

## 2xxx Plate

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2XXX series alloys contain copper as the main alloying element, often in combination with magnesium and silicon.

#### Strength:

Strength is developed through solution treatment and natural ageing (T351, T451) or artificial age hardening (T651, T851). Strength levels in the naturally aged alloys may be further increased by artificial ageing, but this reduces fatigue properties and toughness.

#### Welding:

With the exception of a few specialised alloys the 2XXX series alloys are not generally weldable by fusion welding.

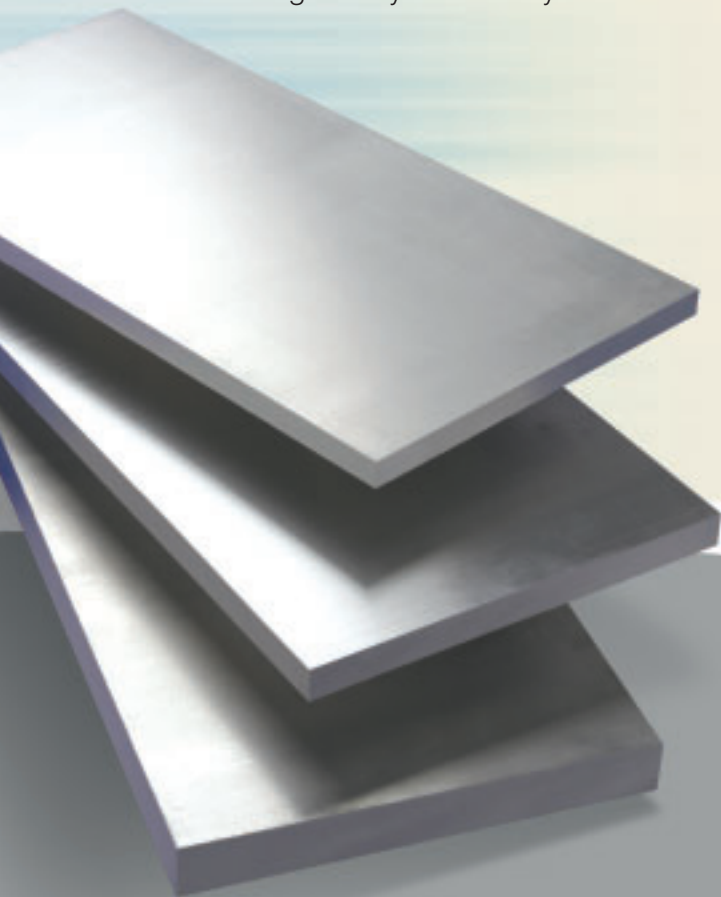
#### Corrosion:

2XXX alloys are susceptible to corrosion and may require protective surface treatments such as anodising or painting.

2XXX alloys are generally used where good levels of strength and toughness are required. The most widely used alloys in this series are 2014A, 2017A and 2024.

#### Applications include:

- Machined parts
- Truck wheels
- Load cells



# 2xxx series alloys technical data

## STANDARD DIMENSIONAL AVAILABILITY

Alloy	Temper	Min Thickness (mm)	Max Thickness (mm)	Max Width (mm)	Max Length (mm)
2014 2014A	T651	6.35	13	3150	20000
		>13	72	2978	
>72		188	2954*		
188		203.2	1104*		
	T652	>203.2	305	1220**	3000
2017A	T451	6.35	12	3150	20000
		>12	69	2978	
		>69	180	2942*	
		>180	194	1101*	
2024	T351 T851	6.35	10	3150	20000
		>10	59	2978	
		>59	154	2958*	
		>154	168	1101*	

1. These dimensions show only the range of capabilities and cannot necessarily be provided in every combination of these sizes. Other sizes may be available, subject to enquiry.  
 2. The above alloys are only available in Mill Finish  
 3. \* denotes maximum width decreases with increasing thickness  
 4. \*\* denotes wider widths may be available on request

Alcoa Europe only supply plate that exceeds the requirements issued by the major specifying authorities e.g. European Standards (a summary of the main requirements of EN485 is available on request).

## 2014/2014A, 2017A AND 2024

2014 and 2014A are commonly supplied in the T651 temper, offering a higher level of strength than 6XXX, and good toughness. Alcoa can also supply 2014/2014A in O condition, which gives good formability and permits further strengthening by means of heat treatment.

2017A and 2024 are characterised by high levels of strength and toughness, allied to good fatigue properties. Because they develop good levels of strength through natural ageing they are usually supplied in the T451 and T351 conditions respectively. Strength in 2024 can be further increased by means of artificially ageing, but this is achieved at the expense of fatigue properties and toughness. Fatigue resistance is higher in 2024 T351 compared to 2017A T451. These alloys are often selected when fatigue is an important consideration and are widely used for other engineering applications.

Radii expressed as thickness (t) are minimum recommended for bending plates in a standard press brake with air bend dies. Minimum permissible radii will also vary with design and condition of tooling. Forming over smaller radii is possible immediately after solution heat treatment and quenching.

## FORMABILITY

Alloy	Temper	Thickness		
		6 mm	9 mm	12 mm
2014A	T651	8t	8.5t	9t
2017A	T451	7t	7.5t	8t
2024	T351	7t	7.5t	8t

Advice and further details on Alcoa's specialised alloys is available on request.

## TYPICAL PHYSICAL PROPERTIES

Alloy	Temper	Relative Density	Co-efficient or Linear Expansion (20°C - 100°C) 10 <sup>-6</sup> /°C	Thermal Conductivity (0-100°C) W/m°C	Electrical Resistivity (20°C) micro-Ohm cm	Melting Range °C	Young's Modulus (GPa)
2014A	T651	2.81	22.0	159	4.5	530-610	74
2017A	T451	2.81	23.6	134	5.0	510-640	72
2024	T351	2.77	23.0	151	5.7	500-640	73