliability 90iSC solder alloys and is designed to encompass a wide process window with improved thermal, electrical, and mechanical connectivity. These solder paste solutions ensure outstanding performance in the most demanding high value PCB applications – all provided by a halogen-free formulation.

HALOGEN FREE

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HF 212 ATTRIBUTES AND BENEFITS

PRODUCT ATTRIBUTE	PROCESS BENEFIT
HALOGEN-FREE	Harima Multicore HF212 solder paste meets all the current definitions of halide free and halogen-free: ▪ No added halogen ▪ Measured < 900 ppm chlorine and bromine and < 1500 ppm total by Oxygen Bomb test (J-STD-004B: EN14582) ▪ Flux classification ROL0 in accordance with J-STD-004B
AVAILABILITY	Lead free solder alloys in both Type 3 and Type 4 particle size distributions: ▪ Standard SAC (SAC305, SAC387) ▪ High reliability 90iSC
APPLICATION	▪ Designed for stencil printing, excellent for pin-in-paste and enclosed head applications ▪ Excellent wetting to a broad range of metallization ▪ Compatible with existing halogen-free solutions ▪ Suitable for medium and large PCB assemblies
PRINTING ADVANTAGES	▪ Wide process window for printing with fine pitch capability ▪ Minimal slump and reduction of solder bridging ▪ Suited for high throughput lines where yield consistency on print deposits is critical ▪ Abandon time of up to 4 hours; work life > 8 hours
REFLOW ADVANTAGES	▪ Optimised for long soak reflow profiles ▪ Improved fine pitch coalescence ▪ Excellent humidity resistance ▪ Excellent solderability on challenging surface finishes
LOW VOIDING	Low void levels increase solder joint reliability ▪ New chemistry allows for low void levels (< 5 %) in ball joints (BGA, CSP) ▪ Low voiding on multiple finishes (ENIG, OSP copper, CuNiZn, immersion silver)
RESIDUES	▪ Clear, colourless and transparent ▪ Pin-testable ▪ High reliability, meeting requirements of J-STD-004B for SIR and electromigration

HALOGEN FREE

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FLUX CORED solder wire

SCAN FOR MORE

HARIMA MULTiCORE WIRE

FLUX CORED SOLDER WIRE SOLUTIONS

The HARIMA MULTiCORE portfolio of flux cored solder wires gives the user assurance of continuous flux availability through the use of Multicore's unique award winning core construction which ensures consistent distribution of the flux throughout the reel of solder wire.

As a trusted brand in electronics for over 80 years, Multicore flux cored solder wire delivers ease of use and outstanding performance for today's electronics industry; be it for rework, robot soldering or simple hand soldering applications.

The fluxes within the wires have been formulated for use in a range of different alloys and in wide reaching applications, with standard rosin based fluxes for electronics applications through to specialist fluxes such as ARAX and ALU for more difficult substrates such as stainless steel and aluminium alloys. Supporting both the traditional tin-lead manufacturers and modern lead-free process our fast wetting materials deliver consistent, reliable solder joint integrity providing outstanding long term performance.

INDUSTRY PROVEN

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WIRE

SOLUTIONS FOR ELECTRONICS APPLICATIONS

FLUX	DESCRIPTION	FLUX CONTENT (%)	PB FREE	PB BASED	J-STD-004B
C400	Fully HALOGEN FREE, clear residue flux suitable for hand soldering. Available as 3 and 5 core	1.5 - 3.0	99C, 96SC, 97SC, 90iSC	Sn62, Sn63 60/40	ROL0
C502	Medium activity halide activated resin flux with good wetting on most common substrates	3.0	99C, 96SC, 97SC	Sn62, Sn63 60/40	ROM1
C511	High activity halide activated resin flux with good wetting on difficult substrates	2.0 - 3.0	99C, 96SC, 97SC	60/40	ROM1
309	High activity halide activated resin flux with good wetting on difficult substrates including aluminium	3.0	99C, 96SC, 97SC	60/40	ROM1
HYDX	High activity halide activated organic flux for electronics and difficult substrates. **REQUIRES CLEANING IN HOT WATER**	2.0	99C, 96SC, 97SC	Sn63 60/40	ROM1

SOLUTIONS FOR INDUSTRIAL APPLICATIONS

FLUX	DESCRIPTION	FLUX CONTENT (%)	PB FREE	PB BASED	J-STD-004B
ARAX	High halide inorganic flux designed specifically for solder stainless steel and other difficult to solder metals in industrial applications. **Residues must be removed by cleaning in hot water.** **NOT FOR ELECTRONICS APPLICATIONS**	2.7	96S	60/40	INH1
ALU	High halide inorganic flux designed specifically for solder aluminium its alloys and other difficult to solder metals in industrial applications. Ideal for flame soldering of light bulbs. **Residues must be removed by cleaning in hot water.** **NOT FOR ELECTRONICS APPLICATIONS**	2.0 - 2.7	97Cu	45D 31D	INH1

AVAILABLE DIAMETERS AND PACK SIZE	
Diameter	**Reel size**
0.25-0.56mm	250g
0.7- 1.2mm	500g
1.2-2.0mm	500g / 1kg

AVAILABLE ALLOYS	
Lead free	**SnPb**
96SC	Sn62
97SC	Sn63
99C	60EN
90iSC	HMP

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HIGH RELIABILTY 90iSC solder materials

90iSC alloy has exceptional performance in high-reliability applications. It is compatible with several flux systems designed for lead-free and halogen-free soldering applications, ensuring adaptability for customized manufacturing requirements. 90iSC alloy is available in HARIMA MULTiCORE HF 212, HARIMA MULTiCORE HF 18 and HARIMA MULTiCORE LF 318 flux technologies.

FLUX TECHNOLOGY		MARKET	ROHS COMPLIANT		APPLICATION	
			90iSC	SAC	Printing	Dispensing
Halogen-free	HF 212	Appliance Aerospace Automotive Medical Lighting Displays Solar WDI	●	●	●	
	HF 18		●		●	
Halide-free	LF 318		●	●	●	●

HALOGEN-FREE

PRODUCT	DESCRIPTION	ALLOY	METAL CONTENT (% WEIGHT)	PARTICLE SIZE	APPLICATION	IPC/J-STD-004B CLASSIFICATION
HF 212	Halogen-free, no clean, high tack, low voiding Pb-free solder paste. Designed for medium – large size boards. Excellent abandon time and stencil work-life. Excellent fine pitch coalescence. Exceptional solderability in both air and nitrogen across a wide range of challenging surface finishes including OSP copper. Optimise for long soak reflow.	90iSC SAC	88.5	AGS (Type 3) DAP (Type 4)	Printing	ROL0
HF 18	Halogen-free, no clean, high tack, very low voiding Pb-free solder paste. Excellent abandon time and stencil work-life. Excellent fine pitch coalescence. Exceptional solderability in both air and nitrogen across a wide range of challenging surface finishes including OSP copper. Optimise for long soak reflow. Excellent voiding performance, especially on larger bottom termination components.	90iSC	88.5	Type 4	Printing	ROL0

HALIDE-FREE

PRODUCT	DESCRIPTION	ALLOY	METAL CONTENT (% WEIGHT)	PARTICLE SIZE	APPLICATION	IPC/J-STD-004A CLASSIFICATION
LF 318	A halide-free, no clean, Pb-free solder paste that has excellent humidity resistance and a broad process window for both printing and reflow. Ability to resist component movement during high-speed placement, long printer abandon times and excellent solderability in both air and nitrogen across a wide range of reflow profiles in air and nitrogen and across a wide range of surface finishes.	90iSC SAC	88.5	AGS (Type 3) DAP (Type 4)	Printing	ROL0
		SAC	84	AGS (Type 3)	Dispensing	

SOLDER WIRE

90iSC alloy is also available in solder wire containing C 400 flux. This is a halogen-free no-clean flux designed to complement electronics soldering processes and provides fast soldering on most common finishes. It is fully compatible with the above solder pastes and is ideal for use in rework applications. The flux is classified as ROL0 to IPC/J-STD-004B.

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90iSC

solder alloy

SCAN FOR MORE

HARIMA MULTiCORE 90iSC

HIGH RELIABILITY SOLDER ALLOY

HARIMA MULTiCORE's 90iSC high reliability, lead-free solder alloy provides superior thermal cycling, thermal shock, vibration, and creep resistance over traditional SAC and SnPb solder alloys while maintaining solderability and void levels. Developed in conjunction with a European consortium and globally accepted by the automotive industry, HARIMA MULTiCORE 90iSC is the world's leading lead-free RoHS compliant solder alloy solution for market segments requiring high reliability solder joints under demanding conditions.

HIGH RELIABILITY

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HIGH RELIABILITY 90iSC

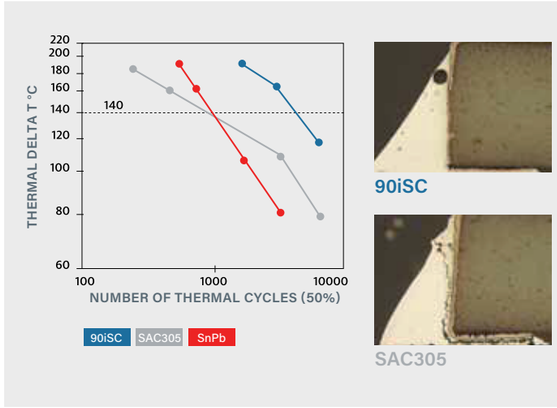
FAILURE MECHANISMS	HIGH RELIABILITY ALLOYS vs TRADITIONAL ALLOYS (1) (2) (3)
Thermal Cycling Thermal cycling causes stress to build within the soldered assembly. Stress relief mechanism is crack propagation through the solder joint.	90iSC alloy gives reduced electrical failures in comparison to SnPb in both -40 °C + 150 °C and -40 °C + 125 °C and under -40 °C + 150 °C, 90iSC has similar electrical failure levels to SnPb at -40 °C + 125 °C.
Thermal Shock Thermal shock testing is a more extreme version of thermal cycling. Failure mechanism is the same as thermal cycling, but failure occurs earlier.	90iSC alloy has outperformed SnPb and SAC alloys in thermal shock testing.
Vibration 20% of airborne failures have been attributed to vibrational stress (4)	SAC alloys have been shown to fail more frequently than SnPb alloys. 90iSC alloy returns the failure resistance performance to SnPb standards.
Drop Test Drop test resistance should not be compromised. Failure mechanism is crack propagation along the intermetallic.	90iSC has reduced ductility over standard alloys however gives similar results to standard SAC with same failure mode.
Creep Creep resistance at a specified temperature is directly linked to thermal cycle failure.	90iSC alloy has a similar plastic strain constant at 150 °C when compared to SnPb at 80 °C.

(1) Lead-free Solders for High-Reliability Applications: High-cycle Fatigue Studies. Barry N., University of Birmingham 2008
(2) Live project seminar, Ratchev R., Berlin 2008
(3) Fraunhofer

STANDARD ALLOY vs HIGH RELIABILTY 90iSC

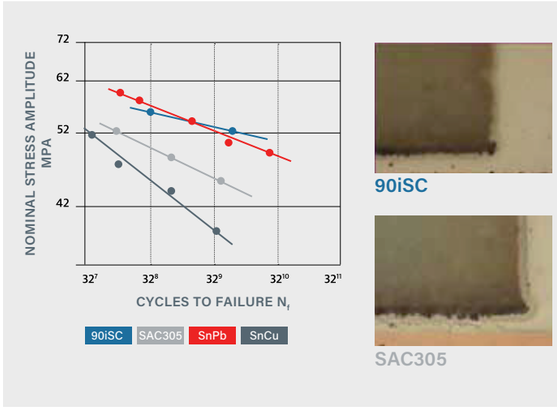
Thermal Cycling

90iSC alloy gives reduced electrical failures in comparison to SnPb in both -40 °C + 150 °C and -40 °C + 125 °C.
Under -40 °C + 150 °C, 90iSC has similar electrical failure levels to SnPb at -40 °C + 125 °C.



Vibration

90iSC alloy failure resistance is comparable to SnPb and significantly better than both SAC305 and SnCu.



Drop Test

Drop test analysis on two surfaces, OSP copper and AuNi. 90iSC alloy gives similar results to standard SAC305*.

* Customer specified drop test.

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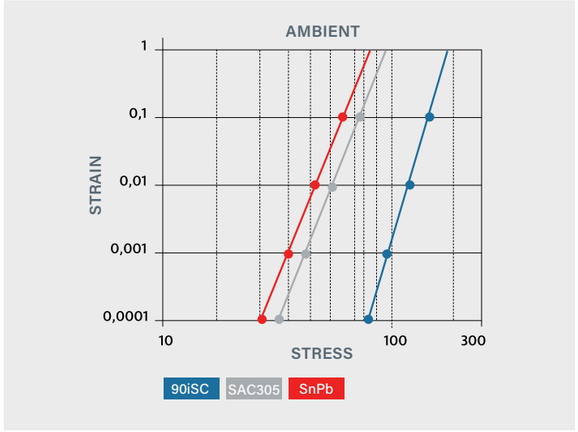
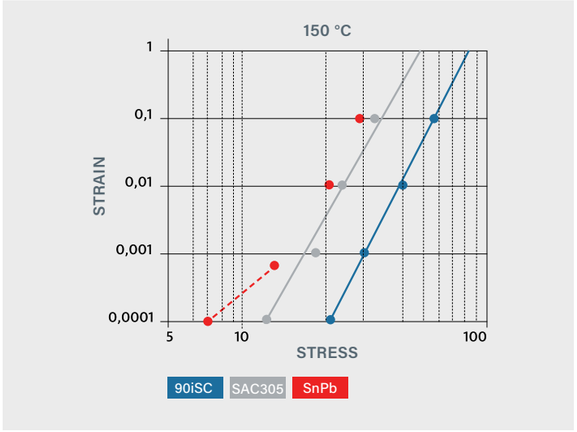
HIGH RELIABILITY 90iSC

Creep (Ambient)

90iSC alloy shows improved creep resistance at ambient temperature over both SAC305 and SnPb (higher stress required to give equivalent creep).



Creep (150°C)

90iSC alloy shows improved creep resistance at 150 °C over both SAC305 and SnPb.