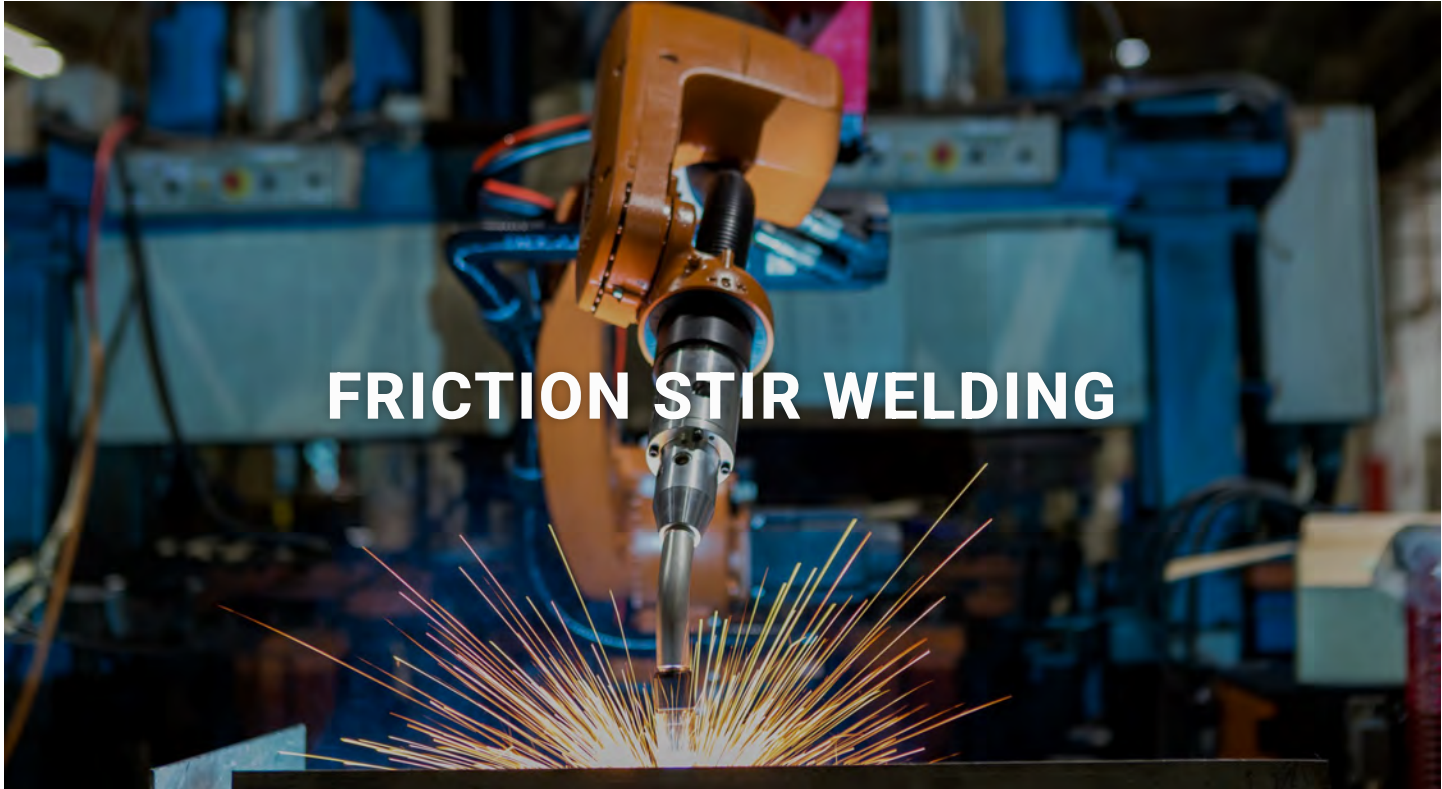




FRICITION STIR WELDING

PRODUCTS

OSFP Thermal Solutions

Passive Cooling (Heatsink)

- Bonded Fin Heatsink
- Crimped Heatsink
- Extruded Heatsink
- Skived Fin Heatsink
- Stacked/Zipper Fin Heatsink
- BGA Heatsink

Active Cooling (Fan)

- AC Fans
- DC Fans
- DC Blowers
- DC Impellers
- Crossflow Fans
- Frameless DC Fans

Metal Fabrications

- CNC Machining

Friction Stir Welding (FSW) – High-Strength, Defect-Free Solid-State Welding

Friction Stir Welding (FSW) is an advanced solid-state joining process that bonds materials without melting them. At Cofan, our FSW technology uses a rotating tool to generate frictional heat, softening the material and creating a durable metallurgical bond with exceptional mechanical performance.

How Friction Stir Welding Works

- Secure Clamping** – The two workpieces are firmly clamped to prevent movement.
- Frictional Heat Generation** – A specially designed tool with a probe and shoulder rotates and penetrates the joint line.
- Material Softening** – Heat is generated below the melting point, softening but not melting the base materials.
- Mechanical Mixing** – As the tool travels along the joint, it stirs and blends the softened material from both sides.
- Solid-Phase Weld Formation** – Upon cooling, the joint solidifies into a strong, defect-free weld.

Materials Suitable for FSW

- Aluminum alloys (0.3 mm to 75 mm thickness in a single pass)
- Magnesium, titanium, copper, nickel, and steel alloys
- Dissimilar materials – e.g., aluminum to steel
- Metal matrix composites (MMC) and select plastics

Advantages of Cofan FSW

- Defect-free welds** – No hot cracking, porosity, or shrinkage distortion
- No consumables required** – No filler wire, flux, or shielding gas for aluminum alloys
- Superior mechanical properties** – High strength, toughness, and minimal residual stress
- Environmentally friendly** – No fumes, spatter, or UV radiation
- Versatility** – Suitable for joining “non-weldable” alloys (2xxx & 7xxx series aluminum)
- Automation ready** – Easily integrated with CNC or robotic systems

Die Casting

Extrusion

Plastic Injection
Molding

Sheet Metal

Cold Plates

Heat Pipes

Vapor Chambers

Air Filtration

Friction Stir Welding

Thermal Pad / Grease

MCPCBs

Brazing Products

Product Information

- Dimension: L620mm x W330mm x T2.4mm
 - Material: Al3003
 - Power: 1000~1200W



Type A (Fitting on the bottom)

Type B (Fitting on the side)

Product Information

- Dimension: L420mm x W220mm x T2.4mm
 - Material: Al3003
 - Power: 600~800W



Type A (Fitting on the bottom)

Type B (Fitting on the side)

Product Information

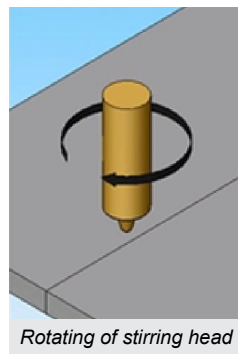
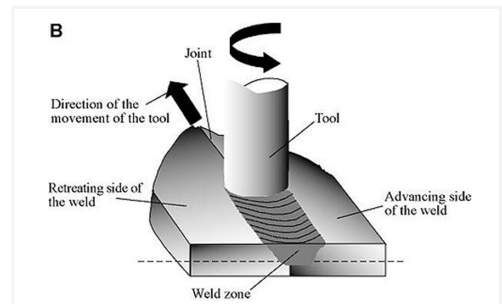
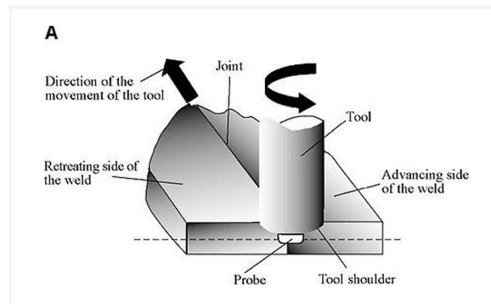
- Dimension: L300mm x W150mm x T1.4mm
 - Material: Al3003
 - Power: 300~500W



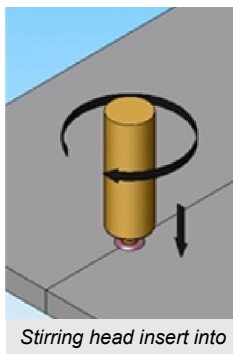
Type A (Fitting on the bottom)

Type B (Fitting on the side)

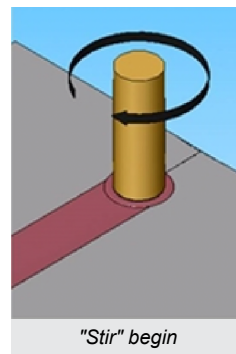
Steps of FSW work



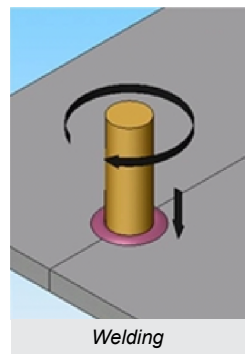
Rotating of stirring head



Stirring head insert into the workpieces

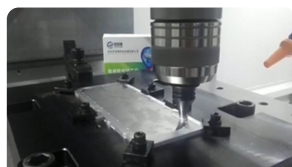


"Stir" begin

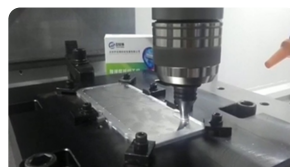


Welding

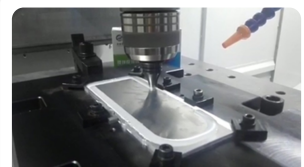
Work processes



1. Fasten the Products to be welded on the work table of the FSW machine



2. Adjust the Stirring head position to follow the welding process



3. Start the friction stir welding process



4. Examine the welded products and remove any excess and bur materials

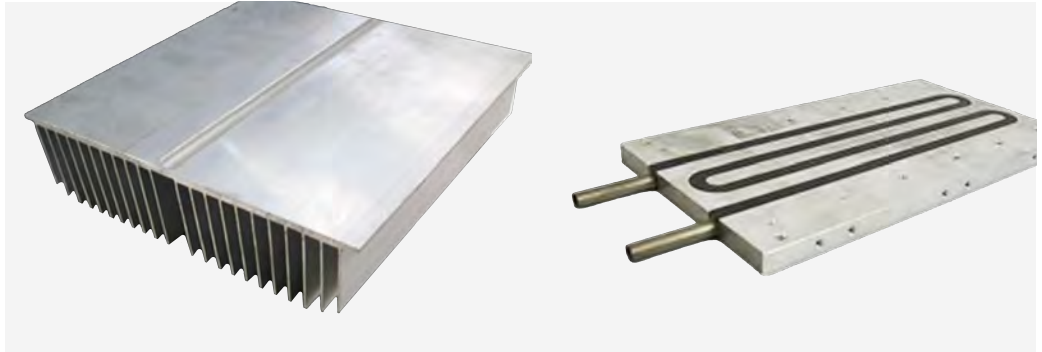


5. Test the integrity of the welded products



6. Examine and packing

Samples



Applicable materials



Aluminum - Aluminum



Aluminum - Copper



Copper - Copper

Machines



		Equip. No.	FSW-GC-3020
		Welding Thickness	1.5 - 25mm AL, Cu&Mg. alloy
		Working Table dimension(mm)	3050 x 2000
		Stroke	Positioning accuracy
Welding stroke & positioning accuracy (mm)	X-axis	3000	0.08
	Y-axis	2000	0.06
	Z-axis	500	0.02
	C-axis	n x 360°	1'
	B-axis	±5°	Manually adjustable
Main axis maxi. Speed (RPM)		1500	

Brazing Reflow Oven

- Inlet of Brazing Reflow Oven: W500mm x H250mm
- Max.Temp. is around 630°C
- Facility area is around 30m x 3m
- Total equipment cost is around ¥ 500,000



Brazing Process Flow



1. Spray Solder Paste



2. Dry the Solder Paste



3. Heating Brazing



4. Cooling Process

Industry Applications

- **Aerospace** – Aircraft fuselage panels, wing structures
- **Automotive & EV** – Battery trays, lightweight body structures
- **Shipbuilding & Marine** – Hull plates, large structural assemblies
- **Rail** – Car body frames, lightweight panels
- **Electronics** – Heat sinks, structural frames

Limitations to Consider

- **Exit hole** at the end of the weld (can be designed out or managed with run-on/off tabs)
- **High clamping forces required** due to strong downforce during welding
- **Gap control** needed since no filler material is used

With state-of-the-art FSW equipment, custom tool design, and extensive material expertise, Cofan delivers **precise, high-strength welds** for demanding applications.

From **prototype development to mass production**, our engineering team provides solutions for complex joining challenges in multiple industries.