

Friction Stir Welding Panel

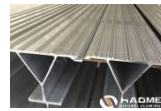
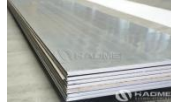
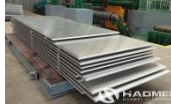
Friction stir welding (FSW) is a solid-state joining process that very suitable for both small and large shipbuilding projects because it can help you reduce assembly time or speed up the construction process. FSW is a solution to the many problems companies have been facing with welding aluminum such as high distortion and poor weld quality. The flatness of the FSW panels, free from distortions and buckling will ensure the highest efficiency during fabrication and this will save man-hours/cost and improve quality.

The marine industry has made a rapid conversion to aluminum friction stir extrusions and was one of the first industries to utilize friction stir welding for commercial applications. FSW, in the marine industry, is generally used to join multiple sheets of metal together to form large panels.

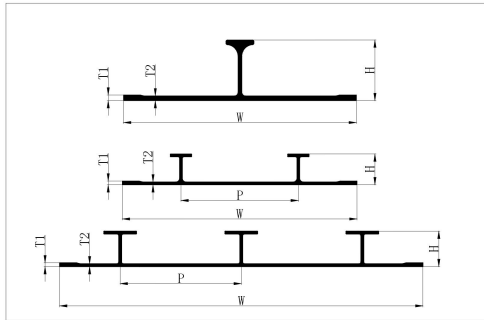
The FSW panel are applied to both the superstructure and hull of ships. The FSW panel product offered by Haomei Aluminum has been approved by all major classification societies such as DNV, CCS, BV, LR. Our highly automated FSW machine makes it possible to weld large size panels up to 15 meters in length. The aluminum alloys we use are seawater resistant and have the mechanical properties of mild steel at merely one third of the weight.



The marine aluminum panels are produced by Friction Stir Welding of large aluminium profiles, rather than the more traditional methods based on manual welding of sheet metal. The absence of melting during welding gives a modularised panel free from thermal distortions, and with a plane and smooth top surface. There is no need for after work such as grinding and brushing on friction stir welded panels. This results in a process that is cheaper overall with substantial weight reductions and an end product with a superior finish.



Specification of FSW panel:



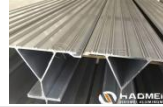
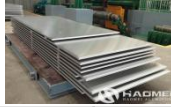
Single stiffener panel					
T1	T2	W	H	L	Grades
(mm)	(mm)	(mm)	(mm)	(mm)	
2.8	1.8	200	60	12500	6082-T6
4	3	250	43	12500	6082-T6
		300	43		6082-T6
		400	43		6082-T6
5	4	250	64	12500	6082-T6
		300	54		6082-T6
6	5	250	55	12500	6082-T6
		300	55		6082-T6
7	6	250	56	12500	6082-T6
		300	66		6082-T6
8	7	250	57	12500	6082-T6
		300	67		6082-T6
9	8	250	68	12500	6082-T6
		300	68		6082-T6
9.6	9	250	59	12500	6082-T6

AND

Double-stiffened panel						
T1	T2	W	H	P	L	Grades
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	
3	1.9	212	32.5	106	12500	6082-T6
	2	270	37	135		6082-T6
3.5	2.5	270	37.5	135	12500	6082-T6
4	3	252	33	126	12500	6082-T6
		320	38	160		6082-T6

And

Multi stiffened panel



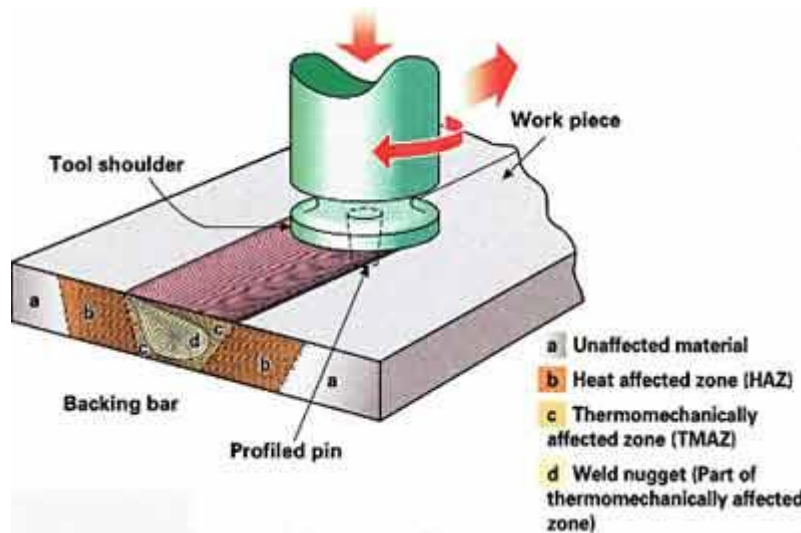
T1	T2	W	H	P	L	Grades
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	
3.5	2.5	345	37.5	115	12500	6082-T6

Note: The solutions we offer can be tailor made to suit the customer's requirements.

Typical uses for FSW panels include:

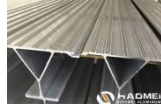
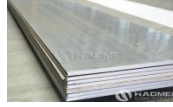
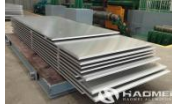
- Ship hulls and superstructure
- Elevator shaft and stair tower walls
- Modules
- Ribbed deck, hoarding, roof

Friction stir welding principle and microstructure



The advantages of Friction Stir Welding (FSW) Panel:

1. **Cost Efficiency:** While manufacturers may hesitate to disclose specific savings, the overall reduction in costs is significant. This is achieved through either investing in FSW facilities or sourcing prefabricated panels from specialized suppliers.
2. **Reduced Distortion:** FSW minimizes the thermal distortion often associated with traditional welding methods, resulting in more precise and uniform joints.
3. **Single Pass Capability:** In many cases, a single FSW pass can replace multiple MIG welding passes, particularly for thicker materials, thereby streamlining the manufacturing process.
4. **Clean Joints:** FSW produces no weld spatter, leading to clean surfaces and roots of joints. This high cosmetic quality can eliminate the need for additional finishing processes, such as painting, further reducing costs.



5. Health and Safety Compliance: The absence of weld fume during the manufacturing process aligns with tightening health and safety standards, making FSW a safer option for workers.

6. Flexible Orientation: FSW can be performed in any orientation, as gravity does not affect the process, allowing for greater versatility in manufacturing setups.

7. Energy Efficiency: The process is energy-efficient, contributing to lower overall operational costs.

8. Reduced Consumables: Unlike traditional welding methods, FSW does not require consumables like gas or filler wire, further enhancing cost-effectiveness.

9. Porosity-Free Welds: The welding process produces joints without porosity, which can enhance the integrity and reliability of the final product.

10. Excellent Mechanical Properties: FSW results in welds with superior mechanical properties, ensuring strong and durable joints that meet stringent performance requirements.

These advantages make FSW an attractive option for manufacturers across various industries, particularly those focused on optimizing production efficiency and product quality.

