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VEROTEC
Electronic Enclosures
A MEMBER OF POLYRACK

WHICH JOINING TECHNIQUE FOR WHICH REQUIREMENT?

The clear comparison of technological welding, bonding and screwing

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INTRODUCTION

The combination of different components is required for almost all metal enclosure solutions in order to achieve the ideal packaging for the technology inside. Corrosion-resistant, impact-resistant, waterproof or galvanized - the technology options for implementation are as varied as the requirements for the final packaging. With this in mind, we have compared the three main joining processes - welding, bonding and screwing - and provide an overview of the requirements and application criteria that can be used to select the right technology.

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WELDING

Welding is certainly the most important technology for joining various metal components. Here, we are talking about a whole group of joining techniques. A distinction can be made here between MIG, MAG and TIG welding as well as electric welding, laser welding and resistance welding, all of which can be carried out semi or full automatic.

CHARACTERISTICS

Safety & strength During welding, the various components are joined together at a molecular level, making the end product highly resistant to vibration and impact and therefore safe for the technology inside.

Cost-effective for high quantities A high degree of automation can be achieved during welding, which ensures low costs.

Flexible Finishing Options Welded parts can be finished with almost any surface treatment, such as coatings and paintwork.

Good for Design Pieces When it comes to design, welding offers optimal possibilities. Professionally executed and reworked, the joints become invisible and a one-piece look is possible.

Maximum Sealing Welded joints are sealed tight, both against water or dust and - particularly important in electronic packaging - against electromagnetic radiation.

Precision Very precise and fine weld seams can be achieved, especially with laser welding.

High Processing Speed High processing speeds are possible thanks to full or partial automation

Cannot be Dismantled Welded joints are made to last forever, so to speak. They cannot be opened again, at least not functionally.

Impossible with Different Materials In order to produce a welded joint, the materials of the components must be the same. If components made of different materials are to be joined together, welding is not an option.

WELDING AT POLYRACK

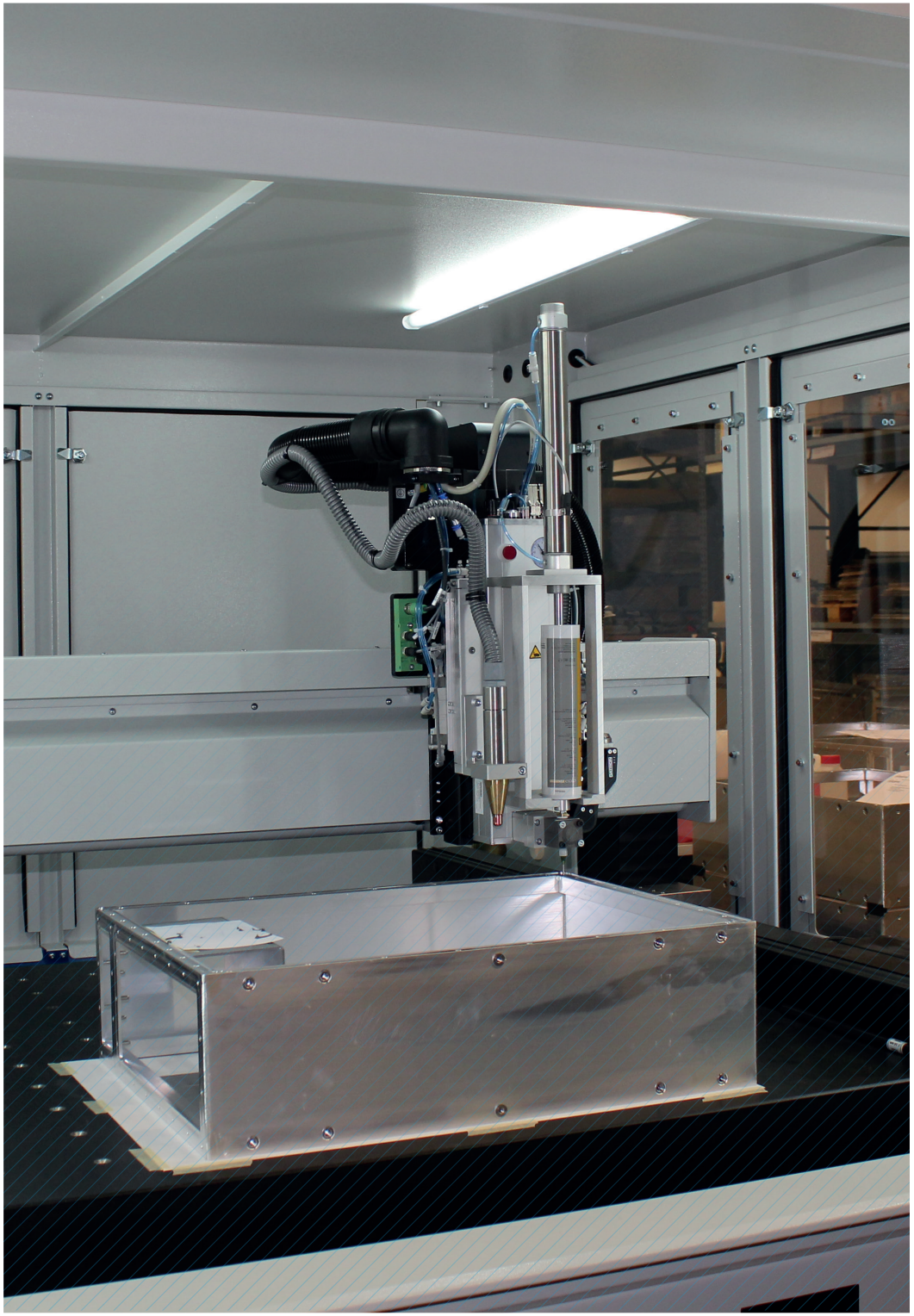
Machinery
- TIG, MIG, MAG welding: Lorch- S/Rehm TIGER
- Resistance welding - analog and high-speed: koyo giken, Myspot NK-21/ Dalex
- Stud welding CNC: bsk + BTV (AB 2000 x 700 mm)
- Manual stud welding: Soyer manual gun
- Manual laser welding: Alpha Laser 300W
- Semi-automatic laser welding: MaxphotonicsMA1-45
- Fully automatic laser welding: Trumpf TruLaserRobot 5020
- Grinding and satin finishing: Kuhlmeyer Two-belt sanding machine type ZBS 2(flat and 3D)

Possible materials
- Steel St-12 - 0.5-10 mm
- Chrome-nickel steel: 0.5-10 mm
- Aluminum alloy: 1-10 mm

Surface treatment
- Satin finishing
- sanding
- Preparation for powder coating, painting, etc.

Certification
DIN EN ISO 3834-2
The certification enables POLYRACK to support customers in the following categories:
- Process selection
- joint types
- Welding parameters

Production equipment such as positioning and clamping devices can also be manufactured by POLYRACK.



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BONDING

The market for bonding technology is making dynamic progress and providing high-tech solutions for more and more areas of application, but despite all the opportunities, there are still limiting factors to be aware of.

CHARACTERISTICS

Water- & dustproof Bonded joints can meet high requirements for water and dust tightness.

Bonding of different materials is possible The individual design of the adhesive makes it possible to join components made of different materials.

Cost-effective for large quantities Adhesive bonds can be realized automatically and therefore cost-efficiently for large quantities.

Additional component required An additional component in the form of the adhesive is required for a bonded joint.

Durability When it comes to durability, bonded joints generally cannot compete with welded joints.

Long processing times Preparatory work, e.g. cleaning, is required before the actual bonding. Afterwards, and before further processing, curing times must be observed. Both of these factors result in relatively long processing times.

Costs for small quantities The costs for small quantities are relatively high due to the individual design of the bonding solution.

Limited coating options Due to the temperature sensitivity of most adhesives, surface finishes that require higher temperatures are not possible.

Visible joints The joints remain visible during bonding, so it is clear that different components have been joined together.

Electromagnetic radiation Enclosures with bonded connections cannot shield electromagnetic radiation.

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SCREWS

Joining two components together with screws is certainly an obvious option and, in fact, screwing is a serious alternative among joining methods, but it also has its limitations.

CHARACTERISTICS

Can be dismantled Screwed connections can be dismantled without destruction. If this is required, screw connections offer unique advantages.

Connection of different materials possible Different materials can also be joined together easily with screws.

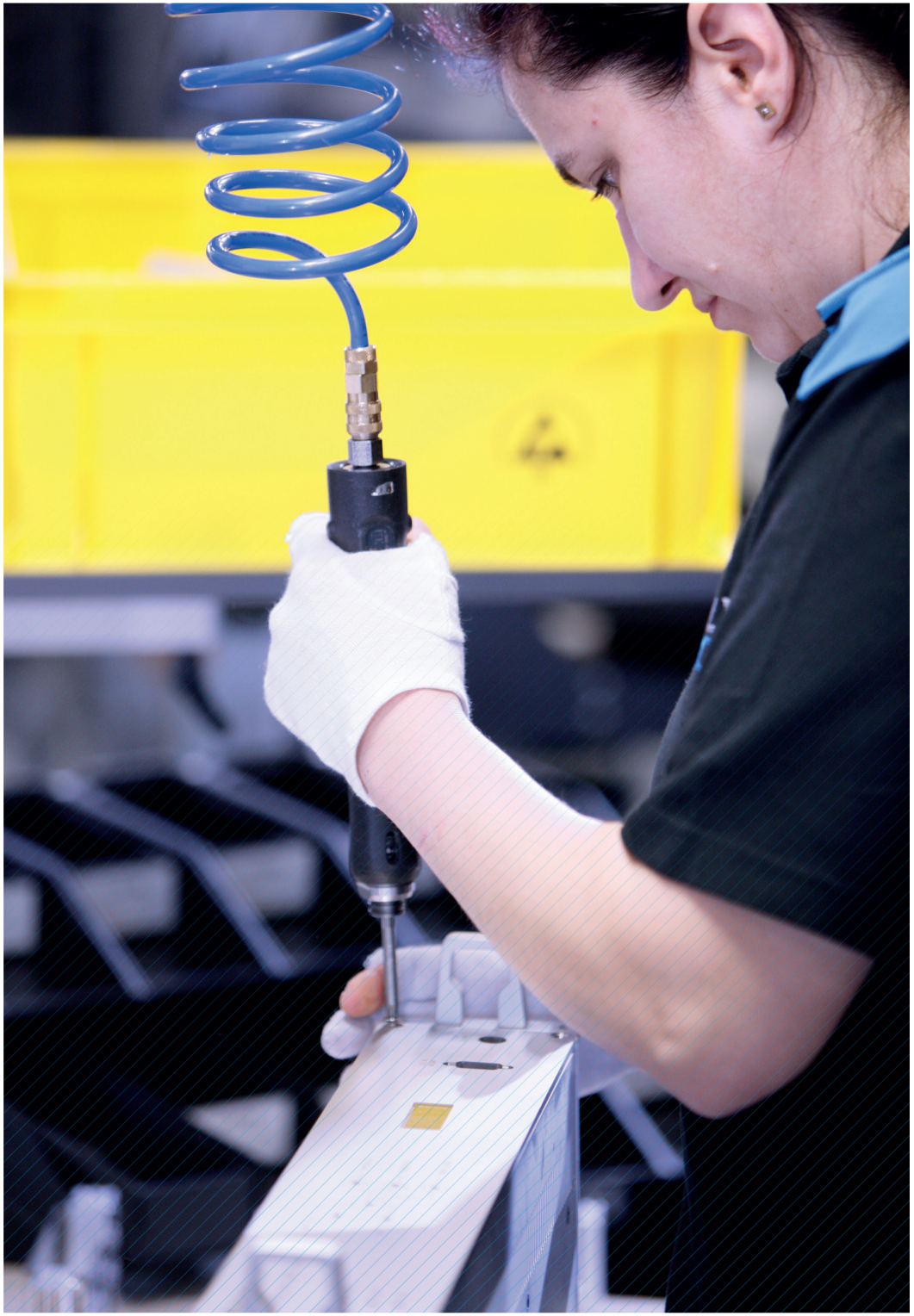
Flexible finishing possible Screwed parts can also be finished with almost any surface treatment, such as coatings and paintwork.

Cost-effective even for small quantities Thanks to the low design and set-up costs, this joining technology is also very economical for small quantities.

Additional parts for tightness Screwed connections can be made tight, but special additional seals are required for water or dust tightness as well as for shielding electromagnetic radiation.

Only moderately robust Screwed connections are not as robust and strong as welded solutions, which makes them more susceptible to vandalism and general wear and tear.

Screws are always visible The screws used initially remain visible, which means that screwed solutions are often ruled out for design reasons. Even lamination cannot keep up with the clean appearance of a welded solution.



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CONCLUSION

When comparing the various joining processes, it becomes clear that none of them can generally be rated as good or bad, as all processes have advantages and disadvantages. Which technology is ultimately the optimal solution for your project depends much more on the individual circumstances, the requirements for the end product, the intended use and location, the design requirements, the planned quantity and numerous other factors. This is where an experienced and technology-open partner is more than helpful in developing the right strategy after weighing up all these factors. This white paper provides a clear first impression and provides orientation for the almost endless possibilities.

Do you have a new project and would 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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