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WELDING TECHNOLOGIES

Overview of possibilities and differences

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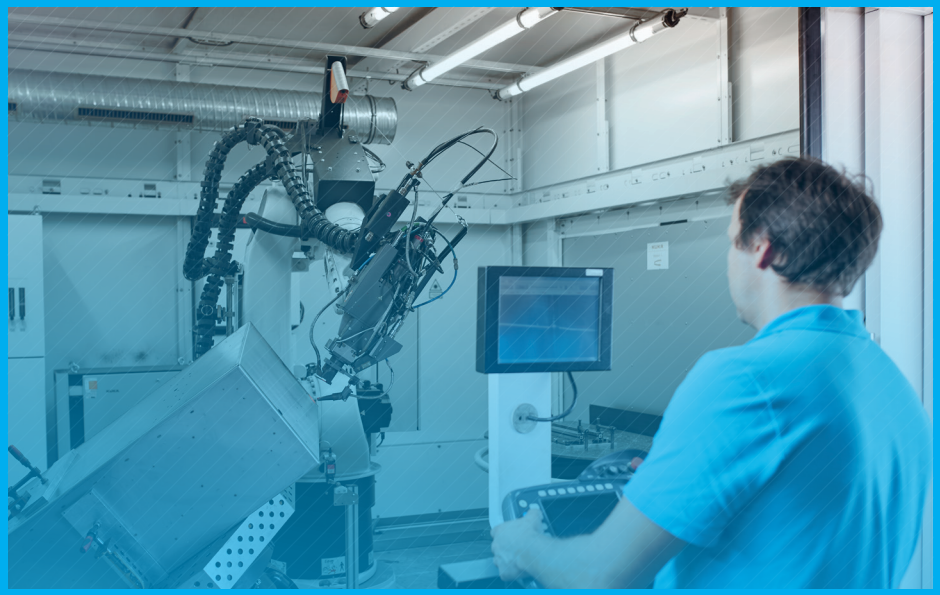

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INTRODUCTION

Welding, along with bonding and screwing, is one of the most important technologies at the moment different components need to be joined. We take a look on the following pages at the various welding technologies, the customization options, the key standards, and the possibilities for further processing.

The POLYRACK TECH-GROUP has comprehensive expertise in all criteria for welded constructions and the development of specifically tailored joint-welding performance according to individual requirements. Experienced development engineers and certified welding specialists have access to the latest technologies in place.

CLICK HERE FOR
our white paper
„Which joining technique
for which requirement?“

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THE DIFFERENT WELDING TECHNOLOGIES

Welding is not just welding – we have prepared an overview comparison to stipulate the different welding processes in combination with each other, pointing out their individual strengths and their specific strengths in different applications.

- **TIG, MIG, and MAG welding**

These three processes are particularly suitable for joining thick materials whereas rigid bonding,, closing larger gaps, and high melting capacity are required.

Our technology center is equipped with state-of-the-art technology, including welding equipment, height-adjustable welding tables, and a central extraction system.

- **Laser welding**

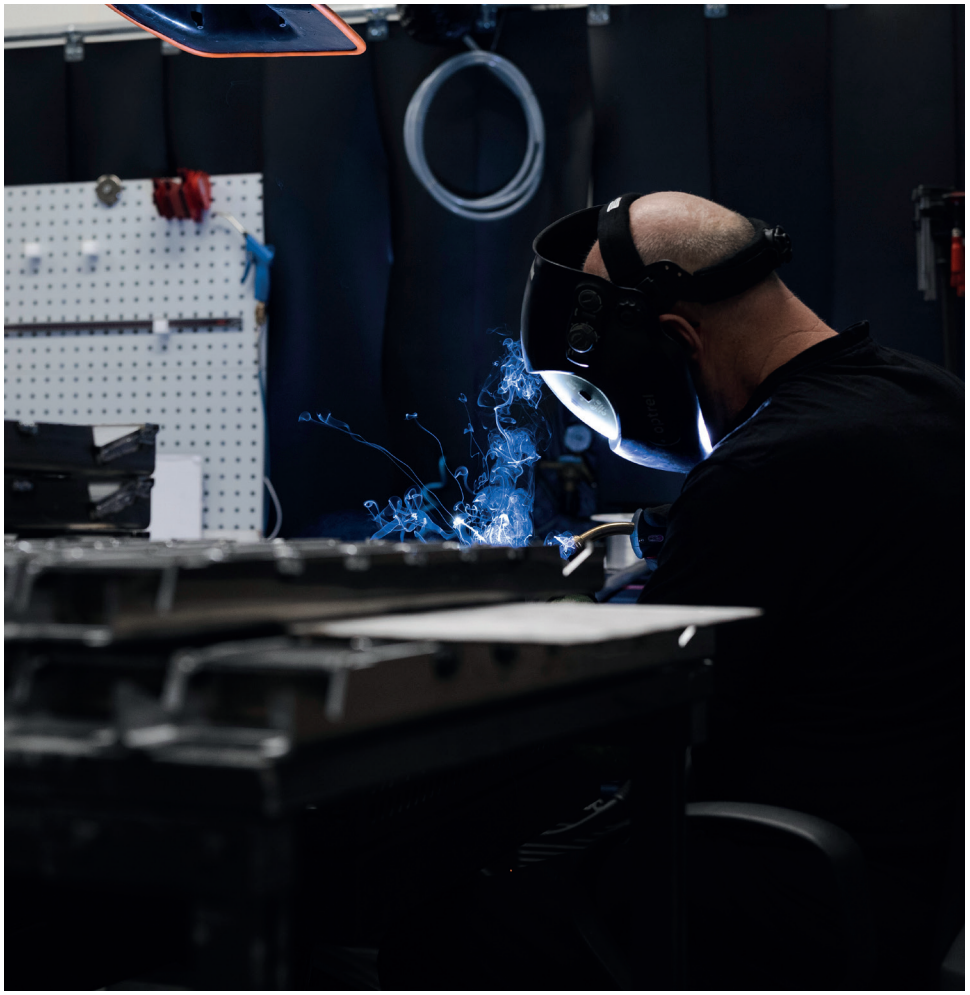
The laser welding process is used in particular for processing thinner sheets and therefore plays an important role in case manufacturing. This process is offered manually, semi-automatically, or fully automatically. The right choice to opt for which process is dependent on the design, the length of the weld seams, and the number of pieces. The orientation values are 200 or 250 pieces: below 200, the manual process is usually chosen, while above 250 pieces, fully automated processing is generally recommended.

- **Stud welding**

Stud welding technology is becoming increasingly popular, especially for implementing ever increasing design demands. Threaded studs or grounding tabs can be welded onto the backs of front panels, for example, making fasteners completely invisible from the front. This process is usually carried out fully automatically on CNC-controlled machines.

- **Resistance welding**

A typical process for thin metal sheets with the demand for threaded mounting features, where press nuts will not meet the required dependability. Another important area of application is the joining of two sheets of metal, a typical approach in automotive manufacturing. A characteristic feature of this process is that, as the name spot welding indicates, individual points are welded instead of continuous seams.
We have also succeeded in the spot welding process thanks to the latest technology in place, managing joint connections in such a way as to avoid visible detection to the front.



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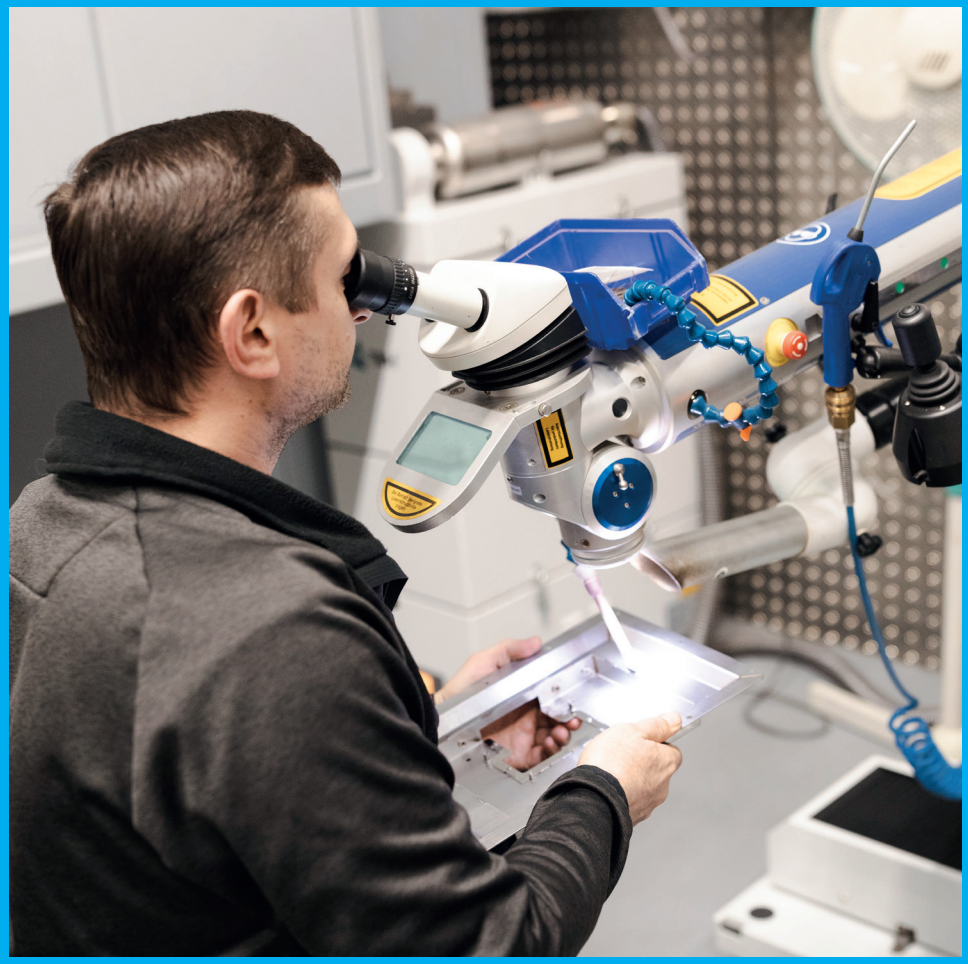
CUSTOMIZATION OPTIONS

The days when cases only had to fulfil functional requirements are long gone. Today, regardless of the area of application, a high extent of customisation is expected in order to create a brand-appropriate appearance with a unique profile and recognisability. Extensive customisation is now standard, particularly in the following areas.



Material

The material used can meet both design requirements and functional requirements and can be customized. Selection criteria may include:

- External requirements in the area of application
- Weight requirements
- Strength requirements
- Heat dissipation concept
- Surface design or finishing

Customization options include:

- Aluminum
- Stainless steel
- Steel
- Brass
- Copper

→ Each in different alloys

Process

Like the material, the welding process used or the combination of different welding processes is tailored individually to the specific project and requirements.
Here, too, the basis is the design and function requirements. One possible question could be, for example, how tight the connection needs to be.

Surface and finish

The surface treatment also follows the individual wishes and requirements for the end product. In addition to leaving the surface in its raw state, the finishing options can be divided into three groups:

- Mechanical treatment to produce a specific structure, such as satin finishing, grinding, sandblasting, or shot blasting
- Galvanic processing, such as anodizing, zinc plating, or chrome plating
- Color design through powder coating, wet painting, or printing

IP and EMC protection

The functional requirements for IP protection, which defines the general resistance to dust or water, and EMC protection, which ensures the electromagnetic compatibility of a system, can be individually integrated through the effective design of the welding technologies used.

Weight

Components with welded joints can be precisely tailored to individual weight specifications.
The reasons for this lie in the flexible choice of materials and the fact that no other materials, such as screws or nuts, need to be included.

Price

Welded joints generally offer more price flexibility than other joining technologies. Welding processes can also be quickly automated for the right quantities.

If a case requires IP sealing and EMC protection, welding is usually the most cost-effective solution.

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NORMS AND STANDARDS

Welded joints are hard to monitor through quality inspection compared to other mechanical production processes, which can be easily measured or checked according to standards. Therefore, welding process certificates in close compliance with the applicable standards are obtaining such a decisive role for the quality management.

The following standards are particularly important in this regard:

- **DIN EN ISO 3834-2**

This is a general certification to ensure comprehensive welding quality requirements. Compliance with this standard and the associated certificate serve as proof that the welding processes are strictly controlled and supervised and that the highest standards in staff training are fulfilled. With regard to the installed equipment, this certification also ensures that the machines are state-of-the-art and that they are maintained and serviced without exception.

The POLYRACKTECH-GROUP has been certified in this division for over 10 years.

- **DIN 2303**

In addition to general certification, various other standards address the specific requirements of certain industries in even more enhanced documentation and are accompanied by more intensive pointed standards along with additional testing. DIN standard 2303 ensures that manufacturers and repair companies meet the quality requirements for defense technology and agricultural products.

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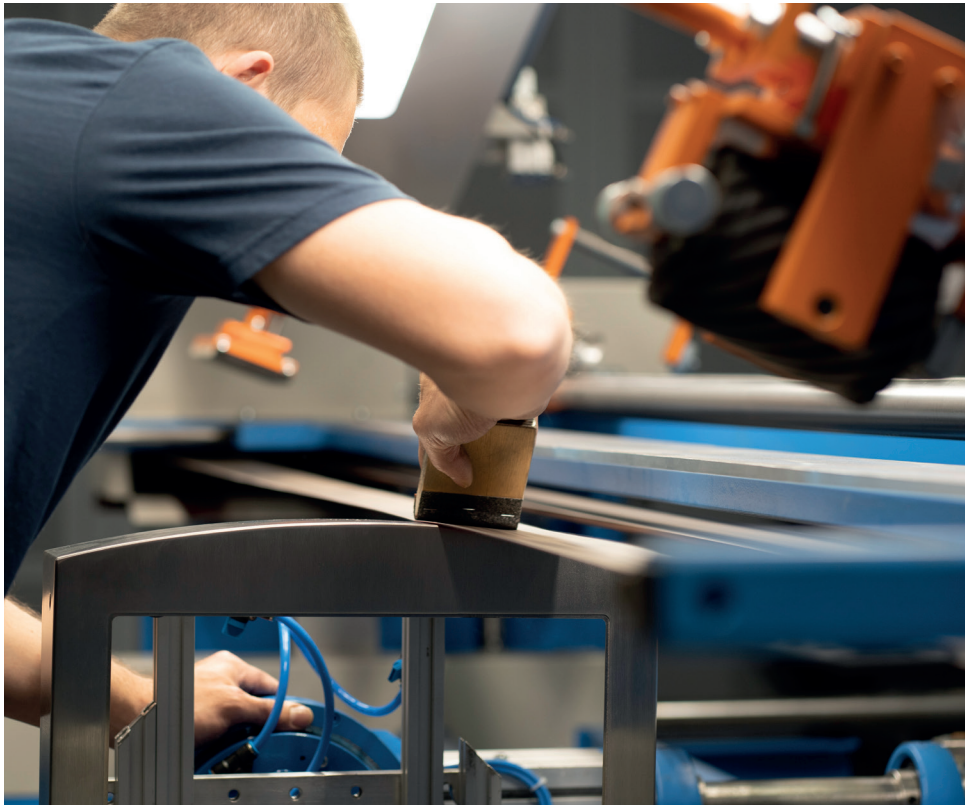
POSSIBILITIES FOR FURTHER PROCESSING

Welding is often followed by individual further treatment, e.g., to prepare the surface for finishing. Grinding work can make weld seams invisible and prepare them for surface finishing through painting, powder coating, anodizing, or galvanizing. Other examples of further treatment include:

- **Satin finishing**
- **Pickling**
- **Electropolishing**



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CONCLUSION

Welding technology in all its variants and the resulting combination possibilities offer numerous possibilities for developing the optimum joining concept for almost any requirement, including the subsequent options for further processing.

However, this high degree of variability is not only an opportunity but also places high demands on the support and advice provided by experienced production partners during the design phase of a project. This conceptual exchange should therefore always precede the start of production in order to ensure the best possible result. The POLYRACK TECH-GROUP offers the strength of providing a wide range of technologies and decades of experienced manpower for your choice of solutions provider.

Are you aiming for a new project, and would you like to discuss a possible production concept in person? The POLYRACK TECH-GROUP team of experts will be happy to provide you with a non-binding initial consultation.

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