

EnviroMark™ 907

Lead-Free No-Clean Solder Paste

Product Description

EnviroMark™ 907 is a lead-free, air and nitrogen reflowable no-clean solder paste specifically designed for the thermal requirements of lead free alloys, including the Sn96.5Ag3.0Cu0.5 alloy. The paste flux system allows joint appearances that closely resemble that achieved with SnPb alloys. EM907 is capable of stencil printing downtimes up to 60 minutes with an effective first print down to 20 mils without any kneading. EM907 also exhibits excellent continual printability for fine pitch (0.4mm/16 mils) and is able to print at high speeds up to 6"/s (150 mm/s). This solder paste also exceeds the reliability standards required by J-STD-004.

- Lead free joints that closely resemble those achieved with SnPb solder paste
- Excellent solderability to a wide variety of surface metallizations, including Ni/Au, Im Sn and Im Ag
- High print speeds up to 150 mm/s
- Capable of 60 minute break times in printing
- Stencil life: 12+ hours (process dependent)
- Excellent printing characteristics to 16 and 20 mils pitch
- Excellent print and reflow characteristics for 0201 applications
- Stable tack life
- Classified as ROL0 per J-STD-004

Standard Applications

88.5% Metal – Stencil Printing

RoHS Compliance

This product meets the requirements of the RoHS (Restriction of Hazardous Substances) Directive, 2002/95/EC Article 4 for the stated banned substances.

Physical Properties

(Data given for Sn96.5 Ag3.0 Cu0.5, 88.5% metal, -325+500 mesh)

Viscosity (typical): 1800 poise

Malcom viscometer @ 10rpm and 25°C

Initial Tackiness (typical): 44 grams

Tested to J-STD-005, IPC-TM-650, Method 2.4.44

Slump Test: Pass

Tested to J-STD-005, IPC-TM-650, Method 2.4.35

Solder Ball Test: Pass

Tested to J-STD-005, IPC-TM-650, Method 2.4.43

Wetting Test: Pass

Tested to J-STD-005, IPC-TM-650, Method 2.4.45

Reliability Properties

Copper Mirror Corrosion: Low

Tested to J-STD-004, IPC-TM-650, Method 2.3.32

Corrosion Test: Low

Tested to J-STD-004, IPC-TM-650, Method 2.6.15

Silver Chromate: Pass

Tested to J-STD-004, IPC-TM-650, Method 2.3.33

Chloride and Bromides: None Detected

Tested to J-STD-004, IPC-TM-650, Method 2.3.35

Fluorides by Spot Test: Pass

Tested to J-STD-004, IPC-TM-650, Method 2.3.35.1

SIR, IPC (typical): Pass

Tested to J-STD-004, IPC-TM-650, Method 2.6.3.3

| | Blank | EM907 |
|-------|--------------------------|-------------------------|
| Day 1 | 1.1 × 10 ¹⁰ Ω | 7.7 × 10 ⁸ Ω |
| Day 4 | 1.5 × 10 ¹⁰ Ω | 1.2 × 10 ⁹ Ω |
| Day 7 | 1.4 × 10 ¹⁰ Ω | 1.4 × 10 ⁹ Ω |

Application Notes

Availability:

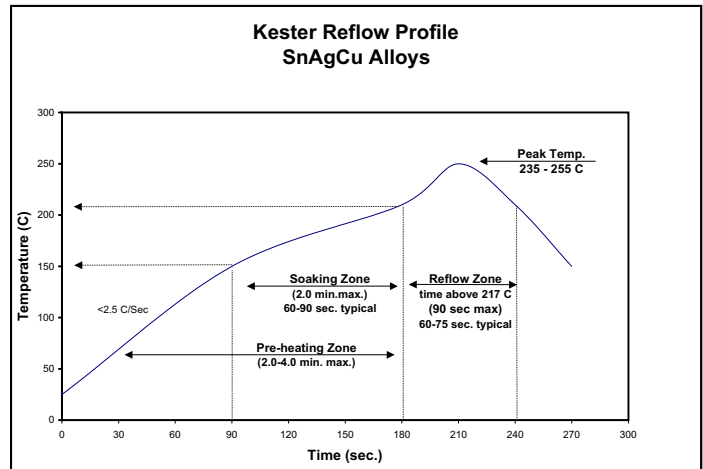
Kester EM907 is available in the Sn96.5Ag3.0Cu0.5 and Sn96.5Ag3.5 alloys. Type 3 powder mesh is normally recommended, but type 4 is available for fine pitch applications. EM907 is also compatible with other SnAgCu alloys in a similar melting range to the listed alloys. For specific packaging information, see Kester's Paste Packaging Chart for available sizes. The appropriate combination depends on process variables and the specific application.

Printing Parameters:

| | |
|----------------------|---|
| Squeegee Blade | 80 to 90 durometer polyurethane or stainless steel |
| Squeegee Speed | Capable to a maximum speed of 150 mm/sec (6 in/sec) |
| Stencil Material | Stainless Steel, Molybdenum, Nickel Plated, Brass |
| Temperature/Humidity | Optimal ranges are 21-25°C (70-77°F) and 35-65% RH |

Recommended Reflow Profile:

Full convection reflow method is most commonly used to reflow the EM907 formula. The recommended convection reflow profile for EM907 made with either the Sn96.5Ag3.5 or SnAgCu alloys is shown here.



Cleaning:

EM907 is a no-clean formula. The residues do not need to be removed for typical applications. Although EM907 is designed for no-clean applications, its residues can be easily removed using automated cleaning equipment (in-line or batch) with a variety of readily available cleaning agents. Call Kester technical support for details.

Storage, Handling, and Shelf Life:

Refrigeration is the recommended optimum storage condition for solder paste to maintain consistent viscosity, reflow characteristics, and overall performance. EM907 should be stabilized at room temperature prior to printing. EM907 should be kept at standard refrigeration temperatures, 0-10°C (32-50°F). Please contact Kester if you require additional advice with regard to storage and handling of this material. Shelf life is 4 months from date of manufacture and held at 0-10°C (32-50°F).

Health & Safety:

This product, during handling or use, may be hazardous to health or the environment. Read the Material Safety Data Sheet and warning label before using this product.

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The data recommendations presented are based on tests, which we consider reliable. Because Kester has no control over the conditions of use, we disclaim any responsibility connected with the use of any of our products or the information presented. We advise that all chemical products be used only by or under the direction of technically qualified personnel who are aware of the potential hazards involved and the necessity for reasonable care in their handling. The technical information contained herein is consistent with the properties of this material but should not be used in the preparation of specifications as it is intended for reference only. For assistance in preparing specifications, please contact your local Kester office for details.

1: PRODUCT AND COMPANY IDENTIFICATION

Trade name: EM907 Sn96.5Ag3.0Cu0.5

Relevant identified uses of the substance or mixture and uses advised against

Soldering Paste
Professional use of solder

Application of the substance / the preparation: Solder paste

1.3 Details of the supplier of the safety data sheet

This Safety Data Sheet has been updated in accordance with the Globally Harmonized System (GHS).

Manufacturer/Supplier:

Kester Inc.
800 West Thorndale Ave.
Itasca, IL 60143
Tel (630) 616-4000

Kester Components Pte Ltd
500 Chai Chee Lane
Singapore 469024
Tel: 65-64491133

Information department: Product Compliance: EHS_Kester@kester.com

1.4 Emergency telephone number:

CHEMTREC 24-Hour Emergency Response Telephone Number : (800) 424-9300
CHEMTREC 24-Hour Emergency Response (Outside US & Canada) Telephone Number : (703) 527-3887

2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008



GHS08 Health hazard

Resp. Sens. 1 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.



GHS07

Eye Irrit. 2A H319 Causes serious eye irritation.

Skin Sens. 1 H317 May cause an allergic skin reaction.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008

The product is classified and labeled according to the CLP regulation.

Hazard pictograms



GHS08

Signal word Danger

Hazard-determining components of labeling:

Denatured Acid Hydrogenation Gum Resin
Rosin, modified

Hazard statements

H319 Causes serious eye irritation.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

SAFETY DATA SHEET (SDS)

According to 1907/2006/EC, Article 31

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Version number 4

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H317 May cause an allergic skin reaction.

Precautionary statements

P284 In case of inadequate ventilation wear respiratory protection.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:**NFPA ratings (scale 0 - 4)**

Health = 1
 Fire = 1
 Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health = *1
 Fire = 1
 Reactivity = 0

2.3 Other hazards**Results of PBT and vPvB assessment**

PBT: Not applicable.

vPvB: Not applicable.

3: COMPOSITION OF MIXTURE**3.2 Chemical characterization: Mixtures**

Description: Mixture of the substances listed below with nonhazardous additions.

| CAS No. | Description | % Range |
|-------------------------------------|---|----------|
| CAS: 7440-31-5 EINECS: 231-141-8 | TIN (Sn) | 90-95% |
| CAS: 144413-22-9 | Denatured Acid Hydrogenation Gum Resin ⚠ Resp. Sens. 1, H334 ⚠ Skin Sens. 1, H317 | 2.5-5.0% |
| CAS: 112-59-4 EINECS: 203-988-3 | Hexyl diglycol ⚠ Eye Dam. 1, H318 ⚠ Acute Tox. 4, H302; Acute Tox. 4, H312 | 2.5-5.0% |
| CAS: 7440-22-4 EINECS: 231-131-3 | SILVER (Ag) | 2.5-5.0% |
| CAS: 65997-06-0 | Rosin, modified ⚠ Resp. Sens. 1, H334 ⚠ Skin Sens. 1, H317 | 1.0-2.5% |
| CAS: 7440-50-8 EINECS: 231-159-6 | COPPER (Cu) | ≤ 1.0% |

Additional information:

Solder powder is typically 85-92% of the solder paste composition.

This solder product does not contain any Substance of Very High Concern (SVHC) on the European Chemicals Agency (ECHA) candidate list.

4: FIRST AID MEASURES**4.1 Description of first aid measures****General information:** Follow general first aid procedures.**After inhalation:** Supply fresh air; consult doctor in case of complaints.

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After skin contact: Immediately wash with water and soap and rinse thoroughly.**After eye contact:** Rinse opened eye for several minutes under running water.**After swallowing:** Seek immediate medical advice.**4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.**4.3 Indication of any immediate medical attention and special treatment needed**

No further relevant information available.

5: FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing agents:** CO₂. Do not use water.**For safety reasons unsuitable extinguishing agents:** Water**5.2 Special hazards arising from the substance or mixture**

In case of fire, the following can be released:

Carbon monoxide (CO)

Nitrogen oxides (NO_x)Carbon dioxide (CO₂)

Aliphatic aldehydes

5.3 Advice for firefighters**Protective equipment:** Wear self-contained respiratory protective device.**6: ACCIDENTAL RELEASE MEASURES****6.1 Personal precautions, protective equipment and emergency procedures** Ensure adequate ventilation**6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.**6.3 Methods and material for containment and cleaning up:**

Dispose contaminated material as waste according to item 13.

Scoop up paste and deposit in appropriate containers.

6.4 Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7: HANDLING AND STORAGE**7.1 Precautions for safe handling**

Ensure good ventilation/exhaustion at the workplace.

Wash hands after handling paste and before eating or smoking. Care should be taken to remove paste from under fingernails.

Information about protection against explosions and fires: No special measures required.**7.2 Conditions for safe storage, including any incompatibilities****Storage:****Requirements to be met by storerooms and receptacles:**

Store in a cool location.

Store at or near 5°C in a dry location.

Information about storage in one common storage facility: Not required.**Further information about storage conditions:** None.**7.3 Specific end use(s)** No further relevant information available.**8: EXPOSURE CONTROLS / PERSONAL PROTECTION****Additional information about design of technical systems:** No further data; see item 7.

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8.1 Control parameters

Components with limit values that require monitoring at the workplace:

7440-31-5 TIN (Sn)

PEL Long-term value: 2 mg/m³
metal

REL Long-term value: 2 mg/m³

TLV Long-term value: 2 mg/m³
metal

7440-22-4 SILVER (Ag)

PEL Long-term value: 0.01 mg/m³

REL Long-term value: 0.01 mg/m³

TLV Long-term value: 0.1 mg/m³
metal: dust and fume

Additional information:

PEL = Permissible Exposure Limit (OSHA)

TLV = Threshold Limit Value (ACGIH)

OSHA = Occupational Safety and Health Administration

ACGIH = American Conference of Governmental Industrial Hygienists

8.2 Exposure controls

Personal protective equipment:

General protective and hygienic measures:

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Breathing equipment:

Exposure Controls: Use appropriate engineering control such as process enclosures, local exhaust ventilation to control airborne levels below recommended exposure limits.

When ventilation is not sufficient to remove airborne levels from the breathing zone, a NIOSH safety approved respirator or self-contained breathing apparatus should be worn. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.

Protection of hands:



Protective gloves

Material of gloves:

Nitrile rubber, NBR

Natural rubber, NR

Penetration time of glove material:

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection:

Safety glasses



Face Shield with Safety Glasses when refilling.

9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information

Appearance:

Form: Pasty

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Color: Silver grey
Odor: Mild
pH-value: Not applicable.
Change in condition
Melting point/Melting range: 235 °C (455 °F) (Reflow Profile)
 Undetermined.
Boiling point/Boiling range: Undetermined.
Flash point: Undetermined.
Flammability (solid, gaseous): Not determined.
Auto igniting: Product is not selfigniting.
Danger of explosion: Product does not present an explosion hazard.
Vapor pressure: Not applicable.
Density: Not determined.
Vapour density Not applicable.
Solubility in / Miscibility with Water: Insoluble.

10: STABILITY AND REACTIVITY**10.1 Reactivity****10.2 Chemical stability****Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.**10.3 Possibility of hazardous reactions** No dangerous reactions known.**10.4 Conditions to avoid** No further relevant information available.**10.5 Incompatible materials:** Strong acids, strong oxidizers.**10.6 Hazardous decomposition products:**

Carbon monoxide and carbon dioxide

When heated to soldering temperatures, the solvents are evaporated and rosin may be thermally degraded to liberate aliphatic aldehydes and acids.

11: TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects****Acute toxicity:****LD/LC50 values that are relevant for classification:****65997-06-0 Rosin, modified**

| | | |
|--------|------|----------------------|
| Oral | LD50 | > 4000 mg/kg (Rat) |
| Dermal | LD50 | >2500 mg/kg (rabbit) |

Primary irritant effect:**on the skin:**

Irritant to skin and mucous membranes.

Possible local irritation by contact with flux or fumes.

on the eye:

Irritating effect.

Smoke during soldering can cause eye irritation.

through inhalation:

Flux fumes during soldering may cause irritation and damage of mucous membranes and respiratory system.

Sensitization:

Sensitization possible through inhalation.

Sensitization possible through skin contact.

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Additional toxicological information:

The product shows the following dangers according to internally approved calculation methods for preparations:

Harmful
Irritant**Carcinogenic categories****IARC (International Agency for Research on Cancer)**

None of the ingredients is listed.

NTP (National Toxicology Program)

None of the ingredients is listed.

OSHA-Ca (Occupational Safety & Health Administration)

None of the ingredients is listed.

12: ECOLOGICAL INFORMATION**12.1 Toxicity****Aquatic toxicity:** No further relevant information available.**Additional ecological information:****General notes:**

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

12.5 Results of PBT and vPvB assessment**PBT:** Not applicable.**vPvB:** Not applicable.**13: DISPOSAL CONSIDERATIONS****13.1 Waste treatment methods****Recommendation:**

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Disposal must be made according to official regulations.

Uncleaned packagings:**Recommendation:** Disposal must be made according to official regulations.**14: TRANSPORT INFORMATION****14.1 UN-Number**

ADR Not regulated

14.2 UN proper shipping name

ADR Not applicable

IMDG, IATA Not regulated

14.3 Transport hazard class(es)**DOT, ADR, IMDG, IATA**

Class Not regulated.

Marine pollutant: No**14.6 Special precautions for user** Not applicable.**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

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15: REGULATORY INFORMATION**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

All ingredients are listed on the following Government Inventories:

China: Inventory of Existing Chemical Substances in China (IECSC)
 Korea: Korea Existing Chemicals List (ECL)
 Europe: European Inventory of Existing Commercial Chemical Substances (EINECS)
 Japan: Inventory of Existing and New Chemical Substances (ENCS)
 Philippines: Philippine Inventory of Chemicals and Chemical Substances (PICCS)
 USA: TSCA (Toxic Substances Control Act) TSCA Inventory of Chemical Substances

USA The following information relates to product regulation specific to the USA.**SARA (Superfund Amendments and Reauthorization Act)****Section 355 (extremely hazardous substances):**

None of the ingredient is listed.

Section 313 (Specific toxic chemical listings):

| | |
|-----------|-------------|
| 7440-22-4 | SILVER (Ag) |
| 7440-50-8 | COPPER (Cu) |

TSCA (Toxic Substances Control Act): Kester certifies that all components listed below for the subject finished product are on the TSCA Inventory of Chemical Substances and are not subject to any chemical specific regulation under TSCA Section 12(b) export notification requirements delineated at 40 CFR part 707, subpart D.

All ingredients are listed or exempt from listing.

California Proposition 65**Chemicals known to cause cancer:**

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity:

None of the ingredients is listed.

Carcinogenic categories**EPA (Environmental Protection Agency)**

| | | |
|-----------|-------------|---|
| 7440-22-4 | SILVER (Ag) | D |
| 7440-50-8 | COPPER (Cu) | D |

NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

CANADA: Not classified.**Labelling according to Regulation (EC) No 1272/2008**

The product is classified and labeled according to the CLP regulation.

Hazard pictograms

GHS08

Signal word Danger**Hazard-determining components of labeling:**Denatured Acid Hydrogenation Gum Resin
Rosin, modified**Hazard statements**

H319 Causes serious eye irritation.
 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
 H317 May cause an allergic skin reaction.

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Precautionary statements

P284 In case of inadequate ventilation wear respiratory protection.
 P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16: OTHER INFORMATION

The information contained herein is based on data considered accurate and is offered solely for information, consideration and investigation. Kester extends no warranties, makes no representations and assumes no responsibility as to the accuracy, completeness or suitability of this data for any purchaser's use. The data on this Material Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and the necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Material Safety Data Sheet as a source for hazard information.

Department issuing Safety Data Sheet (SDS): Product Compliance / EHS Department

Contact: EHS_Kester@kester.com

Date of preparation / last revision 07/14/2014 / 3

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
 IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
 ICAO: International Civil Aviation Organization
 ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
 ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
 IMDG: International Maritime Code for Dangerous Goods
 DOT: US Department of Transportation
 IATA: International Air Transport Association
 GHS: Globally Harmonized System of Classification and Labelling of Chemicals
 EINECS: European Inventory of Existing Commercial Chemical Substances
 ELINCS: European List of Notified Chemical Substances
 CAS: Chemical Abstracts Service (division of the American Chemical Society)
 NFPA: National Fire Protection Association (USA)
 HMIS: Hazardous Materials Identification System (USA)
 LC50: Lethal concentration, 50 percent
 LD50: Lethal dose, 50 percent
 Acute Tox. 4: Acute toxicity, Hazard Category 4
 Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
 Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A
 Resp. Sens. 1: Sensitisation - Respirat., Hazard Category 1
 Skin Sens. 1: Sensitisation - Skin, Hazard Category 1

* **Data compared to the previous version altered.**