



TECHNICAL DATA

Fenix Tin-Silver-Copper Alloys

Description

Fenix tin-silver-copper solders are lead-free alternatives to a number of tin-lead solders used mainly in the electronics and electrical industries. They are safe to use, have low environmental impact and meet the requirements of the European Union's Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS). They are lighter and stronger than the tin-lead alloys they replace.

As Fenix has its own refinery, alloy quality can be ensured throughout the manufacturing process.

Applications

SAC305, SAC405 and SAC387 are suitable for wave soldering and reflow soldering of electronic assemblies, for both high reliability and consumer markets. In these applications, they replace Sn63Pb37, Sn60Pb40 and Sn62Pb36Ag2 alloys. Although the metal cost is higher, this is partly offset by its lower density. A higher wave soldering bath temperature (250-265°C) is needed, which, together with the high tin content, results in an increase in copper dissolution from the circuit board. Bath composition should be monitored for copper content, as the rate of dissolution may not be balanced by the rate of new metal addition. If the copper content rises above 1%, the liquidus temperature will rise rapidly and the defect rate will increase. To counteract this, SAC300 or SAC400, containing no copper, can be added to the bath to maintain a satisfactory copper equilibrium.

Other SAC alloys with alternative silver and copper contents are also available.

As SAC alloys are more aggressive to stainless steel than tin-lead solders, some wave soldering machine parts may need to be modified, to prevent perforation of tanks and ducts, and erosion of impellor blades. Advice should be sought from the soldering machine manufacturer or supplier.

Health & Safety

Please refer to the Safety Data Sheet for full safety and handling instructions.

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Technical Data

PROPERTY	SAC300	SAC305	SAC400	SAC405	SAC387
Melting Range (°C)	221-224	217-220	221-226	217-220	217
Density (g/ml)	7.35	7.37	7.38	7.44	7.43
Specific Heat (J/°C)		0.232		0.236	
Thermal Coefficient of Expansion (x10 ⁻⁶ /°C)		21.9		21.4	20.9
Tensile Strength (Mpa)		49.6		51.5	48.0
Hardness (VHN)		13.3			15.9

Specifications

Fenix solders are all made to high internal specifications. These alloys meet the requirements for the following compositions of the international solder specification ISO 9453 - Soft solder alloys - Chemical compositions and forms.

Name	Alloy No.	Alloy Designation
SAC305	711	Sn96.5Ag3Cu0.5
SAC405	714	Sn95.5Ag4Cu0.5
SAC300	702	S-Sn97Ag3
SAC387	713	Sn95.5Ag3.8Cu0.7

The typical lead content of these alloys is less than 0.05%. SAC400, without copper, is made to the same high standard of purity

Alloys can also be produced to national standards or individual customer requirements.

Packaging

These solders are available as sticks, bars, ingots, pellets and solder wire. Sticks, bars and pellets are usually packed in 25kg cartons. Wire is available in various diameters on several sizes of reel.

Issue 9

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