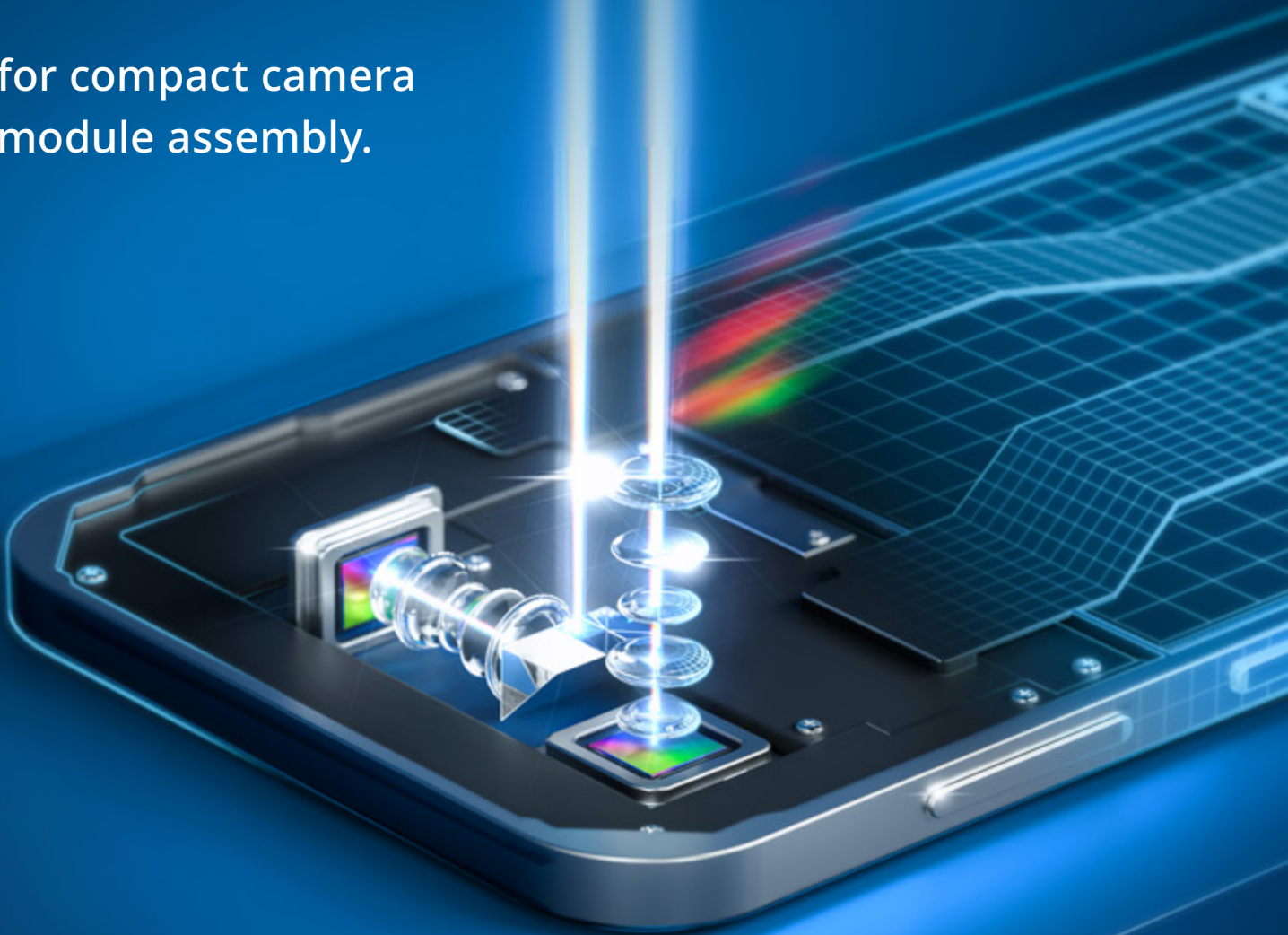


Consumer camera

Customized Adhesives

for compact camera
module assembly.



Extensive experience

for leading camera manufacturers.

As compact camera modules (CCM) become more complex, manufacturers face increasing demands for speed, performance, and space efficiency. DELO's high-tech adhesives are designed to meet these needs: From **bonding over 30 points** in CCMs, to effectively **equalizing tensions**, **minimizing outgassing**, and **maintaining low, consistent shrinkage**. With UV fixation within **≥ 0.5 seconds**, low temperature curing starting **from +45°C** and a wide range of adhesives curing at **≥ +80°C**, these adhesives contribute to increased production efficiency, durability, and precision within miniaturized assemblies.

With **more than a decade of collaboration with leading camera manufacturers**, DELO provides innovative adhesive solutions for camera systems. Whether it's **housing bonding by active alignment**, **lens barrel attach (LBA)**, or **first lens bonding**, our adhesives, dispensing and curing equipment offer superior performance and comprehensive support as a single-source provider.



Visit our website.

go.delo.de/consumer-camera



— Adhesive

$\geq 45^{\circ}\text{C}$

super low temperature curing.

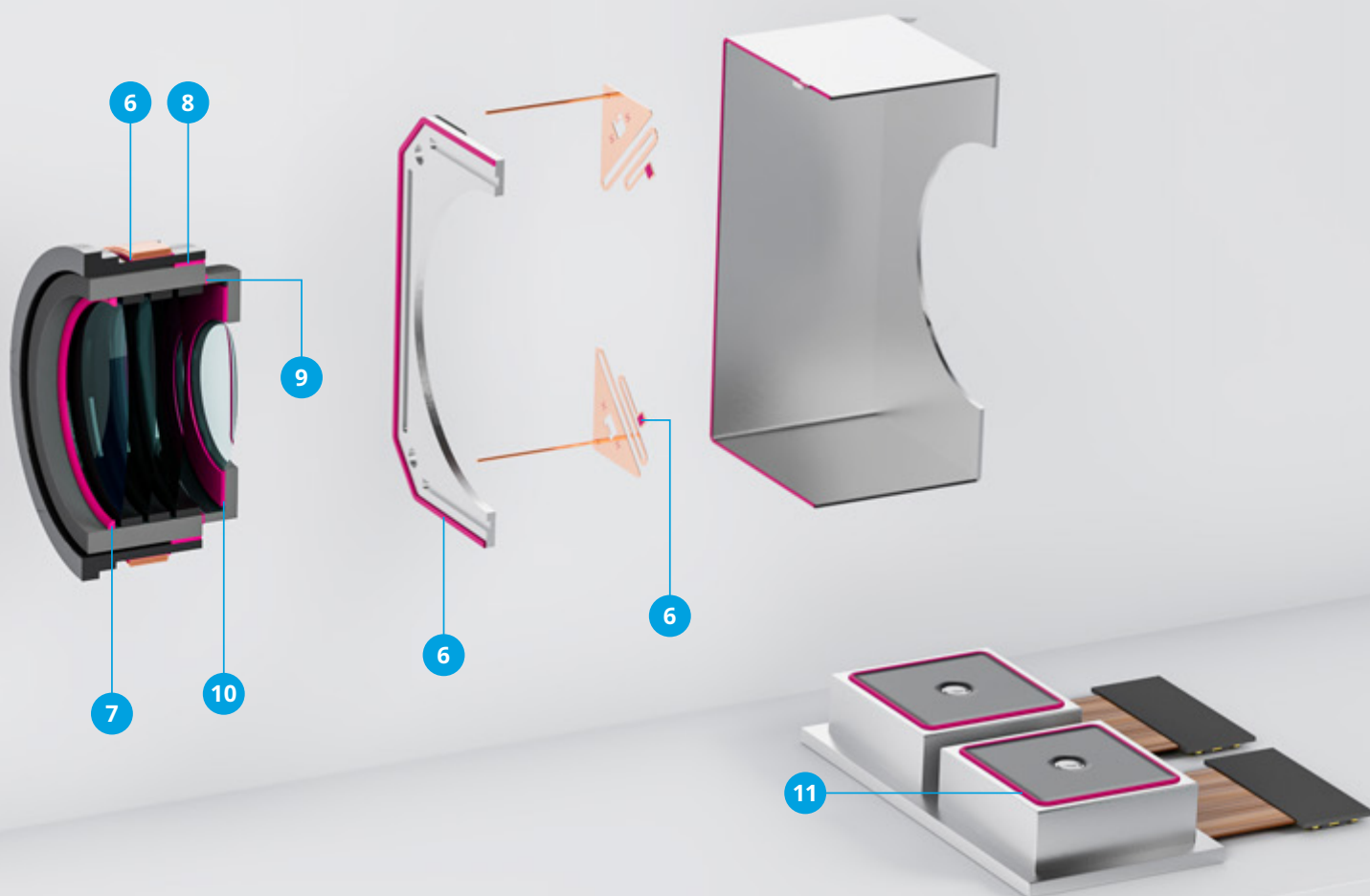
$\geq 0.5\text{ s}$

UV-light fixation.

Main camera



1 Flex anchoring	2 Image sensor attach	3 Grounding	4 IR filter to substrate	5 Housing bonding by active alignment (> page 6)	6 VCM / actuator bonding
› Flexible adhesives optimized for peel resistance	› High reliability for chip-on-board (COB), die attach, and flip-chip attach	› Low heat impact compared to soldering during assembly › Fast, dual-curing electrically conductive adhesives	› Fast-curing, light-blocking adhesives › High drop resistance	› Fast preliminary UV / light fixation › High-precision placement of housing	› Excellent adhesion to various substrates › High reliability › Magnet-to-housing, spring-to-substrate, coil bonding



Adhesive

7 Retainer ring replacement (> page 7)

- › Low-reflectance dual-curing adhesives with fast UV / light fixation and heat curing at low temperatures

8 Lens barrel attach (LBA) (> page 9)

- › High drop resistance
- › Flexible UV-only and low-temperature dual curing solutions for next-gen LBA bonding

9 First lens bonding (> page 8)

- › Passive or active alignment
- › Good adhesion to PC
- › Predictable, low shrinkage

10 Lens bonding, lens-to-barrel fixation

- › UV / light curing
- › High glass transition temperature (Tg) for high optical stability

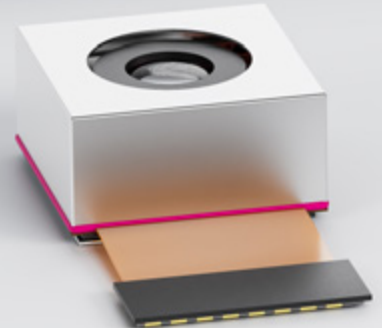
11 Bracket bonding

- › High drop resistance
- › Good adhesion to nickel-plated steel
- › Good flow behavior

Applications

Housing bonding by active alignment

Active alignment requires **maximum precision** to ensure that your camera modules deliver the **best possible image quality**. Due to rapid **light fixation** of our adhesives, components are precisely fixed **within seconds** and remain stable until fully cured. Since its start, DELO has grown with the challenges, by continuously enhancing its products and delivering customized solutions for every requirement.



Adhesive requirements

- › Fast UV / light fixation up to ≥ 0.5 seconds
- › Low temperature curing (from either $+45^{\circ}\text{C}$, $+50^{\circ}\text{C}$ or $+60^{\circ}\text{C}$)
- › Low and reproducible shrinkage
- › High drop resistance

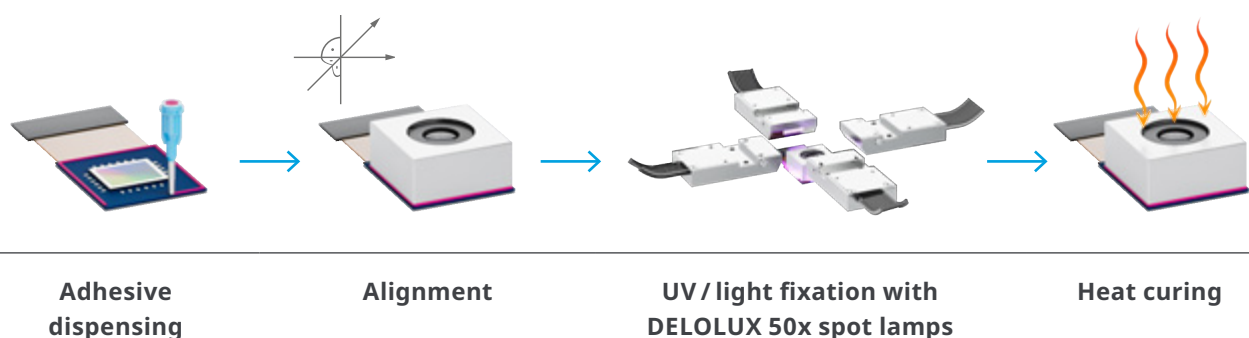
Adhesive solutions

- › DELO DUALBOND LT35x series, dual-curing (UV / heat)
- › DELO DUALBOND LT22xx series, dual-curing (UV / heat)

High standards from the start

DELO's adhesives used for active alignment processes in housing bonding are designed for excellent adhesion to plastic substrates with low and reproducible shrinkage. During the active alignment process, DELOLUX curing lamps enable fast UV fixation in ≥ 0.5 seconds, and offer low temperature curing between $+45^{\circ}\text{C}$ and $+80^{\circ}\text{C}$. This ensures precise alignment and increased production efficiency.

Active alignment



Applications

Retainer ring replacement

Replacing retainer rings with our adhesives saves time and **increases production efficiency** by enabling a **higher output rate per hour (UPH)**. By applying our adhesive directly behind the last lens within the lens stack, tensions and deformations forced by mechanical clamping are eliminated, reducing potential stress and deformation of the lens.



— Adhesive

Adhesive requirements

- › Low reflectance
- › Fast UV / light fixation in ≥ 1 second
- › Low temperature curing
- › No bleeding

Adhesive solutions

- › DELO DUALBOND RE34xx series, dual-curing (UV / heat)
- › DELO DUALBOND SJ47xx series, dual-curing (UV / heat)

Adhesives for optical excellence

Our adhesives flow evenly, cure at low temperatures to protect sensitive optics, and offer ultra-fast UV fixation. They form reliable bonds to commonly used substrates such as polycarbonates (PC) and cyclic olefin polymers (COP). With minimal outgassing and low bleeding, they ensure the highest image quality of the camera modules.

Retainer ring replacement



Adhesive dispensing

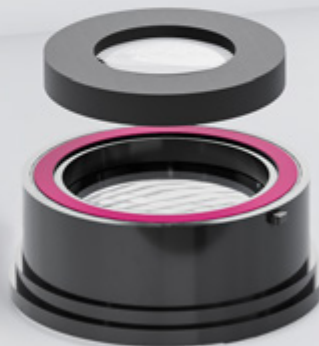
UV / light curing with
DELOLUX 30 small area lamp

Optional heat curing

Applications

First lens bonding

Distortions caused by tolerances and thermal stress can impact image quality. Our fast-curing UV adhesives enable precise alignment of the first lens to the lens stack, equalize tensions, and deliver uncompromised optical performance. With the **fast UV fixation**, they enable **high-throughput production**. The dual curing process is ideal for **opaque or shadowed areas** and supports both passive and active alignment methods.



Adhesive requirements

- › Fast light fixation
- › Low temperature curing (+45°C, +50°C, +60°C or +80°C)
- › Reproducible low shrinkage

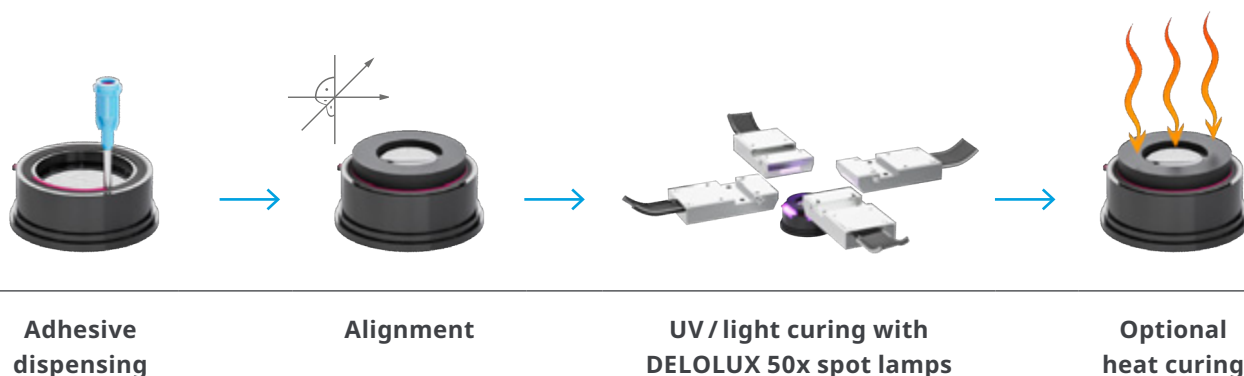
Adhesive solutions

- › DELO DUALBOND SJ47xx series, dual-curing (UV / heat)
- › DELO PHOTOBOND FB series, UV- / light-curing

Reliability meets speed

To ensure optimal performance of the camera system, first lens bonding is used to join the first lens accurately, improving optical performance and compensating for thermal stress between modules of varying sizes. With UV fixation in ≥ 0.5 seconds, our dual-curing adhesives ensure precise, tension-equalizing bonds on LCP and PC—even in shadowed areas.

First lens bonding (UV- and heat-curing)



Applications

Lens barrel attach

Lens barrel-to-housing bonds demand precision and durability. DELO adhesives ensure **reliable curing** even in shadowed areas, protecting substrates by using **energy-efficient low temperature curing**. This ensures that camera modules remain securely bonded while **minimizing tensions** on the components.



— Adhesive

Adhesive requirements

- › Low temperature or UV-only curing
- › Adjusted flow behavior
- › High drop resistance
- › Good adhesion to PC and LCP

Adhesive solutions

- › DELO DUALBOND LT22xx series, dual-curing (UV / heat)

Ultra-fast curing

Our product portfolio offers materials delivering fast light fixation in < 1 second, combined with reliable curing in shadowed areas. These solutions reduce energy consumption, permit gentle processing of sensitive substrates, and yield strong, durable bonds. Combined with our DELOLUX UV lamps, we offer comprehensive system solutions that unite high-tech adhesives with specialized equipment for optimal results.

Lens barrel attach



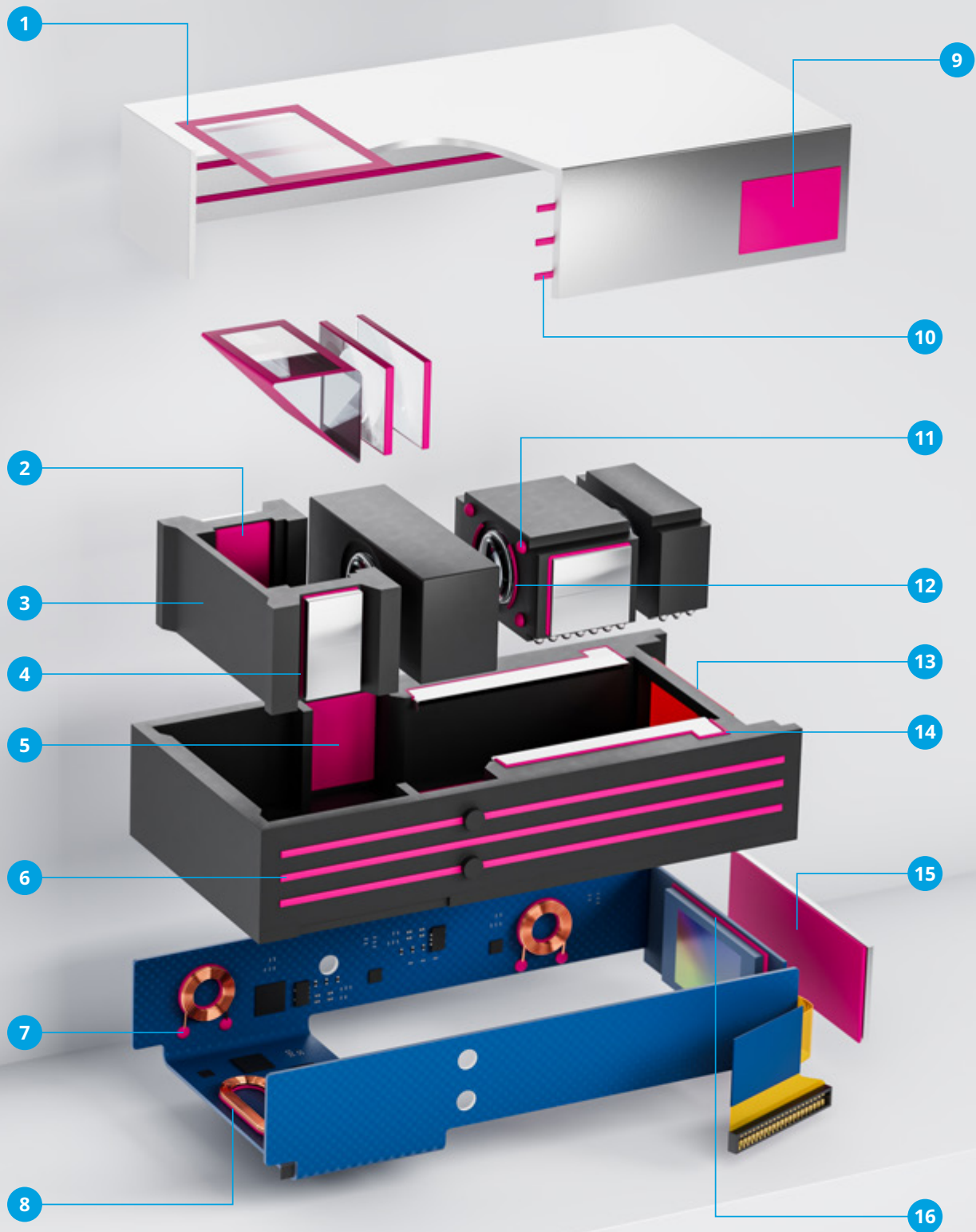
Adhesive dispensing,
adhesive flows into the gap

UV / light fixation with
DELOLUX 30 small area lamp

Heat curing

Periscope camera

1 Black mask shield can › Low transmission and matt surface to reduce reflections › Low viscosity to achieve thin layers	2 Prism side fill (› page 12) › Low viscosity to flow into small gaps › Low temperature curing for optical stability	3 Prism attach (› page 12) › Drop-resistant › Fast UV / light fixation for high-precision placement	4 Magnet bonding (› page 13) › Dual- or heat-curing adhesives › Good adhesion to Ni and PC / LCP
5 Lens group placement by active alignment › High-precision placement of housing › Fast preliminary UV / light fixation	6 Flex to holder › Fast and good fixation (e. g. UV or thermode) › Good peel resistance	7 Solder point protection › Good adhesion to gold, solder paste / flux, and copper › Light and / or heat curing	8 Coil bonding › Fast and good fixation (e. g. thermode) › Good adhesion to Cu and PC / LCP
9 Flex on shield can › Flexible and highly peel-resistant adhesives	10 Shield can bonding › Heat-curing adhesives › Good adhesion to Ni	11 Damping › Flexible adhesives › Solvent-free › Non-tacky	12 Lens barrel attach › High drop resistance › Flexible UV-only and low-temperature dual curing solutions for next-gen LBA bonding
13 IR filter bonding › Matt and low transmission › Low outgassing	14 Guide rail bonding › Drop resistance › Good adhesion to LCP / SUS › Low temperature curing is preferred	15 Stiffener attach › Heat-curing adhesives › Low warpage › Optional thermal or electrical conductivity	16 Sensor attach › Heat-curing adhesives › Low warpage to maintain alignment



Adhesive

Applications

Prism attach & side fill

DELO's advanced adhesives for periscope camera modules are engineered to deliver **optimal optical stability** and **durability**. Tailored for several applications such as prism attach and side fill, our high-tech adhesives offer **low and reproducible shrinkage**, **minimized outgassing**, and **resilience to humidity and temperature**.



Adhesive requirements

- › Fixation in ≥ 0.5 seconds
- › Curing at low temperatures (from either $+45^{\circ}\text{C}$, $+50^{\circ}\text{C}$, $+60^{\circ}\text{C}$ or $+80^{\circ}\text{C}$)
- › Good adhesion to glass, coatings, PPA, LCP, PC
- › High drop resistance

Adhesive solutions

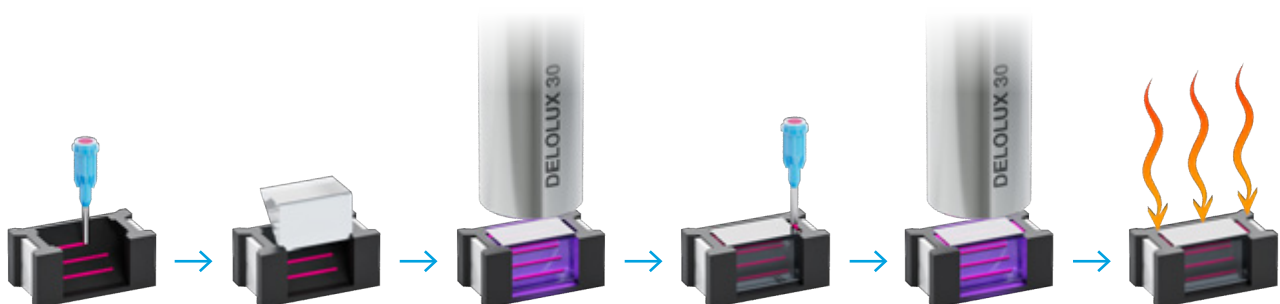
- › DELO DUALBOND LT22xx series, dual-curing (UV / heat)

Strong prism bonding

Our tension-equalizing adhesives are designed for prism attach, providing exceptional adhesion with dual curing for UV fixation in ≥ 0.5 seconds, followed by heat curing starting at $+45^{\circ}\text{C}$.

For side fill applications, our adhesives provide good adhesion to glass and plastics. They can be cured by using only heat or via dual curing from low temperatures starting at $+45^{\circ}\text{C}$, safeguarding sensitive optical components and coatings from thermal stress.

Prism attach & side fill



Prism attach
adhesive
dispensing

Prism
attach

UV / light fixation
with DELOLUX 30
small area lamp

Side fill
adhesive
dispensing

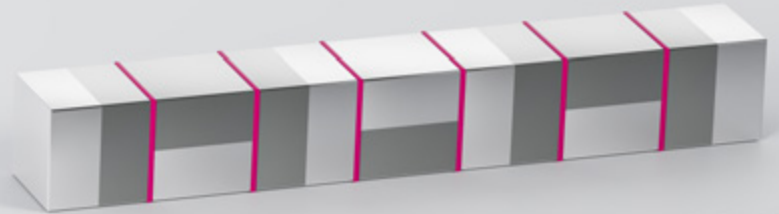
Optional
UV / light
fixation

Heat
curing

Applications

Magnet bonding

Periscope cameras require strong adhesion in small bonding areas to ensure the **highest image quality**. Our adhesives are designed to withstand same-polarity magnet repulsion and **facilitate precise, reliable jetting** even in the smallest spaces; supporting advanced **miniaturized designs** not only for magnet-to-magnet bonding but also for magnet-to-camera module applications.



— Adhesive
■ Magnet

Adhesive requirements

- › Dual- or heat-curing (low temperature $< +80^{\circ}\text{C}$)
- › Good adhesion to Ni / SUS and PC / LCP
- › High drop resistance

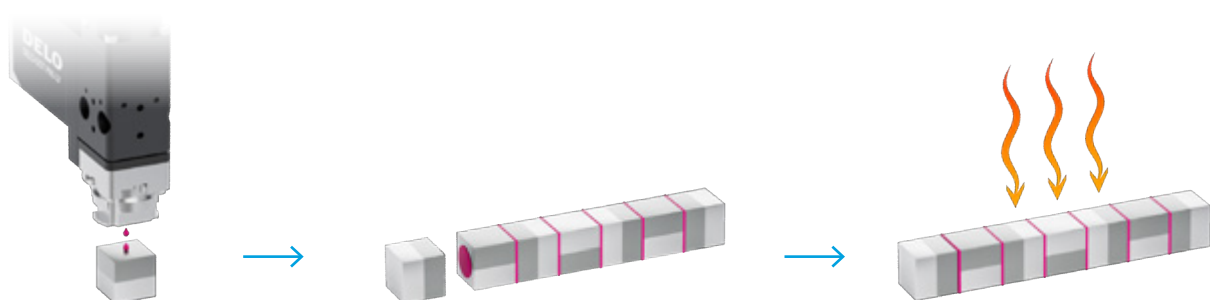
Adhesive solutions

- › DELO DUALBOND LT22xx series, dual-curing (UV / heat)
- › DELO MONOPOX LT37xx series, heat-curing

Halbach array magnet bonding

A Halbach array is a special configuration of permanent magnets that amplifies the magnetic field on one side while minimizing it on the other, enabling high performance in a compact design. Although the joining method is highly complex, DELO developed reliable adhesives that deliver exceptional magnet-to-magnet bonding strength and outstanding creep resistance—ensuring long-term stability and precise alignment.

Halbach bonding



Adhesive jetting
on magnet with
DELO-DOT PN5

Magnet joining

Heat curing

Adhesives for all processes

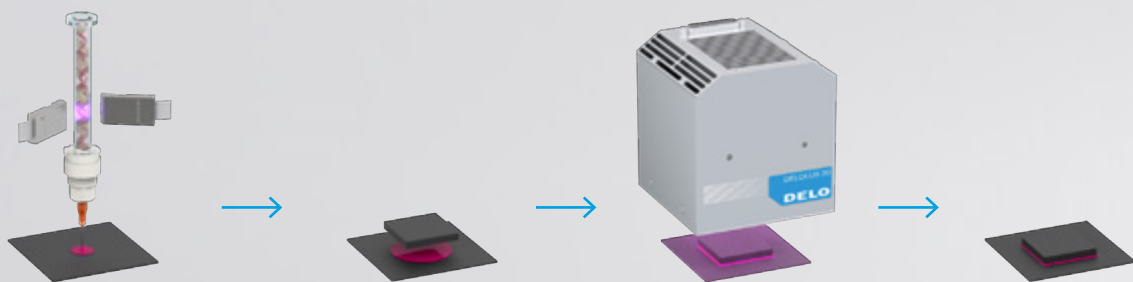
Our comprehensive range of adhesives, dispensing and curing equipment provides you with **maximum flexibility** in curing options, allowing you complete freedom when integrating them into your production processes. Leveraging decades of collaboration with leading tier 1 suppliers and our in-depth process expertise, we always have a solution for you.

DELO provides **two-component** or **light-curing adhesives** for room temperature curing processes, as well as **dual-curing products** that achieve **exceptional image quality** and **maximize throughput**.

For dispensing **filled adhesives** across a wide **range of viscosities**—which are often considered challenging—we offer high-performance solutions such as our pneumatic jet valve DELO-DOT PN5 LV (PN= pneumatic, LV = low viscosity) or our needle dispensing valve DELO-DOT RE (RE = retraction). DELO's jetting and dispensing valves ensure **fast, reproducible dispensing** even under demanding conditions.

To increase efficiency further, we offer materials with **preactivation technology**, which utilizes light curing for shadowed areas and opaque materials. The **activation on the flow** process incorporates dual-initiator systems in adhesives, combining preactivation with additional light fixation to optimize further processing.

Activation on the flow – Process



Dispensing and
irradiation in one step
with DELO-ACTIVIS

Joining

Optional: UV fixation
with DELOLUX 20
curing lamp

Final curing at room
temperature

DELO-ACTIVIS

Activation on the flow

Dispensing and curing in one step

With activation on the flow and DELO-ACTIVIS, DELO has developed a technology that for the first time combines the dispensing and preactivation of adhesives with UV light in one step.

The curing process begins as soon as the adhesive is irradiated with UV light. This process allows **complex geometries**, such as shadowed areas with undercuts, to be bonded or sealed quickly.

As a **timesaving, cost- and energy-efficient technology**, activation on the flow can be an alternative to heat curing, dual curing (light fixation and heat curing) or two-component curing.

Dispensing without a curing oven leads to **faster production processes, lower production costs** and significantly **reduced carbon emissions**.



Your benefits at a glance

>50%

cost savings by
DELO-ACTIVIS compared
to heat curing*

>98%

reduced carbon emissions
without heat curing*

100%

design freedom
for all geometries

* Theoretical calculation for rotor position sensor encapsulation at a European production site.

DELO Industrial Adhesives

**China | Czechia | France | Germany HQ | Italy | Japan
Korea | Malaysia | Singapore | Thailand | USA**

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