

"We know what's under the top layer!"

RIFTEC has been friction stir welding for 20 years. But what does that actually mean? Friction stir welding is an automated welding process that is carried out using systems comparable to CNC machining centers. It is suitable for welding aluminum and other light metals. Sheets, profiles, cast parts and combinations thereof are welded.

What is the difference between friction stir welding and other welding processes?

First of all, the oxide layer on the aluminum doesn't bother us. What causes major problems in fusion welding is simply broken up with friction stir welding. A joint preparation is not necessary.

Also very important is the lower heat input during friction stir welding. We introduce significantly less stresses and thus distortion into the component than other welding processes as we remain in the solidus area when welding. Due to the low heat input, we hardly generate any grain growth, the heat-affected zone is smaller compared to other welding processes and there is only little loss of strength. Friction stir welded sheet metal, for example, can be formed excellently.

How does it work in practice?

As in all other welding processes a welding procedure specification (WPS) needs to be created first for each material thickness and for all material combinations. It defines the parameter settings that are necessary for a correct weld seam. Once the weld has been approved, it is 100% reproducible. No manual errors occur as the process is completely automated. As shielding gas and welding consumables are not required they do not have to be monitored by the welding supervisor.

The process parameters are often released based on the first component in a production line. In serial productions this usually is the first component at the beginning of a shift. In addition to a visual inspection a destructive test is common. If the macroscopic examination is approved, the production is released by the welding supervisor. Further examinations are not necessary until the end of the production or shift. Only in the event of interruptions - such as replacing the welding tool - the quality of the weld would have to be controlled once again.

The job of the welding supervisor in friction stir welding is to monitor the use of the correct process parameters. The machine itself does not have to be supervised by the welding supervisor during operation, as the process is monitored by the system itself. The weld inspection also differs from that of conventional welding processes. With friction stir welding random samples are taken at the start or at the end of the seam. These are representative samples of the entire weld. Despite the destructive test it is not the entire component which has to be destroyed. The area between samples can be used as usual. It should be emphasized that there are no gas inclusions with friction stir welding. Our welds are free of pores. An X-ray of the seam is not necessary because thanks to the reproducibility we know what is under the top layer.

Overall, the automation and reproducibility of the process ensure that the work of the welding supervisor in friction stir welding is less time-consuming than in most other welding processes. The greatest challenge lies in the initial definition of the correct welding parameter for a component. As soon as the production is running, however, it is limited to monitoring the processes, compliance with safety regulations, wearing PPE, etc.

For us, friction stir welding is a great process wherever it is appropriate.

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