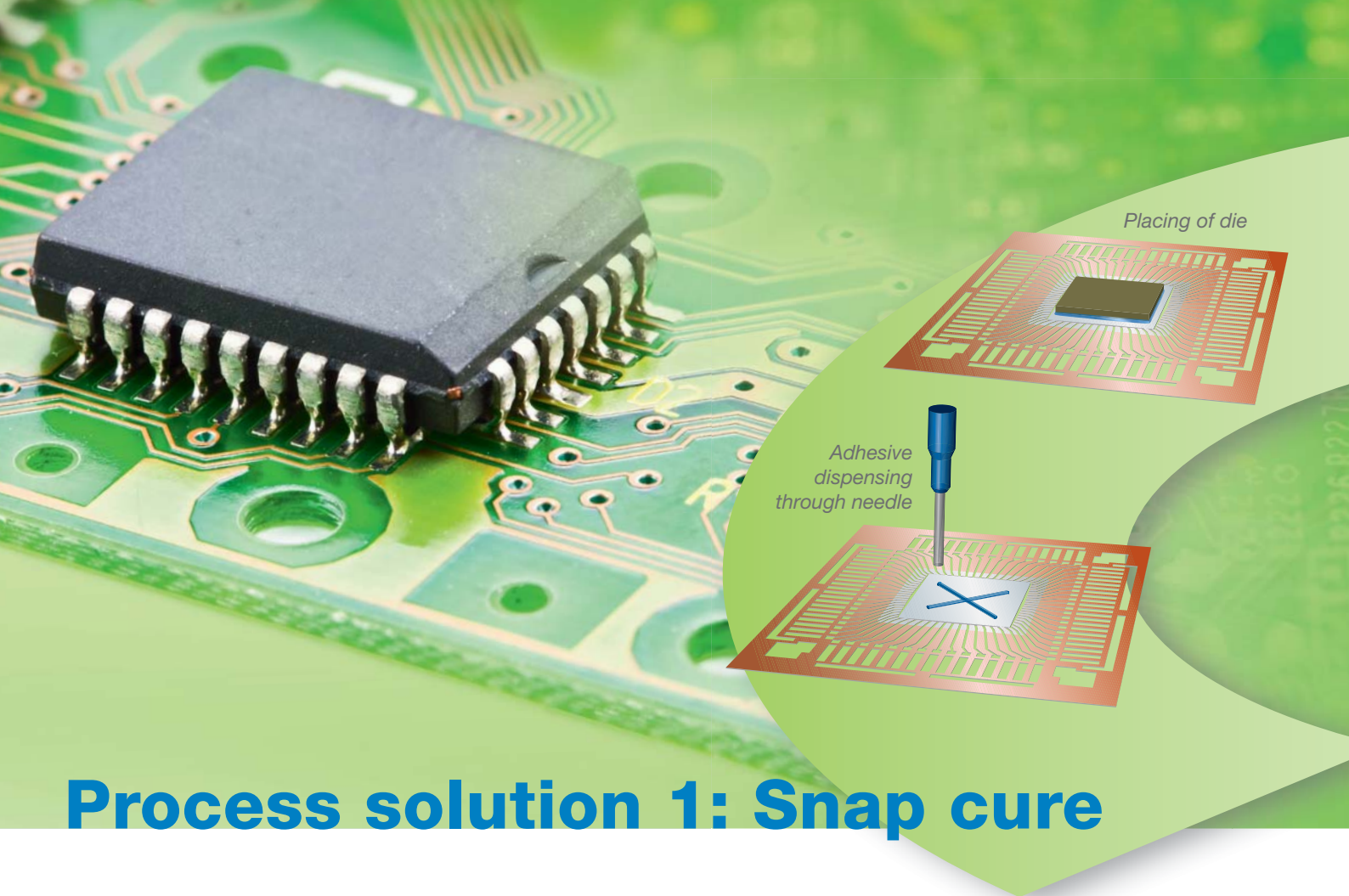


**Process Solutions
for Die Attach**

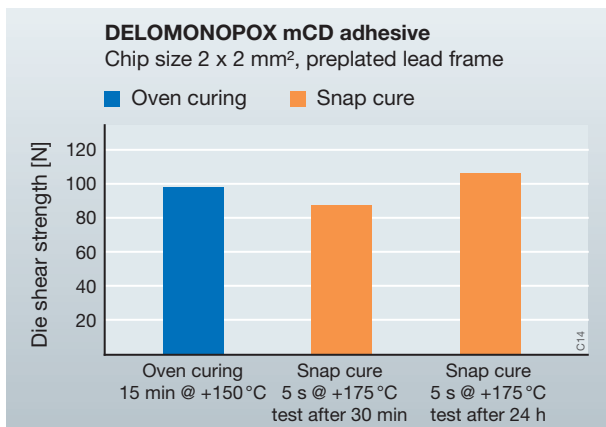


Process solution 1: Snap cure

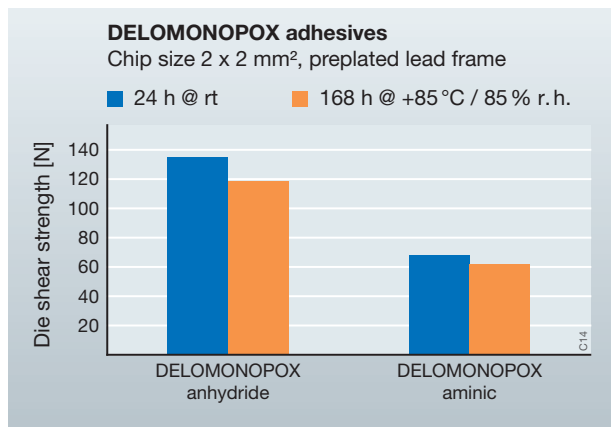
High output: Large quantities make all the difference

Adhesives that are specifically optimized for the snap cure process shorten cycle times and therefore allow manufacturers to cut down on costs. Certain applications with high output require fast-curing and high-performance adhesives: this is made possible by the special snap cure process, where adhesives completely cure in seconds. For curing, either a tunnel oven or substrate heating could be used. In addition, the adhesives have an impressive property profile. They give the strongest adhesion, equalize tensions and cure quickly.

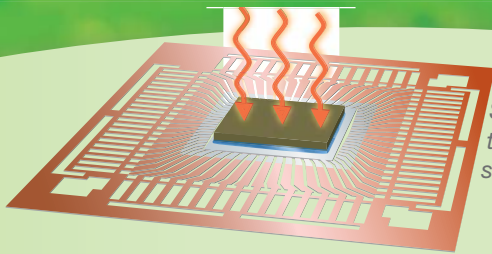
Properties	Advantages
Fast curing	✓ High output
Curing at low temperatures	✓ No tensions, stress on temperature-sensitive components is significantly reduced
Flexible adhesives reduce stress on the components during packaging	✓ Increased yield



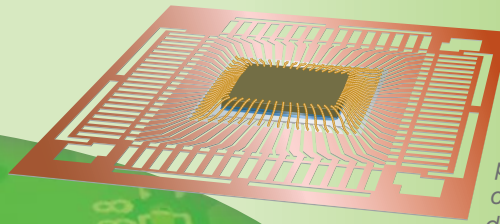
Snap cure: as good as oven curing – but faster



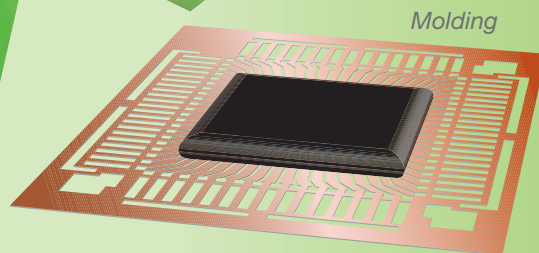
Anhydride and amine epoxies withstand humidity



Snap cure process in tunnel oven or by substrate heating



For very fast processes, final curing by heat during wire bonding is possible



Molding

DELO's die attach adhesives for the snap cure process

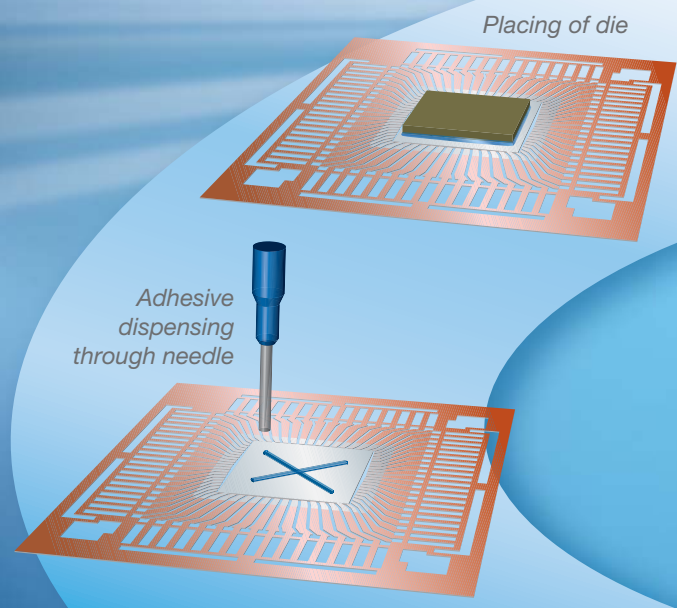
Electrical conductivity	Isotropic (ICA)				Non-conductive (NCA)			
Product group	DELO DUAL-BOND	DELOMONOPOX			DELOMONOPOX			
Product code	IC343	DA375	DA772	DA581	DA255	DA376	DA358	DA587
Chemical basis	mCD dual-curing	mCD	Anhydride	Epoxy cationic	Epoxy aminic	mCD	mCD	Epoxy cationic
Curing in convection oven	2 min @ +175°C 30 min @ +80°C	2 min @ +175°C 30 min @ +80°C	10 min @ +175°C	2 min @ +150°C	2 min @ +150°C	5 min @ +100°C	10 min @ +100°C	2 min @ +150°C 5 min @ +130°C
Flexibility	+++	+++	+	++	+	+++*	+++	++
Reliability (humidity + reflow)	++	++	+++	++	+++	++	++	++
Processing time @ room temperature [h]	72	48	48	72	72	48	72	120

+++ high ++ medium + low * Very flexible adhesive for low-stress applications (such as MEMS)

IC = Isotropic Conductive DA = Die Attach mCD = modified polyCarbamin acid Derivates



All adhesives listed are halogen-free acc. to IEC 61249-2-21



Process solution 2: Dual curing

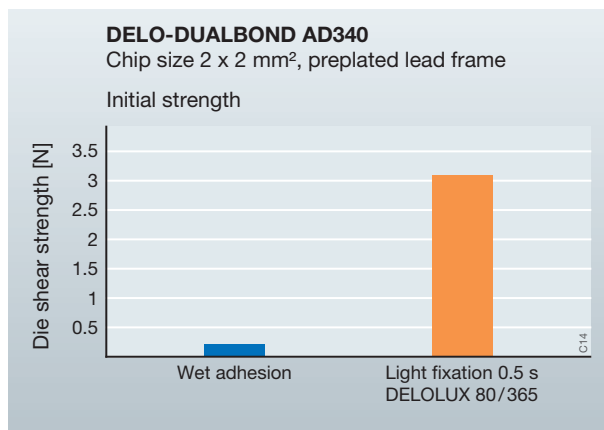
A strong duo: Light and heat ensures the die is kept in place

In microelectronics, components often have to be placed on a material with maximum accuracy. It is important that shift and tilt are prevented in subsequent process steps when the components are moved. For this requirement profile, DELO supplies very fast, dual-curing adhesives which allow for preliminary fixation by light and final curing by heat.



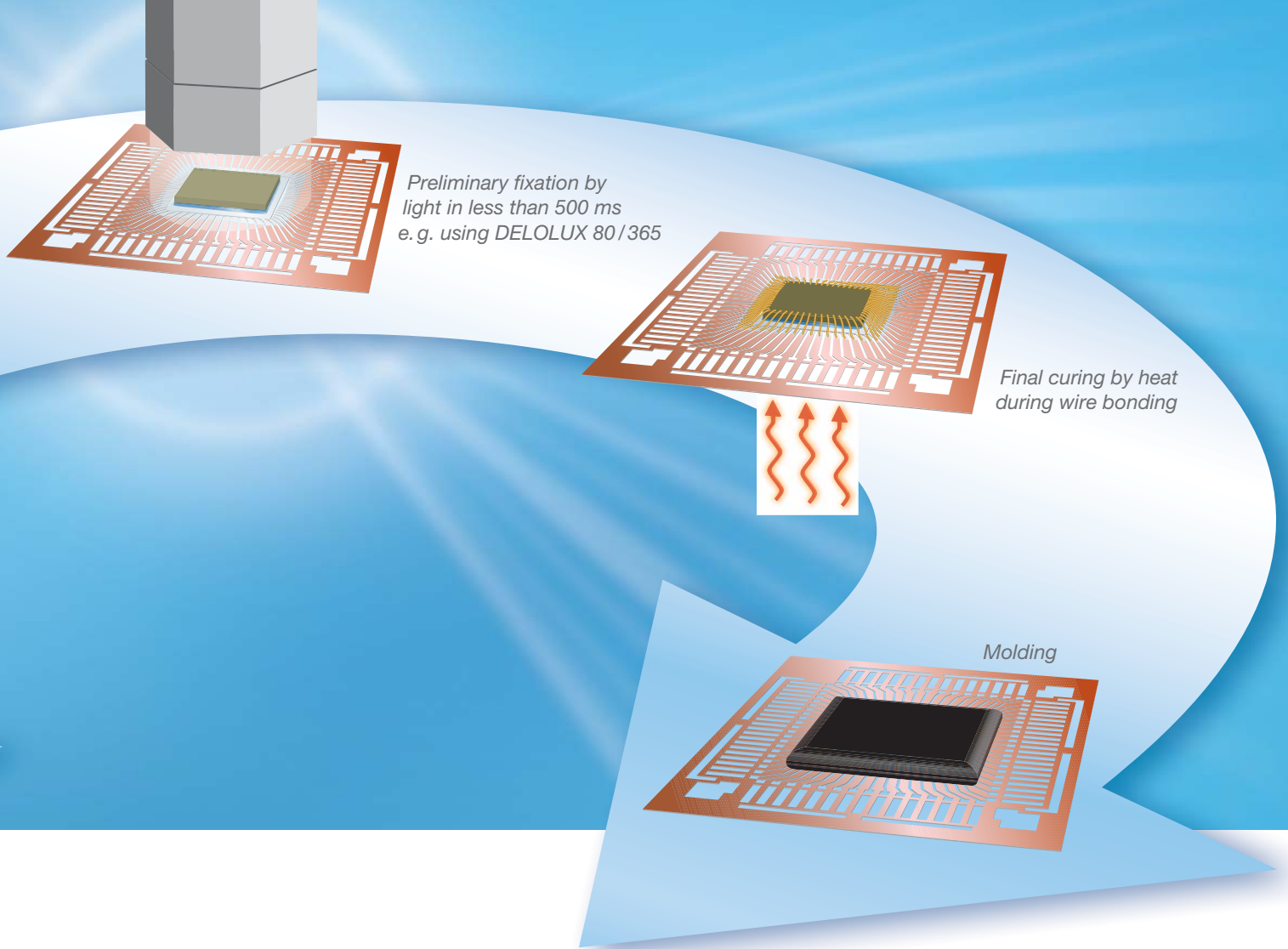
Options for adhesive modification:

- Adjusted flow behavior
- Wide range of flexibility
- Filler content



Prefixation at the speed of light

Properties	Advantages
Short cycle times and high positioning accuracy thanks to fast light fixation	✓ Optimized production process and improved quality of the package
Curing at low temperatures	✓ No tensions, stress on temperature-sensitive components is significantly reduced



DELO's dual-curing die attach adhesives

Electrical conductivity	Isotrop (ICA)	Non-conductive (NCA)	
Product group	DELO DUALBOND		
Product code	IC343	AD340	OB787
Chemical basis	mCD	mCD	modified epoxy resin
Curing in convection oven	2 min @ +175 °C 30 min @ +80 °C	10 min @ +100 °C 30 min @ +80 °C	10 min @ +150 °C 15 min @ +130 °C
Flexibility	+++	+++	+
Reliability (humidity + reflow)	++	++	+++
Processing time @ room temperature [h]	72	72	120

+++ high ++ medium + low

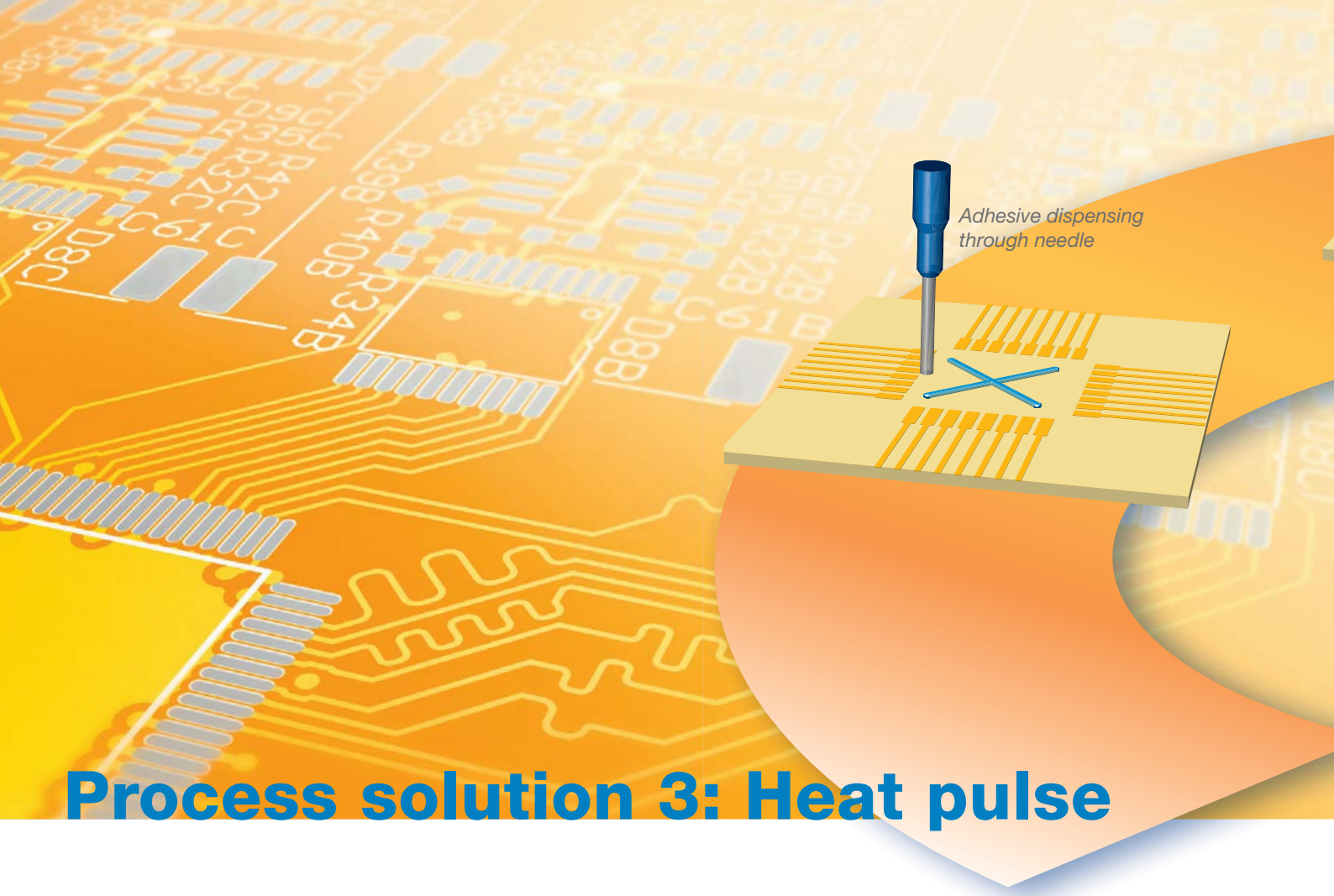
IC = Isotropic **C**onductive **AD** = **A**dhesive **OB** = **O**ptical **B**onding
mCD = modified poly**C**arbamin acid **D**erivates



All adhesives listed are halogen-free acc. to IEC 61249-2-21



For further details on curing with LED lamps, see our "DELOLUX 80" and "DELOLUX 50" brochures.



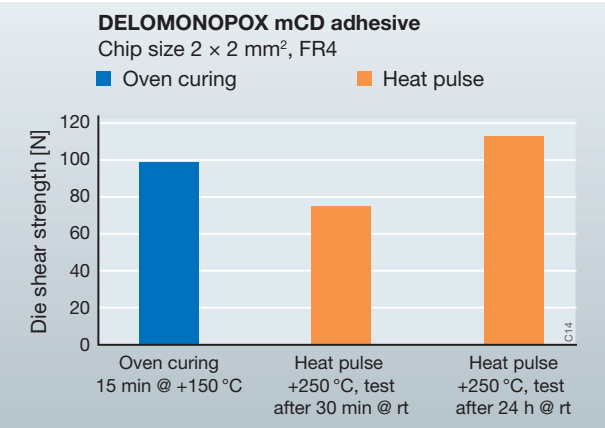
Process solution 3: Heat pulse

Fast is not fast enough for us

Current innovative systems already make it possible to cure adhesives extremely quickly during placing. The mCD chemistry patented by DELO enables this cutting-edge heat pulse process that is new to the market.

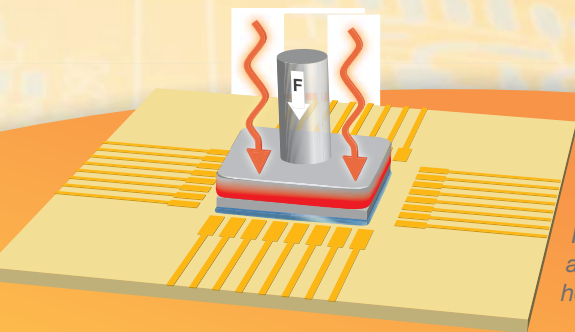
During this process, the die is heated to approx. +250°C by the placer. Afterwards, it is placed onto the substrate to which the mCD adhesive has already been dispensed. In just milliseconds, the adhesive is cured.

mCD = modified polyCarbamin acid Derivates

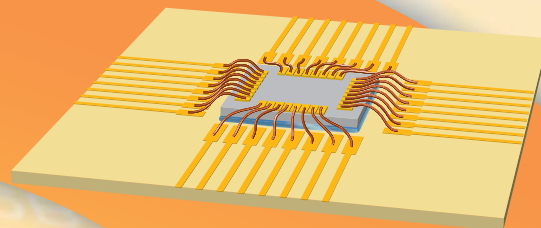


Heat pulse: Curing in milliseconds but as strong as oven curing

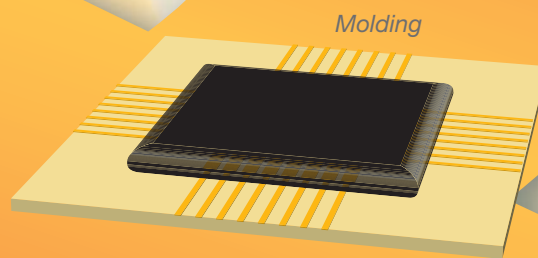
Properties	Advantages
Extremely fast curing within a few milliseconds	✓ Short cycle times
Flexible adhesives reduce stress on the components during packaging	✓ Increased yield
No oven necessary	✓ Saving of energy and costs, minimal space required, improved in-line capability



Heat pulse process:
Placing of chip and
adhesive curing by
heated placer



Final curing during
wire bonding (optional)



Molding

DELO's die attach adhesives for the heat pulse process

Product group		DELOMONOPOX
Product code		DA358
Chemical basis		mCD
Curing	Thermode	5 s @ +150 °C
	Convection oven	10 min @ +100 °C
Flexibility		+++
Reliability (humidity + reflow)		++
Processing time @ room temperature [h]		72

+++ high ++ medium

DA = Die Attach

mCD = modified polyCarbamin acid Derivates



All adhesives listed
are halogen-free
acc. to IEC 61249-2-21



For further details, see our "MEMS Packaging" and "Encapsulants with High Reliability" brochures



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02/17

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Curing

Consulting

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