

## GC 10

GC 10 is a halogen free, zero halogens added no-clean, Pb-free solder paste specially formulated to provide added long-term stability over a wide range of temperature conditions. The enhanced paste stability created through its novel formulation increases both on-line paste utilization and application yields.

GC 10 also shows excellent solderability when reflowed in air and nitrogen across a wide range of challenging surface finishes and component metallization including immersion Ag, OSP-Cu, ENIG and CuNiZn. It supports excellent reflow to overcome industry wide HiP and NWO challenges. The new flux chemistry protects the solder joint longer, improves coalescence and optimizes wetting performance, allowing for very shiny solder joints.

## FEATURES AND BENEFITS

- Halogen-free flux: passes IC with pre-treatment IPC-TM-650 2.3.34/EN14582
- Halogen-free flux classification: ROL0 to IPC/J-STD-004 Rev B
- Suitable for fine pitch, high speed stencil printing up to 125mms<sup>-1</sup>
- Stable at room temperature for enhanced sustainability
- Reflow: superior coalescence and wetting on small components including 01005
- Reflow: Pin-testable post-reflow residues after four reflow cycles
- Printing: up to 72 hours stencil life
- Printing: up to 24 hours abandon time
- Printing: improved paste transfer efficiency
- Reflow: enhanced soak process window 150-200°C
- Reflow: enhanced process window with superior coalescence and wetting
- Reflow: minimal hot slump at 182°C
- Reflow: clear, colourless residues for easy post-reflow inspection
- Reflow: very shiny solder joints

## TYPICAL PROPERTIES

## Solder Alloy/Powder:

The solder alloys used in GC 10 are RoHS and EICC compliant and are manufactured meeting IPC J-STD-006 and EN29453 for impurity levels. The solder powder is manufactured in a carefully controlled production process to a quality level that exceeds IPC J-STD-005 requirements for sphericity, size distribution and oxide levels.

Code	Alloy Composition	Melting Point (°C)
<b>SAC305</b>	Sn96.5Ag3Cu0.5	217
Powder Description	Particle Size Distribution (µm)	IPC Equivalent (J-STD 005A)
<b>T3</b>	45-25	Type 3
<b>T4</b>	38-20	Type 4
<b>T5</b>	25-15	Type 5

Minimum order requirements may apply to certain alloys and powder sizes. For availability contact your local Customer Services Department.

## Solder Paste:

The properties of a solder paste depend in part on the metal content, the solder alloy and the solder powder particle size range. In general terms, increasing metal content reduces the tendency to slump and reduces the tackiness of the solder paste while the solder balling performance improves. The metal content (by weight) of lead-free solder pastes are often somewhat lower than tin/lead solder pastes for similar applications due to the lower density of lead-free alloys.

Property	SAC305		
<b>Particle Size</b>	T3	T4	T5
<b>Metal content (%)</b>	88.5	88.5	88.5
<b>Brookfield viscosity (cP)</b>	930,000	900,000	880,000
<b>Malcom viscosity (Pa.s)</b>	207	190	209
<b>Thixotropic Index (Ti)</b>	0.52	0.50	0.48
<b>Slump, J-STD-005 A21 (mm)</b>			
<b>182°C, 15 minutes</b>			
<b>0.33 x 2.03 mm pads</b>	0.15	0.20	-
<b>0.63 x 2.03 mm pads</b>	0.33	0.33	-
<b>Slump, J-STD-005 A20 (mm)</b>			
<b>182°C, 15 minutes</b>			
<b>0.20 x 2.03 mm pads</b>			0.125
<b>0.33 x 2.03 mm pads</b>			0.15

NOT FOR PRODUCT SPECIFICATIONS

THE TECHNICAL INFORMATION CONTAINED HEREIN IS INTENDED FOR REFERENCE ONLY. PLEASE CONTACT YOUR NEAREST HARIMA LOCATION FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT

## DIRECTIONS FOR USE

### Printing:

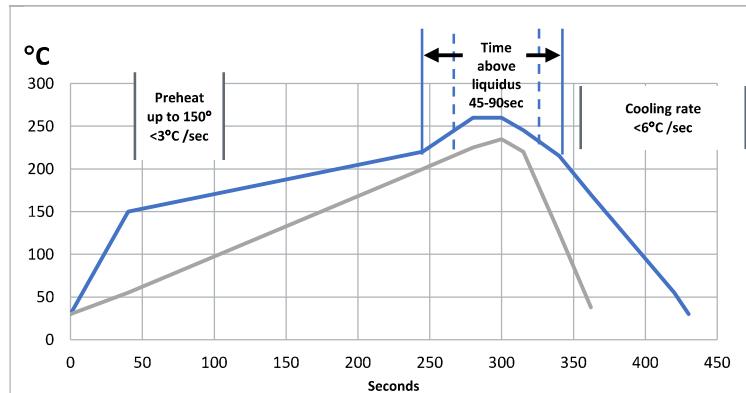
GC 10 can be reliably printed between 25 and 150 mms<sup>-1</sup> using electroformed or laser-cut stencils with a metal blade squeegee (preferably 60°). This is due to a unique rheology which ensures that the higher shear rate viscosity is relatively low, and the thixotropic index is high enough to ensure excellent definition and slump resistance, while maintaining good roll and drop off behaviour. Acceptable first prints have been achieved at 0.4mm pitch after printer down times of 60 minutes without requiring a knead cycle. Unlike some pastes, high squeegee pressures are not required, making GC 10 particularly useful for second side printing processes.

### Reflow:

Excellent soldering performance is typically achieved using a convection reflow oven in air. Nitrogen atmosphere reflow can be used if desired. GC 10 solder pastes may be reflowed using a wide range of profile types. For optimum soldering and voiding performance a peak temperature of 245 to 260°C with a time above liquidus (217°C) between 50 to 110 seconds is recommended. Example profiles are shown which have demonstrated low voiding in a representative assembly process.

Further reflow profiles can be reviewed in the Engineering Manual.

Standard SAC alloys



Preheat ramp up to 150°C	<3°C
Soak zone 150-200°C	60-180s
200°C to peak	<3°C
Time above liquidus	40-90s
Minimum peak temperature	≥235°C
Time at peak temperature	<40s
Cooling rate	<6°C/s
Time to peak from ambient	< 8 mins
Nitrogen (if required)	≤1500ppm O <sub>2</sub>

### Cleaning:

The residues from GC 10 solder pastes may be left on the PCB in many applications since they do not pose a hazard to long term reliability. Should there be a specific requirement for residue removal, this may be achieved using conventional cleaning processes based on solvents such as MCF 800. For stencil cleaning and cleaning board/misprints MSC 01 solvent cleaner is recommended.

## RELIABILITY PROPERTIES

### Solder Paste Medium:

The flux used in GC 10 solder paste contains a stable resin system, slow evaporating solvents and has minimal odour. The flux has been tested to the requirements of the IPC/J-STD-004 B standard, attaining ROL0 classification.

Test	Specification	Test Method	Results
<b>Copper Plate Corrosion</b>	IPC/J-STD-004B	2.6.15C	Pass
<b>Copper Mirror Corrosion</b>	IPC/J-STD-004B	2.3.32D	Pass
<b>Chlorides &amp; Bromides</b>	IPC/J-STD-004B	2.3.33	Pass
<b>Surface Insulation Resistance (SIR) (without cleaning)</b>	IPC/J-STD-004B	2.6.3.7	Pass
<b>Electromigration (ECM) (without cleaning)</b>	IPC/J-STD-004B	2.6.14.1	Pass
<b>Halogen Content (Pre-treatment EN14582, 2.3.28.1)</b>	IPC/J-STD-004B	2.3.34	Pass
<b>Flux Activity Classification (without cleaning)</b>	IPC/J-STD-004B		ROL0

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**COMPATIBILITY:**

GC 10 flux residues have been shown to be compatible with encapsulation technologies.

GC 10 solder paste is compatible with GC 50 jetting and dispensing solder paste.

**STORAGE AND SHELF LIFE****Storage:**

GC 10 solder pastes can be stored refrigerated however they are designed to be stored at 5 to 25°C tightly sealed in the original container (NB cartridges should be stored tip down to prevent the formation of air pockets). If cold storage is used the paste should be removed from cold storage a minimum of 8 hours before use. Do not use forced heating methods to bring solder paste up to temperature.

GC 10 solder paste has been formulated to reduce separation on storage to a minimum, but should it occur, gentle stirring for 15 seconds will return the product to its correct rheological performance.

Please refer to the GC 10 Handling Guideline for further information on storage conditions.

**Shelf Life:**

A minimum shelf life of 12 months can be expected when stored in the original unopened container at room temperature or 31 days if stored at 40°C.

**GENERAL INFORMATION**

**For safe handling information on this product consult the relevant Safety Data Sheet (SDS)**

**Disclaimer**

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. HARIMA is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product. Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

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