sonderhoff
SYSTEM SOLUTIONS

MORE THAN
50
YEARS OF
EXPERIENCE IN
SYSTEM SOLUTIONS

SEALING OF BATTERY HOUSINGS

The future of mobility is emission-free

Electrification is key to mobility and to making people's lives more sustainable. New and revolutionary technologies are driving the biggest transformation the automotive industry has seen in the last hundred years. The car of the future will be primarily electric, as well as connected to its environment and self-driving, in addition to other new types of drive.

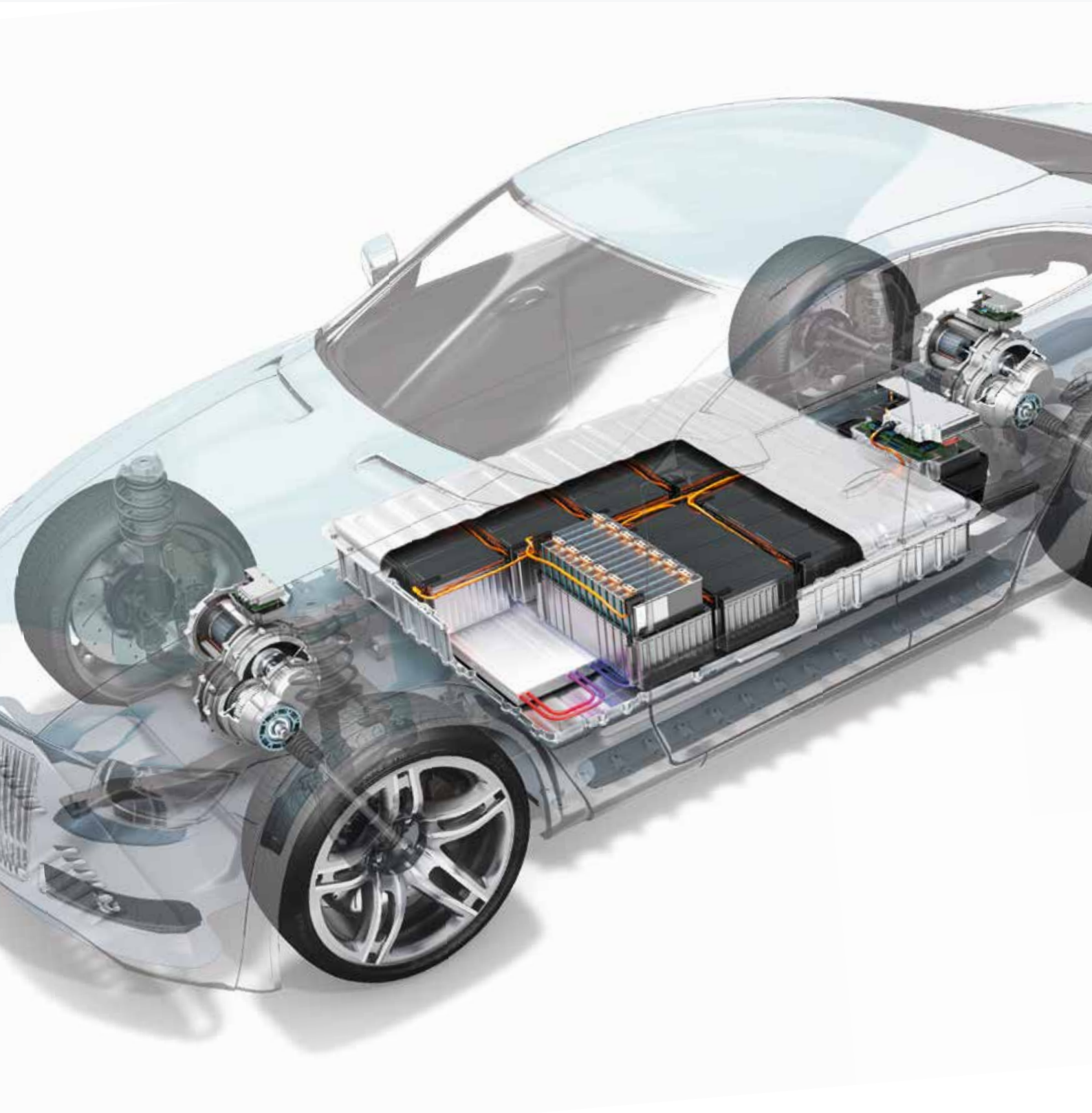
The market for e-mobility will continue to grow unabated in the coming years. According to the German government's National Development Plan, there will be around 2 to 3 million electric vehicles in Germany alone by 2025. To achieve the EU's goal of climate neutrality by 2050, experts say at least 30 million zero-emission vehicles will need to be on EU roads by 2030, with three million public charging stations and up to 1,000 hydrogen refueling stations.

But what does this radical upheaval mean for you? Does an increased production volume also present you with new challenges time and again? Henkel will be pleased to develop individual automation solutions for you according to your requirements.

Are you also wondering how you can make your production processes more efficient? As process experts, we ensure perfect interaction between our dispensing technology and the sealing system selected from our product portfolio.

Using FIPFG technology (Formed-In-Place-Foam-Gasket), you benefit from the advantages of efficient, process-stable application processes. As a result, you ensure the high quality of your component sealing. Special sealing foams from our product portfolio that can be further processed quickly also enable higher production output.

With its Sonderhoff brand, Henkel has many years of experience in sealing battery housings. As a manufacturer of sealing systems, mixing and dosing machines, and as a process expert for material application with FIPFG technology, we combine materials and engineering expertise. In this way, we offer you individual sealing solutions that improve the longevity of batteries for e-cars.



Customized material systems for securely sealed battery housings

We develop individually for your specific requirements

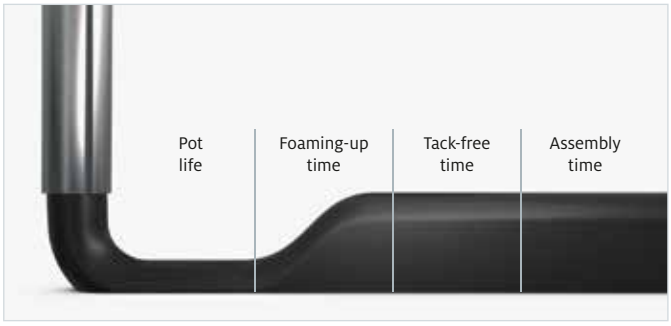
EV (Electrical-Vehicle) batteries for electrically powered vehicles are often exposed to extreme environmental conditions and the harshest vibrations. For this, perfect sealing of the battery housings and electrical insulation is essential for the optimum performance of these components.

The polyurethane sealing foams from the FERMAPOR K31 product family, which are used to seal the battery housings, protect EV batteries from vibrations, thermal shock, moisture, dust, and corrosion. This can extend the service life of EV batteries.

Developed for sealing battery housings, the fast-reacting 2-component polyurethane foam FERMAPOR K31-A-7060-5-B / K31-B-N is tack-free after only 3.5 minutes at room temperature. After the foam has reacted, the cover can be placed on the housing and screwed down after just 35 minutes.

In addition to the polyurethane-based reference product, the 2-component silicone foam seal FERMASIL 40C2-1-UL-FR is a very good alternative. It has a significantly higher temperature resistance. The sealing foam can be applied to 2D or 3D components, with or without groove, has low water absorption and good adhesion to steel, cast iron, aluminum, and plastics (some with pretreatment).

In addition to the reference products, we develop material systems according to your individual requirements.



The different reaction phases of the sealing foam in the time sequence.

The dosing application can be carried out on a flat surface or in a groove.

	FERMAPOR K31-A-7060-5-B FERMAPOR K31-B-N	FERMASIL A-40C2-1-UL-FR FERMASIL B-40C2-1-UL-FR
Mixing ratio	6.4 : 1	1 : 1
Pot life	30 sec.	50 sec.
Short tack-free time	3.5 min.	5 min.
Viscosity A-component	63,000 mPas	130,000 mPas
Density	0.32 g/cm³	0.26 g/cm³
Hardness (Shore 00)	60	40
Temperature resistance	from -40 to +80 °C	from -60 to +180 °C
Flame retardancy	./.	UL 94 V-0

The CNC-guided mixing head of the mixing and dosing machine moves along the housing contour and applies the 2-component polyurethane sealing foam with contour precision.

The unpressed foam seal before closing the housing.

The sealing function is achieved by compressing the foam seal.

The very good resetting ability of the foam seal allows the housing to be opened and closed repeatedly for maintenance purposes without any loss of tightness. After screwing, the housing is tight, and the batteries are protected against splash water and weather influences.

Flexible and fully automatic – according to your requirements

Mixing and dosing system with 6-axis robot and conveyor belt for parts feeding

An important success factor for the high-quality sealing of battery housings is the efficiency of the overall solution and thus the optimal integration into your production. As a process expert, we offer you individual advice for the tailor-made automation of your production processes. For this purpose, we have numerous configuration and equipment options in our portfolio for semi-automatic or fully automatic production, either with 3-axis linear robots or via the use of 6-axis robots. We would be pleased to work with you to develop your individual automation solution according to your requirements.

In the reference configuration shown, the battery housings are fed to our DM 502 dosing system via a conveyor belt system in a cycle defined for this purpose. For the dosing application of the polyurethane foam, the 6-axis robot guides the mixing head precisely over the housing contour. The sealing foam is applied precisely and fully automatically with high repeat accuracy.

Thanks to the automatic recording of the dispensing program data, all process data can be traced and later evaluated via the operating panel during ongoing production. In all solutions, our main focus is on highly reliable system technology, a stable process, minimized maintenance times and consistently high dosing quality.

The control electronics, safety technology and industrial PC are installed in the **control cabinet**.

Separate standing **material pressure tanks** (24 L or 44 L, single-walled or double-walled) with capacitive minimum fill level sensors, on grating platform, with adjustable leveling feet and drip pan

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

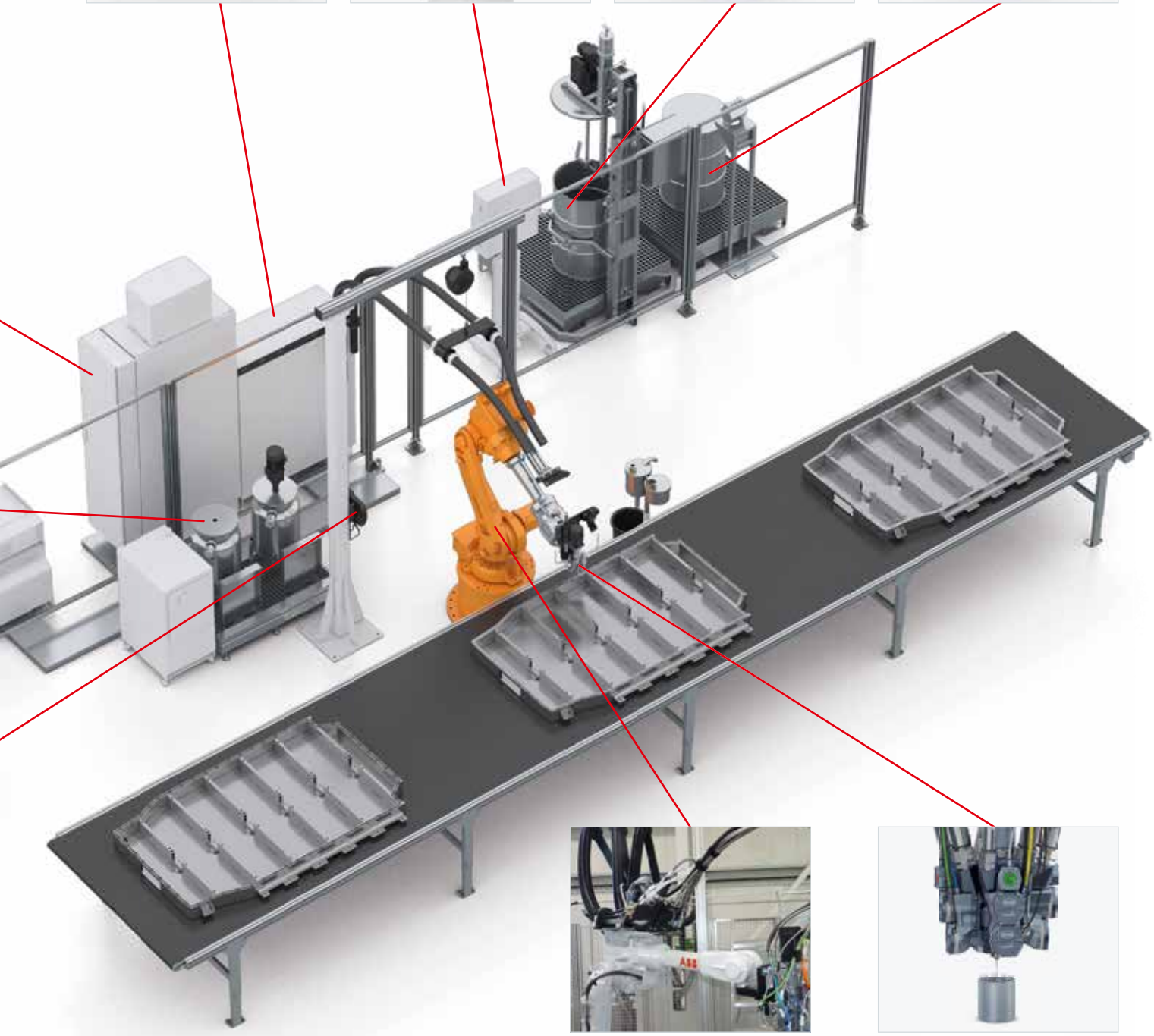
Process information on the reference configuration	
Discharge rate	3.0 g/s
Traversing speed	9.5 m/min.
Component size (L x W)	2,000 x 1,500 mm
Cycle time per component	approx. 44 sec.

The **dosing machine cabinet** contains the components of the dosing periphery such as the dosing pumps.

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

Optional:
Automatic **barrel-type refill station ELEVATOR** for the **A-component** with pneumatic lift and agitator

Optional:
Automatic **barrel-type refill station SUPPLY TAP** for low-viscosity products, e. g. isocyanates (B-component)



The **6-axis robot** guides the mixing head for dosing application precisely over the housing contour.

The sensor-controlled 2 / 3-component **precision mixing head MK 800 PRO** with high-pressure water rinsing and dynamic mixing

An alternative reference configuration

Mixing and dosing system with mixing head traversing unit for foam application and 6-axis robot for parts' handling

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In the reference configuration shown, the arm of the 6-axis robot holds the battery housing with cover and moves it below the mixing head of our DM 502 dosing machine for contour-accurate dispensing application. The foam is applied fully automatically and very precisely with high repeat accuracy. This results in a foam seal on the battery housing cover.

The battery housing is mounted under the vehicle underbody. This compresses the foam seal and thus achieves the sealing function.

Thanks to the automatic recording of the dispensing program data, all process data can be traced and later evaluated via the operating panel during ongoing production. In all solutions, our main focus is on highly reliable system technology, a stable process, minimized maintenance times and consistently high dosing quality.

The **dosing machine cabinet** contains the components of the dosing periphery such as the dosing pumps.

Separate standing **material pressure tanks** (24 L or 44 L, single-walled or double-walled) with capacitive minimum fill level sensors, on grating platform, with adjustable leveling feet and drip pan

2-axis mixing head traversing unit for the precise positioning of mixing heads to different positions for the application of polymeric reactive materials – optionally with electric or pneumatic drive.

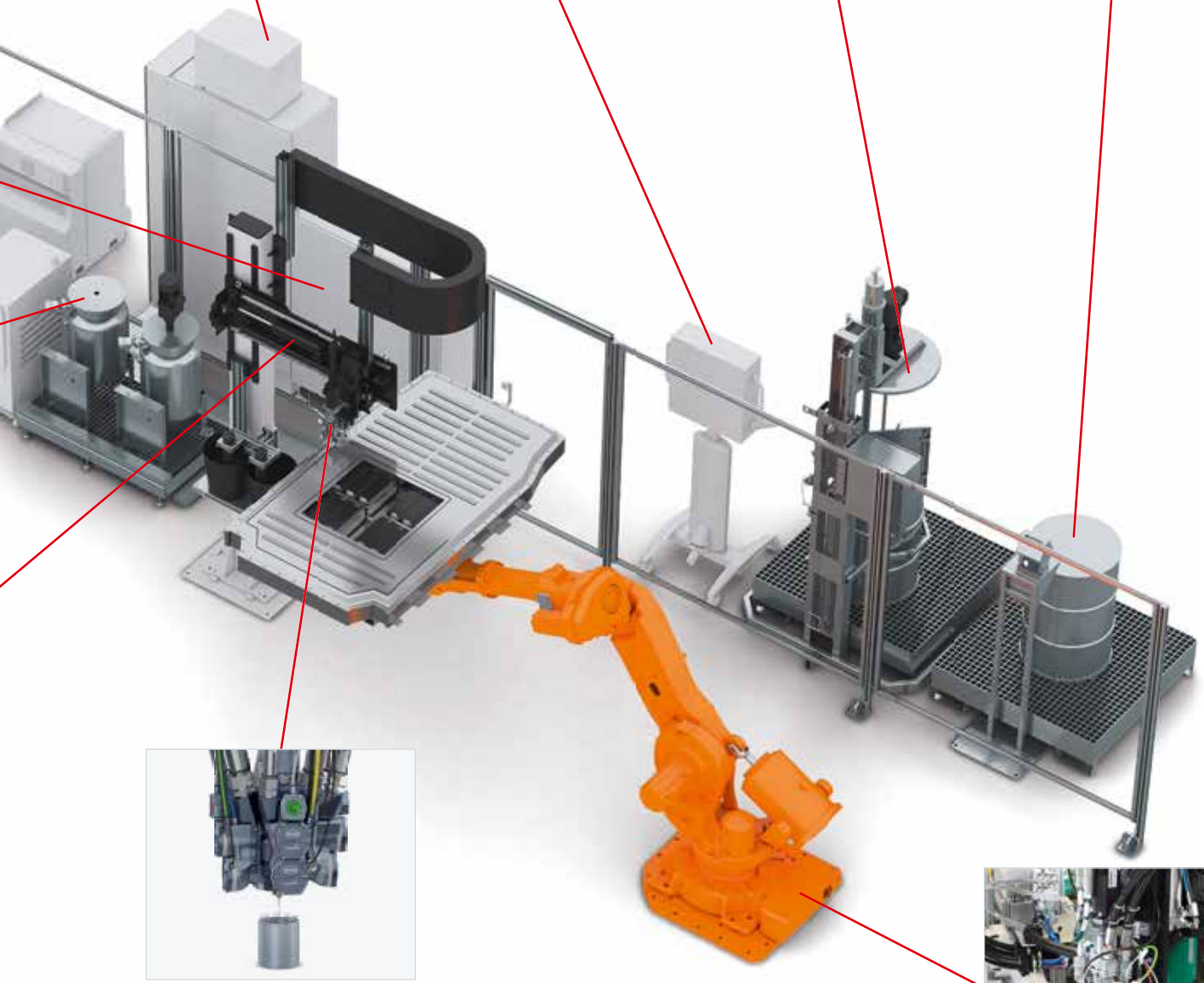
Process information on the reference configuration	
Discharge rate	3.0 g/s
Traversing speed	9.5 m/min.
Component size (L x W)	2,000 x 1,500 mm
Cycle time per component	approx. 44 sec.

The control electronics, safety technology and industrial PC are installed in the **control cabinet**.

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

Optional:
Automatic **barrel-type refill station ELEVATOR** for the **A-component** with pneumatic lift and agitator

Optional:
Automatic **barrel-type refill station SUPPLY TAP** for low-viscosity products, e. g. isocyanates (B-component)



The sensor-controlled 2 / 3-component **precision mixing head MK 800 PRO** with high-pressure water rinsing and dynamic mixing

The **6-axis robot arm** moves the battery housing below the mixing head for contour-accurate dispensing application.

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

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

- Sealing standard in many industrial sectors
- High-precision material application controlled by contour robots
- Processing and reaction at room temperature
- Perfect coordination of material system and dosing equipment
- Suitable for 2D and complex 3D part geometries
- More efficient use of material compared to punch seals
- Less expensive compared to 2C injection molding because no tooling costs
- High future viability, as it can be used in a wide range of industries & applications

Advantages of our mixing and dosing machines

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

Advantages of our FIPFG foam gaskets

- Lower cost due to low foam density, compared with compact systems
- Seamless gasket / hardly visible coupling point
- Compensation of component tolerances
- Good resetting ability
- Multiple compression and decompression possible
- Wide range of properties / variety of formulations
- Individually adaptable formulations
- Good form fit to the component contour
- Resistant to moisture, dust, temperature & media
- Flame retardance 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

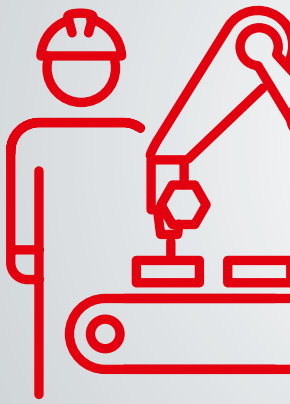
Henkel's technology solutions are designed to optimize the safety, reliability, and efficient assembly of EV battery systems.

With the Sonderhoff portfolio, we offer the solution to your technical and commercial challenges in electromobility, through a unique combination of individual material systems, customized mixing and dosing machines and process expertise.

If you would like to take advantage of all the benefits of FIPFG technology for your battery production flexibly, quickly, easily and without your own initial investment, we can take care of the sealing of your components by expert hands at one of our contract manufacturing sites worldwide. There, the spectrum ranges from prototype sampling and small series to series production on a production scale.

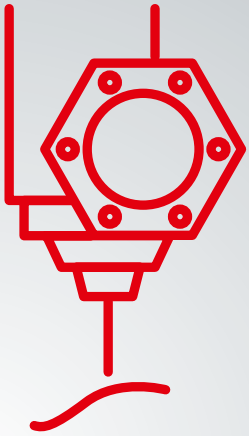
With over 60 years of experience in the automotive industry, our global team of solution engineers has an unparalleled understanding of applications and processes when it comes to co-developing sustainable production processes and the requirements of fully automated series production.

We combine our products and services from a single source in such a way that you receive the optimum solution for your requirement profile for long-lasting, reliable battery protection. To this end, we develop and manufacture the appropriate sealing systems and provide dosing technology tailored to your production processes.



MANUFACT

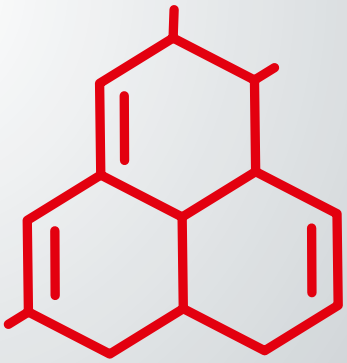
Flexibility & Precision



EQUIPMENT

Automation Solutions

URING



MATERIALS

Customized solutions – worldwide and for many industries

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

KOLO, POLAND
External Subcontracting Location

LONDON, UK
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

Globally present

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

But also, at all other Henkel locations worldwide, our sales staff will be pleased to answer your 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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