STANDARD FSW HEAD

for CNC machine

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

stirweld

Content

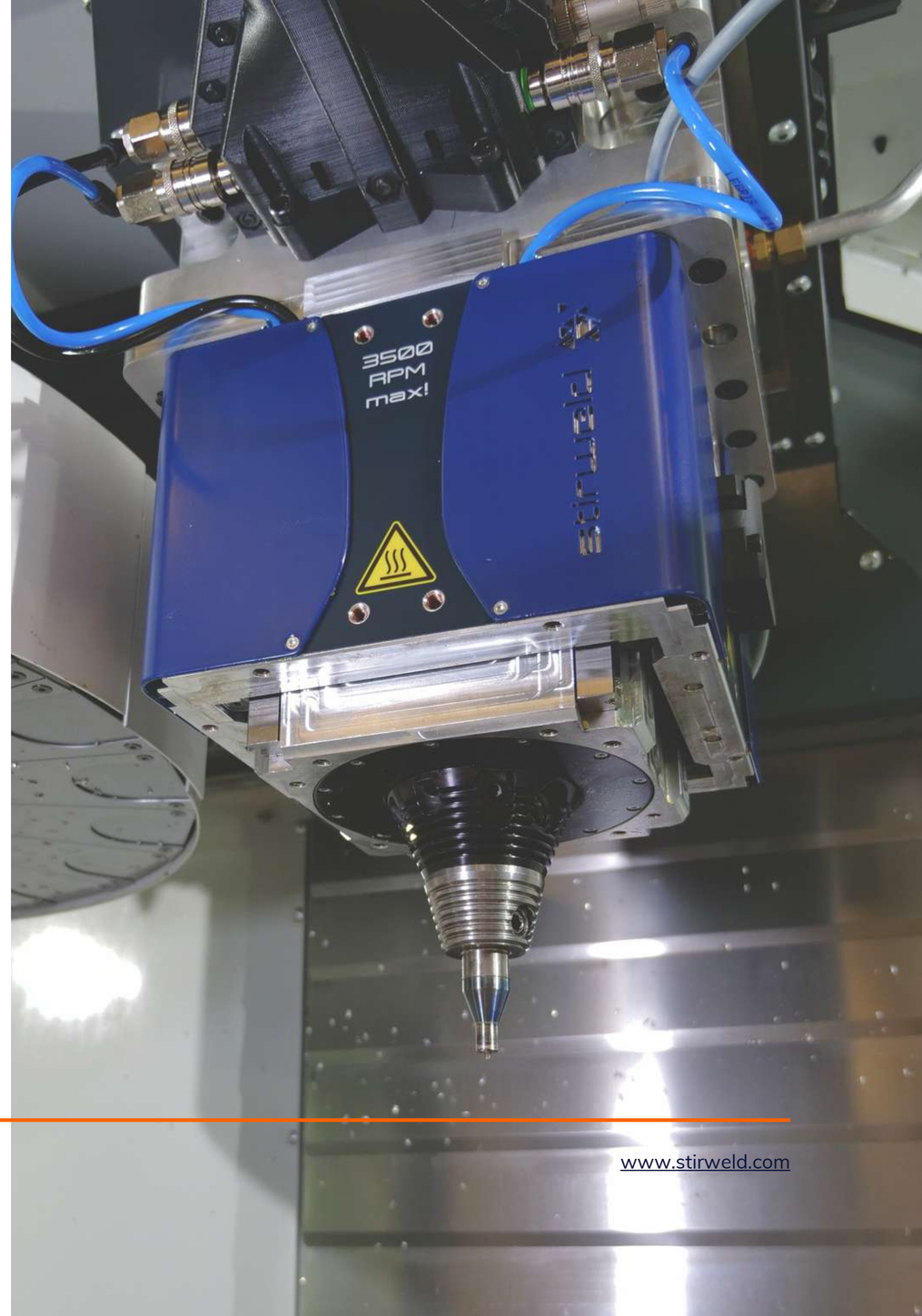
TECHNICAL SPECIFICATIONS

Explore our CNC head core and advanced features: precise force control, optimal cooling, and an innovative automatic tool changer for seamless operation. Learn more in our feature presentation.

TECHNICAL SPECIFICATIONS

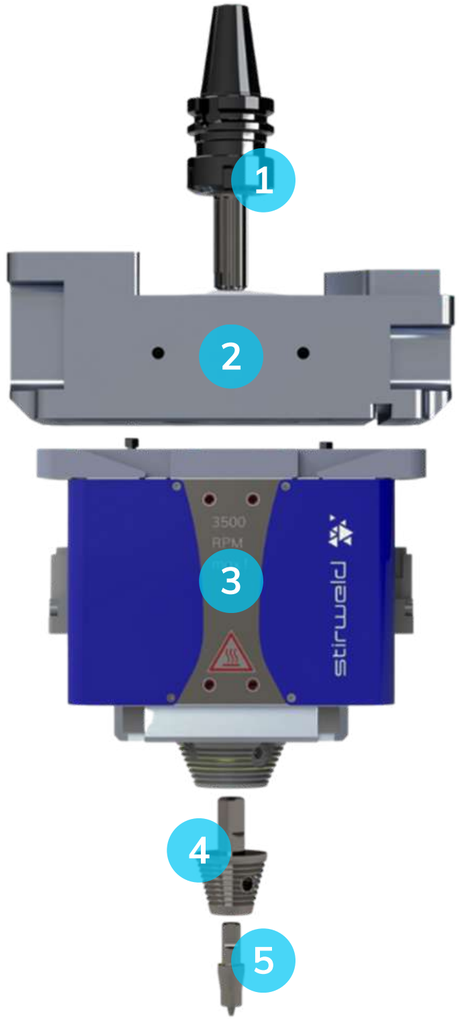
standard head features

Expert-Designed Solution	Patented by FSW specialists and SATT in 2015
Force Control	Weld quality assured from 1 to 25 kN with in-head loop control
Radius Force	Supports up to 5 kN
Force Monitoring	Force recording for consistent quality
Optimized Speed	Up to 3500 RPM for welding, 6000 RPM for milling
Rapid Tool Swap	Quick-change with precise positioning (Whistle Notch System)
Weld-to-Machine Flexibility	No disassembly required
Compact Tooling	Fits complex setups



TECHNICAL
SPECIFICATIONS

standard head features



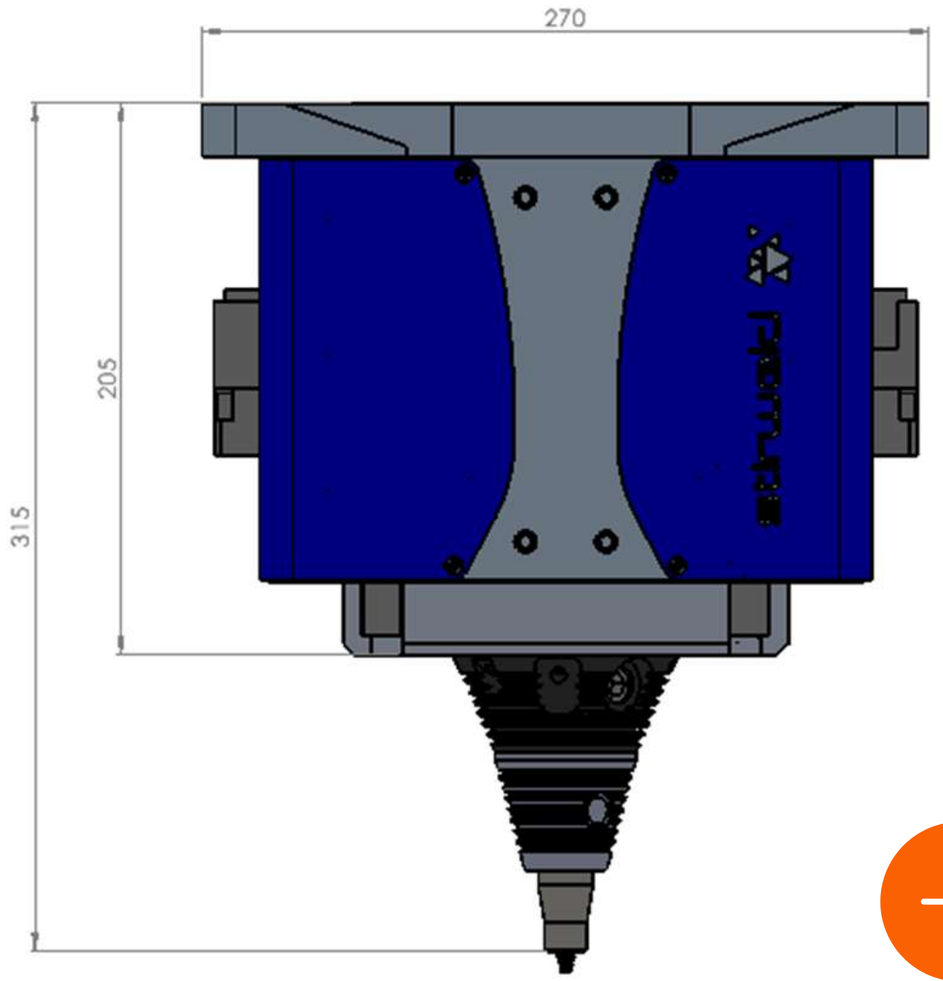
1. Axis: CNC shaft
2. Interface according to your CNC machine
3. Active part
4. Tool holder
5. FSW tools
   Compatible with Stirweld catalog

Explore the functionality of our standard FSW head for CNC machines in our detailed video guide.

TECHNICAL
SPECIFICATIONS

standard head features

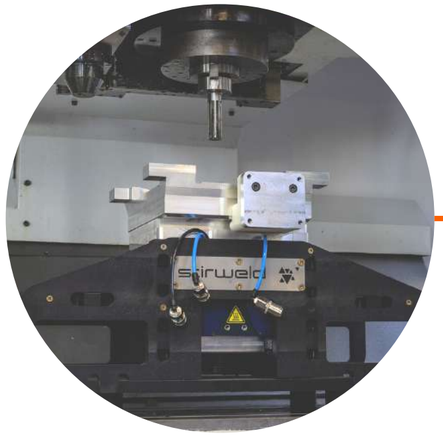
Size	Height of 315 mm (12.4 in)
Weight	35 kg
Water cooling	5l/min at 25°C (77°F)
Air pressure cooling	3 bar (43 psi)
Head console	Distance up to 10 m - 33ft *(more in option)*



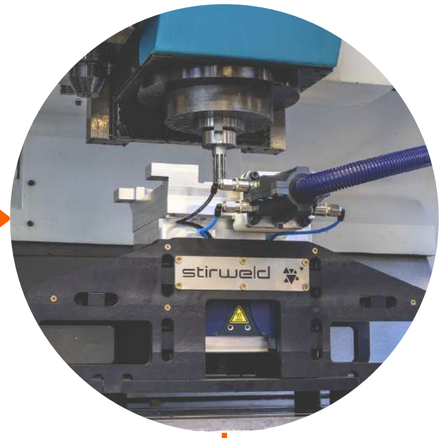
TECHNICAL SPECIFICATIONS

standard head features

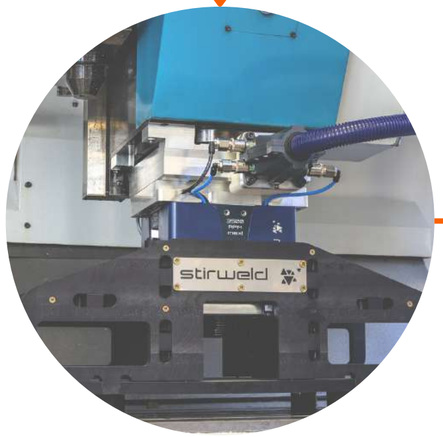
4 STEPS TO INSTALL THE FSW HEAD



1. Using the head box, move the whole unit onto the machine table.



2. Gradually lower the machine spindle until the interface can be attached to the machine.

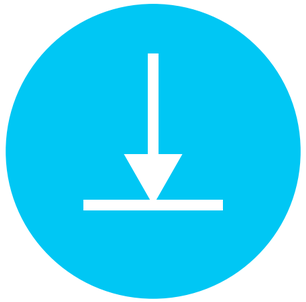


3. Attach the interface to the machine.

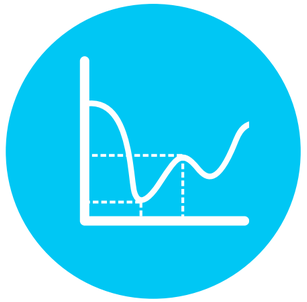
4. The FSW head is ready to weld.

TECHNICAL SPECIFICATIONS

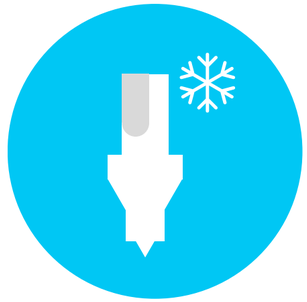
basic functionalities



Force control



Force recording



Tool cooling

FSW forces & vibrations protection

Interested in discovering the intricacies of friction stir welding? Dive into our informative video about FSW technique.

TECHNICAL SPECIFICATIONS

basic functionalities

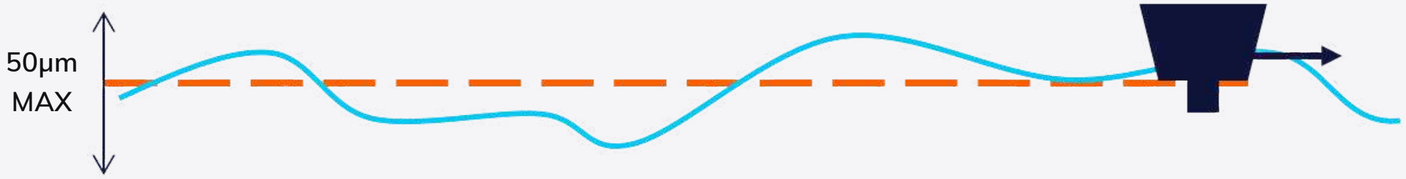
FORCE CONTROL

For optimal welding quality, it is critical to maintain uniform tool penetration throughout the workpiece.

Nonetheless, **discrepancies in part thickness** (extrusion/rolling ~ 0.1 mm, casting ~ 0.5 mm) and **positioning accuracy** (part placement around 1 mm, thermal distortion during welding ~ 0.5-2 mm) present challenges.

FSW demands a tool positioning tolerance of plus or minus 50 micrometers to prevent defects.

WELDING WITHOUT FORCE CONTROL



Force control solves this problem on CNC machine (1 to 18 kN of Z force).

WELDING WITH FORCE CONTROL

TECHNICAL SPECIFICATIONS

basic functionalities

FORCE RECORDING

MONITORING SOFTWARE

Control panel
Production mode (110 / 220 V)

Connector diameter
30 mm (1,2 inch)

Monitoring software
PC for control optimization.

Process improvements
Free software updates

TECHNICAL SPECIFICATIONS

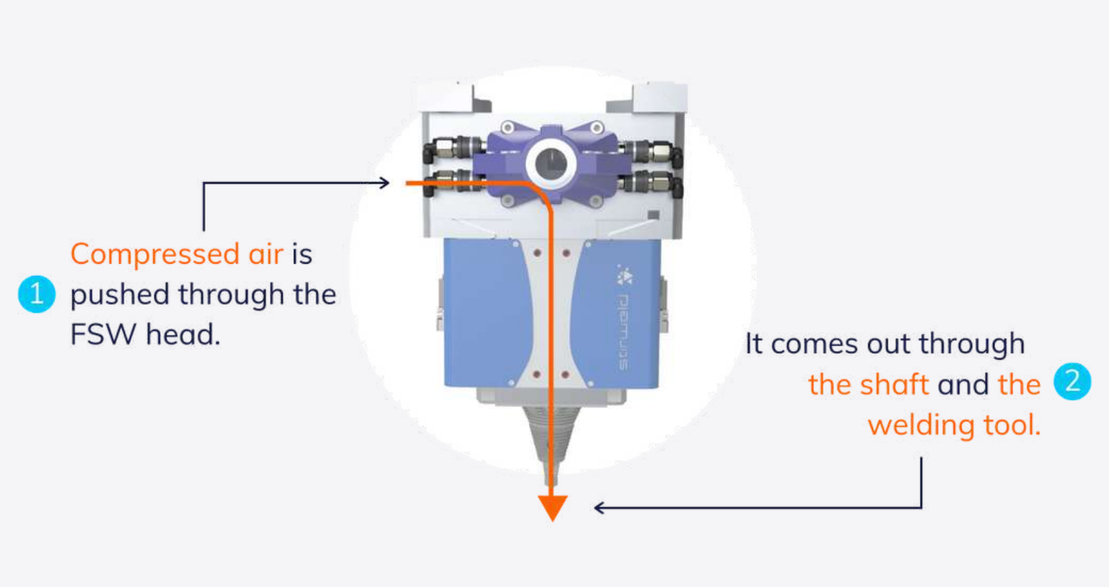
basic functionalities

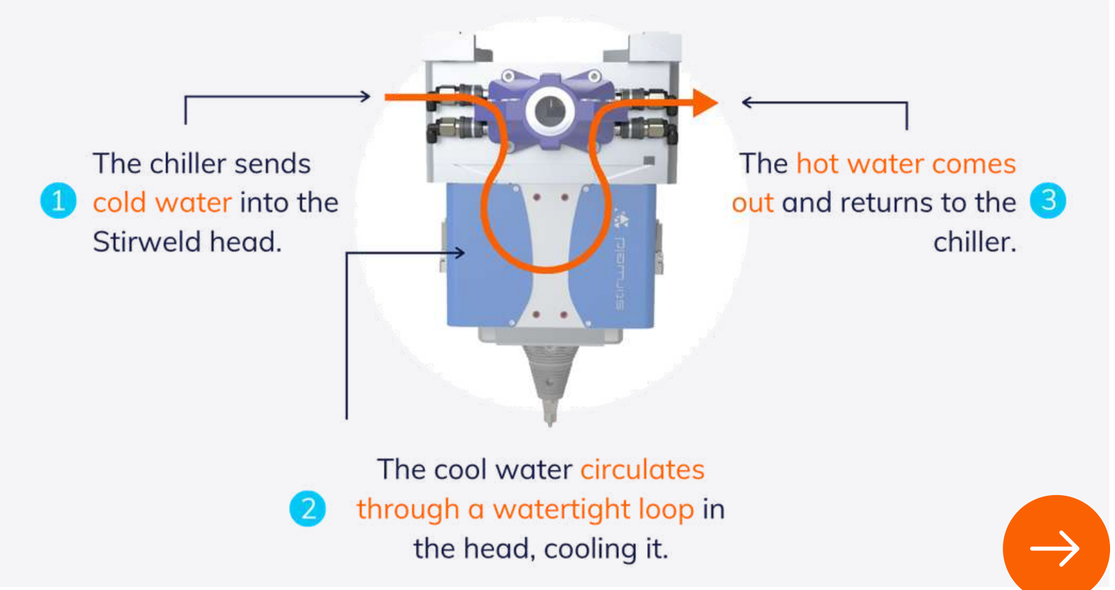
TOOL COOLING

The Stirweld standard FSW head employs an advanced cooling system to maintain optimal temperature during operation.

Stirweld FSW head uses **compressed air** for efficient heat dissipation and a **chiller-driven water loop** for optimal temperature control during welding.

This dual approach to temperature management guarantees prolonged tool life and superior welding quality.





TECHNICAL SPECIFICATIONS

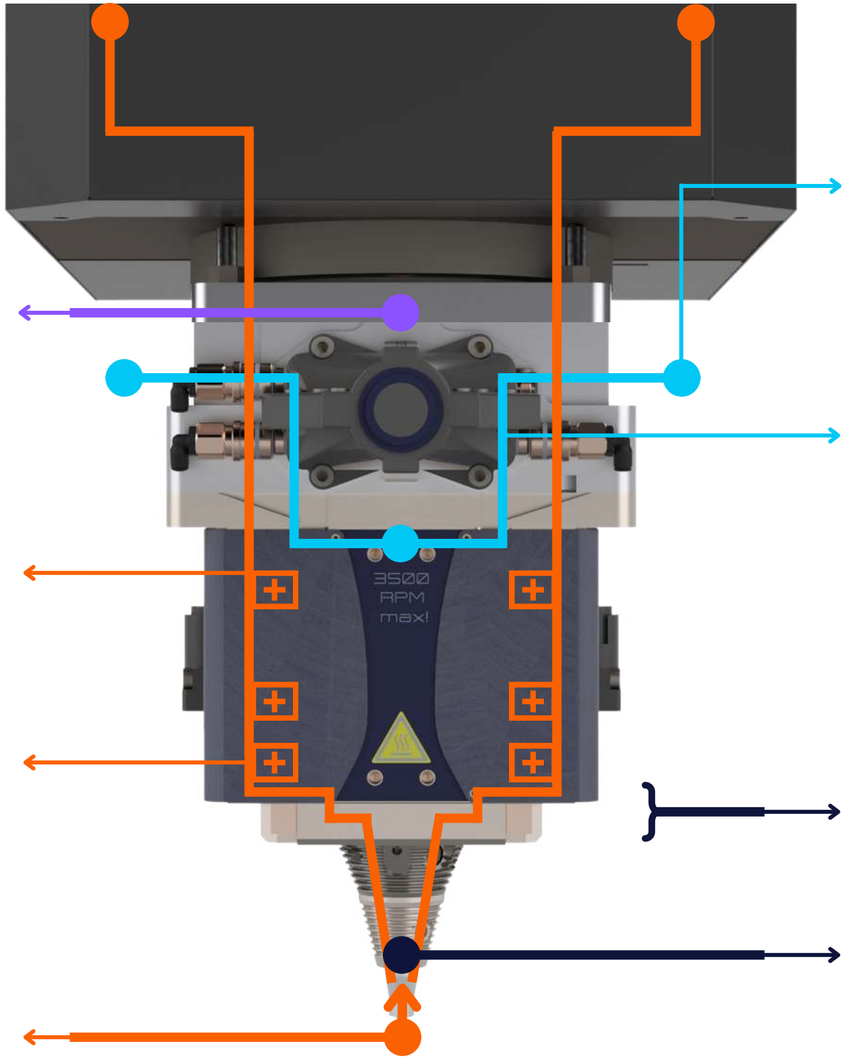
basic functionalities

FORCES & VIBRATIONS

The CNC spindle has 4 protections:

- Against FSW vibrations
- Against FSW load
- Against welding temperature
- Against FSW excessive force

Thanks to these 4 protections, the CNC machine spindle is not affected by the FSW load, the FSW temperature and the FSW vibrations.
Your CNC spindle isfully protected.



Special coupling to not transfer FSW vibration to the CNC spindle

3 large bearings: 5 years for 24/7 usage, 40 000 FSW hours

FSW load transmits to the spindle bed (Z axis body) thanks to the 3 large bearings. The FSW loads are NOT transmit to the CNC spindle bearings

FSW load from 1 to 25 kN

High efficiency cooling system: FSW head temperature is kept under 40°C, (104 °F).

Temperature bearing sensors

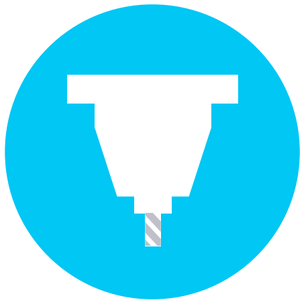
Limitation of maximum Z force at 80% of CNC workload

Force sensor

TECHNICAL SPECIFICATIONS

advanced functionalities

Automatic head changer



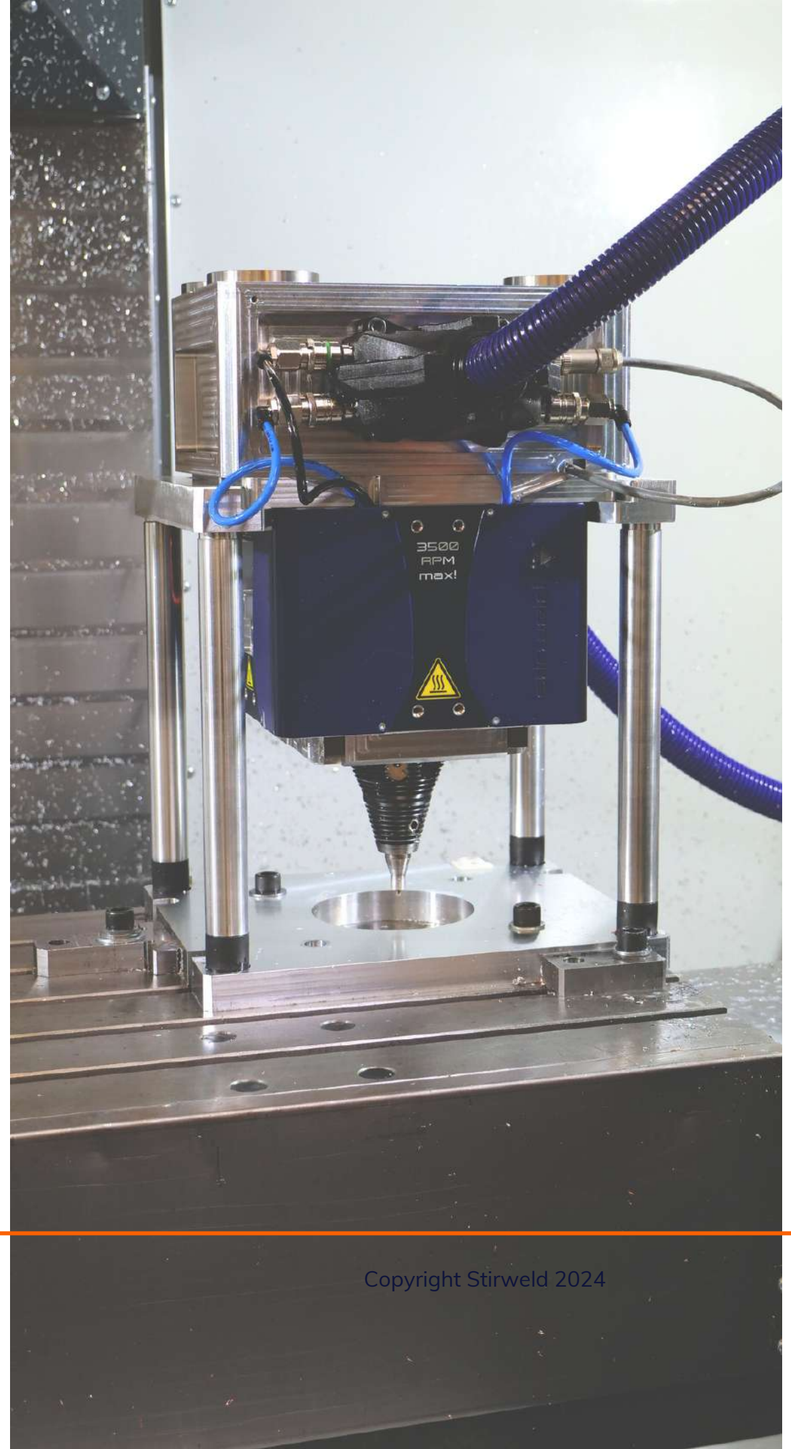
Milling add-on

Pressure wheel add-on for local clamping

TECHNICAL SPECIFICATIONS

advanced functionalities

AUTOMATIC HEAD CHANGER



Fully Automated System
A 100% autonomous welding operation

Versatile Hybrid Machine
Combines welding & milling functionalities in a single CNC system, complete with carousel tool changer access

Optimized Time Cycles
Enhanced productivity through efficient processing

Zero Maintenance
Designed for hassle-free, continuous use

Compact Table Footprint
Measures 300 mm in length and width, fitting neatly (7.9 in)

High Welding Speed
Achieves speeds of up to 5 m/min

Universal Compatibility
Easily integrates with any CNC machine set up

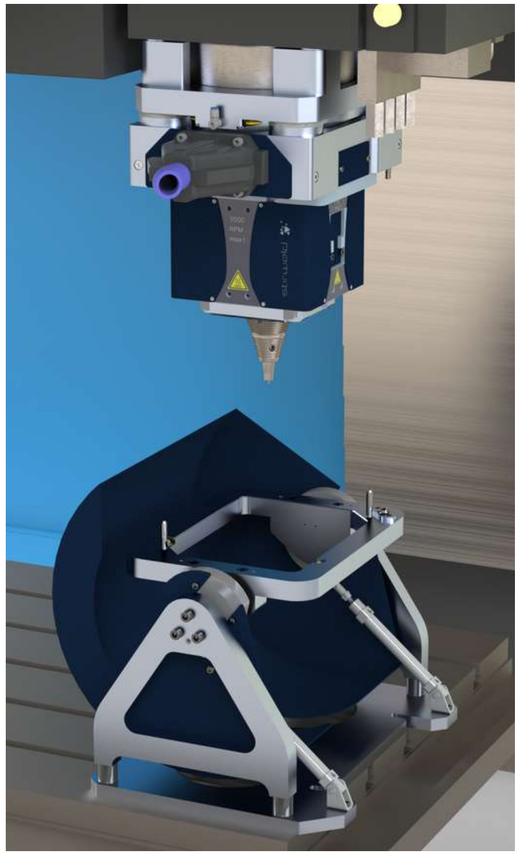
TECHNICAL SPECIFICATIONS

advanced functionalities

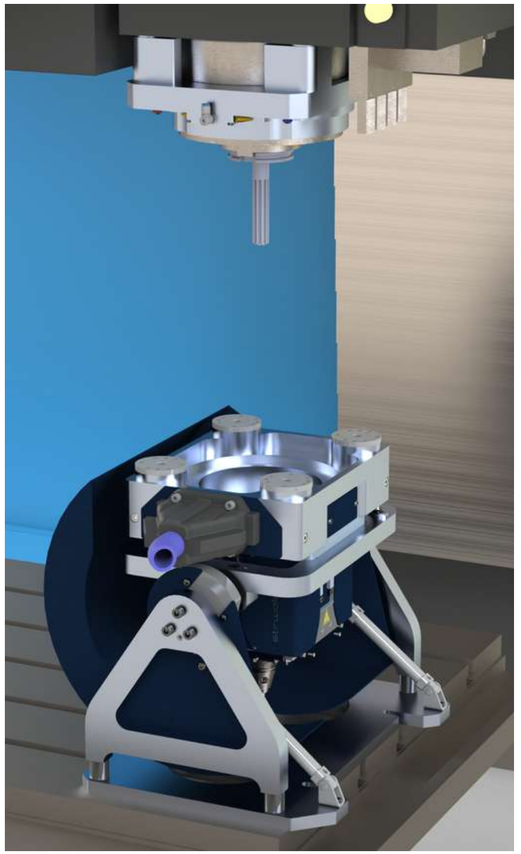
AUTOMATIC HEAD CHANGER

Explore the mechanics of our automatic head changer in this informative video.

1. Automatic head changer on the CNC table



2. CNC spindle takes FSW head (automatic clamping device)he CNC table



3. The machine is ready for welding

TECHNICAL SPECIFICATIONS

advanced functionalities

MILLING ADD-ON

Modular Design
Instantly alteenate between welding & machining modes

Efficient Milling Speed
Rapidly clear FSW weld flashes at speeds up to 5 m/min, with IP64-rated lubrication compatibility

Universal Fit
Compatible with an CNC machine FSW head

Maintenance-Free
Zero upkeep for uninterrupted operation

Compact CNC Table Footprint
200-mm long (7,9 in), 200-mm wide (7,9 in), 200-mm high (7,9 in)
Minimum spindle nose to table of 500 mm (19,7 in)

TECHNICAL SPECIFICATIONS

advanced functionalities

MILLING ADD-ON

1 The milling add-on on its support

2 The FSW had takes the milling add-on thanks to automatic pressure system

3 The FSW head is ready for milling

TECHNICAL SPECIFICATIONS

advanced functionalities

PRESSURE WHEEL ADD-ON FOR LOCAL CLAMPING

The pressure wheel add-on guarantees localized clamping for FSW runs & cuts jig costs significantly:

Fully Automated

Operates entirely on its own.

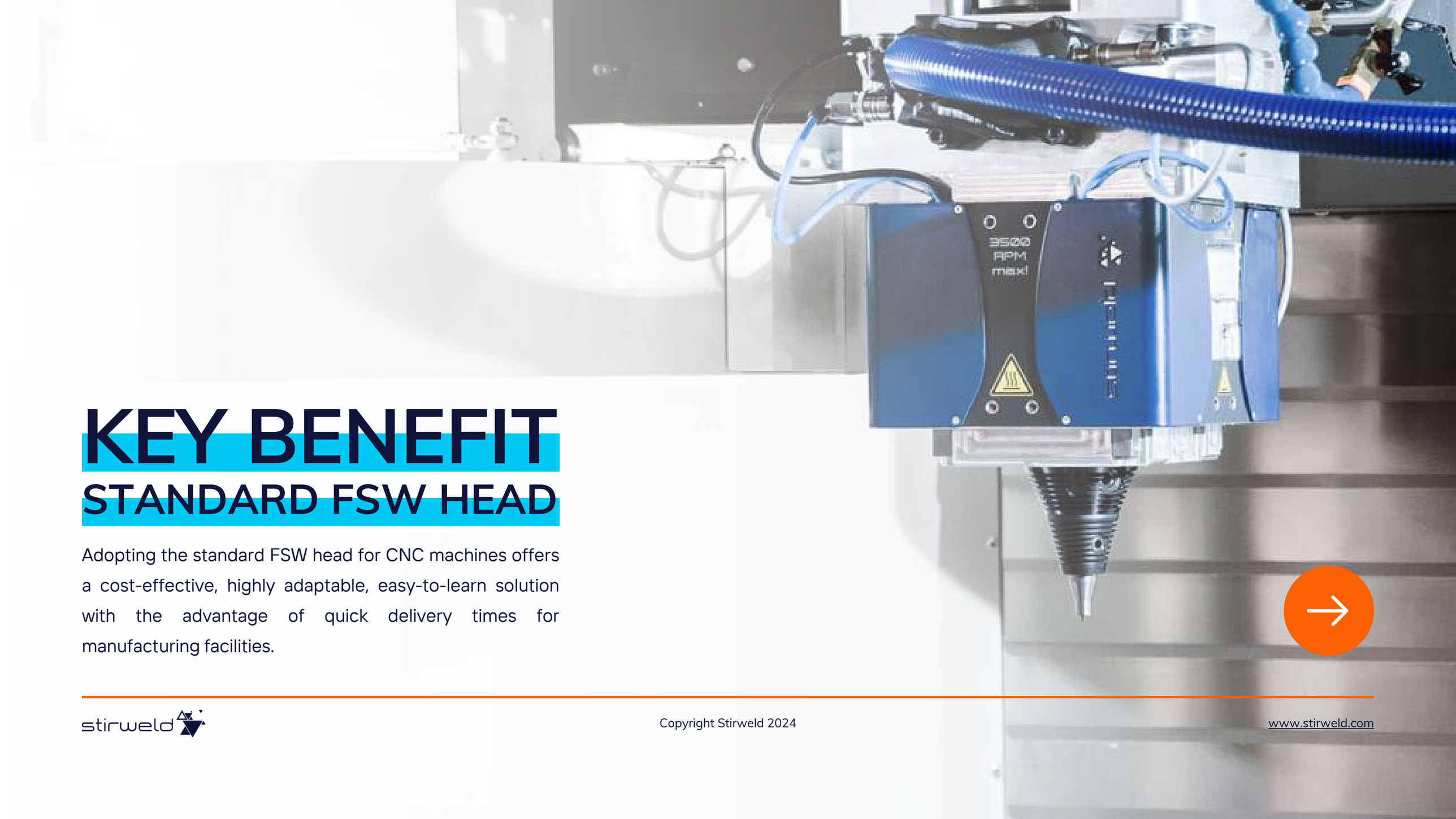
Jig Cost Halved

Cuts fixture costs by 50%.

Capable Performance

Effective for sheet metals up to 3 mm thick

Discover the benefits of our pressure wheel add-on for localized clamping in our latest video.



KEY BENEFIT

STANDARD FSW HEAD

Adopting the standard 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
STANDARD FSW HEAD

Maximise Your ROI

Transform your existing CNC setup with our FSW head — **a smart, budget-friendly alternative to costly dedicated FSW machines** or robots. Experience top-tier welding without the premium expense.

Continuous Support

Our service extends well past the purchase. **Benefit from ongoing support with our dedicated FSW experts**, ensuring seamless integration and exceptional assistance at all times

Seamless Compatibility

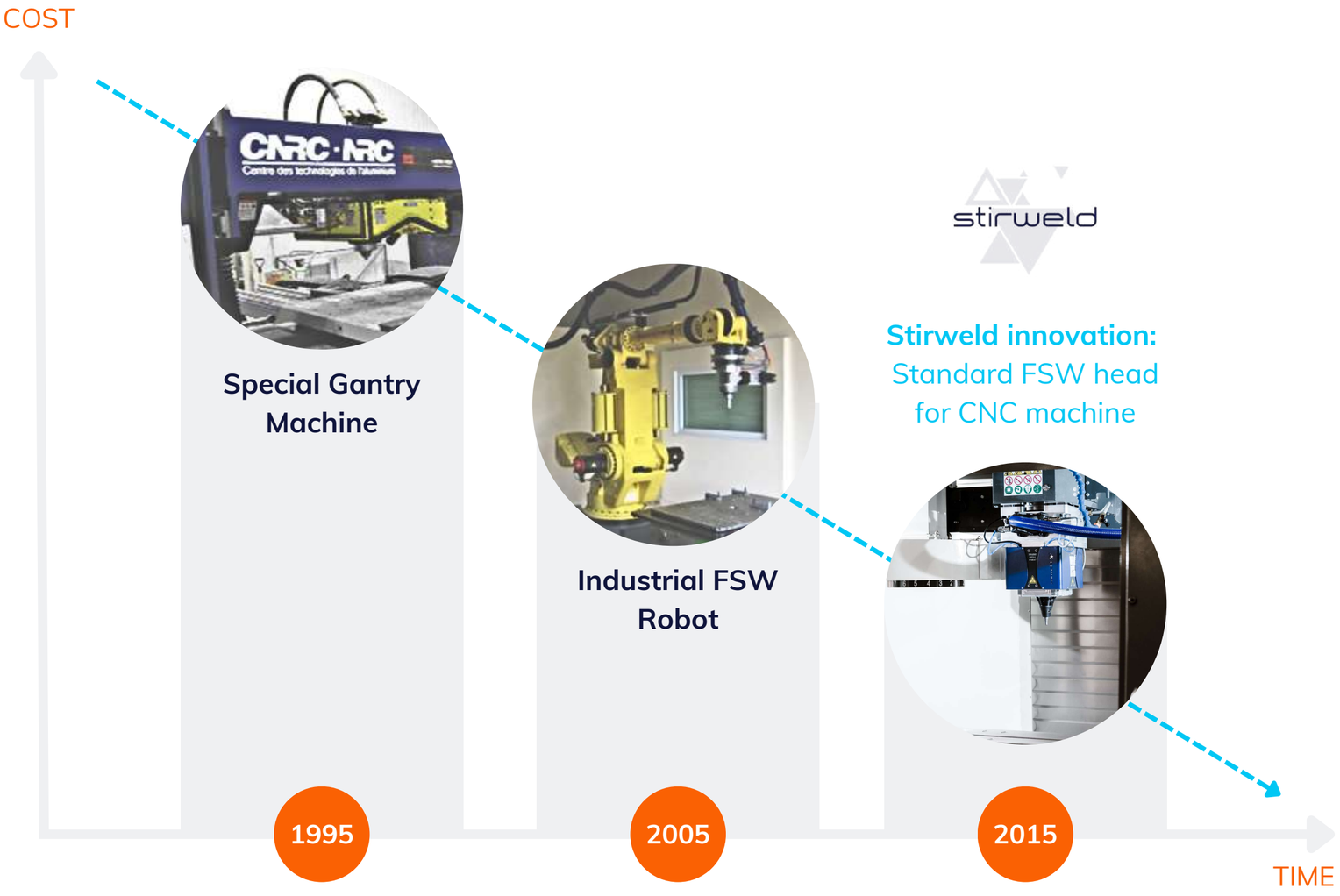
Elevate your CNC capabilities with our universally adaptable FSW head — a plug-and-play solution for any setup, standard machining centers not required.

User-Friendly Set Up

Get up and running with the FSW Stirweld head in just two days — **simplicity meets efficiency** in installation and operation.

Discover the Standard FSW Head: Watch our detailed video to see how it revolutionizes CNC machining.

KEY BENEFIT
STANDARD FSW HEAD
maximise your ROI



KEY BENEFIT

STANDARD FSW HEAD

why opt for FSW head over specialized machines or industrial robots?

	Specialized machines	Industrial robot	FSW head for CNC machine
Investment	☆	☆☆	★★★
Welding thickness	★★★ Up to 50mm	☆ Up to 8mm	☆☆ Up to 20mm
Delivery time	☆ About 1 year	☆☆ About 6 months	★★★ 3 months
Accuracy	★★★	☆☆	★★★
Force control	★★★	★★★	★★★
Footprint	☆	☆☆	★★★
Modularity	☆	☆☆	★★★
Rigidity	★★★	☆	★★★
Work envelope	☆☆	★★★	☆☆
3D welding	☆	★★★	☆☆
Welding speed	☆☆ Up to 2m/min	☆☆ Up to 2m/min	☆☆ Up to 3m/min

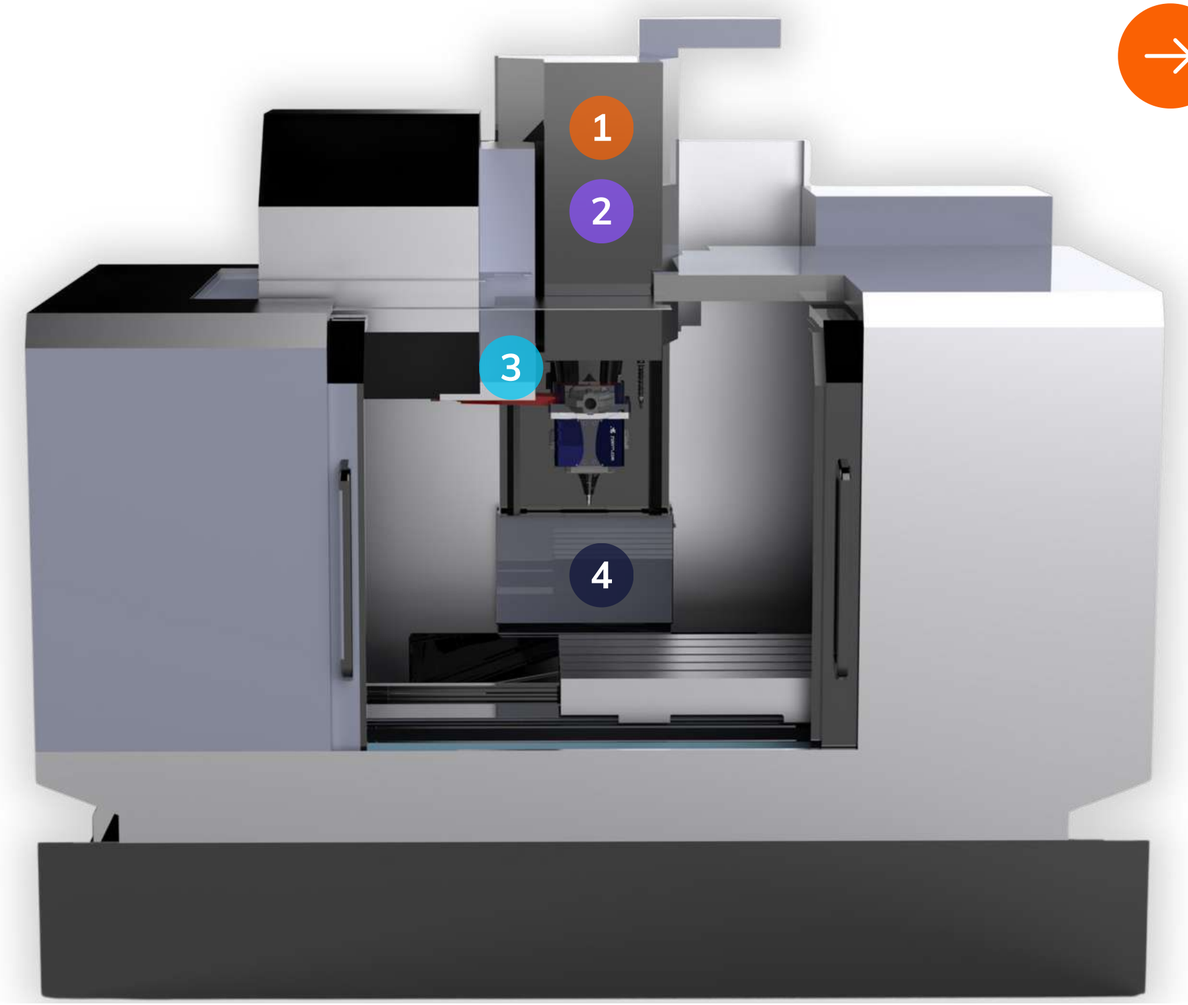
FSW HEAD
INSTALLATIONS ON CNC

Our FSW head effortlessly adapts to 3, 4 or 5-axis machines. While we have showcased just a few installations, know that our head is compatible with 99% of CNC machines on the market.

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: 350 mm minimum, given the FSW head height of 315 mm (12.4 in)



FSW HEAD

INSTALLATIONS ON CNC

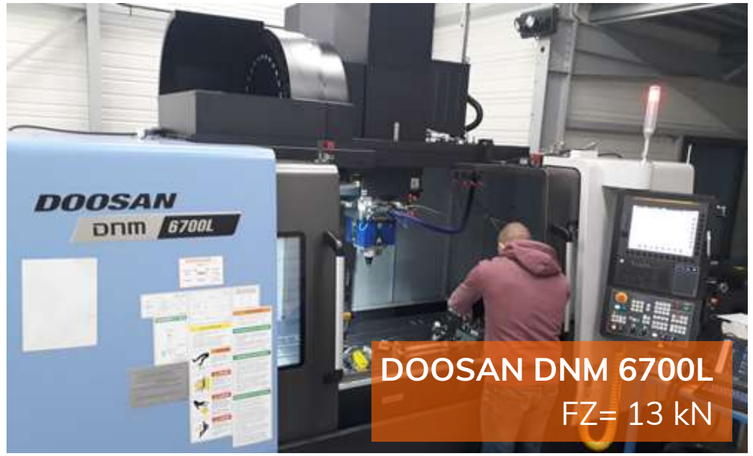
Haas integrations

FSW HEAD

INSTALLATIONS ON CNC

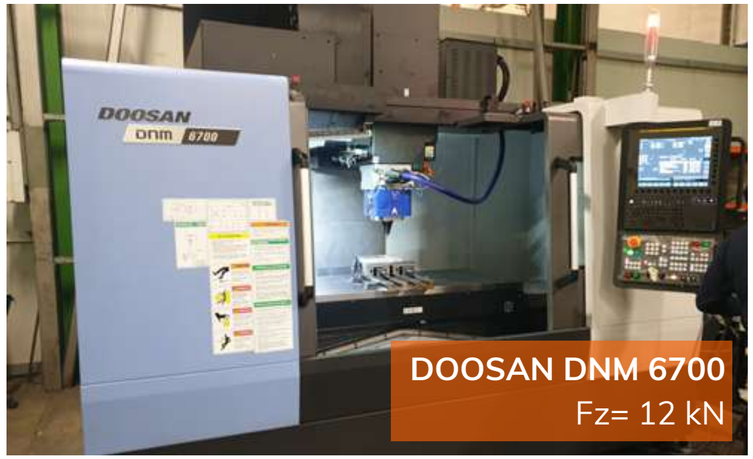
Doosan integrations

DOOSAN DNM 750L
Fz= 13 kN



DOOSAN DNM 6700L
FZ= 13 kN

DOOSAN DNM 50
Fz= 13 kN



DOOSAN DNM 6700
Fz= 12 kN

FSW HEAD

INSTALLATIONS ON CNC

Mazak integrations

Mazak

FSW HEAD

INSTALLATIONS ON CNC

large cnc integrations

MANFORD DL4112
Fz= 10 kN

COREA FP 50
Fz= 20 kN

BRETON MILLFLY
Fz= 25 kN

JOB 159
Fz= 20 kN

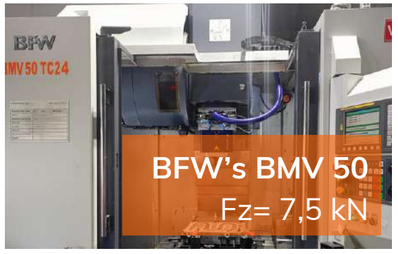
BMO
Fz= 20 kN

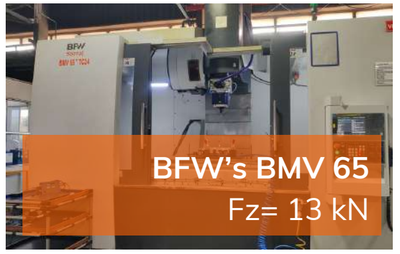
HNK CNC Double Column
Fz= 25 kN

FSW HEAD

INSTALLATIONS ON CNC

other cnc integrations





FSW HEAD

INSTALLATIONS ON CNC

horizontal cnc machine

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

catch

cea

METAL WORKING

CALIP GROUP
L'ALLIANCE DE PRÉCISION

SBB
INNOVATION IN ALUMINIUM

wieland

AUTOMOTIVE

Valeo

COŞKUNÖZ
METAL FORM

TESLA

Nemak
Innovative Lightweighting

Danfoss

AERONAUTICS

AIRBUS

AVANTIS Group

DAHER

SAFRAN

SPACE

arianeGROUP

THALES

KARI
KOREA AEROSPACE RESEARCH INSTITUTE
1989

cnes
CENTRE NATIONAL D'ETUDES SPATIALES

INSTITUE AND UNIVERSITY

TWI

IS INSTITUT de SOUDURE GROUPE

Canada
CNRC·NRC

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

INSTITUT MAUPERTUIS

WHO ARE WE?
QUALITY STANDARD

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

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

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.

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

STIRWELD

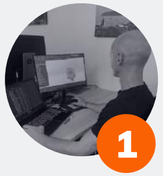
4K Rue du Lieutenant Colonel Dubois
35000 Rennes
FRANCE

STIRWELD INC.

2791 Research Drive, Rochester Hills
MI 48309
USA

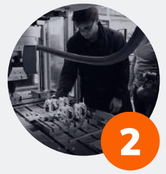
WHO ARE WE?

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,
  - Welding defects,
  - Quality control,
  - 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?'

2015

FIRST DEVELOPMENT

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

2020

FUNDRAISING OF 2 MILLIONS €

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

2023

NEW FACILITIES

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

WHO ARE WE?
OUR SALES PARTNER

Technika Spawalnicza
Poland
Website

BTS Company
Slovenia
Website

CKF Technlogy & Consulting
Turkey
Website

Alu Stir
Germany
Website

Hisco
Malaysia
+60 3-5633 4236

Lortek
Spain
Website

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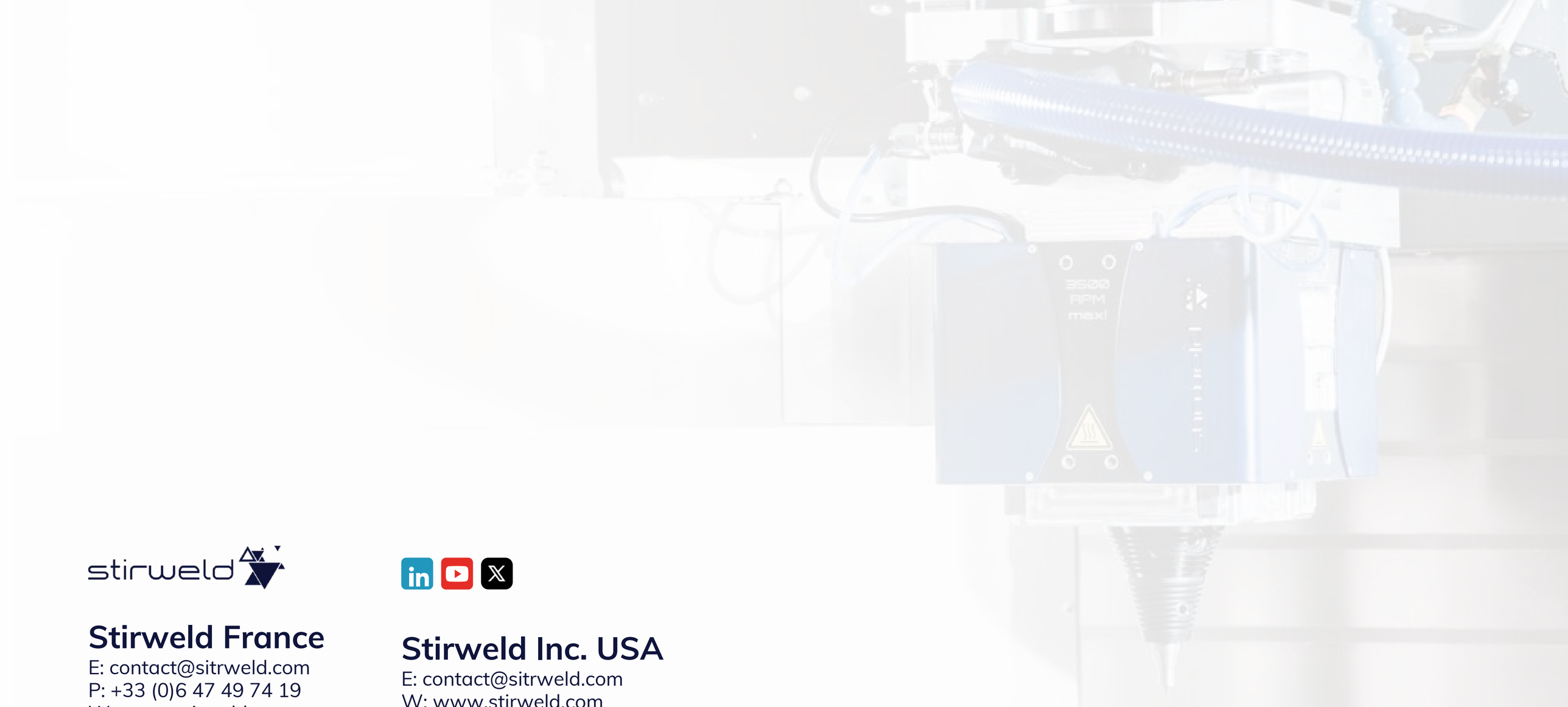

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