

# BÖLLHOFF

## WELTAC®

Resistance element welding for  
modern multi-material designs

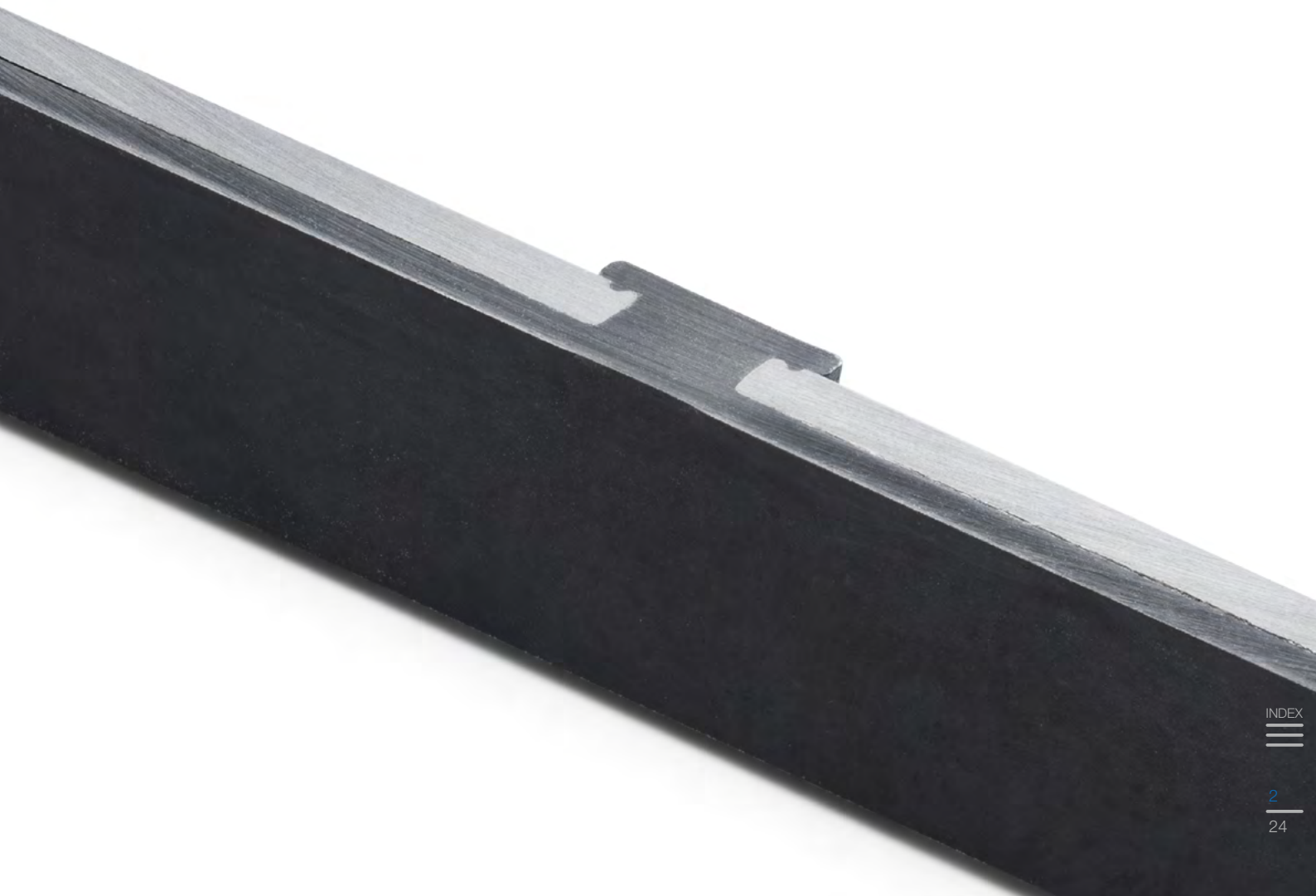


You want to join lightweight materials (aluminium, sandwich materials, polymer materials) with steel of all grades?

And you also want to continue to use your existing spot welding system for modern body construction and, if required, combine different degrees of multi-material designs on the same body construction line?

**Your solution: WELTAC®**

Resistance element welding for modern multi-material designs.



To fulfil the increasing requirements on plant flexibility for modern multi-material designs, we, as a specialist for fasteners and assembly systems, have added the WELTAC® technology to our product portfolio. Non-species components can be joined with high process reliability using this joining technology. You have special requirements for the material combination? Please do not hesitate to contact us.

For processing, we rely on our tried and tested systems RIVSET® Automation E and EH.

See for yourself.





**Welcome.**  
We are your **expert**  
for **fastening**  
and **assembly.**





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Our InfoPoint provides additional information in the form of further brochures and/or videos at the end of this brochure.



# WELTAC® Resistance element welding – technology

Car bodies are increasingly characterised by multi-material designs. Traditional joining technologies, such as resistance spot welding, cannot be used for car bodies because the materials are not thermally compatible, or only to a limited extent. Mainly aluminium and steel are used.

To fulfil those requirements, Böllhoff, the specialist for fasteners and assembly systems, has added another technology to the product portfolio. Resistance element welding WELTAC® gives you flexibility: You can join lightweight materials (aluminium, sandwich materials, polymer materials) with steel of all grades.

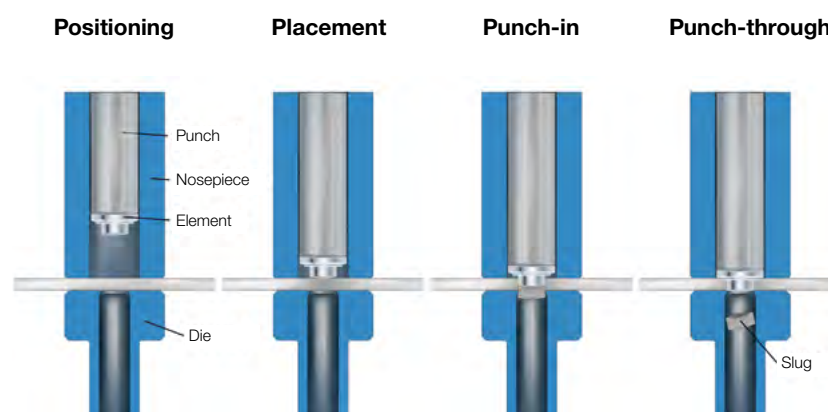
Moreover, you can continue to use your existing spot welding systems for modern body construction and combine different degrees of multi-material designs on the same body construction line.

Flexible. Process-reliable. Robust.

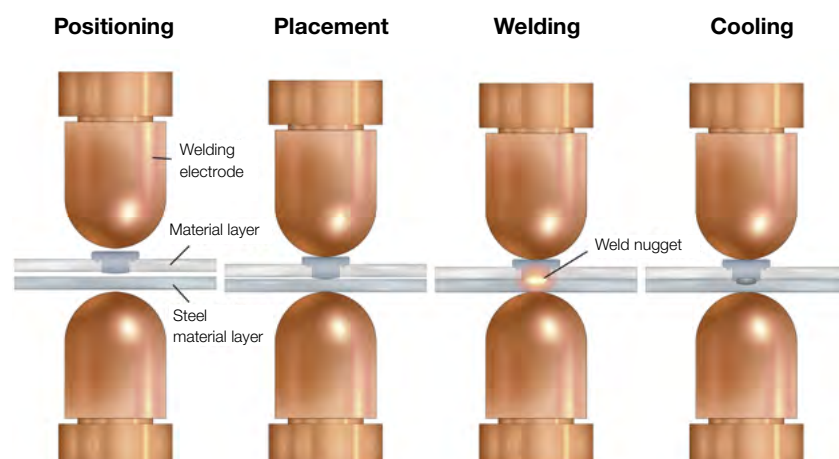


## The technology: 2-stage process

### Process stage 1: punching in the element



### Process stage 2: welding





**WELTAC®** Resistance element welding — your advantages

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Your advantages at a glance:

- High-strength joints
- Use of existing conventional spot welding equipment in body construction possible
- Wide application range with respect to material qualities and thicknesses (aluminium and steel)  
incl. press-hardened steel
- Processing on a tried and tested electric-hydraulic or electric RIVSET® system
- For the production of prototypical components, the Portable C hand tool can be also selected
- System approach: worldwide Böllhoff quality for design of joints, element, automation and after-sales service

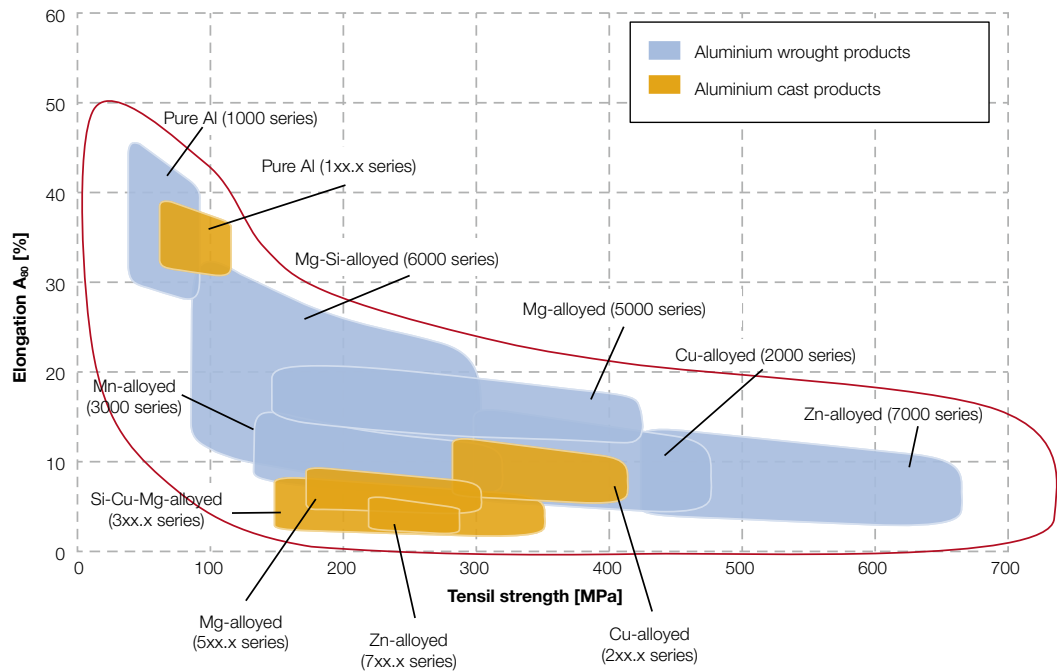


# WELTAC® Resistance element welding — materials

WELTAC® offers a wide application range for steel and aluminium combinations in two-, three- and four-sheet variants:

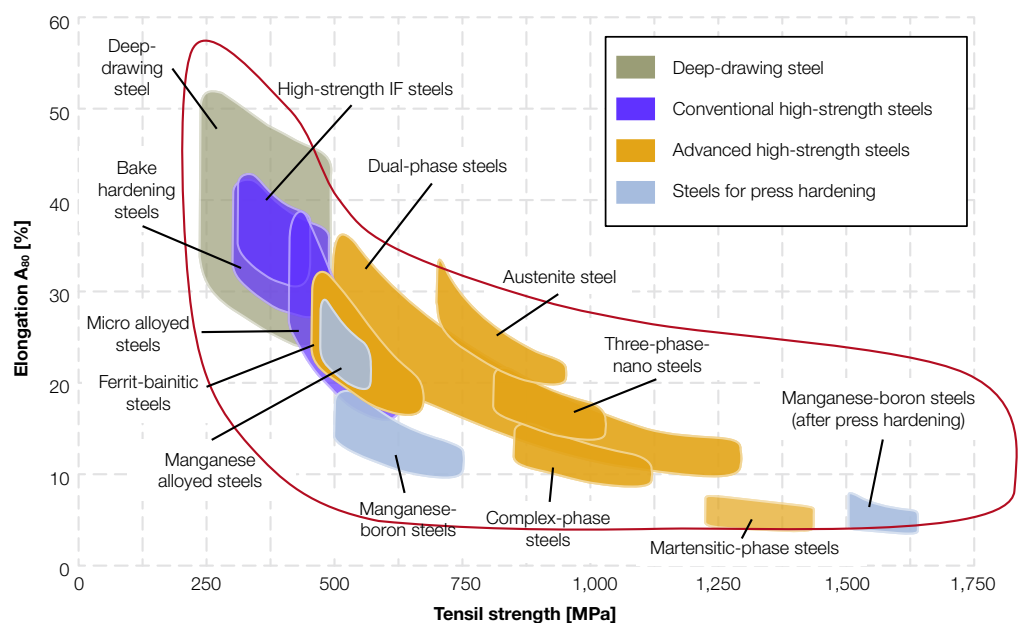
## Aluminium

- Aluminium sheets, extruded profiles and die castings
- Aluminium material thicknesses from 0.8 mm to 3.2 mm using standard elements (higher material thicknesses on request)



## Steel

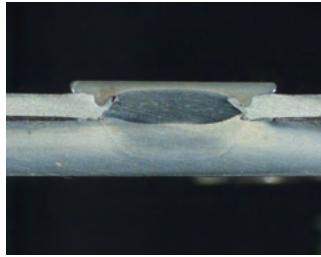
- Cold- and hot-rolled steel of all property classes
- Press-hardened steel



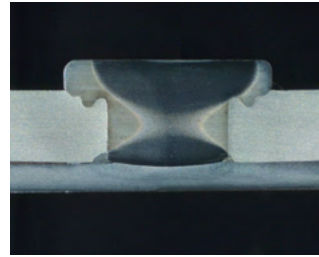
You have individual requirements for the material combinations?  
Do not hesitate to contact us.



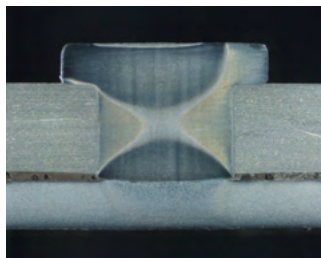
# WELTAC® Resistance element welding — material combinations



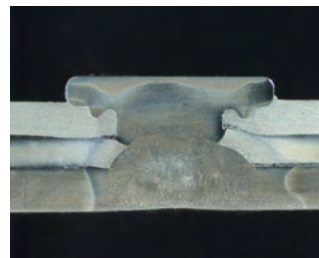
Al5xxx sheet, 0.8 mm  
High-strength steel, 2.0 mm



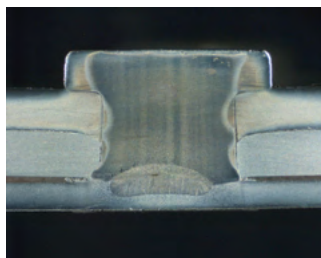
Al6xxx extruded aluminium profile, 2.5 mm  
Structural adhesive  
Deep-drawing steel, 1.0 mm



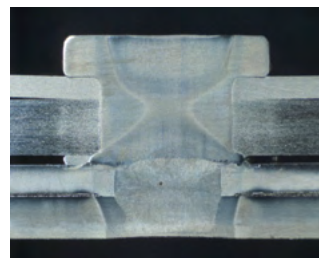
Al die casting 3.0 mm  
(without heat treatment)  
Structural adhesive  
High-strength steel, 1.75 mm



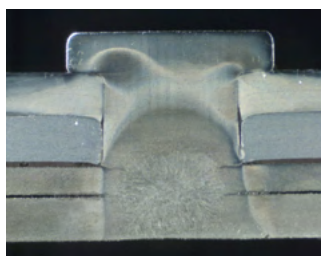
Al6xxx sheet, 1.2 mm  
Deep-drawing steel, 1.0 mm  
Press-hardened steel, 1.6 mm



Super-high-strength steel, 1.5 mm  
Al5xxx sheet, 1.5 mm  
Structural adhesive  
Deep-drawing steel, 1.0 mm









Al5xxx sheet, 0.8 mm  
Al7xxx sheet, 2.0 mm  
Deep-drawing steel, 1.0 mm  
Press-hardened steel, 1.6 mm



Super high-strength steel, 1.5 mm  
Structural adhesive  
Al5xxx sheet, 1.5 mm  
Structural adhesive  
Press-hardened steel, 1.0 mm  
Press-hardened steel, 1.6 mm

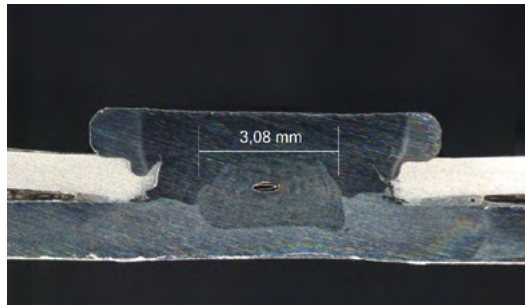
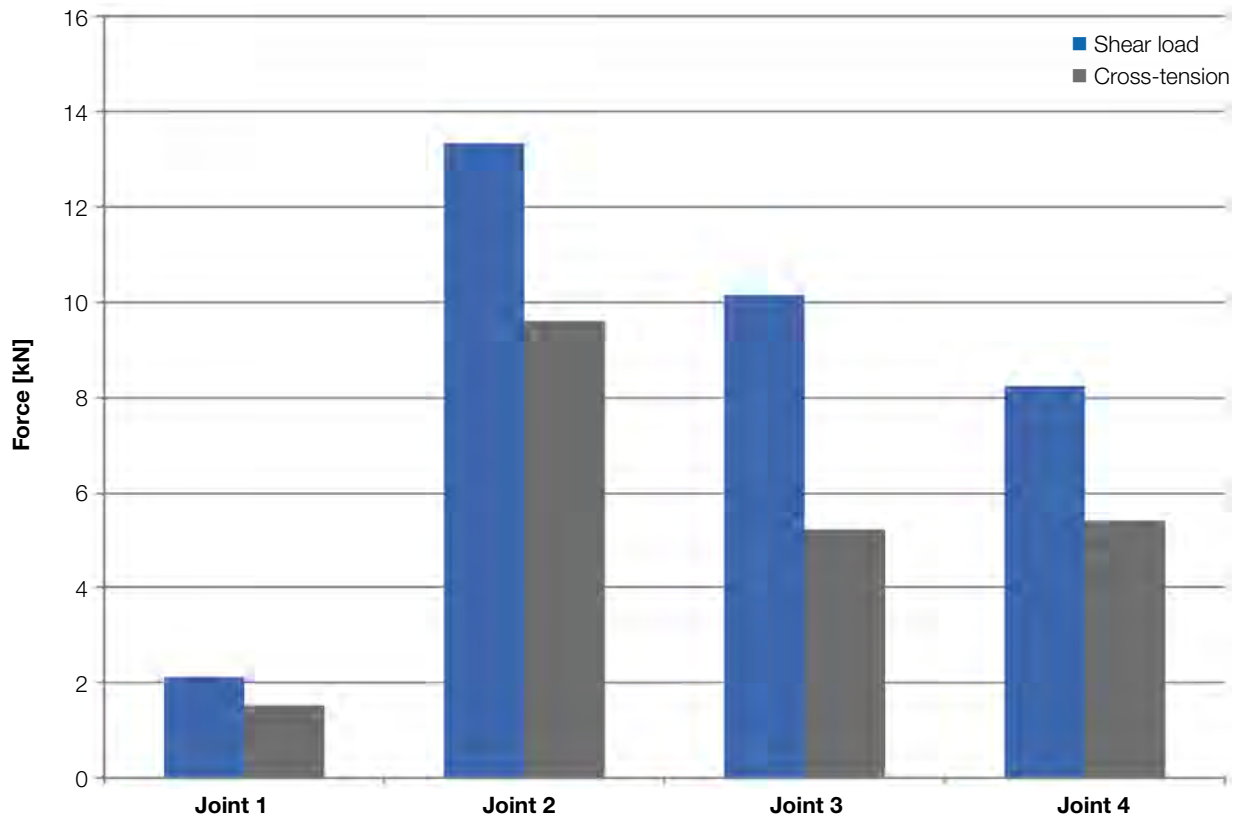
# WELTAC® Resistance element welding — element variants

- The standard portfolio comprises 6 geometry variants
  - 5 versions with flat head
  - 1 version with countersunk head (interference < 0.4 mm)
- Varying shank length, shank diameter and head height depending on material thickness and mechanical joint requirements
- Heat treatment
  - Standard: hardened to 410 HV10
- Surface coating
  - Zinc
  - Zinc-nickel
- Self-produced in cold forging

	Range of use sheet thick-ness (mm)	Interference head (mm)	Clamping ring* for loss protection required?	Version/mechanical strength
	0.8 – 1.2	< 0.4	✓	flat head/low mechanical load
	0.8 – 1.2	≈ 1.0	✓	high head/high mechanical load
	1.3 – 1.7	≈ 1.3	✓	reinforced head and shank area/ increased mechanical load
	1.8 – 2.2	≈ 1.3	✓	reinforced head and shank area/ increased mechanical load
	2.3 – 2.7	≈ 1.5	✗	increased reinforcement of the head and shank area/ maximum mechanical load
	2.8 – 3.2	≈ 1.5	✗	increased reinforcement of the head and shank area/ maximum mechanical load

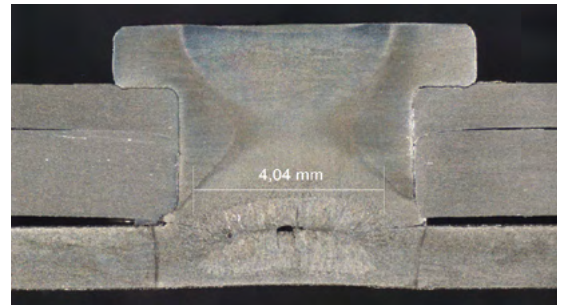
\* The patented clamping ring geometry increases the contact forces applied to the element shank thus ensuring loss protection during transport and handling processes between punching-in process and welding process.

**WELTAC®** Resistance element welding — joint qualities



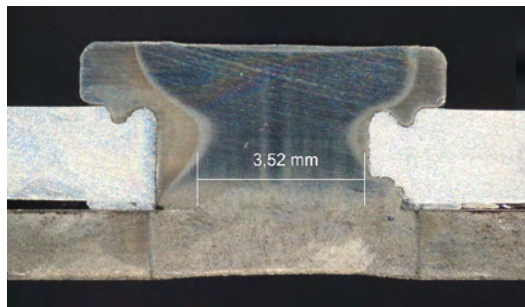
**Joint 1**

AlMg3 [0.8] – HX220YD+Z100 [1.25]



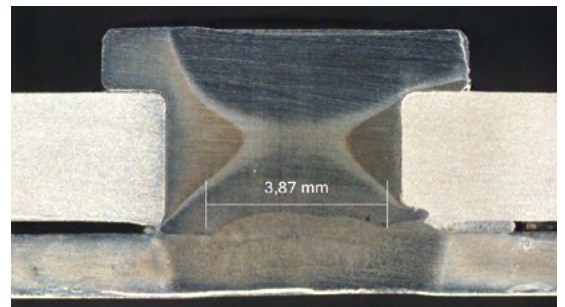
**Joint 2**

EN AW 6082 [3.0] – HCT590X+Z100 [1.5]



**Joint 3**

EN AW 7075 [2.0] – press-hardened steel [1.5]

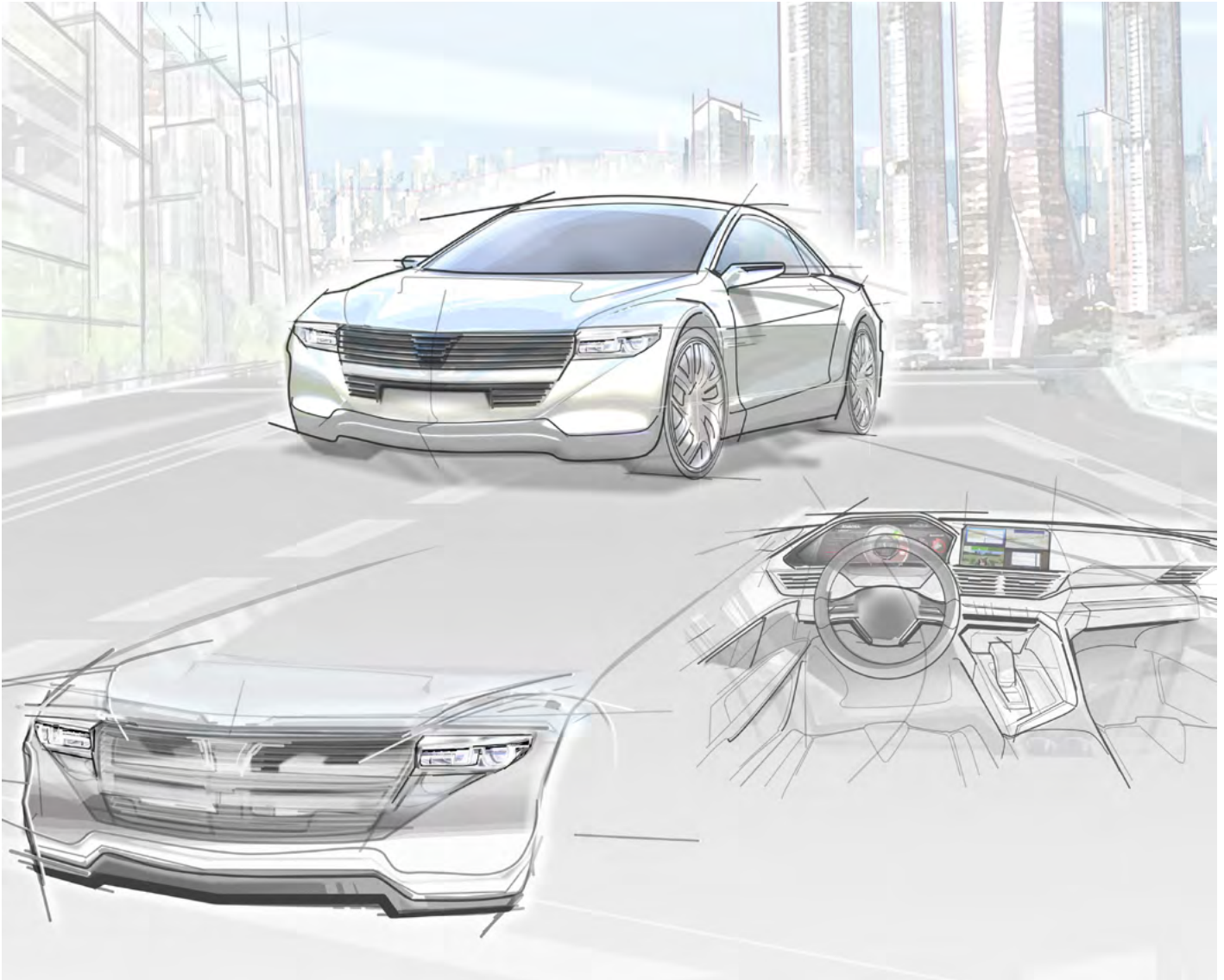


**Joint 4**

AL 6016 [1.0] - AL 6016 [2.0] – press-hardened steel [1.5]



## WELTAC® Resistance element welding — scope of application



The WELTAC® technology was specifically developed to fulfil the special requirements in body construction. All multi-material components can be joined with WELTAC® with high process reliability. For example:

### **Aluminium car body shell parts (thin sheet) on steel structures**

- Side panel
- Roof

### **Aluminium surface components surrounded with steel**

- Floor parts
- Firewall

### **Aluminium structural components surrounded with steel**

- C- and D-pillars
- Crash reinforcements
- Dash panels

### **Functionally integrated aluminium die castings (different material states) surrounded with steel**

- Suspension strut
- Hinge knot rear lid

... and many other possible uses.

## WELTAC® Automation E

For resistance element welding WELTAC®, we rely on our tried and tested processing systems RIVSET® Automation E and EH. The modular design is one of the factors which predestine them for applications in large-scale production that require highest flexibility in production planning.

With Automation E you can configure the system components according to your specific requirements. Only few modules must be exchanged to switch between self-pierce riveting, clinching and resistance element welding.

The joining process is fully automated, energy-efficient and modular. This results in maximum productivity with respect to use, stockage and maintenance.

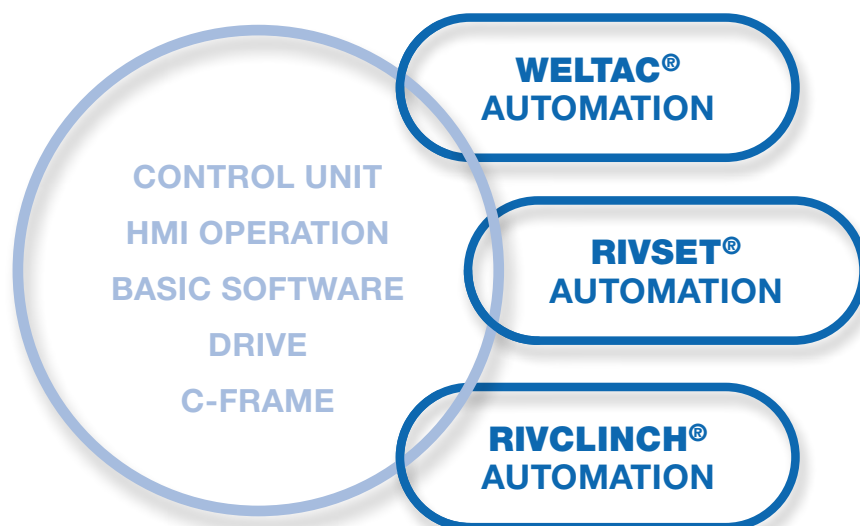
A long life and minimum maintenance are important factors and also the basis to a successful production.

### The highlights of WELTAC® Automation E at a glance:

- Smart: modular and comprehensive machine designs
- Quick: machine configuration via plug & play
- Flexible: remote access to the control software
- Powerful: fast high-performance CPU
- Plug & play: mobile manual control unit for more than one control during commissioning
- Process times  $\leq 1.5$  seconds/element  
(depending on the setting tool – also EH)

Shared modules: WELTAC®, RIVSET®  
and RIVCLINCH® Automation

### Modular system with basic components



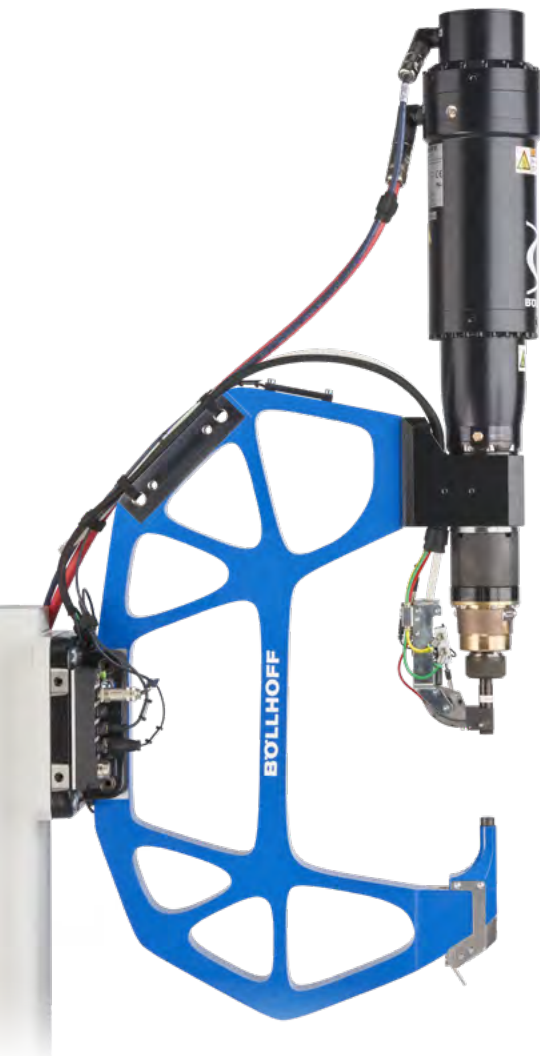
## WELTAC® Automation E – overview of core components



### TOOL

#### Setting tool:

- Setting tools with 100% electrical control for the setting force 80 kN
- Pre-clamping force adjusted with pressure springs
- Variable connection of the setting tool for perfect position on the robot
- C-frame throat depths from 50 to 1,000 mm
- Exchangeable die dome (with/without die lock)



### C-frame

#### The modular design principle:

The new C-frame allows you to generate a maximum number of setting tools even with a minimum number of C-base frames.

#### Control unit

- "Embedded PC"-based control incl. servo controller
- Decentralised hardware configuration with centralised control of the individual modules via bus system
- Open interface for different robot interfaces (ProfiNet, EtherNet/IP etc.)
- Provision of data via OPC UA / MQTT





# WELTAC® Automation E – overview of core components



## SETTING HEAD

- Blow feed and processing of the WELTAC® elements via pneumatically controlled transport into the duct bend
- Also ensures the feed of small WELTAC® elements (shank Ø 4 mm, total length 2.6 mm), with or without clamping ring

## FEEDER

### Element feeder

- Minimum maintenance
- Feeds approx. 1.7 seconds/elements
- Filling volume of approx. 6,300 elements depending on the element geometries (optionally expandable)



## Our general competencies – one by one



### Sales

Innovation capability and technical potential are becoming increasingly important for a company's success.

Every customer has a special contact person who will be glad to discuss all wishes and requirements. So that you save precious time.

Our know-how and experience are also represented by a worldwide distribution network. The headquarters of this family business, which has now been in the family for four generations, is located in Bielefeld, Germany. Apart from that, Böllhoff has sales and production facilities in 25 countries. Outside these 25 countries, Böllhoff cooperates in close partnerships with representatives and merchants to serve international customers in further important industry markets.

### Product and project management

We are satisfied if we can exceed your expectations.

Our competence is based on an efficient concept of consulting, development and support. The joint objective is the realisation of the best technical and economically most appealing solution. That is also the standard for our product and project management.

Our product and project management teams support you with management- and product-specific expertise. They look back on many years of experience in planning application engineering projects for joining and automation solutions. They realise tailor-made solutions according to your requirements.

We think systems: process optimisation, cost reduction, stronger market positions. Our product and project management on three continents stands for the interdisciplinary coordination of complex activities. That means planning, controlling and monitoring in all project phases.

You can find us on four continents:

- Europe
- North America
- Asia
- Africa

## Our general competencies – one by one



### Design and development

The development of the fasteners depends on the material trends of our customers. For the respective processing systems, we focus on functionality, flexibility and design. The main requirements for such systems are reproducible processes, high availability and short process times. The earlier we can contribute our competence, the greater the potential.

FEM simulation reduces the number of iteration loops and therefore shortens the time to market.

To make ideas reality, we employ modern CAD systems complying with today's requirements in the automotive sector. Data transfer is agreed with each customer individually.

### Production

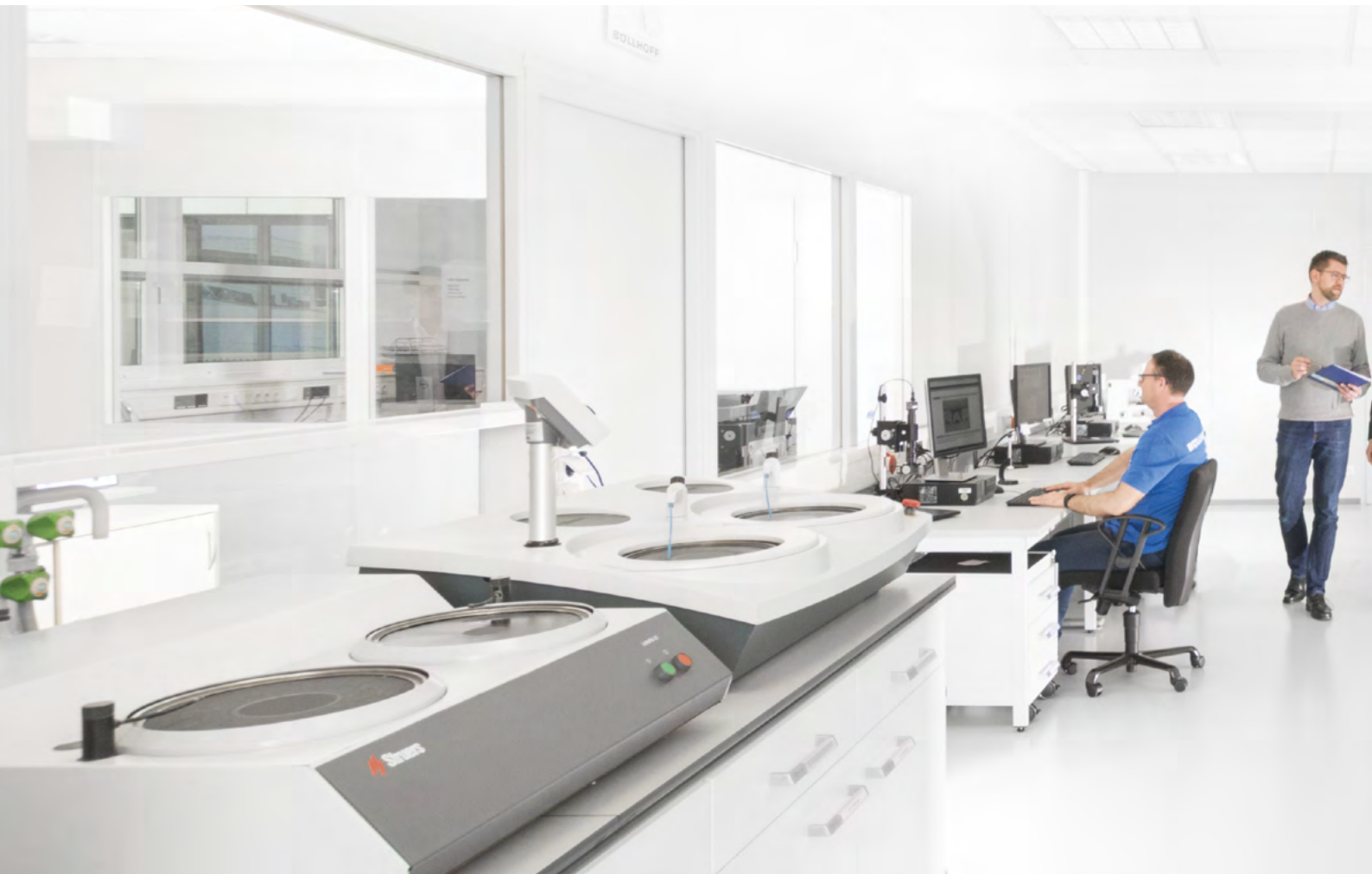
WELTAC® elements are exclusively manufactured at the Böllhoff production facility. They are subject to most stringent quality checks in every single production step. This is the only way we can meet the high customer requirements. Element by element.

With our production facilities at the Sonnewalde location, we are prepared to face the future and the markets' requirements.

Another of our core competencies is the installation and functional testing of our processing systems. All final assemblies and commissioning activities are in-house operations that are not subcontracted.



## Our general competencies – one by one



### Joining laboratory and quality

Our focus is always on sophisticated production processes and modern measurement and monitoring technology. Good quality is no coincidence, but the result of systematic planning and implementation. You define all the technical requirements – if you wish so in cooperation with our qualified team – which are then tested for practicability. You also benefit from process reliability and the avoidance of unnecessary costs.

Our certified laboratory, which fulfils the requirements of DIN EN ISO/IEC 17025, is also there to assist you.

We evaluate the joint quality in mechanical joining, support you by applying numerical modelling procedures and also assess technical feasibility.

### Böllhoff in-house trainings

Are you looking for hands-on machine presentations and trainings in a modern training centre?

Our training concept has a strong practical focus and obtained knowledge can easily be transferred to your work environment. That is how we stand out.

Our trainers are renowned and experienced experts who are happy to introduce you to the up-to-date practice of our modern joining systems.

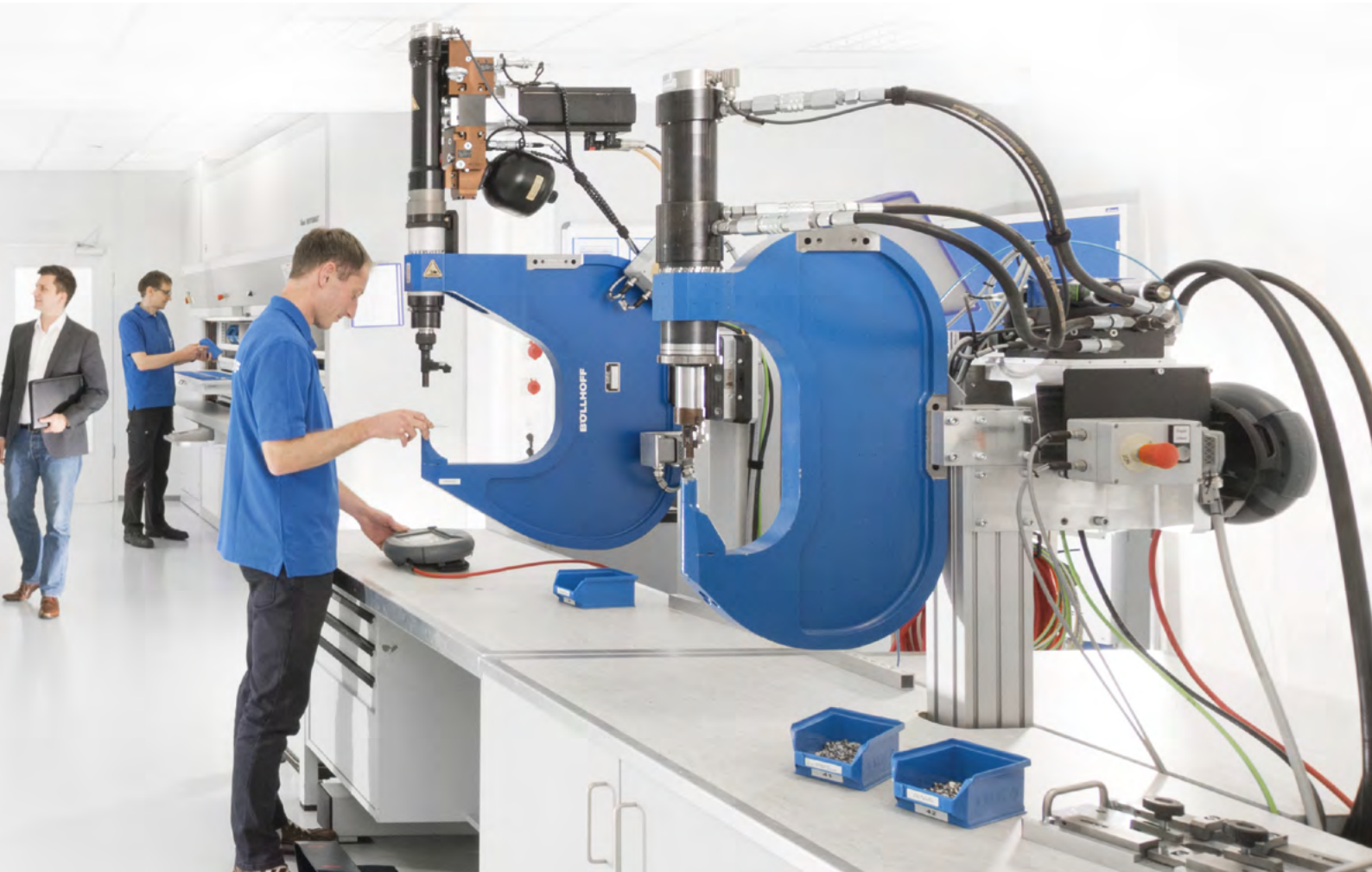
This is what you can expect:

- Machine presentations on real processing systems
- Training on a robot cell
- Theory and practice in an informative and inspiring combination
- A relaxed and at the same time intense training atmosphere with small groups and plenty of time to answer individual questions and discuss specific aspects

At our training centre, you encounter ideal conditions for maximum learning success.

We offer specialised trainings for equipment manufacturers, service personnel and experts.

Our general competencies – one by one



## After-sales service

Our full service in detail:

- Commissioning of the systems
- External repair of systems
- On-site system maintenance → spare parts supply
- Production support for machine parameter adjustments
- Support with initial joint evaluation and checking the system parameters in cooperation with your quality assurance department
- Simulation of joints on the component – joint commissioning
- Assistance with preparing maintenance concepts and TPM schedules
- Maintenance and repair support
- Start-up schedule testing
- Remote servicing on request
- Spare parts management
- Teleservice
- 24h hotline

## Repair centre

In the unlikely event that our tools do need repair, you can resort to us for:

- Evaluation of defective/damaged products
- Cost estimates
- Scheduling and coordination of repair
- Provision of replacement and exchange equipment
- Repair with subsequent function test
- Repair reports
- Assembly and commissioning of repaired equipment
- Generation of repair and maintenance packages

## Catalogues

### Product catalogues



#### **WELTAC®**

Resistance element welding for modern multi-material designs  
Catalogue No 6600

<https://www.boellhoff.com/en/pdf/weltac>



#### **RIVSET®**

Self-pierce riveting for modern multi-material design  
Catalogue No 6701

<https://www.boellhoff.com/en/pdf/rivset>



#### **RIVCLINCH®**

Metal joints without fastener  
Catalogue No 6782

<https://www.boellhoff.com/en/pdf/rivclinch>



#### **RIVCLINCH® Automation E**

When clinching electrifies – energy-efficient, flexible and modular  
Catalogue No 6763

<https://www.boellhoff.com/en/pdf/rivclinch-automation-e>



#### **RIVTAC® Automation P**

High-speed joining – innovative and flexible  
Catalogue No 6810

<https://www.boellhoff.com/en/pdf/rivtac-automation-p>



#### **Portable C**

Electro-hydraulic setting tool for RIVSET® and WELTAC®  
Catalogue No 6650

[www.boellhoff.com/en/pdf/portable-c](https://www.boellhoff.com/en/pdf/portable-c)

### Industry-specific catalogues – automotive industry



#### **360° Joining Technology meets e-mobility**

Catalogue No 8024

<https://www.boellhoff.com/en/pdf/e-mobility>



Videos

Fasteners and processing systems



**WELTAC®**

Resistance element welding for modern multi-material designs

<https://www.boellhoff.com/video/weltac>



**RIVSET®**

Self-pierce riveting for modern multi-material design

<https://www.boellhoff.com/video/rivset>



**RIVCLINCH®**

Metal joints without fastener

<https://www.boellhoff.com/videos/rivclinch>



**RIVTAC®**

High-speed joining

<https://www.boellhoff.com/video/rivtac-highspeed-joining>

Industry-specific videos – automotive industry



**360° Joining Technology meets e-mobility**

<https://www.boellhoff.com/video/e-mobility>



We are right  
where you need us —  
**by your side.**





Do not hesitate to contact us —  
**your partner to succeed in joining.**





Passion for successful joining.

**Böllhoff Group**

Innovative partner for joining technology with assembly and logistics solutions.

Find the contact details of all our locations worldwide at [www.boellhoff.com](http://www.boellhoff.com).