

# Solutions for e-mobility



**KOHLHAGE**  
*E-Tech*



The youngest member of the **KOHLHAGE** Group: At **KOHLHAGE** E-Tech a large number of well-trained engineers and technicians work on developing individual solutions for electrically powered vehicles. Engineering is almost still the smaller part of the daily work. Thanks to the experience of the sister company **KOHLHAGE** Automotive to manufacture complex assemblies in series production in a process-safe way, **KOHLHAGE** E-Tech can also implement its own concepts directly in production at the Neuenrade site and thus realise complete solutions for passenger cars and smaller commercial vehicles.

### **Structural components**



### **Aggregate carrier**



The core products are individually developed, special carrier frames to accommodate electric motors and various attachments in electrically powered vehicles. The already existing competences of the **KOHLHAGE** Group in the processing of tubes (bending, laser cutting, welding, coating) are brought to a particularly high level of exceptional quality.



## Stretch Bending

Car body assemblies made of aluminium square profiles are the basis for automotive lightweight construction. These are formed into highly complex contours using the stretch-bending process.

**KOHLHAGE** Stretch bending machines have up to 16 controlled axes and can bend even complex multi-chamber profiles made of steel, stainless steel and aluminium into almost any desired shape and contour with nominal forces of up to 300 kN.

## Bending, expanding

Tubes are shaped in many different ways in **KOHLHAGE** production. As these production processes are carried out without the addition of heat, they are referred to as “cold forming”.

The spectrum of **KOHLHAGE** processes in the machining of pipes ranges from bending to expanding the pipe diameter. In particular, the combination of these processes while maintaining tight customer-specific tolerances are a speciality of **KOHLHAGE** E-Tech.

**Bending:** It doesn't matter whether it's a round tube or a rectangular tube, **KOHLHAGE** bends tubes up to 50 mm outside diameter and a wall thickness of up to 3 mm made of steel, stainless steel, aluminium, copper or brass. In addition, the **KOHLHAGE** specialists have perfected the bending process to such an extent that they can recommend not only the appropriate bending angle but also the optimum distance between two bending radii. **KOHLHAGE** customers benefit from this.

**Cold forming**



**KOHLHAGE**  
E-Tech



## 100% precisely cut

As in the other production areas, **KOHLHAGE** relies on automation and robots when using laser technology. **KOHLHAGE** uses the laser in two areas of application:

- In the bending process tolerances in the tube length can occur. **KOHLHAGE** measures the parts automatically and compensates the tolerances by precise laser cutting.
- With handling robots the tube pieces are further processed automatically. Any shape can be cut out exactly at any position with the laser.

The high degree of automation in production means that **KOHLHAGE** can be fast and flexible, just as the customer requires. A positive side-effect of the high-precision laser cutting: In the further course of the production, the precisely cut laser holes can also be used for optimal positioning of the components.

## Lasering



## Assembly





## Welding

### Stable process

As with soldering, the heat applied during welding also causes components to change shape. This can be prevented by the optimal arrangement of fixtures and the deliberate definition of process sequences. There is also a risk of burn-through when welding tubes with a wall thickness of less than 1 mm wall diameter. **KOHLHAGE**'s welding engineers know this and have mastered welding technology in a wide variety of variants.

They focus on process stability:  
From the first to the last part.

**KOHLHAGE** pursues a safe-launch concept: The first 10,000 parts of a series are tested for leakage e.g. with compressed air. After that the process is defined and all further parts of the series meet **KOHLHAGE**'s high quality requirements.

### ZSB – Products made of more than just one piece



Today's customers require that a supplier is able to realize ZSB assembly processes. This is also the case with **KOHLHAGE**. In addition, a trend has developed over the years which leads to manufactured assemblies becoming more and more complex.

The spectrum of **KOHLHAGE** E-Tech processes ranges from setting of connecting elements with process reliability to assembling add-on elements such as castings up to pressing-in of rear axle drive (HAG) bearings.

For this reason **KOHLHAGE** has integrated assembly processes into automated production. From the simple fitting of O-rings to the attachment of add-on parts such as quick couplings or other components of all kinds.

**KOHLHAGE**  
E-Tech



**1929**

Founded as a trading company by Ernst Kohlhage

**1950**

Friedrich-Wilhelm Kohlhage takes over the management of the company

**1953**

KOHLHAGE becomes a turning shop with its own production facilities

**1970**

First production in Neuenrade Küntrop

**1986**

Division into trade (KOHLHAGE & Co. KG) and production (KOHLHAGE Verbindungstechnik GmbH)

## The KOHLHAGE Group

### Products for Automotive & Co.

**KOHLHAGE** is a medium-sized, owner-managed company, which has been successful in the market for more than 90 years and can build on this wealth of experience. More than 180 well-trained and committed employees make **KOHLHAGE** one of the first choices when it comes to finding solutions for demanding tasks in metal processing. Today **KOHLHAGE**'s headquarters is still in Neuenrade. Three of the five sites are also located there. But **KOHLHAGE** operates worldwide. With the production site in Kunshan (China) founded in 2016, the purchasing office in Taiwan and the logistic and warehouse site in Mexico, the owner-managed company from the Sauerland region is a global player.

The production focus within the **KOHLHAGE** Group is still in the automotive sector. However, market developments in recent years have led to the re-organisation and repositioning of the **KOHLHAGE** Group as well. For example, the foreseeable changes with regard to e-mobility have led to the founding of **KOHLHAGE** E-Tech. However other companies in the group also serve other markets today, from the plastics industry to special machine construction.

## KOHLHAGE Fasteners

### High-Quality solutions for fastening technology

**KOHLHAGE** Fasteners always comes into its own when it comes to demanding and complex tasks in fastening technology.

**KOHLHAGE** specialist fastening engineers and technicians work together with developers on the customer side to develop efficient solutions, particularly in the area of application technology consulting before the actual launch of a series product. Here, the **KOHLHAGE** specialists benefit from the fact that they are familiar with all common production processes and can therefore also recommend the most favourable and efficient production variant.

### Cold formed parts



### Inserts



### Stamped parts



### Turned parts



### Welding nuts, welding screws



[www.kohlhage.de](http://www.kohlhage.de)



**1997**

Complete move to Neuenrade Küntrop

**2012**

Renaming to KOHLHAGE Automotive GmbH & Co. KG and KOHLHAGE Fasteners GmbH & Co. KG

**2018**

Foundation of KOHLHAGE E-Tech GmbH

**2020**

Maximilian Schreiber (member of the Kohlhage family) joins the management team

**2022**

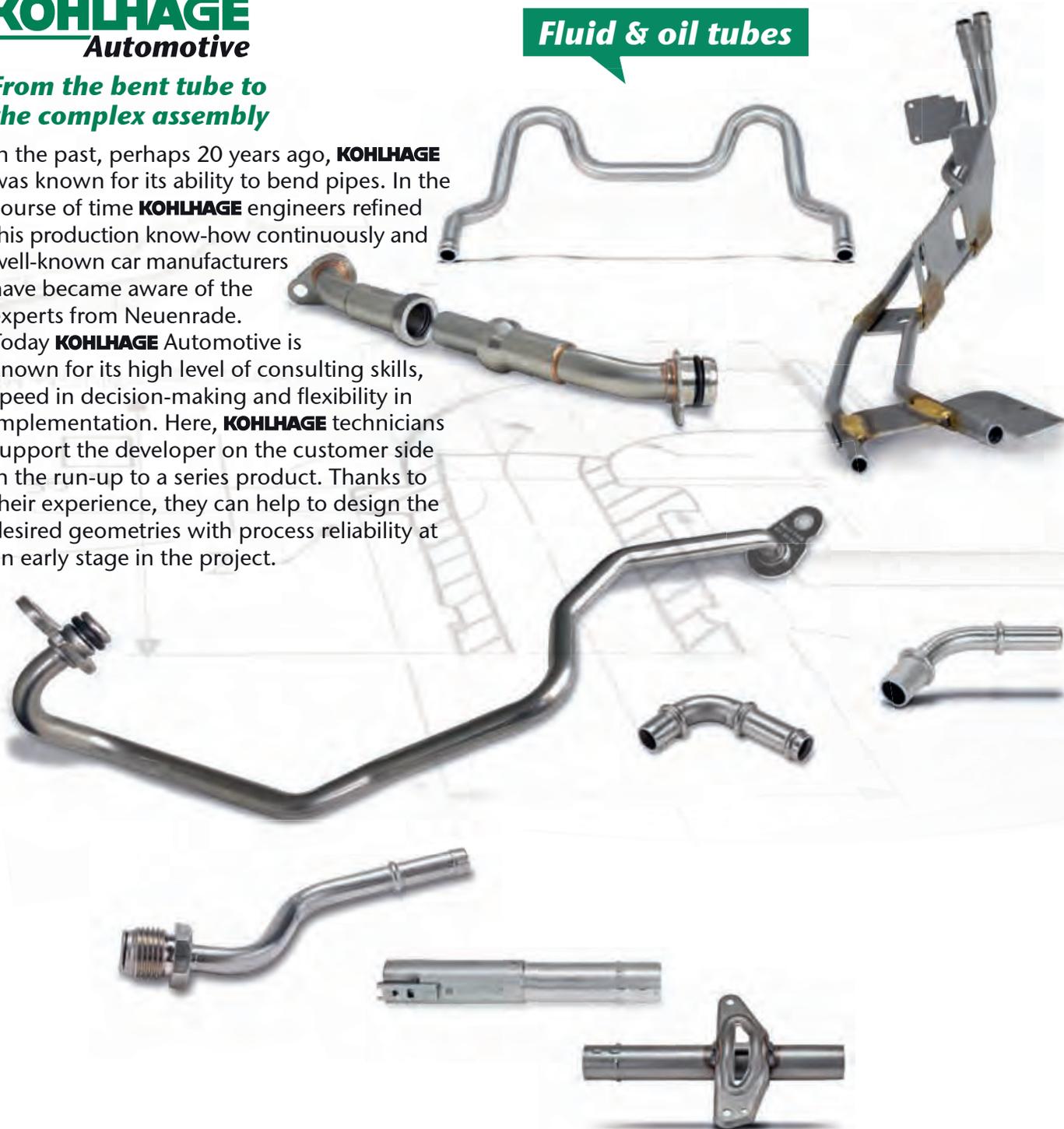
KOHLHAGE E-Tech produces stretch-bent parts for automotive lightweight construction

## **KOHLHAGE** Automotive

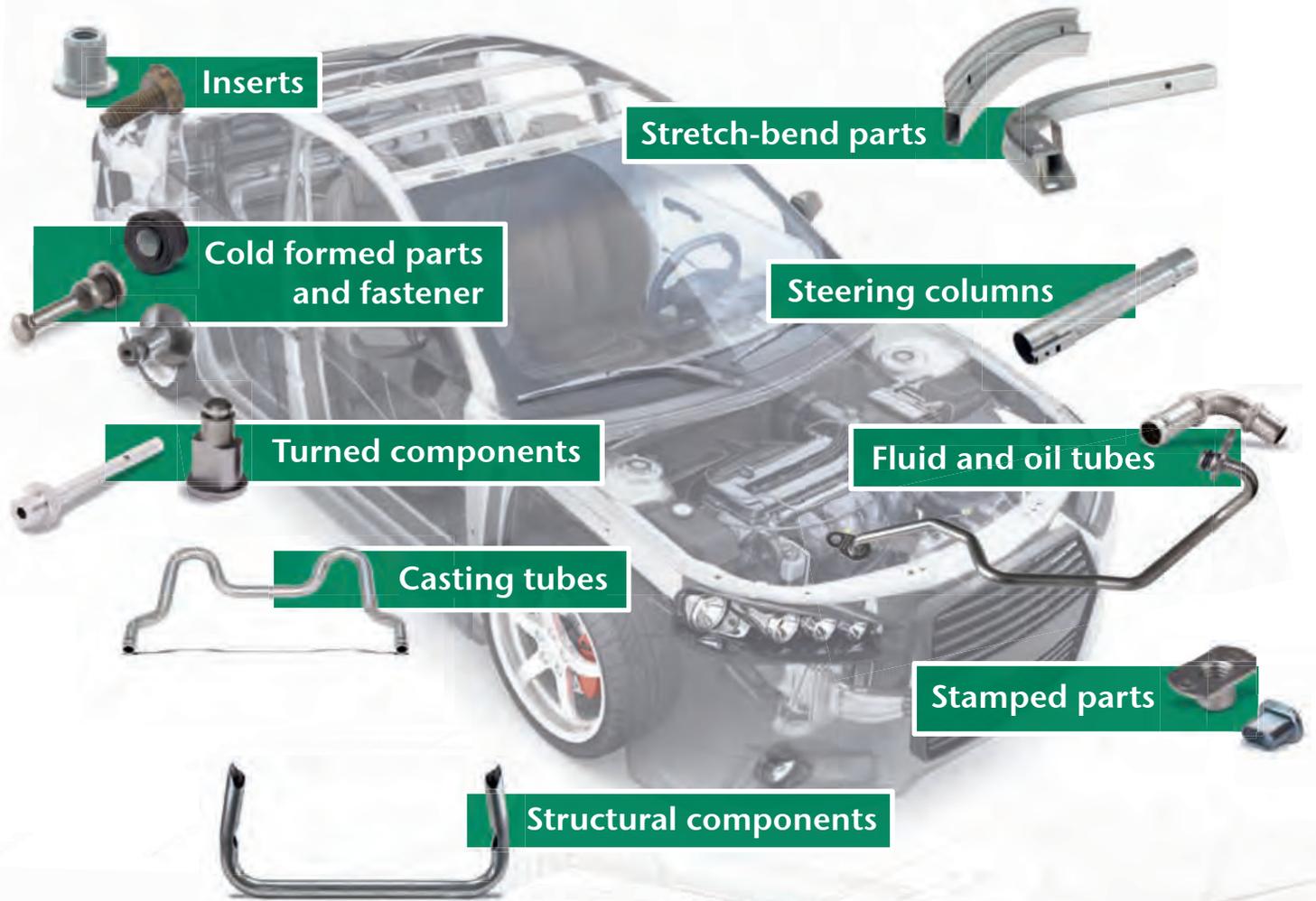
### *From the bent tube to the complex assembly*

In the past, perhaps 20 years ago, **KOHLHAGE** was known for its ability to bend pipes. In the course of time **KOHLHAGE** engineers refined this production know-how continuously and well-known car manufacturers have become aware of the experts from Neuenrade. Today **KOHLHAGE** Automotive is known for its high level of consulting skills, speed in decision-making and flexibility in implementation. Here, **KOHLHAGE** technicians support the developer on the customer side in the run-up to a series product. Thanks to their experience, they can help to design the desired geometries with process reliability at an early stage in the project.

### *Fluid & oil tubes*



**KOHLHAGE**



Functional assemblies  
made of tube

**KOHLHAGE**  
Automotive

Solutions for  
e-mobility

**KOHLHAGE**  
E-Tech

High-Quality solutions  
for fastening technology

**KOHLHAGE**  
Fasteners

Standard parts:  
Excellence in quality and service

**KOHLHAGE**  
Fasteners

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