

RETRACTABLE PIN FSW head for CNC machine

Stirweld FSW equipment: the least expensive & most versatile FSW solution on the market

Content



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Head features, retractable pin principle and head functions

02 Key benefits

Why choose our retractable pin head for your FSW operations?

03 Case application

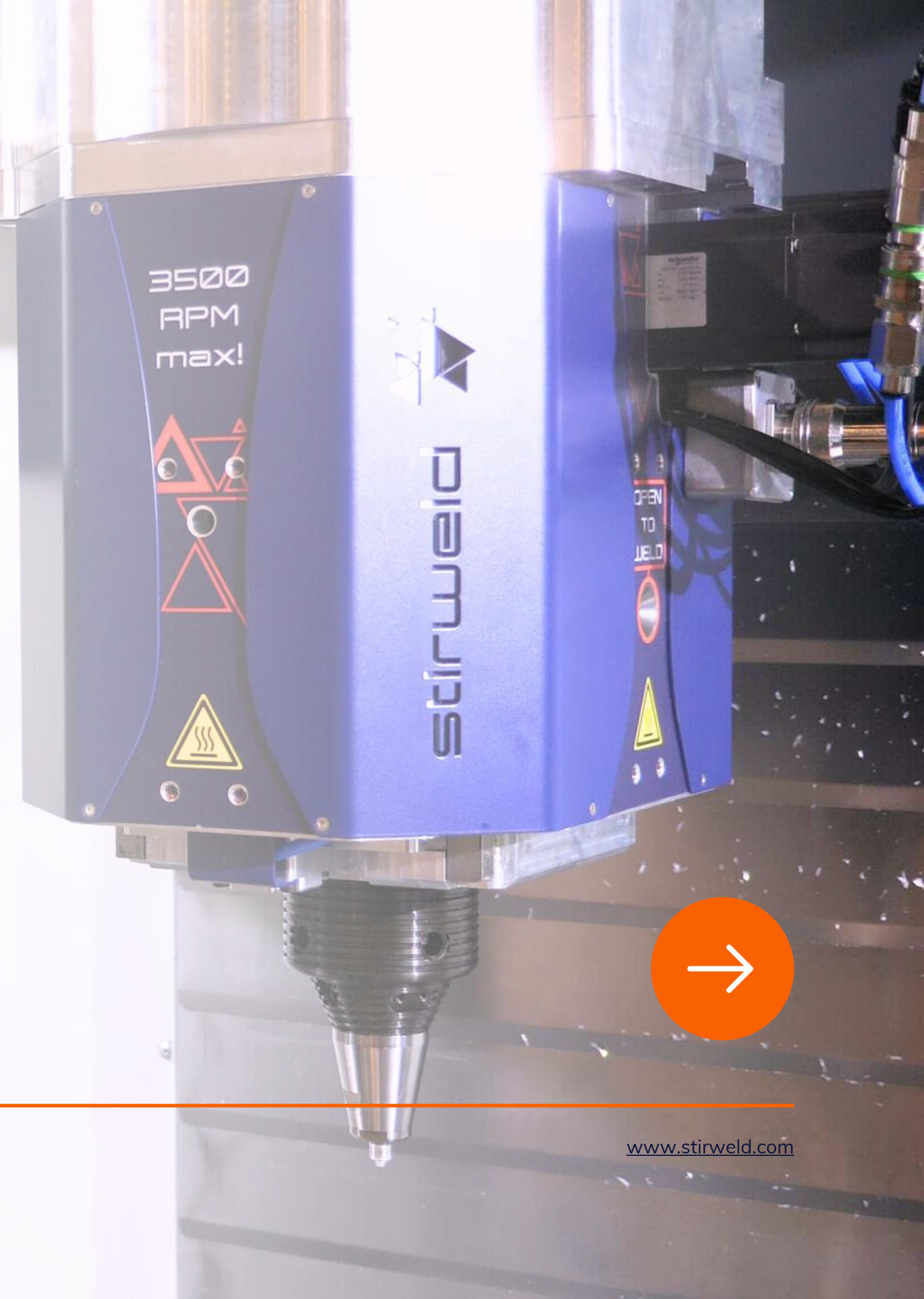
Filling of the exit hole, welding of different thicknesses

04 Who are we?

Our references, quality standard, global presence and sales partner

TECHNICAL SPECIFICATIONS

Upgrade your CNC system with the latest in friction stir welding solutions. Witness unprecedented precision, efficiency and quality with our FSW head for CNC with retractable pin.



TECHNICAL SPECIFICATIONS

retractable pin head features

HOW DOES IT WORK?

→ Tool Comprised of Two Parts

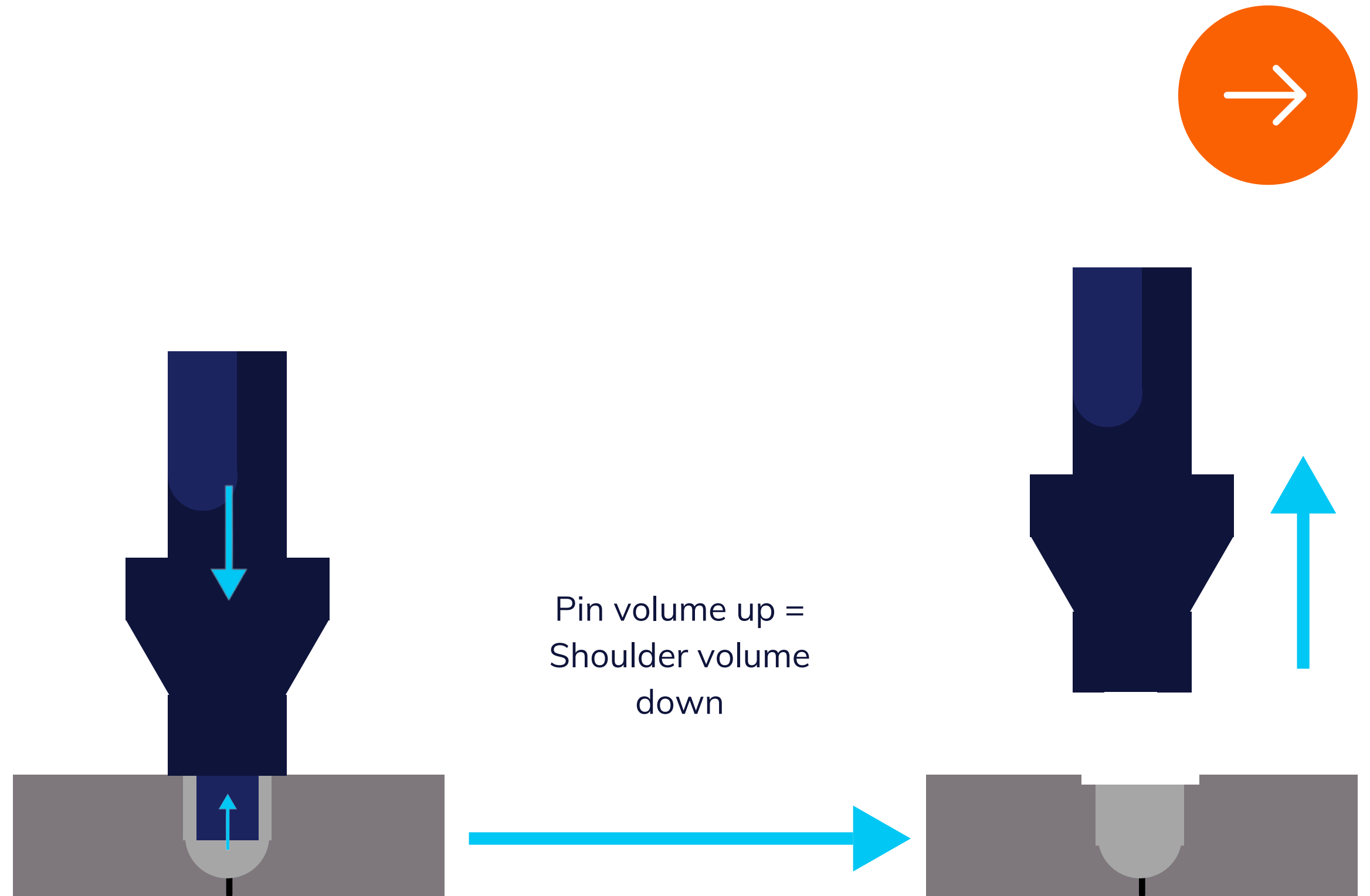
The shoulder & retractable pin function separately, enabling easy replacement and improved cost-effectiveness.

→ Torque Transmission

Torque transmission employs a locking key for high-torque on the shoulder & a pressure screw for the pin, ensuring synchronized rotation.

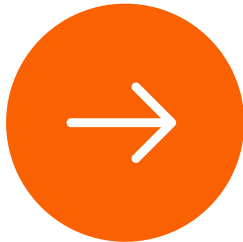
→ Alignement Precision

Achieve precise alignment between the shoulder and the pin with H7/G6 tolerance for exact fitting.

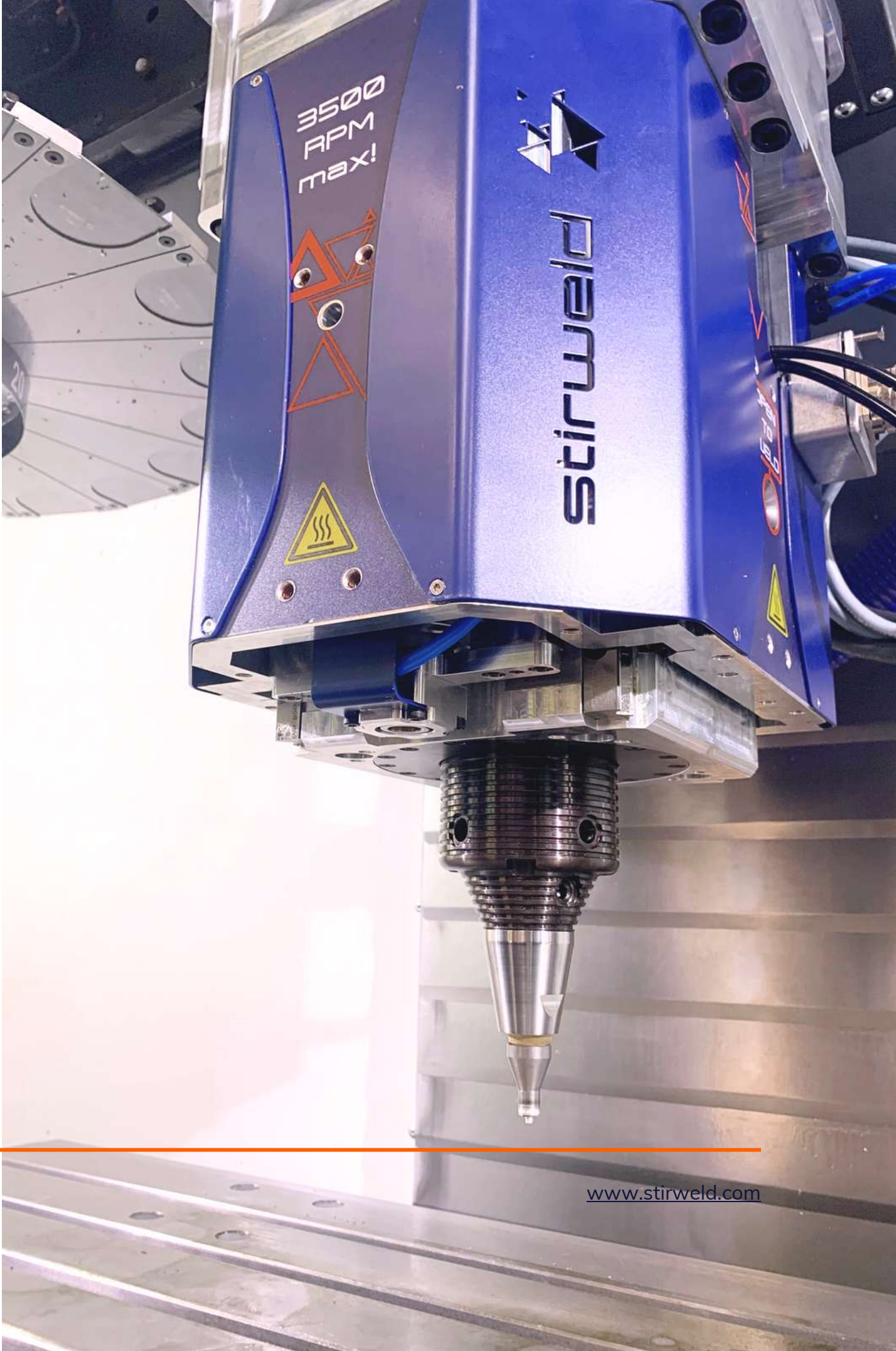


TECHNICAL SPECIFICATIONS

retractable pin head features



Force Management	Secure the weld quality from 1 to 18 kN
Rotational Welding Speed	Up to 4000 RPM
Rapid Tool Swap	Quick-change with precise positioning (Whistle Notch System)
Force Monitoring	Force Reccording for consistent quality
CNC machine protection	Ensuring CNC machine safety from FSW forces up to 18 kN and vibrations in FSW process
Cooling System	Water and air pressure cooling
Remote control	For production mode or process adjusment





TECHNICAL SPECIFICATIONS

retractable pin head features

HUMAN MACHINE INTERFACE

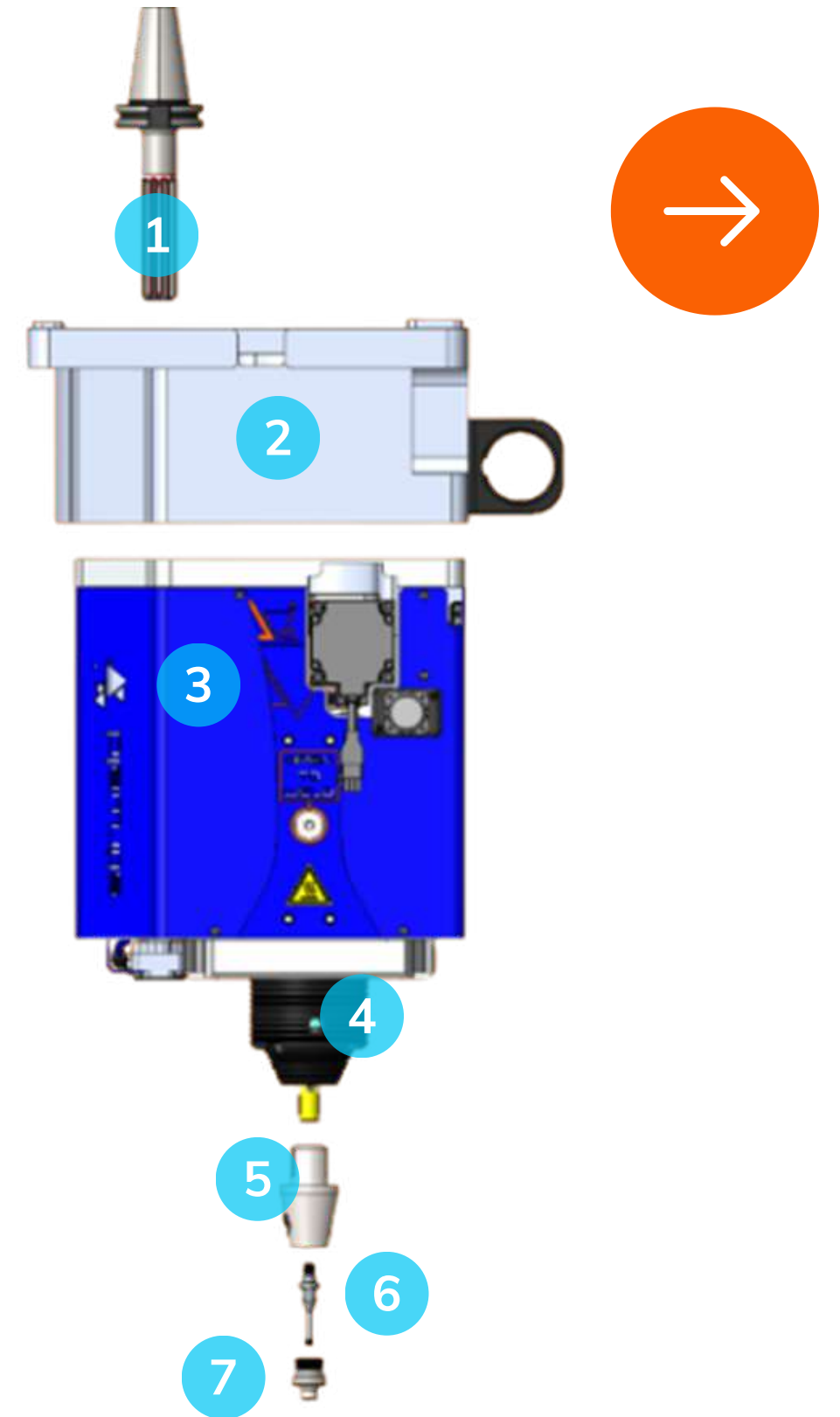
- EN 9100 compliant
- Efficient production adjustment
- 30 mm connector with free updates
- Process monitoring & recipe management
- Manual control & retractable pin adjustment
- Quality assurance with selectable value curves
- Detailed system status reports



TECHNICAL SPECIFICATIONS

retractable pin head features

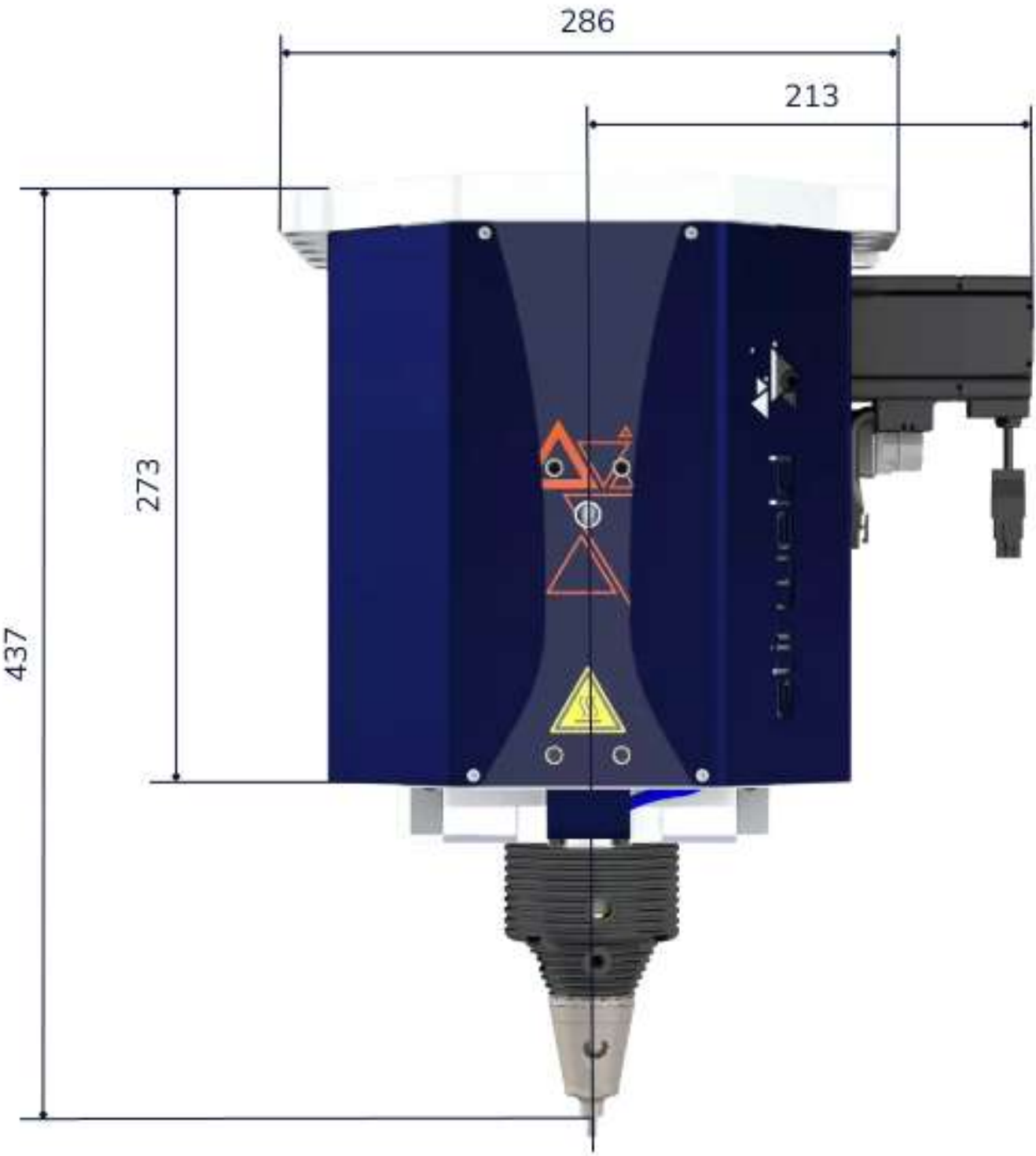
- 1 Axis: CNC shaft
 - 2 Interface according to your CNC machine
 - 3 Active part
 - 4 Pin holder
 - 5 Shoulder holder
 - 6 Retractable pin
 - 7 Shoulder
- ▶ Explore the [functionality of our retractable pin FSW head](#) for CNC machines in our detailed video guide.



TECHNICAL SPECIFICATIONS

retractable pin head features

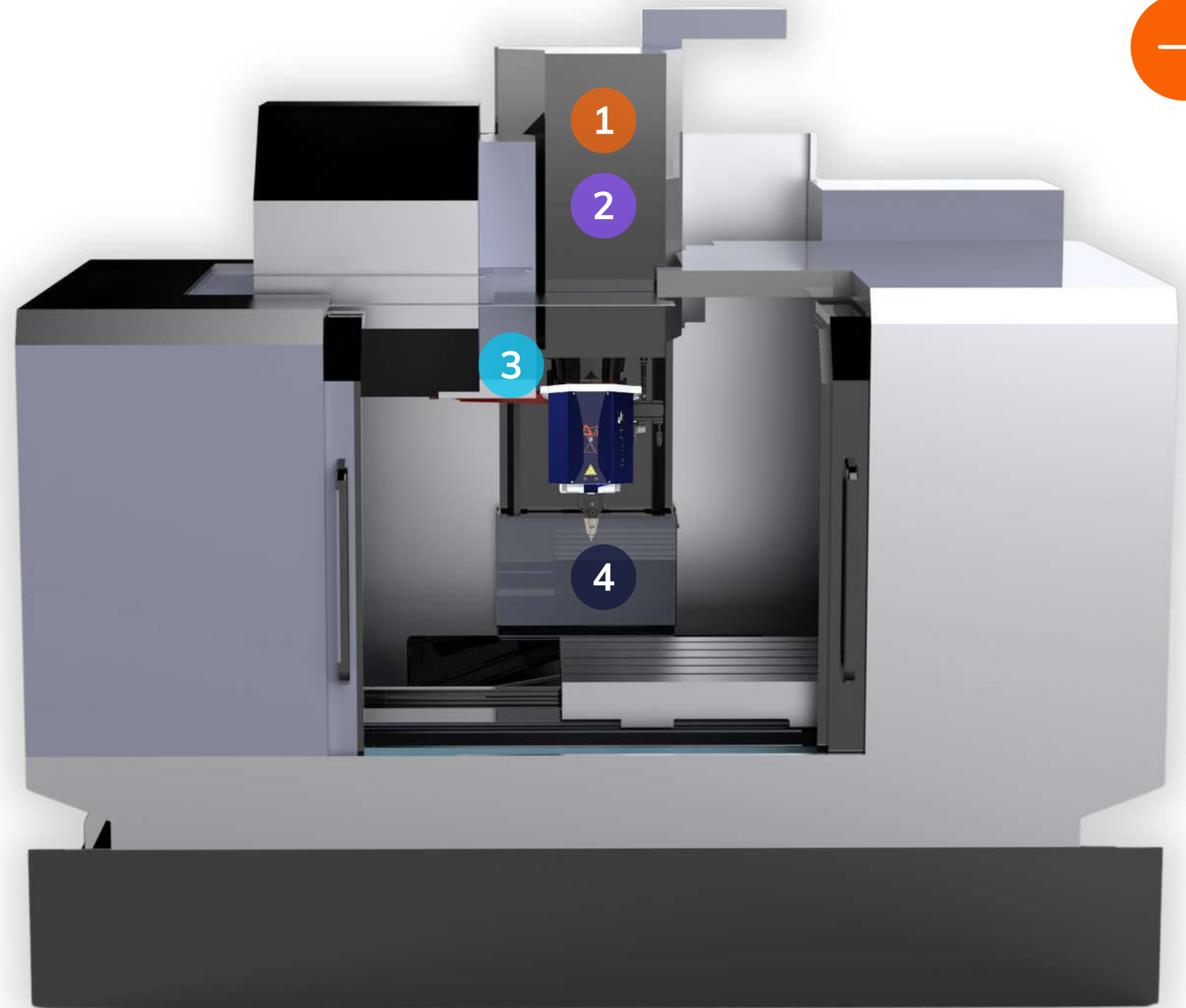
Size	Height of 437 mm (17.2 in)
Weight	70 kg
Assembly & disassembly	Completed in 15 minutes



TECHNICAL SPECIFICATIONS

Minimum CNC specifications

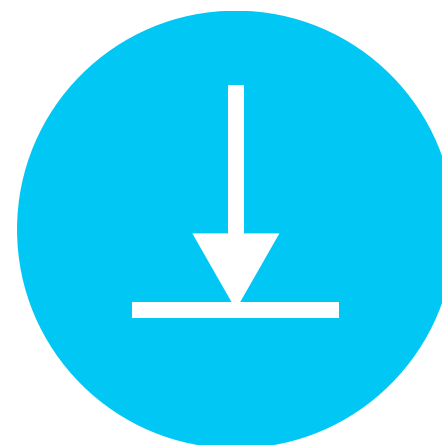
- 1 Spindle power: 10 kw minimum
- 2 Spindle torque: 50 N.m at 1000 RPM minimum
- 3 Minimum size of attachment: ISO 40, BT 40, HSK 63 or other equivalent size of attachment
- 4 Height under the spindle nozzle: 450 mm minimum, given the FSW ead height of 437 mm (17.2 in)



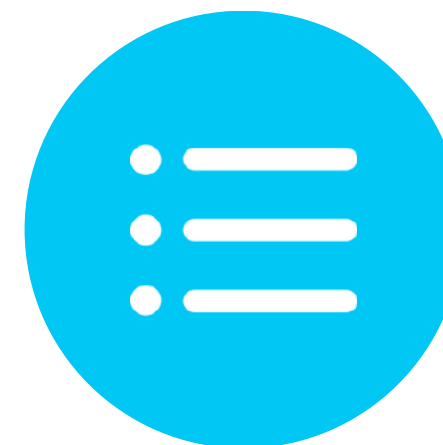


TECHNICAL SPECIFICATIONS

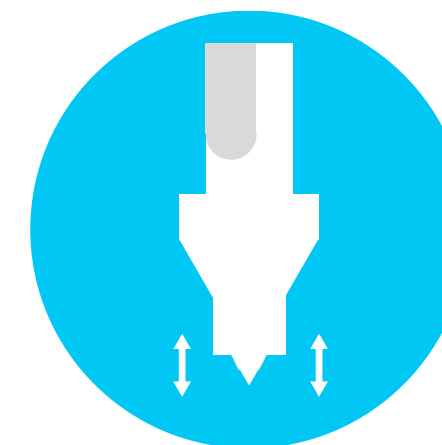
head functionalities



Force control



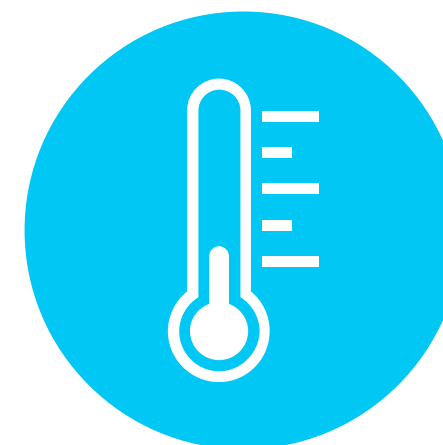
Head usage



Pin length control



Warning pop-up



Head temperature



Data Recording

TECHNICAL SPECIFICATIONS

head functionalities

FORCE CONTROL

- 18 kN max payload capacity
- Precision within +/- 5N
- Enhanced FSW weld quality via force monitoring
- Precise force tuning for optimized FSW parameters



TECHNICAL SPECIFICATIONS

head functionalities

PIN LENGTH CONTROL

- From 0 to 10 long (pin stroke)
- Accuracy of +/- 0.01 mm
- Vertical force up to 18 kN
- Retractable pin speed from 0 to 3mm/s

*Fixed pin tools are also compatible with the retractable pin head.

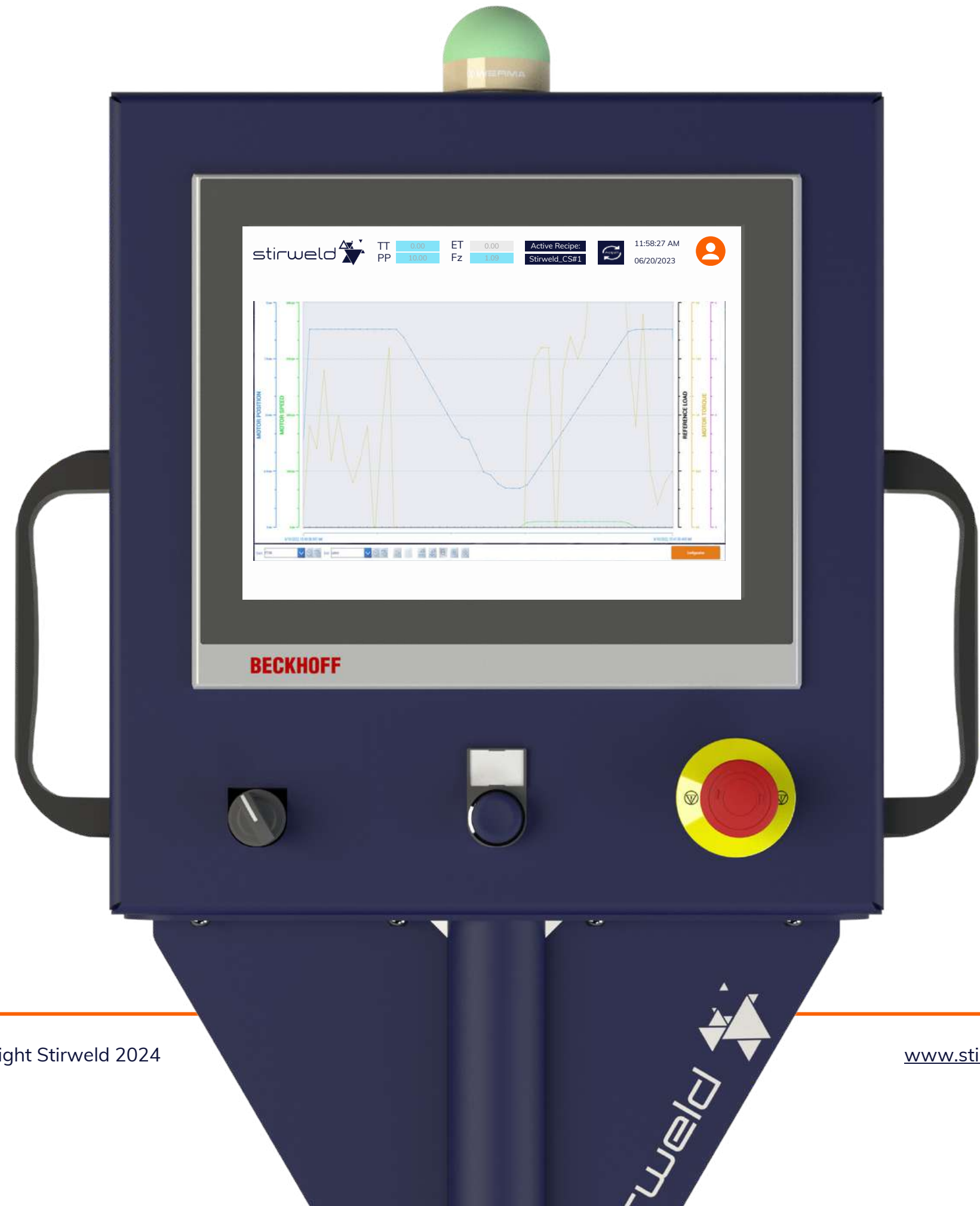


TECHNICAL SPECIFICATIONS

head functionalities

HEAD TEMPERATURE

- Safety operation: emergency stop in case of problem
- Dual temperature monitoring on the head for an integrated safety system



TECHNICAL SPECIFICATIONS

head functionalities

HEAD USAGE

Full Reccording of head usage for predictive maintenance with:

- Welding time,
- Usage ratio.



TECHNICAL SPECIFICATIONS

head functionalities

WARNING POP-UP

Developed by FSW welders:

- 2 thresholds: vigilance and problem
- Vigilance: parameter deviation outside the normal process window
- Problem detection: parameter deviation outside the safety process window

Safety operations

CE certification: European Standards in terms of safety, ergonomics and environment

Sampling: up to 100 Hz



TECHNICAL SPECIFICATIONS

head functionalities

DATA RECCORDING

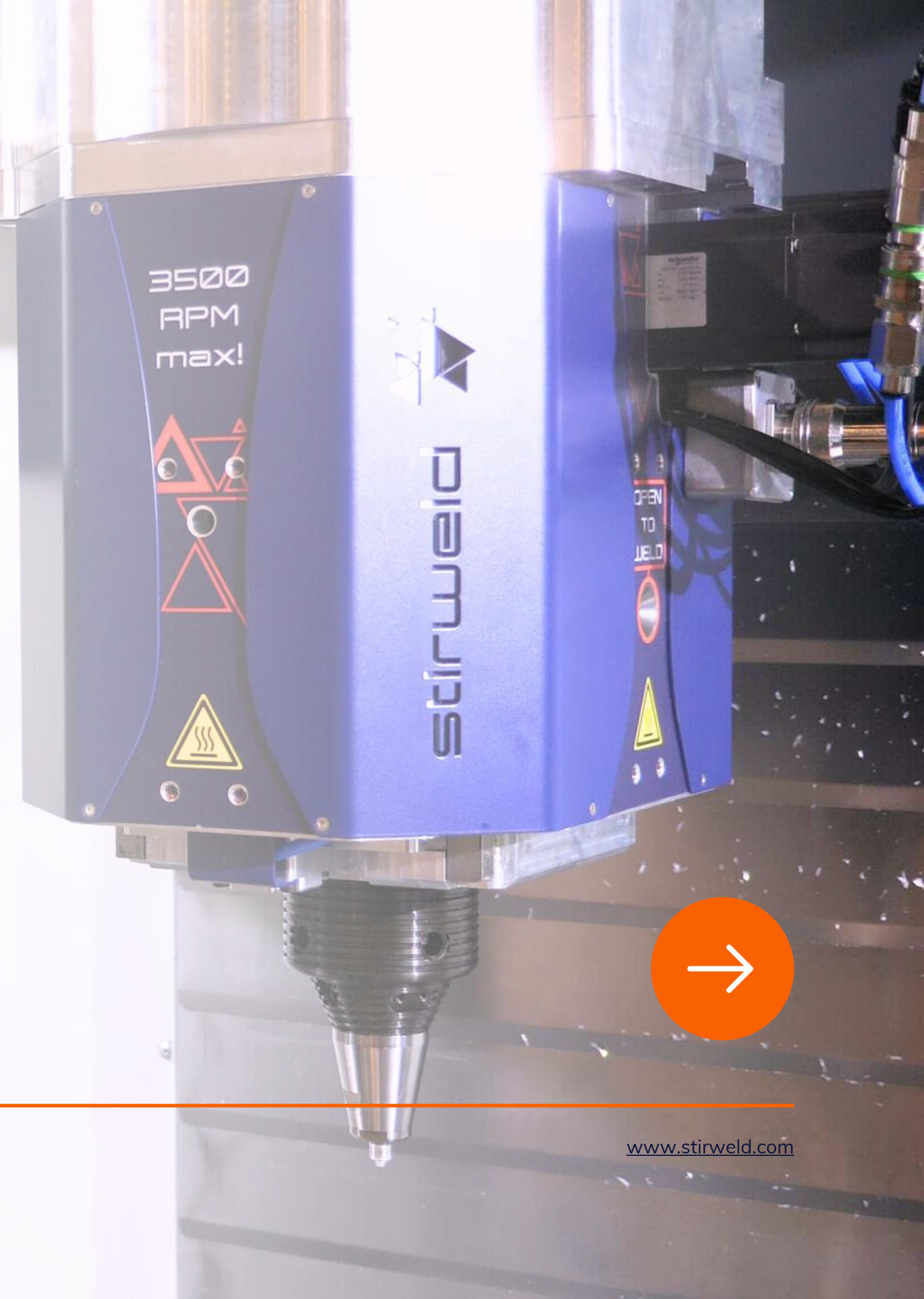
➔ Connection with ERP possible.



KEY BENEFIT

RETRACTABLE PIN FSW HEAD

Adopting the retractable pin FSW head for CNC machines offers a cost-effective, highly adaptable, easy-to-learn solution with the advantage of quick delivery times for manufacturing facilities.



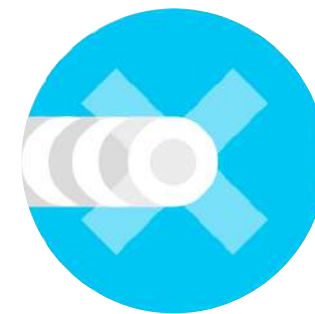
KEY BENEFIT

RETRACTABLE PIN FSW HEAD



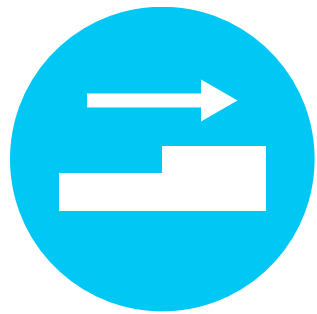
Cost-Effective Investment

The FSW head with retractable pin delivers a **favorable ROI across all batch sizes**, outperforming other FSW equipment like specialized FSW machines and FSW robots.



Optimizing Aero Welding

Elevate aerospace with this Friction Stir Welding equipment — flawless aluminum tank welds, versatile for any thickness and perfect closure of exit holes.



FSW Tech Revolution

Our retractable pin feature not only streamlines the filling of FSW exit holes but also enables versatile **welding across varying thicknesses using a single tool**.

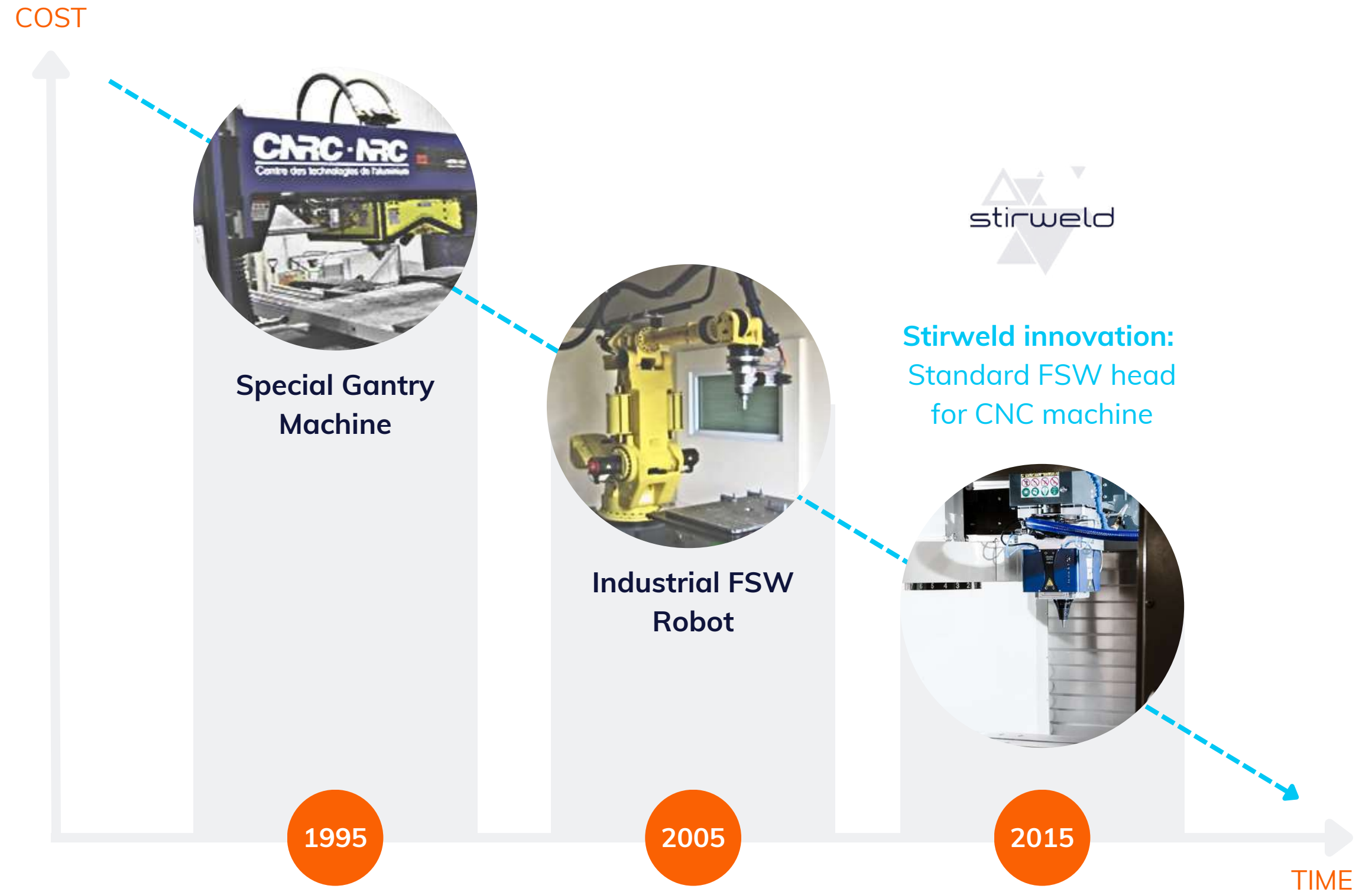


User-Friendly Set Up

Our user-friendly setup and training process ensure that **operators can quickly and seamlessly become proficient** with the Stirweld FSW head featuring a retractable pin.

KEY BENEFIT

RETRACTABLE PIN FSW HEAD
maximise your ROI



CASE APPLICATION

Filling of the exit hole
and welding of different
thicknesses

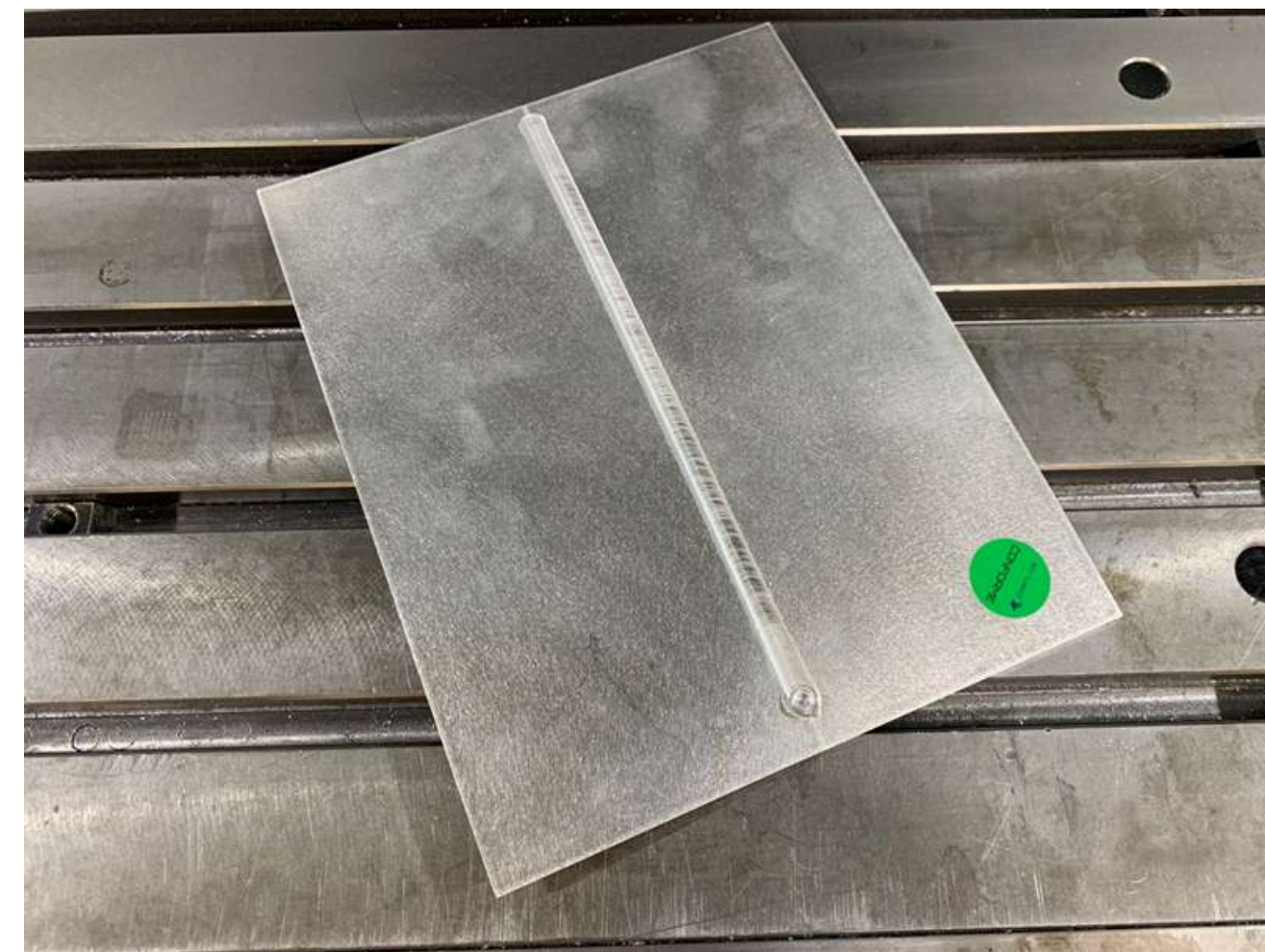


CASE

APPLICATION

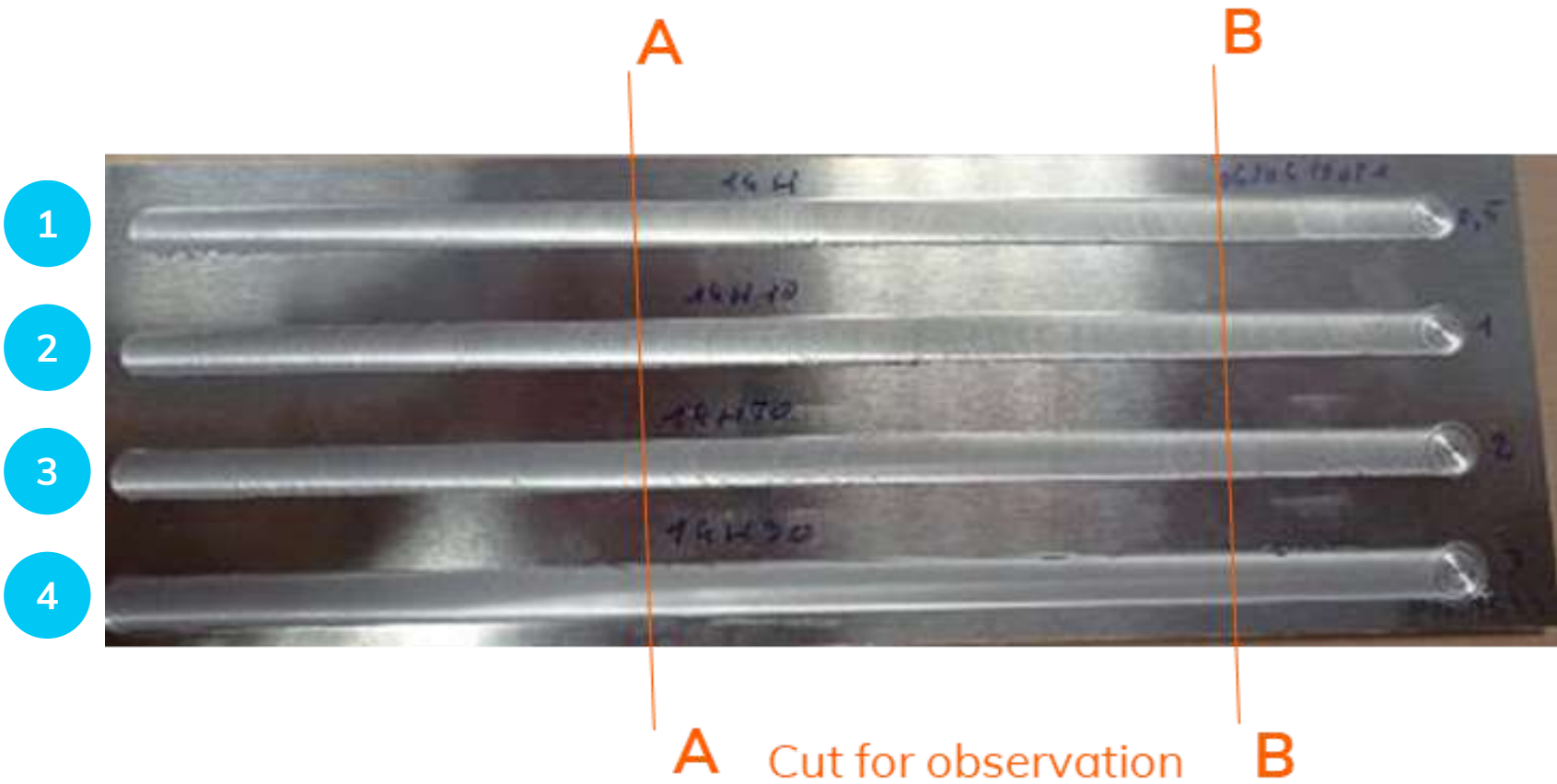
Filling the exit
hole

AA 2219-T8
BUTT welding
3-mm thick



CASE APPLICATION

Welding of variable thicknesses

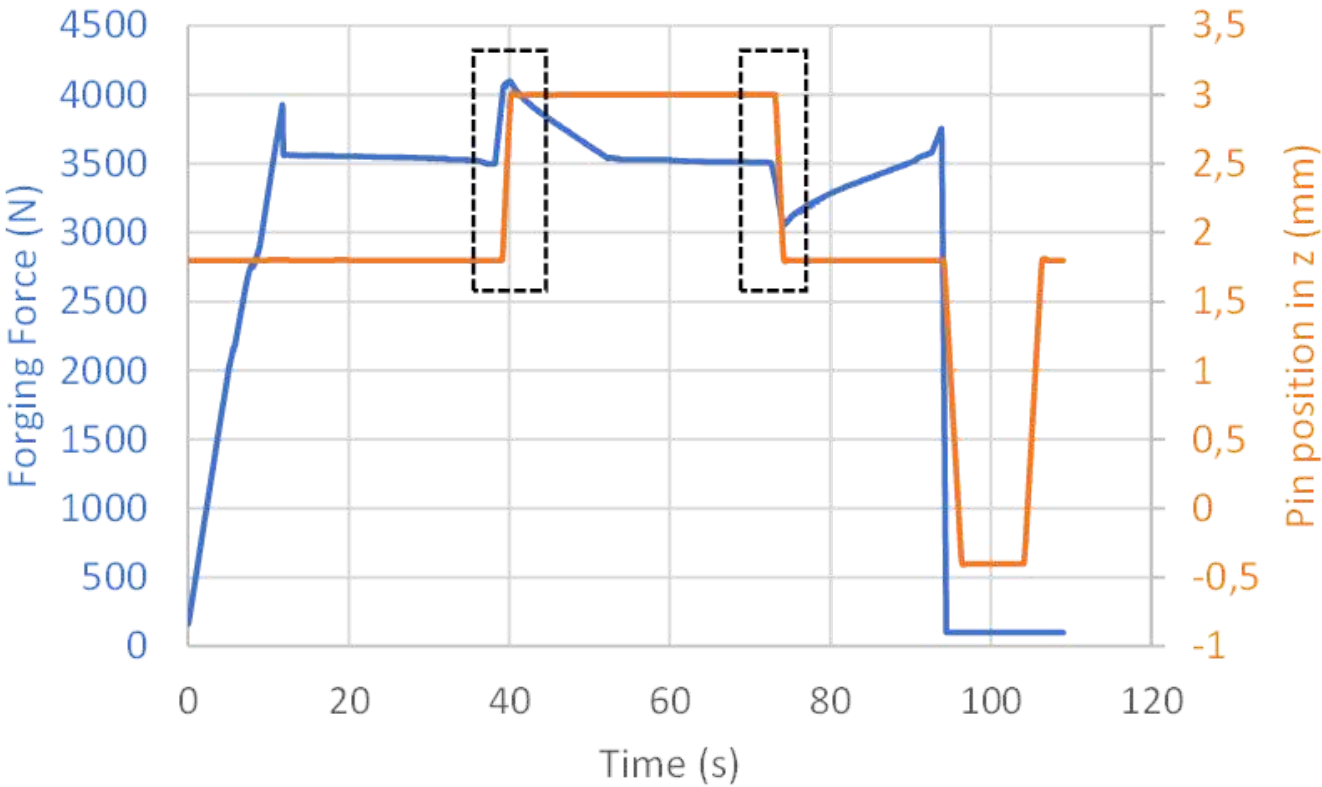


- 1 Pin length of 0.5mm
- 2 Pin length of 1mm
- 3 Pin length of 2mm
- 4 Pin length of 3mm

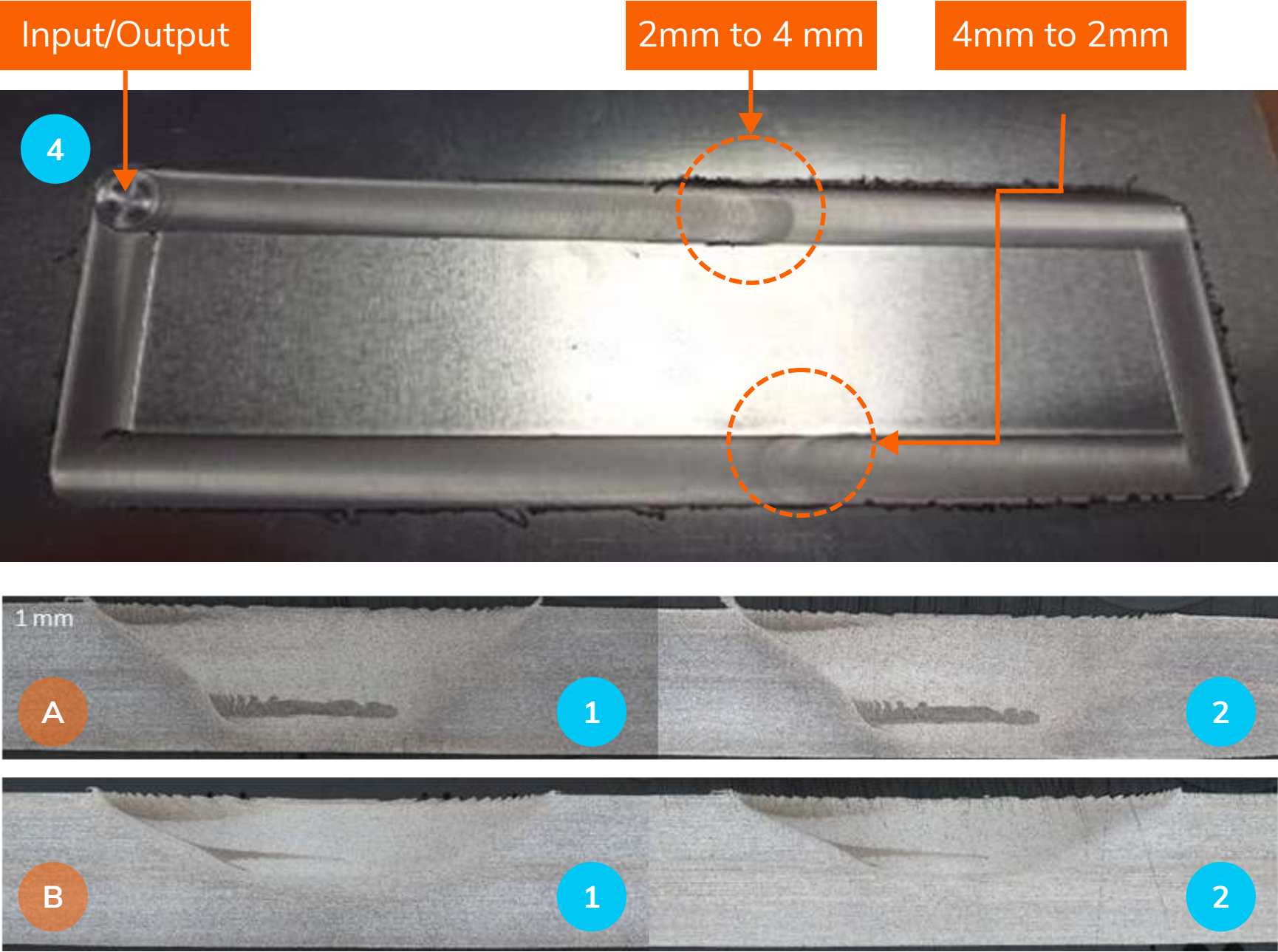


CASE APPLICATION

Welding of variable thicknesses



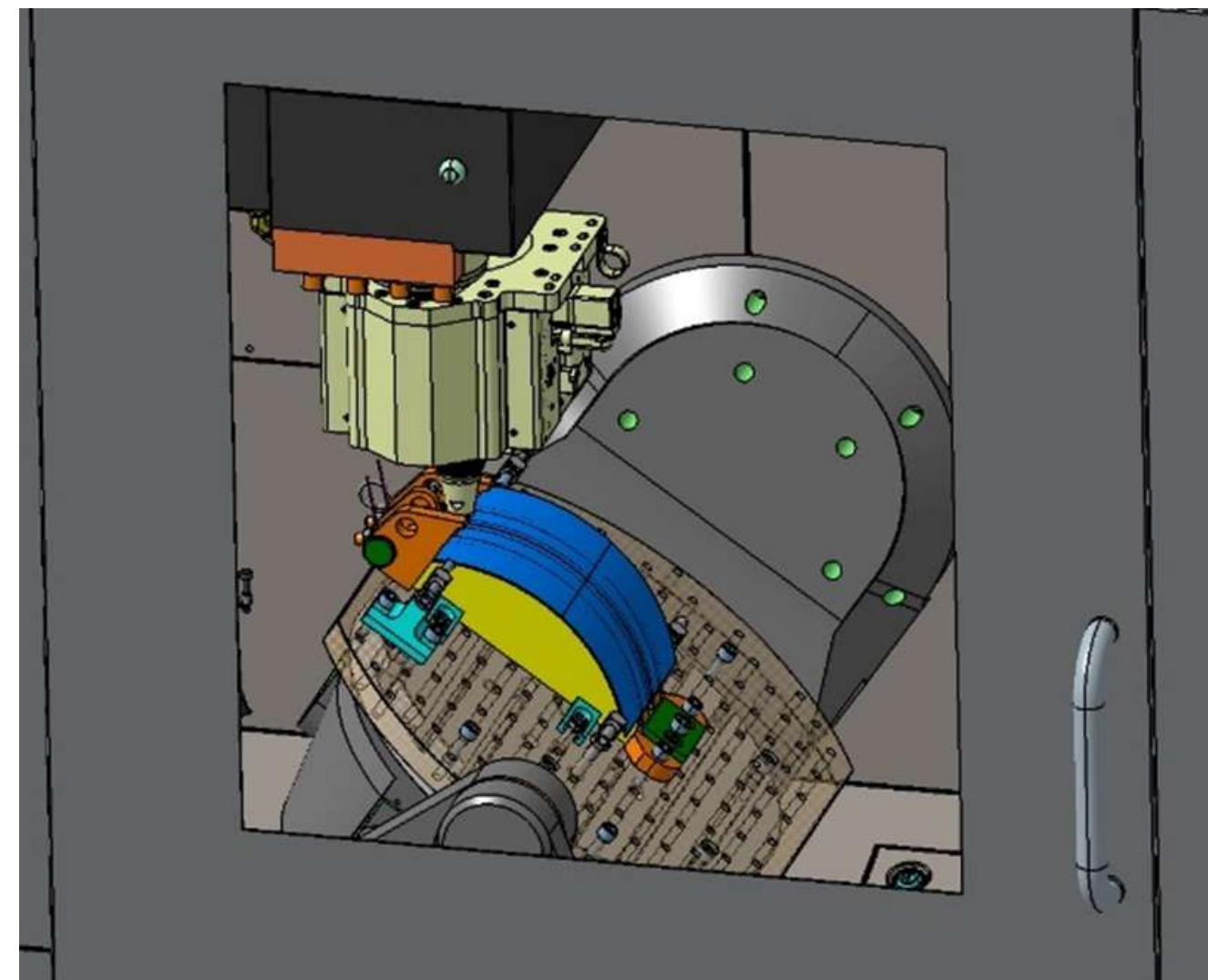
Pin Position (mm) & Forging force (N) Recorded



CASE

APPLICATION

Circumferential
weld



CASE APPLICATION

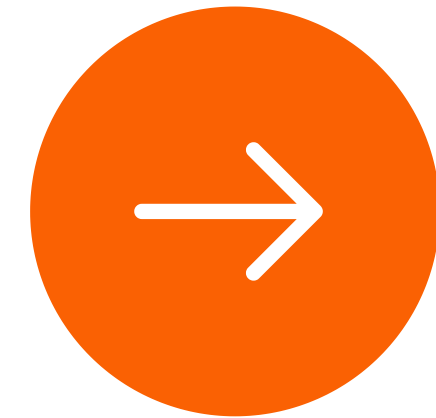
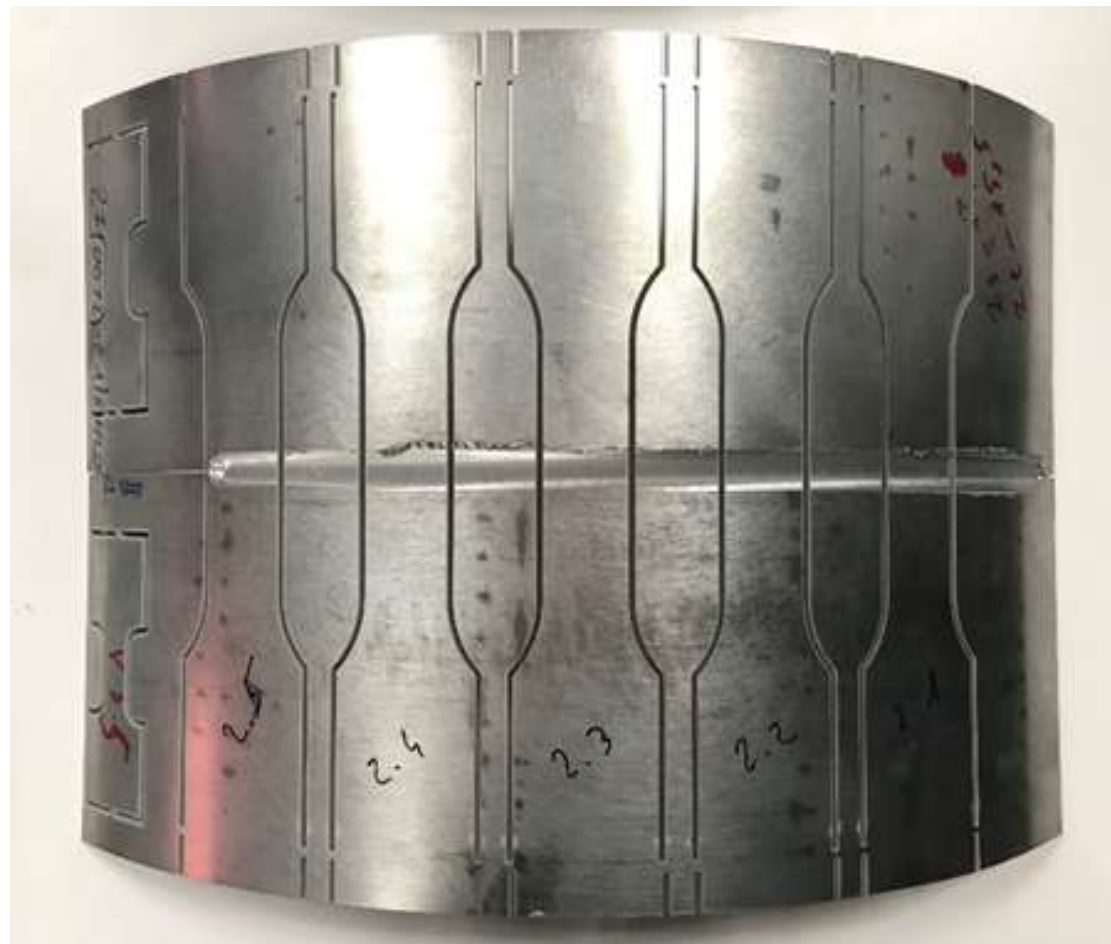
Circumferential weld

Application on 2024-T3 aluminium alloy:

- Welding speed of 240mm/min.
- Rotational speed of 800 RPM.

After the FSW process, joint efficiency reaches 80%, ensuring 100% leak-proof component.

This weldment demands a retractable pin FSW tool to properly fill the keyhole at the end of the weld, ensuring no residual holes compromise the leak-tight integrity.



WHO ARE WE? INNOVATING INDUSTRY

Stirweld, a pioneering startup from France, is on a mission to transform Friction Stir Welding (FSW) globally through innovative technology. Our goal: make FSW accessible.



WHO ARE WE? THEY TRUST US

Our client portfolio speaks volumes, featuring a range of industry leaders who trust in our expertise and solutions.

RENEWABLE ENERGY



METAL WORKING



wieland

AUTOMOTIVE



AERONAUTICS

AIRBUS



DAHER



SPACE



THALES



INSTITUTE AND UNIVERSITY



WHO ARE WE?

QUALITY STANDARD



ISO 9001 Standard

The ISO 9001 standard guarantees the proper implementation of our company's quality management system.



ISO 25239 Standard – Friction Stir Welding

Stirweld rigorously follows the guidelines set out in ISO 25239 – Friction Stir Welding: design of weld joints, qualification of welding operators, specification and qualification of welding procedures, quality and inspection requirements.



TWI Industrial Member

Stirweld is an industrial member of TWI, a leading independent research & technology organization and the inventor of FSW.



American Welding Society – D17.3

Requirements for friction stir welding of aluminium aerospace hardware (design of welded joints, qualification of procedures & operators, fabrication & inspection).

WHO ARE WE?

GLOBAL PRESENCE



30%



30%



30%



10%

55

FSW heads installed
worldwide

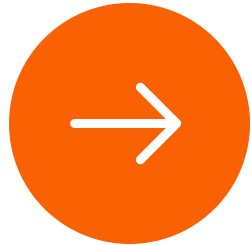
30

team members

1 000 000

welded parts by our customers





WHO ARE WE? OUR FACILITIES



4K Rue du Lieutenant Colonel Dubois
35000 Rennes
FRANCE



2791 Research Drive, Rochester Hills
MI 48309
USA



WHO ARE WE?

HOW TO SUCCESSFULLY IMPLEMENT FSW IN YOUR COMPANY?



Engineering of your part

- ▶ We carry out a free part analysis.
- ▶ We calculate your TCO - Total Cost of Ownership.
- ▶ We build prototypes in small or large batch (pilot line).
- ▶ We secure the compatibility of your CNC machine.



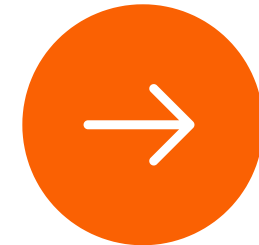
Commissioning and training

- ▶ We install and we train your team: CNC operators, welders, designers quality controllers, sales team.
- ▶ We supply all the necessary documents (standards & procedures) to start your production immediately.



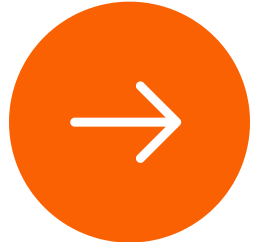
After sales support - Hotline

- ▶ We can support you on any topic:
 - ▶ Welding parameters, ▶ Quality control,
 - ▶ Welding defects, ▶ Spare parts and training.



WHO ARE WE?

STIRWELD JOURNEY



2013

INCEPTION OF THE PROJECT

Facing the high costs of FSW machines, our CEO Laurent Dubourg sought a more affordable solution, sparking the innovative idea: 'Why not adapt FSW for CNC?'

2017

STIRWELD BIRTH

Stirweld, a French start-up, aims to globalize FSW access, and has proudly become a Tier 1 supplier for the Ariane 6 program.

2022

STIRWELD LANDS IN USA

Stirweld has expanded internationally, installing 32 heads globally, achieving a €2 million turnover, and growing to a 25-strong team. To better serve customers, a US subsidiary, Stirweld Inc., was established in Detroit, MI

2015

FIRST DEVELOPMENT

Gilles Sevestre, our CTO, developed the first FSW head for CNC.

2020

FUNDRAISING OF 2 MILLIONS €

2023

NEW FACILITIES

As Stirweld expanded, new space was needed to accommodate its 26 employees, 2 machines and assembly shop.

WHO ARE WE? OUR SALES PARTNER



Technika Spawalnicza
Poland
[Website](#)



BTS Company
Slovenia
[Website](#)



CKF Technology & Consulting
Turkey
[Website](#)



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