NF260 Air-Reflowable and Reworkable Pb-Free No-Flow Underfill

Features

- Reworkable
- Air-reflowable
- Enables large die mounting
- Enhances CSP and BGA reliability
- Reduces costs by combining soldering and underfilling in one heating pass
- Increases yield – no die-drifting, excellent solder wetting
- Compatible with SMT production line and Pb-Free processes

Introduction

NF260 is a No-Flow Underfill, designed for Chip Scale Package (CSP) and BGA or Flip-Chip assemblies using a single reflow process. It offers both a fluxing and underfilling capability for the chip while providing increased reliability and environmental protection.

Designed for the Pb-Free soldering process, **NF260** is fully compatible with the SMT process and offers a wide process window for solder reflow and underfill curing. The underfill curing is completed in one reflow pass and no post cure is required. **NF260** not only reduces costs over capillary flow underfills, but also achieves higher yields.

Manufacturability

NF260 integrates seamlessly with existing SMT processes, which helps to keep the cost/performance ratio in balance.

- Dispense – Virtually any positive displacement or auger type system is capable of dispensing **NF260**.
- Placement – **NF260** is designed to accommodate component placement with existing automate equipment. **NF260** eliminates floating and has sufficient tack to assure reliability.
- Reflow - **NF260** is designed to be processed in typical Pb-Free profiles in an air environment – no new cure equipment is needed.
- Repair – **NF260** is designed to be reworkable in typical SMT rework systems.
- Cleaning – **NF260** eliminates the need for residue cleaning prior to application of an underfill and is a no-clean product, so no post-cure cleaning is necessary.

Reliability

NF260 helps manufacturers make more reliable assemblies.

- Solderability – **NF260** has a robust flux package that promotes excellent wetting, even in oxidized boards and solder bumps.
- Adhesion – **NF260** provides excellent adhesion to a variety of plastic, ceramic and silicon packages with no voiding and without pre-baking components.
- Drop Test - **NF260** has demonstrated durability in thermal cycling (>2500 cycles with no failures) and thermal shock testing. *After enduring over 450 edge-weighted drop tests to force the most difficult impact orientation, **NF260** experienced no failures (typical soldered connections fail after fewer than 10 drops).*

Process Recommendations

NF260 is compatible with a variety of passivations, interconnect substrates, and substrate finishes including copper-nickel-gold and Organic Solder Preservative (OSP). Fig.1 shows the application process. No preheat of substrate is required when applying the material.

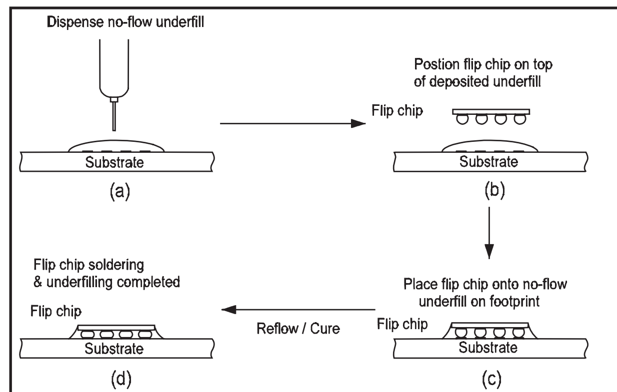

Fig. 1

Rework Process

Heat the assembled components to 260°C and remove the underfill fillet first, using tongue pad; then remove the components and underfill. Clean using a solvent, such as IPA or MEK, using a small brush.

Storage and Handling

NF260 has a shelf life of 6 months when stored at -40°C, and a shelf life of one month when stored at 0 to -10°C. Allow material to reach room temperature before use.

Cleaning of Uncured NF260

The uncured **NF260** in dispense or printing devices can be cleaned with methyl ethyl ketone easily, although isopropyl alcohol can also be used for cleaning.

OVER→

S O L D E R

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Packaging
NF260 is generally available in 10cc or 30cc syringes. However, other packages can be provided according to user's requirements.

Safety
NF260 is a benign, non-toxic material. Under a typical reflow profile, a small amount of volatiles are generated. General hygiene practice is recommended in handling **NF260** and the fumes generated.

Technical Support
Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Material Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder properties, alloy compatibility and selection of solder preforms, wire, ribbon and paste. Indium Corporation's Technical Support engineers provide Rapid Response to all technical inquiries.

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

Reflow

Recommended Profile:

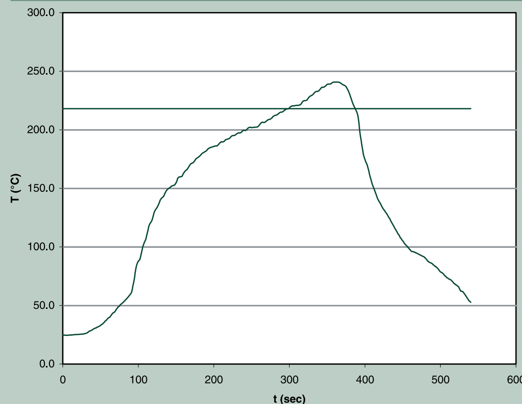

Fig. 2

NF260 can be widely used in infrared, convection, conduction or vapor phase soldering systems. Protective nitrogen atmosphere is recommended for Flip-Chip attachment in order to achieve reliable soldering joints. This is particularly true for reflow profiles with a long soaking time. Although most reflow profiles commonly used for Sn/Ag or Sn/Ag/Cu can be used for **NF260** for soldering/curing, a recommended profile is shown in Fig. 2. The preferred time from ambient to peak temperature is four minutes with a peak temperature from 230°C to 260°C.

Physical Properties	Value	Test Method
Color	Amber liquid	Visual
Viscosity@25°C, Brookfield, Kcps (typical)	19	Model HB DVII$^+$-CP (0.5 rpm)
Shelf Life@-40°C, months	6	
Pot Life@25°C, hours	24	
Hardness, Shore D	>90	(One reflow pass)
Glass Transition Temperature (Tg), °C (typical)	96	TMA
Coefficient of Linear Thermal Expansion		
Alpha 1, ppm/°C (typical)	65	TMA
Alpha 2, ppm/°C (typical)	275	TMA
Lap Shear Strength (psi) (typical)	2800	
Extractable Ionic Content		MIL-STD-883, 5011.4
Chloride ($C1^-$), ppm	<5	
Nitrate (NO_3^-), ppm	<5	
Sulfate (SO_4^-), ppm	<5	
Sodium (Na^+), ppm	<5	
Ammonium (NH_4^+), ppm	<5	
Process Yield (typical)	100%	
Underfill Voids (typical)	None	CSAM
Delamination (96hs pressure cooking)	No	JEDEC level-3 preconditioning and accelerated moisture testing

This product data sheet is provided for general information only. It is not intended, and shall not be construed, to warrant or guarantee the performance of the products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices.

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