sonderhoff

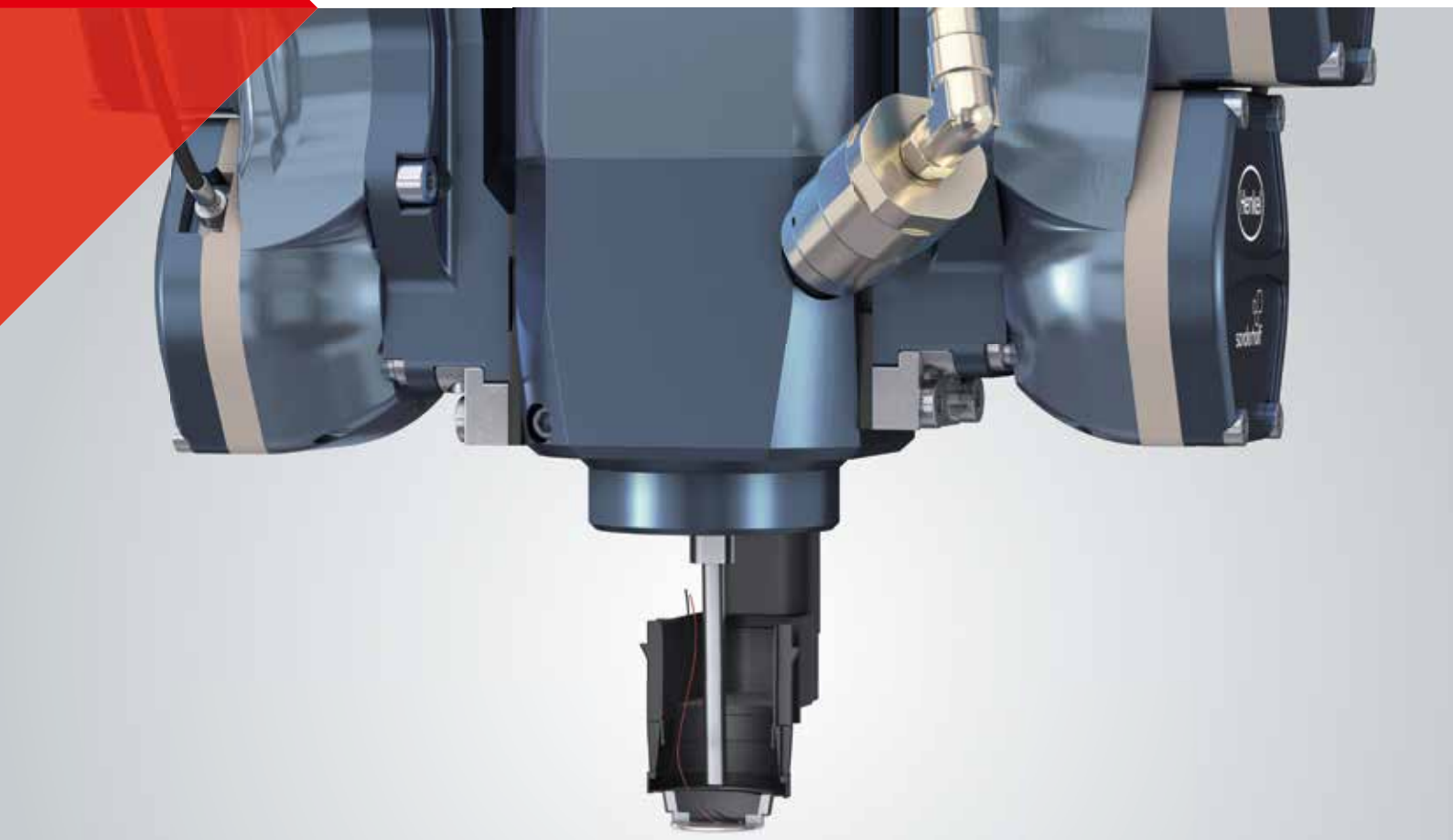
SYSTEM SOLUTIONS

MORE THAN

50

YEARS OF EXPERIENCE IN SYSTEM SOLUTIONS

POTTING OF ULTRASONIC PARKING DISTANCE SENSORS



Henkel

High measurement accuracy resulting from vibration-damped distance sensors

Advanced Driver Assistance Systems, commonly referred to as ADAS, are becoming far more common in modern-day vehicles. Key to enabling ADAS functionality is the cooperation of cameras, radar and LiDAR (Light Imaging, Detection and Ranging) as well as multiple ultrasonic sensor systems, all of which work together to identify objects, pedestrians and potential hazards for the driver, and thus ensure the safety of drivers, passengers and pedestrians. According to the measurement accuracy of the driver assistance systems used and the ultrasonic sensors, the recorded data is transmitted directly and immediately to the vehicle's on-board computer. On the basis of this data, the connected control devices can trigger the necessary actions in real time.

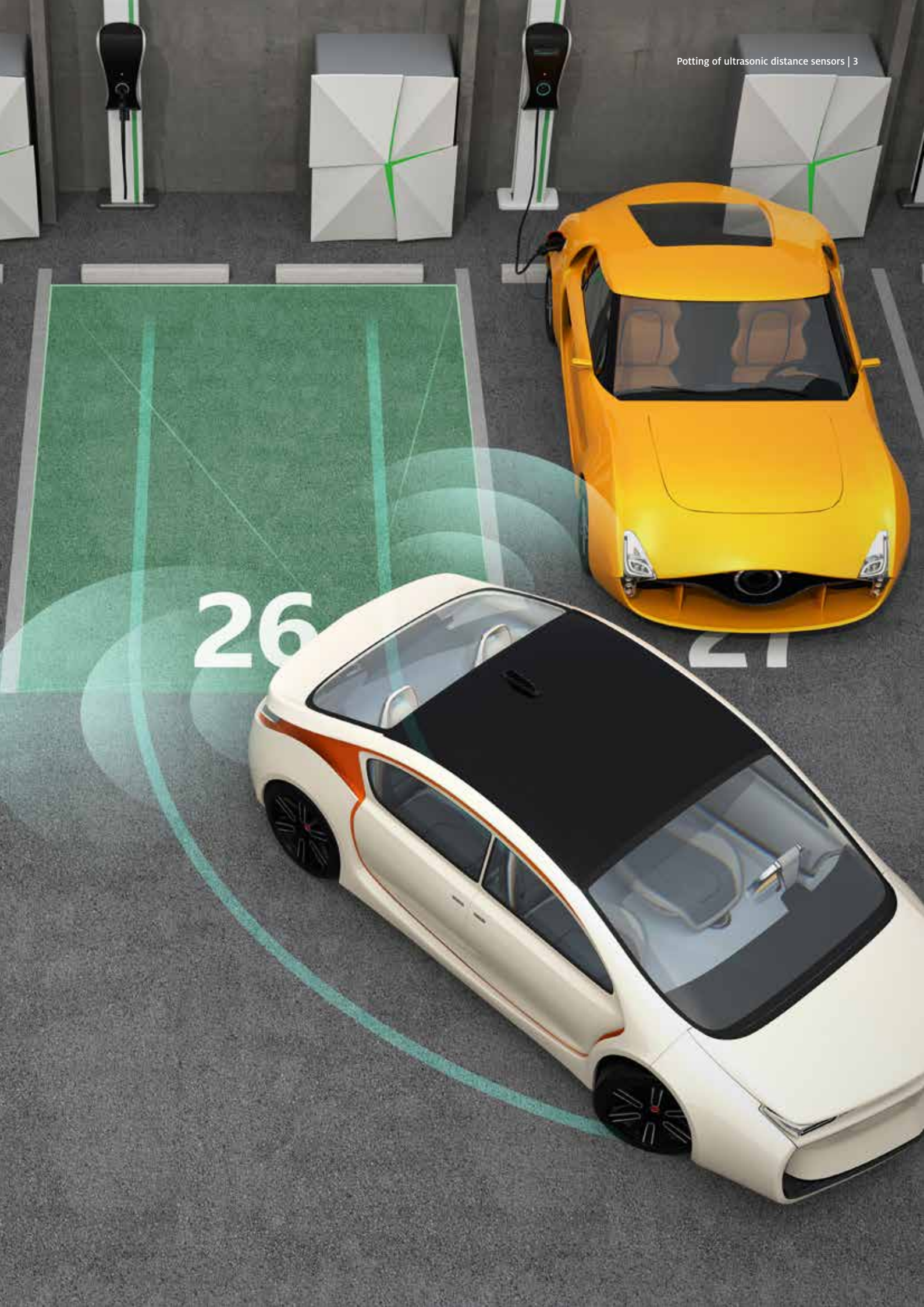
Today's vehicles have up to 8 distance sensors at the front and rear in the standard vehicle and 10 to 12 sensors in the premium vehicle. The sensors used today can calculate the distances even more accurately which is crucial for the safety of modern mobility and traffic systems, especially self-driving cars.

Henkel's FERMASIL silicone foam is used to provide a vibration-damping seal for the piezo sensors, which calculate distances with maximum precision.

The properties of FERMASIL silicone foams, tailored to requirements, are critical in ensuring reliable and functioning ultrasonic sensors. Our fully automatic mixing and dosing systems ensure highly accurate processing and dosing of these.

Are you also faced with the task of encapsulating distance sensors with extreme accuracy in high quantities and at high process speeds with very small material quantities?

We are able to do this with our dosing technology. Within the cycle times specified by our customers, we can apply even the smallest quantities with a highly repeatable accuracy of +/- 0.01 mm into the sensor housings.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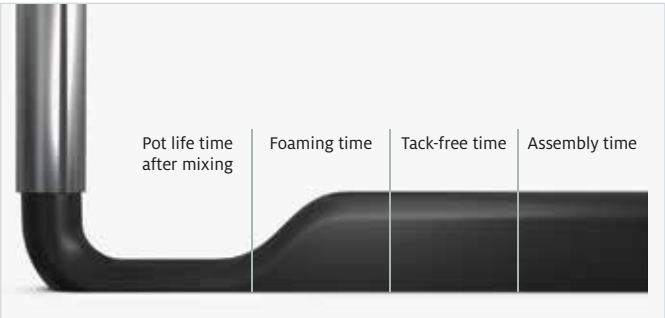
Reliable ultrasonic sensors due to vibration damping

Optimally potted with special silicone foam

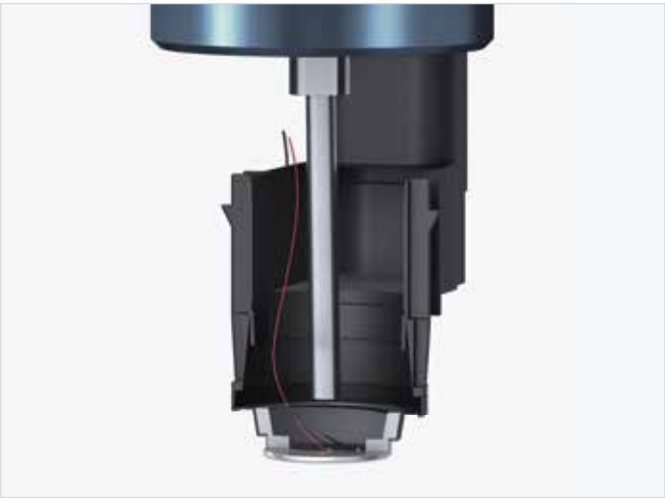
The distance sensors work according to the ultrasonic echolocation principle. The sensors emit short ultrasonic pulses that are reflected by obstacles. The echo signals are registered by the sensors and evaluated by a central control device. In this way, the sensitive systems of the sensors always provide the car's on-board computer with accurate data.

The piezoelectric distance sensors offer the best conditions for generating and detecting the ultrasonic waves. The piezo actuator works as a transmitter and receiver. It emits an ultrasonic pulse that is reflected by an object or obstacle. The required travel time of the resonant frequency is a measure of the distance covered. The distance measurement is based on the travel time difference when ultrasonic pulses are alternately transmitted and received.

The piezo actuator is located on the cavity floor of the sensor housing and is potted with the two-component silicone foam FERMASIL A-33-4 and B-33-4 for vibration damping.



The different reaction phases of the sealing foam in the chronological sequence



Potting of the piezo with FERMASIL silicone foam

	FERMASIL A-33-4 FERMASIL B-33-4
Mixing ratio	1 : 1
Pot life time	280 sec.
Tack-free time	35 min.
Viscosity A component	9,000 mPas
Viscosity B component	5,200 mPas
Bulk density	0.74 g/cm³
Hardness (Shore A)	24
Temperature resistance	from -60 to +180 °C

The FERMASIL silicone foam is applied to the piezo in the ultrasonic distance sensor and ensures consistent vibration damping.

After curing the silicone foam is characterized by a high level of elasticity, so that temperature differences from -60 to +180 °C can be met. FERMASIL is also weather-resistant and has very low water absorption levels thanks to its almost closed foam cell structure. This is the perfect solution to keep the required properties of ultrasonic distance sensors consistent.

Flexible and fully automatic – according to your requirements

Customer-specific mixing and dosing systems for accurate and efficient dosing processes

As process experts, we support our customers with individual advice for the automation of your manufacturing processes. We offer numerous configuration and equipment options for semi-automatic or fully automatic production systems, using either the 3-axis linear robots or 6-axis robots.

The ultrasonic distance sensors are fed for the application of the sealing foam via a conveyor belt system that runs through the SMART-L dosing cell. The centering station positions the sensor housing for the encapsulating of the sensors with FERMASIL silicone foam.

Despite the usually high volumes of parts and process speeds, the dosing cell is able to dispense even the smallest quantities into the sensor housing via the MK 825 PRO precision mixing head with a positioning accuracy of +/- 0.01 mm and no deviations from the specified cycle times.

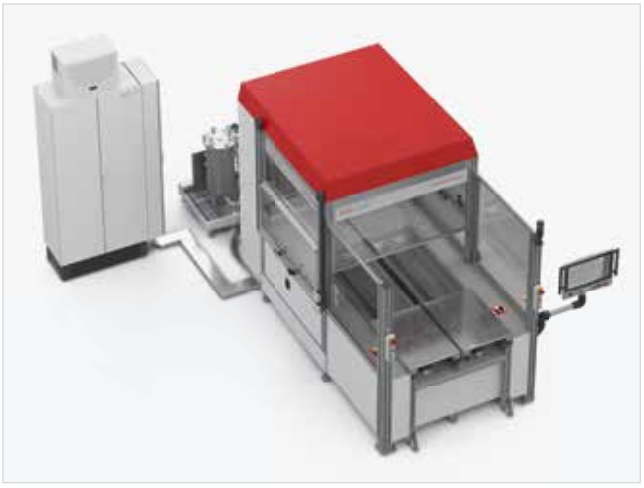
The main focus of all our solutions is to ensure very reliable plant engineering, minimized maintenance times and consistent dosing quality. Due to the traceability of the dosing program data, all process data can be traced while production is running.

The electronic control devices, safety engineering and industrial PC are installed in the **control cabinet**.

The **dosing machine cabinet** contains the components of the dosing periphery such as the dosing pumps, the optional Peltier cooling and the high-pressure unit for cleaning the mixing head.

Material pressure tanks (24 l or 44 l single-walled or double-walled) with minimum level sensors, on a grating platform with adjustable leveling feet and drip tray

Process information for the plant reference configuration	
Dispensing quantity	1 g/sec.
Dispense time	1.5 sec. / part
Component size	20 mm x 10 mm
Cycle time	approx. 3 sec.



Alternative reference system of the SMART-L dosing cell with **sliding table**. Two shuttle tables operating in pendulum mode enable the parts to be processed on one level. This means that very short cycle times and continuous operation can be guaranteed.

The multifunctional **MP 2 mobile panel** (10.1" WXGA TFT) enables convenient operation of the dosing system.

Optionally available: **CONTROL 2 touchscreen operating panel** (21.5") for operating the dosing system

MK 825 PRO precision mixing head with high-pressure water rinsing

This is why you should use the FIPFG technology in your production process

Advantages of the Formed-In-Place-Foam-Gasket Technology

- Sealing standard in many industrial sectors
- Highly accurate material application controlled by contour robots
- Processing and full curing at room temperature
- Harmonized coordination of the material system and dosing system
- Suitable for 2D and complex 3D part geometries
- More efficient use of materials compared to punched seals
- More cost effective compared to 2K injection molding, as there are no tooling costs
- High degree of future viability, due to solution flexibility in a wide variety of industries & applications

Advantages of our mixing and dosing machines

- Combination of processes (bonding, foaming, potting)
- High flexibility of the dosing system
- Simple, intuitive human interface
- Automatic material preparation incl. handling
- High dosing and repeat accuracy
- Short machine downtimes and cycle times
- Fine-cellular foam structure due to dynamic mixing
- Reproducible foam quality
- Ecological high-pressure water rinsing
- Easy maintenance

Advantages of our FIPFG foam gaskets

- More cost-effective than compact systems due to lower foam density
- Seamless seal / low visible coupling point
- Compensation of component tolerances
- Excellent resilience after compression
- Multiple compression and recovery processes possible
- Broad range of properties / wide variety of recipes
- Individually adaptable formulations
- Good form fit to the component contour
- Resistant to moisture, dust, temperature & media
- Flame-retardant according to UL 94
- IP classes up to IP 68 or NEMA 4 to 6 and NEMA 12
- Special PU foam with low VOC emissions
- Very fast reacting PU foam (Fast-Cure)

Perfectly coordinated solutions of material, machine and contract manufacturing

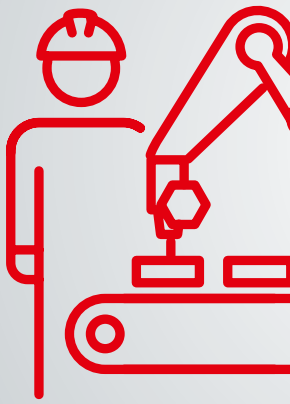
With its Sonderhoff brand, Henkel has not only acquired many years of experience in the manufacturing of tailor-made 2 component sealing systems and mixing and dosing machines, but also process expertise for very precise material application using the FIPFG (Formed-In-Place-Foam-Gasket) technology.

With the Sonderhoff portfolio, we offer our customers the advantages of a system provider from a single source and the solutions to meet your technical and commercial challenges.

With the dosing technology that is tailored to our sealing foams, we ensure efficient production processes in accordance with the requirements of fully automated series production.

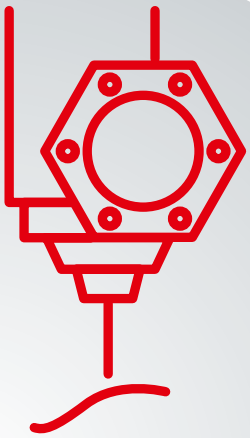
If you would like to take advantage of all the benefits of the FIPFG technology for your production in a flexible, fast, and effective manner, we provide sealing solutions for your components at one of our many contract manufacturing sites worldwide without having to make your own acquisition investments. There, the spectrum ranges from the sampling of prototypes and small batch series to production scale manufacturing.

The choice is yours! You can either decide in favor of our all-inclusive package, consisting of material, machine and contract manufacturing, supported by application advice, sampling and training or you can choose the individual solutions that suit you best. We combine our products and services from a single source in such a way that you receive the optimum solution for your requirements profile.



MANUFACT

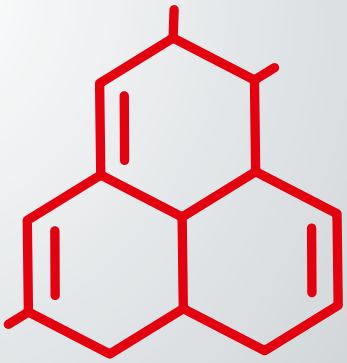
Flexibility & Precision



EQUIPMENT

Automation Solutions

URING



MATERIALS

Customer-specific solutions – worldwide and for many industries

The Henkel specialists for the Sonderhoff portfolio are available to you worldwide

KOLO, POLAND
External Subcontracting Location

LONDON, GB
External Subcontracting Location

COLOGNE, GERMANY
Center of Expertise

ELGIN, ILLINOIS, USA
Regional Hub

RICHMOND (KANSAS CITY), USA
Regional Hub

DORNBIRN, AUSTRIA
Center of Expertise

BARCELONA, SPAIN
External Subcontracting Location

OGGIONO, ITALY
Regional Hub

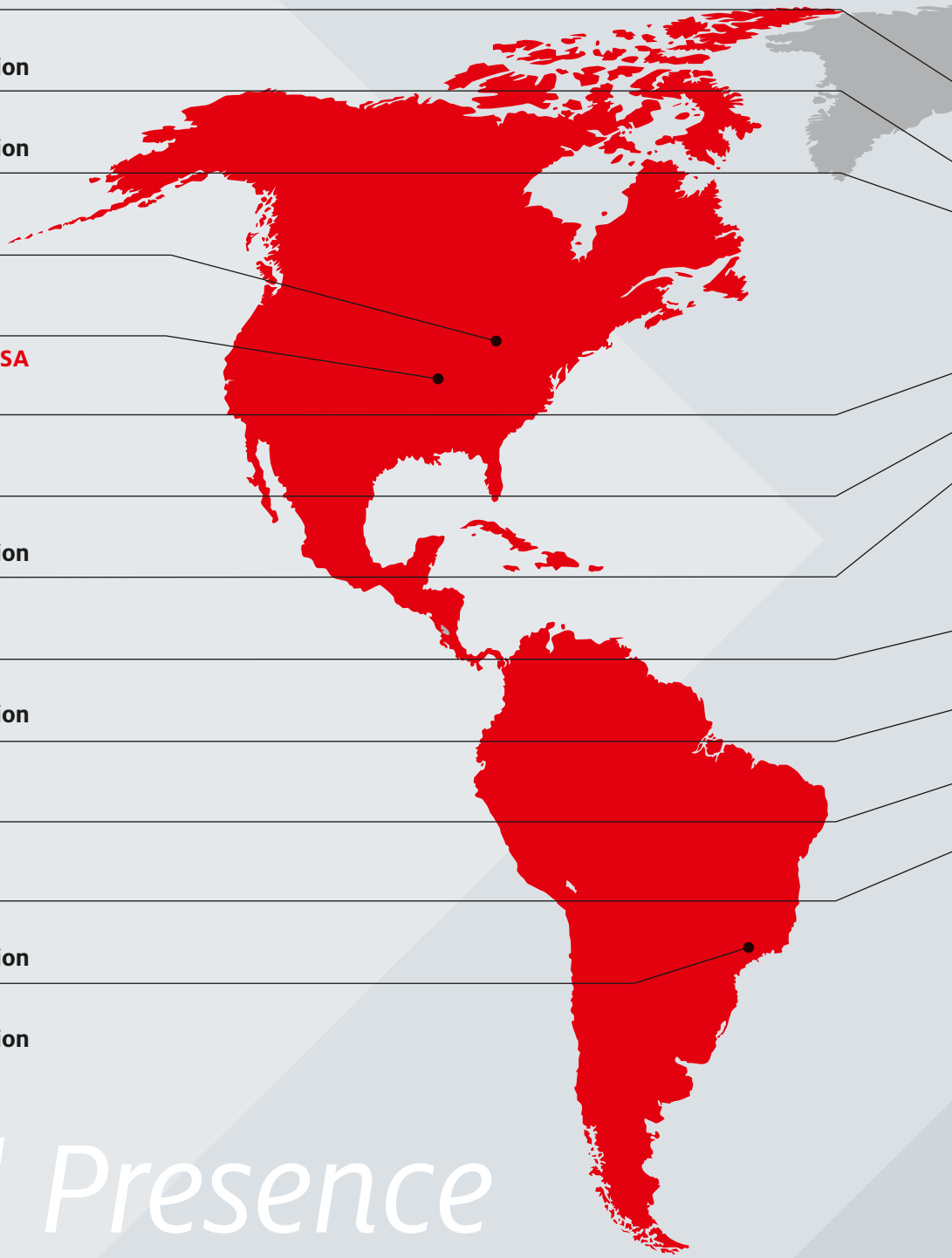
INCHEON, KOREA
External Subcontracting Location

SHANGHAI, CHINA
Regional Hub

PUNE, INDIA
Regional Hub

PUNE, INDIA
External Subcontracting Location

SÃO PAULO, BRAZIL
External Subcontracting Location



Global Presence

Every year, more than 300 million seals are manufactured in more than 50 countries using products from the Sonderhoff portfolio. At our “Centers of Expertise” and “Regional Hubs”, our specialists offer application engineering advice, e.g. on the selection of a suitable material system and the sampling of your components as well as project management for dosing systems and automation. We can offer training on how to handle the FIPFG technology and we will support you with the selection of spare parts and regular service. Furthermore, we will be pleased to take over parts of your production for you – from small to large series – at our subcontracting locations.

Sales staff at all other Henkel locations worldwide will also be happy to answer any questions and provide you with further information on our sealing, bonding and potting solutions. We look forward to hearing from you.

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