TIPPERLITE® ALUMINUM
THE ALLOY FOR TIPPER TRUCKS

TipperLite®
TipperLite® is a 5000 series alloy, which is high in magnesium, that has been optimized for the requirements of tipper truck engineering. It has been developed in collaboration with a number of tipper truck manufacturers, whose specific needs have been considered in the alloy's design process.

This high strength material offers a well-balanced property profile and shows excellent abrasion resistance, based on its performance in accordance with the industry standard Erichsen and Taber tests.

Test results also highlight TipperLite®'s superiority over existing 5000 series alloys and the material’s excellent corrosion resistance. The workability of TipperLite® and the material’s high bending capacity are equally outstanding.

Finally, the alloy is ideally suited for welding in combination with common filler metals (TIG / MIG).

Our production facility at Koblenz offers ample scope for tipper truck design, with respect to material dimensions. The new material can be built into existing designs (as a drop-in solution) as well as incorporated in newly developed products. Using TipperLite® allows the tipper truck manufacturers low-maintenance costs, and it requires less repair work with its enhanced durability, so it won’t stretch the corporate budget of the end user.
ALERIS ROLLED PRODUCTS GERMANY GMBH IN KOBLENZ is a global leading supplier of aluminum rolled products, serving a number of industries such as aerospace, defense, shipping, and transportation markets. Our material is supplied as coil, sheets or plates. Our annual output, shipped to customers around the world, is more than 150,000 tons. Our range of semi-finished products – delivered in 100 different alloys – are not mass-produced items, but involve a high degree of cutting-edge technology to qualify for our customers’ sophisticated applications, they are bespoke engineered solutions.

Our plant has various certifications and international environmental standards that have been obtained over the past 50 years of production, and 2008 saw one of the largest investments ever made at Koblenz facility, which involved the replacement of the existing 148” mill with a state-of-the-art 160” wide rolling mill.

This is one of the most capable rolling mills in the aluminum sector, and so we are well-positioned to manufacture extremely large widths and lengths.

---

### Mechanical properties of TipperLite®

<table>
<thead>
<tr>
<th>Tensile strength</th>
<th>Yield strength</th>
<th>Elongation</th>
<th>Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_m$ (MPa)</td>
<td>$R_p0.2$ (MPa)</td>
<td>$A$ (%)</td>
<td>$H_B$</td>
</tr>
<tr>
<td>Typ.</td>
<td>370</td>
<td>270</td>
<td>18</td>
</tr>
<tr>
<td>Min. 5 - &lt; 8 mm</td>
<td>340</td>
<td>240</td>
<td>10</td>
</tr>
<tr>
<td>Min. &gt; 8 - 10 mm</td>
<td>320</td>
<td>215</td>
<td>12</td>
</tr>
</tbody>
</table>

1) Values at room temperature
2) in LT direction

---

### Dimensional range of TipperLite®

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[mm]</td>
<td>[mm]</td>
</tr>
<tr>
<td>5 - 10</td>
<td>max 2,500</td>
<td>max 12,000</td>
</tr>
</tbody>
</table>

Further dimensions on request

---

### Physical properties of TipperLite®

<table>
<thead>
<tr>
<th>Density (g/cm³)</th>
<th>E-Modulus (MPa)</th>
<th>Coefficient of thermal expansion (²K⁻¹)</th>
<th>Thermal conductivity (W/(m·K))</th>
<th>Electrical conductivity (MS/m)</th>
<th>Melting range (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.66</td>
<td>71,000</td>
<td>23.9</td>
<td>116</td>
<td>17</td>
<td>29</td>
</tr>
</tbody>
</table>

1) Values at room temperature

---

### Bending capacity of TipperLite®

<table>
<thead>
<tr>
<th>Factor²</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>

³ Thickness range > 6 mm, bending angle >90°
² Bending radii = factor x plate thickness

---

### Bending of TipperLite®

- Thickness range: 5-10 mm
- Bending radii: 3.0 x Thickness

TipperLite® can be bent to angles of more than 90° with the radii indicated. The radius of the mandrel is calculated from the material thickness and multiplied with the factors indicated.

---

### Hardness of TipperLite®

<table>
<thead>
<tr>
<th>Alloy</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
</table>

1) Values at room temperature
A unique new pilot caster was launched in Koblenz in 2014 which provides additional support to our customer INNOVATION CENTERS, IN KOBLENZ AND AACHEN. This new equipment, which allows the optimization of specific alloying process parameters, is an important step on the road to volume production.

Our research facility in Aachen closely cooperates with the RWTH Aachen and their numerous institutes, where we are involved in various research institutions.

---

**WEAR TEST ACCORDING TO ERICHSEN**

All material samples (ranging from 5-10mm in thickness) have been tested in an external test laboratory in Germany using a number of samples.

The mass loss of the sampled material following a fixed test period is displayed and standardized to the result of 5083 O/H111.

The wear resistant test was conducted using an Erichsen-317 test device (ISO 8251) which involves a wheel covered with grinding paper which moves back and forth over a test sample applying a specified force. The grade of the grinding paper is specified and used for all samples.

---

**TABER TEST**

All material samples (ranging from 5-10mm in thickness) have been tested in an external test laboratory in Germany using a number of samples.

The mass loss of the sampled material following a fixed test period is displayed and standardized to the result of 5083 O/H111.

The test was conducted with a standardized set-up according to Taber in which two abrasion wheels with a specified surface are rotated with specified force on a rotating material sample. The two abrasion wheels are rotating in opposite directions, which means that the material abrasion takes place crosswise.
THE BENEFITS OF TIPPERLITE®

- Excellent abrasion resistance
- High hardness
- High strength
- Superior bending capacity
- Ideally suited for welding
- Excellent corrosion resistance
- Durable / extended service life
- Low maintenance and repair costs
- Higher level of design freedom due to excellent processability
- Property profile geared to specific needs in tipper truck construction
- The use of commercially available welding filler wires & rods is possible
Care has been taken to ensure that this information is accurate. Although any information or recommendation contained herein is given in good faith, we make no warranty or guarantee, express or implied, (i) that our products meet your specific requirements, and (ii) that the results described herein will be obtained under end-use conditions, and (iii) as to the effectiveness or safety of our products, services or recommendations. Except as provided in our general terms of sale and delivery, we shall not be responsible for any loss resulting from use of our products or services described herein. The materials, products and services described herein are sold subject to our general terms of sale and delivery, which can be found at https://www.aleris.com/locations and are available upon request.

© 2018, Aleris Corporation
Issue 09/18 · 2nd release