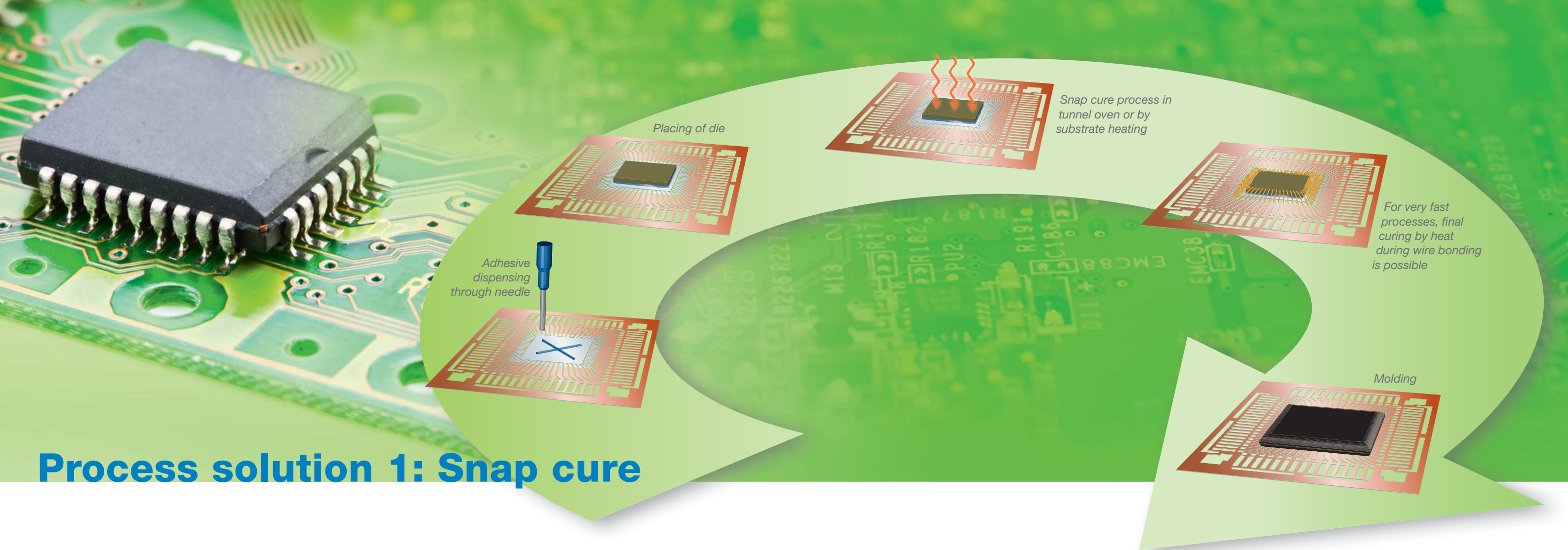


**Process Solutions
for Die Attach**

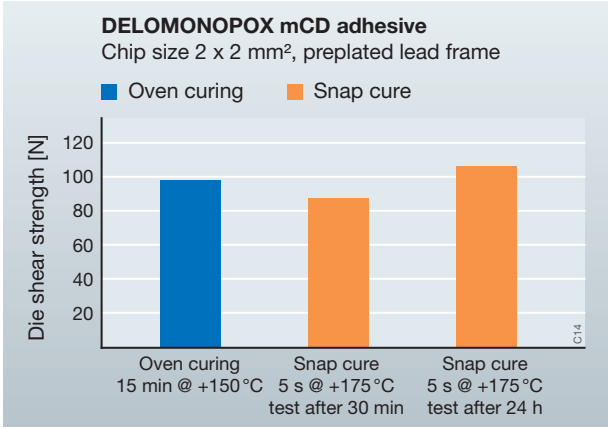


Process solution 1: Snap cure

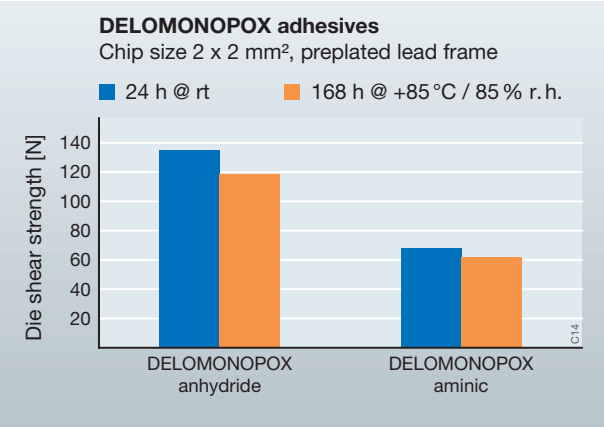
High output: Large quantities make all the difference

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 aminic epoxies withstand humidity

DELO's die attach adhesives for the snap cure process

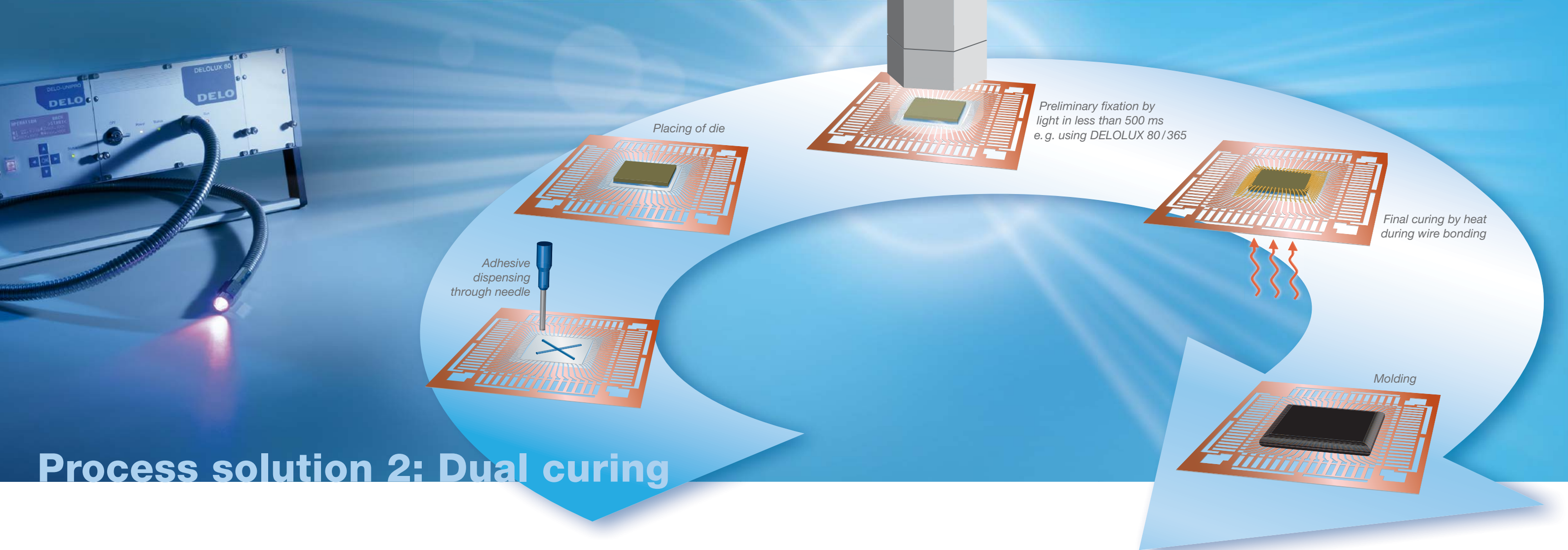
Electrical conductivity	Isotropic (ICA)				Non-conductive (NCA)			
	DELO-DUAL-BOND	DELOMONOPOX			DELOMONOPOX			
Product group	IC343	DA375	DA772	DA581	DA255	DA376	DA358	DA587
Product code	mCD	mCD	Anhydride	Epoxy cationic	Epoxy aminic	mCD	mCD	Epoxy cationic
Chemical basis	dual-curing	mCD	Anhydride	Epoxy 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

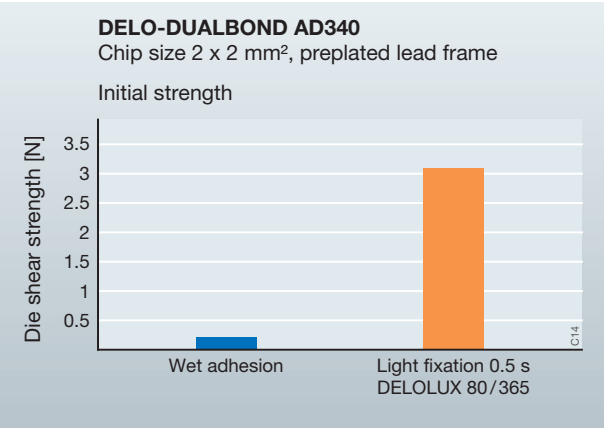
A strong duo: Light and heat ensures the die is kept in place

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

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 Conductive AD = ADhesive OB = Optical Bonding
mCD = modified polyCarbamin acid Derivates



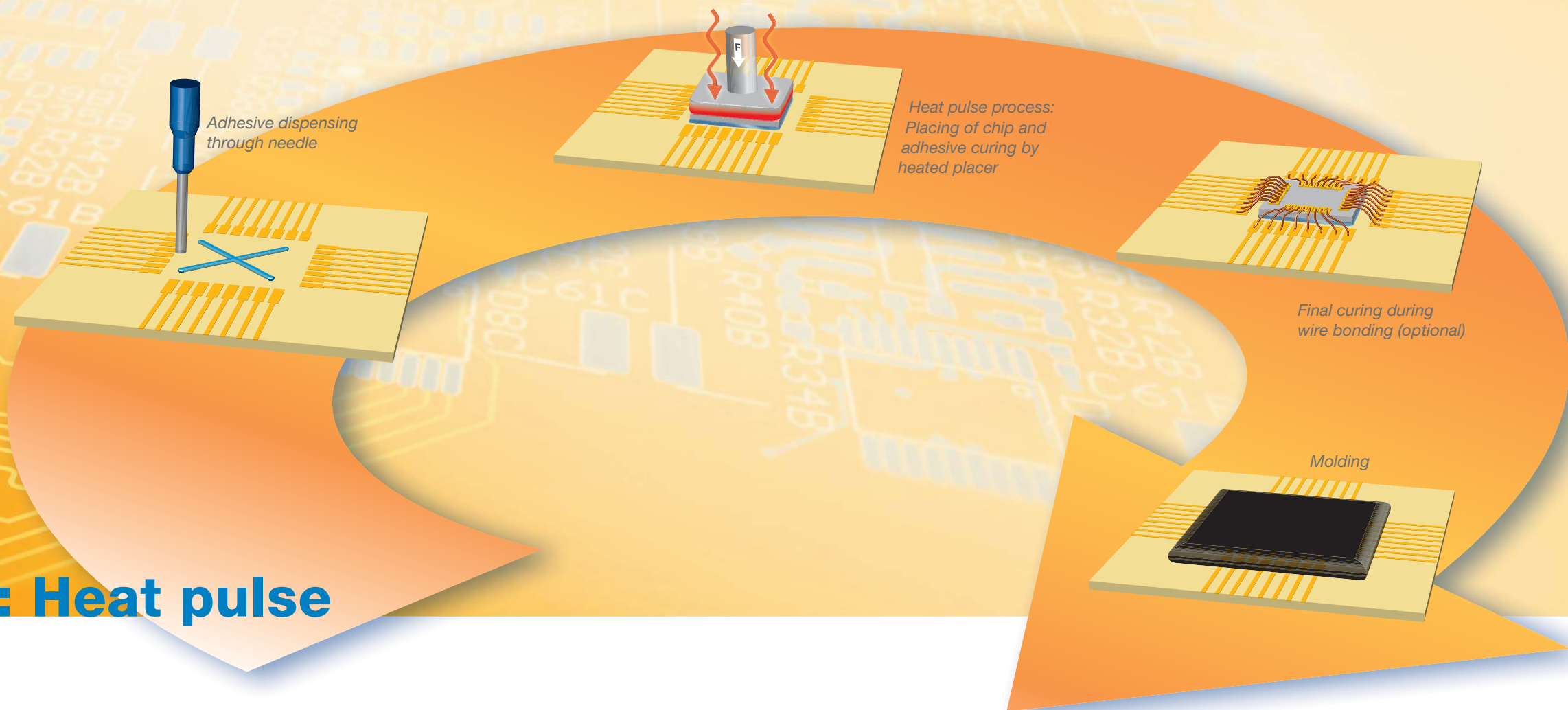
All adhesives listed are halogen-free acc. to IEC 61249-2-21

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



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

Process solution 3: Heat pulse

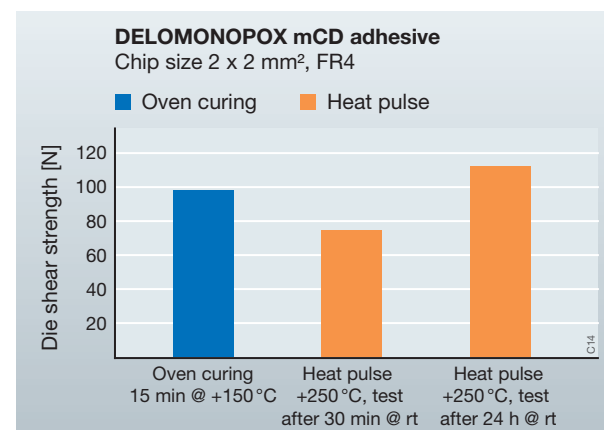


Fast is not fast enough for us

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 to +350 °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



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

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



CONTACT

Headquarters

DELO Industrial Adhesives

- **Germany** · Windach/Munich
Phone +49 8193 9900-0
info@DELO.de
www.DELO.de

DELO Industrial Adhesives

- **USA** · Sudbury/Boston, MA
Phone +1 978 254 5275
info@DELO.us
www.DELO.us

DELO Industrial Adhesives

- **Singapore**
Phone +65 6807 0800
info@DELO.com.sg
www.DELO.com.sg

DELO Industrial Adhesives

- **China** · Shanghai
Phone +86 21 2898 6563
info@DELO.cn
www.DELO.cn

DELO Industrial Adhesives

- **Taiwan** · Taipei
Phone +886 2 6639 8248
info@DELO.com.tw
www.DELO.com.tw

DELO Industrial Adhesives

- **Malaysia** · Kuala Lumpur
Phone +65 6807 0800
info@DELO.de
www.DELO.de/en

DELO Industrial Adhesives

- **South Korea** · Seoul
Phone +82 2 2190 3727
info@DELO.de
www.DELO.de/en

The data and information provided are based on tests performed under laboratory conditions. Reliable information about the behavior of the product under practical conditions and its suitability for a specific purpose cannot be concluded from this. It is the user's responsibility to test the suitability of the product for the intended purpose by considering all specific requirements. Type, physical and chemical properties of the materials to be processed with the product, as well as all actual influences occurring during transport, storage, processing and use, may cause deviations in the behavior of the product compared to its behavior under laboratory conditions. All data provided are typical average values or uniquely determined parameters measured under laboratory conditions. The data and information provided are therefore no guarantee for specific product properties or the suitability of the product for a specific purpose. Nothing contained herein shall be construed to indicate the non-existence of any relevant patents or to constitute a permission, encouragement or recommendation to practice any development covered by any patents, without permission of the owner of this patent. All products provided by DELO are subject to DELO's General Terms of Business. Verbal ancillary agreements are deemed not to exist.

© DELO – This brochure including any and all parts is protected by copyright. Any use not expressly permitted by the Urheberrechtsgesetz (German Copyright Act) shall require DELO's written consent. This shall apply without limitation to reproductions, duplications, disseminations, adaptations, translations and microfilms as well as to the recording, processing, duplication and/or dissemination by electronic means.

08/15

Adhesives

Dispensing

Curing

Consulting

DELO