



## The latest from our R&D department

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*Image1: A welded-on end piece seals the stainless steel door handle against corrosion*

Pressure resistance welding with medium-frequency technology:

### Efficient connection technology for diverse applications

**Industrial joining technology usually requires material connections that are able to be completed quickly and simultaneously stable. Medium-frequency pressure resistance welding enables these connections to be produced. ATEC, a specialist for automation solutions, has developed and manufactured high-performance welding machines for industrial serial applications.**

New welding machines for efficient heating register production needed to be developed for an international air conditioning system manufacturer and integrated into the company's serial production line. In this case, customer needs involved high throughput and simultaneously stable, clean welds with the least amount of follow-up work on the production pieces. A high-performance medium-frequency welding system was developed for radiator production, which is able to weld up to 2,700 radiator elements per hour. This means that after 4 seconds, both head pieces are already connected with the tubes. In addition to a high throughput, an additional advantage of pressure

resistance welding with medium-frequency technology is that hardly any visible connection points are created, and follow-up work on the welding seam is seriously reduced or may even be omitted versus conventional welding processes. In this case, the welding seams exhibit a high degree of stability. This is necessary, since the heating registers need to resist a test pressure of 8 bar. A control module was integrated with the system, which enables up to 12 welding seam connections to be examined at the same time. This achieved the maximum level of flexibility in the manufacturing process, since fully automatic conversion for welding different radiator types is also possible.

Medium-frequency pressure resistance welding cannot, however, be used for processing round geometries, but it is also suitable for other shapes. In this way, a production system for door fixtures was built for an international fixture manufacturer, which enables rings to be welded onto a long, flat steel carrier plate. The system was conceptualised for manual operation and nevertheless enables fast welding combined with high hourly performance. Because the actual welding process is completed within 10 – 20 milliseconds, only a very small amount of heat is applied to the production pieces, whereby changes to the material are practically excluded. The exact welding seams



*Image2:* High-quality welding seams where the tubes are connected with the head pieces

for this product do not required any follow-up work, which is why the production pieces are able to be passed on directly to the surface finishing step after welding.

ATEC also built a system for sealing stainless steel door handles for the same fixture manufacturer. This welding machine is fed manually and designed for the medium-frequency range. With this pressure resistance welding system, connections are able to be produced with such a high level of density, which prevents corrosion. The system was conceptualised for flexible production activity, and thanks to easy and speedy conversion, it enables diverse products to be processed. Different materials may also be processed in this case. The welding parameters for the individual materials are specified in the controls, in which case reproducible welds are possible. The system has run for many years without faults and without any wear being detected.

The examples provided show that pressure resistance welding in the medium-frequency range is suitable for diverse applications as an excellent connection technology. No matter whether steel, stainless steel, or non-ferrous metals are involved, pressure resistance welding enable equivalent and different materials to

be connected quickly and stably. The process is especially suitable for manufacturing products which require a high level of density. The low heat application also avoids material changes, which is why follow-up work is frequently able to be omitted. Downstream processing of a welding seam may also be omitted, because pressure resistance welding provides cleanly processed positions. The process is especially suitable for industrial serial production thanks to the extremely short welding times of only a few milliseconds, which is why pressure resistance welding is used in more and more applications, for example in reinforcement, fixture and fitting technology, furniture and automotive supplier industries, and in heating and process technology.



*Image3:* A ring is welded at the centre of a carrier plate for a door fixture

ATEC is a medium-sized company that has specialised in automation solutions in a wide range of industrial sectors for 25 years. ATEC advises customers on rational production technology and designs and builds systems for economical serial production on their behalf. Actual business areas include welding technology, stamping and metal forming technology, and handling and logistics.

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