

FRICTION STIR WELDING

www.stirtec.at

STIRtec GMBH A COMPANY PROFILE

STIRtec GmbH is an Austrian high-tech company with headquarters near Graz.

Our core competency is research, development and the delivery of technology, machines and tools in the area of Friction Stir Welding, "FSW".

STIRtec GmbH is a specialist for the industrial implementation of FSW technology, which makes us your ideal partner for all topics involving FSW.

STIRtec stands for:

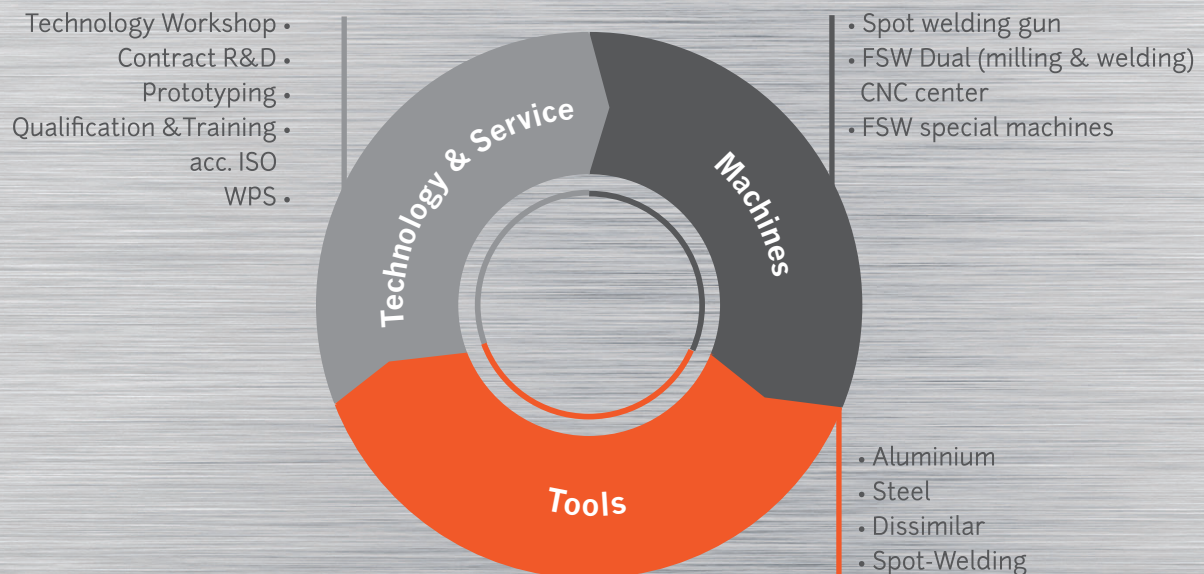
Competent, comprehensive technological consulting: process, application, certification, optimization

Development and sales of high-quality FSW-CNC machining centres and special-purpose systems for demanding industrial applications

Autonomous and independent development of FSW tools for both standard and custom applications

Our know-how is based on years of scientific research combined with the successful implementation of various projects for customers with outstanding reputations in their sectors, such as in the automobile and commercial vehicle or rail vehicle industries.

STIRtec IS YOUR COMPREHENSIVE PARTNER FOR COMPLETE SOLUTIONS FROM A SINGLE SOURCE.



■ TECHNOLOGY AND SERVICE

Our range of services enables our customers to move into series FSW production quickly – from the product idea to the development phase and on to the series phase complete with process certification.

TECHNOLOGY WORKSHOP

The Technology Workshop communicates the fundamentals of FSW, its range of application possibilities and the processes required for the implementation of FSW in a company.

CONTRACT R&D

In the area of Contract R&D, we offer development services for concrete product and process questions, such as feasibility studies, fabrication process analysis or tool development.

PROTOTYPING

Prototyping deals with the manufacture of product

samples. Typically, prototyping is offered as an additional module in combination with Contract R&D.

QUALIFICATION & TRAINING ACC. TO ISO STANDARD

FSW is a welding process which is subject to internationally applicable standards and qualification and/or certification procedures.

This service package offers our customers competent support and consultation with the objective of obtaining these certifications.

WPS (WELDING PROCEDURE SPECIFICATION)

It is the responsibility of companies, that bring welded components to the market, to create application-specific WPS's.

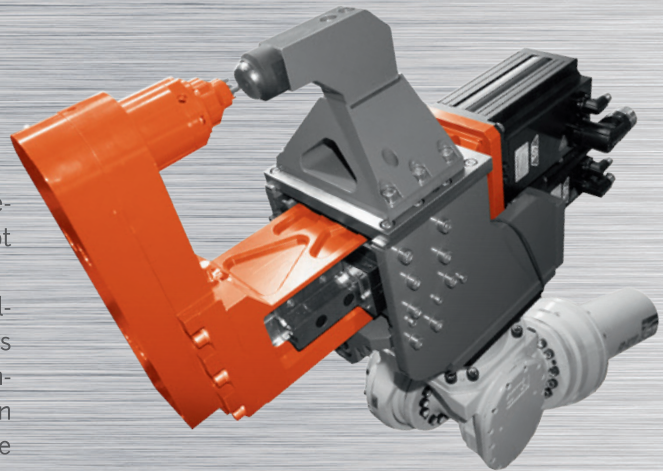
We offer support for the creation of specification-compliant WPS's for FSW applications.

■ MACHINES

FSW WELDING GUN SERIES R-SWG

The FSW welding guns form a special product development area and are used primarily when spot welds or short linear welds are required.

The FSW welding gun is equipped with its own welding controller and the associated drives and is capable of being mounted on an industrial robot (independent from manufacturer). Areas of application include: automotive industry and special-purpose machinery manufacturing



MACHINE SERIES: STIRPOWER V-WMC

The STIRPOWER V-WMC machine series is a globally unique solution that synthesizes the very latest in FSW technology with top-grade milling functionality in a single machine. (STIRtec 2-in-1 concept)

The machines in this series are conceived as 3-axis CNC machines with a C-frame design (in table widths from 800 mm to 2500 mm). As an option, the machine can also be equipped with an FSW quality monitoring system for reliable series fabrication.

MACHINE SERIES: HAGEMATIC FSW

The HAGEMATIC FSW machining centre is the result of consistent implementation of the innovative STIRtec 2-in-1 concept for the machining of medium to large-sized components and was developed in partnership with HAGE Sondermaschinenbau GmbH. The multi-axis machining head has been designed specifically for industrial applications and creates a unique solution allowing large components to be both welded and mechanically processed using a single clamping operation. The flexibility this offers makes this machine series ideal for applications such as rail vehicle construction, the commercial vehicle industry or the manufacture of special-purpose systems.

SPECIAL-PURPOSE SYSTEMS

We provide the experience and expertise in the area of automated series production of FSW components to develop and fabricate special-purpose



FSW systems in cooperation with our customers. High process functionality and stability as well as high-level system availability are the fundamental requirements we apply in the development of special-purpose FSW systems.

TOOLS

MAXSTIR TOOL RANGE

As a single-source supplier of FSW technology, STIRtec also offers high-quality tools. Our innovative MaXstir tool range is based on many man-years of research and development in the areas of process technology and materials technology.

All of the MaXstir tools are characterized by high functionality, process reliability and exceptional wear resistance which results in a long service life. Moreover, our tools also enable comparatively higher welding speeds for the respective application areas.



A broad range of material combinations can be welded using MaXstir tools, such as aluminium/aluminium (including high-strength alloys) or different metals, such as aluminium with steel, copper, magnesium or titanium.



Available Geometries and Areas of Application:

Spot welding tools (aluminium/aluminium, aluminium/steel, steel/steel)

Two-part tools with a fixed pin (ideal for standard applications and series production)

Two-part tools with controlled pin (e.g. for avoiding an end hole)

Bobbin tool in versions with fixed or controlled counter-shoulder



FSW – ADVANTAGES AND AREAS OF APPLICATION

FSW is an innovative solid-phase joining method that is ideal for connecting lightweight materials such as aluminium or magnesium. But it is also being employed successfully for joining steel or combinations of these materials (e.g. aluminium/steel).

The characteristics of FSW often make it the superior choice compared to conventional joining methods such as electric arc welding, both in terms of technology and economy.

The advantages of FSW over conventional arc welding include:

- + Low distortion and residual stress
- + Improved microstructure and fatigue strength
- + Reduced risk of crack formation
- + Avoids the emergence of porosities
- + Significantly higher strength in the weld joint
- + No significant surface and edge pre-weld preparations required
- + Easy to automate and to monitor (quality assurance)
- + A fast and stable welding process
- + A very high degree of reproducibility
- + No filler material or welding consumables required

- + No smoke, welding spatter or other emissions
- + An environmentally-friendly fabrication process

The advantages FSW offers have led to its being used already today in the following sectors:

- + Automotive industry
- + Commercial vehicles
- + Aviation and astronautics
- + Rail vehicles
- + Shipbuilding
- + Medical technology
- + Process technology and engineering
- + Special-purpose machinery manufacturing

STIRtec is your partner for incorporating the advantages of FSW in your company with expertise and quality.



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