Compact Camera Module Assembly
Customized Adhesives
Perfection is our goal

That is why we have developed a wide range of high-quality adhesives to answer the technical needs of CCM design and production.

DELO’s customers receive everything from just one supplier: Individual adhesives, dispensing technology, and associated LED curing lamps. Comprehensive consulting and intensive project support are part of the package for DELO as a supplier of turnkey solutions.

DELO’s adhesives are available in containers of various sizes, and adapted to the production processes. Typical cartridge contents are 10 cc and 30 cc.

Various adhesive families and the new edge curing technology can be used for manifold assemblies and many substrates.

All bondable substrates at a glance:
We pave the way to your success: Customer-specific support

<table>
<thead>
<tr>
<th>Idea</th>
<th>Design</th>
<th>Prototype</th>
<th>Introduction</th>
<th>Production</th>
<th>Ongoing support</th>
</tr>
</thead>
</table>
| • Define the adhesive requirements together with the customer | • Analysis of the adhesive characteristics in relation to the customer's technical and quality requirements | • Functional tests on the prototype | • Joint determination of process specifications based on the prototype phase results | • Ongoing intensive customer support during production | • Global support  
• Adapt to process changes | • Determination of process specifications  
• Tests in DELO’s lab  
• Adhesive samples for customers  
• Fast on-site support  
• On-site process and start-up consulting  
• Process finetuning where necessary  
• Support of quality assurance  
• Assist the customer in improving process efficiency  
• Application-specific staff training |

DELO is capable of customer-specific global support. The early involvement of DELO for new projects cuts down development time and helps reduce the time to market.
DELO’s solutions for compact camera module (CCM) bonding

1 Anchoring of flex board to camera: UV-/light-curing adhesives give improved adhesion and cure within seconds

2 Stiffener support plate to flex board: The adhesives cure at low temperatures and adhere well to the stiffener

3 Flex cable (FPC) to camera PCB: Flexible solutions and lower cost through liquid anisotropic adhesives

4 Image sensor to substrate: Heat-curing adhesives give high reliability in both COB die attach and flip-chip attach

5 Grounding: Fast dual-curing electrically conductive adhesives allow fast preliminary UV/light fixation (→ page 10)

6 IR filter to substrate: Fast-curing and light-blocking adhesives are designed for the best drop test performance (→ page 7)
Retainer ring replacement:
Black dual-curing adhesives with fast UV/light fixation and heat curing at low temperatures (→ page 9)

EMI shield bonding:
Heat-curing adhesives with high flexibility and good adhesion to nickel

Lens bonding and lens barrel fixation:
UV/light curing with very fast fixation and high glass transition temperature ($T_g$)

Lens barrel to VCM holder bonding:
Fast dual-curing adhesives with UV/light fixation and high drop test sustainability

Contacting the wires of VCM (voice coil motor) to board:
Adhesives with good electrical contact and adhesion to gold. Low-temperature curing to protect optical coating.

Housing bonding by active alignment:
Fast preliminary UV/light fixation for high-precision placement of housing (→ page 6)

VCM bonding:
(→ page 8)
Cameras with high image quality require highly accurate placement solutions. We make sure that our customers achieve high output and highly reliable solutions in their camera production.

**Benefits in application**

- UV/light fixation in less than 1 s
- Heat curing mechanism to cure shadowed areas
- Low-temperature curing: Final curing at +80 °C is possible
- Utilization of the process advantages of a heat-curing adhesive
- Excellent adhesion to plastic substrates, such as LCP

**Adhesive properties**

- Short cycle times can be achieved
- Automotive test passed: more than 1,000 h in +85 °C/85 % r.h.
- Low outgassing and low shrinkage
- Good temperature stability
- Good resistance to climatic changes and humidity test conditions
- Solvent-free material
- Halogen-free according to IEC 61249-2-21

**Product group examples**

- DELO DUALBOND AD34 series
- DELO DUALBOND OB7 series
In this application, it is essential to prevent the unintentional incidence of light. The IR filter helps block light and protects the sensor image quality from being impaired. DELO’s fast-curing adhesives with UV/light fixation capability impress with their superior quality.

**Benefits in application**
- Optimized modulus for drop test reliability
- Excellent adhesion to IR glass, many plastic materials and ceramics
- Optimized flow behavior and viscosity to allow tilt adjustment
- Very fast curing for high production volumes
- Low-temperature curing at temperatures from +80°C to avoid damage of optical components and coating

**Adhesive properties**
- UV/light fixation in less than 0.5 s
- Fast heat curing at temperatures from +80°C
- Modulus adapted to bondline requirements
- Adhesives with color from transparent to black available
- Low outgassing
- Halogen-free according to IEC 61249-2-21

**Product group examples**
- DELO DUALBOND AD34 series
- DELO DUALBOND AD4 series
- DELO PHOTOBOND GB series
Millions of smartphone cameras feature built-in autofocus and image stabilization (autofocus AF, optical image stabilization OIS). Our DELO DUALBOND adhesives allow fast fixation of components and reliable curing in shadowed areas. These adhesives exhibit good adhesion, in particular on difficult-to-bond substrates such as LCP or PC which are frequently used in VCMs.

Benefits in application

- High hourly output (UPH) by fast curing
- Low outgassing and thus no deposit on optically active surfaces such as lenses, filters, or sensors

Adhesive properties

- UV/light fixation of components within seconds
- Low-temperature curing from +60 °C (DELO DUALBOND LT series) or +80 °C
- UV/light curing with optional second humidity curing mechanism in shadowed areas
- Very low outgassing
- Excellent bond strength on substrates used such as LCP and PC and on metals
- Snap cure capability
- Resistance to drop and tumble test
- Solvent-free material
- Halogen-free according to IEC 61249-2-21

Product group examples

- DELO DUALBOND AD series (light + heat curing)
- DELO DUALBOND AD49 series (light + humidity curing)
- DELO DUALBOND and DELO MONOPOX LT series (light + heat curing)
- DELO-ML DB series (light curing + anaerobic curing)
For reasons of space, there shall not be any increase in the footprint in the smartphone. At the same time, however, the optics should allow more light to reach the sensor. Replacing the last retainer ring with black adhesive may substantially help achieve the effect. Since the components are very temperature-sensitive, the adhesive may not be exposed to high curing temperatures.

Benefits in application

- Low-temperature curing from +60 °C
- Pure UV/light curing of black adhesives possible
- High output (UPH) by fast UV/light curing possible
- Process advantage: One machine less is required, as there is no more retainer ring to be screwed in
- Black adhesive with good optical blocking properties
- Cost advantage through optimized design without thread

Adhesive properties

- Very low outgassing → No deposit on optical components
- UV/light fixation in less than 1 s possible
- Black color; Good optical properties
- Optimized flow behavior
- Good adhesion to PC, ZEONEX, COC, and CO
- Solvent-free material
- Halogen-free according to IEC 61249-2-21

Product group examples

- DELO DUALBOND RE3 series
- DELO DUALBOND LT series
- DELO KATIOBOND OB6 series

\[\text{RE} = \text{RE}plica \text { Material}\]
\[\text{LT} = \text{Low} \text { Temperature}\]
\[\text{OB} = \text{Optical} \text { Bonding}\]
Besides the typically used heat-curing IC adhesives, DELO also offers dual-curing products combining fast UV/light fixation and final curing at moderate temperatures. Depending on their needs, customers can choose from various isotropic conductive (IC) materials for electrical grounding and contacting.

**Benefits in application**

- Less heat impact compared to soldering during assembly process
- Low resistance for good grounding
- Dual curing process with UV/light fixation possible – no negative flow behavior in later process steps

**Adhesive properties**

- Dual curing process capability – UV/light fixation within 1 s
- Heat curing at +80 °C
- Halogen-free according to IEC 61249-2-21

**Product group examples**

- DELO DUALBOND IC3 series
- DELO MONOPOX DA series

IC = Isotropic Conductive
DA = Die Attach
# DELO-DOT PN3

**Pneumatic microdispensing valve**

- **Modular design**
  Separate pneumatic actuator and fluid system

- **Actuator lifetime**
  Normally more than 1,000 million cycles

- **Max. dispensing frequency**
  330 Hz (drops per sec.)

- **Typical dispensing volumes**
  2–5,000 nl

# DELO FLEXCAP

**Bubble-free container**

- **Pressure tank with fill level sensor**
  Full process control

- **Bubble-free adhesive**
  No voids
  Precise dispensing
  Reliable results

- **Hermetically closed cartridge**
  Dry ice transport possible
  Reduced transportation cost

- **Flexible membrane**
  Maximum emptying

# DELOLUX 502

**Spot LED curing lamp**

- **Dimensions of lamp head**
  20 mm × 21.3 mm × 4.9 mm

- **Wavelength**
  365 nm

- **Irradiated area**
  3 mm × 8 mm

- **Typical working distance**
  5–8 mm

- **Intensity**
  Up to 1,500 mW/cm²

- **Cooling mechanism**
  Passive aircooled

---

All DELO products are developed and produced in Germany, ensuring the highest quality of design and manufacture.
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 customer's responsibility to test the suitability of a product for the intended purpose by considering all specific requirements and by applying standards the customer deems suitable (e.g. DIN 2304-1). Typical, 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.