

# 2010 RECOMMENDED Electronics Assembly Materials



# In A Class By Itself

Kester's EnviroMark<sup>®</sup> 828 Lead-Free Water-Soluble Paste

*Best in class features:*

- Ultra Low BGA Voiding
- Excellent Solderability
- Easy Residue Removal
- Excellent Printability
- Minimizes Slump Defects



**kester**<sup>®</sup> 

## EM828 Product Benefits

Kester's EnviroMark<sup>®</sup> 828 lead-free water-soluble solder paste represents a break-through in water-soluble technology with the combination of low voiding, excellent wetting behavior, and ease of cleaning. Backed by our world renowned customer service, technical service expertise, and 100 plus years of experience in soldering technology, EnviroMark<sup>®</sup> 828 is the only lead-free water-soluble solder paste that satisfies all your assembly needs.

### Key Characteristics:

- **Ultra Low BGA Voiding:** Best in class BGA voiding performance...period! Low void performance is a must for most assemblies today reducing rework costs and improving first pass yields.
- **Excellent Solderability:** Best in class solderability, joint appearance and shininess. The first and only lead free water-soluble solder paste to produce joints that closely resemble those achieved with SnPb solder paste. This characteristic will make the transition to lead-free easier on OEMs and contract manufacturers alike by making the change to lead-free appear seamless.
- **Easy Residue Removal:** Post soldering residues are easily removed in a standard DI aqueous cleaning process. Cleanability demands are more stringent today than ever with higher reflow temperatures and lower profile components, EM828 creates no foam in in-line washers minimizing equipment maintenance and down time.
- **Excellent Printability:** Consistent solder paste volume deposits regardless of idle time, stencil life and print speed. This is the most important characteristic of any solder paste, as print volume inconsistency is the top cause of defects in electronic assembly.
- **Minimizes Slump Defects:** Excellent print definition and bridging prevention due to its non-slumping chemistry. The solder brick maintains its shape without variation over time. This attribute avoids bridging especially in fine pitch components, saving the customer from wasting time and money on rework.
- **Advanced Technologies:** Offers 0201 print and reflow capabilities with standard type 3 (-325/+500 mesh) powder. Because of print limitations of other lead-free solder pastes on the market, competing products typically require a more costly finer mesh powder size for these miniature components.

**Contact Kester today to learn more about EnviroMark<sup>®</sup> 828 lead-free water-soluble paste.**



**Global Headquarters**

**Kester, Inc.**

An Illinois Tool Works Company  
800 West Thorndale Avenue  
Itasca, IL USA 60143

**Phone:** (+1) 630-616-4000

**Fax:** (+1) 630-616-4044

[www.kester.com](http://www.kester.com)

## Lead-Free Solder Pastes

| Formula                   | EnviroMark™ 907   | EnviroMark™ 828   |
|---------------------------|---|---|
| Application               | No-Clean Stencil Printing   | Water-Soluble Stencil Printing  |
| Alloys                    | Sn96.5Ag3.0Cu0.5  | Sn96.5Ag3.0Cu0.5  |
| Product Characteristics   | Designed to exceed customers' expectations for high yield lead-free manufacturing. EM907 is engineered for the high thermal demands of assembling with lead-free alloys such as the family of SnAgCu (SAC). Joints are cosmetically bright as SnPb joints. Prints down to 0201 pad sites. Designed to be reflowable in air as well as nitrogen. | Kester EM828 provides excellent printability, activity, cleanability and low-voiding behavior. EM828 is very robust and can tolerate a wide variety of printing and reflow conditions. EM828 is first to market with a water-soluble lead-free paste that combines superior activity, cleanability and low-voiding. |
| Residue Characteristics   | Light colored   | Cleanable in warm water   |
| Typical Metal Percentage  | 88.5%, -325/+500 (Type 3)   | 89.5%, -325/+500 (Type 3)   |
| Compliant Specifications  | Telcordia Issue 1 GR-78-CORE<br>IPC/J-STD-004 Flux Designator ROL0  | IPC/J-STD-004 Flux Designator ORH1  |
| Suggested Packaging Style | 500g jar, 600g, 1400g cartridges  | 500g jar, 600g, 1400g cartridges  |



## Liquid Soldering Fluxes for Lead-Free Wave Soldering

Lead-free wave and selective soldering require exposing the flux to slightly higher soldering temperatures. Lead-free alloys traditionally wet metal surfaces more slowly than tin-lead. Kester liquid fluxes for lead-free assembly have new activator packages to enable rapid wetting and hole-filling, ensuring reliable product output.

| Kester Part # | Description                              | Alloy            | Packaging      |
|---------------|--|------------------|----------------|
| 7006050810    | EM907 No-Clean, Type 3, 88.5% metal      | Sn96.5Ag3.0Cu0.5 | 500g jar       |
| 7006050811    | EM907 No-Clean, Type 3, 88.5% metal      | Sn96.5Ag3.0Cu0.5 | 600g cartridge |
| 7004030810    | EM828 Water-Soluble, Type 3, 89.5% metal | Sn96.5Ag3.0Cu0.5 | 500g jar       |
| 7004030811    | EM828 Water-Soluble, Type 3, 89.5% metal | Sn96.5Ag3.0Cu0.5 | 600g cartridge |

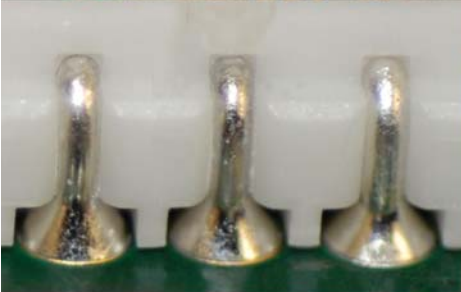
| Kester Part # | Description                    | Packaging      |
|---------------|--------------------------------|----------------|
| 63-0004-0985  | 985M No-Clean                  | 1 gallon       |
| 64-0004-0985  | 985M No-Clean                  | 5 gallon       |
| 65-0004-0985  | 985M No-Clean                  | 53 gallon drum |
| 63-0020-0959  | 959T No-Clean                  | 1 gallon       |
| 64-0020-0959  | 959T No-Clean                  | 5 gallon       |
| 65-0020-0959  | 959T No-Clean                  | 53 gallon drum |
| 63-0056-2220  | 2220-VF VOC-Free Water-Soluble | 1 gallon       |
| 64-0056-2220  | 2220-VF VOC-Free Water-Soluble | 5 gallon       |
| 65-0056-2220  | 2220-VF VOC-Free Water-Soluble | 53 gallon drum |
| 63-0000-2235  | 2235 Water-Soluble             | 1 gallon       |
| 64-0000-2235  | 2235 Water-Soluble             | 5 gallon       |
| 65-0000-2235  | 2235 Water-Soluble             | 53 gallon drum |

| *Formula         | 985M                                  | 959T                             | 2220-VF VOC-Free                      | 2235                             |
|------------------|---------------------------------------|----------------------------------|---------------------------------------|----------------------------------|
|                  | No-Clean                              | No-Clean                         | Water-Soluble                         | Water-Soluble                    |
| Application      | Spray or Wave Fluxer                  | Spray or Foam                    | Spray, Wave or Foam                   | Spray or Foam                    |
| Halide Content % | Halide - free                         | Halide - free                    | 1.6                                   | 1.6                              |
| Specific Gravity | 0.805                                 | 0.794                            | 1.055                                 | 0.856                            |
| Solids %         | 3.6                                   | 2.9                              | 7                                     | 11                               |
| Compliant        | IPC/J-STD-004<br>Flux Designator ROL0 | IPC/J-STD-004<br>Flux Designator | IPC/J-STD-004<br>Flux Designator ORH1 | IPC/J-STD-004<br>Flux Designator |

\*These products are designed specifically for high performance lead-free applications.

# Diminish the 5D's

Dissolution. Dullness. Defects. Dross. Dollars.



## K100LD LEAD-FREE ALLOY

Bar & Wire Solder

### Ultrapure® K100LD Lead-Free Solder Bar

K100LD is a new patent-pending low-cost lead-free solder alloy for use in wave soldering, selective soldering, and tip tinning operations. K100LD has the Lowest Copper Dissolution amongst all common solder alloys, including SN63, SAC305, and other lead-free options. Kester K100LD provides the lowest cost for wave soldering operations. It also provides solder joints with no shrinkage effects, excellent through-hole penetration and topside fillet, and provides a low dross rate.

| Kester Part # | Alloy            | Each Bar   | Sold As |
|---------------|------------------|------------|---------|
| 04-9574-0050  | K100LD           | 1 2/3 lbs. | 25 lbs. |
| 04-7068-0000  | Sn96.5Ag3.0Cu0.5 | 1 2/3 lbs. | 25 lbs. |

| Common Lead-Free Alloys |                  |                     |
|-------------------------|------------------|---------------------|
| *Alloys                 | Melt Temperature | Application         |
| K100LD                  | ~227°C/441°F     | Wave/Hand Soldering |
| Sn96.5Ag3.0Cu0.5        | 217°C/423°F      | SMT/Hand/Wave       |
| Sn96.5Ag3.5             | 221°C/430°F      | SMT/Hand Soldering  |

\* These are the most common lead-free alloys used in the industry. Kester can also produce a multitude of lead-free alloys as specified by individual requirements.

## Solder Wires for Lead-Free Assembly

| Formula                   | 275   | 48                                    | 331                                   |
|---------------------------|---|---------------------------------------|---------------------------------------|
|                           | No-Clean  | Activated Rosin                       | Water-Soluble                         |
| Halide Percentage         | < 0.05%   | 1.0%                                  | 1.25%                                 |
| Flux Content Availability | See Below   | 66 core (3.3%)                        | 66 core (3.3%)                        |
| Compliant Specifications  | Telcordia Issue 1<br>GR-78-CORE & IPC/J-STD-004<br>Flux designator R0L0 | IPC/J-STD-004<br>Flux Designator ROM1 | IPC/J-STD-004<br>Flux designator ORH1 |



### "275" No-Clean Core 1 lb. with K100LD

| Part #       | Alloy  | Diameter | Core Size |
|--------------|--------|----------|-----------|
| 24-9574-7610 | K100LD | .020     | 66        |
| 24-9574-7619 | K100LD | .025     | 66        |
| 24-9574-7618 | K100LD | .031     | 66        |
| 24-9574-7613 | K100LD | .050     | 66        |
| 24-9574-7615 | K100LD | .062     | 66        |

### "275" No-Clean Core 1 lb. with SAC305

| Part #       | Alloy            | Diameter | Core Size |
|--------------|------------------|----------|-----------|
| 24-7068-7603 | Sn96.5Ag3.0Cu0.5 | .020     | 58        |
| 24-7068-7617 | Sn96.5Ag3.0Cu0.5 | .025     | 58        |
| 24-7068-7601 | Sn96.5Ag3.0Cu0.5 | .031     | 58        |
| 24-7068-7606 | Sn96.5Ag3.0Cu0.5 | .050     | 58        |
| 24-7068-7607 | Sn96.5Ag3.0Cu0.5 | .062     | 58        |

### "48" Activated Rosin 1 lb. with K100LD

| Part #       | Alloy  | Diameter | Core Size |
|--------------|--------|----------|-----------|
| 24-9574-1401 | K100LD | .020     | 66        |
| 24-9574-1406 | K100LD | .025     | 66        |
| 24-9574-1402 | K100LD | .031     | 66        |
| 24-9574-1404 | K100LD | .050     | 66        |
| 24-9574-1400 | K100LD | .062     | 66        |

### "48" Activated Rosin 1 lb. with SAC305

| Part #       | Alloy            | Diameter | Core Size |
|--------------|------------------|----------|-----------|
| 24-7068-1401 | Sn96.5Ag3.0Cu0.5 | .020     | 66        |
| 24-7068-1406 | Sn96.5Ag3.0Cu0.5 | .025     | 66        |
| 24-7068-1402 | Sn96.5Ag3.0Cu0.5 | .031     | 66        |
| 24-7068-1404 | Sn96.5Ag3.0Cu0.5 | .050     | 66        |
| 24-7068-1400 | Sn96.5Ag3.0Cu0.5 | .062     | 66        |

### "331" Water-Soluble Core 1 lb. with K100LD

| Part #       | Alloy  | Diameter | Core Size |
|--------------|--------|----------|-----------|
| 24-9574-6401 | K100LD | .020     | 66        |
| 24-9574-6417 | K100LD | .025     | 66        |
| 24-9574-6403 | K100LD | .031     | 66        |
| 24-9574-6409 | K100LD | .050     | 66        |
| 24-9574-6411 | K100LD | .062     | 66        |

### "331" Water-Soluble Core 1 lb. with SAC305

| Part #       | Alloy            | Diameter | Core Size |
|--------------|------------------|----------|-----------|
| 24-7068-6401 | Sn96.5Ag3.0Cu0.5 | .020     | 66        |
| 24-7068-6417 | Sn96.5Ag3.0Cu0.5 | .025     | 66        |
| 24-7068-6403 | Sn96.5Ag3.0Cu0.5 | .031     | 66        |
| 24-7068-6409 | Sn96.5Ag3.0Cu0.5 | .050     | 66        |
| 24-7068-6411 | Sn96.5Ag3.0Cu0.5 | .062     | 66        |





|  | No-Clean   |             |  |             | Water-Soluble   |             |  |             |
|--|--|-------------|--|-------------|---|-------------|--|-------------|
| Solder Paste for Stencil Printing Applications   |  |             |  |             |   |             |  |             |
| Formula Type                                     | Easy Profile 256HA   |             | Easy Profile® 256  |             | HydroMark 531   |             | R562   |             |
| Alloy  | Sn63Pb37   | Sn62Pb36Ag2 | Sn63Pb37   | Sn62Pb36Ag2 | Sn63Pb37  | Sn62Pb36Ag2 | Sn63Pb37   | Sn62Pb36Ag2 |
| Product Characteristics                          | High activity no-clean paste specifically engineered to provide excellent solderability to lead free component and board finishes. Consistent print volume regardless of process parameters and 0201 application capable. Wide reflow process window. Compatible with enclosed print head systems. |             | Standard no-clean paste for a wide variety of reflow profiles and printing conditions. Industry standard formula that performs well in a variety of applications. Compatible with enclosed print head systems. |             | This highly-active, anti-slump paste is produced consistently so that every batch results in high yield manufacturing. HydroMark 531 also offers extremely robust printing, even with idle time up to 1 hour and print speeds of up to 6 in/sec. This very active formula is effective on a wide variety of metallizations, including palladium. Compatible with enclosed print head systems. |             | Designed for maximum environmental robustness and minimal void production, R562 has a stencil life of over 8 hours and may be used in a wide range of humidities (10 - 85% RH). Compatible with enclosed print head systems. |             |
| Residue Removal                                  | Not normally required.   |             | Not normally required.   |             | Use de-ionized or soft tap water at 120-140°F.  |             | Use de-ionized or soft tap water at 120-140°F.   |             |
| Compliant Specifications                         | Telcordia Issue 1GR-78-CORE, IPC/J-STD-004 Classification ROLO   |             | Telcordia Issue 1GR-78-CORE, IPC/J-STD-004 Classification ROLO   |             | IPC/J-STD-004 Classification ORM0   |             | IPC/J-STD-004 Classification ORHO  |             |
| Powder Mesh Size                                 | -325/+500 (Type 3)   |             | -325/+500 (Type 3)   |             | -325/+500 (Type 3)  |             | -325/+500 (Type 3)   |             |
| Metal %  | 90%  |             | 90%  |             | 90%   |             | 90%  |             |
| Suggested Packaging Style                        | 500g jar, 600g, 1400g cartridges   |             | 500g jar, 600g, 1400g cartridges   |             | 500g jar, 600g, 1400g cartridges  |             | 500g jar, 600g, 1400g cartridges   |             |
| Solder Paste for Syringe Dispensing Applications |  |             |  |             |   |             |  |             |
| Formula Type                                     | R276   |             |  |             | R500  |             |  |             |
| Alloy  | Sn63Pb37   |             |  |             | Sn63Pb37  |             |  |             |
| Product Characteristics                          | Provides optimal performance in all types of dispensing applications. R276 is packaged void-free to ensure consistent dispensing in high speed automated processes. Exhibits excellent dispensing characteristics with a wide range of needle diameters.   |             |  |             | The activator package in this formula is aggressive enough to remove tenacious oxide layers or solder to OSP coated boards. R500 delivers excellent wetting characteristics.  |             |  |             |
| Residue Removal                                  | Not normally required.   |             |  |             | Use de-ionized or soft tap water at 120-140°F.  |             |  |             |
| Compliant Specifications                         | Telcordia Issue 1GR-78-CORE, IPC/J-STD-004 Classification ROLO   |             |  |             | IPC/J-STD-004 Classification ORHO   |             |  |             |
| Powder Mesh Size                                 | -325/+500 (Type 3)   |             |  |             | -325/+500 (Type 3)  |             |  |             |
| Metal %  | 87%  |             |  |             | 86%   |             |  |             |
| Suggested Packaging Style                        | 35g and 100g syringes  |             |  |             | 35g and 100g syringes   |             |  |             |

**\*For lead based products, Kester produces solder powder to J-STD-006B for alloy purity and particle distribution, except for Antimony, which is specified to a maximum of 0.2%.**

| Kester Part # | Description                                     | Alloy       | Packaging      |
|---------------|---|-------------|----------------|
| 7002020510    | Easy Profile® 256HA No-Clean, Type 3, 90% metal | Sn63Pb37    | 500g jar       |
| 7002020310    | Easy Profile® 256HA No-Clean, Type 3, 90% metal | Sn62Pb36Ag2 | 500g jar       |
| 7002020511    | Easy Profile® 256HA No-Clean, Type 3, 90% metal | Sn63Pb37    | 600g cartridge |
| 7002020311    | Easy Profile® 256HA No-Clean, Type 3, 90% metal | Sn62Pb36Ag2 | 600g cartridge |
| 7001020510    | Easy Profile® 256 No-Clean, Type 3, 90% metal   | Sn63Pb37    | 500g jar       |
| 7001020310    | Easy Profile® 256 No-Clean, Type 3, 90% metal   | Sn62Pb36Ag2 | 500g jar       |
| 7001020511    | Easy Profile® 256 No-Clean, Type 3, 90% metal   | Sn63Pb37    | 600g cartridge |
| 7001020311    | Easy Profile® 256 No-Clean, Type 3, 90% metal   | Sn62Pb36Ag2 | 600g cartridge |
| 7010020510    | HydroMark 531 Water Soluble, Type 3, 90% metal  | Sn63Pb37    | 500g jar       |
| 7010020310    | HydroMark 531 Water Soluble, Type 3, 90% metal  | Sn62Pb36Ag2 | 500g jar       |
| 7010020511    | HydroMark 531 Water Soluble, Type 3, 90% metal  | Sn63Pb37    | 600g cartridge |
| 7010020311    | HydroMark 531 Water Soluble, Type 3, 90% metal  | Sn62Pb36Ag2 | 600g cartridge |
| 7021020510    | R562 Water Soluble, Type 3, 90% metal           | Sn63Pb37    | 500g jar       |
| 7021020310    | R562 Water Soluble, Type 3, 90% metal           | Sn62Pb36Ag2 | 500g jar       |
| 7021020511    | R562 Water Soluble, Type 3, 90% metal           | Sn63Pb37    | 600g cartridge |
| 7021020311    | R562 Water Soluble, Type 3, 90% metal           | Sn62Pb36Ag2 | 600g cartridge |
| 7016070520    | R276 No-Clean, Type 3, 87% metal                | Sn63Pb37    | 35g syringe    |
| 7016070504    | R276 No-Clean, Type 3, 87% metal                | Sn63Pb37    | 100g syringe   |
| 7017080520    | R500 Water Soluble, Type 3, 86% metal           | Sn63Pb37    | 35g syringe    |
| 7017080504    | R500 Water Soluble, Type 3, 86% metal           | Sn63Pb37    | 100g syringe   |





## Kester ULTRAPURE®

Manufactured by a special process that controls the inclusions of oxides and metallic and non-metallic impurities, Kester Ultrapure® is the industry standard bar solder for use high tech electronic applications where lower surface tension and hole filling ability are essential. The purity of Kester Ultrapure® far exceeds the requirements of ASTM B32, and IPC/J-STD-006A.

| Kester Part # | Alloy    | Each Bar   | Sold As |
|---------------|----------|------------|---------|
| 04-6337-0050  | Sn63Pb37 | 1 2/3 lbs. | 25 lbs. |
| 04-6040-0050  | Sn60Pb40 | 1 2/3 lbs. | 25 lbs. |

## Kester Solder Analysis Program

Kester's Solder Analysis Program is a prepaid method for rapid response solder sample analysis. It allows customers to document solder pot impurities for conformance to Federal Specifications or ISO quality requirements.

**Option C:** This option includes monitoring tin, antimony, copper, gold, lead, cadmium, aluminum, zinc, iron, arsenic, bismuth, silver, and nickel.

| Kester Part # | Description |
|---------------|-------------|
| 53-0000-0041  | Option C    |



## Kester Ultra Low Dross

This bar solder is manufactured using the Ultrapure® process and containing the same metal purity as Kester Ultrapure®. Kester Ultra Low Dross is formulated with a special low dross additive that dramatically decreases dross formation on the solder pot.

| Kester Part # | Alloy    | Each Bar   | Sold As |
|---------------|----------|------------|---------|
| 04-6337-0030  | Sn63Pb37 | 1 2/3 lbs. | 25 lbs. |



## Kester Flo-Bar

Flo-Bar is an extruded 8.5 or 10 lb. bar manufactured specifically for situations where a larger size is more conveniently managed on certain automatic solder feeding systems. Flo-Bar is available in Ultrapure® and Ultra Low Dross grade solder.

| Kester Part # | Alloy                    | Each Bar | Sold As   |
|---------------|--------------------------|----------|-----------|
| 07-6337-1950  | Ultrapure® Sn63Pb37      | 8.5 lbs. | 42.5 lbs. |
| 07-6337-0050  | Ultrapure® Sn63Pb37      | 10 lbs.  | 50 lbs.   |
| 07-6337-1930  | Ultra Low Dross Sn63Pb37 | 8.5 lbs. | 42.5 lbs. |
| 07-6337-0030  | Ultra Low Dross Sn63Pb37 | 10 lbs.  | 50 lbs.   |



## #5744 Solder Saver®

A chloride-free, inorganic white powder formulated to remove dross, which is the oxide of solder, from still solder pots and wave soldering machines. It does not decompose to sticky residues that are harder to remove than the original dross. The product is low fuming and is stable at molten solder temperatures.

| Kester Part # | Description              |
|---------------|--------------------------|
| 56-0002-5744  | 5744 Solder Saver 2 lb.  |
| 56-0005-5744  | 5744 Solder Saver 5 lb.  |
| 56-0025-5744  | 5744 Solder Saver 25 lb. |



**"245" No-Clean**

"245" is a halide-free; rosin based no-clean core flux that provides excellent wetting combined with optimal reliability and cosmetics. "245" is compliant to Bellcore GR-78-CORE and is classified as ROLO per J-STD-004.

| "245" No-Clean Core 1 lb. |          |          |           |
|---------------------------|----------|----------|-----------|
| Part #                    | Alloy    | Diameter | Core Size |
| 24-6337-8806              | Sn63Pb37 | .015     | 50        |
| 24-6337-8807              | Sn63Pb37 | .020     | 50        |
| 24-6337-8834              | Sn63Pb37 | .020     | 58        |
| 24-6337-8809              | Sn63Pb37 | .025     | 50        |
| 24-6337-8800              | Sn63Pb37 | .031     | 50        |
| 24-6337-8801              | Sn63Pb37 | .031     | 58        |
| 24-6337-8802              | Sn63Pb37 | .031     | 66        |
| 24-6337-8813              | Sn63Pb37 | .040     | 50        |
| 24-6337-8814              | Sn63Pb37 | .050     | 50        |
| 24-6337-8817              | Sn63Pb37 | .062     | 50        |

**"331" Water Soluble**

"331" is a high-activity water-soluble core flux for soldering difficult metals. "331" is designed for optimal cleanability, along with minimal smoke and odor. The residues from "331" must be removed. "331" is classified as ORH1 per J-STD-004.

| "331" Water-Soluble Core 1 lb. |          |          |           |
|--------------------------------|----------|----------|-----------|
| Part #                         | Alloy    | Diameter | Core Size |
| 24-6337-6422                   | Sn63Pb37 | .015     | 66        |
| 24-6337-6401                   | Sn63Pb37 | .020     | 66        |
| 24-6337-6417                   | Sn63Pb37 | .025     | 66        |
| 24-6337-6403                   | Sn63Pb37 | .031     | 66        |
| 24-6337-6411                   | Sn63Pb37 | .062     | 66        |

**"285" RMA**

"285" is an RMA based core flux that provides wetting action comparable to that of typical RA fluxes. Although "285" is an RMA-based material, the residues are non-corrosive if not cleaned. "285" is categorized as ROLO per J-STD-004.

| "285" RMA Core 1 lb. |          |          |           |
|----------------------|----------|----------|-----------|
| Part #               | Alloy    | Diameter | Core Size |
| 24-6337-9703         | Sn63Pb37 | .015     | 66        |
| 24-6337-9702         | Sn63Pb37 | .020     | 66        |
| 24-6337-9718         | Sn63Pb37 | .025     | 66        |
| 24-6337-9710         | Sn63Pb37 | .031     | 66        |
| 24-6337-9713         | Sn63Pb37 | .031     | 58        |

**"275" No-Clean**

"275" provides superior wetting performance leaving an extremely clear post-soldering residue. "275" is designed to be a low splattering core flux. "275" is classified as ROLO per J-STD-004.

| "275" No-Clean Core 1 lb. |          |          |           |
|---------------------------|----------|----------|-----------|
| Part #                    | Alloy    | Diameter | Core Size |
| 24-6337-7604              | Sn63Pb37 | .015     | 50        |
| 24-6337-7602              | Sn63Pb37 | .020     | 50        |
| 24-6337-7616              | Sn63Pb37 | .025     | 50        |
| 24-6337-7600              | Sn63Pb37 | .031     | 50        |
| 24-6337-7612              | Sn63Pb37 | .050     | 50        |
| 24-6337-7614              | Sn63Pb37 | .062     | 50        |

**Kester "44"®**

Rosin "44"® is a high activity RA core flux designed for excellent instant wetting action, even on Nickel surfaces. Although "44"® is a RA-based material, the residues are non-corrosive if not cleaned. Per J-STD-004, "44"® is classified as ROM1 flux.

| "44"® RA Core 1 lb. |          |          |           |
|---------------------|----------|----------|-----------|
| Part #              | Alloy    | Diameter | Core Size |
| 24-6337-0007        | Sn63Pb37 | .015     | 66        |
| 24-6337-0010        | Sn63Pb37 | .020     | 66        |
| 24-6337-0018        | Sn63Pb37 | .025     | 66        |
| 24-6337-0027        | Sn63Pb37 | .031     | 66        |
| 24-6337-0039        | Sn63Pb37 | .040     | 66        |
| 24-6337-0053        | Sn63Pb37 | .050     | 66        |
| 24-6337-0061        | Sn63Pb37 | .062     | 66        |
| 24-6040-0010        | Sn60Pb40 | .020     | 66        |
| 24-6040-0018        | Sn60Pb40 | .025     | 66        |
| 24-6040-0027        | Sn60Pb40 | .031     | 66        |
| 24-6040-0039        | Sn60Pb40 | .040     | 66        |
| 24-6040-0053        | Sn60Pb40 | .050     | 66        |
| 24-6040-0061        | Sn60Pb40 | .062     | 66        |
| 24-6040-0066        | Sn60Pb40 | .093     | 66        |

**Kester Solid Wire**

Kester's solid wire solder, without flux core, is manufactured using virgin metals and strict quality control standards. Conforming to IPC/J-STD-006A and ASTM B32.

| Solid Wire 5 lbs. |          |          |
|-------------------|----------|----------|
| Part #            | Alloy    | Diameter |
| 16-6337-0062      | Sn63Pb37 | .062     |
| 16-6337-0125      | Sn63Pb37 | .125     |
| 16-6040-0031      | Sn63Pb37 | .031     |
| 16-6040-0050      | Sn63Pb37 | .050     |
| 16-6040-0125      | Sn63Pb37 | .125     |

| Solid Wire 1 lb. |          |          |
|------------------|----------|----------|
| Part #           | Alloy    | Diameter |
| 14-6337-0015     | Sn63Pb37 | .015     |
| 14-6337-0031     | Sn63Pb37 | .031     |
| 14-6337-0062     | Sn63Pb37 | .062     |
| 14-6337-0125     | Sn63Pb37 | .125     |
| 14-6040-0031     | Sn60Pb40 | .031     |
| 14-6040-0062     | Sn60Pb40 | .062     |
| 14-6040-0125     | Sn60Pb40 | .125     |

| No-Clean Fluxes                         |   |   |   |   |   |  |
|---|---|---|---|---|---|--|
|   | Alcohol Based   |   |   | VOC-Free  |   |  |
| Formula                                 | 985M  | 959T  | 951   | 979T  | 977   | 971M   |
| Flux Type                               | Low Solids No-Clean   | Low Solids No-Clean   | Rosin-Free Low Solids, No-Clean   | VOC-Free No-Clean   | VOC-Free No-Clean   | VOC-Free No-Clean  |
| Percent Solids                          | 3.6   | 2.9   | 2.0   | 4.2   | 3.25  | 2.8  |
| VOCs (g/liter)                          | 776   | 770   | 792   | 0   | 0   | 0  |
| Specific Gravity                        | 0.805   | 0.794   | 0.813   | 1.015   | 1.012   | 1.007  |
| Product Characteristics                 | Designed for the wave soldering applications and gives excellent hole fill on thick board assemblies. | Designed for the wave soldering of conventional and SMT board assemblies. Developed to minimize the formation of micro-solderballs. | Very low solids, rosin free, foam and spray application flux. Practically no residue after the soldering process. | Developed to reduce bottomsides micro-solder balling and bridging on glossy laminates and between connector pins. Designed as a spray flux, 979's activation system provides excellent wetting producing complete and consistent hole-fill. | Developed to reduce bottomsides micro-solder balling and bridging. The wetting system is designed to allow for a larger process window and can survive the longer dwell times in extremely turbulent chip waves. Designed for spray applications. | Designed for foam applications. VOC-Free, no clean flux that is water based, water soluble, halide free, non-flammable and eliminates the need for a flux thinner. |
| Compliant Specifications                | Telcordia Issue 1 GR-78-CORE & IPC/J-STD-004 Flux designator ORLO                                     | Telcordia Issue 1 GR-78-CORE & IPC/J-STD-004 Flux designator ORLO   | Telcordia Issue 1 GR-78-CORE & IPC/J-STD-004 Flux designator ORLO   | Telcordia Issue 1 GR-78-CORE & IPC/J-STD-004 Flux designator ORLO   | Telcordia Issue 1 GR-78-CORE & IPC/J-STD-004 Flux designator ORLO   | Telcordia Issue 1 GR-78-CORE & ANSI/J-STD-004 Flux designator ORLO   |
| Residue Removal (not normally required) | Wash with Kester's #5768 Bio-Kleen® saponifier at 2% concentration.                                   | Wash with Kester's #5768 Bio-Kleen® saponifier at 2% concentration.   | Wash with Kester's #5768 Bio-Kleen® saponifier at 2% concentration.   | Wash with hot de-ionized water at 140-160°F or use 1% solution of Kester's #5768 Bio-Kleen® saponifier in water.  | Wash with hot de-ionized water at 140-160°F or use 1% solution of Kester's #5768 Bio-Kleen® saponifier in water.  | Wash with hot de-ionized water at 140-160°F or use 1% solution of Kester's #5768 Bio-Kleen® saponifier in water.   |
| Thinner                                 | 108-S   | #4662   | 110   | De-ionized Water  | De-ionized Water  | De-ionized Water   |
| Flux Test Kit                           | PS-20 or PS-22  | PS-20 or PS-22  | PS-22   | PS-20 or PS-22  | PS-20 or PS-22  | PS-20  |



| Kester Part # | Description            | Packaging      |
|---------------|------------------------|----------------|
| 63-0000-0951  | 951 No-Clean           | 1 gallon       |
| 64-0000-0951  | 951 No-Clean           | 5 gallon       |
| 65-0000-0951  | 951 No-Clean           | 53 gallon drum |
| 63-0000-0985  | 985M No-Clean          | 1 gallon       |
| 64-0000-0985  | 985M No-Clean          | 5 gallon       |
| 65-0000-0985  | 985M No-Clean          | 53 gallon drum |
| 63-0020-0959  | 959T No-Clean          | 1 gallon       |
| 64-0020-0959  | 959T No-Clean          | 5 gallon       |
| 65-0020-0959  | 959T No-Clean          | 53 gallon drum |
| 63-0004-0971  | 971M VOC-Free No-Clean | 1 gallon       |
| 64-0004-0971  | 971M VOC-Free No-Clean | 5 gallon       |
| 65-0004-0971  | 971M VOC-Free No-Clean | 53 gallon drum |
| 63-0000-0977  | 977 VOC-Free No-Clean  | 1 gallon       |
| 64-0000-0977  | 977 VOC-Free No-Clean  | 5 gallon       |
| 65-0000-0977  | 977 VOC-Free No-Clean  | 53 gallon drum |
| 63-0020-0979  | 979T VOC-Free No-Clean | 1 gallon       |
| 64-0020-0979  | 979T VOC-Free No-Clean | 5 gallon       |
| 65-0020-0979  | 979T VOC-Free No-Clean | 53 gallon drum |

| Water-Soluble Fluxes     |   |  |  |
|--------------------------|---|--|--|
| Formula                  | 2331-ZX   | 2235   | 2120   |
| Flux Type                | Neutral pH<br>Organic Water-Soluble   | Organic<br>Water-Soluble   | Organic<br>Water-Soluble   |
| Percent Solids           | 33  | 11   | 24   |
| VOCs (g/liter)           | 729   | 763  | 670  |
| Specific Gravity         | 0.899 ± 0.005   | 0.856 ± 0.005  | 0.862 ± 0.005  |
| Percent Halides          | 2.2   | 1.5  | Halide-Free  |
| Product Characteristics  | Original pH neutral organic flux for automated wave and drag soldering processes.       | Very active flux for surface mount assemblies designed to help reduce skips on bottom side surface mount pads. | Highly active, organic flux designed for automated wave soldering applications. This halide-free formula produces bright, shiny joints and high ionic cleanliness after water cleaning |
| Compliant Specifications | IPC/J-STD-004<br>Flux designator ORH1   | IPC/J-STD-004<br>Flux designator ORH1  | IPC/J-STD-004<br>Flux designator ORH0  |
| Residue Removal          | Residue removal is required. Use soft or de-ionized water at temperatures of 120-150°F. | Residue removal is required. Use soft or de-ionized water at temperatures of 120-150°F.                        | Residue removal is required. Use soft or de-ionized water at temperatures of 120-150°F.  |
| Thinner                  | 4662  | 4662   | 4662   |

| Kester Part # | Description           | Packaging      |
|---------------|-----------------------|----------------|
| 63-0097-2331  | 2331-ZX Water-Soluble | 1 gallon       |
| 64-0097-2331  | 2331-ZX Water-Soluble | 5 gallon       |
| 65-0097-2331  | 2331-ZX Water-Soluble | 53 gallon drum |
| 63-0000-2235  | 2235 Water-Soluble    | 1 gallon       |
| 64-0000-2235  | 2235 Water-Soluble    | 5 gallon       |
| 65-0000-2235  | 2235 Water-Soluble    | 53 gallon drum |
| 63-0000-2120  | 2120 Water-Soluble    | 1 gallon       |
| 64-0000-2120  | 2120 Water-Soluble    | 5 gallon       |
| 65-0000-2120  | 2120 Water-Soluble    | 53 gallon drum |



| Rosin Based Fluxes       |   |   |
|--------------------------|---|---|
| Formula                  | 186   | 1544  |
| Flux Type                | Rosin Mildly Activated (RMA)  | Activated Rosin (RA)  |
| Percent Solids           | 36  | 50  |
| Specific Gravity         | 0.879 ± 0.005   | 0.929 ± 0.005   |
| Percent Halides          | 0.02  | 0.44  |
| Product Characteristics  | Designed for high thermal stability and superior solderability.   | Kester's active, Non-corrosive rosin type flux. Used on surfaces that are more difficult to solder.   |
| Compliant Specifications | IPC/J-STD-004 Flux designator ROLO  | IPC/J-STD-004 Flux designator ROM1  |
| Residue Removal          | Residue is non-corrosive, but may be removed with solvent or with Kester's 5768 Bio-Kleen® saponifier at 7-10% solution in de-ionized or soft water at temperatures of 120-140°F. | Residue is non-corrosive, but may be removed with solvent or with Kester's 5768 Bio-Kleen® saponifier at 7-10% solution in de-ionized or soft water at temperatures of 120-140°F. |
| Thinner                  | 120   | 104   |



| Kester Part # | Description | Packaging      |
|---------------|-------------|----------------|
| 63-0000-0186  | 186 RMA     | 1 gallon       |
| 64-0000-0186  | 186 RMA     | 5 gallon       |
| 65-0000-0186  | 186 RMA     | 53 gallon drum |
| 63-0000-1544  | 1544 RA     | 1 gallon       |
| 64-0000-1544  | 1544 RA     | 5 gallon       |
| 65-0000-1544  | 1544 RA     | 53 gallon drum |

### Kester Flux-Pen®

The Kester Flux-Pen® is a unique tool for rework and touch-up soldering. It allows controlled application of flux, eliminating the mess from flux bottles. Flux-Pens are ideally suited for typical hand-soldering applications. The five available formulas are listed below.



| Kester Part # | Description                                      |
|---------------|--|
| 83-1020-0959  | 959T Low Solids No-Clean (20 pens/carton)        |
| 83-1000-0951  | 951 Low Solids No-Clean (20 pens/carton)         |
| 83-1018-0186  | 186-18 RMA No-Clean (20 pens/carton)             |
| 83-1000-0186  | 186 RMA No-Clean (20 pens/carton)                |
| 83-1097-2331  | 2331-ZX Neutral pH Water-Soluble (20pens/carton) |
| 53-0000-0225  | Flux-Pen® Replacement Tips (25 tips/bag)         |



### Kester Rework Fluxes

Kester's two rework formulas are specifically formulated for PCB rework operations. Kester's No-Clean RF-741 and Water Soluble RF-771 rework fluxes are all that's needed to handle any surface mount or through-hole rework applications. Available only in 30 gram syringe packaging.

### Kester Flux Thinners

Selecting the correct thinner for reducing solids or replacing evaporated solvent will result in maximum efficiency of the flux. To select a thinner, find the flux you are using from the chart below:

| Thinner | Use with Soldering Flux  |
|---------|--|
| 104     | 1544 Activated Rosin Flux  |
| 110     | 951 No-Clean Flux  |
| 120     | 186 Series Rosin Mildly Activated Flux   |
| 4662    | 959 No-Clean Flux<br>958 No-Clean Flux   |
| 4662    | 2331-ZX Organic Water-Soluble Flux<br>2235 Organic Water-Soluble Flux<br>2120 Organic Water-Soluble Flux |

### Kester Flux Test Kits

Control of the flux concentration in the flux becomes more critical when using a low solids flux. The accuracy problems encountered with automatic specific gravity controllers in conjunction with low-solids "no-clean" fluxes make the flux kit a better alternative for process control. Good control is necessary to assure a consistent amount of flux is applied to the circuit boards, consistent soldering results are obtained, and the least amount of flux residue remains after soldering. Kester PS-20 and PS-22 flux kits provide a simple method for process control.



| Kester Part # | Description          | Packaging   |
|---------------|----------------------|-------------|
| 57-0000-5025  | RF-741 No-Clean      | 30g syringe |
| 55-0000-0225  | RF-771 Water-Soluble | 30g syringe |

| Kester Part # | Description       | Packaging      |
|---------------|-------------------|----------------|
| 63-0000-0104  | 104 Flux Thinner  | 1 gallon       |
| 64-0000-0104  | 104 Flux Thinner  | 5 gallon       |
| 65-0000-0104  | 104 Flux Thinner  | 53 gallon drum |
| 63-0000-0110  | 110 Flux Thinner  | 1 gallon       |
| 64-0000-0110  | 110 Flux Thinner  | 5 gallon       |
| 65-0000-0110  | 110 Flux Thinner  | 53 gallon drum |
| 63-0000-0120  | 120 Flux Thinner  | 1 gallon       |
| 64-0000-0120  | 120 Flux Thinner  | 5 gallon       |
| 65-0000-0120  | 120 Flux Thinner  | 53 gallon drum |
| 63-0000-4662  | 4662 Flux Thinner | 1 gallon       |
| 64-0000-4662  | 4662 Flux Thinner | 5 gallon       |
| 65-0000-4662  | 4662 Flux Thinner | 53 gallon drum |
| 63-0000-4662  | 4662 Flux Thinner | 1 gallon       |
| 64-0000-4662  | 4662 Flux Thinner | 5 gallon       |
| 65-0000-4662  | 4662 Flux Thinner | 53 gallon drum |

| Flux Test Kit | Use With Soldering Flux   |
|---------------|---|
| PS-20         | 959 No-Clean Flux<br>959T No-Clean Flux<br>958 No-Clean Flux<br>979 VOC-Free No-Clean Flux<br>977 VOC-Free No-Clean Flux<br>971M VOC-Free No-Clean Flux |
| PS-22         | 951 No-Clean Flux<br>959 No-Clean Flux<br>979 VOC-Free No-Clean Flux<br>977 VOC-Free No-Clean Flux  |

| Kester Part # | Description         |
|---------------|---------------------|
| 53-0000-0200  | PS-20 Flux Test Kit |
| 53-0000-0220  | PS-22 Flux Test Kit |

## Kester Tacky Soldering Fluxes

Kester's TSFs are the industry standard for attachment of spheres to BGA and  $\mu$ BGA packages. The TSFs are also used in electronics assembly operations to solder flip chip components to PWB substrates. Kester's TSF portfolio includes a complete line of no clean and water-soluble products capable of being screen and stencil printed, dot dispensed, or thin film transfer processed.



### TSF-6592LV Lead-Free No-Clean (For Screen Printing/Stencil Printing/Pin Transfer)

TSF-6592LV is compatible with lead and lead-free solder alloys such as SnAg, SnCu, SnAgCu, SnAgBi, and can be reflowed in nitrogen or air with peak temperatures up to 270°C. The residues are clear, non-conductive, and non-corrosive.

| Kester Part # | Description         | Packaging      |
|---------------|---------------------|----------------|
| 300303        | TSF-6592LV No-Clean | 30g syringe    |
| 300304        | TSF-6592LV No-Clean | 100g jar       |
| 300305        | TSF-6592LV No-Clean | 150g cartridge |



### TSF-6852 Lead-Free Water Soluble (For Screen or Stencil Printing)

TSF-6852 is an aggressive synthetic flux with residues that are easily and completely cleaned with water temperatures ranging from 20-65°C yielding bright, shiny joints. TSF-6852 is a drop-in solution for solder alloys that will have a liquidus up to 300°C. TSF-6852 also has a 6 month shelf life when stored between 0-25°C (refrigerated or room temperature).

| Kester Part # | Description            | Packaging      |
|---------------|------------------------|----------------|
| 300203        | TSF-6852 Water-Soluble | 30g syringe    |
| 300204        | TSF-6852 Water-Soluble | 100g jar       |
| 300206        | TSF-6852 Water-Soluble | 165g cartridge |

### TSF-6502 No-Clean (Lower Viscosity for Screen Printing/Thin Film Deposition)

TSF-6502 is a no-clean tacky soldering flux formula designed for BGA/CSP/PGA screen printing, sphere/pin processing or for repair and reballing/repinning. It possesses a high activity level, allowing it to solder nickel surfaces. The robust wetting action of the TSF-6502 will allow OSP treated copper, as well as heavily oxidized copper, surfaces to exhibit good soldering properties, even after 2 or 3 thermal cycles. TSF-6502 is designed for a wide range of temperature and humid conditions.

| Kester Part # | Description       | Packaging      |
|---------------|-------------------|----------------|
| 300103        | TSF-6502 No-Clean | 30g syringe    |
| 300104        | TSF-6502 No-Clean | 100g jar       |
| 300105        | TSF-6502 No-Clean | 150g cartridge |



## Kester Solder Masks

### TC-530 Peelable De-Ammoniated Solder Mask

This high-temperature flexible solder masking compound can be applied to areas of printed circuit boards, which require masking during wave soldering processes. It can also be used on bare copper without causing oxidation. TC-530 is popular because of its low odor characteristics and can be used as a mold seal and conformal coat mask.

### TC-533 Peelable Solder Mask

This is a high-temperature flexible solder masking compound specially formulated of natural latex rubber. It is extremely versatile as it can be used as a temporary solder mask, conformal coating maskant, and a potting compound mold seal.

### TC-527 Hi-Temp Flexible Solder Mask

TC-527 is a high-temperature flexible solder masking compound formulated of natural latex rubber to protect delicate components. The latex is heat stable and tacky enough to be applied to those areas of circuit boards that require masking during a wave soldering process. Can be applied by automatic dip, brush or flow methods, direct from applicator bottle or by automated dispensing machines. It can easily be peeled away without leaving a residue.

### TC-564-1 Water Soluble Temporary Solder Mask

Kester's best selling temporary solder mask specially designed to effectively protect printed circuit boards that require masking during wave soldering operations. TC-564-1 can be used with any type of flux: rosin, organic or inorganic and can also be washed away in any appropriate cleaning equipment.

| Kester Part # | Description | Packaging |
|---------------|-------------|-----------|
| 53-4000-0530  | TC-530      | ½ pint    |
| 53-4001-0530  | TC-530      | 1 pint    |
| 53-4003-0530  | TC-530      | 1 gallon  |
| 53-4000-0533  | TC-533      | ½ pint    |
| 53-4001-0533  | TC-533      | 1 pint    |
| 53-4003-0533  | TC-533      | 1 gallon  |
| 53-4001-0564  | TC-564-1    | 1 pint    |
| 53-4003-0564  | TC-564-1    | 1 gallon  |
| 53-4000-0527  | TC-527      | ½ pint    |
| 53-4001-0527  | TC-527      | 1 pint    |
| 53-4003-0527  | TC-527      | 1 gallon  |



| Solderform® |                  | Minimum (mm)  | Maximum (mm) |
|-------------|------------------|---|--------------|
| Ribbons     | Width            | 0.50 ± 0.13   | 76.20 ± 0.75 |
|             | Thickness        | 0.0762 ± 0.03   | 3.18 ± 0.13  |
| Cut-Offs    | Width            | 0.50 ± 0.13   | 76.20 ± 0.75 |
|             | Thickness        | 0.0762 ± 0.03   | 3.18 ± 0.13  |
|             | Length           | 0.762 ± 0.25  | 500 ± 1.25   |
| Washers     | Outside Diameter | 0.889 ± 0.05  | 63.5 ± 0.13  |
|             | Inside Diameter  | 0.38 ± 0.05   | 58.42 ± 0.13 |
|             | Thickness        | 0.0762 ± 0.03   | 6.35 ± 0.25  |
| Discs       | Outside Diameter | 0.41 ± 0.05   | 65 ± 0.05    |
|             | Thickness        | 0.0762 ± 0.03   | 6.35 ± 0.25  |
| Pellets     | Diameter         | 0.254 ± 0.03  | 12.7 ± 0.13  |
|             | Length           | 0.50 ± 0.13   | 152.4 ± 0.76 |
| Stampings   | Description      | Stampings use special dies that are customer specific and require a customer's engineering drawing and specification. |              |

## Kester Solderforms®

Kester Solderforms® are stamped, extruded, compacted or formed pieces of pure soft solder alloys manufactured with strict known tolerances to customer specifications. Kester also creates other preforms such as collars, ribbon forms, rings, and wireforms.

Solderforms® may be produced as flux cored, solid metal, and with or without a flux coating.

Fluxes available are no-clean, water soluble, RMA, and RA chemistries. External dyes are also available for identification or to aid in determining the solder melt point.

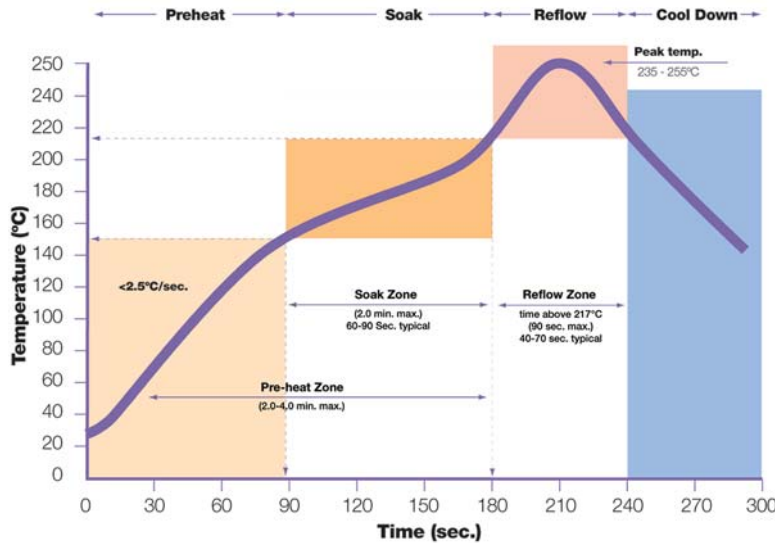




| Category | If trying to solder to this metal surface:  | Solder Paste and Tacky Soldering Fluxes   | Liquid Fluxes and Flux-Pen® Formulas                   | Cored Wire                                    |
|----------|---|---|--|---|
| 1        | Platinum, Gold, Copper, Tin, Solder, Silver   | All products can solder these metal surfaces.   | All products can solder these metal surfaces.          | All products can solder these metal surfaces. |
| 2        | Nickel, Cadmium, Brass, Lead, Bronze, Rhodium, Beryllium Copper, Palladium, Immersion Tin, Immersion Silver | EnviroMark™ 907, EnviroMark™ 828<br>Easy Profile® 256 & 256HA<br>HydroMark 531, TSF 6592LV, TSF 6800 Series | 186, 1544, 2120, 2331-ZX, 2235, 2224-25, 2222, 2220-VF | 44, 48, 331, OR-421                           |
| 3        | Nickel-Iron, Kovar  | Base metal must be plated.  | 2222, 2220-VF  | 48, 331, OR-421                               |
| 4        | Zinc, Mild Steel, Chromium, Inconel, Monel, Stainless Steel   | Base metal must be plated.  | Call Kester's Customer Service Department              | 48  |

EXAMPLE 1: When soldering Beryllium Copper to Tin, you could use any of the products listed in Category 2, 3, or 4 since Beryllium Copper requires more active products than Tin.  
EXAMPLE 2: If you were soldering Solder coated leads to a Copper surface, you could use any of Kester's products (Category 1, 2, 3, or 4).

### STANDARD SOLDER PASTE REFLOW PROFILE FOR KESTER PASTE CONTAINING ALLOYS: Sn96.5Ag3.0Cu0.5 or Sn96.5Ag3.5



#### Stage 1- Preheat Zone (Rapid Heating Stage)

The purpose of this zone is to quickly bring the assembly up to a temperature where solder paste can become highly chemically active.

#### Stage 2- Soak Zone (Temperature Equalization Stage)

The purpose of this stage is for the thermal mass of the assembly to reach a uniform temperature plateau so that there is a very small differential between the hottest and coldest soldering locations on the assembly.

#### Stage 3- Reflow Zone (Rapid Heating and Cooling)

The purpose of this stage is to rapidly heat the assembly above the melting (liquidus) temperature of the solder and subsequently cool the assembly down quickly to solidify the solder. Wetting of solder onto substrates occurs in the reflow zone.

| To Change            | To           | Multiply By:              |
|----------------------|--------------|---------------------------|
| Gallons (US)         | Liters       | 3.7853                    |
| Quarts (liquid)      | Liters       | 0.9463                    |
| Pounds (avdp.)       | Grams        | 453.592                   |
| Pounds (avdp.)       | Kilograms    | 0.4536                    |
| Pounds (avdp.)       | Ounce (troy) | 14.5833                   |
| Ounces (avdp.)       | Grams        | 28.3495                   |
| Celsius = 5/9 (F-32) |              | Fahrenheit = 9/5 (C) + 32 |

|   |   |  |
|---|---|--|
| Tin can be added to solder to replace tin lost by oxidation. The pot temperature should be at least 460°F. Tin bars should be added slowly and the solder should be mixed well. |   |  |
| $T = \frac{W(A - B)}{(100 - A)}$  | <b>EXAMPLE</b><br>$\frac{900(63 - 61.6)}{(100 - 63)} = \frac{1260}{37} = 34 \text{ lbs. of Tin to add}$ |  |
| T = Pounds of Tin to add  | W = Pounds of solder on pot   |  |
| A = Percentage of Tin desired   | B = Percentage of Tin in pot  |  |

Please visit [www.kester.com](http://www.kester.com) and click on Lead-Free Solutions™ for a worksheet to balance Lead-Free alloy systems.

**GLOBAL  
HEADQUARTERS**

**USA**

800 West Thorndale Avenue  
Itasca, IL 60143-1341

Phone: (+1) 630-616-4000  
Fax: (+1) 630-616-4044  
Email: [customerservice@kester.com](mailto:customerservice@kester.com)

Customer Service  
Phone: 800-2-KESTER  
Fax: (+1) 630-616-4044

**EUROPEAN  
HEADQUARTERS**

**Germany**

Zum Plom 5  
08541 Neuensalz  
Germany

Phone: (+49) 3741 4233-0  
Fax: (+49) 3741 4233-111  
Email: [customerservice@kester-eu.com](mailto:customerservice@kester-eu.com)

**ASIA-PACIFIC  
HEADQUARTERS**

**Singapore**

500 Chai Chee Lane  
Singapore 4690224

Phone: (+65) 6 449-1133  
Fax: (+65) 6 242-9036  
Email: [customerservice@kester.com.sg](mailto:customerservice@kester.com.sg)

**Mexico**

Carretera Internacional Km. 6.5  
Esquina Boulevard del Castillo  
Parque Industrial  
Nogales, Son. 84000  
Mexico

*For customer service call the  
Global Headquarters facility*

**Taiwan**

4th Floor, No. 128  
Lane 235  
Pao-Chiao Road  
Hsien-Tien City  
Taipei Hsien, Taiwan

Tel: (+886) 2-8912-1066  
Fax: (+886) 2-8912-1072

Email: [twsales@kester.com.tw](mailto:twsales@kester.com.tw)

**Japan**

20-11 YokoKawa 2-Chome,  
Sumida-ku  
Tokyo 130, Japan

Tel: (+81) 3-3624-5351  
Fax (+81) 3-3626-6253

Email: [jpsales@kester.com.sg](mailto:jpsales@kester.com.sg)

**JOHOR BAHRU, MALAYSIA**

PLO 113, Fasa 3  
Kawasan Perindustria Senai  
81400 Senai, Johor, Malaysia

Tel: (+60) 7-598-4113  
Fax: (+60) 7-598-3103

**Kester Vision Statement**

**Smart Products.  
Great Service.  
No Boundaries.**

Kester *will* be the leading global supplier of high performance interconnecting materials and related services for the electronic assembly and component assembly markets.

To achieve this we will focus on customer-driven innovation and exceptional service worldwide.

