PRODUCT DATA SHEET

CW-807

Halogen-Free, No-Clean Flux-Cored Wire

Introduction

CW-807 is Indium Corporation's best-selling flux-cored wire. It is compatible with all Indium Corporation's no-clean solder pastes, wave fluxes, and common soft solder alloys. It solders well while still meeting the most recent requirements of J-STD-004B type ROL0. **CW-807** contains less than 500ppm total halogens, so it is considered halogen-free by both J-STD-004B and JEITA ET-7304. **CW-807** passes the more stringent Surface Insulation Resistance (SIR) and Electromigration (ECM) requirements of J-STD-004 revision B; therefore, the no-clean residue is electronically safe for virtually all applications. When properly configured, cored wire with **CW-807** yields superior results in automated soldering operations, including laser soldering.

Features

- **Halogen-free per J-STD-004B**
  To be halogen-free per J-STD-004B, the formula must contain less than 500ppm of any kind of halogen, ionic or nonionically bonded chlorine, bromine, or fluorine. This is new to J-STD-004B since fluxes that conform to the original J-STD-004 or J-STD-004A may still contain halogens that only disassociate at soldering temperatures, but leave a residue that contains ionic halogen.
- **Light-colored, low-smoking, rosin-containing flux**
  Rosin, modified rosins, and resins contribute to enhanced heat stability and reliability; however, in some cases, rosins and resins may interfere with probe-testability.
- **Tested compatibility with Hot Air Solder Leveled (HASL), Immersion Silver, Electroless Nickel Immersion Gold (ENIG), and Organically Solder Preserved (OSP) Copper surfaces.**
- **Tested for use with all common lead-free, low- or no-silver lead-free, tin-lead alloys,** and many others.

Physical Properties

In the core, **CW-807** has a clear, colorless appearance. Upon soldering, **CW-807** smokes very little and has a mild, sweet odor. **CW-807** contains no added volatile solvents or water absorbent materials to limit spattering. The flux residue is clear and slightly shiny. It typically blends in well with epoxy glass circuit boards and does not detract from the board's appearance.

IPC J-STD-004B Classification	ROL0
Acid Value (mgKOH/gram of flux)	270
Rosin-Containing	Yes
Halide Content %	<0.05
Smoke	Minimal
Odor	Mild, sweet
Color	Clear, light
IPC J-STD-006 Compliance	Indium Corporation impurity levels conform to or exceed IPC J-STD-006
Compatible Alloys	All common and specialty alloys†
Copper Mirror IPC J-STD-004B	See Copper Mirror section
Copper Corrosion IPC J-STD-004B	See Copper Corrosion section
SIR J-STD-004B*	Pass
Electromigration J-STD-004B*	Pass

† Common Alloys: SAC305; SACm®0510; Sn995; SAC105; SAC0307; SAC387; 96.5Sn/3.5Ag; 95Sn/5Sb; Indalloy®227; Indalloy®254; 63Sn/37Pb; 60Sn/40Pb; 93.5Pb/5Sb/1.5Ag; 43Sn/43Pb/14B, 60Sn/39Pb/1Cu and all similar alloys.

** Data available upon request.*

From One Engineer To Another®

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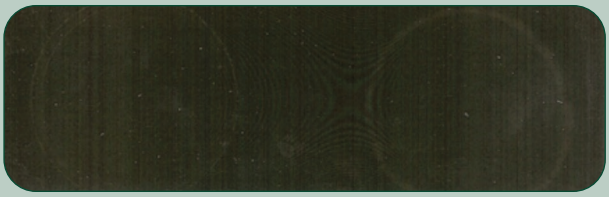
Test Data

Copper Mirror

The J-STD-004B copper mirror test is performed per IPC-TM-650 method 2.3.32. To be classified as an "L" type flux, there should be no complete removal of the mirror surface. **CW-807** shows no complete removal of the copper mirror and, therefore, is classified as an ROL0.

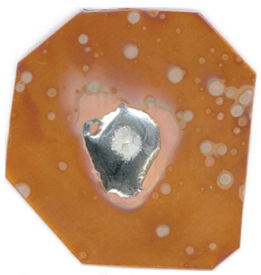


CW-807 5% Solution (IPA) Standard Rosin Front Side

CW-807 5% Solution (IPA) Standard Rosin Back Side

Copper Corrosion

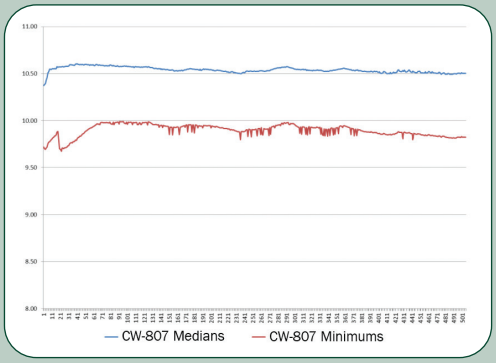
Copper corrosion is tested per IPC-TM-650 method 2.6.15. This test gives an indication of any visible reactions that take place between the flux residue after soldering and copper surface finishes. In particular, green copper corrosion (formed as copper-chloride) should not be seen.



CW-807 SAC305 0 hours

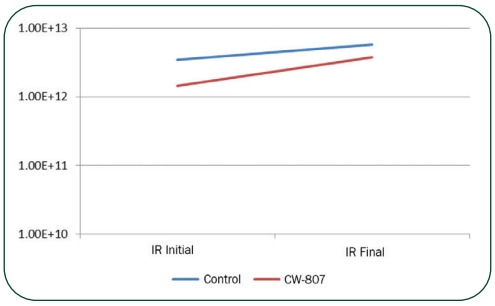
CW-807 SAC305 240 hours

Surface Insulation Resistance (SIR)



The Surface Insulation Resistance test is performed per IPC-TM-650 Method 2.6.3.7, using boards prepared per IPC-TM-650 method 2.6.3.3. All boards soldered with **CW-807** pass the requirements of having exhibited no dendritic growth, no visible corrosion, and a minimum insulation resistance of 100 megaohms (1 x 10^8). The values shown on the adjacent graph show the number of Ohms times ten to the power of the vertical axis. The IPC-TM-650 SIR is a 7-day test and gives a general idea of the effect of the flux residue on the electrical properties of the surface of the circuit board.

Electromigration (ECM)



The electromigration test is performed to IPC-TM-650 method 2.6.14.1 with boards prepared using IPC-TM-650 method 2.6.3.3. The test conditions for this test are 496 hours at 65°C ± 2°C and 88.5% ± 3.5% RH. To pass this test, there should be no visible corrosion and no dendritic growth that decreases line spacing by more than 20%. In addition, the insulation resistance should not drop more than on order of magnitude after the first 96-hour stabilization period when a bias voltage is applied. **CW-807** passes all of the ECM requirements.

	Control	CW-807
IR Initial	3.43E+12	1.44E+12
IR Final	5.73E+12	3.75E+12

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Performance Test (Spread Test)

The spread test is not a pass/fail test, but rather is one that measures the relative wetting strength and surface tension characteristics of fluxes. The spread test is performed per IPC TM-650 method 2.6.46A. A 10% solution of flux solids is created. A known volume is then applied along with a known volume of 60Sn/40Pb solder to a brass coupon and reflowed at 508°F. After reflow, the area of solder is measured. The test is performed three times and an average is determined.

Test	Area
1	61.4574 mm^2
2	70.9803 mm^2
3	68.4278 mm^2
x-bar	66.9552 mm^2

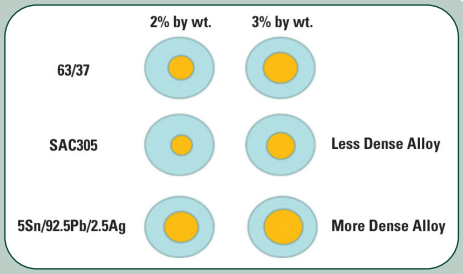
Application Recommendations

Soldering Iron Temperature		
Alloy Family	**Alloy Melting Range**	**Soldering Iron Temperature**
Tin-Lead	170–190°C	340–370°C
Lead-Free	210–250°C	370–400°C
>85% High Lead	280–320°C	400–425°C

Choosing the correct soldering tip temperature is a balancing act between optimizing the speed of heating up the solder joint, melting the solder, charring of the flux, and degradation of the soldering iron tip. At lower temperatures, soldering occurs more slowly, but there is less of a chance of damaging circuit boards, charring fluxes, and it will extend the use of the soldering iron tip. The recommendations listed are for a middle path between performance and safety.

Cored Wire Flux Percent

Indium Corporation is capable of coring wire in a variety of flux percents. Flux cores are typically determined by weight percent of flux compared to weight percent of solder. As can be seen by the graphic to the right, 1% more flux by weight adds considerably more flux by volume. The trade-off: higher flux contents make soldering faster, easier, and reduce defects, but increase the amount of residue that can be seen cosmetically and that may interfere electrically. The most common nominal flux contents are 2% by weight and 3% by weight.



Cored Wire for Robotic and Laser Soldering

Indium Corporation specializes in making fine diameter wire, typically between 0.008" (0.2mm) and 0.015" (0.375mm) diameter for robotic and laser soldering. To make robotic and laser soldering effective and eliminate peaking and bridging with a mild, halogen-free cored wire flux, such as the **CW-807**, higher than normal flux content must be used. The standard range of flux content for lead-free (SAC305 and similar alloys) robotic or laser soldering is 4.3–4.7% by weight.

Shelf Life

Always store cored wire in a cool, dry environment. The main causes of degraded cored wire reflow performance are the buildup of a thick oxide layer on the surface of the wire, caused by prolonged exposure to higher than normal temperature and humidity conditions, or the buildup of lead carbonate on high-lead (>85%) alloy cored wire shipped or stored under very high humidity conditions.

	Warranted	Practical*
Tin-Lead Alloys	10 years from DOM	Indefinite
Lead-Free Alloys	10 years from DOM	Indefinite
>85% High-Lead Alloys	2 years from DOM	Indefinite

*When stored at less than 40°C and less than 80% RH

Residue Removal Recommendations

All of Indium Corporation's no-clean fluxes, including this formula, are designed to be electrically safe under normal consumer electronic and telecommunication operating conditions. Unless otherwise specified, electrically safe means that the post soldering residues pass J-STD-004B SIR and ECM testing. However, it is understood that some customers desire to remove residues for cosmetic reasons, improved in-circuit testing, improved compatibility with specific conformal coatings, or where the operating parameters of the circuit board may be in extreme conditions for a prolonged period.

If the removal of no-clean flux residues is desired, most commercially available cleaning agents will be effective. Indium Corporation's Technical Support Engineers work closely with cleaning agent vendors and have confirmed flux residue removal capabilities from several vendors using their recommended products and parameters. It is unlikely that users of Indium Corporation's no-clean products will need to change their current residue removal materials and parameters from those currently used. However, when establishing a new process or desiring confirmation of process recommendations, please contact Indium Corporation's Technical Support Staff for assistance.

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Indium Corporation Compatible Products

- **Solder Paste**: Indium8.9HF
- **Wave Flux**: WF-9945 (rosin-containing) or WF-9955 (low or no rosin)
- **Flux Pen**: FP-500 (rosin-containing)

Indium Corporation's cored wire has been designed to be fully compatible with our solder paste, wave fluxes, and rework fluxes, and is also expected to be compatible with many of our Competitive Products. For example, **CW-807** cored wire flux is not only compatible with Indium8.9HF Solder Paste, but also with our 5.2LS, 8.9 series, 92 series, and 10 series products. Indium Corporation determines compatibility primarily by matching flux chemistry. However, a select number of wave, reflow, and rework product combinations have been thoroughly tested to ensure that the combined flux residues meet the electrical and reliability requirements of IPC J-STD-004B. Please contact Indium Corporation Technical Support if you are interested in knowing about these fully-tested combinations.

Health, Safety, Environmental, and Shipping

REACH

No substances of very high concern (SVHC) are used in this product.

Hazard Labels

For all **CW-807** Cored Wire:

For Lead-Containing **CW-807** Cored Wire:

Shipping Classification

Transport in accordance with applicable regulations and requirements. Not regulated under US DOT (United States Department of Transportation).

Not hazardous under shipping regulations. UN–none

Additional Information

Commonly Available Diameters and Packaging

Diameter	Spool Weight	63/37 Length	SAC305 Length
0.006" ± 0.002"* (Select Pb-Free Only)	1/4lb	2,142ft	2,445ft
0.008" ± 0.002"* (Select Pb-Free Only)	1/4lb	1,366ft	1,560ft
0.010" ± 0.002"	1/4lb	966ft	1,097ft
0.015" ± 0.002"	1/4lb	429ft	487ft
0.020" ± 0.002"	1lb	966ft	1,097ft
0.025" ± 0.002"	1lb	618ft	702ft
0.032" ± 0.002"	1lb	377ft	428ft
0.040" ± 0.002"	1lb	242ft	274ft
0.062" ± 0.002"	1lb	101ft	114ft
0.15mm ± 0.05mm* (Select Pb-Free Only)	113g	653m	745m
0.20mm ± 0.05mm* (Select Pb-Free Only)	113g	416m	476m
0.25mm ± 0.05mm	113g	294m	334m
0.38mm ± 0.05mm	113g	131m	148m
0.51mm ± 0.05mm	454g	294m	334m
0.64mm ± 0.05mm	454g	188m	214m
0.81mm ± 0.05mm	454g	115m	131m
1.02mm ± 0.05mm	454g	74m	84m
1.57mm ± 0.05mm	454g	31m	35m

* This size can only be manufactured using select Pb-free alloys.

All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified.
Indium Corporation is an ISO 9001:2015 registered company.

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