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Product Data Sheet

LED TACFlux® 007

Features

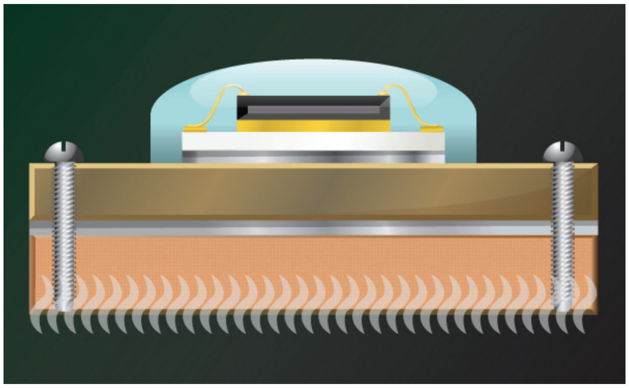
- Tolerates a wide range of reflow temperatures
- Suitable for use with high tin-containing and gold-tin solder alloys
- Low voiding die-attach soldering to sub-mount
- Minimizes skewing/die-shifting during reflow
- Cleans easily with aqueous-based solutions
- Airless (bubble-free) packaging

Introduction

LED TACFlux® 007 is the leading die-attach flux for the light-emitting diode (LED) industry. It was specifically designed for die-to-sub-mount applications with sputtered film or solder preform alloys, with melting points that range from from tin-silver (Sn/Ag), SAC (Sn/Ag/Cu) and pure tin (Sn) up to gold-tin (Au/Sn) eutectic, and is approved by leading LED manufacturers, such as Cree, for this purpose(1). It may be applied using various application techniques, holds the die in place during reflow, and is easily cleaned to give high wirebond pull-strengths. The use of small quantities is recommended for best results.

Properties

Properties	Value	Test Method
Flux classification	ROL1	J-STD-004
Typical viscosity	365kcps (stirred) 615kcps (unstirred)	IPC TM-650 2.4.34.4
SIR before cleaning	>1E9 Ohms at 96 and 168 hours	IPC TM-650 2.6.3.3
Post-reflow residue	~ 47%	TGA - result found varies with reflow profile
Typical tack strength	290g	IPC TM-650 2.4.44
Typical acid value	95mg KOH	Titration
Shelf-life	0–30°C for 1 year	Viscosity change/microscopic examination
Color	Light amber; clear gel	Visual inspection



Application

LED TACFlux® 007 is suitable for dispense, printing (both stencil and screen), and dipping/pin-transfer. Using minimal quantities usually gives the best results; i.e., minimal voiding, little or no die float or skew, excellent solderability, and easy cleaning. The volume of flux on the die can be optimized by changing process parameters appropriate to the flux. A UV-fluorescent version of the flux, **TACFlux® 007-UV**, is also available to help with process set-up and optimization.

Key variables for these flux application processes are:

Application Method	Control Parameters
Dispense	Dispense pressure, dispense time, needle height above substrate, needle gauge, and needle withdrawal speed
Printing	Flux kneading time, time between prints, flux deposit size, temperature, screen or stencil design, and squeegee speed
Dipping	Flux kneading time, time between dips, chip withdrawal speed, dip depth, component size, temperature, doctor blade speed, and rotary or dip tray equipment
Pin-transfer	Flux kneading time, time between dips, pin withdrawal speed, dip depth, pin design and size, temperature, doctor blade speed, substrate pad size and design, and rotary or dip tray equipment

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(1) Cree EZbright™ Brochure: http://www.cree.com/products/pdf/CPR3AN04.pdf

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Cleaning

LED TACFlux® 007 may be removed using solvents, such as isopropyl alcohol, or standard semi-aqueous cleaning solvents. Indium Corporation's Technical Support Engineers can recommend appropriate cleaning materials that are suitable for the application.

NOTE: LED die can be sensitive to the cleaning chemicals used to remove flux. The die supplier's instructions on cleaning chemicals and cleaning procedures must be followed and should take precedence over the above guidelines.

Packaging

LED TACFlux® 007 is available in both 10cc and 30cc syringes. Airless packaging is available when ordered under the IPN: FLUXOT-84106-DISP.

Storage

For maximum shelf life, **LED TACFlux® 007** syringes and cartridges should be stored tip down. Storage temperatures should never exceed 30°C. After removing from cold storage, **LED TACFlux® 007** should be allowed to stand for at least 4 hours at room temperature before using.

Technical Support

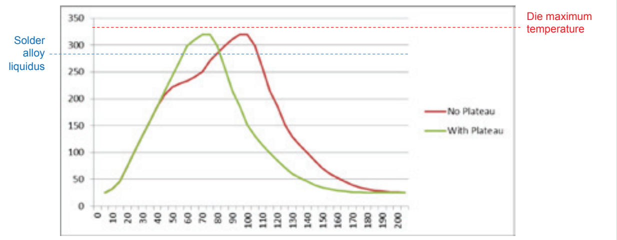
Indium Corporation sets the industry standard in providing rapid response, on-site technical support for our customers worldwide. Indium's team of Technical Support Engineers can provide expertise in all aspects of Materials Science and Semiconductor Packaging process applications.

Material Safety Data Sheets

The MSDS for this product can be found online at http://www.indium.com/techlibrary/msds.php

Reflow

Recommended Profile:



The diagram provides two examples of acceptable reflow profiles for use with 80Au/20Sn solder alloy and a maximum allowed die temperature of 325°C. General reflow guidelines for other solders are below.

NOTE: LED die can be very sensitive to both temperature exposure and the use of hydrogen or other reducing gases in the reflow atmosphere. The die supplier's instructions on reflow tolerance, especially the maximum allowed temperatures and allowable gases, must be followed and should take precedence.

Reflow Atmosphere: A nitrogen (<100ppm oxygen) atmosphere is recommended.

Ramp Rate: A ramp rate of up +5°C/second is recommended as a maximum

Plateau: A plateau of 20-30 seconds at around 50°-60°C below the liquidus of the solder, while not essential, will help to remove volatile flux ingredients and reduce voiding in the final joint.

Peak Temperature: The peak temperature during reflow must not exceed the LED die manufacturer's maximum allowed rating, and ideally, should be at least 20°C above the liquidus of the solder alloy. Standard alloys used in LED-attach are listed in the table below.

Cooling: A cooling rate of up to 10°C per second can typically be tolerated by LED die.

Indalloy Number	Liquidus		Solidus	Elemental Composition (% by Mass)					
	°C		°C	%w/w	Element	%w/w	Element	%w/w	Element
241	220		217	95.5	Sn	3.8	Ag	0.7	Cu
256	220		217	96.5	Sn	3.0	Ag	0.5	Cu
121	221	E	221	96.5	Sn	3.5	Ag		
128	232	MP		100.0	Sn		å		
259	257		243	90.0	Sn	10.0	Sb		
182	280	E	280	80.0	Au	20.0	Sn		

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