

# CustomerStory



 Gebr. STAHL GmbH

Gebrüder Stahl  
GmbH

## TIG welding is faster than MAG welding

**What at first appears unbelievable, is reality at Gebrüder Stahl GmbH:**

**TIG welding has largely replaced conventional manual MAG welding – and thanks to tigSpeed by EWM, it has simultaneously increased both the welding speed and the welding quality.**

Gebrüder Stahl GmbH, from Wenden in Germany's Sauerland region, has its roots in equipment and container construction. However, they now increasingly manufacture heat exchangers and cooler bundles, as well as individual parts and

components for industrial furnaces, annealing and hardening shops. Here, the material spectrum ranges from austenitic steels, through duplex steels and special materials such as Monel 400, Alloy 59\* and Hastelloy C4\*, to heat-resistant steels such as 1.4828, 1.4841 or 1.4749. Gebrüder Stahl GmbH uses the heat-resistant steels to produce muffles. Depending on the application and the desired material properties, temperatures of up to 950 °C are required. Accordingly, the materials used must primarily be capable of withstanding high temperatures. This is in addition to good corrosion and oxidation resistance, and good creep strength at high temperatures. Obviously, any welds must also fulfil these demands.

## Critical welding of high-alloy special materials

The heat exchangers have diameters up to 3 metres and lengths up to 30 metres, each with an individual weight of up to 35 tonnes. The use of high-alloy special materials also requires appropriate welding consumables when welding nickel-based alloys. Here, X-ray-proof welds are

Attaching a stiffening plate using the TIG welding procedure.

required. However, these materials also have a tendency for hot cracking. Reduced heat input during welding can significantly reduce this problem and thus increase the quality of the weld seam. For this reason, these welds are joined using the TIG welding procedure (tungsten inert gas). This process is characterised by particularly high-quality weld seams which display excellent mechanical and metallurgical properties – but also by a very low welding speed.

## tigSpeed semi-mechanised wire feed system

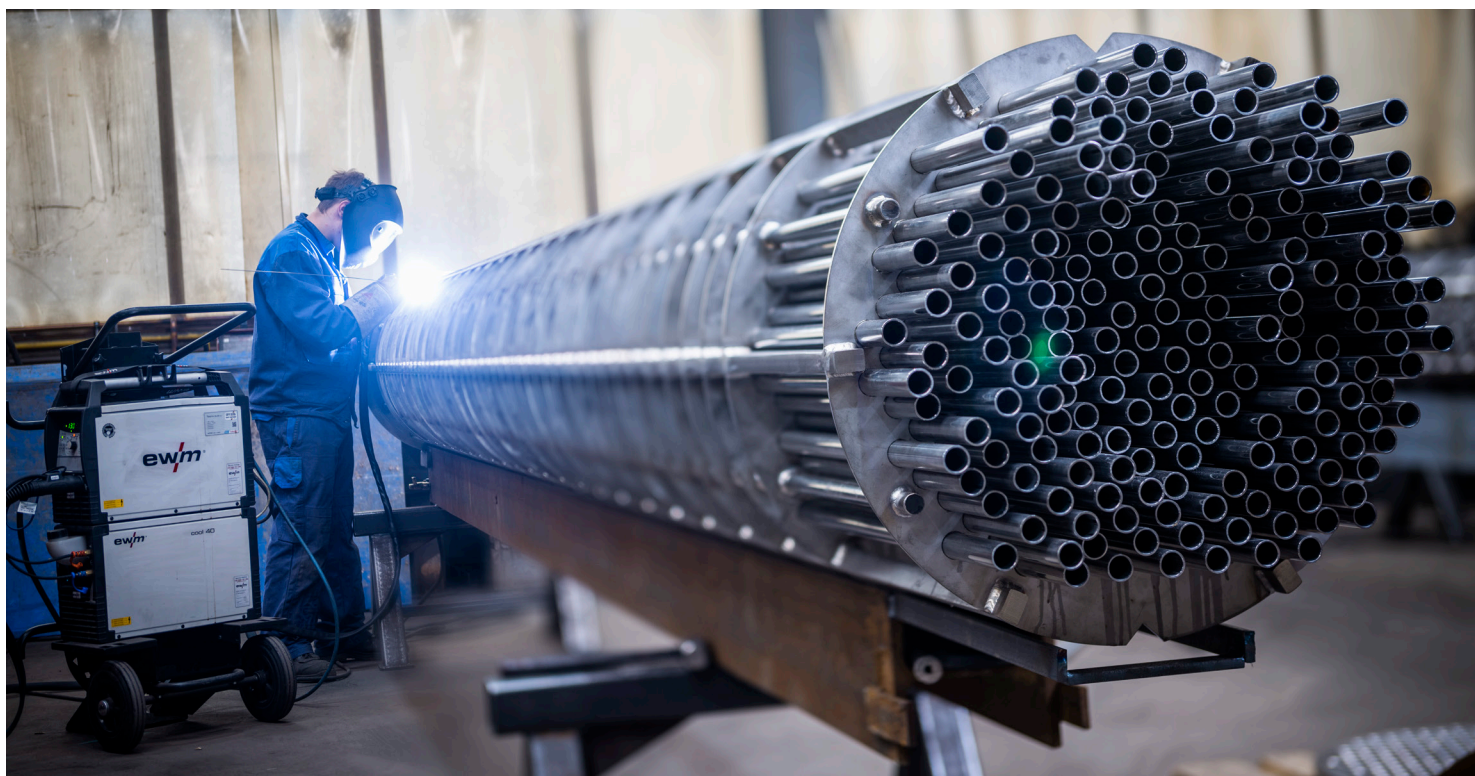
In MIG/MAG welding, the filler wire comes off the roll. However, EWM, the welding machine manufacturer from Mündersbach, also offers a wire feed system for TIG welding: tigSpeed. This wire feed system is designed precisely to the demands of TIG welding and guides the wire off the roll. Here, an additional movement can be superimposed on the continuous wire feeding, which feeds and retracts the wire. The filler material is repeatedly drawn out of the weld pool and passes over drop by drop. The result is a very even seam pattern. However, the higher deposition rate – and the resulting greater welding speed – represents only one of the ways in which working time is reduced. Because the process is also predominantly spatter-free and, thanks to the use of the large Jumbo gas nozzle, hardly any discolouration forms, finishing work is also minimal – another significant time saver.



## Reduced heat input

In the case of hot wire welding, the filler material is preheated. As a consequence, less energy from the arc is required to melt the wire. The available energy can be converted into a higher welding speed, which is accompanied by a significantly reduced heat input into the material and which results in less distortion in the finished welded part. This means that straightening work is also reduced, in turn positively influencing the production speed.





Back to basics – manual TIG welding is also deployed at Gebrüder Stahl. In this case for the struts of a tube bundle made of duplex 1.4462 with 180 tubes Ø25 x 2 mm.

## The welding torch: lightweight and flexible

EWM provided not only the power source and the welding consumables, but also the welding torch used. In more technical terms, Gebrüder Stahl GmbH uses the TIG 450 hot wire welding torch with a Jumbo gas nozzle. Thanks to the good shielding gas coverage, the intermediate weld passes are characterised by especially little discolouration. This is optimal weld preparation for the following passes.

## EWM as a full-service provider

In addition to the equipment for TIG welding with tigSpeed and the filler material, Gebrüder Stahl GmbH has also equipped its entire conventional welding production chain with EWM MIG/MAG welding machines. These machines and welding processes are also characterised by high productivity, cost-effectiveness and safety, with simultaneously easy operation. One very simple solution for boosting productivity is: weld less.

## Innovative MIG/MAG welding processes

Here, welding less does not mean reducing the number of welds per se, but simply the seam volume. A lower seam volume requires fewer welding consumables, less gas, electricity and, of course, welding time. This is made possible by employing suitable welding processes. EWM's welding machines are equipped with all innovative welding processes as standard, allowing every welder to access them at any time and use them at the push of a button. With the aid of the electronic control system, each arc for the various welding processes is specifically formed. What's more, the arc properties are kept constant at the same time. This ensures uniform welding results. In addition, the arc can be made more powerful. This means that the included angle of the flank can be reduced from 60° to 30°, for example. Here, too, the entire savings chain that results from this change is revealed: A smaller included angle requires less weld metal, less work time, less energy and, due to the high quality, less finishing work. This single design adaptation, in conjunction with the correct welding process, thus brings with it multiple savings.



Welding a heat exchanger flange made of P265 GH with a diameter of 2.30 meters using the tigSpeed system.

the hand thanks to the integrated control cables and balanced design. The integrated display of the PM RD3X welding torch shows the current welding parameters. These can be set and adjusted directly on the welding torch. Tiresome journeys back to the power source are no longer required.

### Decision: EWM.

Whether TIG welding with tigSpeed or MIG/MAG welding: the welders have only had the best experience using the machines. Schröter's conclusion: "The EWM machines are the perfect match for our company. Our employees can handle them well because their design is well thought out and coherent."

### Easy to operate

"The greatest benefits are the flexibility, the short set-up times and the position-independent welding result," summarises Carsten Schröter, Operations Manager at Gebrüder Stahl GmbH. Flexibility is delivered by the various welding processes, which the welder can call up at the press of a button. Position-independent welding plays a major role, in particular for large and heavy components. The welder cannot simply rotate the component in a way that is most convenient for him and for accessibility. Due to the ever-optimal arc and reliable wire feeding, welding is equally good in any position and in any orientation. The welding torch makes its own contribution: It is characterised by its low weight, compact design and easy operation. It lies comfortably in



Completed weld on a flange pipe connection of a duplex steel container



Years of satisfaction with EWM's complete welding solutions: Tim Höller, EWM AG, Carsten Schröter, Operations Manager, Martin Hellbach, welder

In collaboration with



Gebrüder Stahl GmbH