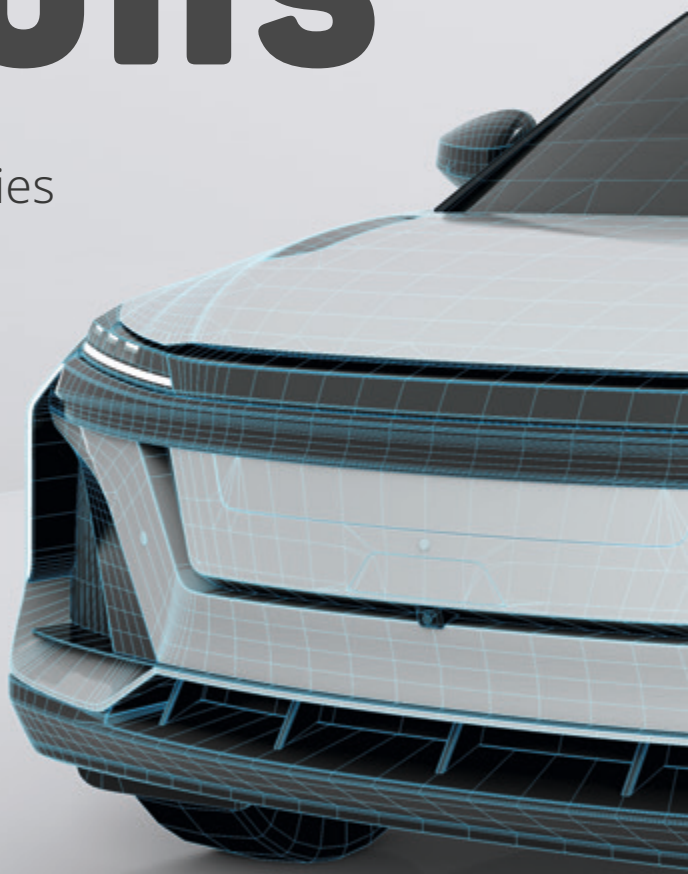
DELO

Sense it.

Adhesive process solutions for automotive sensor technologies

Adhesive pr solutions

for automotive sensing technologies



Of the many tools and technologies used in automotive manufacturing, adhesives are particularly advantageous. They open the door to new fabrication possibilities, enabling design flexibility and allowing dissimilar materials that otherwise cannot be joined to do so. They are also multifunctional, serving as mold or sealant materials on top of acting as a bonding agent. In a wide variety of automotive applications—from EV motor components to powertrain sensors, to camera systems—they play an especially important role. With extensive experience in automotive sensing technologies, DELO Industrial Adhesives has established itself as a **world market leader for automotive camera adhesives**.

In our research and development in this field, we seek to create materials that **meet even the most stringent requirements while making minimal impact on the environment**, both in production and during use. These correspond with curing equipment that helps streamline production processes and can easily be integrated into virtually any production facility.

Visit our website.
go.delo.de/br-automotive

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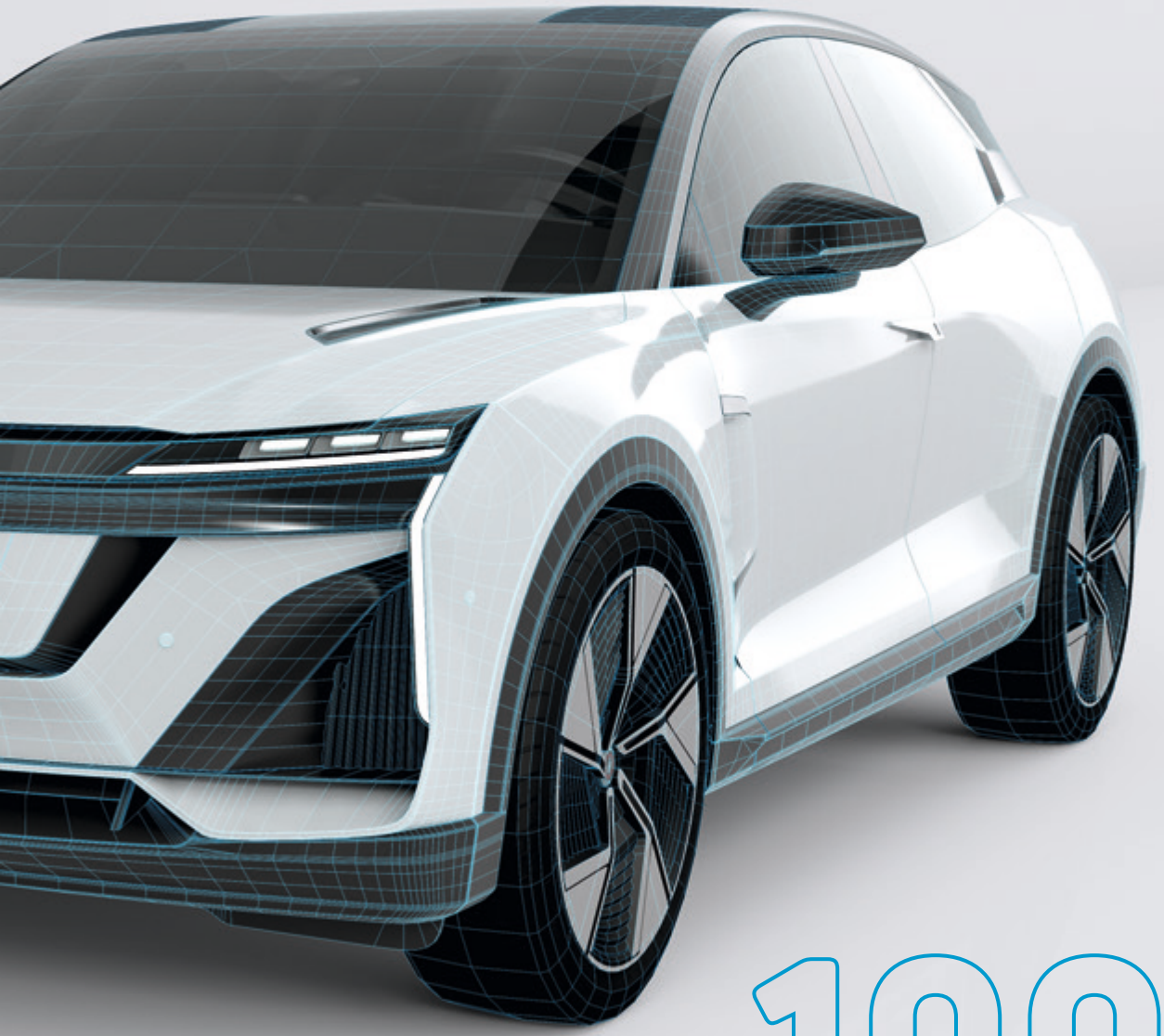


100+

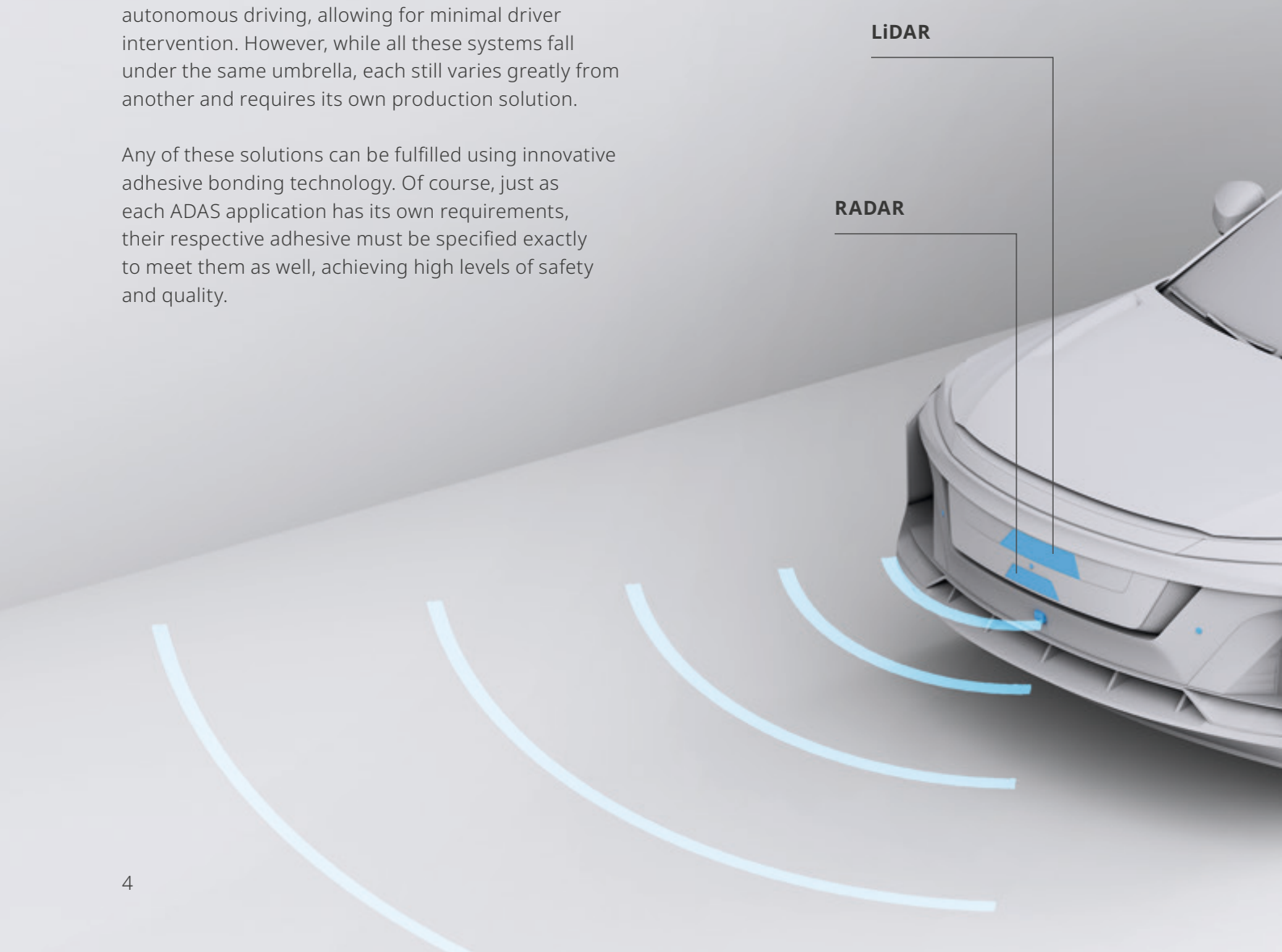
sensors per car, most of which are processed through bonding and potting.

Advanced Driver Assistant Systems

Enabling automation and safety.

Although the journey to achieving full autonomous driving has been a long one, we are already seeing cutting-edge ADAS technologies such as Traffic Jam Assist or Highway Pilot. **Cameras**, **LiDAR**, **RADAR**, and **ultrasonic sensors** each play a role in Level 3 autonomous driving, allowing for minimal driver intervention. However, while all these systems fall under the same umbrella, each still varies greatly from another and requires its own production solution.

Any of these solutions can be fulfilled using innovative adhesive bonding technology. Of course, just as each ADAS application has its own requirements, their respective adhesive must be specified exactly to meet them as well, achieving high levels of safety and quality.



50%

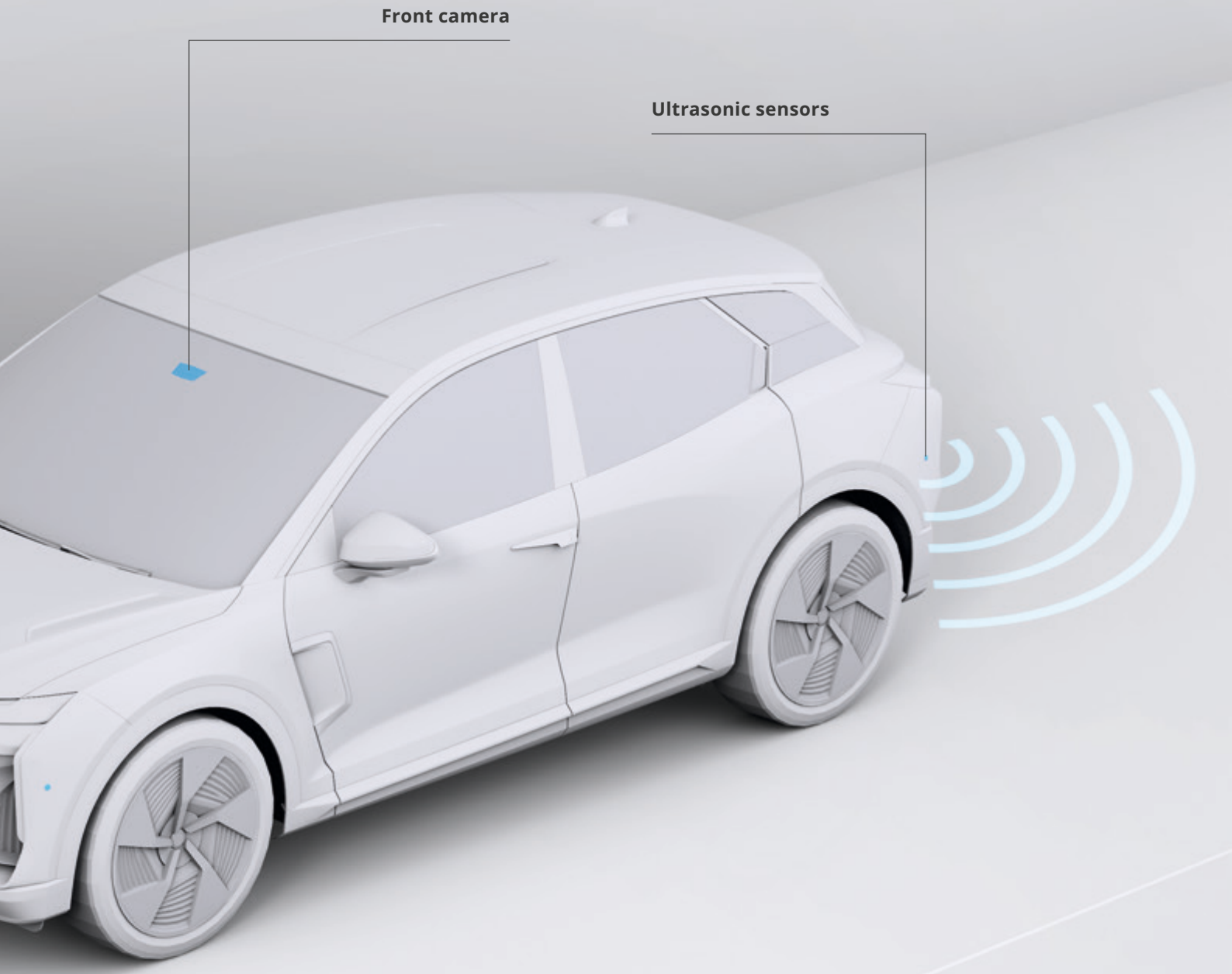
of new cars will have Level 3 ADAS within the next five years.

14+

sensors can be found in cars with this technology.

90%

of auto accidents could be prevented by ADAS.



RADAR

One central component of autonomous driving technology is the RADAR sensor. The key advantage of these sensors is their ability to detect objects in traffic regardless of environment, be it rain, snow or fog. This functionality, however, requires a highly reliable adhesive, used here in various applications while also performing functional tasks such as EMI shielding.

Applications

› Antenna bonding
› Housing bonding and sealing
› EMI shielding

Assembly processes

› Dual initiator
› Light activation

Patented DELO dual-initiator light curing process

using just one adhesive enables you to scale up production volumes as market demand rises. The first of two separate light curing steps preactivates the adhesive before joining, ensuring it reliably and energy-efficiently cures in shadowed areas. The second step immediately fixates the parts after joining, allowing for cycle times of just a few seconds.

Product features

Antenna bonding	Housing bonding and sealing	EMI shielding
		
Innovative process: Light curing only	Fast sealing for inline tests < 30 min	Protecting of sensitive parts
Fast cycle times 4 s	Tension-equalizing, adapted flexibility	Multifunctional material, electrically and thermally conductive

Ultrasonic sensors

In the case of ultrasonic parking sensors, adhesives must frequently perform other functions in addition to their mechanical tasks. Specifically, the adhesive helps ensure that the sensor transmits a high-quality ultrasonic signal and does not falsify it. To achieve this, the adhesive must have good acoustic properties and the right oscillation behavior.

Adhesive

Applications

› Piezo bonding
› Pin sealing

Assembly processes

› Preactivation
› Dual curing – light and humidity
› Activation on the flow

Proven solution and experience

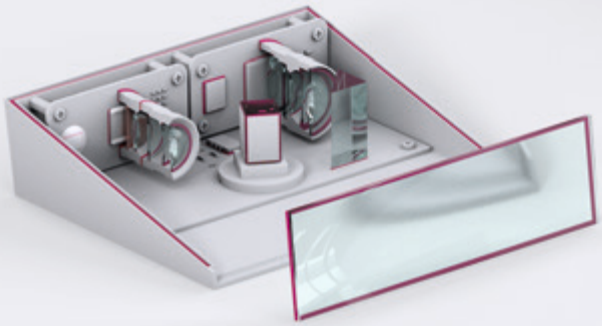
for more than a decade. Classic preactivation and dual curing have been among the core curing technologies at DELO for a long time. Key partners across various industries rely on this expertise in many different applications, including many tier 1 automotive suppliers.

Product features

Piezo bonding	Pin sealing
	
Smart preactivation process No thermal stress	Durable and resistant sealing Up to 3,000 h storage
Optimal signal transmission Layer thickness < 10 µm	Adjusted flowability Customized viscosity

LiDAR

In ADAS, LiDAR is chiefly used to detect on-road obstacles, be they objects, pedestrians, or traffic. They precisely measure 3D objects and their distances and maintain their capabilities at night and in adverse conditions such as fog. However, they also come with their own assembly requirements, which adhesives meet while maintaining production efficiency.



Applications

› Active alignment
› Mirror / optics bonding
› Cover window bonding

Assembly processes

› Preactivation
› Light curing (standalone)
› Dual curing: light and humidity, light and heat

Broad product portfolio

DELO has a broad product portfolio for a variety of different bonding tasks. From active alignment processes to fixed and movable optics, large cover windows and different materials, LiDAR systems pose demanding requirements for adhesives. DELO offers solutions tailored to each of these bonding tasks.

Product features

Active alignment	Mirror / optics bonding	Cover windows bonding
		
A cutting-edge assembly process for efficient manufacturing and the highest quality.	For this stress-sensitive task, adhesives demonstrate outstanding flexibility.	Serves as a basis for various designs, materials, dimensions and requirements.
Fast light fixation in less than 5 s.	Light-fixable and low-outgassing	Tension-equalizing, low outgassing, UV-stable

Cameras

Automotive cameras span more than just backup cameras. For functions such as lane keeping assist, traffic sign recognition and automatic emergency braking, cameras play a foundational role as well. DELO has extensive experience in adhesive solutions for camera assemblies, with its adhesives continuing to prove themselves in these applications.

Adhesive

Applications

› Active alignment
› Bonding and sealing
› Module fixation

Assembly processes

› Light curing (standalone)
› Dual curing: light and heat

Over 15 years of experience

We have played a role in camera assemblies for over 15 years. Throughout this time, our product portfolio has evolved with each generation of camera technology, making DELO the market leader in this application. Our innovative adhesives play a major role in meeting the requirements of high-quality camera modules and efficient manufacturing processes.

Product features

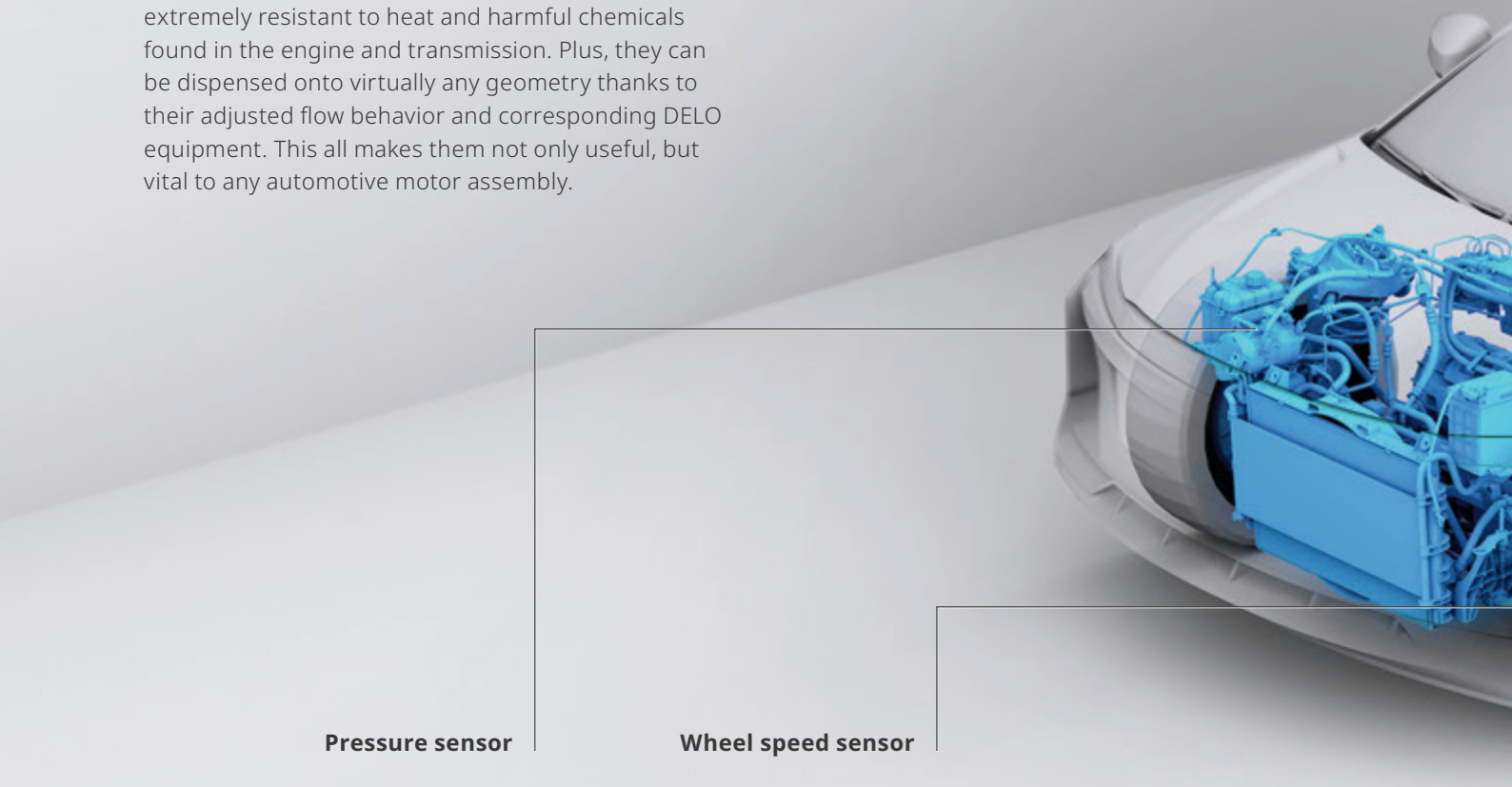
Active alignment	Bonding and sealing	Module fixation
		
Predictable shrinkage and low swelling to avoid any out-of-focus movement	Balanced combination of flexibility and adhesion	Alignment accuracy due to fast light fixation
Fast light fixation down to 1 s	Light-fixable, low outgassing	High curable layer thickness, reliable curing in shadowed areas

Powertrain

Helping forge the motors of the future.

Internal combustion engines (ICE) are no longer the simple mechanical assemblies they once were. Now, they are heavily reliant on sensor technologies such as **pressure** or **speed and position sensors**, as well as sensor-enabled features like exhaust gas recirculation valves, to ensure that they run correctly and efficiently, and that any faults or errors are detected if they do occur. Despite containing far fewer mechanical linkages than in ICE vehicles, electric vehicles (EV) have many other factors, such as battery temperature, **e-motor position**, and how it interacts with other powertrain components, that require sensor technology to help monitor.

DELO adhesives have a place in powertrains of either motor type. They are proven to be reliable and extremely resistant to heat and harmful chemicals found in the engine and transmission. Plus, they can be dispensed onto virtually any geometry thanks to their adjusted flow behavior and corresponding DELO equipment. This all makes them not only useful, but vital to any automotive motor assembly.



35%

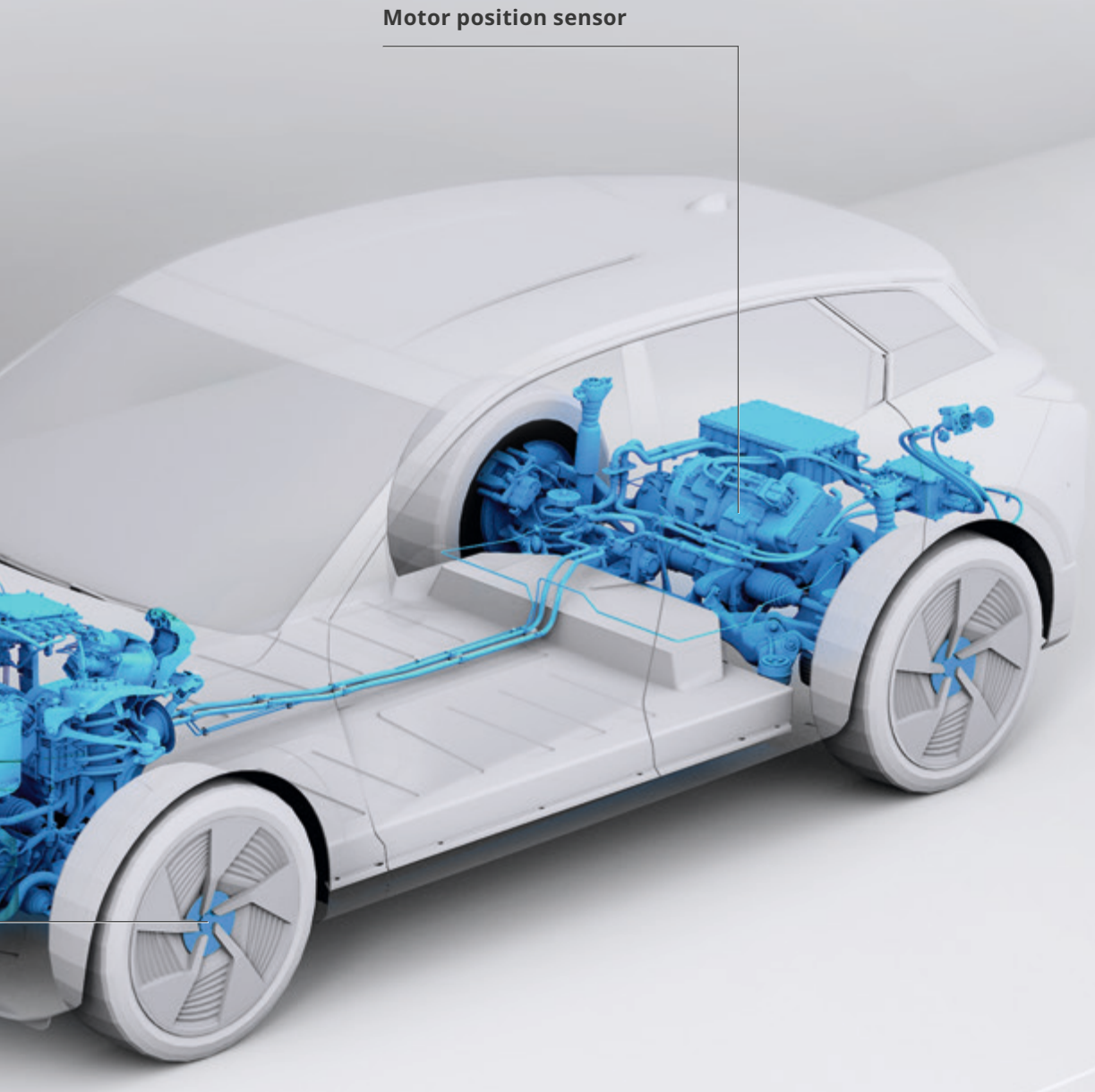
of produced cars in 2024 are electrified.

65%

of produced cars in 2024 are running with internal combustion engines.

50/50

split between ICE and EVs projected within the next five years.



Motor position sensors

These measure multiple aspects within electric motor operation, including changes in the surrounding magnetic or inductive fields as well as the position of the rotation angle. They are used for brake control as well as commutation between gasoline and electric motors in hybrid motor technologies.

Applications

› High volume potting

Assembly processes

› Fast heat curing
› Activation on the flow

Potting

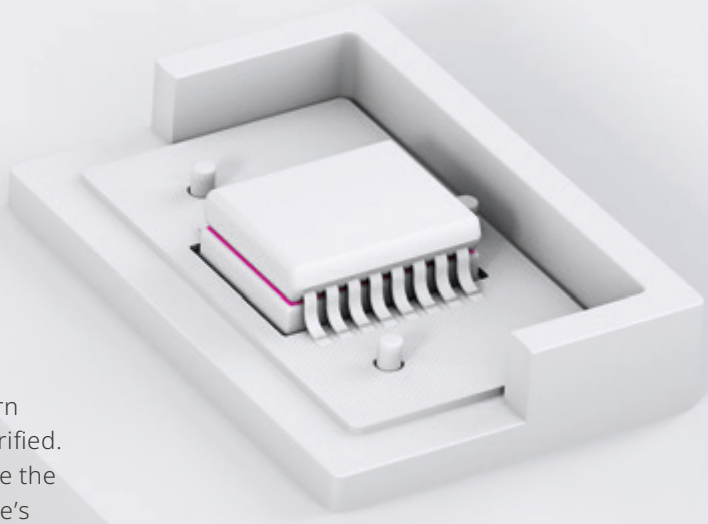
Potting compounds provide optimal protection for automotive electronics, especially those close to the engine compartment that are constantly exposed to media and high temperatures. With potting compounds, the adhesive can flow directly and encapsulate components of any geometry, ensuring appropriate protection.

Product features

Sensor potting
Fast curing Light fixation or fast heat curing
High temperature and media resistance up to 3,000 h

Pressure sensors

Pressure sensors are an essential part of any modern automotive powertrain, whether traditional or electrified. As their name would indicate, these devices measure the pressure of various fluids found throughout a vehicle's powertrain, including oil, coolant, or fuel if applicable. In EVs specifically, these sensors are also used to measure non-fluidic pressure as a means of thermal management.



Adhesive

Applications

› Sensor bonding

Assembly processes

› Heat curing
› Dual initiator (DI)

Partnership

With pressure sensors already being a rather small structure, bonding pressure sensor semiconductor chips can prove to be a challenging task. DELO has partnered with microelectronics semiconductor supplier Melexis to jointly develop a tailor-made adhesive specifically for this purpose.

Product features

Sensor bonding

Highest bonding strength
up to 200 bar

High temperature and media resistance
up to 3,000 h

Exhaust gas recirculation

Innovations in internal combustion engines have primarily come in the form of combustion optimization and emissions management. Exhaust gas recirculation (EGR) valves work by returning a portion of exhaust gas to an engine's combustion chambers via the intake manifold. This, in turn, not only reduces combustion temperatures, but also cuts down noxious gases.

Applications

› Hall sensor fixation
› Small volume potting

Assembly processes

› Dual curing: light and heat
› Dual curing: light and humidity
› Activation on the flow

Smart curing process

DELO adhesives and dispensing technology enable dual-curing and activation on the flow. This allows for adhesives used for EGR valves to cure quickly while efficiently utilizing the energy required. Specifically designed flexible adhesives come with properties that allow them to withstand an exhaust system's harsh temperatures.

Product features

Hall sensor fixation	Small volume potting
	
Fast light fixation Immediate handling strength	Excellent flowability
Reliable final curing in shadowed areas	High temperature and media resistance up to 3,000 h

Wheel speed sensors

These sensors rely on the Hall effect to measure wheel speed on a vehicle. Using a rotating magnetic cap, changes of the magnetic field surrounding the wheel are measured.

Adhesive

Applications

› Hall sensor bonding
› Magnet bonding

Assembly processes

› Preactivation
› Anaerobic curing

An extensive automotive product portfolio

DELO has a broad range of products—from adhesives to dispensing and curing equipment—engineered specifically for the fixation of several automotive components such as magnet caps or Hall sensors. Some of our automotive products feature technologies such as preactivation or anaerobic curing to help optimize manufacturing processes.

Product features

Hall sensor bonding	Magnet bonding
	
Fast light fixation Immediate handling strength	Fluorescent dyes available for adhesive detection
Reliable final curing in shadowed areas	Additional light fixation possible

Process equipment and resources

to easily integrate into your facility

Whatever your adhesive needs may be, there surely is dispensing and curing equipment that goes along with them. Fortunately, we at DELO have the resources you need to make sure that our products can be integrated with ease.

If your application requires the adhesive to be dispensed at a precise amount at an exact geometry, we offer a wide range of **DELO-DOT dispensing equipment** that can help realize those specifications.

We also offer light curing solutions for all applications. We have **DELOLUX curing lamps** in sizes varying from area lamps that can be arrayed to create larger areas to medium-sized lamps and ultra-small spot lamps for smaller bonding areas. One of these will certainly fit your specific application geometry. Coupled with our irradiation control modules, we have solutions to ensure your desired curing process and subsequent production yield is met.

300

Hz continuous dispensing frequency with DELO-DOT PN5.

500,000

mPa·s maximum dispensable viscosity.

30+

years light-curing expertise.

20,000

hour-long DELOLUX LED lamp service life.

DELO's portfolio supports all processes

With different automotive applications coming with their own requirements for strength, durability and reliability, a key determinant of an adhesive's compatibility with a specific application is its curing mechanism and how well it guarantees a long-lasting bond.

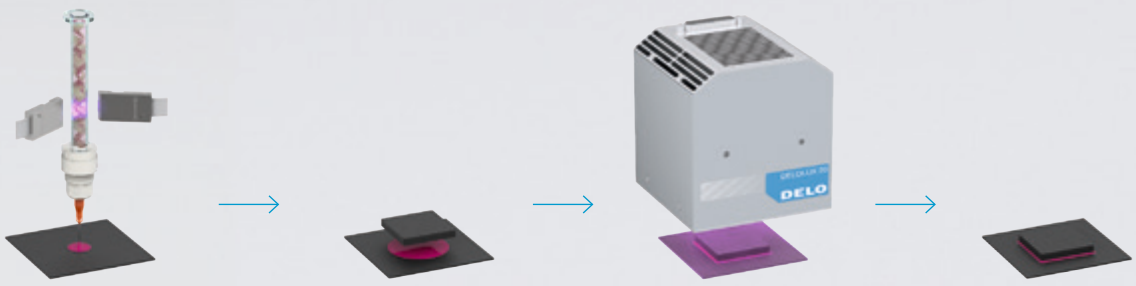
DELO adhesives can be used in all curing processes commonly found in high-tech automotive production. These include light curing, heat curing and dual curing, the latter of which is a combination of light fixation and a secondary curing mechanism, typically heat or humidity.

In addition, some DELO materials are available with preactivation—a process technology that leverages light curing for opaque materials—as well as dual-initiator technology, incorporating preactivation with additional light fixation for faster processing.

One particularly interesting technology unique to DELO is activation on the flow—shown in the figure below—which utilizes UV light to "activate" curing as the adhesive is being dispensed. This unique process comes with a host of advantages, often **cutting process costs in half** and **nearly eliminating all carbon emissions** while enabling **full design freedom**.

Whichever curing process or equipment you choose, we work closely with the automotive industry's leading machine integrators across the globe to seamlessly fit our dispensing and curing solutions in your production lines. This strong network of partners allows us to serve all of our customers best, providing them peace of mind that everything works well.

Activation on the flow – Process



Dispensing and irradiation in one step with DELO-ACTIVIS	Joining	Optional: UV fixation with DELOLUX 20	Final curing at room temperature

Innovative process

With **DELO-ACTIVIS activation on the flow**, DELO has developed a technology that, for the first time, combines the process steps of dispensing and preactivation. This opens up a wide range of new possibilities for product and process design. Since the flow-activated adhesive starts the curing reaction after a defined and controlled open time, it can be used to bond or seal geometries impenetrable by UV light, such as shadowed areas like undercuts.

As a time-saving and cost- and energy-efficient technology, activation on the flow can be a potential alternative for heat curing, standard dual curing (light fixation and heat curing) and two-component curing processes.

By enabling two independent light curing process steps in one adhesive formulation, it ensures fast production processes, minimizing production costs as there is no need to operate a curing oven, significantly reducing carbon footprint. Thus, with its preactivation step, this process helps bring the end user a substantial process cost savings.

Your benefits at a glance

>50 %

process cost savings by DELO-ACTIVIS compared to heat curing.

>98 %

reduced carbon emissions without heat curing.

100 %

design freedom for all geometries.

DELO Industrial Adhesives

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

delo-adhesives.com

01 / 2025