Typical Applications
Light to very heavily machined precision and ultra precision baseplates and construction components

- High precision assembly construction
- High precision components
- Computers
- Automatic assembly machinery
- Recording systems
- Aerospace industry

Product Description
An ultra-high precision wrought aluminium speciality plate designed to meet the most stringent requirements for size and shape stability under the most extreme machining whilst minimising through cost.

Technical Description
Internationally recognised grade 5083/AlMg4.5Mn is the basis for the ALPLAN alloy. The exact composition and processes used in the production process are not disclosed for commercial reasons. The superior wrought production method provides significant technical advantages over cast aluminium plates.

Composition
ALPLAN is a specialised derivative alloy of grade 5083/AlMg4.5Mn pre-milled on both sides to very close thickness and flatness tolerances.

Welding
ALPLAN can be welded using either the MIG or TIG process with excellent results and without suffering any loss of strength. The local deformation will depend on the size, shape and deposition of the weld. Smiths Metal Centres recommended filler metals are S-AlMg4.5Mn (S556) or S-AlMg5.

Machining
To realise ALPLAN’s excellent machinability always use sintered carbide cutting tools at high cutting speeds. Very high metal removal rates and an excellent finish are easily achievable with ALPLAN. The exceptional dimensional stability of ALPLAN prevents deformation during and after the machining process.

Anodising
ALPLAN readily accepts anodising for both protective and decorative purposes. The oxide layer will take on a grey tint which produces the best results with darker shades.

Product Attributes
Wrought product

Customer Benefits
Significant benefits in porosity, strength, weldability, structure and anodisability compared with cast product

Porosity free

Pre-milled on both sides

Excellent thickness tolerance

Excellent flatness tolerance

Excellent machinability

Exceptional shape stability

Minimal internal stresses

Anodisable alloy

High corrosion resistance

Excellent weldability

Close tolerance cut to size service for both cut blanks circles/rings

Immediate or just in time delivery

Cut to Size Capability
Smiths Metal Centres carry a full range of ALPLAN plates in both imperial and metric sizes. Our close tolerance CNC plate sawing equipment can cut accurately to exact customer requirement for immediate or just in time delivery. We can also supply circles or rings cut to your specifications as part of our first stage engineering capability.

Cutting Tolerances

<table>
<thead>
<tr>
<th>FLATNESS</th>
<th>mm per m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness ≤15mm</td>
<td>0.35</td>
</tr>
<tr>
<td>Thickness &gt;15mm</td>
<td>0.15</td>
</tr>
<tr>
<td>Thickness mm</td>
<td>±0.1</td>
</tr>
<tr>
<td>Surface Ra max.</td>
<td>0.5 microns</td>
</tr>
<tr>
<td>Roughness (Both sides)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CUT TO SIZE SAWN BLANKS</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge deviation over cut length/width</td>
<td>+1.5,-0</td>
</tr>
</tbody>
</table>

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## Corrosion Resistance

ALPLAN has very good natural corrosion resistance in both inland and marine atmospheric conditions.

## Porosity

ALPLAN is porosity free.

### Typical Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength</td>
<td>N/mm² (Rm)</td>
<td>275-350</td>
</tr>
<tr>
<td>0.2% Yield strength</td>
<td>N/mm² (Rp0.2)</td>
<td>130-190</td>
</tr>
<tr>
<td>Elongation</td>
<td>% (A5)</td>
<td>min. 17%</td>
</tr>
<tr>
<td>Brinell Hardness</td>
<td>HB</td>
<td>approx. 68</td>
</tr>
<tr>
<td>Elastic modulus</td>
<td>kN/mm²</td>
<td>70</td>
</tr>
<tr>
<td>Coefficient of thermal expansion</td>
<td>1/K</td>
<td>≤24x10⁻⁶</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>W/m.K</td>
<td>120</td>
</tr>
<tr>
<td>Melting Range</td>
<td>°C</td>
<td>580-640</td>
</tr>
<tr>
<td>Electrical conductivity</td>
<td>MSM/m (20 °C)</td>
<td>17-18</td>
</tr>
</tbody>
</table>

### Typical Machining Parameters

#### Circular Sawing
- Blade: SC
- Cutting speed: up to 2500m/min.
- Feed per tooth: 0.03mm
- Primary clearance angle: 9-7°
- Top rake angle: 10°

#### Rough Milling
- Tool: SC
- Cutting speed: up to 2500m/min.
- Feed per tooth: Primary clearance angle: 8°
- Radial rake angle: 20°
- Depth of cut: 2-20mm
- Helix angle: 30-40°

#### No cutting fluid

#### Finish Milling
- Tool: SC
- Cutting speed: up to 3000m/min.
- Feed per tooth: Primary clearance angle: 12°
- Radial rake angle: 25°
- Depth of cut: 0.5mm
- Helix angle: 30-40°

ALPLAN is unsuitable for deep boring operations greater than 500mm with a radius smaller than 5mm.

Smiths Metal Centres are the exclusive U.K. distributors for ALPLAN high technology speciality plate - for further information on how ALPLAN can reduce your through cost contact one of our local metal centres.

### Technical Assistance

Our knowledgeable staff backed up by our resident team of qualified metallurgists and engineers, will be pleased to assist further on any technical topic.

www.smithmetal.com  sales@smithmetal.com

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