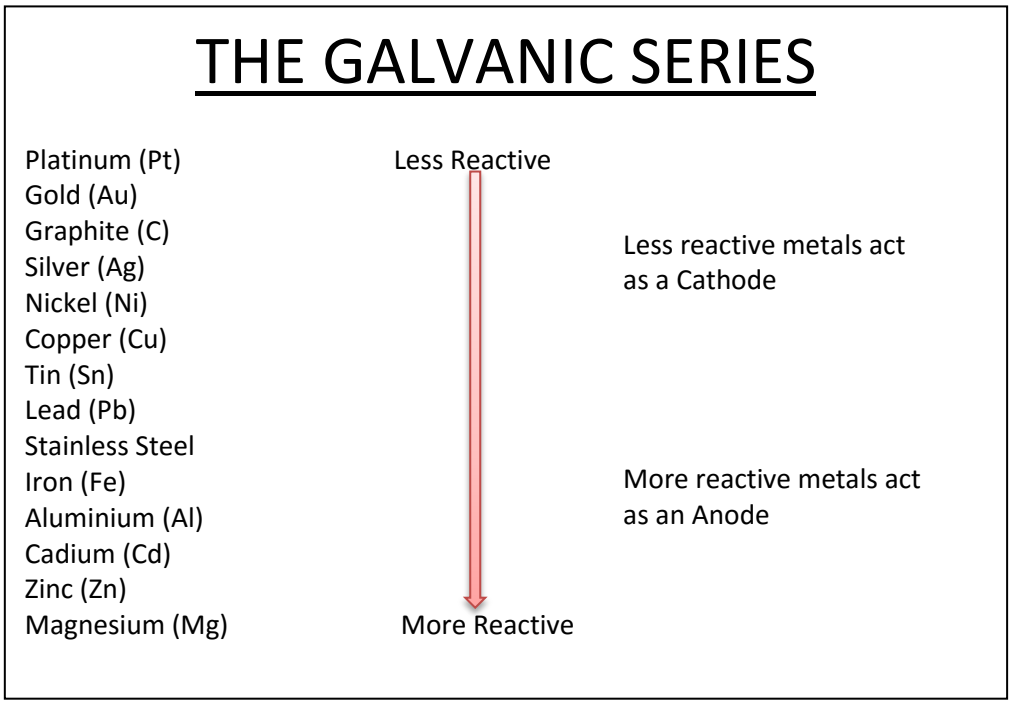
PT 001 – Al 5005 – Sheet & Plate Specifications

Chemical Properties

All % are as maximum allowable. Al makes up remainder.

							Others	
Si	**Fe**	**Cu**	**Mn**	**Mg**	**Cr**	**Zn**	**Each**	**Total**
0.3	0.7	0.2	0.2	0.5 - 1.1	0.1	0.25	0.05	0.15



Generally, the closer one metal is to another in the series, the more compatible they will be, i.e., the galvanic effects will be minimal. Conversely, the farther one metal is from another, the greater the corrosion will be.

I.E. Aluminium sheet can be secured with suitable stainless steel screws. Since aluminium is the more reactive, a large surface area of aluminium should not be disturbed by a small steel screw. In a marine environment it could be beneficial to use an anti-corrosive lubricant or similar when installing the screws/bolts.

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Combustibility & Thermal Properties

Thermal conductivity (the rate at which heat passes through a material) is measured in W m−1 K−1. Aluminium alloys have values in the range 75-235 W m−1 K−1, at the top end of the range for metallic alloys (5-390 W m−1 K−1).
Only copper has a higher thermal conductivity, while steel has values in the range 10-55 W m−1 K−1.

Specific heat (*cp*)(The specific heat is the amount of heat per unit mass required to raise the temperature by one degree Celsius) is measured in J kg −1 K. Aluminium alloys have values in the range 850-1000 J kg −1 K, at the top end of the range for metallic alloys (120-1060 J kg −1 K).

In general the lower the elastic (Young's) modulus of the metal, the higher the specific heat.

In fire tests on aluminium materials, when the temperature exceeds the melting point, in the range 600-660°C, the aluminium surface exposed to the fire can be seen to melt, but it does not burn.
At the end of the fire test, the metal remains as a resolidified pool.
The Southwest Research Institute carried out fire performance evaluation tests on behalf of the Aluminium Association in 2011.

A summary of the results is listed below.

RESULTS

Run	Initial Mass (g)	Final Mass (g)	Percent Mass Loss	Specimen Center Stabilized (°C)	Specimen Center Maximum (°C)	Specimen Center ΔT (°C)	Specimen Center Criteria* ΔT< 30 °C	Specimen Surface Stabilized (°C)	Specimen Surface Maximum (°C)	Specimen Surface ΔT (°C)	Specimen Surface Criteria* ΔT< 30 °C
1	178.95	178.71	0%	751	761	10	Pass	751	768	17	Pass
2	183.50	183.35	0%	750	762	12	Pass	750	768	18	Pass
3	187.26	187.06	0%	750	764	14	Pass	750	770	19	Pass
4	182.48	181.75	0%	751	771	20	Pass	751	767	17	Pass

*Criteria for when percent mass loss < 50%

TEST OBSERVATIONS

	Insertion Time (s)	Ignition Time (min:s)	Flameout (min:s)	Duration of flaming (min:s)	Criteria: No flaming after first 30 s	Observed Smoke (min:s)	Observed Soot (min:s)	Total Test Time (s)
1	20	N/A	N/A	0:00	Pass	None	None	2686
2	26	N/A	N/A	0:00	Pass	None	None	3462
3	48	N/A	N/A	0:00	Pass	None	None	3606
4	48	N/A	N/A	0:00	Pass	None	None	3190

Notice the tests carried out at > 700 degrees Celsius, higher than the melting point.

Only aluminium in the form of finely divided powder or flake oxidises exothermically (burns or explodes), but this is a very special case because of the very large surface area-to-weight ratio. Aluminium then behaves in a similar way to other finely divided materials such as iron and titanium, tea, flour and coal, all of which will also readily oxidise exothermically in the powder form.

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